

# Contents

|          |  |          |
|----------|--|----------|
| <b>1</b> | <b>Introduction to Cables.gl</b>             | <b>1</b> |
| 1.1      | What is Cables.gl? . . . . .                 | 1        |
| 1.2      | A (Brief) History of cables.gl . . . . .     | 1        |
| 1.3      | Why Use Cables.gl? . . . . .                 | 2        |
| 1.3.1    | Visual Programming . . . . .                 | 2        |
| 1.3.2    | Browser-Based . . . . .                      | 2        |
| 1.3.3    | High Performance . . . . .                   | 2        |
| 1.3.4    | Export Options . . . . .                     | 2        |
| 1.3.5    | Extensible . . . . .                         | 2        |
| 1.4      | Key Concepts . . . . .                       | 3        |
| 1.4.1    | Operators (Ops) . . . . .                    | 3        |
| 1.4.2    | Patches . . . . .                            | 3        |
| 1.4.3    | Ports . . . . .                              | 3        |
| 1.4.4    | Types of Ports . . . . .                     | 3        |
| 1.5      | Featured Videos . . . . .                    | 3        |
| 1.5.1    | Overview and Getting Started . . . . .       | 3        |
| 1.5.2    | More Resources . . . . .                     | 4        |
| 1.6      | Getting Help . . . . .                       | 4        |
| <b>2</b> | <b>Getting Started with Cables.gl</b>        | <b>5</b> |
| 2.1      | Creating Your Account . . . . .              | 5        |
| 2.2      | The Interface . . . . .                      | 5        |
| 2.2.1    | Main Areas . . . . .                         | 5        |
| 2.2.2    | Key Interface Elements . . . . .             | 5        |
| 2.3      | Navigation Controls . . . . .                | 5        |
| 2.4      | Keyboard Shortcuts . . . . .                 | 6        |
| 2.4.1    | Essential Shortcuts . . . . .                | 6        |
| 2.4.2    | Selection & Navigation . . . . .             | 6        |
| 2.4.3    | Organizing & Aligning . . . . .              | 7        |
| 2.4.4    | Working with Ops . . . . .                   | 7        |
| 2.4.5    | Cables & Connections . . . . .               | 7        |
| 2.4.6    | View & Interface . . . . .                   | 7        |
| 2.4.7    | Performance & Debugging . . . . .            | 8        |
| 2.4.8    | Pro Tips . . . . .                           | 8        |
| 2.5      | Your First Patch . . . . .                   | 8        |
| 2.5.1    | Step 1: Create the Render Pipeline . . . . . | 8        |
| 2.5.2    | Step 2: Add a BasicMaterial . . . . .        | 8        |
| 2.5.3    | Step 3: Draw a Circle . . . . .              | 9        |
| 2.5.4    | Step 4: Add Color . . . . .                  | 9        |
| 2.5.5    | Step 5: Animate It . . . . .                 | 10       |
| 2.6      | Understanding the Flow . . . . .             | 10       |
| 2.7      | Saving Your Work . . . . .                   | 10       |
| 2.8      | Tips for Beginners . . . . .                 | 10       |
| 2.9      | Featured Videos . . . . .                    | 10       |
| 2.10     | Common First-Patch Issues . . . . .          | 11       |
| 2.10.1   | “I don’t see anything!” . . . . .            | 11       |
| 2.10.2   | “Colors aren’t changing!” . . . . .          | 11       |
| 2.10.3   | “Animation isn’t working!” . . . . .         | 11       |

|          |  |           |
|----------|--|-----------|
| <b>3</b> | <b>2D Graphics in Cables.gl</b>              | <b>12</b> |
| 3.1      | Introduction to 2D Drawing . . . . .         | 12        |
| 3.2      | Basic Shapes . . . . .                       | 12        |
| 3.2.1    | Circle . . . . .                             | 12        |
| 3.2.2    | Rectangle . . . . .                          | 12        |
| 3.2.3    | RoundedRectangle . . . . .                   | 12        |
| 3.2.4    | Polygon . . . . .                            | 12        |
| 3.2.5    | Line / Lines . . . . .                       | 13        |
| 3.3      | Color and Appearance . . . . .               | 13        |
| 3.3.1    | SetColor . . . . .                           | 13        |
| 3.3.2    | SetAlpha . . . . .                           | 13        |
| 3.3.3    | Gradients . . . . .                          | 13        |
| 3.4      | Transformations . . . . .                    | 13        |
| 3.4.1    | Transform . . . . .                          | 13        |
| 3.4.2    | Transformation Order Matters! . . . . .      | 14        |
| 3.4.3    | Nested Transforms . . . . .                  | 15        |
| 3.5      | Blending Modes . . . . .                     | 15        |
| 3.5.1    | SetBlending . . . . .                        | 16        |
| 3.5.2    | Depth Testing . . . . .                      | 16        |
| 3.6      | Patterns and Repetition . . . . .            | 16        |
| 3.6.1    | IteratorLoop . . . . .                       | 16        |
| 3.6.2    | ArrayIterator . . . . .                      | 16        |
| 3.7      | Text Rendering . . . . .                     | 16        |
| 3.7.1    | DrawText . . . . .                           | 16        |
| 3.7.2    | TextTexture . . . . .                        | 16        |
| 3.8      | Advanced Transformation Techniques . . . . . | 17        |
| 3.8.1    | Matrix Transformations . . . . .             | 17        |
| 3.8.2    | Pivot Points . . . . .                       | 17        |
| 3.8.3    | Compound Transformations . . . . .           | 17        |
| 3.9      | Interactive 2D Elements . . . . .            | 17        |
| 3.9.1    | InteractiveRectangle . . . . .               | 17        |
| 3.9.2    | Mouse Input . . . . .                        | 18        |
| 3.9.3    | Example: Interactive Color Picker . . . . .  | 18        |
| 3.10     | Generative Art Techniques . . . . .          | 18        |
| 3.10.1   | Feedback Loops . . . . .                     | 18        |
| 3.10.2   | Op Art and Moiré Patterns . . . . .          | 19        |
| 3.10.3   | Procedural Pattern Generation . . . . .      | 19        |
| 3.11     | Post-Processing Effects . . . . .            | 20        |
| 3.11.1   | Image Composition . . . . .                  | 20        |
| 3.11.2   | TextureEffects for 2D . . . . .              | 20        |
| 3.11.3   | Displacement Mapping . . . . .               | 21        |
| 3.12     | Advanced Pattern Techniques . . . . .        | 21        |
| 3.12.1   | Recursive Subdivision . . . . .              | 21        |
| 3.12.2   | Particle Systems in 2D . . . . .             | 21        |
| 3.12.3   | Grid-Based Automata . . . . .                | 22        |
| 3.13     | Data Visualization . . . . .                 | 22        |
| 3.13.1   | Chart Generation . . . . .                   | 22        |
| 3.13.2   | Integration with ECharts . . . . .           | 23        |
| 3.13.3   | Real-Time Data . . . . .                     | 23        |

|        |  |    |
|--------|--|----|
| 3.14   | Complex Example Projects . . . . .                     | 23 |
| 3.14.1 | Example 4: Kaleidoscope Effect . . . . .               | 23 |
| 3.14.2 | Example 5: Audio-Reactive Loading Animation . . . . .  | 23 |
| 3.14.3 | Example 6: Data-Driven Weather Visualization . . . . . | 24 |
| 3.14.4 | Example 7: Feedback Tunnel Effect . . . . .            | 24 |
| 3.14.5 | Example 8: Mouse Trail with Fade . . . . .             | 25 |
| 3.15   | Performance Optimization . . . . .                     | 25 |
| 3.15.1 | Culling and Clipping . . . . .                         | 25 |
| 3.15.2 | Object Pooling . . . . .                               | 25 |
| 3.15.3 | Level of Detail (LOD) . . . . .                        | 25 |
| 3.15.4 | Batching Draw Calls . . . . .                          | 26 |
| 3.16   | Masking and Clipping . . . . .                         | 26 |
| 3.16.1 | Stencil Buffer Masking . . . . .                       | 26 |
| 3.16.2 | Alpha Mask Technique . . . . .                         | 26 |
| 3.17   | Color Theory in Practice . . . . .                     | 27 |
| 3.17.1 | Color Harmonies . . . . .                              | 27 |
| 3.17.2 | Gradient Creation . . . . .                            | 27 |
| 3.18   | Typography and Text Effects . . . . .                  | 28 |
| 3.18.1 | Dynamic Text . . . . .                                 | 28 |
| 3.18.2 | Text as Texture . . . . .                              | 28 |
| 3.18.3 | Kinetic Typography . . . . .                           | 28 |
| 3.19   | Practical Examples . . . . .                           | 28 |
| 3.19.1 | Example 1: Pulsing Circle . . . . .                    | 29 |
| 3.19.2 | Example 2: Rotating Grid . . . . .                     | 29 |
| 3.19.3 | Example 3: Color Gradient Circle . . . . .             | 29 |
| 3.20   | Debugging and Workflow Tips . . . . .                  | 29 |
| 3.20.1 | Visualizing Values . . . . .                           | 30 |
| 3.20.2 | Color Coding . . . . .                                 | 30 |
| 3.20.3 | Naming Convention . . . . .                            | 30 |
| 3.20.4 | Comment Ops . . . . .                                  | 30 |
| 3.21   | Common Patterns and Recipes . . . . .                  | 30 |
| 3.21.1 | Pattern: Circular Array . . . . .                      | 30 |
| 3.21.2 | Pattern: Wave Grid . . . . .                           | 31 |
| 3.21.3 | Pattern: Spiral . . . . .                              | 31 |
| 3.21.4 | Pattern: Responsive Grid . . . . .                     | 31 |
| 3.22   | Troubleshooting Common Issues . . . . .                | 31 |
| 3.22.1 | “Shapes not appearing” . . . . .                       | 32 |
| 3.22.2 | “Performance is slow” . . . . .                        | 32 |
| 3.22.3 | “Colors look wrong” . . . . .                          | 32 |
| 3.22.4 | “Animation is jerky” . . . . .                         | 32 |
| 3.23   | Performance Tips . . . . .                             | 32 |
| 3.24   | Featured Videos . . . . .                              | 33 |
| 3.24.1 | Official Tutorials . . . . .                           | 33 |
| 3.24.2 | Additional Resources . . . . .                         | 33 |
| 3.25   | Exercises . . . . .                                    | 33 |
| 3.25.1 | Beginner . . . . .                                     | 33 |
| 3.25.2 | Intermediate . . . . .                                 | 34 |
| 3.25.3 | Advanced . . . . .                                     | 34 |
| 3.26   | Project Ideas . . . . .                                | 34 |

|          |  |           |
|----------|--|-----------|
| <b>4</b> | <b>3D Graphics in Cables.gl</b>                              | <b>35</b> |
| 4.1      | Introduction to 3D . . . . .                                 | 35        |
| 4.2      | The 3D Pipeline . . . . .                                    | 35        |
| 4.3      | Cameras . . . . .  | 36        |
| 4.3.1    | PerspectiveCamera . . . . .                                  | 36        |
| 4.3.2    | OrthographicCamera . . . . .                                 | 36        |
| 4.3.3    | Orbit Controls . . . . .                                     | 36        |
| 4.3.4    | LookAt . . . . .   | 36        |
| 4.3.5    | Camera Animation . . . . .                                   | 37        |
| 4.3.6    | Camera Shake Effect . . . . .                                | 37        |
| 4.3.7    | First-Person Camera . . . . .                                | 37        |
| 4.3.8    | Camera Path Following . . . . .                              | 37        |
| 4.3.9    | Camera Constraints . . . . .                                 | 37        |
| 4.4      | Lighting . . . . .   | 38        |
| 4.4.1    | AmbientLight . . . . .                                       | 38        |
| 4.4.2    | DirectionalLight . . . . .                                   | 38        |
| 4.4.3    | PointLight . . . . .   | 38        |
| 4.4.4    | SpotLight . . . . .  | 38        |
| 4.4.5    | Shadow Mapping . . . . .                                     | 38        |
| 4.4.6    | Three-Point Lighting Setup . . . . .                         | 39        |
| 4.4.7    | Image-Based Lighting (IBL) . . . . .                         | 39        |
| 4.4.8    | Light Probes . . . . .                                       | 39        |
| 4.4.9    | Volumetric Lighting . . . . .                                | 39        |
| 4.4.10   | Light Animation . . . . .                                    | 40        |
| 4.5      | Geometry and Meshes . . . . .                                | 40        |
| 4.5.1    | Primitive Shapes . . . . .                                   | 40        |
| 4.5.2    | Loading 3D Models . . . . .                                  | 40        |
| 4.5.3    | Creating Custom Geometry . . . . .                           | 41        |
| 4.5.4    | Procedural Geometry Generation . . . . .                     | 41        |
| 4.5.5    | Geometry Instancing . . . . .                                | 42        |
| 4.5.6    | Geometry Modifiers . . . . .                                 | 42        |
| 4.5.7    | Boolean Operations . . . . .                                 | 42        |
| 4.6      | Real-Time Mesh Distortion . . . . .                          | 42        |
| 4.6.1    | Understanding Vertex Manipulation . . . . .                  | 43        |
| 4.6.2    | Method 1: Node-Based Distortion . . . . .                    | 43        |
| 4.6.3    | Method 2: JavaScript Custom Op for Mesh Distortion . . . . . | 46        |
| 4.6.4    | Advanced: Animated Wall Distortion . . . . .                 | 51        |
| 4.6.5    | Practical Example: Interactive Curved Wall . . . . .         | 55        |
| 4.6.6    | Performance Optimization . . . . .                           | 55        |
| 4.6.7    | Advanced Techniques . . . . .                                | 57        |
| 4.6.8    | Common Use Cases . . . . .                                   | 57        |
| 4.6.9    | Troubleshooting . . . . .                                    | 58        |
| 4.7      | Materials . . . . .  | 58        |
| 4.7.1    | BasicMaterial . . . . .                                      | 58        |
| 4.7.2    | LambertMaterial . . . . .                                    | 58        |
| 4.7.3    | PhongMaterial . . . . .                                      | 58        |
| 4.7.4    | PBRMaterial (Physically Based Rendering) . . . . .           | 59        |
| 4.7.5    | Material Blending . . . . .                                  | 59        |
| 4.7.6    | Animated Materials . . . . .                                 | 59        |

|         |   |    |
|---------|---|----|
| 4.7.7   | Material Variants . . . . .                         | 59 |
| 4.7.8   | Custom Shader Materials . . . . .                   | 59 |
| 4.7.9   | Material Instancing . . . . .                       | 60 |
| 4.8     | Transformations in 3D . . . . .                     | 60 |
| 4.8.1   | Transform . . . . .                                 | 60 |
| 4.8.2   | Matrix Operations . . . . .                         | 60 |
| 4.8.3   | Hierarchical Transforms . . . . .                   | 60 |
| 4.8.4   | Constraint Systems . . . . .                        | 60 |
| 4.8.5   | IK (Inverse Kinematics) . . . . .                   | 61 |
| 4.8.6   | Physics-Based Transforms . . . . .                  | 61 |
| 4.8.7   | Transform Caching . . . . .                         | 61 |
| 4.9     | Rendering Techniques . . . . .                      | 61 |
| 4.9.1   | Rendering Order . . . . .                           | 61 |
| 4.9.2   | Multiple Render Passes . . . . .                    | 62 |
| 4.9.3   | Fog . . . . .                                       | 62 |
| 4.9.4   | Screen-Space Ambient Occlusion (SSAO) . . . . .     | 62 |
| 4.9.5   | Screen-Space Reflections (SSR) . . . . .            | 63 |
| 4.9.6   | Depth of Field . . . . .                            | 63 |
| 4.9.7   | Bloom . . . . .                                     | 63 |
| 4.9.8   | Motion Blur . . . . .                               | 63 |
| 4.9.9   | Color Grading . . . . .                             | 63 |
| 4.9.10  | Chromatic Aberration . . . . .                      | 63 |
| 4.9.11  | Vignette . . . . .                                  | 64 |
| 4.9.12  | Post-Processing Chain . . . . .                     | 64 |
| 4.10    | Scene Management . . . . .                          | 64 |
| 4.10.1  | Scene Hierarchy . . . . .                           | 64 |
| 4.10.2  | Object Grouping . . . . .                           | 65 |
| 4.10.3  | Layer System . . . . .                              | 65 |
| 4.10.4  | Culling and Optimization . . . . .                  | 65 |
| 4.10.5  | LOD (Level of Detail) System . . . . .              | 66 |
| 4.11    | Practical Examples . . . . .                        | 66 |
| 4.11.1  | Example 1: Rotating Cube . . . . .                  | 66 |
| 4.11.2  | Example 2: Lit Sphere with Orbit Controls . . . . . | 66 |
| 4.11.3  | Example 3: Loading a 3D Model . . . . .             | 67 |
| 4.11.4  | Example 4: Solar System . . . . .                   | 67 |
| 4.11.5  | Example 5: Procedural Terrain . . . . .             | 67 |
| 4.11.6  | Example 6: Instanced Forest . . . . .               | 68 |
| 4.11.7  | Example 7: Interactive 3D Scene . . . . .           | 68 |
| 4.11.8  | Example 8: Animated Character . . . . .             | 69 |
| 4.11.9  | Example 9: Particle System . . . . .                | 69 |
| 4.11.10 | Example 10: Reflective Surface . . . . .            | 70 |
| 4.11.11 | Example 11: Volumetric Fog . . . . .                | 70 |
| 4.11.12 | Example 12: Dynamic Lighting Setup . . . . .        | 71 |
| 4.11.13 | Example 13: Morphing Objects . . . . .              | 71 |
| 4.11.14 | Example 14: Physics Simulation . . . . .            | 72 |
| 4.11.15 | Example 15: Post-Processing Pipeline . . . . .      | 72 |
| 4.11.16 | Example 16: Audio-Reactive 3D . . . . .             | 73 |
| 4.11.17 | Example 17: Procedural City . . . . .               | 73 |
| 4.11.18 | Example 18: Water Surface . . . . .                 | 74 |

|          |  |           |
|----------|--|-----------|
| 4.11.19  | Example 19: Portal Effect . . . . .                                | 74        |
| 4.11.20  | Example 20: Multi-Pass Rendering . . . . .                         | 75        |
| 4.12     | Advanced Animation Techniques . . . . .                            | 75        |
| 4.12.1   | Skeletal Animation . . . . .                                       | 75        |
| 4.12.2   | Morph Targets . . . . .  | 76        |
| 4.12.3   | Procedural Animation . . . . .                                     | 76        |
| 4.12.4   | Physics Animation . . . . .  | 76        |
| 4.12.5   | Animation Blending . . . . .                                       | 76        |
| 4.13     | Performance Optimization . . . . .                                 | 76        |
| 4.13.1   | General Tips . . . . .   | 76        |
| 4.13.2   | Advanced Optimization . . . . .                                    | 77        |
| 4.13.3   | Performance Monitoring . . . . .                                   | 77        |
| 4.13.4   | Adaptive Quality . . . . .   | 77        |
| 4.14     | Common Patterns and Workflows . . . . .                            | 78        |
| 4.14.1   | Pattern: Object Pooling . . . . .                                  | 78        |
| 4.14.2   | Pattern: Component System . . . . .                                | 78        |
| 4.14.3   | Pattern: Event System . . . . .                                    | 78        |
| 4.14.4   | Pattern: State Machine . . . . .                                   | 79        |
| 4.15     | Debugging 3D Scenes . . . . .                                      | 79        |
| 4.15.1   | Visual Debugging . . . . .   | 79        |
| 4.15.2   | Common Issues . . . . .  | 79        |
| 4.16     | Best Practices . . . . .   | 80        |
| 4.17     | Featured Videos . . . . .  | 80        |
| 4.18     | Exercises . . . . .  | 80        |
| 4.18.1   | Beginner . . . . .   | 80        |
| 4.18.2   | Intermediate . . . . .   | 80        |
| 4.18.3   | Advanced . . . . .   | 81        |
| 4.19     | Project Ideas . . . . .  | 81        |
| <b>5</b> | <b>Texturing in Cables.gl</b> . . . . .                            | <b>82</b> |
| 5.1      | Introduction to Textures . . . . .                                 | 82        |
| 5.2      | Loading Textures . . . . .   | 82        |
| 5.2.1    | ImageTexture . . . . .   | 82        |
| 5.2.2    | VideoTexture . . . . .   | 82        |
| 5.2.3    | WebcamTexture . . . . .  | 82        |
| 5.3      | Texture Mapping . . . . .  | 83        |
| 5.3.1    | UV Coordinates . . . . .   | 83        |
| 5.3.2    | UV Transform . . . . .   | 83        |
| 5.3.3    | Tiling Textures . . . . .  | 85        |
| 5.4      | Advanced Texture Workflow (Production Mindset) . . . . .           | 85        |
| 5.4.1    | Color Space: sRGB vs Linear (Why Your Colors Look “Off”) . . . . . | 85        |
| 5.4.2    | Alpha (Transparency) Pitfalls . . . . .                            | 85        |
| 5.4.3    | Filtering, Mipmaps, and Why Textures “Shimmer” . . . . .           | 86        |
| 5.4.4    | Power-of-Two Sizes (and When It Matters) . . . . .                 | 86        |
| 5.4.5    | Aspect Ratio Correctness (Especially for Video) . . . . .          | 86        |
| 5.5      | Advanced Techniques and Patch Recipes . . . . .                    | 86        |
| 5.5.1    | Recipe: Masked Texture Blend (Two Textures + a Mask) . . . . .     | 86        |
| 5.5.2    | Recipe: Animated UVs (Scrolling / Parallax) . . . . .              | 87        |
| 5.5.3    | Recipe: Render-to-Texture for Post-Processing . . . . .            | 87        |
| 5.5.4    | Recipe: Feedback / Trails (Texture Feedback Loop) . . . . .        | 87        |

|          |  |           |
|----------|--|-----------|
| 5.5.5    | Recipe: Planar “Mirror” Reflection (Render-to-Texture) . . . . . | 88        |
| 5.5.6    | Recipe: Environment Reflections (Cubemap/HDR) . . . . .          | 88        |
| 5.5.7    | Recipe: Video Texture “Billboard” (Reliable Playback) . . . . .  | 88        |
| 5.5.8    | Recipe: Webcam Texture (Permissions + UX) . . . . .              | 88        |
| 5.6      | Texture Types for PBR Materials . . . . .                        | 88        |
| 5.6.1    | Albedo/Diffuse Map . . . . .                                     | 89        |
| 5.6.2    | Normal Map . . . . .   | 89        |
| 5.6.3    | Roughness Map . . . . .  | 89        |
| 5.6.4    | Metalness Map . . . . .  | 89        |
| 5.6.5    | Ambient Occlusion Map . . . . .                                  | 89        |
| 5.6.6    | Height/Displacement Map . . . . .                                | 89        |
| 5.6.7    | Emissive Map . . . . .   | 89        |
| 5.7      | Procedural Textures . . . . .                                    | 89        |
| 5.7.1    | Noise Textures . . . . .   | 90        |
| 5.7.2    | Gradient Textures . . . . .                                      | 90        |
| 5.7.3    | Pattern Generators . . . . .                                     | 90        |
| 5.8      | Render to Texture . . . . .                                      | 90        |
| 5.8.1    | Common Uses: . . . . .   | 90        |
| 5.9      | Texture Effects . . . . .  | 90        |
| 5.9.1    | TextureEffects Op . . . . .                                      | 90        |
| 5.9.2    | Custom Shader Effects . . . . .                                  | 91        |
| 5.10     | Cubemaps and Environment Maps . . . . .                          | 91        |
| 5.10.1   | CubemapTexture . . . . .   | 91        |
| 5.10.2   | HDRTexure . . . . .  | 91        |
| 5.11     | Texture Compression and Optimization . . . . .                   | 91        |
| 5.11.1   | File Size Tips: . . . . .  | 91        |
| 5.11.2   | Memory Considerations: . . . . .                                 | 92        |
| 5.12     | Practical Examples . . . . .                                     | 92        |
| 5.12.1   | Example 1: Textured Rotating Cube . . . . .                      | 92        |
| 5.12.2   | Example 2: Video on a Plane . . . . .                            | 92        |
| 5.12.3   | Example 3: Animated Noise Background . . . . .                   | 92        |
| 5.12.4   | Example 4: PBR Textured Material . . . . .                       | 93        |
| 5.13     | Featured Videos . . . . .  | 93        |
| 5.14     | Exercises . . . . .  | 93        |
| <b>6</b> | <b>    Shaders &amp; GLSL in Cables.gl</b> . . . . .             | <b>94</b> |
| 6.1      | Introduction to Shaders . . . . .                                | 94        |
| 6.2      | What Are Shaders? . . . . .                                      | 94        |
| 6.3      | Why Use Custom Shaders? . . . . .                                | 94        |
| 6.4      | Shader Ops in Cables.gl . . . . .                                | 94        |
| 6.4.1    | ShaderMaterial . . . . .   | 94        |
| 6.4.2    | TextureEffect (Shader-based) . . . . .                           | 94        |
| 6.4.3    | CustomShader . . . . .   | 94        |
| 6.5      | GLSL Basics . . . . .  | 95        |
| 6.5.1    | Data Types . . . . .   | 95        |
| 6.5.2    | Swizzling . . . . .  | 95        |
| 6.5.3    | Built-in Functions . . . . .                                     | 95        |
| 6.6      | Your First Fragment Shader . . . . .                             | 96        |
| 6.7      | Common Shader Patterns . . . . .                                 | 96        |
| 6.7.1    | Solid Color . . . . .  | 96        |

|         |  |     |
|---------|--|-----|
| 6.7.2   | UV Gradient . . . . .  | 97  |
| 6.7.3   | Circle (SDF) . . . . .   | 97  |
| 6.7.4   | Smooth Circle . . . . .  | 97  |
| 6.7.5   | Animated Pattern . . . . .   | 97  |
| 6.8     | Uniforms . . . . .   | 98  |
| 6.9     | Advanced Shader Workflows in cables.gl . . . . .                   | 98  |
| 6.9.1   | A Practical Uniform “Contract” . . . . .                           | 98  |
| 6.9.2   | Coordinate Spaces: UV vs Screen Space . . . . .                    | 98  |
| 6.9.3   | Anti-Aliasing SDFs (Clean Edges) . . . . .                         | 99  |
| 6.9.4   | Palette Mapping (Better Color Fast) . . . . .                      | 99  |
| 6.10    | Advanced Examples (Copy-and-Adapt) . . . . .                       | 99  |
| 6.10.1  | Example: Texture Distortion (UV Warp) . . . . .                    | 99  |
| 6.10.2  | Example: Simple Bloom-ish Glow (Threshold + Blur-ish) . . . . .    | 100 |
| 6.10.3  | Example: Domain Warping (More Organic Noise) . . . . .             | 101 |
| 6.11    | Debugging Shaders (In Practice) . . . . .                          | 101 |
| 6.11.1  | Common Gotchas . . . . .   | 102 |
| 6.12    | Performance Guidelines (Real-Time Friendly) . . . . .              | 102 |
| 6.13    | Signed Distance Functions (SDFs) . . . . .                         | 102 |
| 6.13.1  | SDF Primitives . . . . .   | 102 |
| 6.13.2  | SDF Operations . . . . .   | 103 |
| 6.14    | Noise Functions . . . . .  | 103 |
| 6.14.1  | Simple Value Noise . . . . .                                       | 103 |
| 6.14.2  | Fractal Brownian Motion (FBM) . . . . .                            | 104 |
| 6.15    | Post-Processing Effects . . . . .                                  | 104 |
| 6.15.1  | Vignette . . . . .   | 104 |
| 6.15.2  | Chromatic Aberration . . . . .                                     | 104 |
| 6.15.3  | Blur (Box Blur) . . . . .  | 105 |
| 6.15.4  | Pixelation . . . . .   | 105 |
| 6.16    | Vertex Shader Basics . . . . .                                     | 106 |
| 6.17    | Debugging Shaders . . . . .  | 106 |
| 6.17.1  | Visualize Values . . . . .   | 106 |
| 6.18    | Performance Tips . . . . .   | 107 |
| 6.19    | Professional Video Projection Mapping in Cables.gl . . . . .       | 107 |
| 6.19.1  | Understanding Cables.gl Shader Context . . . . .                   | 107 |
| 6.19.2  | Cables.gl Shader Compliance Checklist . . . . .                    | 108 |
| 6.19.3  | Troubleshooting Common Issues . . . . .                            | 108 |
| 6.19.4  | Using Shaders in Cables.gl: Two Approaches . . . . .               | 109 |
| 6.19.5  | Geometric Distortion Correction . . . . .                          | 110 |
| 6.19.6  | Multi-Projector Setups . . . . .                                   | 116 |
| 6.19.7  | Projector Stacking . . . . .                                       | 119 |
| 6.19.8  | Gradient Blend Composition . . . . .                               | 120 |
| 6.19.9  | Color Correction for Projection Mapping . . . . .                  | 124 |
| 6.19.10 | Complete Projection Mapping Pipeline . . . . .                     | 131 |
| 6.19.11 | JavaScript Custom Op Examples . . . . .                            | 134 |
| 6.19.12 | Comparison: Built-in Shader Ops vs Custom JavaScript Ops . . . . . | 139 |
| 6.19.13 | Quick Reference: Using These Shaders . . . . .                     | 141 |
| 6.19.14 | Best Practices for Projection Mapping in Cables.gl . . . . .       | 141 |
| 6.19.15 | Debug Visualization Shaders . . . . .                              | 142 |
| 6.19.16 | Summary: Shader Compliance and Usage . . . . .                     | 143 |

|          |   |            |
|----------|---|------------|
| 6.20     | Featured Videos . . . . .                                   | 144        |
| 6.21     | Resources . . . . .   | 144        |
| 6.22     | Exercises . . . . .   | 145        |
| <b>7</b> | <b>JavaScript &amp; Custom Ops in Cables.gl</b>             | <b>146</b> |
| 7.1      | Introduction . . . . .                                      | 146        |
| 7.2      | When to Use Custom Ops . . . . .                            | 146        |
| 7.3      | Creating Your First Op . . . . .                            | 146        |
| 7.3.1    | Step 1: Open the Op Editor . . . . .                        | 146        |
| 7.3.2    | Step 2: Understanding the Structure . . . . .               | 146        |
| 7.4      | Port Types . . . . .  | 146        |
| 7.4.1    | Input Ports . . . . .                                       | 147        |
| 7.4.2    | Output Ports . . . . .                                      | 147        |
| 7.5      | Handling Events . . . . .                                   | 148        |
| 7.5.1    | Trigger Execution . . . . .                                 | 148        |
| 7.5.2    | Value Changes . . . . .                                     | 148        |
| 7.5.3    | Linking Ports . . . . .                                     | 148        |
| 7.6      | Working with Arrays . . . . .                               | 149        |
| 7.7      | Working with Objects . . . . .                              | 149        |
| 7.8      | Render Loop Integration . . . . .                           | 149        |
| 7.9      | UI Port Groups . . . . .                                    | 150        |
| 7.10     | Port UI Types . . . . .                                     | 150        |
| 7.11     | Accessing Patch Resources . . . . .                         | 151        |
| 7.11.1   | Timer and Time . . . . .                                    | 151        |
| 7.11.2   | Canvas and Context . . . . .                                | 151        |
| 7.11.3   | Loading External Resources . . . . .                        | 151        |
| 7.12     | Using External Libraries . . . . .                          | 152        |
| 7.12.1   | Including Libraries . . . . .                               | 152        |
| 7.12.2   | Or use op.patch.loading for proper load tracking: . . . . . | 152        |
| 7.13     | Error Handling . . . . .                                    | 153        |
| 7.14     | Example: Custom Math Op . . . . .                           | 153        |
| 7.15     | Example: Array Processor . . . . .                          | 154        |
| 7.16     | Example: API Fetcher . . . . .                              | 155        |
| 7.17     | Debugging Tips . . . . .                                    | 155        |
| 7.18     | Advanced Patterns (How to Build “Good” Ops) . . . . .       | 156        |
| 7.18.1   | Pattern: Separate “Compute” from “Trigger” . . . . .        | 156        |
| 7.18.2   | Pattern: “Only Recompute When Dirty” . . . . .              | 157        |
| 7.18.3   | Pattern: Debounce (Stabilize Noisy Inputs) . . . . .        | 157        |
| 7.18.4   | Pattern: Rate-Limit (Prevent Flooding Downstream) . . . . . | 158        |
| 7.18.5   | Pattern: Stateful Ops (Resettable Systems) . . . . .        | 158        |
| 7.19     | Async Ops (Fetching Data Safely) . . . . .                  | 159        |
| 7.19.1   | Example: Fetch JSON with Cancellation . . . . .             | 159        |
| 7.19.2   | Loading Semantics (Patch-Friendly) . . . . .                | 160        |
| 7.20     | Performance Tips for Custom Ops . . . . .                   | 160        |
| 7.21     | Featured Videos . . . . .                                   | 160        |
| 7.22     | Exercises . . . . .   | 161        |
| <b>8</b> | <b>Audio &amp; Sound in Cables.gl</b>                       | <b>162</b> |
| 8.1      | Introduction . . . . .                                      | 162        |
| 8.2      | Audio Sources . . . . .                                     | 162        |

|          |  |            |
|----------|--|------------|
| 8.2.1    | AudioFile . . . . .  | 162        |
| 8.2.2    | Microphone . . . . .   | 162        |
| 8.2.3    | AudioBuffer . . . . .  | 162        |
| 8.2.4    | WebAudio Oscillator . . . . .  | 162        |
| 8.3      | Audio Analysis . . . . .   | 163        |
| 8.3.1    | AudioAnalyzer . . . . .  | 163        |
| 8.3.2    | FFT (Fast Fourier Transform) . . . . .   | 163        |
| 8.3.3    | Smoothing . . . . .  | 163        |
| 8.4      | Common Audio-Reactive Patterns . . . . .   | 163        |
| 8.4.1    | Volume-Based Scaling . . . . .   | 163        |
| 8.4.2    | Frequency Band Visualization . . . . .   | 163        |
| 8.4.3    | Color from Audio . . . . .   | 164        |
| 8.4.4    | Beat Detection . . . . .   | 164        |
| 8.5      | Audio Effects . . . . .  | 164        |
| 8.5.1    | Gain . . . . .   | 164        |
| 8.5.2    | Filter . . . . .   | 164        |
| 8.5.3    | Delay . . . . .  | 165        |
| 8.5.4    | Reverb . . . . .   | 165        |
| 8.5.5    | Compressor . . . . .   | 165        |
| 8.6      | Building a Visualizer . . . . .  | 165        |
| 8.6.1    | Step 1: Set Up Audio . . . . .   | 165        |
| 8.6.2    | Step 2: Create Base Render . . . . .   | 165        |
| 8.6.3    | Step 3: Add Audio-Reactive Elements . . . . .                                      | 166        |
| 8.6.4    | Step 4: Add Frequency Visualization . . . . .                                      | 166        |
| 8.7      | Synchronizing to Music . . . . .   | 166        |
| 8.7.1    | BPM and Beat Sync . . . . .  | 166        |
| 8.7.2    | Timeline with Audio . . . . .  | 167        |
| 8.8      | Advanced Audio Techniques (Make It Feel “Musical”) . . . . .                       | 167        |
| 8.8.1    | Technique: Energy vs Transient (Two-Signal Approach) . . . . .                     | 167        |
| 8.8.2    | Technique: Log Frequency Mapping (Better Spectra) . . . . .                        | 167        |
| 8.8.3    | Technique: Peak Hold (Readable Visuals) . . . . .                                  | 168        |
| 8.8.4    | Technique: Band-Specific Control (Bass Drives Scale, High Drives Detail) . . . . . | 168        |
| 8.8.5    | Technique: Audio -> Shader (The “Pro” Move) . . . . .                              | 168        |
| 8.9      | Advanced Patch Recipes . . . . .   | 168        |
| 8.9.1    | Recipe: Stable Beat Trigger (Avoid Double-Triggers) . . . . .                      | 169        |
| 8.9.2    | Recipe: Audio-Reactive Post-Processing . . . . .                                   | 169        |
| 8.9.3    | Recipe: Audio-Reactive 3D Equalizer (Optimized) . . . . .                          | 169        |
| 8.9.4    | Recipe: Audio-Driven Palette . . . . .   | 170        |
| 8.10     | Practical Examples . . . . .   | 170        |
| 8.10.1   | Example 1: Bass-Reactive Background . . . . .                                      | 170        |
| 8.10.2   | Example 2: Circular Spectrum . . . . .   | 170        |
| 8.10.3   | Example 3: Waveform Display . . . . .  | 171        |
| 8.10.4   | Example 4: 3D Audio Visualization . . . . .  | 171        |
| 8.11     | Performance Considerations . . . . .   | 171        |
| 8.12     | Browser Audio Policies . . . . .   | 172        |
| 8.13     | Featured Videos . . . . .  | 172        |
| 8.14     | Exercises . . . . .  | 172        |
| <b>9</b> | <b>Animation &amp; Timeline in Cables.gl</b>                                       | <b>173</b> |
| 9.1      | Introduction . . . . .   | 173        |

|       |   |     |
|-------|---|-----|
| 9.2   | Types of Animation . . . . .  | 173 |
| 9.2.1 | 1. Procedural Animation . . . . .   | 173 |
| 9.2.2 | 2. Keyframe Animation . . . . .   | 173 |
| 9.2.3 | 3. Physics-Based Animation . . . . .  | 173 |
| 9.2.4 | 4. Data-Driven Animation . . . . .  | 173 |
| 9.3   | Procedural Animation . . . . .  | 173 |
| 9.3.1 | The Time Op . . . . .   | 173 |
| 9.3.2 | Basic Movement Patterns . . . . .   | 173 |
| 9.3.3 | Easing Functions . . . . .  | 174 |
| 9.3.4 | The Smooth Op . . . . .   | 174 |
| 9.3.5 | Spring Animation . . . . .  | 175 |
| 9.4   | Timeline Animation . . . . .  | 175 |
| 9.4.1 | Opening the Timeline . . . . .  | 175 |
| 9.4.2 | Timeline Interface . . . . .  | 175 |
| 9.4.3 | Adding Keyframes . . . . .  | 175 |
| 9.4.4 | Keyframe Types . . . . .  | 175 |
| 9.4.5 | Editing Keyframes . . . . .   | 176 |
| 9.4.6 | Timeline Tracks . . . . .   | 176 |
| 9.5   | Non-Linear Animation Clips (New Animation System - November 2025) . . . . . | 176 |
| 9.5.1 | What Are Animation Clips? . . . . .   | 176 |
| 9.5.2 | Creating Animation Clips . . . . .  | 176 |
| 9.5.3 | Clip Properties and Options . . . . .                                       | 177 |
| 9.5.4 | Additive Animation (Layering Clips) . . . . .                               | 178 |
| 9.5.5 | Mixable Animation (Blending Clips) . . . . .                                | 178 |
| 9.5.6 | Clip Management . . . . .   | 179 |
| 9.5.7 | Advanced Clip Techniques . . . . .  | 179 |
| 9.6   | JavaScript Custom Op Integration with Animation System . . . . .            | 180 |
| 9.6.1 | Accessing Animation Data from Custom Ops . . . . .                          | 180 |
| 9.6.2 | Controlling Timeline from Custom Ops . . . . .                              | 181 |
| 9.6.3 | Creating Animation Clips Programmatically . . . . .                         | 182 |
| 9.6.4 | Manipulating Animation Clips . . . . .                                      | 183 |
| 9.6.5 | Advanced: Custom Easing Functions . . . . .                                 | 185 |
| 9.6.6 | Real-Time Animation Modification . . . . .                                  | 187 |
| 9.6.7 | Integration Example: Physics-Driven Animation . . . . .                     | 188 |
| 9.6.8 | Best Practices for Animation + Custom Ops . . . . .                         | 189 |
| 9.6.9 | Example: Complete Animation Controller Op . . . . .                         | 189 |
| 9.7   | Sequence and Timing Ops . . . . .   | 191 |
| 9.7.1 | Sequence . . . . .  | 191 |
| 9.7.2 | Delay . . . . .   | 191 |
| 9.7.3 | Timer . . . . .   | 191 |
| 9.7.4 | Interval . . . . .  | 192 |
| 9.8   | Animation Patterns . . . . .  | 192 |
| 9.8.1 | Staggered Animation . . . . .   | 192 |
| 9.8.2 | Loop with Pause . . . . .   | 192 |
| 9.8.3 | Ping-Pong (Back and Forth) . . . . .  | 192 |
| 9.8.4 | One-Shot Animation . . . . .  | 192 |
| 9.9   | State Machines . . . . .  | 193 |
| 9.9.1 | Simple States . . . . .   | 193 |
| 9.9.2 | Transition Between States . . . . .   | 193 |

|           |  |            |
|-----------|--|------------|
| 9.10      | Interactive Animation . . . . .                                  | 193        |
| 9.10.1    | Mouse-Based . . . . .  | 193        |
| 9.10.2    | Scroll-Based . . . . .   | 193        |
| 9.10.3    | Click-Triggered . . . . .  | 194        |
| 9.11      | Advanced Animation Systems (How to Build “Scenes”) . . . . .     | 194        |
| 9.11.1    | Layering: Timeline for Structure, Procedural for Life . . . . .  | 194        |
| 9.11.2    | Shot-Based Timelines (Cinematic Organization) . . . . .          | 194        |
| 9.11.3    | Animation Curves: Clamp Early, Map Late . . . . .                | 195        |
| 9.11.4    | Reusable “Rig” Pattern . . . . .                                 | 195        |
| 9.11.5    | Avoiding Jitter in Interactive Animation . . . . .               | 195        |
| 9.11.6    | Choreographing Triggers Reliably . . . . .                       | 195        |
| 9.12      | Advanced Recipes . . . . .                                       | 196        |
| 9.12.1    | Recipe: Scroll-Driven Scene (Interactive Storytelling) . . . . . | 196        |
| 9.12.2    | Recipe: Beat-Synced Timeline Sections . . . . .                  | 196        |
| 9.12.3    | Recipe: One-Shot “Punch” Animation (No Keyframes) . . . . .      | 196        |
| 9.12.4    | Recipe: Camera Rig (Orbit + Handheld Micro Motion) . . . . .     | 196        |
| 9.13      | Practical Examples . . . . .                                     | 197        |
| 9.13.1    | Example 1: Bouncing Ball . . . . .                               | 197        |
| 9.13.2    | Example 2: Rotating Carousel . . . . .                           | 197        |
| 9.13.3    | Example 3: Fade In Sequence . . . . .                            | 197        |
| 9.13.4    | Example 4: Timeline-Based Scene . . . . .                        | 198        |
| 9.13.5    | Example 5: Layered Animation Clips (Additive) . . . . .          | 198        |
| 9.13.6    | Example 6: Blended Animation Clips (Mixable) . . . . .           | 198        |
| 9.13.7    | Example 7: Reusable Clip System . . . . .                        | 199        |
| 9.13.8    | Example 8: JavaScript-Controlled Animation . . . . .             | 199        |
| 9.13.9    | Example 9: Physics + Animation Clip Hybrid . . . . .             | 200        |
| 9.13.10   | Example 10: Conditional Clip Playback . . . . .                  | 201        |
| 9.14      | Performance Tips . . . . .                                       | 202        |
| 9.15      | Debugging Animation . . . . .                                    | 202        |
| 9.15.1    | Slow Motion . . . . .  | 202        |
| 9.15.2    | Visualize Values . . . . .                                       | 202        |
| 9.15.3    | Pause at Problem . . . . .                                       | 202        |
| 9.16      | Featured Videos . . . . .  | 202        |
| 9.17      | Exercises . . . . .  | 202        |
| 9.17.1    | Basic Animation . . . . .  | 202        |
| 9.17.2    | Animation Clips . . . . .  | 203        |
| 9.17.3    | JavaScript Integration . . . . .                                 | 203        |
| 9.17.4    | Advanced . . . . .   | 203        |
| <b>10</b> | <b>Interfaces in Cables.gl</b> . . . . .                         | <b>204</b> |
| 10.1      | Introduction . . . . .   | 204        |
| 10.2      | Interface Approaches Overview . . . . .                          | 204        |
| 10.3      | HTML/CSS Interfaces . . . . .                                    | 204        |
| 10.3.1    | Overview . . . . .   | 205        |
| 10.3.2    | The HTML Op . . . . .  | 205        |
| 10.3.3    | Connecting HTML to Patch Logic . . . . .                         | 207        |
| 10.3.4    | Advanced HTML Interface Patterns . . . . .                       | 213        |
| 10.4      | Native Sidebar Interface Ops . . . . .                           | 215        |
| 10.4.1    | Overview . . . . .   | 215        |
| 10.4.2    | Available Interface Ops . . . . .                                | 215        |

|           |  |            |
|-----------|--|------------|
| 10.4.3    | Basic Interface Op Setup . . . . .                               | 215        |
| 10.4.4    | Styling Native Sidebar with CSS . . . . .                        | 217        |
| 10.4.5    | Complete Styling Example: Professional Control Panel . . . . .   | 227        |
| 10.4.6    | Advanced CSS Techniques . . . . .                                | 238        |
| 10.5      | Combining HTML and Native Interfaces . . . . .                   | 240        |
| 10.6      | Best Practices . . . . .   | 240        |
| 10.6.1    | 1. Performance . . . . .   | 241        |
| 10.6.2    | 2. Accessibility . . . . .                                       | 241        |
| 10.6.3    | 3. Responsive Design . . . . .                                   | 241        |
| 10.6.4    | 4. Organization . . . . .  | 241        |
| 10.7      | Practical Examples . . . . .                                     | 241        |
| 10.7.1    | Example 1: Animation Control Panel . . . . .                     | 242        |
| 10.7.2    | Example 2: Game UI Overlay . . . . .                             | 242        |
| 10.7.3    | Example 3: Data Visualization Dashboard . . . . .                | 242        |
| 10.8      | Debugging Interface Issues . . . . .                             | 242        |
| 10.8.1    | Common Issues . . . . .  | 242        |
| 10.8.2    | Debugging Tools . . . . .  | 243        |
| 10.9      | Exercises . . . . .  | 243        |
| <b>11</b> | <b>Export &amp; Deployment in Cables.gl</b>                      | <b>245</b> |
| 11.1      | Introduction . . . . .   | 245        |
| 11.2      | Export Options . . . . .   | 245        |
| 11.2.1    | 1. Public Patch Link . . . . .                                   | 245        |
| 11.2.2    | 2. Embedded iframe . . . . .                                     | 245        |
| 11.2.3    | 3. Standalone Export . . . . .                                   | 245        |
| 11.2.4    | 4. npm Package Export . . . . .                                  | 245        |
| 11.3      | Standalone Export Process . . . . .                              | 246        |
| 11.3.1    | Step 1: Prepare Your Patch . . . . .                             | 246        |
| 11.3.2    | Step 2: Export . . . . .   | 246        |
| 11.3.3    | Step 3: Download . . . . .                                       | 246        |
| 11.3.4    | Step 4: Test Locally . . . . .                                   | 246        |
| 11.4      | Customizing the Export . . . . .                                 | 247        |
| 11.4.1    | Custom HTML Template . . . . .                                   | 247        |
| 11.4.2    | Configuration Options . . . . .                                  | 248        |
| 11.5      | Communicating with Your Patch . . . . .                          | 248        |
| 11.5.1    | Setting Variables from JavaScript . . . . .                      | 248        |
| 11.5.2    | Getting Values from the Patch . . . . .                          | 248        |
| 11.5.3    | Triggering Events . . . . .                                      | 249        |
| 11.6      | Advanced Embedding & Integration . . . . .                       | 249        |
| 11.6.1    | Responsive Canvas: Beyond Width/Height . . . . .                 | 249        |
| 11.6.2    | Pausing When Not Visible . . . . .                               | 249        |
| 11.6.3    | postMessage Integration (iframe Control) . . . . .               | 250        |
| 11.6.4    | Environment-Specific Configuration (dev / test / prod) . . . . . | 250        |
| 11.6.5    | Asset Path Gotchas . . . . .                                     | 251        |
| 11.7      | Hosting Options . . . . .  | 251        |
| 11.7.1    | Static Hosting . . . . .   | 251        |
| 11.7.2    | GitHub Pages Deployment . . . . .                                | 251        |
| 11.7.3    | Netlify Deployment . . . . .                                     | 251        |
| 11.8      | Embedding in Existing Websites . . . . .                         | 252        |
| 11.8.1    | As a Background . . . . .  | 252        |

|          |  |     |
|----------|--|-----|
| 11.8.2   | As a Hero Section . . . . .  | 252 |
| 11.8.3   | Responsive Embedding . . . . .   | 252 |
| 11.9     | Performance Optimization . . . . .                                       | 253 |
| 11.9.1   | Before Export . . . . .  | 253 |
| 11.9.2   | Asset Optimization . . . . .   | 253 |
| 11.9.3   | Loading Optimization . . . . .   | 253 |
| 11.10    | Deployment Checklist (The Stuff That Breaks at the Worst Time) . . . . . | 254 |
| 11.10.1  | Cache Busting and Versioning . . . . .                                   | 254 |
| 11.10.2  | MIME Types (Especially for Wasm / Binary Assets) . . . . .               | 254 |
| 11.10.3  | CORS (Cross-Origin Assets) . . . . .                                     | 254 |
| 11.10.4  | Content Security Policy (CSP) . . . . .                                  | 255 |
| 11.11    | CI/CD Ideas (Optional, But Great for Teams) . . . . .                    | 255 |
| 11.12    | Offline/PWA . . . . .  | 255 |
| 11.12.1  | manifest.json . . . . .  | 255 |
| 11.12.2  | Service Worker . . . . .   | 256 |
| 11.13    | Electron Desktop Applications . . . . .                                  | 256 |
| 11.13.1  | Why Electron? . . . . .  | 257 |
| 11.13.2  | Getting Started with Electron . . . . .                                  | 257 |
| 11.13.3  | Main Process (main.js) . . . . .   | 259 |
| 11.13.4  | Preload Script (preload.js) . . . . .                                    | 268 |
| 11.13.5  | Advanced Window Configuration . . . . .                                  | 268 |
| 11.13.6  | Inter-Window Communication . . . . .                                     | 272 |
| 11.13.7  | Splash Screen Implementation . . . . .                                   | 275 |
| 11.13.8  | JSON File Operations . . . . .   | 280 |
| 11.13.9  | Code Signing for Distribution . . . . .                                  | 287 |
| 11.13.10 | Building and Distributing . . . . .                                      | 295 |
| 11.13.11 | Advanced Electron Features . . . . .                                     | 295 |
| 11.13.12 | Performance Optimization for Electron . . . . .                          | 297 |
| 11.13.13 | Security Best Practices . . . . .  | 298 |
| 11.13.14 | Troubleshooting Electron Issues . . . . .                                | 298 |
| 11.14    | Troubleshooting . . . . .  | 298 |
| 11.14.1  | Common Issues . . . . .  | 298 |
| 11.15    | Featured Videos . . . . .  | 299 |
| 11.16    | Exercises . . . . .  | 299 |
| 11.17    | Congratulations! . . . . .   | 299 |

|           |   |            |
|-----------|---|------------|
| <b>12</b> | <b>Video Tutorials</b>                    | <b>301</b> |
| 12.1      | Getting Started & Overviews . . . . .     | 301        |
| 12.2      | Core Concepts & Workflow . . . . .        | 306        |
| 12.3      | 3D / 3D Meshes . . . . .                  | 309        |
| 12.4      | Textures / Post-Processing . . . . .      | 309        |
| 12.5      | Shaders / Shadertoy / GLSL . . . . .      | 310        |
| 12.6      | Audio / Music / MIDI . . . . .            | 311        |
| 12.7      | Physics . . . . .                         | 313        |
| 12.8      | Export / Deployment / Embedding . . . . . | 313        |
| 12.9      | Hardware / External Tools . . . . .       | 314        |
| 12.10     | Talks / Meetups / Release Notes . . . . . | 315        |
| 12.11     | Showcases / Demos / Visualizers . . . . . | 316        |
| 12.12     | Unsorted (Still cables.gl-related)        | 317        |

|   |            |
|---|------------|
| <b>13 All Operators Reference</b>             | <b>322</b> |
| 13.1 How to Use This Reference . . . . .      | 322        |
| 13.2 Ops.Anim . . . . .                       | 322        |
| 13.2.1 AnimNumber . . . . .                   | 322        |
| 13.2.2 Bang . . . . .                         | 322        |
| 13.2.3 BoolAnim . . . . .                     | 323        |
| 13.2.4 Crossfade . . . . .                    | 323        |
| 13.2.5 FrameRangeAnimSwitcher . . . . .       | 324        |
| 13.2.6 FrameRangeAnim_v2 . . . . .            | 324        |
| 13.2.7 InOutInAnim . . . . .                  | 325        |
| 13.2.8 LFO_v3 . . . . .                       | 325        |
| 13.2.9 RandomAnim_v2 . . . . .                | 325        |
| 13.2.10 SimpleAnim . . . . .                  | 326        |
| 13.2.11 SineAnim . . . . .                    | 326        |
| 13.2.12 Smooth . . . . .                      | 327        |
| 13.2.13 Snap . . . . .                        | 327        |
| 13.2.14 Spring . . . . .                      | 328        |
| 13.2.15 StringTypeAnimation_v2 . . . . .      | 328        |
| 13.2.16 TimeDelta . . . . .                   | 329        |
| 13.2.17 Timer_v2 . . . . .                    | 329        |
| 13.3 Ops.Array . . . . .                      | 330        |
| 13.3.1 AnglesBetweenPoints . . . . .          | 330        |
| 13.3.2 AnimArray_v2 . . . . .                 | 330        |
| 13.3.3 Array1toX_v2 . . . . .                 | 331        |
| 13.3.4 Array2To3 . . . . .                    | 331        |
| 13.3.5 Array3 . . . . .                       | 332        |
| 13.3.6 Array3GetAverage . . . . .             | 332        |
| 13.3.7 Array3GetNumbers . . . . .             | 332        |
| 13.3.8 Array3InterpolateDistributed . . . . . | 333        |
| 13.3.9 Array3Iterator . . . . .               | 333        |
| 13.3.10 Array3Multiply . . . . .              | 334        |
| 13.3.11 Array3PushNumbers_v2 . . . . .        | 334        |
| 13.3.12 Array3RandomSelection . . . . .       | 335        |
| 13.3.13 Array3SetNumber . . . . .             | 335        |
| 13.3.14 Array3Sum . . . . .                   | 335        |
| 13.3.15 Array3To2 . . . . .                   | 336        |
| 13.3.16 Array3To4 . . . . .                   | 336        |
| 13.3.17 Array3VectorLength . . . . .          | 337        |
| 13.3.18 Array4 . . . . .                      | 337        |
| 13.3.19 Array4GetNumbers . . . . .            | 337        |
| 13.3.20 Array4SetNumber . . . . .             | 338        |
| 13.3.21 Array4ToArray3 . . . . .              | 338        |
| 13.3.22 ArrayAbs . . . . .                    | 339        |
| 13.3.23 ArrayAppendArray . . . . .            | 339        |
| 13.3.24 ArrayBuffer . . . . .                 | 339        |
| 13.3.25 ArrayBuffer3 . . . . .                | 340        |
| 13.3.26 ArrayCeil . . . . .                   | 340        |
| 13.3.27 ArrayChunk . . . . .                  | 341        |
| 13.3.28 ArrayChunkDuplicate . . . . .         | 341        |

|         |   |     |
|---------|---|-----|
| 13.3.29 | ArrayClamp . . . . .                        | 341 |
| 13.3.30 | ArrayContains_v2 . . . . .                  | 342 |
| 13.3.31 | ArrayDivide . . . . .                       | 342 |
| 13.3.32 | ArrayFindStrings . . . . .                  | 343 |
| 13.3.33 | ArrayFloor . . . . .                        | 343 |
| 13.3.34 | ArrayFract . . . . .                        | 344 |
| 13.3.35 | ArrayFromNumbers . . . . .                  | 344 |
| 13.3.36 | ArrayGetArray . . . . .                     | 345 |
| 13.3.37 | ArrayGetNumber . . . . .                    | 345 |
| 13.3.38 | ArrayGetObject . . . . .                    | 346 |
| 13.3.39 | ArrayGetString_v2 . . . . .                 | 346 |
| 13.3.40 | ArrayGetTexture . . . . .                   | 346 |
| 13.3.41 | ArrayGetValuesByIndexArray . . . . .        | 347 |
| 13.3.42 | ArrayIndexBetween . . . . .                 | 347 |
| 13.3.43 | ArrayIndexMinMax . . . . .                  | 348 |
| 13.3.44 | ArrayIteratorArray . . . . .                | 348 |
| 13.3.45 | ArrayIteratorNumbers . . . . .              | 349 |
| 13.3.46 | ArrayIteratorObjects . . . . .              | 349 |
| 13.3.47 | ArrayIteratorStrings . . . . .              | 350 |
| 13.3.48 | ArrayIteratorTextures . . . . .             | 350 |
| 13.3.49 | ArrayLength_v2 . . . . .                    | 351 |
| 13.3.50 | ArrayLogic . . . . .                        | 351 |
| 13.3.51 | ArrayLogicArray . . . . .                   | 351 |
| 13.3.52 | ArrayLogicBetween_v2 . . . . .              | 352 |
| 13.3.53 | ArrayLookup . . . . .                       | 352 |
| 13.3.54 | ArrayMath . . . . .                         | 353 |
| 13.3.55 | ArrayMathArray . . . . .                    | 353 |
| 13.3.56 | ArrayMathExpression . . . . .               | 354 |
| 13.3.57 | ArrayMathExpressionTrigger . . . . .        | 354 |
| 13.3.58 | ArrayMax . . . . .                          | 354 |
| 13.3.59 | ArrayMergeTrigger . . . . .                 | 355 |
| 13.3.60 | ArrayMerge_v3 . . . . .                     | 355 |
| 13.3.61 | ArrayMin . . . . .                          | 356 |
| 13.3.62 | ArrayModulo . . . . .                       | 356 |
| 13.3.63 | ArrayMultiply . . . . .                     | 357 |
| 13.3.64 | ArrayNumberRamp_v2 . . . . .                | 357 |
| 13.3.65 | ArrayOfArrays . . . . .                     | 358 |
| 13.3.66 | ArrayOfObjectsFilterByKeyValue_v3 . . . . . | 358 |
| 13.3.67 | ArrayOfObjectsFilterKeys . . . . .          | 359 |
| 13.3.68 | ArrayOfObjectsToString . . . . .            | 359 |
| 13.3.69 | ArrayPack . . . . .                         | 359 |
| 13.3.70 | ArrayPack2 . . . . .                        | 360 |
| 13.3.71 | ArrayPack2Simple . . . . .                  | 360 |
| 13.3.72 | ArrayPack3 . . . . .                        | 361 |
| 13.3.73 | ArrayPack3Simple . . . . .                  | 361 |
| 13.3.74 | ArrayPack4 . . . . .                        | 362 |
| 13.3.75 | ArrayPack4Simple . . . . .                  | 362 |
| 13.3.76 | ArrayPow . . . . .                          | 363 |
| 13.3.77 | ArrayPushString . . . . .                   | 363 |

|          |  |     |
|----------|--|-----|
| 13.3.78  | ArrayQuantizer . . . . .               | 364 |
| 13.3.79  | ArrayRandomSelection . . . . .         | 364 |
| 13.3.80  | ArrayRemoveFalsy . . . . .             | 365 |
| 13.3.81  | ArrayReverse . . . . .                 | 365 |
| 13.3.82  | ArrayRound . . . . .                   | 366 |
| 13.3.83  | ArraySetNumber_v3 . . . . .            | 366 |
| 13.3.84  | ArraySetString . . . . .               | 366 |
| 13.3.85  | ArraySin . . . . .                     | 367 |
| 13.3.86  | ArraySmoothStep . . . . .              | 367 |
| 13.3.87  | ArraySqrt . . . . .                    | 368 |
| 13.3.88  | ArraySubtract . . . . .                | 368 |
| 13.3.89  | ArraySum . . . . .                     | 369 |
| 13.3.90  | ArraySumPrevious . . . . .             | 369 |
| 13.3.91  | ArraySumUp . . . . .                   | 370 |
| 13.3.92  | ArraySwizzle . . . . .                 | 370 |
| 13.3.93  | ArrayToArrays . . . . .                | 371 |
| 13.3.94  | ArrayToByteBuffer . . . . .            | 371 |
| 13.3.95  | ArrayToString_v3 . . . . .             | 372 |
| 13.3.96  | ArrayTrigger . . . . .                 | 372 |
| 13.3.97  | ArrayUnique . . . . .                  | 373 |
| 13.3.98  | ArrayUniqueItemInfo . . . . .          | 373 |
| 13.3.99  | ArrayUnpack2 . . . . .                 | 373 |
| 13.3.100 | ArrayUnpack3 . . . . .                 | 374 |
| 13.3.101 | ArrayUnpack4 . . . . .                 | 374 |
| 13.3.102 | ArrayUnshiftString . . . . .           | 375 |
| 13.3.103 | Array_v3 . . . . .                     | 375 |
| 13.3.104 | ArraysToArrayMultiPort . . . . .       | 375 |
| 13.3.105 | AverageArray . . . . .                 | 376 |
| 13.3.106 | BoolStateArray . . . . .               | 376 |
| 13.3.107 | CopyArray . . . . .                    | 377 |
| 13.3.108 | CopyArraySimple . . . . .              | 377 |
| 13.3.109 | CropArray . . . . .                    | 378 |
| 13.3.110 | CutArray . . . . .                     | 378 |
| 13.3.111 | EaseArray . . . . .                    | 379 |
| 13.3.112 | EmptyArray . . . . .                   | 379 |
| 13.3.113 | FillArrayRandomDuplicates_v2 . . . . . | 380 |
| 13.3.114 | FilterArray . . . . .                  | 380 |
| 13.3.115 | FilterValidArray . . . . .             | 381 |
| 13.3.116 | FlattenArray . . . . .                 | 381 |
| 13.3.117 | FreezeArray . . . . .                  | 382 |
| 13.3.118 | GateArray_v2 . . . . .                 | 382 |
| 13.3.119 | GetValuesFromArrayOfObjects . . . . .  | 383 |
| 13.3.120 | HSBtoRGBArray . . . . .                | 383 |
| 13.3.121 | InfoArray . . . . .                    | 383 |
| 13.3.122 | InfoArray2 . . . . .                   | 384 |
| 13.3.123 | InfoArray3 . . . . .                   | 384 |
| 13.3.124 | InterpolateArrays . . . . .            | 385 |
| 13.3.125 | InterpolateArraysRange . . . . .       | 385 |
| 13.3.126 | InterpolateNumbersArray . . . . .      | 386 |

|          |                                      |     |
|----------|--------------------------------------|-----|
| 13.3.127 | InterpolateNumbersArray3 . . . . .   | 386 |
| 13.3.128 | LissajouseSpline . . . . .           | 386 |
| 13.3.129 | LoopArray3 . . . . .                 | 387 |
| 13.3.130 | MapRangeArray . . . . .              | 387 |
| 13.3.131 | NumbersToArrayMultiPort_v2 . . . . . | 388 |
| 13.3.132 | ObjectIteratorKeys . . . . .         | 388 |
| 13.3.133 | PaletteLibrary . . . . .             | 389 |
| 13.3.134 | PerlinArray . . . . .                | 389 |
| 13.3.135 | Phyllotaxis . . . . .                | 390 |
| 13.3.136 | RandomNumbersArray_v4 . . . . .      | 390 |
| 13.3.137 | RandomWordsArray . . . . .           | 391 |
| 13.3.138 | ReduceArray3_v3 . . . . .            | 391 |
| 13.3.139 | ReverseArray3 . . . . .              | 392 |
| 13.3.140 | RingBuffer . . . . .                 | 392 |
| 13.3.141 | RotateArray . . . . .                | 392 |
| 13.3.142 | RouteArray . . . . .                 | 393 |
| 13.3.143 | SetNumberArray . . . . .             | 393 |
| 13.3.144 | SetNumbersArray3 . . . . .           | 394 |
| 13.3.145 | ShuffleArray3_v3 . . . . .           | 394 |
| 13.3.146 | ShuffleArray_v3 . . . . .            | 395 |
| 13.3.147 | SimplexArray . . . . .               | 395 |
| 13.3.148 | SmoothArray . . . . .                | 396 |
| 13.3.149 | SortArray . . . . .                  | 396 |
| 13.3.150 | SortArray3 . . . . .                 | 396 |
| 13.3.151 | SortArrayOfObjects . . . . .         | 397 |
| 13.3.152 | SortArrayWithIndices_v2 . . . . .    | 397 |
| 13.3.153 | SplineLengthArray3 . . . . .         | 398 |
| 13.3.154 | SplinesToLineStripArray . . . . .    | 398 |
| 13.3.155 | StringToArray_v2 . . . . .           | 399 |
| 13.3.156 | StringToCharArray . . . . .          | 399 |
| 13.3.157 | StringToLineNumberArray . . . . .    | 399 |
| 13.3.158 | SubdivideArray1 . . . . .            | 400 |
| 13.3.159 | SwitchArray . . . . .                | 400 |
| 13.3.160 | SwitchArrayMultiPort_v2 . . . . .    | 401 |
| 13.3.161 | SwitchArrayOnTrigger . . . . .       | 401 |
| 13.3.162 | TextureBufferArray . . . . .         | 402 |
| 13.3.163 | WeaveArrays . . . . .                | 402 |
| 13.4     | Ops.Array.PointArray . . . . .       | 403 |
| 13.4.1   | Array3AreaRemove . . . . .           | 403 |
| 13.4.2   | Array3PointEditor . . . . .          | 403 |
| 13.4.3   | Array3RepeatTransform . . . . .      | 404 |
| 13.4.4   | Array3VectorDistance . . . . .       | 404 |
| 13.4.5   | ArraySpray . . . . .                 | 405 |
| 13.4.6   | CircularPoints_v2 . . . . .          | 405 |
| 13.4.7   | FillPointArrayDuplicates . . . . .   | 406 |
| 13.4.8   | PointsCube . . . . .                 | 406 |
| 13.4.9   | PointsHexagonGrid . . . . .          | 407 |
| 13.4.10  | PointsPlane_v2 . . . . .             | 407 |
| 13.4.11  | PointsRectangleRounded_v2 . . . . .  | 408 |

|         |  |     |
|---------|--|-----|
| 13.4.12 | PointsRectangle_v2 . . . . .             | 408 |
| 13.4.13 | PointsSphereRandom . . . . .             | 409 |
| 13.4.14 | RedistributeSplinePoints . . . . .       | 409 |
| 13.4.15 | SortArray3ByDistance . . . . .           | 410 |
| 13.4.16 | SplinePositionAtDistanceArray3 . . . . . | 410 |
| 13.4.17 | SubdivideArray3_v2 . . . . .             | 411 |
| 13.4.18 | TransformArray3 . . . . .                | 411 |
| 13.5    | Ops.Audio . . . . .                      | 412 |
| 13.5.1  | BpmTap . . . . .                         | 412 |
| 13.5.2  | MidiJson . . . . .                       | 412 |
| 13.5.3  | MidiJsonNote_v2 . . . . .                | 413 |
| 13.6    | Ops.Boolean . . . . .                    | 413 |
| 13.6.1  | And . . . . .                            | 413 |
| 13.6.2  | AndMultiPort_v2 . . . . .                | 413 |
| 13.6.3  | BoolByTrigger . . . . .                  | 414 |
| 13.6.4  | BoolToColor . . . . .                    | 414 |
| 13.6.5  | BoolToNumber_v2 . . . . .                | 415 |
| 13.6.6  | BoolToString . . . . .                   | 415 |
| 13.6.7  | Boolean . . . . .                        | 416 |
| 13.6.8  | DelayBooleanSimple . . . . .             | 416 |
| 13.6.9  | IfFalseThen . . . . .                    | 417 |
| 13.6.10 | IfTrueThen_v2 . . . . .                  | 417 |
| 13.6.11 | IsOne . . . . .                          | 418 |
| 13.6.12 | IsZero . . . . .                         | 418 |
| 13.6.13 | MonoFlop . . . . .                       | 418 |
| 13.6.14 | Not . . . . .                            | 419 |
| 13.6.15 | Or . . . . .                             | 419 |
| 13.6.16 | OrNumber_v2 . . . . .                    | 420 |
| 13.6.17 | ParseBoolean_v2 . . . . .                | 420 |
| 13.6.18 | RouteBoolean . . . . .                   | 421 |
| 13.6.19 | ToggleBool_v2 . . . . .                  | 421 |
| 13.6.20 | TriggerChangedFalse . . . . .            | 422 |
| 13.6.21 | TriggerChangedTrue . . . . .             | 422 |
| 13.6.22 | TriggerOnChangeBoolean_v2 . . . . .      | 422 |
| 13.7    | Ops.Cables . . . . .                     | 423 |
| 13.7.1  | AssetPathURL . . . . .                   | 423 |
| 13.7.2  | CablesInfo . . . . .                     | 423 |
| 13.7.3  | CallBack_v2 . . . . .                    | 424 |
| 13.7.4  | FPS_v2 . . . . .                         | 424 |
| 13.7.5  | Function_v2 . . . . .                    | 425 |
| 13.7.6  | GetOpName . . . . .                      | 425 |
| 13.7.7  | GetSubPatchName . . . . .                | 426 |
| 13.7.8  | LoadingJob . . . . .                     | 426 |
| 13.7.9  | LoadingStatus_v2 . . . . .               | 427 |
| 13.7.10 | PatchInfo_v2 . . . . .                   | 427 |
| 13.7.11 | UIMode . . . . .                         | 428 |
| 13.7.12 | UploadAsset . . . . .                    | 428 |
| 13.7.13 | UploadScreenshot . . . . .               | 428 |
| 13.8    | Ops.Color . . . . .                      | 429 |

|          |                                     |     |
|----------|-------------------------------------|-----|
| 13.8.1   | ColorArraySort . . . . .            | 429 |
| 13.8.2   | ColorPalettes . . . . .             | 430 |
| 13.8.3   | ColorValue . . . . .                | 430 |
| 13.8.4   | EyeDropper . . . . .                | 430 |
| 13.8.5   | Gradient . . . . .                  | 431 |
| 13.8.6   | GradientColorArray . . . . .        | 431 |
| 13.8.7   | HSLtoRGB . . . . .                  | 432 |
| 13.8.8   | HexToRGB_v2 . . . . .               | 432 |
| 13.8.9   | LuminanceContrast . . . . .         | 433 |
| 13.8.10  | RGBLuminance . . . . .              | 433 |
| 13.8.11  | RGBToCMYK . . . . .                 | 434 |
| 13.8.12  | RGBtoHSB . . . . .                  | 434 |
| 13.8.13  | RGBtoHSL . . . . .                  | 435 |
| 13.8.14  | RgbToHex . . . . .                  | 435 |
| 13.9     | Ops.Data . . . . .                  | 436 |
| 13.9.1   | SpreadSheetArray . . . . .          | 436 |
| 13.10    | Ops.Data.Compose.Array . . . . .    | 436 |
| 13.10.1  | CompArray . . . . .                 | 436 |
| 13.10.2  | CompArrayPopNumber . . . . .        | 437 |
| 13.10.3  | CompArrayPushArray . . . . .        | 437 |
| 13.10.4  | CompArrayPushArrayItems . . . . .   | 438 |
| 13.10.5  | CompArrayPushNumber . . . . .       | 439 |
| 13.10.6  | CompArrayPushNumbers . . . . .      | 439 |
| 13.10.7  | CompArrayPushObject . . . . .       | 440 |
| 13.10.8  | CompArrayPushString . . . . .       | 440 |
| 13.10.9  | CompArrayPushTexture . . . . .      | 441 |
| 13.10.10 | CompArraySetNumber . . . . .        | 441 |
| 13.10.11 | CompArraySetObject . . . . .        | 442 |
| 13.10.12 | CompArrayShiftNumber . . . . .      | 442 |
| 13.10.13 | CompArraySnapshot . . . . .         | 443 |
| 13.11    | Ops.Data.Compose.Object . . . . .   | 443 |
| 13.11.1  | CompObject . . . . .                | 443 |
| 13.11.2  | CompObjectFromObject . . . . .      | 444 |
| 13.11.3  | CompObjectSetArray . . . . .        | 444 |
| 13.11.4  | CompObjectSetBool . . . . .         | 445 |
| 13.11.5  | CompObjectSetNumber . . . . .       | 446 |
| 13.11.6  | CompObjectSetObject . . . . .       | 446 |
| 13.11.7  | CompObjectSetString . . . . .       | 447 |
| 13.12    | Ops.Data.Compose.String . . . . .   | 447 |
| 13.12.1  | CompString . . . . .                | 447 |
| 13.12.2  | CompStringAppend . . . . .          | 448 |
| 13.12.3  | CompStringShorten . . . . .         | 448 |
| 13.13    | Ops.Data.JsonPath . . . . .         | 449 |
| 13.13.1  | ArrayGetArrayByPath . . . . .       | 449 |
| 13.13.2  | ArrayGetArrayValuesByPath . . . . . | 449 |
| 13.13.3  | ArrayGetNumberByPath . . . . .      | 450 |
| 13.13.4  | ArrayGetObjectByPath . . . . .      | 450 |
| 13.13.5  | ArrayGetStringByPath_v2 . . . . .   | 451 |
| 13.13.6  | ObjectGetArrayByPath . . . . .      | 451 |

|          |                                      |     |
|----------|--------------------------------------|-----|
| 13.13.7  | ObjectGetArrayValuesByPath . . . . . | 451 |
| 13.13.8  | ObjectGetNumberByPath . . . . .      | 452 |
| 13.13.9  | ObjectGetObjectByPath . . . . .      | 452 |
| 13.13.10 | ObjectGetStringByPath_v2 . . . . .   | 453 |
| 13.14    | Ops.Data.StackValues . . . . .       | 453 |
| 13.14.1  | StackGetArray . . . . .              | 453 |
| 13.14.2  | StackGetNumber . . . . .             | 454 |
| 13.14.3  | StackGetTexture . . . . .            | 454 |
| 13.14.4  | StackPushArray . . . . .             | 455 |
| 13.14.5  | StackPushNumber . . . . .            | 455 |
| 13.14.6  | StackPushTexture . . . . .           | 456 |
| 13.15    | Ops.Date . . . . .                   | 456 |
| 13.15.1  | DateAndTime . . . . .                | 456 |
| 13.15.2  | DateCalc . . . . .                   | 457 |
| 13.15.3  | DateDifference . . . . .             | 457 |
| 13.15.4  | DateFormatter . . . . .              | 457 |
| 13.15.5  | DatIsoToTimestamp . . . . .          | 458 |
| 13.15.6  | DateTimestamp . . . . .              | 458 |
| 13.15.7  | Milliseconds . . . . .               | 459 |
| 13.15.8  | TimestampToIsoDate . . . . .         | 459 |
| 13.16    | Ops.Debug . . . . .                  | 460 |
| 13.16.1  | Console . . . . .                    | 460 |
| 13.16.2  | ConsoleLog . . . . .                 | 460 |
| 13.16.3  | CrashOp . . . . .                    | 461 |
| 13.16.4  | GlLogErrors . . . . .                | 461 |
| 13.16.5  | GlStates . . . . .                   | 462 |
| 13.16.6  | ProfileGL . . . . .                  | 462 |
| 13.16.7  | StopWatch . . . . .                  | 463 |
| 13.17    | Ops.Devices . . . . .                | 463 |
| 13.17.1  | TouchGesture . . . . .               | 463 |
| 13.17.2  | TouchScreen . . . . .                | 464 |
| 13.18    | Ops.Devices.Browser . . . . .        | 464 |
| 13.18.1  | BrowserInfo_v3 . . . . .             | 465 |
| 13.18.2  | ColorScheme . . . . .                | 465 |
| 13.18.3  | History . . . . .                    | 465 |
| 13.18.4  | JsExpression . . . . .               | 466 |
| 13.18.5  | JsMemory . . . . .                   | 466 |
| 13.18.6  | UserActivation . . . . .             | 467 |
| 13.18.7  | WebShare . . . . .                   | 467 |
| 13.19    | Ops.Devices.GamePad . . . . .        | 468 |
| 13.19.1  | GamePad . . . . .                    | 468 |
| 13.19.2  | GamePadJoystickAxis . . . . .        | 468 |
| 13.19.3  | GamePads . . . . .                   | 469 |
| 13.20    | Ops.Devices.Keyboard . . . . .       | 469 |
| 13.20.1  | CursorKeys . . . . .                 | 469 |
| 13.20.2  | KeyPressLearn . . . . .              | 470 |
| 13.20.3  | KeyPress_v2 . . . . .                | 470 |
| 13.20.4  | PersonController . . . . .           | 470 |
| 13.20.5  | QWERTYtoMidi . . . . .               | 471 |

|          |                                     |     |
|----------|-------------------------------------|-----|
| 13.21    | Ops.Devices.Midi . . . . .          | 471 |
| 13.21.1  | DeviceList . . . . .                | 472 |
| 13.21.2  | MidiCCOut_v2 . . . . .              | 472 |
| 13.21.3  | MidiCC_v3 . . . . .                 | 473 |
| 13.21.4  | MidiChord3 . . . . .                | 473 |
| 13.21.5  | MidiClock . . . . .                 | 473 |
| 13.21.6  | MidiInputDevice_v2 . . . . .        | 474 |
| 13.21.7  | MidiMonitor . . . . .               | 474 |
| 13.21.8  | MidiNRPN . . . . .                  | 475 |
| 13.21.9  | MidiNRPNOut . . . . .               | 475 |
| 13.21.10 | MidiNote . . . . .                  | 476 |
| 13.21.11 | MidiNoteFilter . . . . .            | 476 |
| 13.21.12 | MidiNoteOut . . . . .               | 476 |
| 13.21.13 | MidiOutputDevice . . . . .          | 477 |
| 13.21.14 | MidiTranspose . . . . .             | 477 |
| 13.21.15 | MidiValueToNote_v2 . . . . .        | 478 |
| 13.22    | Ops.Devices.Mobile . . . . .        | 478 |
| 13.22.1  | DeviceVibrate . . . . .             | 478 |
| 13.22.2  | GeoLocation . . . . .               | 479 |
| 13.22.3  | LockOrientation . . . . .           | 479 |
| 13.22.4  | MotionSensor_v2 . . . . .           | 480 |
| 13.22.5  | Pinch . . . . .                     | 480 |
| 13.22.6  | ScreenOrientation_v2 . . . . .      | 481 |
| 13.22.7  | ShakeGesture . . . . .              | 481 |
| 13.23    | Ops.Devices.Mouse . . . . .         | 481 |
| 13.23.1  | MouseButtons . . . . .              | 482 |
| 13.23.2  | MouseDrag . . . . .                 | 482 |
| 13.23.3  | MouseWheel_v2 . . . . .             | 483 |
| 13.23.4  | Mouse_v4 . . . . .                  | 483 |
| 13.23.5  | PointerLock . . . . .               | 484 |
| 13.24    | Ops.Devices.WebXr.Vr . . . . .      | 484 |
| 13.24.1  | Vr . . . . .                        | 484 |
| 13.24.2  | VrController . . . . .              | 485 |
| 13.25    | Ops.Extension.Ai . . . . .          | 486 |
| 13.25.1  | LLmModelList . . . . .              | 486 |
| 13.25.2  | LlmPrompt . . . . .                 | 486 |
| 13.26    | Ops.Extension.AmmoPhysics . . . . . | 487 |
| 13.26.1  | AmmoBody . . . . .                  | 487 |
| 13.26.2  | AmmoBodyCollision . . . . .         | 487 |
| 13.26.3  | AmmoCharacter . . . . .             | 488 |
| 13.26.4  | AmmoCharacterFpsCamera . . . . .    | 488 |
| 13.26.5  | AmmoDebugRenderer . . . . .         | 489 |
| 13.26.6  | AmmoEmitter . . . . .               | 489 |
| 13.26.7  | AmmoRaycast . . . . .               | 490 |
| 13.26.8  | AmmoWorld . . . . .                 | 490 |
| 13.26.9  | GltfAmmoBodies . . . . .            | 491 |
| 13.27    | Ops.Extension.DetectGpu . . . . .   | 491 |
| 13.27.1  | DetectGPU . . . . .                 | 491 |
| 13.28    | Ops.Extension.ECharts . . . . .     | 491 |

|         |                                 |     |
|---------|---------------------------------|-----|
| 13.28.1 | ECharts                         | 492 |
| 13.28.2 | EChartsEvent                    | 492 |
| 13.29   | Ops.Extension.FxHash            | 492 |
| 13.29.1 | FxHash                          | 493 |
| 13.30   | Ops.Extension.GlParticles       | 493 |
| 13.30.1 | VelocityBoundaries              | 493 |
| 13.31   | Ops.Extension.HtmlElementArray  | 494 |
| 13.31.1 | DivElements                     | 494 |
| 13.31.2 | ElementArrayCssPropertyNumber   | 494 |
| 13.31.3 | ElementArrayCssPropertyString   | 495 |
| 13.32   | Ops.Extension.HtmlToTexture     | 496 |
| 13.32.1 | HtmlToTexture                   | 496 |
| 13.33   | Ops.Extension.LSystem           | 496 |
| 13.33.1 | Lsystem_v2                      | 496 |
| 13.34   | Ops.Extension.Lottie            | 497 |
| 13.34.1 | LottieSVGPlayer                 | 497 |
| 13.34.2 | LottieTexturePlayer_v2          | 497 |
| 13.35   | Ops.Extension.Mediapipe         | 498 |
| 13.35.1 | FaceMesh                        | 498 |
| 13.35.2 | MpFaceTracking                  | 498 |
| 13.35.3 | MpHand                          | 499 |
| 13.35.4 | MpHandCoordinate                | 499 |
| 13.35.5 | MpHandTracking                  | 500 |
| 13.35.6 | MpPoseGetCoordinate             | 500 |
| 13.35.7 | MpPoseTracking                  | 500 |
| 13.36   | Ops.Extension.OpenType          | 501 |
| 13.36.1 | OpentypeFont                    | 501 |
| 13.36.2 | OpentypeToSvgPath               | 501 |
| 13.37   | Ops.Extension.Osc2Ws            | 502 |
| 13.37.1 | Osc2WsArray                     | 502 |
| 13.37.2 | Osc2WsMessage                   | 502 |
| 13.37.3 | Osc2WsNumber                    | 503 |
| 13.37.4 | Osc2WsNumbers                   | 503 |
| 13.38   | Ops.Extension.ReactionDiffusion | 503 |
| 13.38.1 | ReactionDiffusionSystem_v2      | 503 |
| 13.39   | Ops.Extension.SocketCluster     | 504 |
| 13.39.1 | SocketClusterClient_v2          | 504 |
| 13.39.2 | SocketClusterReceiveObject      | 504 |
| 13.39.3 | SocketClusterReceiveTrigger     | 505 |
| 13.39.4 | SocketClusterSendObject         | 506 |
| 13.39.5 | SocketClusterSendTrigger        | 506 |
| 13.39.6 | SocketClusterTopicInfo_v2       | 507 |
| 13.40   | Ops.Extension.Standalone        | 507 |
| 13.40.1 | Ffmpeg                          | 507 |
| 13.41   | Ops.Extension.Standalone.Files  | 507 |
| 13.41.1 | CreateFile                      | 508 |
| 13.41.2 | Exist                           | 508 |
| 13.41.3 | FileUrlToPath                   | 509 |
| 13.41.4 | Makedir                         | 509 |

|          |   |     |
|----------|---|-----|
| 13.41.5  | OpenFileManager . . . . .                 | 510 |
| 13.41.6  | PathToFileUrl . . . . .                   | 510 |
| 13.41.7  | ReadDir . . . . .                         | 511 |
| 13.41.8  | ResolvePath . . . . .                     | 511 |
| 13.41.9  | SelectDir . . . . .                       | 512 |
| 13.41.10 | SelectFile . . . . .                      | 512 |
| 13.41.11 | Stat . . . . .                            | 513 |
| 13.41.12 | SystemDirs . . . . .                      | 513 |
| 13.41.13 | Watch . . . . .                           | 514 |
| 13.41.14 | WriteBinaryFileFromBase64 . . . . .       | 514 |
| 13.41.15 | WriteTextFile . . . . .                   | 515 |
| 13.42    | Ops.Extension.Standalone.Net . . . . .    | 515 |
| 13.42.1  | HttpServer . . . . .                      | 515 |
| 13.42.2  | HttpServerResponse . . . . .              | 516 |
| 13.42.3  | IpAddress . . . . .                       | 516 |
| 13.42.4  | OscSend . . . . .                         | 517 |
| 13.42.5  | Osc_v2 . . . . .                          | 517 |
| 13.42.6  | ReadTextFile . . . . .                    | 518 |
| 13.42.7  | SocketClusterServer . . . . .             | 518 |
| 13.43    | Ops.Extension.SuperShapes . . . . .       | 519 |
| 13.43.1  | SuperShapesCpu . . . . .                  | 519 |
| 13.43.2  | SuperShapesGpu . . . . .                  | 519 |
| 13.44    | Ops.Extension.TeachableMachines . . . . . | 520 |
| 13.44.1  | AudioClassifier . . . . .                 | 520 |
| 13.44.2  | ImageClassifier_v2 . . . . .              | 520 |
| 13.44.3  | PoseDetection_v2 . . . . .                | 521 |
| 13.45    | Ops.Extension.Trackingjs . . . . .        | 521 |
| 13.45.1  | TrackWebcamColor . . . . .                | 521 |
| 13.46    | Ops.Extension.Voice . . . . .             | 522 |
| 13.46.1  | MeSpeak . . . . .                         | 522 |
| 13.46.2  | Say_v2 . . . . .                          | 522 |
| 13.46.3  | SpeechRecognition . . . . .               | 523 |
| 13.47    | Ops.Extension.WebGpu . . . . .            | 523 |
| 13.47.1  | ArrayToGpuBuffer . . . . .                | 523 |
| 13.47.2  | ArrayToTexture . . . . .                  | 524 |
| 13.47.3  | AttributeAsColorMaterial . . . . .        | 524 |
| 13.47.4  | BasicMaterial . . . . .                   | 525 |
| 13.47.5  | ColorTexture . . . . .                    | 525 |
| 13.47.6  | CompCompute . . . . .                     | 526 |
| 13.47.7  | ComputeStorageInput . . . . .             | 526 |
| 13.47.8  | ComputeStorageOutput . . . . .            | 527 |
| 13.47.9  | ComputeUniform . . . . .                  | 528 |
| 13.47.10 | DefaultTextures . . . . .                 | 528 |
| 13.47.11 | FaceCulling . . . . .                     | 529 |
| 13.47.12 | FrontBacksideMaterial . . . . .           | 529 |
| 13.47.13 | FullScreenRect . . . . .                  | 530 |
| 13.47.14 | GpuBufferToArray . . . . .                | 530 |
| 13.47.15 | MatCapMaterial . . . . .                  | 531 |
| 13.47.16 | MeshInstancer . . . . .                   | 531 |

|   |     |
|---|-----|
| 13.47.17 Pipeline . . . . .                   | 532 |
| 13.47.18 RenderToTexture . . . . .            | 532 |
| 13.47.19 SaselHund . . . . .                  | 533 |
| 13.47.20 Texture . . . . .                    | 534 |
| 13.47.21 VizTexture . . . . .                 | 534 |
| 13.47.22 WebGpuCanvas . . . . .               | 535 |
| 13.47.23 WebGpuInfo . . . . .                 | 535 |
| 13.48 Ops.Gl . . . . .                        | 536 |
| 13.48.1 ArrayToTexture_v2 . . . . .           | 536 |
| 13.48.2 BlendMode . . . . .                   | 536 |
| 13.48.3 CanvasFocus . . . . .                 | 537 |
| 13.48.4 CanvasInfo_v3 . . . . .               | 537 |
| 13.48.5 CanvasToTexture . . . . .             | 538 |
| 13.48.6 ClearColor . . . . .                  | 538 |
| 13.48.7 ClearDepth . . . . .                  | 539 |
| 13.48.8 ColorMask . . . . .                   | 539 |
| 13.48.9 ColorPick . . . . .                   | 540 |
| 13.48.10 DirectionalTranslate . . . . .       | 540 |
| 13.48.11 DownloadTexture_v3 . . . . .         | 541 |
| 13.48.12 DrawTextureMapping . . . . .         | 541 |
| 13.48.13 ElementInBrowserViewport . . . . .   | 542 |
| 13.48.14 ExternalCanvas . . . . .             | 542 |
| 13.48.15 FaceCulling_v2 . . . . .             | 542 |
| 13.48.16 FontMSDF_v2 . . . . .                | 543 |
| 13.48.17 ForceCanvasSize . . . . .            | 543 |
| 13.48.18 GateTexture . . . . .                | 544 |
| 13.48.19 GlBlendFunc . . . . .                | 544 |
| 13.48.20 GlInfo_v2 . . . . .                  | 545 |
| 13.48.21 GlPrimitive . . . . .                | 545 |
| 13.48.22 GradientTexture . . . . .            | 545 |
| 13.48.23 GridTransform . . . . .              | 546 |
| 13.48.24 Identity . . . . .                   | 546 |
| 13.48.25 IdentityViewMatrix . . . . .         | 547 |
| 13.48.26 ImageSequenceAnim_v2 . . . . .       | 547 |
| 13.48.27 InteractiveRectangle_v2 . . . . .    | 548 |
| 13.48.28 LayerSequence . . . . .              | 548 |
| 13.48.29 LineFont_v2 . . . . .                | 549 |
| 13.48.30 MainLoop_v2 . . . . .                | 550 |
| 13.48.31 MediaRecorder_v2 . . . . .           | 550 |
| 13.48.32 MeshInstancer_v4 . . . . .           | 550 |
| 13.48.33 MeshMorph . . . . .                  | 551 |
| 13.48.34 NormalizeScreenCoordinates . . . . . | 551 |
| 13.48.35 OrTexture . . . . .                  | 552 |
| 13.48.36 Orthogonal_v2 . . . . .              | 552 |
| 13.48.37 OverwriteViewportSize . . . . .      | 553 |
| 13.48.38 Performance . . . . .                | 553 |
| 13.48.39 PerformanceMeasure . . . . .         | 554 |
| 13.48.40 Perspective . . . . .                | 554 |
| 13.48.41 PixelProjection_v3 . . . . .         | 555 |

|  |     |
|--|-----|
| 13.48.42 PointCollector . . . . .                    | 555 |
| 13.48.43 PointCollectorCollect . . . . .             | 555 |
| 13.48.44 PointCollectorScreenCoords . . . . .        | 556 |
| 13.48.45 RandomCluster . . . . .                     | 556 |
| 13.48.46 RenderAnim_v2 . . . . .                     | 557 |
| 13.48.47 RenderGeometry_v2 . . . . .                 | 557 |
| 13.48.48 RenderToTexture_v3 . . . . .                | 557 |
| 13.48.49 RenderToTextures_v3 . . . . .               | 558 |
| 13.48.50 ResetTransform . . . . .                    | 559 |
| 13.48.51 SaveScreenShot_v3 . . . . .                 | 559 |
| 13.48.52 ShowNormals_v2 . . . . .                    | 560 |
| 13.48.53 SurfaceScatter_v2 . . . . .                 | 560 |
| 13.48.54 TextMeshMSDF_v2 . . . . .                   | 560 |
| 13.48.55 TextureArray . . . . .                      | 561 |
| 13.48.56 TextureArrayLoaderFromArray_v3 . . . . .    | 561 |
| 13.48.57 TextureArrayLoader_v2 . . . . .             | 562 |
| 13.48.58 TextureColorPick . . . . .                  | 562 |
| 13.48.59 TextureToArray_v4 . . . . .                 | 563 |
| 13.48.60 TextureToPointArray3 . . . . .              | 563 |
| 13.48.61 TextureToRandomPoints . . . . .             | 564 |
| 13.48.62 Texture_v2 . . . . .                        | 564 |
| 13.48.63 TriggerOnCanvasResize . . . . .             | 565 |
| 13.48.64 ValidTexture . . . . .                      | 565 |
| 13.48.65 ViewPortSize . . . . .                      | 566 |
| 13.49 Ops.Gl.CubeMap . . . . .                       | 566 |
| 13.49.1 CubeMapFromTextures_v2 . . . . .             | 566 |
| 13.49.2 CubeMapMaterial_v2 . . . . .                 | 567 |
| 13.49.3 CubemapToEquirectangularTexture_v2 . . . . . | 567 |
| 13.49.4 EquirectangularTextureToCubemap . . . . .    | 567 |
| 13.49.5 RenderToCubemap_v3 . . . . .                 | 568 |
| 13.49.6 Skybox . . . . .                             | 568 |
| 13.50 Ops.Gl.GLTF . . . . .                          | 569 |
| 13.50.1 GltfAnimationArray . . . . .                 | 569 |
| 13.50.2 GltfCameraViewMatrix . . . . .               | 569 |
| 13.50.3 GltfDracoCompression . . . . .               | 570 |
| 13.50.4 GltfGeometry . . . . .                       | 570 |
| 13.50.5 GltfHierarchy . . . . .                      | 571 |
| 13.50.6 GltfInfo . . . . .                           | 571 |
| 13.50.7 GltfMeshSequence_v2 . . . . .                | 572 |
| 13.50.8 GltfMorphTargets . . . . .                   | 572 |
| 13.50.9 GltfNodeSineAnim . . . . .                   | 573 |
| 13.50.10 GltfNodeTransform_v2 . . . . .              | 573 |
| 13.50.11 GltfNodeTransforms_v3 . . . . .             | 574 |
| 13.50.12 GltfNode_v2 . . . . .                       | 574 |
| 13.50.13 GltfScene_v4 . . . . .                      | 575 |
| 13.50.14 GltfSetMaterial . . . . .                   | 575 |
| 13.50.15 GltfSkin . . . . .                          | 576 |
| 13.50.16 GltfTexture . . . . .                       | 576 |
| 13.50.17 GltfTransformNode . . . . .                 | 577 |

|  |     |
|--|-----|
| 13.50.18 GltfVertexAnim . . . . .          | 577 |
| 13.51 Ops.Gl.Geometry . . . . .            | 578 |
| 13.51.1 BoundingBoxVisible . . . . .       | 578 |
| 13.51.2 GeometryBoundingBox . . . . .      | 578 |
| 13.52 Ops.Gl.ImageCompose . . . . .        | 579 |
| 13.52.1 Alpha . . . . .                    | 579 |
| 13.52.2 AlphaMask_v2 . . . . .             | 579 |
| 13.52.3 BarrelDistortion_v3 . . . . .      | 580 |
| 13.52.4 Blur . . . . .                     | 580 |
| 13.52.5 Border_v2 . . . . .                | 581 |
| 13.52.6 BrightnessContrast . . . . .       | 581 |
| 13.52.7 BulgePinch . . . . .               | 582 |
| 13.52.8 CheckerBoard_v2 . . . . .          | 582 |
| 13.52.9 ChromaticAberration_v2 . . . . .   | 583 |
| 13.52.10 CircleTexture_v4 . . . . .        | 584 |
| 13.52.11 ClampTexture_v2 . . . . .         | 584 |
| 13.52.12 Clarity . . . . .                 | 585 |
| 13.52.13 ColorBalance_v2 . . . . .         | 585 |
| 13.52.14 ColorChannel_v2 . . . . .         | 586 |
| 13.52.15 ColorMap_v2 . . . . .             | 586 |
| 13.52.16 Color_v2 . . . . .                | 587 |
| 13.52.17 Denoise . . . . .                 | 587 |
| 13.52.18 DepthTextureFocus_v2 . . . . .    | 588 |
| 13.52.19 DepthTexture_v2 . . . . .         | 588 |
| 13.52.20 Desaturate . . . . .              | 589 |
| 13.52.21 Dither_v2 . . . . .               | 589 |
| 13.52.22 DrawImage_v3 . . . . .            | 590 |
| 13.52.23 EdgeDetection_v4 . . . . .        | 590 |
| 13.52.24 Emboss . . . . .                  | 591 |
| 13.52.25 FXAA . . . . .                    | 591 |
| 13.52.26 FastBlur_v2 . . . . .             | 592 |
| 13.52.27 Flip . . . . .                    | 592 |
| 13.52.28 Float32ToRgbeTexture . . . . .    | 593 |
| 13.52.29 Fog_v4 . . . . .                  | 593 |
| 13.52.30 GammaCorrection_v2 . . . . .      | 594 |
| 13.52.31 Gradient_v2 . . . . .             | 594 |
| 13.52.32 GridTexture_v2 . . . . .          | 595 |
| 13.52.33 GrowPixels_v2 . . . . .           | 595 |
| 13.52.34 Hue . . . . .                     | 596 |
| 13.52.35 ImageComposeAspectRatio . . . . . | 596 |
| 13.52.36 ImageComposeSnapshot . . . . .    | 597 |
| 13.52.37 ImageCompose_v4 . . . . .         | 597 |
| 13.52.38 Interlace . . . . .               | 598 |
| 13.52.39 Invert_v2 . . . . .               | 598 |
| 13.52.40 Kaleidoscope_v2 . . . . .         | 599 |
| 13.52.41 LUTMap . . . . .                  | 599 |
| 13.52.42 LensDirt_v2 . . . . .             | 600 |
| 13.52.43 LensScratches_v2 . . . . .        | 600 |
| 13.52.44 Levels_v2 . . . . .               | 601 |

|   |     |
|---|-----|
| 13.52.45 LumaKey_v3 . . . . .             | 601 |
| 13.52.46 Mirror . . . . .                 | 602 |
| 13.52.47 Mix . . . . .                    | 602 |
| 13.52.48 MultiDrawImage . . . . .         | 603 |
| 13.52.49 OnePassBlur . . . . .            | 603 |
| 13.52.50 PatternLookup . . . . .          | 603 |
| 13.52.51 PixelColor . . . . .             | 604 |
| 13.52.52 PixelDifference . . . . .        | 604 |
| 13.52.53 PixelDisplacement_v4 . . . . .   | 605 |
| 13.52.54 Pixelate_v2 . . . . .            | 606 |
| 13.52.55 Plasma_v2 . . . . .              | 606 |
| 13.52.56 PolarCoords . . . . .            | 607 |
| 13.52.57 Posterize_v2 . . . . .           | 607 |
| 13.52.58 PseudoLensFlares . . . . .       | 608 |
| 13.52.59 RGBOffset_v2 . . . . .           | 608 |
| 13.52.60 RandomNumberTexture . . . . .    | 609 |
| 13.52.61 RectangleTexture_v5 . . . . .    | 609 |
| 13.52.62 RemoveAlpha . . . . .            | 610 |
| 13.52.63 RepeatTexture_v2 . . . . .       | 610 |
| 13.52.64 RgbMultiply . . . . .            | 611 |
| 13.52.65 RgbToHsvTexture . . . . .        | 611 |
| 13.52.66 RotateTexture_v2 . . . . .       | 612 |
| 13.52.67 RoundCorners . . . . .           | 612 |
| 13.52.68 ScaleTexture_v3 . . . . .        | 613 |
| 13.52.69 ScrollTexture . . . . .          | 613 |
| 13.52.70 Shapes2d_v2 . . . . .            | 614 |
| 13.52.71 Sharpen . . . . .                | 614 |
| 13.52.72 SkewStretchImage_v2 . . . . .    | 615 |
| 13.52.73 Stripes_v4 . . . . .             | 615 |
| 13.52.74 TexMathModulo . . . . .          | 616 |
| 13.52.75 TextureDifference . . . . .      | 616 |
| 13.52.76 ToNormalMap_v2 . . . . .         | 617 |
| 13.52.77 Twirl_v4 . . . . .               | 617 |
| 13.52.78 Vibrance . . . . .               | 618 |
| 13.52.79 Vignette_v3 . . . . .            | 618 |
| 13.52.80 WaveformGradient_v4 . . . . .    | 619 |
| 13.52.81 Waveform_v3 . . . . .            | 619 |
| 13.52.82 Wobble_v2 . . . . .              | 620 |
| 13.52.83 ZoomBlur_v2 . . . . .            | 620 |
| 13.53 Ops.Gl.ImageCompose.Math . . . . .  | 621 |
| 13.53.1 ColorMapRange . . . . .           | 621 |
| 13.53.2 Normalize . . . . .               | 621 |
| 13.53.3 RgbMath . . . . .                 | 622 |
| 13.53.4 RgbMathExpression . . . . .       | 622 |
| 13.53.5 RgbTransform . . . . .            | 623 |
| 13.53.6 RgbeToFloat32Texture . . . . .    | 623 |
| 13.53.7 Round . . . . .                   | 624 |
| 13.53.8 TexMathCompare . . . . .          | 624 |
| 13.54 Ops.Gl.ImageCompose.Noise . . . . . | 625 |

|          |                             |     |
|----------|-----------------------------|-----|
| 13.54.1  | CellularNoise_v2            | 625 |
| 13.54.2  | FBMNoise_v2                 | 625 |
| 13.54.3  | GaborNoise                  | 626 |
| 13.54.4  | GlitchNoise_v2              | 626 |
| 13.54.5  | HexagonNoise_v2             | 627 |
| 13.54.6  | LayerNoise_v3               | 628 |
| 13.54.7  | Noise_v2                    | 628 |
| 13.54.8  | PerlinNoise_v2              | 629 |
| 13.54.9  | PixelNoise_v3               | 629 |
| 13.54.10 | PolkaDotNoise_v2            | 630 |
| 13.54.11 | Shardnoise                  | 630 |
| 13.54.12 | SimplexNoise_v2             | 631 |
| 13.54.13 | TriangleNoise_v2            | 631 |
| 13.54.14 | ValueNoise_v2               | 632 |
| 13.54.15 | VoronoiNoise_v2             | 632 |
| 13.54.16 | WorleyNoise_v2              | 633 |
| 13.55    | Ops.Gl.Matrix               | 633 |
| 13.55.1  | AnimMatrix                  | 634 |
| 13.55.2  | ArrayPathFollow             | 634 |
| 13.55.3  | ArrayPathFollowParticles_v2 | 635 |
| 13.55.4  | Billboard                   | 635 |
| 13.55.5  | CameraInfo                  | 636 |
| 13.55.6  | CameraPosition              | 636 |
| 13.55.7  | Camera_v2                   | 637 |
| 13.55.8  | Coordinates                 | 637 |
| 13.55.9  | DeviceOrientationCamera     | 638 |
| 13.55.10 | GetMatrixScaling            | 638 |
| 13.55.11 | GetModelMatrix              | 639 |
| 13.55.12 | GetProjectionMatrix         | 639 |
| 13.55.13 | GetViewMatrix               | 640 |
| 13.55.14 | InterpolateMatrix           | 640 |
| 13.55.15 | InvertMatrix                | 641 |
| 13.55.16 | LookatCamera                | 641 |
| 13.55.17 | MatrixTranslation           | 642 |
| 13.55.18 | MulViewMatrix               | 642 |
| 13.55.19 | MultiplyModelMatrix         | 643 |
| 13.55.20 | Quaternion                  | 643 |
| 13.55.21 | QuaternionCamera            | 644 |
| 13.55.22 | RandomGridPlacement         | 644 |
| 13.55.23 | RandomGridPlacementArrays   | 645 |
| 13.55.24 | Scale                       | 645 |
| 13.55.25 | ScaleXYZViewMatrix          | 646 |
| 13.55.26 | ScreenCoordinates_v2        | 646 |
| 13.55.27 | ScreenPosTo3d_v3            | 647 |
| 13.55.28 | SetProjectionMatrix         | 647 |
| 13.55.29 | Shear                       | 648 |
| 13.55.30 | TransformMatrix             | 648 |
| 13.55.31 | TransformMul                | 649 |
| 13.55.32 | Translate                   | 649 |

|  |     |
|--|-----|
| 13.55.33 TranslateView . . . . .               | 650 |
| 13.55.34 VectorTranslate . . . . .             | 650 |
| 13.55.35 WASDCamera_v2 . . . . .               | 651 |
| 13.56 Ops.Gl.Meshes . . . . .                  | 651 |
| 13.56.1 ComposingGridOverlay . . . . .         | 651 |
| 13.56.2 Cone . . . . .                         | 652 |
| 13.56.3 Corner . . . . .                       | 652 |
| 13.56.4 Cylinder_v2 . . . . .                  | 653 |
| 13.56.5 FloorGrid . . . . .                    | 653 |
| 13.56.6 FreeFormPlane . . . . .                | 653 |
| 13.56.7 FullscreenRectangle_v2 . . . . .       | 654 |
| 13.56.8 GeometryToTexture_v3 . . . . .         | 654 |
| 13.56.9 Grid . . . . .                         | 655 |
| 13.56.10 HeightMap . . . . .                   | 655 |
| 13.56.11 Helix . . . . .                       | 656 |
| 13.56.12 Icosahedron_v2 . . . . .              | 656 |
| 13.56.13 Line . . . . .                        | 657 |
| 13.56.14 LinesArray . . . . .                  | 657 |
| 13.56.15 MeshInstancerFromTexture_v3 . . . . . | 658 |
| 13.56.16 ParametricSurface . . . . .           | 658 |
| 13.56.17 PointCloudFromArray_v2 . . . . .      | 659 |
| 13.56.18 PointCloudFromTexture . . . . .       | 659 |
| 13.56.19 Polyhedron_v2 . . . . .               | 660 |
| 13.56.20 Pyramid_v2 . . . . .                  | 660 |
| 13.56.21 QuadWarpTexture . . . . .             | 661 |
| 13.56.22 Rectangle9Slice . . . . .             | 661 |
| 13.56.23 RectangleFrame_v2 . . . . .           | 662 |
| 13.56.24 RectangleRounded_v2 . . . . .         | 662 |
| 13.56.25 SimpleSpline_v2 . . . . .             | 663 |
| 13.56.26 SimpleWireframe . . . . .             | 663 |
| 13.56.27 SplineMeshMaterial_v2 . . . . .       | 664 |
| 13.56.28 SplineMesh_v2 . . . . .               | 664 |
| 13.56.29 TextMesh_v2 . . . . .                 | 665 |
| 13.56.30 Torus_v3 . . . . .                    | 665 |
| 13.56.31 TriangleSphere . . . . .              | 666 |
| 13.57 Ops.Gl.Pbr . . . . .                     | 666 |
| 13.57.1 PbrEnvironmentLight . . . . .          | 666 |
| 13.57.2 PbrMaterial . . . . .                  | 666 |
| 13.58 Ops.Gl.Phong . . . . .                   | 667 |
| 13.58.1 AmbientLight_v4 . . . . .              | 667 |
| 13.58.2 DirectionalLight_v5 . . . . .          | 667 |
| 13.58.3 LambertMaterial_v2 . . . . .           | 668 |
| 13.58.4 PhongMaterial_v6 . . . . .             | 668 |
| 13.58.5 PointLight_v5 . . . . .                | 669 |
| 13.58.6 ResetLights . . . . .                  | 669 |
| 13.58.7 SpotLight_v5 . . . . .                 | 669 |
| 13.59 Ops.Gl.Shader . . . . .                  | 670 |
| 13.59.1 AttributeAsColorMaterial . . . . .     | 670 |
| 13.59.2 BasicMaterial_v3 . . . . .             | 670 |

|  |     |
|--|-----|
| 13.59.3 ChromaKeyMaterial . . . . .            | 671 |
| 13.59.4 CustomShader_v2 . . . . .              | 671 |
| 13.59.5 ErrorMaterial . . . . .                | 672 |
| 13.59.6 FrontBacksideMaterial . . . . .        | 672 |
| 13.59.7 GetShader . . . . .                    | 673 |
| 13.59.8 MatCapMaterial_v3 . . . . .            | 673 |
| 13.59.9 MinifyGlsl . . . . .                   | 674 |
| 13.59.10 PointMaterial_v6 . . . . .            | 674 |
| 13.59.11 PositionAsColorMaterial . . . . .     | 675 |
| 13.59.12 SetShader . . . . .                   | 675 |
| 13.59.13 SetUniformFloat_v2 . . . . .          | 676 |
| 13.59.14 SetUniformTexture_v2 . . . . .        | 676 |
| 13.59.15 ShaderDefine . . . . .                | 677 |
| 13.59.16 ShaderInfo . . . . .                  | 677 |
| 13.59.17 ShaderInfoUniforms_v2 . . . . .       | 678 |
| 13.59.18 ShaderToTexture_v2 . . . . .          | 678 |
| 13.59.19 VertexColorMaterial . . . . .         | 679 |
| 13.59.20 VertexNumberMaterial . . . . .        | 679 |
| 13.59.21 WireframeMaterial_v2 . . . . .        | 680 |
| 13.60 Ops.Gl.ShaderEffects . . . . .           | 680 |
| 13.60.1 AreaDiscardPixel_v2 . . . . .          | 680 |
| 13.60.2 AreaRotate_v2 . . . . .                | 680 |
| 13.60.3 AreaScaler_v3 . . . . .                | 681 |
| 13.60.4 AreaTranslateFBMNoise . . . . .        | 681 |
| 13.60.5 AreaTranslateMeshes_v3 . . . . .       | 682 |
| 13.60.6 Bend_v2 . . . . .                      | 682 |
| 13.60.7 ClampVertexPosition_v2 . . . . .       | 683 |
| 13.60.8 ColorArea_v5 . . . . .                 | 683 |
| 13.60.9 DeformArea . . . . .                   | 684 |
| 13.60.10 DiscardMaterialAlpha . . . . .        | 685 |
| 13.60.11 ExplodeDividedMesh_v2 . . . . .       | 685 |
| 13.60.12 FogEffect . . . . .                   | 686 |
| 13.60.13 FresnelGlow . . . . .                 | 686 |
| 13.60.14 InstancedDisplacementMap_v2 . . . . . | 687 |
| 13.60.15 InstancedPerlinPosition_v2 . . . . .  | 687 |
| 13.60.16 InstancedTextureColorize . . . . .    | 688 |
| 13.60.17 LimitMeshByTexCoord . . . . .         | 688 |
| 13.60.18 MeshPixelNoise_v2 . . . . .           | 689 |
| 13.60.19 ModuloVertexPosition . . . . .        | 689 |
| 13.60.20 PerlinAreaDeform_v4 . . . . .         | 690 |
| 13.60.21 ScaleByNormal_v2 . . . . .            | 690 |
| 13.60.22 Shadow_v3 . . . . .                   | 691 |
| 13.60.23 SplineDeform_v2 . . . . .             | 691 |
| 13.60.24 TextureProjection_v2 . . . . .        | 692 |
| 13.60.25 TransformTextureCoordinates . . . . . | 692 |
| 13.60.26 TransformVertex . . . . .             | 693 |
| 13.60.27 Twist_v3 . . . . .                    | 693 |
| 13.60.28 UseVertexColor . . . . .              | 693 |
| 13.60.29 VertexArea . . . . .                  | 694 |

|          |  |     |
|----------|--|-----|
| 13.60.30 | VertexColorAsAlpha . . . . .           | 694 |
| 13.60.31 | VertexDisplacementMap_v5 . . . . .     | 695 |
| 13.60.32 | VertexNumberLimit_v2 . . . . .         | 696 |
| 13.60.33 | VertexPositionFromTexture_v2 . . . . . | 696 |
| 13.60.34 | VertexWobble_v2 . . . . .              | 697 |
| 13.61    | Ops.Gl.Textures . . . . .              | 697 |
| 13.61.1  | Base64ToTexture . . . . .              | 697 |
| 13.61.2  | ColorTexture . . . . .                 | 698 |
| 13.61.3  | CombineTextures . . . . .              | 698 |
| 13.61.4  | CopyTexture_v3 . . . . .               | 699 |
| 13.61.5  | EmptyTexture . . . . .                 | 700 |
| 13.61.6  | ExrTexture . . . . .                   | 700 |
| 13.61.7  | GraphTexture . . . . .                 | 701 |
| 13.61.8  | Histogram . . . . .                    | 701 |
| 13.61.9  | MontageTextures_v2 . . . . .           | 702 |
| 13.61.10 | NoiseTexture . . . . .                 | 702 |
| 13.61.11 | PaletteTexture . . . . .               | 703 |
| 13.61.12 | SSAO . . . . .                         | 703 |
| 13.61.13 | SequenceTextures . . . . .             | 704 |
| 13.61.14 | SwitchTextureMultiPort_v2 . . . . .    | 705 |
| 13.61.15 | SwitchTextures_v2 . . . . .            | 705 |
| 13.61.16 | TextTexture_v6 . . . . .               | 706 |
| 13.61.17 | TextureArrayInfo . . . . .             | 706 |
| 13.61.18 | TextureInfo_v2 . . . . .               | 707 |
| 13.61.19 | TextureSVG_v2 . . . . .                | 707 |
| 13.61.20 | TextureToBase64_v5 . . . . .           | 708 |
| 13.61.21 | TextureToCoordinateGrid . . . . .      | 708 |
| 13.61.22 | VideoTexture_v3 . . . . .              | 709 |
| 13.61.23 | WebcamTexture_v3 . . . . .             | 709 |
| 13.62    | Ops.Graphics . . . . .                 | 709 |
| 13.62.1  | ArrayToExr . . . . .                   | 710 |
| 13.62.2  | DepthTest . . . . .                    | 710 |
| 13.62.3  | GeometryMergeSimple . . . . .          | 711 |
| 13.62.4  | GetMaterialId . . . . .                | 711 |
| 13.62.5  | GetObjectId . . . . .                  | 712 |
| 13.62.6  | OrbitControls_v3 . . . . .             | 712 |
| 13.62.7  | Transform . . . . .                    | 712 |
| 13.62.8  | TransformView . . . . .                | 713 |
| 13.63    | Ops.Graphics.Geometry . . . . .        | 713 |
| 13.63.1  | AlignGeometry . . . . .                | 713 |
| 13.63.2  | BoundingBox . . . . .                  | 714 |
| 13.63.3  | CalculateNormals . . . . .             | 714 |
| 13.63.4  | DivideGeometry . . . . .               | 715 |
| 13.63.5  | FlipNormals . . . . .                  | 715 |
| 13.63.6  | FreezeMeshes . . . . .                 | 716 |
| 13.63.7  | GeometryAttributes . . . . .           | 716 |
| 13.63.8  | GeometryExtrude . . . . .              | 717 |
| 13.63.9  | GeometryFromArrays . . . . .           | 717 |
| 13.63.10 | GeometryInfo . . . . .                 | 718 |

|   |     |
|---|-----|
| 13.63.11 GeometryMerge . . . . .              | 718 |
| 13.63.12 GeometryToObj . . . . .              | 719 |
| 13.63.13 GeometryToWireframeArray3 . . . . .  | 720 |
| 13.63.14 GeometryUnIndex . . . . .            | 720 |
| 13.63.15 ObjGeometry . . . . .                | 721 |
| 13.63.16 RandomizeTriangles . . . . .         | 721 |
| 13.63.17 ReverseVertices . . . . .            | 722 |
| 13.63.18 ScaleGeometry . . . . .              | 722 |
| 13.63.19 SortGeometryAxis . . . . .           | 723 |
| 13.63.20 SvgPathToGeometry_v2 . . . . .       | 723 |
| 13.63.21 TesselateGeometry . . . . .          | 724 |
| 13.63.22 TransformGeometry . . . . .          | 724 |
| 13.63.23 TriangleArrayToGeometry_v2 . . . . . | 725 |
| 13.63.24 Triangulate2dPath . . . . .          | 725 |
| 13.64 Ops.Graphics.Intersection . . . . .     | 726 |
| 13.64.1 FilterIntersections . . . . .         | 726 |
| 13.64.2 IntersectBody . . . . .               | 726 |
| 13.64.3 IntersectTestBody . . . . .           | 727 |
| 13.64.4 IntersectTestPoint . . . . .          | 727 |
| 13.64.5 IntersectTestRaycast . . . . .        | 728 |
| 13.64.6 IntersectWorld . . . . .              | 729 |
| 13.65 Ops.Graphics.Meshes . . . . .           | 729 |
| 13.65.1 CablesLogo . . . . .                  | 729 |
| 13.65.2 Circle_v3 . . . . .                   | 730 |
| 13.65.3 Cross . . . . .                       | 730 |
| 13.65.4 Cube_v2 . . . . .                     | 731 |
| 13.65.5 Rectangle_v4 . . . . .                | 731 |
| 13.65.6 Sphere_v3 . . . . .                   | 732 |
| 13.65.7 Star_v2 . . . . .                     | 732 |
| 13.65.8 Triangle_v2 . . . . .                 | 733 |
| 13.66 Ops.Html . . . . .                      | 733 |
| 13.66.1 ActiveElement . . . . .               | 733 |
| 13.66.2 AlignElement . . . . .                | 734 |
| 13.66.3 AppendChild_v2 . . . . .              | 734 |
| 13.66.4 BrowserSpecificFile_v2 . . . . .      | 734 |
| 13.66.5 CanvasToBase64 . . . . .              | 735 |
| 13.66.6 CompareImages_v2 . . . . .            | 735 |
| 13.66.7 DocumentBody . . . . .                | 736 |
| 13.66.8 DraggableElement . . . . .            | 737 |
| 13.66.9 ElementAsHtmlString . . . . .         | 737 |
| 13.66.10 ElementChildsMultiPort_v2 . . . . .  | 738 |
| 13.66.11 ElementChilds_v2 . . . . .           | 738 |
| 13.66.12 ElementClientRect . . . . .          | 739 |
| 13.66.13 ElementCssCursor_v3 . . . . .        | 739 |
| 13.66.14 ElementCssString . . . . .           | 739 |
| 13.66.15 ElementDataSet . . . . .             | 740 |
| 13.66.16 ElementEquals . . . . .              | 740 |
| 13.66.17 ElementFadeInOut_v2 . . . . .        | 741 |
| 13.66.18 ElementGetClosest . . . . .          | 741 |

|   |     |
|---|-----|
| 13.66.19 ElementGradientBg . . . . .        | 742 |
| 13.66.20 ElementHasClass . . . . .          | 742 |
| 13.66.21 ElementInfo . . . . .              | 743 |
| 13.66.22 ElementIsFocused . . . . .         | 743 |
| 13.66.23 ElementsPositionsByClass . . . . . | 744 |
| 13.66.24 FontFile_v2 . . . . .              | 744 |
| 13.66.25 FontsLoaded . . . . .              | 745 |
| 13.66.26 FullscreenMode . . . . .           | 745 |
| 13.66.27 GlCopyToCanvas . . . . .           | 746 |
| 13.66.28 HyperLink_v3 . . . . .             | 746 |
| 13.66.29 InnerHTML . . . . .                | 746 |
| 13.66.30 InnerHtmlAppend . . . . .          | 747 |
| 13.66.31 MailtoLink . . . . .               | 748 |
| 13.66.32 MarkdownToHtml . . . . .           | 748 |
| 13.66.33 ModalOverlay . . . . .             | 748 |
| 13.66.34 QuerySelectorAll_v2 . . . . .      | 749 |
| 13.66.35 QuerySelector_v3 . . . . .         | 749 |
| 13.66.36 ReloadPage . . . . .               | 750 |
| 13.66.37 ScrollIntoView . . . . .           | 750 |
| 13.66.38 ScrollPosition_v2 . . . . .        | 751 |
| 13.66.39 ScrollTo . . . . .                 | 751 |
| 13.66.40 WindowClose . . . . .              | 752 |
| 13.66.41 WindowHasFocus . . . . .           | 752 |
| 13.66.42 WindowInfo . . . . .               | 753 |
| 13.66.43 WindowScroll . . . . .             | 753 |
| 13.67 Ops.Html.Attributes . . . . .         | 753 |
| 13.67.1 ElementAccessibility . . . . .      | 754 |
| 13.67.2 ElementAttributes . . . . .         | 754 |
| 13.67.3 ElementGetAttribute . . . . .       | 755 |
| 13.67.4 ElementSetAttribute . . . . .       | 755 |
| 13.68 Ops.Html.CSS . . . . .                | 756 |
| 13.68.1 BackgroundImage_v2 . . . . .        | 756 |
| 13.68.2 CSSFilter . . . . .                 | 756 |
| 13.68.3 CSSPropertyString . . . . .         | 757 |
| 13.68.4 CSSProperty_v2 . . . . .            | 757 |
| 13.68.5 CSS_v3 . . . . .                    | 758 |
| 13.68.6 CssClass . . . . .                  | 758 |
| 13.68.7 CssFile . . . . .                   | 759 |
| 13.68.8 ElementclassList . . . . .          | 759 |
| 13.68.9 Elementcss3DTransform . . . . .     | 760 |
| 13.68.10 ElementcssBorder . . . . .         | 760 |
| 13.68.11 ElementcssColor . . . . .          | 761 |
| 13.68.12 ElementcssPadding_v2 . . . . .     | 761 |
| 13.68.13 ElementcssShadow . . . . .         | 762 |
| 13.68.14 ElementcssSize . . . . .           | 762 |
| 13.68.15 ElementcssText . . . . .           | 763 |
| 13.68.16 ElementcssTransform_v2 . . . . .   | 763 |
| 13.68.17 ElmentcssScrollbar . . . . .       | 764 |
| 13.68.18 GetCssVariable . . . . .           | 764 |

|  |     |
|--|-----|
| 13.68.19 SetCssVariableColor . . . . .       | 765 |
| 13.68.20 SetCssVariableNumber . . . . .      | 765 |
| 13.68.21 SetCssVariableString . . . . .      | 766 |
| 13.68.22 SetCssVariableUrl . . . . .         | 766 |
| 13.68.23 SwitchClass . . . . .               | 767 |
| 13.68.24 TransformCSS3DElement . . . . .     | 767 |
| 13.68.25 TransformElement . . . . .          | 768 |
| 13.69 Ops.Html.Css . . . . .                 | 768 |
| 13.69.1 ElementBackDropFilter . . . . .      | 768 |
| 13.69.2 ElementMargin . . . . .              | 769 |
| 13.70 Ops.Html.Elements . . . . .            | 769 |
| 13.70.1 AudioMediaElement . . . . .          | 769 |
| 13.70.2 Element_v2 . . . . .                 | 770 |
| 13.70.3 IFrame_v3 . . . . .                  | 770 |
| 13.70.4 ImageElement_v3 . . . . .            | 771 |
| 13.70.5 InputElement . . . . .               | 771 |
| 13.70.6 VideoElement . . . . .               | 772 |
| 13.71 Ops.Html.Event . . . . .               | 773 |
| 13.71.1 ElementEventListener_v2 . . . . .    | 773 |
| 13.71.2 ElementPointerEvents . . . . .       | 773 |
| 13.71.3 ElementsArrayEventListener . . . . . | 774 |
| 13.71.4 PreventDefault . . . . .             | 774 |
| 13.71.5 StopPropagation . . . . .            | 775 |
| 13.72 Ops.Html_Utils . . . . .               | 775 |
| 13.72.1 CablesLink . . . . .                 | 775 |
| 13.72.2 LoadingIndicator_v2 . . . . .        | 776 |
| 13.72.3 Notification . . . . .               | 776 |
| 13.72.4 PlayButton . . . . .                 | 777 |
| 13.72.5 PlayerControlPanel_v2 . . . . .      | 777 |
| 13.72.6 QrCode . . . . .                     | 777 |
| 13.72.7 YoutubePlayer . . . . .              | 778 |
| 13.73 Ops.Json . . . . .                     | 778 |
| 13.73.1 ArrayOfObjectsMultiPort_v2 . . . . . | 778 |
| 13.73.2 CopyObject . . . . .                 | 779 |
| 13.73.3 CsvArray . . . . .                   | 779 |
| 13.73.4 CsvColumnArray_v2 . . . . .          | 780 |
| 13.73.5 EmptyObject . . . . .                | 780 |
| 13.73.6 FilterValidObject . . . . .          | 781 |
| 13.73.7 GateObject . . . . .                 | 781 |
| 13.73.8 HttpFetchStream . . . . .            | 782 |
| 13.73.9 HttpRequest_v4 . . . . .             | 782 |
| 13.73.10 Object . . . . .                    | 783 |
| 13.73.11 ObjectDeleteKey . . . . .           | 783 |
| 13.73.12 ObjectFilterContentByKey . . . . .  | 784 |
| 13.73.13 ObjectFunnel . . . . .              | 784 |
| 13.73.14 ObjectGetArray_v2 . . . . .         | 785 |
| 13.73.15 ObjectGetNumber_v2 . . . . .        | 785 |
| 13.73.16 ObjectGetObject_v2 . . . . .        | 786 |
| 13.73.17 ObjectGetString_v2 . . . . .        | 786 |

|   |     |
|---|-----|
| 13.73.18 ObjectIsNull . . . . .             | 787 |
| 13.73.19 ObjectKeys . . . . .               | 787 |
| 13.73.20 ObjectMerge . . . . .              | 788 |
| 13.73.21 ObjectOr . . . . .                 | 788 |
| 13.73.22 ObjectRecorder . . . . .           | 789 |
| 13.73.23 ObjectSetArray_v2 . . . . .        | 789 |
| 13.73.24 ObjectSetBool . . . . .            | 790 |
| 13.73.25 ObjectSetColorArray . . . . .      | 790 |
| 13.73.26 ObjectSetNumber_v2 . . . . .       | 791 |
| 13.73.27 ObjectSetObject_v2 . . . . .       | 791 |
| 13.73.28 ObjectSetString_v2 . . . . .       | 792 |
| 13.73.29 ObjectStringify_v2 . . . . .       | 792 |
| 13.73.30 ObjectToArray . . . . .            | 793 |
| 13.73.31 ObjectValuesAsArray . . . . .      | 793 |
| 13.73.32 ParseObject_v2 . . . . .           | 794 |
| 13.73.33 RemoveDataUrlPrefix . . . . .      | 794 |
| 13.73.34 RouteObject . . . . .              | 795 |
| 13.73.35 SaveJsonFile . . . . .             | 795 |
| 13.73.36 SequenceObjects_v2 . . . . .       | 796 |
| 13.73.37 SwitchObject . . . . .             | 796 |
| 13.73.38 SwitchObjectMultiPort_v2 . . . . . | 797 |
| 13.73.39 TriggerObject . . . . .            | 797 |
| 13.73.40 TriggerObjectSetNumber . . . . .   | 798 |
| 13.73.41 TriggerObjectSetString . . . . .   | 798 |
| 13.74 Ops.Math . . . . .                    | 799 |
| 13.74.1 Abs . . . . .                       | 799 |
| 13.74.2 Accumulator . . . . .               | 799 |
| 13.74.3 AddUp . . . . .                     | 800 |
| 13.74.4 AngleBetweenPoints . . . . .        | 800 |
| 13.74.5 Array3MultiplyMatrix . . . . .      | 801 |
| 13.74.6 Array3To2dProjection . . . . .      | 801 |
| 13.74.7 Atan2 . . . . .                     | 802 |
| 13.74.8 Average . . . . .                   | 802 |
| 13.74.9 ButterflyCurve . . . . .            | 803 |
| 13.74.10 Ceil . . . . .                     | 803 |
| 13.74.11 CircleCoordinates . . . . .        | 803 |
| 13.74.12 Clamp . . . . .                    | 804 |
| 13.74.13 Cosine . . . . .                   | 804 |
| 13.74.14 Cross . . . . .                    | 805 |
| 13.74.15 DegreeToVector . . . . .           | 805 |
| 13.74.16 Degrees . . . . .                  | 806 |
| 13.74.17 Delta . . . . .                    | 806 |
| 13.74.18 DeltaSum . . . . .                 | 807 |
| 13.74.19 Difference . . . . .               | 807 |
| 13.74.20 Distance2d . . . . .               | 808 |
| 13.74.21 Distance3d_v2 . . . . .            | 808 |
| 13.74.22 Divide . . . . .                   | 809 |
| 13.74.23 Ease . . . . .                     | 809 |
| 13.74.24 Exp . . . . .                      | 809 |

|          |                                   |     |
|----------|-----------------------------------|-----|
| 13.74.25 | FlipSign . . . . .                | 810 |
| 13.74.26 | Floor . . . . .                   | 810 |
| 13.74.27 | Fract . . . . .                   | 811 |
| 13.74.28 | GaussianRandomArray . . . . .     | 811 |
| 13.74.29 | Incrementor . . . . .             | 812 |
| 13.74.30 | IndexFraction . . . . .           | 812 |
| 13.74.31 | Interpolate . . . . .             | 813 |
| 13.74.32 | IsNumberRising . . . . .          | 813 |
| 13.74.33 | Log . . . . .                     | 814 |
| 13.74.34 | MapGeoCoordsSpherical . . . . .   | 814 |
| 13.74.35 | MapRange . . . . .                | 815 |
| 13.74.36 | Math . . . . .                    | 815 |
| 13.74.37 | MathExpression . . . . .          | 815 |
| 13.74.38 | Max . . . . .                     | 816 |
| 13.74.39 | MaxSinceReset . . . . .           | 816 |
| 13.74.40 | MercatorCoord . . . . .           | 817 |
| 13.74.41 | MercatorCoordsArray . . . . .     | 817 |
| 13.74.42 | MinSinceReset . . . . .           | 818 |
| 13.74.43 | Min_v3 . . . . .                  | 818 |
| 13.74.44 | Modulo . . . . .                  | 819 |
| 13.74.45 | MulMatrixXyz . . . . .            | 819 |
| 13.74.46 | Multiply . . . . .                | 820 |
| 13.74.47 | Multiply3Numbers . . . . .        | 820 |
| 13.74.48 | Normalize . . . . .               | 821 |
| 13.74.49 | NumberDivisible . . . . .         | 821 |
| 13.74.50 | OneMinus . . . . .                | 822 |
| 13.74.51 | PerlinNoise_v2 . . . . .          | 822 |
| 13.74.52 | Pi . . . . .                      | 823 |
| 13.74.53 | PointInRectangle2d . . . . .      | 823 |
| 13.74.54 | Pow . . . . .                     | 824 |
| 13.74.55 | PowerOfTwoSize . . . . .          | 824 |
| 13.74.56 | Radians . . . . .                 | 825 |
| 13.74.57 | RandomCounter . . . . .           | 825 |
| 13.74.58 | RandomNumbersFromString . . . . . | 825 |
| 13.74.59 | RandomNumbers_v3 . . . . .        | 826 |
| 13.74.60 | RotationFromNormal . . . . .      | 826 |
| 13.74.61 | Round . . . . .                   | 827 |
| 13.74.62 | RoundEven . . . . .               | 827 |
| 13.74.63 | SchlickBias . . . . .             | 828 |
| 13.74.64 | Sign . . . . .                    | 828 |
| 13.74.65 | SimpleMovingAverage . . . . .     | 829 |
| 13.74.66 | Sine . . . . .                    | 829 |
| 13.74.67 | Speed . . . . .                   | 830 |
| 13.74.68 | Sqrt . . . . .                    | 830 |
| 13.74.69 | Subtract . . . . .                | 831 |
| 13.74.70 | Sum . . . . .                     | 831 |
| 13.74.71 | Tangent . . . . .                 | 832 |
| 13.74.72 | TriggerMathExpression . . . . .   | 832 |
| 13.74.73 | TriggerRandomNumber_v3 . . . . .  | 833 |

|          |                                    |     |
|----------|------------------------------------|-----|
| 13.74.74 | VectorLength . . . . .             | 833 |
| 13.75    | Ops.Math.Compare . . . . .         | 834 |
| 13.75.1  | Between . . . . .                  | 834 |
| 13.75.2  | BetweenEquals . . . . .            | 834 |
| 13.75.3  | CompareNumbers . . . . .           | 835 |
| 13.75.4  | Equals . . . . .                   | 835 |
| 13.75.5  | GreaterOrEquals . . . . .          | 836 |
| 13.75.6  | GreaterThan . . . . .              | 836 |
| 13.75.7  | IfBetweenThen . . . . .            | 837 |
| 13.75.8  | IsEven . . . . .                   | 837 |
| 13.75.9  | LessThan . . . . .                 | 838 |
| 13.76    | Ops.Net . . . . .                  | 838 |
| 13.76.1  | CorsProxy_v3 . . . . .             | 838 |
| 13.77    | Ops.Net.WebSocket . . . . .        | 838 |
| 13.77.1  | WebSocketSend . . . . .            | 839 |
| 13.77.2  | WebSocket_v2 . . . . .             | 839 |
| 13.78    | Ops.Number . . . . .               | 840 |
| 13.78.1  | DelayNumberSimple . . . . .        | 840 |
| 13.78.2  | DelayedNumber . . . . .            | 840 |
| 13.78.3  | FilterValidNumber . . . . .        | 841 |
| 13.78.4  | FreezeNumber . . . . .             | 841 |
| 13.78.5  | GateNumber . . . . .               | 842 |
| 13.78.6  | Integer . . . . .                  | 842 |
| 13.78.7  | MaximumSafeInteger . . . . .       | 843 |
| 13.78.8  | MinimumSafeInteger . . . . .       | 843 |
| 13.78.9  | Number . . . . .                   | 843 |
| 13.78.10 | NumberSequence . . . . .           | 844 |
| 13.78.11 | Preset . . . . .                   | 844 |
| 13.78.12 | PreviousNumberStore . . . . .      | 845 |
| 13.78.13 | RouteNumber . . . . .              | 845 |
| 13.78.14 | SequenceNumbers . . . . .          | 846 |
| 13.78.15 | SumMultiPort_v2 . . . . .          | 846 |
| 13.78.16 | SwitchNumber . . . . .             | 847 |
| 13.78.17 | SwitchNumberMultiPort_v2 . . . . . | 847 |
| 13.78.18 | SwitchNumberOnTrigger . . . . .    | 848 |
| 13.78.19 | Trigger3Numbers . . . . .          | 848 |
| 13.78.20 | TriggerOnChangeNumber_v2 . . . . . | 849 |
| 13.79    | Ops Sidebar . . . . .              | 849 |
| 13.79.1  | Button_v2 . . . . .                | 849 |
| 13.79.2  | ColorPicker_v3 . . . . .           | 850 |
| 13.79.3  | DisplayValue_v2 . . . . .          | 850 |
| 13.79.4  | DropDown_v2 . . . . .              | 851 |
| 13.79.5  | Group . . . . .                    | 851 |
| 13.79.6  | Incrementor_v3 . . . . .           | 852 |
| 13.79.7  | LocalFileToDataUrl . . . . .       | 852 |
| 13.79.8  | NumberInput_v2 . . . . .           | 852 |
| 13.79.9  | Presets_v2 . . . . .               | 853 |
| 13.79.10 | SideBarImage . . . . .             | 853 |
| 13.79.11 | SideBarStyle . . . . .             | 854 |

|  |            |
|--|------------|
| 13.79.12 SideBarSwitch . . . . .               | 854        |
| 13.79.13 Sidebar . . . . .                     | 855        |
| 13.79.14 SidebarDateTime . . . . .             | 855        |
| 13.79.15 SidebarElement . . . . .              | 856        |
| 13.79.16 SidebarText_v3 . . . . .              | 856        |
| 13.79.17 SidebarVariables . . . . .            | 857        |
| 13.79.18 Slider_v3 . . . . .                   | 857        |
| 13.79.19 TextInput_v2 . . . . .                | 858        |
| 13.79.20 Toggle_v4 . . . . .                   | 858        |
| 13.79.21 XYPad . . . . .                       | 859        |
| <b>13.80 Ops.String . . . . .</b>              | <b>859</b> |
| 13.80.1 AddLineBreaks_v2 . . . . .             | 859        |
| 13.80.2 ArrayContainsString . . . . .          | 860        |
| 13.80.3ArrayOfStrings . . . . .                | 860        |
| 13.80.4 CharacterRotate . . . . .              | 861        |
| 13.80.5 ConcatMultiPort_v2 . . . . .           | 861        |
| 13.80.6 ConcatMulti_v2 . . . . .               | 862        |
| 13.80.7 Concat_v2 . . . . .                    | 862        |
| 13.80.8 CopyToClipboard . . . . .              | 863        |
| 13.80.9 DelayStringSimple . . . . .            | 863        |
| 13.80.10 EndsWith . . . . .                    | 864        |
| 13.80.11 FileUrlsToArrayMultiPort_v2 . . . . . | 864        |
| 13.80.12 FilterValidString . . . . .           | 865        |
| 13.80.13 FreezeString . . . . .                | 865        |
| 13.80.14 GateString . . . . .                  | 866        |
| 13.80.15 HandleBarsHtml_v2 . . . . .           | 866        |
| 13.80.16 HtmlDecode . . . . .                  | 866        |
| 13.80.17 HtmlEncode . . . . .                  | 867        |
| 13.80.18 LeftPad_v2 . . . . .                  | 867        |
| 13.80.19 LimitLineBreaks_v2 . . . . .          | 868        |
| 13.80.20 LineBreak . . . . .                   | 868        |
| 13.80.21 LineBreaksHtml . . . . .              | 869        |
| 13.80.22 LoremIpsum . . . . .                  | 869        |
| 13.80.23 Lowercase_v2 . . . . .                | 870        |
| 13.80.24 Md5 . . . . .                         | 870        |
| 13.80.25 NumTotalLineBreaks . . . . .          | 871        |
| 13.80.26 NumberFormatter . . . . .             | 871        |
| 13.80.27 NumberSwitchByString . . . . .        | 872        |
| 13.80.28 NumberToString_v2 . . . . .           | 872        |
| 13.80.29 OrString . . . . .                    | 873        |
| 13.80.30 ParseInt_v2 . . . . .                 | 873        |
| 13.80.31 RandomString_v3 . . . . .             | 874        |
| 13.80.32 RightPadNumber_v2 . . . . .           | 874        |
| 13.80.33 RightPad_v2 . . . . .                 | 875        |
| 13.80.34 RouteString . . . . .                 | 875        |
| 13.80.35 SaveTextFile . . . . .                | 876        |
| 13.80.36 SequenceStrings . . . . .             | 876        |
| 13.80.37 StartsWith . . . . .                  | 877        |
| 13.80.38 StringCompose_v3 . . . . .            | 877        |

|   |     |
|---|-----|
| 13.80.39 StringContains_v2 . . . . .          | 878 |
| 13.80.40 StringEditor . . . . .               | 878 |
| 13.80.41 StringEquals_v2 . . . . .            | 879 |
| 13.80.42 StringGetLineNumAtIndex . . . . .    | 879 |
| 13.80.43 StringIterator_v2 . . . . .          | 880 |
| 13.80.44 StringLength_v2 . . . . .            | 880 |
| 13.80.45 StringRemoveCharacters . . . . .     | 881 |
| 13.80.46 StringReplace . . . . .              | 881 |
| 13.80.47 StringSortLines . . . . .            | 882 |
| 13.80.48 StringSwitchByString . . . . .       | 882 |
| 13.80.49 StringToNumber . . . . .             | 883 |
| 13.80.50 StringTrim_v2 . . . . .              | 883 |
| 13.80.51 String_v3 . . . . .                  | 884 |
| 13.80.52 StringsToArrayMultiPort_v2 . . . . . | 884 |
| 13.80.53 StripHtml . . . . .                  | 885 |
| 13.80.54 SubString_v2 . . . . .               | 885 |
| 13.80.55 SwitchString . . . . .               | 886 |
| 13.80.56 SwitchStringMultiPort_v2 . . . . .   | 886 |
| 13.80.57 UUID . . . . .                       | 887 |
| 13.80.58 Uppercase_v2 . . . . .               | 887 |
| 13.81 Ops.String.Base64 . . . . .             | 888 |
| 13.81.1 Base64Decode_v2 . . . . .             | 888 |
| 13.81.2 Base64Encode_v3 . . . . .             | 888 |
| 13.81.3 DownloadBase64File . . . . .          | 889 |
| 13.82 Ops.String.File . . . . .               | 889 |
| 13.82.1 FileInputStream_v2 . . . . .          | 889 |
| 13.82.2 SwitchFile_v2 . . . . .               | 890 |
| 13.83 Ops.Templates . . . . .                 | 890 |
| 13.83.1 ExampleVizOp . . . . .                | 890 |
| 13.83.2 MinimalMaterial . . . . .             | 891 |
| 13.83.3 PortsArrayExample . . . . .           | 891 |
| 13.83.4 PortsBooleanExample . . . . .         | 892 |
| 13.83.5 PortsObjectExample . . . . .          | 892 |
| 13.83.6 PortsStringExample . . . . .          | 893 |
| 13.83.7 PortsTriggerExample . . . . .         | 893 |
| 13.83.8 PortsValueExample . . . . .           | 894 |
| 13.83.9 ShaderEffectExample . . . . .         | 894 |
| 13.83.10 UiTestOp . . . . .                   | 895 |
| 13.84 Ops.TimeLine . . . . .                  | 895 |
| 13.84.1 Anim . . . . .                        | 895 |
| 13.84.2 AnimGetKey . . . . .                  | 896 |
| 13.84.3 AnimGetValue . . . . .                | 896 |
| 13.84.4 AnimInfo . . . . .                    | 897 |
| 13.84.5 AutoPlay . . . . .                    | 897 |
| 13.84.6 DemoPrerender . . . . .               | 898 |
| 13.84.7 GotoFrame . . . . .                   | 898 |
| 13.84.8 PreRender . . . . .                   | 899 |
| 13.84.9 TimeLineControls . . . . .            | 899 |
| 13.84.10 TimeLineFrame . . . . .              | 900 |

|   |     |
|---|-----|
| 13.84.11 TimeLineLength . . . . .             | 900 |
| 13.84.12 TimeLineLoop . . . . .               | 901 |
| 13.84.13 TimeLineOverwrite . . . . .          | 901 |
| 13.84.14 TimeLinePlay . . . . .               | 902 |
| 13.84.15 TimeLinePlayer . . . . .             | 902 |
| 13.84.16 TimeLineRewind . . . . .             | 903 |
| 13.84.17 TimeLineSetTime . . . . .            | 903 |
| 13.84.18 TimeLineTime . . . . .               | 904 |
| 13.84.19 TimeLineTogglePlay . . . . .         | 904 |
| 13.84.20 TimelineConfig . . . . .             | 905 |
| 13.84.21 TimelineDebug . . . . .              | 905 |
| 13.84.22 TimelineValue . . . . .              | 906 |
| 13.85 Ops.TimeLine.Viz . . . . .              | 906 |
| 13.85.1 TimeLineBPM . . . . .                 | 906 |
| 13.85.2 TimeLineImage . . . . .               | 907 |
| 13.86 Ops.Trigger . . . . .                   | 907 |
| 13.86.1 DelayedTrigger . . . . .              | 907 |
| 13.86.2 GateTrigger . . . . .                 | 908 |
| 13.86.3 Interval . . . . .                    | 908 |
| 13.86.4 IsTriggered . . . . .                 | 909 |
| 13.86.5 NthTrigger_v2 . . . . .               | 909 |
| 13.86.6 NumberByTrigger . . . . .             | 909 |
| 13.86.7 NumberByTriggerMultiPort_v2 . . . . . | 910 |
| 13.86.8 ProbabilityTrigger . . . . .          | 910 |
| 13.86.9 RandomTrigger . . . . .               | 911 |
| 13.86.10 Repeat2d . . . . .                   | 911 |
| 13.86.11 Repeat_v2 . . . . .                  | 912 |
| 13.86.12 RouteTrigger . . . . .               | 912 |
| 13.86.13 RouteTriggerAnimated . . . . .       | 913 |
| 13.86.14 RouteTriggerMultiPort_v2 . . . . .   | 913 |
| 13.86.15 RouteTriggerString_v2 . . . . .      | 914 |
| 13.86.16 Sequence . . . . .                   | 914 |
| 13.86.17 SequenceMultiPort_v2 . . . . .       | 915 |
| 13.86.18 SwitchTrigger . . . . .              | 915 |
| 13.86.19 Threshold . . . . .                  | 916 |
| 13.86.20 TimeSinceTrigger . . . . .           | 916 |
| 13.86.21 TimedSequence . . . . .              | 917 |
| 13.86.22 TriggerButton . . . . .              | 917 |
| 13.86.23 TriggerCounter . . . . .             | 918 |
| 13.86.24 TriggerCounterLoop . . . . .         | 918 |
| 13.86.25 TriggerDistributeByValue . . . . .   | 918 |
| 13.86.26 TriggerExtender . . . . .            | 919 |
| 13.86.27 TriggerIfDecreased . . . . .         | 919 |
| 13.86.28 TriggerIfIncreased . . . . .         | 920 |
| 13.86.29 TriggerLimiter . . . . .             | 920 |
| 13.86.30 TriggerNumber . . . . .              | 921 |
| 13.86.31 TriggerOnChangeArray_v2 . . . . .    | 921 |
| 13.86.32 TriggerOnChangeObject_v2 . . . . .   | 921 |
| 13.86.33 TriggerOnChangeString_v2 . . . . .   | 922 |

|   |     |
|---|-----|
| 13.86.34 TriggerOnChangeTexture . . . . . | 922 |
| 13.86.35 TriggerOnce . . . . .            | 923 |
| 13.86.36 TriggerReceive . . . . .         | 923 |
| 13.86.37 TriggerReceiveFilter . . . . .   | 924 |
| 13.86.38 TriggerSend . . . . .            | 924 |
| 13.86.39 TriggerSendNamed . . . . .       | 925 |
| 13.86.40 TriggerString . . . . .          | 925 |
| 13.86.41 TriggersPerSecond . . . . .      | 926 |
| 13.86.42 ValueBecameZeroTrigger . . . . . | 926 |
| 13.87 Ops.Ui . . . . .                    | 926 |
| 13.87.1 Area . . . . .                    | 926 |
| 13.87.2 CablesEditorEvents . . . . .      | 927 |
| 13.87.3 Comment_v2 . . . . .              | 927 |
| 13.87.4 GetCablesDefaultTheme . . . . .   | 928 |
| 13.87.5 MaximizeRenderer . . . . .        | 928 |
| 13.87.6 PatchInput . . . . .              | 929 |
| 13.87.7 PatchOutput . . . . .             | 929 |
| 13.87.8 SetCablesTheme . . . . .          | 930 |
| 13.87.9 SubPatch . . . . .                | 930 |
| 13.87.10 SubPatchInput . . . . .          | 931 |
| 13.87.11 SubPatchOutput . . . . .         | 931 |
| 13.87.12 Subpatch2Template . . . . .      | 932 |
| 13.87.13 VizArrayChart . . . . .          | 932 |
| 13.87.14 VizArrayGraph . . . . .          | 933 |
| 13.87.15 VizArrayTable_v2 . . . . .       | 933 |
| 13.87.16 VizBool . . . . .                | 934 |
| 13.87.17 VizGraph . . . . .               | 934 |
| 13.87.18 VizImageUrl . . . . .            | 935 |
| 13.87.19 VizLogger . . . . .              | 935 |
| 13.87.20 VizNumber . . . . .              | 936 |
| 13.87.21 VizNumberBar . . . . .           | 936 |
| 13.87.22 VizObject . . . . .              | 937 |
| 13.87.23 VizString . . . . .              | 937 |
| 13.87.24 VizTexture . . . . .             | 938 |
| 13.87.25 VizTextureTable . . . . .        | 938 |
| 13.87.26 VizTrigger . . . . .             | 939 |
| 13.88 Ops.Ui.Debug . . . . .              | 939 |
| 13.88.1 PatchUiCoords . . . . .           | 939 |
| 13.89 Ops.Ui.Routing . . . . .            | 940 |
| 13.89.1 RouteArray . . . . .              | 940 |
| 13.89.2 RouteNumber . . . . .             | 940 |
| 13.89.3 RouteObject . . . . .             | 941 |
| 13.89.4 RouteString . . . . .             | 941 |
| 13.89.5 RouteTrigger . . . . .            | 942 |
| 13.90 Ops.Vars . . . . .                  | 942 |
| 13.90.1 TriggerVarGetArray . . . . .      | 942 |
| 13.90.2 TriggerVarGetNumber . . . . .     | 943 |
| 13.90.3 TriggerVarGetObject . . . . .     | 943 |
| 13.90.4 TriggerVarGetString . . . . .     | 944 |

|  |     |
|--|-----|
| 13.90.5 VarGetArray_v2 . . . . .           | 944 |
| 13.90.6 VarGetNumber_v2 . . . . .          | 945 |
| 13.90.7 VarGetObject_v2 . . . . .          | 945 |
| 13.90.8 VarGetString . . . . .             | 946 |
| 13.90.9 VarGetTexture_v2 . . . . .         | 946 |
| 13.90.10 VarSetArray_v2 . . . . .          | 947 |
| 13.90.11 VarSetNumber_v2 . . . . .         | 947 |
| 13.90.12 VarSetObject_v2 . . . . .         | 948 |
| 13.90.13 VarSetString_v2 . . . . .         | 948 |
| 13.90.14 VarSetTexture_v2 . . . . .        | 949 |
| 13.90.15 VarTriggerArray . . . . .         | 949 |
| 13.90.16 VarTriggerNumber . . . . .        | 949 |
| 13.90.17 VarTriggerObject . . . . .        | 950 |
| 13.90.18 VarTriggerString . . . . .        | 950 |
| 13.90.19 VarTriggerTexture . . . . .       | 951 |
| 13.90.20 VariablesAsObject . . . . .       | 951 |
| 13.91 Ops.WebAudio . . . . .               | 952 |
| 13.91.1 AnalyzerTexture_v2 . . . . .       | 952 |
| 13.91.2 AudioAnalyzer_v2 . . . . .         | 952 |
| 13.91.3 AudioBufferChannelRouter . . . . . | 953 |
| 13.91.4 AudioBufferPlayer_v2 . . . . .     | 953 |
| 13.91.5 AudioBufferToSplineArray . . . . . | 954 |
| 13.91.6 AudioBuffer_v3 . . . . .           | 954 |
| 13.91.7 AudioPanner . . . . .              | 955 |
| 13.91.8 AudioRecorder . . . . .            | 955 |
| 13.91.9 BiquadFilter_v2 . . . . .          | 956 |
| 13.91.10 ClockSequencer . . . . .          | 956 |
| 13.91.11 ClockSequencerPattern . . . . .   | 957 |
| 13.91.12 Convolver_v2 . . . . .            | 957 |
| 13.91.13 CutFilter . . . . .               | 957 |
| 13.91.14 Delay . . . . .                   | 958 |
| 13.91.15 FFTAreaAverage_v3 . . . . .       | 958 |
| 13.91.16 Gain . . . . .                    | 959 |
| 13.91.17 KeyPiano . . . . .                | 959 |
| 13.91.18 MicrophoneIn_v2 . . . . .         | 960 |
| 13.91.19 MidiValueToFrequency . . . . .    | 960 |
| 13.91.20 Mixer . . . . .                   | 961 |
| 13.91.21 MusicalScales . . . . .           | 961 |
| 13.91.22 Output_v2 . . . . .               | 962 |
| 13.91.23 ThreeBandEqualizer . . . . .      | 962 |
| 13.91.24 WaveformMesh . . . . .            | 962 |
| 13.91.25 Waveshaper . . . . .              | 963 |
| 13.92 Ops.Website . . . . .                | 963 |
| 13.92.1 Cookie . . . . .                   | 963 |
| 13.92.2 FileInfo . . . . .                 | 964 |
| 13.92.3 ForceHttps . . . . .               | 964 |
| 13.92.4 InIframe . . . . .                 | 965 |
| 13.92.5 InfoURL . . . . .                  | 965 |
| 13.92.6 LocalStorageNumber . . . . .       | 966 |

|                                      |     |
|--------------------------------------|-----|
| 13.92.7 LocalStorageString . . . . . | 966 |
| 13.92.8 LocationHashRoute . . . . .  | 967 |
| 13.92.9 SetLocationHash . . . . .    | 967 |
| 13.92.10 UrlQueryParams_v2 . . . . . | 968 |

# The Cables.gl Book

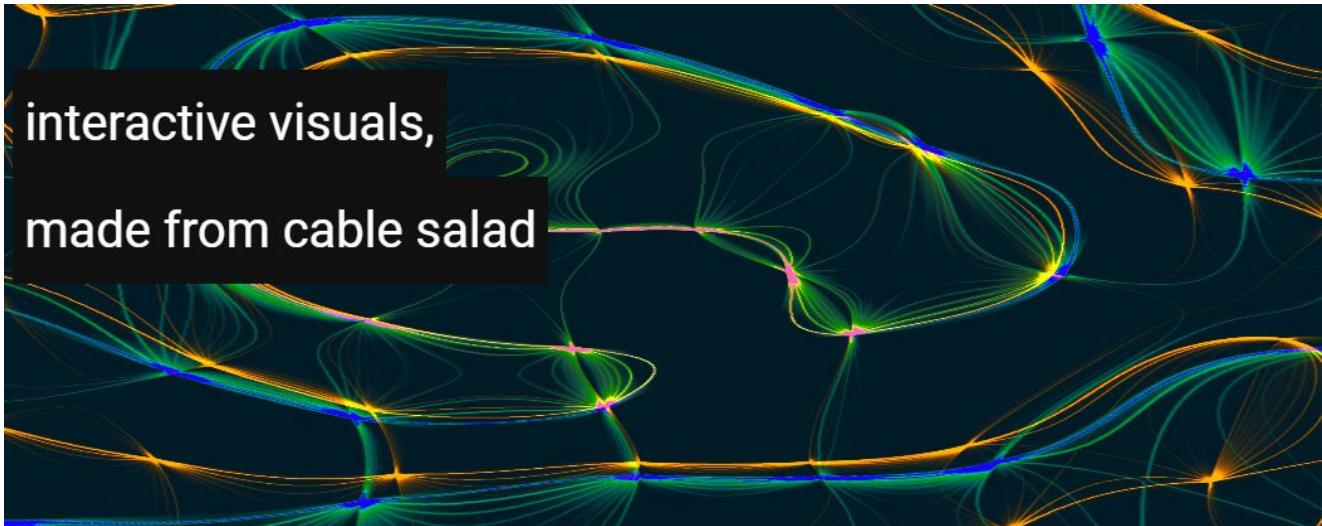
A Comprehensive Guide to Visual Programming

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# 1 Introduction to Cables.gl

## 1.1 What is Cables.gl?



**Cables.gl** is a powerful, browser-based visual programming environment for creating interactive 2D and 3D graphics using WebGL. It was created by undev in Berlin and has become a popular tool for creative coding, interactive installations, data visualization, and web-based visual experiences.

Unlike traditional coding environments, cables.gl uses a **node-based** (or “patch-based”) approach where you connect visual operators (ops) together to create your projects. This makes it accessible to artists and designers while still being powerful enough for developers.

## 1.2 A (Brief) History of cables.gl

cables.gl was created by **undev** (Berlin) with the goal of making **real-time WebGL** creation approachable through a node-based workflow—similar in spirit to visual programming environments used in motion design and interactive installations, but built for the browser.

Over time, cables.gl grew from a tool for quick experiments into a full ecosystem:

- **Early days:** a strong focus on rapid prototyping and sharing patches online.
- **Maturing platform:** a steadily growing op library for 2D, 3D, textures, audio, and interaction, plus better tooling (timeline, profiling/debugging utilities, export options).
- **Community-driven growth:** more public patches, tutorials, Discord knowledge-sharing, and reusable patterns (e.g., render-to-texture workflows, post-processing chains, audio-reactive setups).

- **Production use:** cables.gl exports make it viable for deployment in websites, installations, and client work—where performance, asset management, and reliable runtime behavior matter.

If you’re coming from traditional code, it helps to think of cables.gl as a **visual runtime graph**: triggers define *when* things run; value connections define *what data flows*; and the patch as a whole becomes a web-ready app.

## 1.3 Why Use Cables.gl?

### 1.3.1 Visual Programming

- No coding required to get started
- Drag-and-drop interface
- See results in real-time as you build

### 1.3.2 Browser-Based

- No installation needed
- Works on any modern browser
- Collaborate and share easily

### 1.3.3 High Performance

- Built on WebGL for GPU-accelerated graphics
- Optimized for real-time rendering
- Handles complex 3D scenes smoothly

### 1.3.4 Export Options

- Standalone HTML/JS builds
- Embed in websites
- Create offline applications

### 1.3.5 Extensible

- Write custom operators (ops) in JavaScript
- GLSL shader support
- Import external libraries

## 1.4 Key Concepts

### 1.4.1 Operators (Ops)

The building blocks of cables.gl. Each op performs a specific function - from drawing shapes to processing audio to handling user input.

### 1.4.2 Patches

A patch is your complete project - a collection of ops connected together to create your visual experience.

### 1.4.3 Ports

Ops have input and output ports. You connect ports together with “cables” (hence the name!) to pass data between ops.

### 1.4.4 Types of Ports

- **Trigger** (grey) - Execution flow, like “when to do something”
- **Number** (green) - Numerical values
- **String** (yellow) - Text values
- **Object** (blue) - Complex data like meshes, textures, arrays
- **Array** (cyan) - Collections of data

## 1.5 Featured Videos

### 1.5.1 Overview and Getting Started

<https://youtu.be/hVxrxXhH7vQ>

Title: Cables.gl Standalone (Offline) Build: Create Without Limits!

Author: Decode GL

Thumbnail: <https://i.ytimg.com/vi/hVxrxXhH7vQ/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/go03PhuenBI>

Title: First Steps in Cables.gl - Tutorial

Author: The Interactive & Immersive HQ

Thumbnail: <https://i.ytimg.com/vi/go03PhuenBI/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@TheInteractiveImmersiveHQ>

<https://youtu.be/xn0bNRv8n9I>  
Title: Introduction to cables.gl - Data-Driven Gradient from Geo-Located Weather - Part 0  
Author: Kirell Benzi  
Thumbnail: <https://i.ytimg.com/vi/xn0bNRv8n9I/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@kirellbenzi>

## 1.5.2 More Resources

**Note:** There are limited intro-specific YouTube videos for cables.gl, but the platform has excellent resources:  
- Browse the cables.gl Public Patches to see examples  
- Check the official cables.gl YouTube channel for official tutorials  
- The Decode GL channel has multiple cables.gl tutorials  
- Search for “cables.gl” on YouTube for the latest community content  
- Many cables.gl creators share their work on social media and personal channels

## 1.6 Getting Help

- **Official Documentation:** [cables.gl/docs](https://cables.gl/docs)
  - **Example Patches:** Browse public patches for inspiration
-

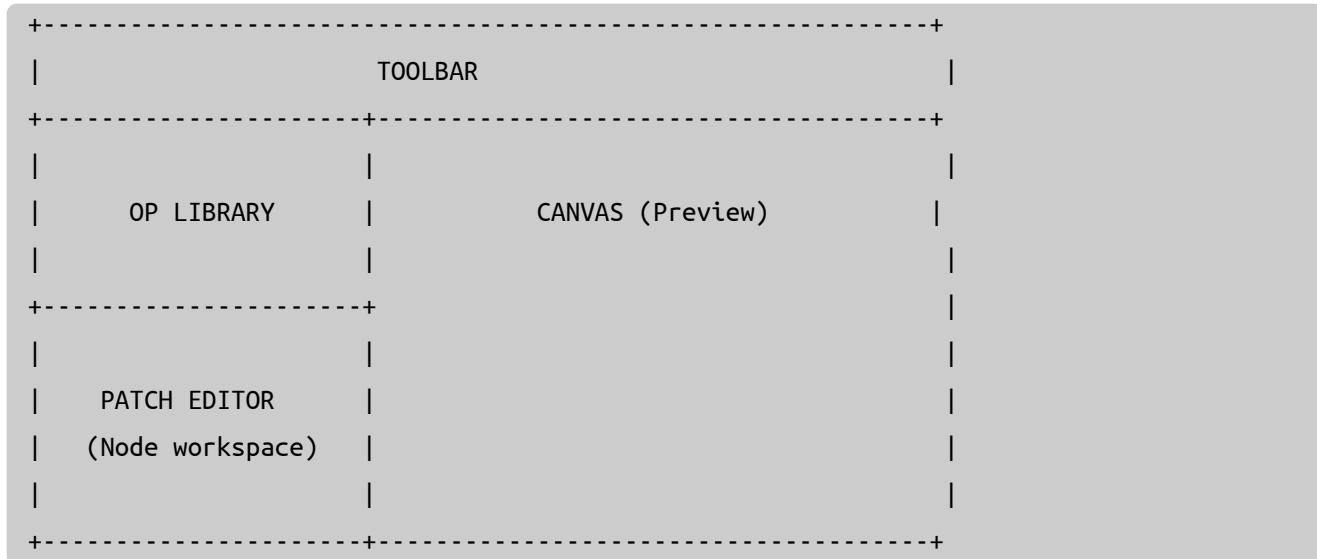
# 2 Getting Started with Cables.gl

## 2.1 Creating Your Account

1. Go to cables.gl
2. Click "Sign Up" to create a free account
3. Verify your email
4. You're ready to start creating!

## 2.2 The Interface

### 2.2.1 Main Areas



### 2.2.2 Key Interface Elements

1. **Canvas** - Live preview of your creation
2. **Patch Editor** - Where you place and connect ops
3. **Op Library** - Browse and search for operators
4. **Parameters Panel** - Adjust settings for selected ops
5. **Timeline** - For animation keyframes

## 2.3 Navigation Controls

| Action          | Control                           |
|-----------------|-----------------------------------|
| Pan the view    | Middle mouse drag or Space + drag |
| Zoom in/out     | Mouse scroll wheel                |
| Select op       | Left click                        |
| Multi-select    | Shift + click or drag box         |
| Delete selected | Delete or Backspace               |
| Add new op      | Double-click or Tab               |
| Connect ports   | Drag from output to input         |

## 2.4 Keyboard Shortcuts

Mastering keyboard shortcuts will significantly speed up your workflow in cables.gl.

### 2.4.1 Essential Shortcuts

| Shortcut                                  | Action                    |
|---|---------------------------|
| <b>Tab or Double-click</b>                | Add new op (opens search) |
| <b>Delete or Backspace</b>                | Delete selected op(s)     |
| <b>Ctrl + C / Cmd + C</b>                 | Copy selected op(s)       |
| <b>Ctrl + V / Cmd + V</b>                 | Paste op(s)               |
| <b>Ctrl + X / Cmd + X</b>                 | Cut selected op(s)        |
| <b>Ctrl + D / Cmd + D</b>                 | Duplicate selected op(s)  |
| <b>Ctrl + Z / Cmd + Z</b>                 | Undo                      |
| <b>Ctrl + Shift + Z / Cmd + Shift + Z</b> | Redo                      |

### 2.4.2 Selection & Navigation

| Shortcut                          | Action              |
|-----------------------------------|---------------------|
| <b>Ctrl + A / Cmd + A</b>         | Select all ops      |
| <b>Shift + Click</b>              | Add to selection    |
| <b>Ctrl + Click / Cmd + Click</b> | Toggle selection    |
| <b>Escape</b>                     | Deselect all        |
| <b>Space + Drag</b>               | Pan the patch view  |
| <b>Mouse Wheel</b>                | Zoom in/out         |
| <b>Ctrl + 0 / Cmd + 0</b>         | Zoom to fit all ops |

| Shortcut | Action                     |
|----------|----------------------------|
| <b>F</b> | Focus/frame selected op(s) |

### 2.4.3 Organizing & Aligning

| Shortcut                                  | Action                                |
|---|---------------------------------------|
| <b>Ctrl + Shift + A / Cmd + Shift + A</b> | Align selected ops horizontally       |
| <b>Ctrl + Shift + D / Cmd + Shift + D</b> | Distribute selected ops evenly        |
| <b>Ctrl + G / Cmd + G</b>                 | Group selected ops                    |
| <b>Arrow Keys</b>                         | Nudge selected op(s) by small amount  |
| <b>Shift + Arrow Keys</b>                 | Nudge selected op(s) by larger amount |

### 2.4.4 Working with Ops

| Shortcut                  | Action                             |
|---------------------------|------------------------------------|
| <b>Enter</b>              | Open/edit selected op's parameters |
| <b>Ctrl + E / Cmd + E</b> | Enable/disable selected op         |
| <b>Ctrl + M / Cmd + M</b> | Mute selected op                   |
| <b>R</b>                  | Rename selected op                 |
| <b>C</b>                  | Add comment node                   |
| <b>Ctrl + F / Cmd + F</b> | Find/search ops in patch           |

### 2.4.5 Cables & Connections

| Shortcut                      | Action                   |
|-------------------------------|--------------------------|
| <b>Drag from port</b>         | Create connection        |
| <b>Click connection</b>       | Select cable             |
| <b>Alt + Click connection</b> | Delete cable             |
| <b>Shift + Drag port</b>      | Create cable with search |

### 2.4.6 View & Interface

| Shortcut                                  | Action                         |
|---|--------------------------------|
| <b>T</b>                                  | Toggle timeline                |
| <b>Ctrl + / / Cmd + /</b>                 | Toggle op library              |
| <b>H</b>                                  | Toggle patch editor visibility |
| <b>P</b>                                  | Toggle parameters panel        |
| <b>Ctrl + S / Cmd + S</b>                 | Save patch                     |
| <b>Ctrl + Shift + S / Cmd + Shift + S</b> | Save as...                     |

## 2.4.7 Performance & Debugging

| Shortcut                                  | Action                  |
|---|-------------------------|
| <b>Ctrl + Shift + P / Cmd + Shift + P</b> | Performance monitor     |
| <b>Ctrl + Shift + L / Cmd + Shift + L</b> | Show patch loading info |
| <b>Alt + Click op</b>                     | View op documentation   |

## 2.4.8 Pro Tips

- **Hold Shift while connecting:** Automatically opens op search to insert an op in the connection
- **Hold Alt while dragging:** Duplicate op while moving
- **Double-click a connection:** Insert a new op in that cable
- **Right-click an op:** Quick access to op menu (rename, mute, group, etc.)
- **Click and drag in empty space:** Selection box for multiple ops

## 2.5 Your First Patch

Let's create a simple animated shape!

### 2.5.1 Step 1: Create the Render Pipeline

1. Double-click in the patch editor to open the op search
2. Search for MainLoop and add it
3. The MainLoop is the heartbeat of your patch - it triggers every frame

### 2.5.2 Step 2: Add a BasicMaterial

1. Add a BasicMaterial op

2. Connect MainLoop's trigger output to BasicMaterial's trigger input
3. You should see a black canvas appear

### 2.5.3 Step 3: Draw a Circle

1. Add a Circle op
2. Connect BasicMaterial -> Circle
3. A white circle appears!

Here's what your patch should look like:

#### Visualization Options

##### Option 1: Screenshot from Real Cables.gl (Most Authentic)

See Screenshot Guide for instructions on capturing real cables.gl patches.

##### Option 3: HTML/CSS Interactive

Open HTML Version in your browser for an interactive view.

##### Option 4: Mermaid Diagram (Simple Flow)

```
graph TD
    MainLoop[MainLoop] -->|trigger| BasicMaterial[BasicMaterial]
    BasicMaterial -->|trigger| Circle[Circle]

    style MainLoop fill:#2d2d2d,stroke:#4a4a4a,color:#e0e0e0
    style BasicMaterial fill:#2d2d2d,stroke:#4a4a4a,color:#e0e0e0
    style Circle fill:#2d2d2d,stroke:#4a4a4a,color:#e0e0e0
```

*The basic render chain: MainLoop triggers the BasicMaterial, which then draws the Circle*

### 2.5.4 Step 4: Add Color

1. Select the BasicMaterial op
2. Adjust the color values (r, g, b) in the parameters panel
3. Or connect a SetColor op's output to BasicMaterial's color input ports
4. The circle will display with your chosen color

## 2.5.5 Step 5: Animate It

1. Add a Time op (outputs current time)
2. Add a Math op (for calculations)
3. Add a Sin op (sine wave)
4. Connect: Time -> Sin -> Circle's Scale input
5. Watch your circle pulse!

## 2.6 Understanding the Flow

Data flows from **top to bottom** and **left to right**:

```
MainLoop (starts the frame)
  |
BasicMaterial (defines appearance and color)
  |
Circle (draws the shape)
```

The **trigger** connection (grey) determines WHEN things happen. The **value** connections (colored) determine WHAT values are used.

## 2.7 Saving Your Work

- Patches auto-save regularly
- Click the save icon to force a save
- Use “Save As” to create copies
- Export for standalone deployment

## 2.8 Tips for Beginners

1. **Start Simple** - Begin with basic shapes before complex 3D
2. **Explore Examples** - Study public patches to learn patterns
3. **Use Comments** - Add comment ops to document your work
4. **Name Your Ops** - Rename ops for clarity in complex patches
5. **Save Often** - And use versioning for major changes

## 2.9 Featured Videos

## 2.10 Common First-Patch Issues

### 2.10.1 “I don’t see anything!”

- Make sure MainLoop is connected to BasicMaterial
- Check that your shape ops are connected in the chain
- Verify the canvas is visible (not minimized)

### 2.10.2 “Colors aren’t changing!”

- Check BasicMaterial’s color values (r, g, b) in the parameters panel
- Make sure RGB values aren’t all 0 (black)
- If using SetColor, connect it to BasicMaterial’s color input ports

### 2.10.3 “Animation isn’t working!”

- Ensure Time op is connected
  - Check that the animated value is actually changing (view the port value)
-

# 3 2D Graphics in Cables.gl

## 3.1 Introduction to 2D Drawing

Cables.gl excels at creating stunning 2D graphics and animations, from simple shapes to complex generative art. This comprehensive chapter covers fundamental 2D drawing operations, advanced transformations, interactive elements, feedback loops, post-processing effects, and professional techniques for creating production-ready 2D visuals.

Whether you're creating data visualizations, interactive installations, or generative art, this chapter will give you the tools and knowledge to master 2D graphics in cables.gl.

## 3.2 Basic Shapes

### 3.2.1 Circle

The Circle op is one of the most common 2D primitives.

**Key Parameters:** - Radius - Size of the circle - Segments - Smoothness (more segments = smoother circle) - Inner Radius - Creates a ring when > 0

### 3.2.2 Rectangle

The Rectangle op draws rectangular shapes.

**Key Parameters:** - Width - Horizontal size - Height - Vertical size - Pivot - Origin point for positioning

### 3.2.3 RoundedRectangle

A rectangle with smooth corners.

**Key Parameters:** - Width / Height - Dimensions - Corner Radius - How rounded the corners are

### 3.2.4 Polygon

Create regular polygons (triangles, pentagons, etc.)

**Key Parameters:** - Sides - Number of sides (3 = triangle, 5 = pentagon, etc.) - Radius - Size of the polygon

### 3.2.5 Line / Lines

Draw single or multiple lines.

**Key Parameters:** - Start and End coordinates - Line width - Line style (solid, dashed)

## 3.3 Color and Appearance

### 3.3.1 SetColor

Changes the drawing color for subsequent shapes.

```
MainLoop -> BasicMaterial -> Circle
```

Connect SetColor output to BasicMaterial's color input ports (r, g, b, a) to set the color.

**Color Modes:** - RGB (Red, Green, Blue) - HSB (Hue, Saturation, Brightness) - Hex values

### 3.3.2 SetAlpha

Controls transparency.

```
MainLoop -> BasicMaterial -> Shape
```

Connect SetAlpha output to BasicMaterial's alpha (a) input port to control transparency.

Values range from 0 (invisible) to 1 (fully opaque).

### 3.3.3 Gradients

Use texture-based gradients or shader-generated gradients for smooth color transitions.

## 3.4 Transformations

### 3.4.1 Transform

The Transform op modifies position, rotation, and scale of all following shapes.

```
+-----+  
|           TRANSFORM PIPELINE           |  
+-----+
```

```

| MainLoop
| |
| BasicMaterial
| |
| Transform
|   +-> Position (X, Y, Z)
|   +-> Rotation (X, Y, Z)
|   +-> Scale
| |
| Shape (Circle, Rectangle, etc.)
|
+-----+

```

**Parameters:** - TranslateX, TranslateY, TranslateZ - Position - RotateX, RotateY, RotateZ - Rotation (degrees) - Scale - Uniform scaling

### 3.4.2 Transformation Order Matters!

Transformations are applied in order. These produce different results:

#### Rotate then Translate:

```

+-----+
|          ROTATE THEN TRANSLATE
+-----+
|
| Original Position
|   o
|
| Step 1: Rotate 45 degrees
|   o
|   (rotate)
|
| Step 2: Translate Right
|   -> o
|
| Result: Object rotates around origin, then moves
|
+-----+

```

```
Transform (rotate) -> Transform (translate) -> Shape
```

#### Translate then Rotate:

```
+-----+
|      TRANSLATE THEN ROTATE      |
+-----+
|
| Original Position
|   o
|
| Step 1: Translate Right
|   -> o
|
| Step 2: Rotate 45 degrees (around new position)
|   (rotate) o
|
| Result: Object moves first, then rotates around new origin
|
+-----+
```

```
Transform (translate) -> Transform (rotate) -> Shape
```

### 3.4.3 Nested Transforms

Create hierarchies by chaining transforms:

```
Transform (parent)
  |
Transform (child)
  |
Shape
```

The child inherits and adds to the parent's transformations.

## 3.5 Blending Modes

### 3.5.1 SetBlending

Controls how colors combine when shapes overlap.

**Common Modes:** - Normal - Standard opacity blending - Add - Colors add together (great for glow effects) - Multiply - Colors multiply (darkening effect)

### 3.5.2 Depth Testing

For 2D, you often want to disable depth testing:

```
MainLoop -> BasicMaterial -> DepthTest (disabled) -> Your 2D Content
```

This ensures draw order matches your connection order.

## 3.6 Patterns and Repetition

### 3.6.1 IteratorLoop

Create patterns by repeating shapes:

```
MainLoop -> IteratorLoop -> [Your Shape Setup]
```

Use the iterator index to offset position, color, or other properties.

### 3.6.2 ArrayIterator

Iterate over data arrays to position multiple shapes.

## 3.7 Text Rendering

### 3.7.1 DrawText

Display text in your patches.

**Key Parameters:** - Text - The string to display - Font - Font family - Size - Text size - Alignment - Left, center, right

### 3.7.2 TextTexture

Create textures from text for more advanced effects.

## 3.8 Advanced Transformation Techniques

### 3.8.1 Matrix Transformations

For precise control, work directly with transformation matrices:

```
MatrixMultiply -> Combine multiple transformations  
MatrixInvert -> Reverse a transformation
```

### 3.8.2 Pivot Points

Control the center of rotation and scaling:

```
Transform (set pivot) -> Transform (rotate) -> Shape
```

**Common Pivot Values:** -0, 0 - Bottom left corner - 0.5, 0.5 - Center (default) - 1, 1 - Top right corner

### 3.8.3 Compound Transformations

Build complex motion by layering transforms:

#### Example: Orbital Motion

```
Transform (parent orbit)  
|  
Transform (child rotation)  
|  
Transform (child offset)  
|  
Shape
```

This creates a shape that orbits while rotating on its own axis.

## 3.9 Interactive 2D Elements

### 3.9.1 InteractiveRectangle

Create draggable, clickable UI elements:

```
InteractiveRectangle  
| (outputs X, Y, Width, Height on interaction)  
Control other ops with mouse input
```

**Use Cases:** - On-screen sliders - Draggable controllers - Interactive buttons - Touch-enabled interfaces

### 3.9.2 Mouse Input

Capture and use mouse position:

```
Mouse -> Map (screen to world coords) -> Visual property
```

**Mouse Ops:** - MouseX / MouseY - Cursor position - MouseButton - Click detection - MouseWheel - Scroll input

### 3.9.3 Example: Interactive Color Picker

```
MainLoop  
|  
MouseX -> Map (0 to 1) -> Hue  
MouseY -> Map (0 to 1) -> Brightness  
|  
HSBtoRGB -> BasicMaterial (color input)  
|  
FullscreenRectangle
```

## 3.10 Generative Art Techniques

### 3.10.1 Feedback Loops

Create evolving, self-referential visuals by feeding output back as input:

**Basic Feedback Setup:**

```
MainLoop  
|  
RenderToTexture (previous frame)  
|  
ImageCompose (blend with new content)
```

```
|  
Transform (slight scale/rotate)  
|  
TextureEffects (blur, fade)  
|  
Draw new shapes  
|  
Output (becomes next frame's input)
```

**Parameters to Experiment With:** - Feedback decay (fade amount) - Transformation amount (scale, rotation) - Blend mode (add, multiply, screen) - Blur intensity

**Result:** Trails, echoes, and organic growth patterns

### 3.10.2 Op Art and Moiré Patterns

Create optical illusions with overlapping patterns:

```
IteratorLoop (creates grid)  
|  
Time -> Sin -> Rotation angle  
|  
IteratorLoop (nested for lines)  
|  
Rectangle (thin line)
```

Vary parameters like: - Line spacing - Rotation speed - Line thickness - Pattern density

### 3.10.3 Procedural Pattern Generation

Use noise and math to create endless variations:

**Perlin Noise-Based Patterns:**

```
IteratorLoop  
|  
Position -> NoiseTexture sample  
|  
Noise value -> Circle size  
|  
Noise value -> Color
```

### **Grid Distortion:**

```
IteratorLoop (grid)
|
Position + (Noise * distortion amount)
|
Shape
```

## **3.11 Post-Processing Effects**

### **3.11.1 Image Composition**

Layer multiple render passes for rich effects:

```
RenderTargetTexture (Pass 1: Shapes)
RenderTargetTexture (Pass 2: Glow)
RenderTargetTexture (Pass 3: Noise)
|
ImageCompose (blend all layers)
|
Final Output
```

### **3.11.2 TextureEffects for 2D**

Apply effects to your rendered 2D scene:

#### **Blur:**

```
RenderTargetTexture -> TextureEffects (Blur) -> Output
```

#### **Color Grading:**

```
RenderTargetTexture -> ColorCorrection
| (adjust hue, saturation, brightness, contrast)
Output
```

#### **Glow Effect:**

```
Original scene
|
RenderToTexture (bright pass)
|
Blur (large radius)
|
ImageCompose (add to original)
```

### 3.11.3 Displacement Mapping

Distort shapes using textures:

```
NoiseTexture -> DisplacementMap -> Shape rendering
```

Creates wavy, distorted effects on 2D graphics.

## 3.12 Advanced Pattern Techniques

### 3.12.1 Recursive Subdivision

Create fractal-like patterns:

```
// Custom op: Recursive shape division
for (depth = 0; depth < maxDepth; depth++) {
    // Draw shape
    // Divide into smaller shapes
    // Recursively apply
}
```

### 3.12.2 Particle Systems in 2D

Simple particle engine structure:

```
ArrayLoop (particle count)
|
Particle data (position, velocity, life)
|
```

```
Physics update (gravity, friction)
|
Transform -> Circle (particle visual)
```

### 3.12.3 Grid-Based Automata

Cellular automata and Game of Life patterns:

```
ArrayIterator (grid cells)
|
Cell state + neighbor count
|
Update rules (Conway's rules, etc.)
|
Visual representation
```

## 3.13 Data Visualization

### 3.13.1 Chart Generation

Create custom charts and graphs:

#### Bar Chart:

```
ArrayIterator (data values)
|
Index -> X position
Value -> Rectangle height
|
Rectangle (bar)
```

#### Line Chart:

```
ArrayIterator (data points)
|
Connect points with Lines op
|
Add circles for data points
```

### 3.13.2 Integration with ECharts

Combine cables.gl with Apache ECharts for advanced charts:

1. Load ECharts library
2. Generate chart in HTML/Canvas
3. Capture as texture in cables.gl
4. Apply 3D transforms or effects

### 3.13.3 Real-Time Data

Visualize live data streams:

```
WebSocket/API -> Parse data
|
ArrayIterator -> Visualize each value
|
Smooth/Interpolate for fluid animation
```

## 3.14 Complex Example Projects

### 3.14.1 Example 4: Kaleidoscope Effect

```
MainLoop
|
BasicMaterial
|
IteratorLoop (6 segments)
|
Transform (rotate by index * 60°)
|
Transform (mirror flip alternating)
|
Your content (shapes, webcam, etc.)
```

### 3.14.2 Example 5: Audio-Reactive Loading Animation

```
AudioAnalyzer (beat detection)
|
IteratorLoop (circle of dots)
|
Index + Time -> Rotation
Beat amplitude -> Scale pulse
|
SetColor (beat changes color)
|
Circle (dot)
```

### 3.14.3 Example 6: Data-Driven Weather Visualization

```
API -> Fetch weather data
|
Parse JSON -> Extract values
|
Temperature -> Background color
Humidity -> Particle density
Wind -> Animation speed
|
Animated scene reflecting weather
```

### 3.14.4 Example 7: Feedback Tunnel Effect

```
RenderToTexture (previous frame)
|
Transform (scale 1.05, center pivot)
|
SetAlpha (0.98 for fade)
|
Draw to screen
|
Add new circles at edges
|
Feed back into texture
```

Creates an infinite tunnel effect.

### 3.14.5 Example 8: Mouse Trail with Fade

```
MousePosition
|
RenderToTexture (with feedback)
|
ColorCorrection (reduce brightness)
|
Draw circle at mouse position
|
Blend with previous frame
```

Creates smooth, fading trails following the cursor.

## 3.15 Performance Optimization

### 3.15.1 Culling and Clipping

Only draw what's visible:

```
If (shape position in viewport bounds)
    -> Draw shape
Else
    -> Skip
```

### 3.15.2 Object Pooling

Reuse shape instances instead of creating new ones:

```
// Maintain pool of inactive shapes
// Activate/deactivate as needed
// Prevents GC thrashing
```

### 3.15.3 Level of Detail (LOD)

Simplify distant or small shapes:

```
If (shape size < threshold)
    -> Use simple circle
Else
    -> Use detailed polygon
```

### 3.15.4 Batching Draw Calls

Group similar operations:

```
SetColor once
|
Draw all shapes of same color
|
SetColor again
|
Draw next batch
```

Reduces state changes and improves performance.

## 3.16 Masking and Clipping

### 3.16.1 Stencil Buffer Masking

Use shapes as masks for other shapes:

```
EnableStencil
|
Draw mask shape (Circle)
|
SetStencilMode (draw only inside)
|
Draw content (Rectangle)
|
DisableStencil
```

### 3.16.2 Alpha Mask Technique

Use texture alpha for complex masks:

```
MaskTexture -> AlphaMask  
|  
Your content (masked by texture)
```

## 3.17 Color Theory in Practice

### 3.17.1 Color Harmonies

Generate pleasing color palettes:

**Complementary:**

```
BaseHue -> SetColor (shape 1)  
BaseHue + 180° -> SetColor (shape 2)
```

**Triadic:**

```
BaseHue -> Color 1  
BaseHue + 120° -> Color 2  
BaseHue + 240° -> Color 3
```

**Analogous:**

```
BaseHue -> Color 1  
BaseHue + 30° -> Color 2  
BaseHue - 30° -> Color 3
```

### 3.17.2 Gradient Creation

Smooth color transitions:

**Linear Gradient:**

```
IteratorLoop (steps)  
|  
Index / TotalSteps -> Mix (Color1, Color2, t)  
|  
SetColor -> Rectangle strip
```

**Radial Gradient:**

```
Distance from center -> Mix (Inner, Outer, t)
```

## 3.18 Typography and Text Effects

### 3.18.1 Dynamic Text

Animate text properties:

```
Time -> Character spacing  
MouseX -> Font size  
AudioLevel -> Text opacity
```

### 3.18.2 Text as Texture

Use text rendering for effects:

```
TextTexture (render text to texture)  
|  
Apply shader effects  
|  
Use as sprite or background
```

### 3.18.3 Kinetic Typography

Animate individual letters:

```
TextArray (split into chars)  
|  
ArrayIterator  
|  
Transform (unique per character)  
|  
DrawText (single char)
```

## 3.19 Practical Examples

### 3.19.1 Example 1: Pulsing Circle

```
MainLoop  
|  
BasicMaterial (set your color)  
|  
Time -> Sin -> Scale input  
|  
Circle
```

### 3.19.2 Example 2: Rotating Grid

```
MainLoop  
|  
BasicMaterial  
|  
IteratorLoop (10x10)  
|  
Transform (position from iterator)  
|  
Transform (rotation from Time)  
|  
Rectangle
```

### 3.19.3 Example 3: Color Gradient Circle

```
MainLoop  
|  
IteratorLoop (for each ring)  
|  
IteratorIndex -> Map to Hue -> HSBtoRGB -> BasicMaterial (color input)  
|  
BasicMaterial  
|  
Circle (radius from iterator index)
```

## 3.20 Debugging and Workflow Tips

### 3.20.1 Visualizing Values

See what your ops are outputting:

```
Value -> NumberDisplay  
Value -> DrawNumber (on screen)
```

### 3.20.2 Color Coding

Use consistent colors to identify different element types:  
- Structural elements: Blue  
- Interactive elements: Green  
- Data elements: Yellow  
- Background: Dark grey

### 3.20.3 Naming Convention

Name ops descriptively:  
- TransformRotation\_MainShape  
- Color\_Background  
- Iterator\_ParticleGrid

### 3.20.4 Comment Ops

Document complex sections:

```
Comment ("This section creates the feedback loop")  
|  
Your complex patch area
```

## 3.21 Common Patterns and Recipes

### 3.21.1 Pattern: Circular Array

Arrange shapes in a circle:

```
IteratorLoop (count)  
|  
Index * (360 / count) -> Angle  
Angle -> Cos -> X position  
Angle -> Sin -> Y position  
|  
Transform -> Shape
```

### 3.21.2 Pattern: Wave Grid

Create wave motion across a grid:

```
IteratorLoop (rows)
  |
IteratorLoop (columns)
  |
(X + Time) -> Sin -> Y offset
  |
Transform -> Shape
```

### 3.21.3 Pattern: Spiral

Generate spiral patterns:

```
IteratorLoop
  |
Index -> Angle (index * goldenAngle)
Index -> Radius (sqrt(index) * spacing)
  |
Polar to Cartesian
  |
Transform -> Shape
```

### 3.21.4 Pattern: Responsive Grid

Grid that adapts to screen size:

```
ViewportWidth / CellSize -> Columns
ViewportHeight / CellSize -> Rows
  |
IteratorLoop (columns * rows)
  |
Grid positioning logic
```

## 3.22 Troubleshooting Common Issues

### 3.22.1 “Shapes not appearing”

- Check trigger connections (grey ports)
- Verify MainLoop is connected to BasicMaterial
- Check BasicMaterial alpha isn't 0
- Verify camera/viewport settings

### 3.22.2 “Performance is slow”

- Reduce segment count on circles
- Lower particle/iterator counts
- Disable antialiasing if not needed
- Use simpler blend modes
- Check for unnecessary texture reads

### 3.22.3 “Colors look wrong”

- Verify color space (RGB vs HSB)
- Check SetColor is before shapes
- Verify alpha values
- Check blend modes

### 3.22.4 “Animation is jerky”

- Use Smooth op for value transitions
- Check frame rate in performance monitor
- Reduce complexity during motion
- Pre-calculate expensive operations

## 3.23 Performance Tips

1. **Reduce Segments** - Circles don't need 100 segments if they're small
2. **Batch Similar Shapes** - Group similar operations together
3. **Use Instancing** - For many identical shapes, use instanced drawing
4. **Limit Transparency** - Overlapping transparent shapes are expensive
5. **Cache Calculations** - Don't recalculate same values each frame
6. **Cull Off-Screen** - Don't draw what's not visible
7. **Simplify Blending** - Complex blend modes are expensive
8. **Optimize Textures** - Use appropriate texture sizes

9. **Limit Feedback Depth** - Don't keep too many feedback history frames
10. **Profile Regularly** - Use performance monitor to identify bottlenecks

## 3.24 Featured Videos

### 3.24.1 Official Tutorials

<https://youtu.be/go03PhuenBI>  
Title: First Steps in Cables.gl - Kaleidoscope Webcam Effect  
Author: The Interactive & Immersive HQ  
Thumbnail: <https://i.ytimg.com/vi/go03PhuenBI/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@TheInteractiveImmersiveHQ>

<https://youtu.be/xn0bNRv8n9I>  
Title: Introduction to cables.gl - Data-Driven Gradient from Geo-Located Weather  
Author: Kirell Benzi  
Thumbnail: <https://i.ytimg.com/vi/xn0bNRv8n9I/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@kirellbenzi>

### 3.24.2 Additional Resources

- **Generative Op Art Tutorial:** Class Central Course - Learn feedback loops and Op Art
- **Interactive Rectangle Tutorial:** Blog Post - Create on-screen sliders
- **Post-Processing Guide:** Official Docs - Apply effects to scenes
- **Data Visualization:** Apache ECharts Integration - Combine with charting libraries
- **Cables.gl Examples:** Official Examples - Browse community creations
- **Coding with Cables:** GitHub Repo - Code examples and custom ops

## 3.25 Exercises

### 3.25.1 Beginner

1. Create a colorful loading spinner using rotating circles
2. Build a grid of squares that change color based on mouse position
3. Make a simple particle system with random positions and sizes

### 3.25.2 Intermediate

4. Create a kaleidoscope effect with 8 mirrored segments
5. Build an interactive color picker using mouse position
6. Implement a feedback tunnel with infinite zoom effect
7. Create a data visualization showing time-series data as animated bars

### 3.25.3 Advanced

8. Build a generative Op Art piece using feedback loops
9. Create a particle system with physics (gravity, collision)
10. Implement a cellular automaton (Game of Life or similar)
11. Create an audio-reactive geometric pattern generator
12. Build a real-time weather visualization using API data

## 3.26 Project Ideas

1. **Abstract Clock** - Time visualization with geometric shapes
  2. **Music Visualizer** - Frequency bands displayed as 2D patterns
  3. **Generative Logo** - Company logo with parametric variations
  4. **Loading Animations** - Collection of animated loaders
  5. **Data Dashboard** - Real-time data display with charts
  6. **Interactive Art Installation** - Touch/camera-driven visuals
  7. **Typography Animation** - Kinetic text effects
  8. **Pattern Generator** - Infinite procedural pattern variations
  9. **Mouse-Driven Drawing Tool** - Paint with code
  10. **Meditation Visual** - Calming, slowly evolving patterns
-

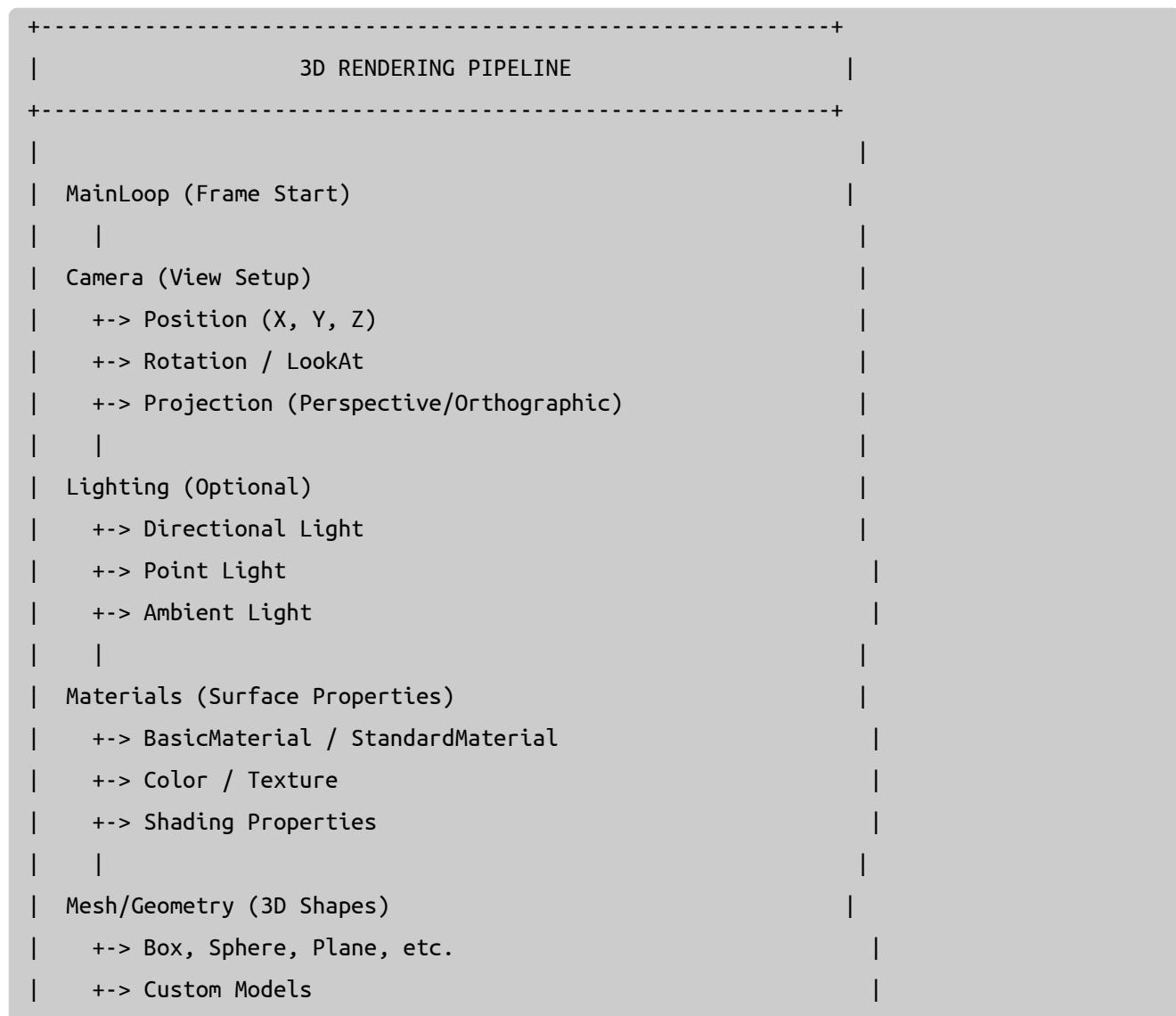
# 4 3D Graphics in Cables.gl

## 4.1 Introduction to 3D

Cables.gl provides powerful tools for creating real-time 3D graphics using WebGL. This chapter covers everything from basic 3D concepts to advanced rendering techniques, scene management, and performance optimization. Whether you're creating simple 3D visualizations or complex interactive experiences, this guide will give you the knowledge to master 3D graphics in cables.gl.

## 4.2 The 3D Pipeline

A basic 3D setup requires:





## 4.3 Cameras

Cameras define how we view the 3D scene.

### 4.3.1 PerspectiveCamera

The most common camera type - mimics human vision with perspective distortion.

**Key Parameters:** - FOV (Field of View) - How wide the view is (typically 45-90 degrees) - Near / Far - Clipping planes (objects outside this range aren't rendered) - Position X/Y/Z - Camera location

### 4.3.2 OrthographicCamera

No perspective distortion - useful for UI, 2D-style 3D, or technical views.

**Key Parameters:** - Zoom - Scale of the view - Near / Far - Clipping planes

### 4.3.3 Orbit Controls

Add interactive camera controls:

Camera -> OrbitControls

Allows users to rotate, zoom, and pan the view.

### 4.3.4 LookAt

Point the camera at a specific location or object.

Camera -> LookAt (target position)

**Use Cases:** - Follow a moving object - Create cinematic camera movements - Focus on specific scene elements

### 4.3.5 Camera Animation

Animate camera movement for cinematic effects:

```
Time -> Sin -> Camera Position X  
Time -> Cos -> Camera Position Z  
Time -> Camera Rotation Y (orbit)
```

### 4.3.6 Camera Shake Effect

Add dynamic camera shake:

```
Random -> Multiply (shake intensity) -> Add to Camera Position
```

### 4.3.7 First-Person Camera

Create FPS-style camera controls:

```
MouseX -> Camera Rotation Y  
MouseY -> Camera Rotation X  
WASD Keys -> Camera Position
```

### 4.3.8 Camera Path Following

Follow a predefined path:

```
ArrayIterator (path points)  
|  
Smooth interpolation between points  
|  
Camera Position
```

### 4.3.9 Camera Constraints

Limit camera movement:

```
Camera Position -> Clamp (min, max) -> Constrained Position
```

## 4.4 Lighting

Lighting brings depth and realism to 3D scenes.

### 4.4.1 AmbientLight

Uniform light that illuminates everything equally.

```
MainLoop -> Camera -> AmbientLight -> [Rest of scene]
```

**Tip:** Use subtle ambient light to prevent completely black shadows.

### 4.4.2 DirectionalLight

Light from a specific direction (like the sun).

**Key Parameters:** - Direction (X, Y, Z) - Color - Intensity

### 4.4.3 PointLight

Light emanating from a point in space (like a light bulb).

**Key Parameters:** - Position (X, Y, Z) - Color - Intensity - Falloff radius

### 4.4.4 SpotLight

Focused beam of light (like a flashlight or stage light).

**Key Parameters:** - Position and direction - Cone angle - Falloff

### 4.4.5 Shadow Mapping

Enable shadows for more realism:

```
DirectionalLight (shadows enabled) -> ShadowMap -> Scene
```

**Shadow Parameters:** - Shadow Map Size - Resolution (higher = sharper, slower) - Shadow Bias - Prevents shadow acne - Shadow Radius - Softness of shadow edges

**Tip:** Use lower shadow map sizes for better performance. 1024x1024 is usually sufficient.

#### 4.4.6 Three-Point Lighting Setup

Professional lighting arrangement:

```
MainLoop -> Camera
|
AmbientLight (subtle, 0.2 intensity) - Fill light
|
DirectionalLight (main, from top-left) - Key light
|
PointLight (weaker, opposite side) - Rim light
|
[Your scene]
```

**Key Light:** Main illumination (brightest) **Fill Light:** Reduces harsh shadows (ambient or weak directional) **Rim Light:** Creates edge highlights (back/side lighting)

#### 4.4.7 Image-Based Lighting (IBL)

Use environment maps for realistic lighting:

```
HDRITexture -> Environment Map -> PBRMaterial
```

Creates reflections and lighting based on real-world environments.

#### 4.4.8 Light Probes

Place light probes in your scene for accurate local lighting:

```
LightProbe -> Sample nearby lights -> Apply to objects
```

#### 4.4.9 Volumetric Lighting

Create god rays and atmospheric lighting:

```
DirectionalLight -> VolumetricScattering -> [Scene]
```

#### 4.4.10 Light Animation

Animate lights for dynamic scenes:

```
Time -> Sin -> Light Intensity (pulsing)  
Time -> Rotate -> Light Direction (rotating sun)  
AudioAnalyzer -> Light Color (audio-reactive)
```

### 4.5 Geometry and Meshes

#### 4.5.1 Primitive Shapes

**Cube** - Basic box shape

```
Parameters: Width, Height, Depth
```

**Sphere** - Perfect sphere

```
Parameters: Radius, Segments (horizontal/vertical)
```

**Cylinder** - Tube shape

```
Parameters: Radius Top/Bottom, Height, Segments
```

**Plane** - Flat surface

```
Parameters: Width, Height
```

**Torus** - Donut shape

```
Parameters: Radius, Tube Radius, Segments
```

#### 4.5.2 Loading 3D Models

**OBJLoader** - Load .obj format models

```
OBJLoader -> Mesh
```

**GLTFLoader** - Load .gltf/.glb models (recommended)

```
GLTFLoader -> Scene/Mesh
```

**FBXLoader** - Load .fbx models

### 4.5.3 Creating Custom Geometry

Use **PointCloud** or **CustomGeometry** ops to build meshes from data.

**PointCloud:**

```
ArrayIterator (positions) -> PointCloud
```

**CustomGeometry:**

```
Vertices Array -> Normals Array -> UVs Array -> CustomGeometry
```

### 4.5.4 Procedural Geometry Generation

Create geometry programmatically:

**Example: Procedural Terrain**

```
IteratorLoop (grid)
  |
  NoiseTexture (sample at position) -> Height
  |
  Calculate vertex positions
  |
  Generate normals
  |
  CustomGeometry
```

**Example: Parametric Surfaces**

```
U/V parameters -> Math functions -> Vertex positions
  |
  CustomGeometry
```

## 4.5.5 Geometry Instancing

Render many copies efficiently:

```
Mesh -> InstanceTransform (array of transforms) -> InstancedMesh
```

**Use Cases:** - Forests of trees - Crowds of characters - Particle systems - Repeating architectural elements

## 4.5.6 Geometry Modifiers

Modify existing geometry:

**Subdivision:**

```
Mesh -> Subdivide -> Smoother surface
```

**Displacement:**

```
Mesh -> DisplacementMap -> Deformed geometry
```

**Morphing:**

```
Mesh1 -> Morph -> Mesh2 (blend between shapes)
```

## 4.5.7 Boolean Operations

Combine geometries:

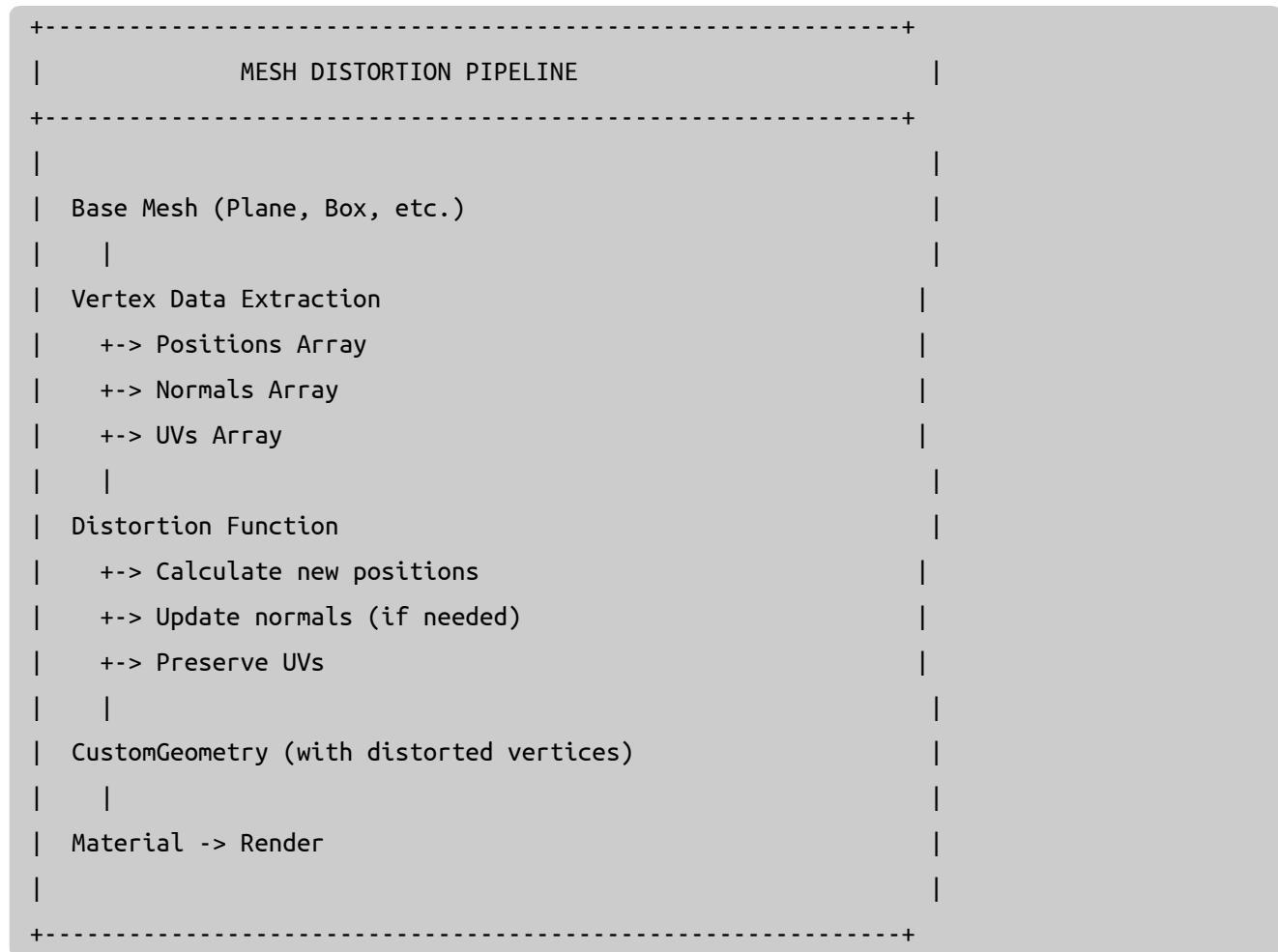
```
Mesh1 -> BooleanUnion -> Mesh2  
Mesh1 -> BooleanSubtract -> Mesh2  
Mesh1 -> BooleanIntersect -> Mesh2
```

## 4.6 Real-Time Mesh Distortion

Real-time mesh distortion allows you to dynamically modify geometry vertices during rendering, creating effects like bending walls, scaling surfaces, and warping shapes. This is essential for architectural visualization, interactive installations, and dynamic 3D effects.

#### 4.6.1 Understanding Vertex Manipulation

Mesh distortion works by modifying vertex positions in real-time. Each vertex has: - **Position** (X, Y, Z) - Where the vertex is located - **Normal** (NX, NY, NZ) - Which direction the surface faces - **UV Coordinates** (U, V) - Texture mapping coordinates



#### 4.6.2 Method 1: Node-Based Distortion

Using built-in cables.gl ops to distort meshes.

##### Example 1: Scaling a Wall (Size Transformation)

Transform a plain wall into different sizes using procedural scaling:



```

+-----+
| |
| Plane (Base Wall)
|   |
| GetVertices -> Positions Array
|   |
| Scale Factor (X, Y, Z)
|   |
| ArrayMap (multiply each vertex by scale)
|   |
| GetNormals -> Normals Array
| GetUVs -> UVs Array
|   |
| CustomGeometry (new positions, normals, UVs)
|   |
| Material -> Render
|
+-----+

```

### **Step-by-Step Node Setup:**

#### **1. Create Base Plane:**

- Add Plane op
- Set Width: 10, Height: 5
- Set Segments Width: 20, Segments Height: 10 (for smooth distortion)

#### **2. Extract Vertex Data:**

- Add GetVertices op
- Connect Plane -> GetVertices
- Output: Array of vertex positions

#### **3. Create Scale Controls:**

- Add Slider ops for X, Y, Z scale
- Or use Number ops with values

#### **4. Apply Scaling:**

- Use ArrayMap or ArrayIterator to multiply each vertex
- For each vertex: [x, y, z] \* [scaleX, scaleY, scaleZ]

#### **5. Rebuild Geometry:**

- Get original normals and UVs from Plane
- Add CustomGeometry op
- Connect: Scaled Positions -> CustomGeometry
- Connect: Original Normals -> CustomGeometry

- Connect: Original UVs -> CustomGeometry

## Example 2: Bending a Wall (Curved Distortion)

Bend a plain wall into a curved wall with controllable angle:

```
+-----+
|          WALL BENDING SETUP          |
+-----+
|
| Plane (Base Wall)                  |
| |                                |
| GetVertices -> Positions Array   |
| |                                |
| Bend Angle (Slider/Number)        |
| Bend Center (X position where bend occurs) |
| |                                |
| ArrayMap (apply bend transformation) |
| |                                |
| Calculate New Normals (for proper lighting) |
| |                                |
| CustomGeometry -> Material -> Render      |
| |                                |
+-----+
```

### Bending Algorithm (Node-Based):

For each vertex: 1. Calculate distance from bend center 2. Calculate angle based on distance and bend amount 3. Rotate vertex around bend axis 4. Update position

### Node Setup for Bending:

```
Plane
|
GetVertices -> ArrayIterator
|
For each vertex:
|
Vertex X -> Subtract (Bend Center) -> Distance from center
```

```

Distance -> Multiply (Bend Angle) -> Rotation angle
|
Vertex Y -> Sin(Rotation) -> New Y position
Vertex Z -> Cos(Rotation) -> New Z position
Vertex X -> Keep original
|
Combine -> New Vertex Position
|
ArrayCollect -> All Distorted Vertices
|
CustomGeometry

```

### 4.6.3 Method 2: JavaScript Custom Op for Mesh Distortion

For more control and performance, use a JavaScript custom op to handle distortion.

#### Custom Op: Wall Distorter

Create a custom op that handles both scaling and bending:

```

// Custom Op: WallDistorter
// Distorts a plane mesh with scaling and bending

const inVertices = op.inArray("Input Vertices");
const inNormals = op.inArray("Input Normals");
const inUVs = op.inArray("Input UVs");

// Scale parameters
const inScaleX = op.inFloat("Scale X", 1.0);
const inScaleY = op.inFloat("Scale Y", 1.0);
const inScaleZ = op.inFloat("Scale Z", 1.0);

// Bend parameters
const inBendAngle = op.inFloat("Bend Angle", 0.0); // in radians
const inBendCenter = op.inFloat("Bend Center X", 0.0); // X position of bend
const inBendAxis = op.inSwitch("Bend Axis", ["X", "Y", "Z"], "X");

// Outputs

```

```

const outVertices = op.outArray("Distorted Vertices");
const outNormals = op.outArray("Distorted Normals");
const outUVs = op.outArray("Output UVs");

function distortVertices() {
    const vertices = inVertices.get();
    const normals = inNormals.get();
    const uvs = inUVs.get();

    if (!vertices || vertices.length === 0) {
        outVertices.set([]);
        outNormals.set([]);
        outUVs.set([]);
        return;
    }

    const scaleX = inScaleX.get();
    const scaleY = inScaleY.get();
    const scaleZ = inScaleZ.get();
    const bendAngle = inBendAngle.get();
    const bendCenter = inBendCenter.get();
    const bendAxis = inBendAxis.get();

    const distortedVertices = [];
    const distortedNormals = [];

    for (let i = 0; i < vertices.length; i += 3) {
        let x = vertices[i];
        let y = vertices[i + 1];
        let z = vertices[i + 2];

        // Apply scaling first
        x *= scaleX;
        y *= scaleY;
        z *= scaleZ;

        // Apply bending
        if (Math.abs(bendAngle) > 0.001) {

```

```

if (bendAxis === "X") {
    // Bend along X axis (curves in Y-Z plane)
    const distanceFromCenter = x - bendCenter;
    const angle = distanceFromCenter * bendAngle;

    // Rotate around X axis
    const cosA = Math.cos(angle);
    const sinA = Math.sin(angle);
    const newY = y * cosA - z * sinA;
    const newZ = y * sinA + z * cosA;
    y = newY;
    z = newZ;

    // Update normals
    if (normals && normals.length > i + 2) {
        const nx = normals[i];
        const ny = normals[i + 1];
        const nz = normals[i + 2];
        distortedNormals.push(
            nx,
            ny * cosA - nz * sinA,
            ny * sinA + nz * cosA
        );
    }
} else if (bendAxis === "Y") {
    // Bend along Y axis (curves in X-Z plane)
    const distanceFromCenter = y - bendCenter;
    const angle = distanceFromCenter * bendAngle;

    const cosA = Math.cos(angle);
    const sinA = Math.sin(angle);
    const newX = x * cosA - z * sinA;
    const newZ = x * sinA + z * cosA;
    x = newX;
    z = newZ;

    if (normals && normals.length > i + 2) {
        const nx = normals[i];

```

```

        const ny = normals[i + 1];
        const nz = normals[i + 2];
        distortedNormals.push(
            nx * cosA - nz * sinA,
            ny,
            nx * sinA + nz * cosA
        );
    }

} else if (bendAxis === "Z") {
    // Bend along Z axis (curves in X-Y plane)
    const distanceFromCenter = z - bendCenter;
    const angle = distanceFromCenter * bendAngle;

    const cosA = Math.cos(angle);
    const sinA = Math.sin(angle);
    const newX = x * cosA - y * sinA;
    const newY = x * sinA + y * cosA;
    x = newX;
    y = newY;

    if (normals && normals.length > i + 2) {
        const nx = normals[i];
        const ny = normals[i + 1];
        const nz = normals[i + 2];
        distortedNormals.push(
            nx * cosA - ny * sinA,
            nx * sinA + ny * cosA,
            nz
        );
    }
}
} else {
    // No bending, just copy normals
    if (normals && normals.length > i + 2) {
        distortedNormals.push(
            normals[i],
            normals[i + 1],
            normals[i + 2]
    }
}

```

```

        );
    }

    distortedVertices.push(x, y, z);
}

outVertices.set(distortedVertices);
if (distortedNormals.length > 0) {
    outNormals.set(distortedNormals);
} else if (normals) {
    outNormals.set(normals);
}
if (uvs) {
    outUVs.set(uvs);
}
}

// Update when inputs change
inVertices.onChange = distortVertices;
inNormals.onChange = distortVertices;
inUVs.onChange = distortVertices;
inScaleX.onChange = distortVertices;
inScaleY.onChange = distortVertices;
inScaleZ.onChange = distortVertices;
inBendAngle.onChange = distortVertices;
inBendCenter.onChange = distortVertices;
inBendAxis.onChange = distortVertices;

```

## Using the Wall Distorter Op

### Setup:

```

Plane (Base Wall)
|
GetVertices -> WallDistorter (Input Vertices)
GetNormals -> WallDistorter (Input Normals)
GetUVs -> WallDistorter (Input UVs)

```

```

|
WallDistorter (Distorted Vertices) -> CustomGeometry
WallDistorter (Distorted Normals) -> CustomGeometry
WallDistorter (Output UVs) -> CustomGeometry
|
Material -> Render

```

**Controls:** - **Scale X/Y/Z:** Resize the wall - **Bend Angle:** Curvature amount (in radians, use `Math.PI/4` for 45°) - **Bend Center X:** Where the bend occurs along the wall - **Bend Axis:** Which axis to bend around

#### 4.6.4 Advanced: Animated Wall Distortion

Combine distortion with animation for dynamic effects:

```

// Custom Op: AnimatedWallDistorter
// Adds time-based animation to distortion

const inVertices = op.inArray("Input Vertices");
const inNormals = op.inArray("Input Normals");
const inUVs = op.inArray("Input UVs");

// Animation parameters
const inTime = op.inFloat("Time", 0.0);
const inAnimationSpeed = op.inFloat("Animation Speed", 1.0);
const inAnimationType = op.inSwitch("Animation Type",
    ["None", "Pulse", "Wave", "Oscillate"], "None");

// Distortion parameters (same as before)
const inScaleX = op.inFloat("Scale X", 1.0);
const inScaleY = op.inFloat("Scale Y", 1.0);
const inScaleZ = op.inFloat("Scale Z", 1.0);
const inBendAngle = op.inFloat("Bend Angle", 0.0);
const inBendCenter = op.inFloat("Bend Center X", 0.0);

// Outputs
const outVertices = op.outArray("Distorted Vertices");
const outNormals = op.outArray("Distorted Normals");
const outUVs = op.outArray("Output UVs");

```

```

function getAnimatedBendAngle() {
    const baseAngle = inBendAngle.get();
    const time = inTime.get();
    const speed = inAnimationSpeed.get();
    const type = inAnimationType.get();

    if (type === "None") {
        return baseAngle;
    } else if (type === "Pulse") {
        // Pulse between 0 and baseAngle
        const pulse = (Math.sin(time * speed) + 1) / 2; // 0 to 1
        return baseAngle * pulse;
    } else if (type === "Wave") {
        // Wave effect
        return baseAngle * Math.sin(time * speed);
    } else if (type === "Oscillate") {
        // Oscillate around baseAngle
        return baseAngle + Math.sin(time * speed) * (baseAngle * 0.5);
    }

    return baseAngle;
}

function distortVertices() {
    const vertices = inVertices.get();
    const normals = inNormals.get();
    const uvs = inUVs.get();

    if (!vertices || vertices.length === 0) {
        outVertices.set([]);
        outNormals.set([]);
        outUVs.set([]);
        return;
    }

    const scaleX = inScaleX.get();
    const scaleY = inScaleY.get();
    const scaleZ = inScaleZ.get();

```

```

const bendAngle = getAnimatedBendAngle();
const bendCenter = inBendCenter.get();

const distortedVertices = [];
const distortedNormals = [];

for (let i = 0; i < vertices.length; i += 3) {
    let x = vertices[i];
    let y = vertices[i + 1];
    let z = vertices[i + 2];

    // Apply scaling
    x *= scaleX;
    y *= scaleY;
    z *= scaleZ;

    // Apply animated bending
    if (Math.abs(bendAngle) > 0.001) {
        const distanceFromCenter = x - bendCenter;
        const angle = distanceFromCenter * bendAngle;

        const cosA = Math.cos(angle);
        const sinA = Math.sin(angle);
        const newY = y * cosA - z * sinA;
        const newZ = y * sinA + z * cosA;
        y = newY;
        z = newZ;

        // Update normals
        if (normals && normals.length > i + 2) {
            const nx = normals[i];
            const ny = normals[i + 1];
            const nz = normals[i + 2];
            distortedNormals.push(
                nx,
                ny * cosA - nz * sinA,
                ny * sinA + z * cosA
            );
        }
    }
}

```

```

        }

    } else {
        if (normals && normals.length > i + 2) {
            distortedNormals.push(
                normals[i],
                normals[i + 1],
                normals[i + 2]
            );
        }
    }

    distortedVertices.push(x, y, z);
}

outVertices.set(distortedVertices);
if (distortedNormals.length > 0) {
    outNormals.set(distortedNormals);
} else if (normals) {
    outNormals.set(normals);
}
if (uvs) {
    outUVs.set(uvs);
}
}

// Update on input changes
inVertices.onChange = distortVertices;
inNormals.onChange = distortVertices;
inUVs.onChange = distortVertices;
inTime.onChange = distortVertices;
inAnimationSpeed.onChange = distortVertices;
inAnimationType.onChange = distortVertices;
inScaleX.onChange = distortVertices;
inScaleY.onChange = distortVertices;
inScaleZ.onChange = distortVertices;
inBendAngle.onChange = distortVertices;
inBendCenter.onChange = distortVertices;

```

## 4.6.5 Practical Example: Interactive Curved Wall

Complete setup for an interactive curved wall with real-time controls:

```
+-----+
|           INTERACTIVE CURVED WALL SETUP          |
+-----+
|
| MainLoop
|   |
| Plane (Base Wall)
|   Width: 10, Height: 5
|   Segments: 30x15 (for smooth curves)
|   |
| GetVertices -> WallDistorter
| GetNormals -> WallDistorter
| GetUVs -> WallDistorter
|   |
| Slider (Bend Angle: 0 to PI/2) -> WallDistorter
| Slider (Bend Center: -5 to 5) -> WallDistorter
| Slider (Scale X: 0.5 to 2.0) -> WallDistorter
| Slider (Scale Y: 0.5 to 2.0) -> WallDistorter
|   |
| WallDistorter -> CustomGeometry
|   |
| StandardMaterial -> Render
|   |
| Camera -> OrbitControls
|
+-----+
```

## 4.6.6 Performance Optimization

For real-time distortion, optimize your setup:

### 1. Reduce Vertex Count When Possible:

- Use fewer segments for static walls
- Increase segments only where distortion is visible

## 2. Cache Calculations:

```
let cachedVertices = null;
let cachedBendAngle = null;
let cachedScale = null;

function distortVertices() {
    const bendAngle = inBendAngle.get();
    const scale = inScaleX.get();

    // Only recalculate if inputs changed
    if (cachedVertices &&
        cachedBendAngle === bendAngle &&
        cachedScale === scale) {
        return; // Use cached result
    }

    // Recalculate...
    cachedVertices = distortedVertices;
    cachedBendAngle = bendAngle;
    cachedScale = scale;
}
```

## 3. Use Instancing for Multiple Walls:

- Create one distorted wall
- Use InstancedMesh to duplicate it
- Much faster than distorting each wall separately

## 4. Update Only When Needed:

```
// Only update on frame if animation is active
const inRender = op.inTrigger("Render");
inRender.onTriggered = function() {
    if (inAnimationType.get() !== "None") {
        distortVertices();
    }
};
```

## 4.6.7 Advanced Techniques

### Multi-Axis Bending

Bend along multiple axes simultaneously:

```
// Bend along both X and Y axes
const bendX = distanceFromCenterX * bendAngleX;
const bendY = distanceFromCenterY * bendAngleY;

// Apply rotations in sequence
// First rotate around X, then around Y
```

### Non-Linear Distortion

Use easing functions for smooth transitions:

```
function easeInOutCubic(t) {
    return t < 0.5
        ? 4 * t * t * t
        : 1 - Math.pow(-2 * t + 2, 3) / 2;
}

const easedAngle = baseAngle * easeInOutCubic(progress);
```

### Texture Coordinate Preservation

When distorting, UVs should remain unchanged for proper texturing:

```
// Always preserve original UVs
outUVs.set(inUVs.get()); // Don't modify UVs during distortion
```

## 4.6.8 Common Use Cases

### 1. Architectural Visualization:

- Bend walls to show different room layouts
- Scale walls to demonstrate space variations

### 2. Interactive Installations:

- User-controlled wall distortion
- Audio-reactive bending

### 3. Animation:

- Morphing between straight and curved walls
- Dynamic space transformations

### 4. Game Mechanics:

- Procedural level generation
- Dynamic environment changes

## 4.6.9 Troubleshooting

**Problem: Normals look wrong after distortion** - Solution: Recalculate normals after distortion - Use CalculateNormals op or compute in JavaScript

**Problem: Texture stretches or distorts** - Solution: Don't modify UV coordinates - Keep original UVs from the base mesh

**Problem: Performance is slow** - Solution: Reduce vertex count - Cache calculations - Only update when parameters change

**Problem: Bending looks jagged** - Solution: Increase mesh segments - Use smoother interpolation

## 4.7 Materials

Materials define how surfaces appear when lit.

### 4.7.1 BasicMaterial

Simple colored material, not affected by lighting.

### 4.7.2 LambertMaterial

Matte material with diffuse lighting.

### 4.7.3 PhongMaterial

Shiny material with specular highlights.

**Key Parameters:** - Diffuse Color - Base color - Specular Color - Highlight color - Shininess - How sharp the highlights are

## 4.7.4 PBRMaterial (Physically Based Rendering)

Most realistic material option.

**Key Parameters:** - Albedo - Base color - Metalness - How metallic (0 = plastic, 1 = metal) - Roughness - Surface smoothness (0 = mirror, 1 = rough) - Normal Map - Surface detail - Ambient Occlusion - Crevice shadows - Emissive - Self-illumination - Clearcoat - Additional glossy layer (for car paint, etc.)

**PBR Workflow Tips:** - Use real-world material values for best results - Metalness and Roughness are inverse - metals are usually smooth (low roughness) - Combine texture maps for realistic surfaces - Use HDR environment maps for accurate reflections

## 4.7.5 Material Blending

Blend between materials:

```
Material1 -> Mix -> Material2 (blend factor) -> BlendedMaterial
```

## 4.7.6 Animated Materials

Animate material properties:

```
Time -> Sin -> Material Color (pulsing)  
Time -> Material Roughness (shimmer effect)  
MouseX -> Material Metalness (interactive)
```

## 4.7.7 Material Variants

Create material variations:

```
BaseMaterial -> Multiply Color -> Variant1  
BaseMaterial -> Multiply Color -> Variant2
```

## 4.7.8 Custom Shader Materials

Use custom GLSL shaders (see Shaders chapter):

```
ShaderMaterial (custom GLSL) -> Mesh
```

## 4.7.9 Material Instancing

Apply same material to multiple objects efficiently:

```
Material -> Apply to multiple meshes
```

# 4.8 Transformations in 3D

## 4.8.1 Transform

Same as 2D but with full 3D control:

```
Transform
+-- TranslateX, TranslateY, TranslateZ
+-- RotateX, RotateY, RotateZ
+-- ScaleX, ScaleY, ScaleZ (or uniform Scale)
```

## 4.8.2 Matrix Operations

For advanced control, use matrix ops: - MatrixMultiply - Combine transformations - LookAt - Point object at target - Billboard - Always face camera - MatrixInvert - Reverse transformation - MatrixDecompose - Extract position/rotation/scale

## 4.8.3 Hierarchical Transforms

Create parent-child relationships:

```
Transform (parent)
|
Transform (child) - inherits parent's transform
|
Mesh
```

**Use Cases:** - Character rigging (body -> arm -> hand) - Vehicle systems (car -> wheel -> tire) - Solar systems (sun -> planet -> moon)

## 4.8.4 Constraint Systems

Constrain object movement:

### **Distance Constraint:**

```
Object1 Position -> Distance -> Object2 Position (maintain distance)
```

### **Look-At Constraint:**

```
Object -> LookAt -> Target (always face target)
```

### **Path Constraint:**

```
Object -> Follow Path -> Constrained movement
```

## **4.8.5 IK (Inverse Kinematics)**

Control chains of objects:

```
End Effector Position -> IK Solver -> Joint Angles  
|  
Transform chain
```

## **4.8.6 Physics-Based Transforms**

Use physics for natural movement:

```
PhysicsBody -> Transform (position/rotation from physics)
```

## **4.8.7 Transform Caching**

Cache expensive transformations:

```
Transform -> Cache -> Reuse for multiple objects
```

## **4.9 Rendering Techniques**

### **4.9.1 Rendering Order**

Opaque objects should render before transparent ones:

```
MainLoop -> Camera  
|  
[Opaque objects]  
|  
EnableBlending  
|  
[Transparent objects]
```

## 4.9.2 Multiple Render Passes

Create effects like glow, depth of field, or reflections:

```
MainLoop -> Camera -> RenderToTexture -> [Scene]  
|  
TextureEffect  
|  
RenderToScreen
```

## 4.9.3 Fog

Add atmospheric depth:

```
MainLoop -> Camera -> Fog -> [Scene]
```

**Types:** - Linear fog - Constant density - Exponential fog - Density increases with distance - Height fog  
- Fog based on Y position

## 4.9.4 Screen-Space Ambient Occlusion (SSAO)

Add depth and realism:

```
MainLoop -> Camera -> RenderToTexture (depth)  
|  
SSAO Effect  
|  
Apply to scene
```

## 4.9.5 Screen-Space Reflections (SSR)

Realistic reflections without reflection probes:

```
Scene -> RenderToTexture -> SSR Effect -> Reflections
```

## 4.9.6 Depth of Field

Focus blur effect:

```
Camera -> DepthOfField -> Focus distance -> Blur amount
```

## 4.9.7 Bloom

Glowing highlights:

```
Scene -> Brightness threshold -> Blur -> Add back -> Bloom
```

## 4.9.8 Motion Blur

Blur moving objects:

```
Previous frame -> Current frame -> Blend -> Motion blur
```

## 4.9.9 Color Grading

Post-process color adjustments:

```
Scene -> ColorCorrection  
    +-- Exposure  
    +-- Contrast  
    +-- Saturation  
    +-- Color temperature  
    +-- Tint
```

## 4.9.10 Chromatic Aberration

Color separation effect:

```
Scene -> ChromaticAberration -> Distorted colors
```

### 4.9.11 Vignette

Darken edges:

```
Scene -> Vignette -> Darkened corners
```

### 4.9.12 Post-Processing Chain

Combine multiple effects:

```
Scene
  |
  RenderToTexture
  |
  SSAO
  |
  Bloom
  |
  ColorGrading
  |
  ChromaticAberration
  |
  Vignette
  |
  Final Output
```

## 4.10 Scene Management

### 4.10.1 Scene Hierarchy

Organize complex scenes:

```
MainLoop -> Camera
  |
  Scene (root)
```

```
+-- Environment
|   +- Skybox
|   +- Fog
+-- Lighting
|   +- AmbientLight
|   +- DirectionalLight
|   +- PointLights (array)
+-- Static Objects
|   +- [Buildings, terrain, etc.]
+-- Dynamic Objects
|   +- [Characters, vehicles, etc.]
+-- Effects
    +- Particles
    +- Post-processing
```

#### 4.10.2 Object Grouping

Group related objects:

```
Group (name: "Characters")
  +- Character1
  +- Character2
  +- Character3
```

#### 4.10.3 Layer System

Use layers for organization:

```
Layer 0: Background
Layer 1: Environment
Layer 2: Characters
Layer 3: Effects
Layer 4: UI
```

#### 4.10.4 Culling and Optimization

Hide objects outside view:

```
Object Position -> FrustumCull -> Only render if visible
```

#### 4.10.5 LOD (Level of Detail) System

Use simpler models at distance:

```
Distance from camera -> If > threshold -> Use LOD model
```

### 4.11 Practical Examples

#### 4.11.1 Example 1: Rotating Cube

```
MainLoop
  |
  PerspectiveCamera
  |
  DirectionalLight
  |
  Time -> RotateY input
  |
  PhongMaterial
  |
  Cube
```

#### 4.11.2 Example 2: Lit Sphere with Orbit Controls

```
MainLoop
  |
  PerspectiveCamera -> OrbitControls
  |
  AmbientLight (subtle)
  |
  PointLight
  |
  PBRMaterial (metalness: 1, roughness: 0.2)
  |
  Sphere
```

### 4.11.3 Example 3: Loading a 3D Model

```
MainLoop
  |
  PerspectiveCamera
  |
  DirectionalLight
  |
  GLTFLoader (your model.glb)
  |
  Transform (scale/position)
```

### 4.11.4 Example 4: Solar System

```
MainLoop
  |
  PerspectiveCamera -> OrbitControls
  |
  AmbientLight (space ambient)
  |
  DirectionalLight (sun)
  |
  [Sun] - Static sphere with emissive material
  |
  [Planet1] - Transform (orbit around sun)
    |   +-- Time -> RotateY (orbit)
    |   +-- Time -> RotateY (self-rotation)
    |       +-- Sphere
    |
  [Planet2] - Different orbit speed
    +-- [Moon] - Orbits planet
```

### 4.11.5 Example 5: Procedural Terrain

```
MainLoop
  |
  PerspectiveCamera -> OrbitControls
  |
```

```
DirectionalLight
|
IteratorLoop (grid: 100x100)
|
Position -> NoiseTexture (3D noise) -> Height
|
Calculate vertex (X, height, Z)
|
Calculate normal from neighbors
|
CustomGeometry
|
PBRMaterial (terrain textures)
```

#### 4.11.6 Example 6: Instanced Forest

```
MainLoop
|
PerspectiveCamera
|
DirectionalLight
|
TreeModel (loaded GLTF)
|
ArrayIterator (1000 positions)
|
Random -> Scale variation
Random -> Rotation variation
|
InstanceTransform
|
InstancedMesh
```

#### 4.11.7 Example 7: Interactive 3D Scene

```
MainLoop
|
PerspectiveCamera -> OrbitControls
```

```
|  
MouseX -> Map -> Light Direction X  
MouseY -> Map -> Light Direction Y  
|  
DirectionalLight  
|  
MouseClicked -> Toggle -> Object visibility  
|  
[Scene objects]
```

#### 4.11.8 Example 8: Animated Character

```
MainLoop  
|  
PerspectiveCamera  
|  
DirectionalLight  
|  
CharacterModel  
|  
Timeline  
+-- Frame 0: Idle pose  
+-- Frame 30: Walk cycle start  
+-- Frame 60: Walk cycle end  
+-- [Loop]  
|  
Apply to skeleton  
|  
AnimatedMesh
```

#### 4.11.9 Example 9: Particle System

```
MainLoop  
|  
PerspectiveCamera  
|  
ArrayIterator (particles)  
|
```

```
Particle Data
  +- Position (update with velocity)
  +- Velocity (update with forces)
  +- Life (decrease over time)
  +- Size (scale with life)
  |
  Transform (position, scale)
  |
  BasicMaterial (color from life)
  |
  Sphere (small)
```

#### 4.11.10 Example 10: Reflective Surface

```
MainLoop
  |
  PerspectiveCamera
  |
  [Scene to reflect]
  |
  RenderToTexture (reflection view)
  |
  CubemapTexture
  |
  PBRMaterial (reflection map)
  |
  Plane (mirror surface)
```

#### 4.11.11 Example 11: Volumetric Fog

```
MainLoop
  |
  PerspectiveCamera
  |
  Scene
  |
  RenderToTexture (depth)
  |
```

```

VolumetricFog
  +-+ Depth texture
  +-+ Noise texture (for variation)
  +-+ Light direction
  |
Blend with scene

```

#### 4.11.12 Example 12: Dynamic Lighting Setup

```

MainLoop
  |
PerspectiveCamera
  |
Time -> Sin -> Sun angle
  |
Sun angle -> Calculate direction
  |
DirectionalLight (sun)
  +-+ Color (warm -> cool based on angle)
  +-+ Intensity (day -> night)
  |
AmbientLight
  +-+ Intensity (complement sun)
  |
[Scene]

```

#### 4.11.13 Example 13: Morphing Objects

```

MainLoop
  |
PerspectiveCamera
  |
Time -> Sin -> Morph factor (0 to 1)
  |
Mesh1 -> Morph -> Mesh2
  |
Material

```

#### 4.11.14 Example 14: Physics Simulation

```
MainLoop
  |
  PerspectiveCamera
  |
  PhysicsWorld
    +-- Gravity
    +-- Colliders
    |
  PhysicsBody (rigid body)
    +-- Mass
    +-- Forces
    +-- Collisions
    |
  Transform (from physics)
  |
  Mesh
```

#### 4.11.15 Example 15: Post-Processing Pipeline

```
MainLoop
  |
  PerspectiveCamera
  |
  [Render scene]
  |
  RenderToTexture
  |
  SSAO
  |
  Bloom (extract bright areas)
  |
  Blur (bloom)
  |
  Add bloom back
  |
  ColorGrading
```

```
    +-+ Exposure  
    +-+ Contrast  
    +-+ Saturation  
    |  
ChromaticAberration  
    |  
Vignette  
    |  
Final output
```

#### 4.11.16 Example 16: Audio-Reactive 3D

```
MainLoop  
|  
PerspectiveCamera  
|  
AudioAnalyzer -> FFTArray  
|  
ArrayIterator (frequency bands)  
|  
FFT Value -> Scale Y  
|  
Transform (position from index, scale from FFT)  
|  
Cube (bar visualization)
```

#### 4.11.17 Example 17: Procedural City

```
MainLoop  
|  
PerspectiveCamera -> OrbitControls  
|  
DirectionalLight  
|  
IteratorLoop (grid: city blocks)  
|  
NoiseTexture -> Building height  
Random -> Building type
```

```
|  
Transform (position, height)  
|  
Cube (building)  
|  
PBRMaterial (building texture)
```

#### 4.11.18 Example 18: Water Surface

```
MainLoop  
|  
PerspectiveCamera  
|  
Time -> Sin -> Wave offset  
|  
Plane (subdivided)  
|  
Vertex shader (displace vertices)  
|  
WaterMaterial  
+-- Normal map (animated)  
+-- Reflection (scene)  
+-- Refraction  
+-- Foam (at edges)
```

#### 4.11.19 Example 19: Portal Effect

```
MainLoop  
|  
PerspectiveCamera  
|  
[Main scene]  
|  
PortalCamera (different view)  
|  
RenderTargetToTexture (portal view)  
|  
Plane (portal frame)
```

```
|  
Material (portal texture)  
|  
Stencil buffer (mask to portal shape)
```

#### 4.11.20 Example 20: Multi-Pass Rendering

```
MainLoop  
|  
PerspectiveCamera  
|  
[Pass 1: Opaque objects]  
|  
RenderToTexture  
|  
[Pass 2: Transparent objects]  
|  
Blend with Pass 1  
|  
[Pass 3: Effects]  
|  
Blend all passes  
|  
Post-processing
```

## 4.12 Advanced Animation Techniques

### 4.12.1 Skeletal Animation

Animate characters with bones:

```
Skeleton (bone hierarchy)  
|  
Animation data (keyframes)  
|  
Skin weights (vertex -> bone influence)  
|  
AnimatedMesh
```

## 4.12.2 Morph Targets

Blend between shape variations:

```
BaseMesh -> MorphTarget1 (blend factor) -> MorphTarget2
```

**Use Cases:** - Facial expressions - Shape variations - Smooth transitions

## 4.12.3 Procedural Animation

Generate animation with code:

```
Time -> Math functions -> Transform values  
|  
Apply to objects
```

## 4.12.4 Physics Animation

Use physics for natural movement:

```
PhysicsBody -> Forces -> Motion -> Transform
```

## 4.12.5 Animation Blending

Smoothly transition between animations:

```
Animation1 -> Blend -> Animation2 (blend factor)
```

## 4.13 Performance Optimization

### 4.13.1 General Tips

1. **Reduce Polygon Count** - Use lower-poly models when possible
2. **Texture Atlas** - Combine textures to reduce draw calls
3. **Level of Detail (LOD)** - Use simpler models for distant objects
4. **Frustum Culling** - Built-in, but organize scenes efficiently
5. **Bake Lighting** - Pre-calculate lighting for static scenes

## 4.13.2 Advanced Optimization

### Occlusion Culling:

```
Object -> Check if occluded -> Skip rendering
```

### Batching:

```
Similar objects -> Batch -> Single draw call
```

**Texture Compression:** - Use compressed texture formats (DXT, ETC) - Reduce texture resolution when possible - Use mipmaps for distant objects

**Geometry Optimization:** - Remove unnecessary vertices - Use indexed geometry - Optimize UV mapping

**Shader Optimization:** - Minimize texture samples - Use simpler shaders when possible - Avoid branching in shaders

**Render Target Optimization:** - Use appropriate render target sizes - Don't render at higher resolution than display - Use half-precision floats when possible

## 4.13.3 Performance Monitoring

Track performance metrics:

```
PerformanceMonitor
  +- FPS
  +- Draw calls
  +- Triangle count
  +- Texture memory
  +- Shader compilation time
```

## 4.13.4 Adaptive Quality

Adjust quality based on performance:

```
FPS -> If < 30 -> Reduce quality
  +- Lower LOD
  +- Disable effects
```

```
+-- Reduce particle count
```

## 4.14 Common Patterns and Workflows

### 4.14.1 Pattern: Object Pooling

Reuse objects instead of creating/destroying:

```
Pool of inactive objects
|
Activate when needed
|
Deactivate when done
|
Return to pool
```

### 4.14.2 Pattern: Component System

Organize object behavior:

```
GameObject
+-- Transform component
+-- Render component
+-- Physics component
+-- Script component
```

### 4.14.3 Pattern: Event System

Decouple object interactions:

```
EventEmitter
+-- Subscribe (listener)
+-- Emit (event)
|
Objects react to events
```

#### 4.14.4 Pattern: State Machine

Manage object states:

```
StateMachine
  +-- Idle state
  +-- Active state
  +-- Transition conditions
```

### 4.15 Debugging 3D Scenes

#### 4.15.1 Visual Debugging

Show Normals:

```
Mesh -> DebugNormals -> Visualize normals
```

Show Bounding Boxes:

```
Mesh -> DebugBounds -> Show bounding boxes
```

Show Wireframe:

```
Material -> Wireframe mode -> See geometry
```

Show Grid:

```
GridHelper -> Visual reference
```

#### 4.15.2 Common Issues

**"Objects not visible"** - Check camera position and direction - Verify objects are within near/far planes  
- Check material alpha values - Verify lighting setup

**"Shadows look wrong"** - Adjust shadow bias - Increase shadow map resolution - Check light shadow settings - Verify shadow receiving objects

**"Performance is slow"** - Reduce polygon count - Lower texture resolutions - Disable expensive effects  
- Use LOD system - Optimize shaders

**"Materials look incorrect"** - Verify texture UV mapping - Check normal map orientation - Verify PBR material values - Check lighting setup

## 4.16 Best Practices

1. **Start Simple** - Build complexity gradually
2. **Optimize Early** - Consider performance from the start
3. **Use Instancing** - For repeated objects
4. **Organize Scenes** - Use hierarchies and groups
5. **Test on Target Hardware** - Performance varies by device
6. **Use Appropriate Formats** - GLTF for models, compressed textures
7. **Profile Regularly** - Use performance tools
8. **Document Complex Setups** - Add comments to patches
9. **Version Control** - Save iterations of complex scenes
10. **Reuse Assets** - Don't duplicate unnecessarily

## 4.17 Featured Videos

## 4.18 Exercises

### 4.18.1 Beginner

1. Create a solar system with orbiting planets
2. Build a simple room with multiple light sources
3. Load a 3D model and add interactive rotation controls
4. Create a rotating cube with different materials
5. Build a simple scene with fog

### 4.18.2 Intermediate

6. Create a procedural terrain with noise
7. Build an instanced forest with 100+ trees
8. Implement a three-point lighting setup
9. Create a water surface with animated waves
10. Build a particle system with physics
11. Create a portal effect with dual cameras
12. Implement post-processing effects (bloom, SSAO)
13. Build an audio-reactive 3D visualization

14. Create a morphing object animation
15. Implement a character with skeletal animation

### 4.18.3 Advanced

16. Build a complete scene with LOD system
17. Create a volumetric fog effect
18. Implement screen-space reflections
19. Build a physics-based simulation
20. Create a procedural city generator
21. Implement a multi-pass rendering pipeline
22. Build an interactive 3D game scene
23. Create advanced post-processing chain
24. Implement custom shader materials
25. Build a complex scene with optimization techniques

## 4.19 Project Ideas

1. **3D Product Viewer** - Interactive product showcase
  2. **Architectural Visualization** - Building walkthrough
  3. **Game Prototype** - Simple 3D game mechanics
  4. **Data Visualization** - 3D charts and graphs
  5. **Virtual Gallery** - 3D art exhibition
  6. **Interactive Installation** - Museum or event display
  7. **Music Visualizer** - 3D audio-reactive visuals
  8. **Procedural World** - Generated landscape exploration
  9. **Character Animation** - Animated character showcase
  10. **Physics Sandbox** - Interactive physics playground
-

# 5 Texturing in Cables.gl

## 5.1 Introduction to Textures

Textures add detail, color, and realism to your visuals. In cables.gl, textures can come from images, videos, webcams, or be generated procedurally.

## 5.2 Loading Textures

### 5.2.1 ImageTexture

Load images from files or URLs:

```
ImageTexture -> Material (texture input)
```

**Supported Formats:** - PNG (with transparency) - JPG - WebP - GIF (first frame or animated)

**Key Parameters:** - URL - Path to image - Filter - Nearest (pixelated) or Linear (smooth) - Wrap - Repeat, Clamp, Mirror

### 5.2.2 VideoTexture

Use video as a texture:

```
VideoTexture -> Material (texture input)
```

**Key Parameters:** - URL - Path to video file - Loop - Whether to loop playback - Playback Rate - Speed control - Volume - Audio volume

**Supported Formats:** - MP4 (H.264) - WebM

### 5.2.3 WebcamTexture

Live webcam input as a texture:

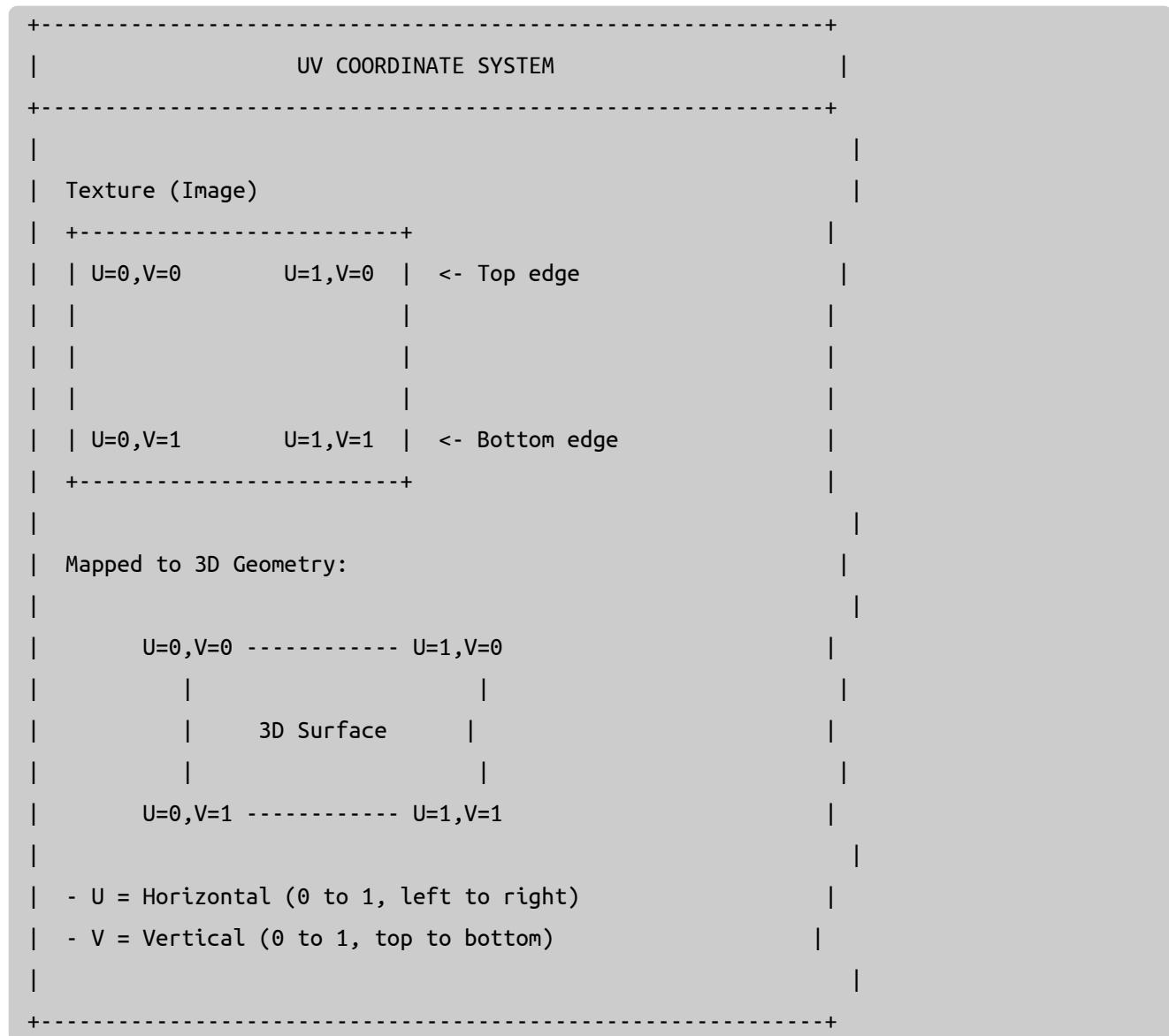
```
WebcamTexture -> Material (texture input)
```

**Tip:** Great for interactive installations!

## 5.3 Texture Mapping

### 5.3.1 UV Coordinates

UV coordinates define how textures wrap onto geometry:

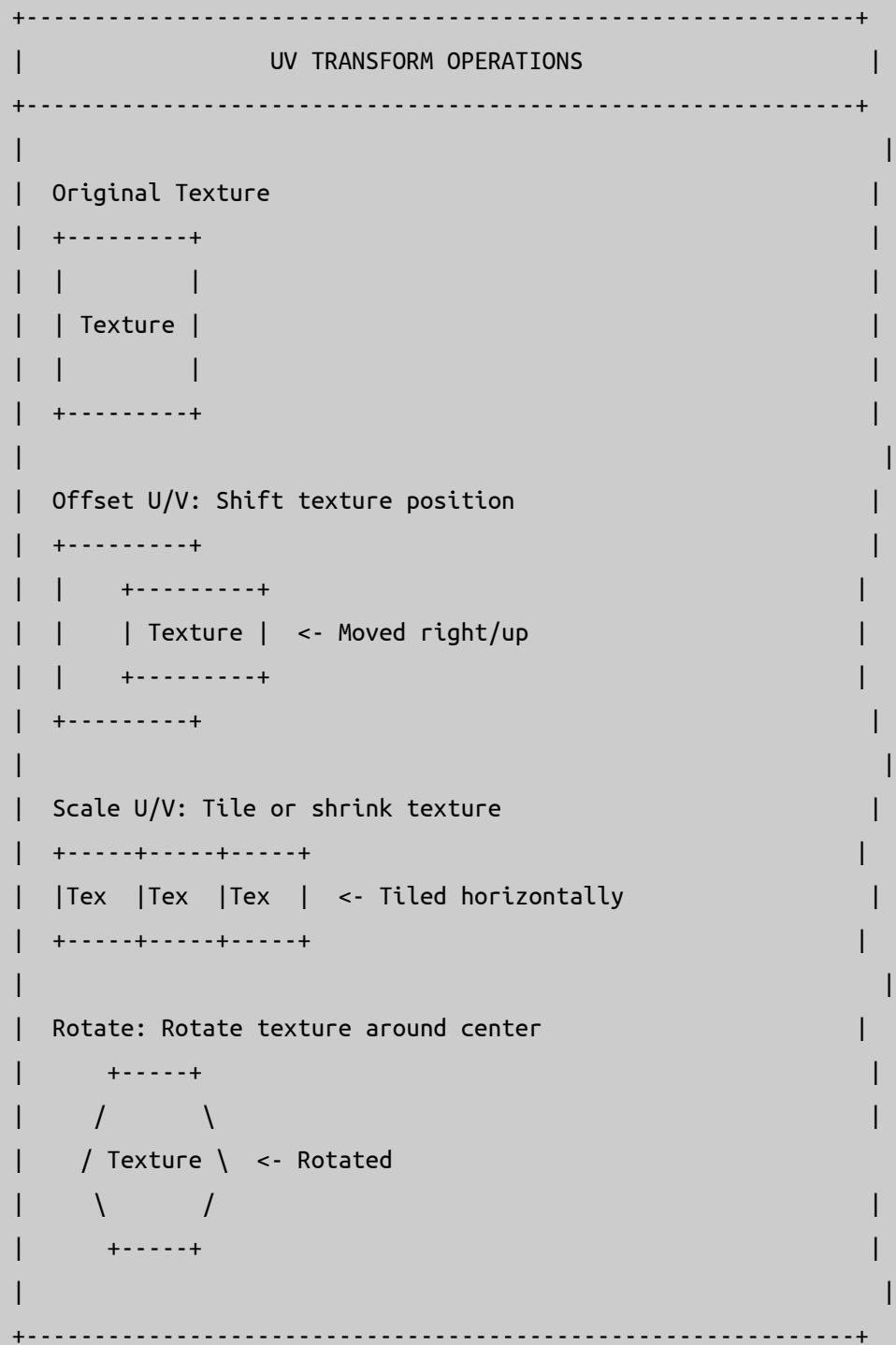


- **U** = Horizontal position (0 to 1)
- **V** = Vertical position (0 to 1)

Most primitive shapes have automatic UV mapping.

### 5.3.2 UV Transform

Modify texture coordinates:



TextureTransform -> Before texture application

**Parameters:** - Offset U/V - Shift the texture - Scale U/V - Tile or shrink - Rotate - Rotate the texture

### 5.3.3 Tiling Textures

For seamless repeating:

1. Set wrap mode to Repeat
2. Scale UV coordinates > 1

## 5.4 Advanced Texture Workflow (Production Mindset)

Texturing is where many cables.gl projects move from “cool prototype” to “polished piece”. The two recurring themes are:

- **Correctness:** color space, alpha handling, UVs, aspect ratios, and predictable sampling.
- **Performance:** texture sizes, filtering, mipmaps, compression, and “how many textures are you sampling per pixel”.

### 5.4.1 Color Space: sRGB vs Linear (Why Your Colors Look “Off”)

Most images you download (JPG/PNG/WebP) are authored in **sRGB** (gamma corrected). Most lighting and shading math expects **linear** values. If your project mixes lit materials (e.g., PBR) with UI-like textures, you can run into:

- washed-out or too-dark textures
- incorrect blending
- “metal looks wrong” in PBR

**Practical rule of thumb:**

- **Color/albedo** textures are usually **sRGB**.
- **Data** textures (normal maps, roughness/metalness/AO, masks) are usually **linear**.

If a texture looks wrong, verify you’re not treating a data map like a color map (or vice versa).

### 5.4.2 Alpha (Transparency) Pitfalls

If you see dark/bright halos around transparent textures (logos, sprites), you’re likely looking at one of these issues:

- The texture was exported with a bad matte color (common in PNGs).
- The pipeline expects **premultiplied alpha** but you provided straight alpha (or the other way around).
- Filtering/mipmaps sample transparent pixels and “bleed” colors into edges.

**Fix strategies:**

- Add padding/bleed around sprites in your source image.
- Prefer power-of-two textures with mipmaps for distant rendering.
- If you have control over asset export, re-export with correct alpha handling.

### 5.4.3 Filtering, Mipmaps, and Why Textures “Shimmer”

When a textured surface gets small on screen, the GPU needs mipmaps to avoid shimmer and crawling.

- **Nearest** filtering: crisp pixels, great for pixel-art, terrible for most 3D.
- **Linear** filtering: smoother sampling, better for general use.
- **Mipmaps**: essential for 3D surfaces viewed at varying distances.

If a ground texture “crawls” when the camera moves, you typically need mipmaps and (if available) anisotropic filtering.

### 5.4.4 Power-of-Two Sizes (and When It Matters)

Power-of-two textures (256/512/1024/2048/4096) generally behave better for:

- mipmaps
- repeating wrap modes
- GPU compatibility/performance

Non-power-of-two often still works in modern WebGL, but when things behave oddly, returning to power-of-two sizes is a reliable fix.

### 5.4.5 Aspect Ratio Correctness (Especially for Video)

Video textures are a frequent source of “why is it stretched?” issues.

- Match the **Plane** aspect ratio to the video’s aspect ratio.
- If you use Fullscreen rectangles, make sure you’re compensating for screen aspect.

## 5.5 Advanced Techniques and Patch Recipes

These are “building block” patterns you can reuse across many projects.

### 5.5.1 Recipe: Masked Texture Blend (Two Textures + a Mask)

Use a mask texture (black/white) to blend between two images.

**Conceptual chain:**

```
ImageTexture (A) -+
    +--> (blend using mask) -> Material -> Mesh
ImageTexture (B) -+
ImageTexture (Mask)
```

**Notes:** - The mask should be treated as a data texture (linear). - Great for dirt overlays, decals, and transitions.

### 5.5.2 Recipe: Animated UVs (Scrolling / Parallax)

Scrolling textures are perfect for conveyor belts, moving backgrounds, water normals, etc.

```
Time -> (speed multiply) -> TextureTransform (Offset U/V)
ImageTexture -> Material (texture input)
Material -> Mesh
```

### 5.5.3 Recipe: Render-to-Texture for Post-Processing

Render your scene to a texture, apply effects, then output.

```
MainLoop -> Camera -> RenderToTexture
|
[Scene]
|
TextureEffects -> Output
```

**Use Cases:** - blur/glow chains - color grading - stylized distortion - feedback trails (see next recipe)

### 5.5.4 Recipe: Feedback / Trails (Texture Feedback Loop)

Feedback is a signature look in real-time visuals.

High-level structure:

```
Previous Frame Texture
|
TextureEffects (fade/blur)
|
Combine with New Frame Content
```

```
|  
RenderToTexture (becomes "previous frame" next tick)
```

**Tip:** Keep feedback subtle (small fade each frame). Large blur + high persistence can become very expensive.

### 5.5.5 Recipe: Planar “Mirror” Reflection (Render-to-Texture)

To fake a mirror floor:

- Render the scene from a reflected camera to a texture.
- Apply that texture onto a plane.

```
MainLoop  
+-- Camera (main) -> [Scene]  
+-- Camera (reflected) -> RenderToTexture -> Plane Material -> Mirror Plane
```

### 5.5.6 Recipe: Environment Reflections (Cubemap/HDR)

Use an environment texture for reflections and more believable PBR materials.

```
HDRITexture or CubemapTexture -> (environment input) -> PBRMaterial -> Mesh
```

**Tip:** Even simple objects look dramatically better with good environment lighting.

### 5.5.7 Recipe: Video Texture “Billboard” (Reliable Playback)

```
VideoTexture -> BasicMaterial -> Plane
```

**Checklist:** - Use a browser-served URL (avoid file:// in production). - Make sure autoplay policies are satisfied (user interaction may be required). - Use a fallback poster image if video takes time to load.

### 5.5.8 Recipe: Webcam Texture (Permissions + UX)

```
WebcamTexture -> BasicMaterial -> Plane
```

**Checklist:** - Provide a UI prompt (“Click to enable camera”). - Handle denied permissions gracefully (fallback texture). - Keep resolution reasonable for performance.

## 5.6 Texture Types for PBR Materials

### **5.6.1 Albedo/Diffuse Map**

The base color of the surface.

### **5.6.2 Normal Map**

Adds surface detail without extra geometry.

```
NormalMap -> PBRMaterial (normal input)
```

**Tip:** Use tangent-space normal maps (blue-purple appearance).

### **5.6.3 Roughness Map**

Controls surface smoothness per-pixel.

- White = rough
- Black = smooth/shiny

### **5.6.4 Metalness Map**

Defines metallic vs. non-metallic regions.

- White = metal
- Black = non-metal (dielectric)

### **5.6.5 Ambient Occlusion Map**

Pre-baked shadow information for crevices.

### **5.6.6 Height/Displacement Map**

Actual geometry displacement (more expensive).

### **5.6.7 Emissive Map**

Self-illuminating regions of the surface.

## **5.7 Procedural Textures**

Generate textures with code/nodes:

### 5.7.1 Noise Textures

```
NoiseTexture -> Creates Perlin/Simplex noise
```

**Types:** - Perlin noise - Simplex noise - Voronoi - Fractal/FBM

### 5.7.2 Gradient Textures

```
GradientTexture -> Creates color gradients
```

### 5.7.3 Pattern Generators

- Checkerboard
- Stripes
- Dots
- Custom math-based patterns

## 5.8 Render to Texture

Capture your scene as a texture for post-processing or effects:

```
MainLoop -> Camera -> RenderToTexture  
|  
[Scene to capture]  
|  
TextureOutput -> Use elsewhere
```

### 5.8.1 Common Uses:

1. **Post-processing effects** - Apply shaders to the entire scene
2. **Mirrors/Reflections** - Render from reflection viewpoint
3. **Dynamic textures** - Use one patch's output in another
4. **Feedback effects** - Feed output back as input

## 5.9 Texture Effects

### 5.9.1 TextureEffects Op

Chain of image processing effects:

ImageTexture -> TextureEffects -> Output

**Available Effects:** - Blur - Sharpen - Color correction - Distortion - Edge detection - Pixelation

## 5.9.2 Custom Shader Effects

Write GLSL for custom texture processing (see Shaders chapter).

# 5.10 Cubemaps and Environment Maps

## 5.10.1 CubemapTexture

Six images forming a surrounding environment:

CubemapTexture -> Environment lighting

**Uses:** - Skyboxes - Reflections - Image-based lighting (IBL)

## 5.10.2 HDRITexture

High Dynamic Range images for realistic lighting:

HDRITexture -> IBL/Environment

# 5.11 Texture Compression and Optimization

## 5.11.1 File Size Tips:

### 1. Use appropriate formats:

- PNG for transparency
- JPG for photos (no transparency)
- WebP for best compression

### 2. Power of 2 sizes: 256, 512, 1024, 2048, 4096 pixels

### 3. Mipmaps: Enable for textures viewed at varying distances

### 4. Compress textures: Use tools like TinyPNG, Squoosh

## 5.11.2 Memory Considerations:

| Size      | Approximate Memory |
|-----------|--------------------|
| 512x512   | ~1 MB              |
| 1024x1024 | ~4 MB              |
| 2048x2048 | ~16 MB             |
| 4096x4096 | ~64 MB             |

## 5.12 Practical Examples

### 5.12.1 Example 1: Textured Rotating Cube

```
MainLoop
  |
  PerspectiveCamera
  |
  DirectionalLight
  |
  Time -> RotateY
  |
  ImageTexture -> PhongMaterial (texture input)
  |
  Cube
```

### 5.12.2 Example 2: Video on a Plane

```
MainLoop
  |
  VideoTexture -> BasicMaterial
  |
  Plane (aspect ratio matching video)
```

### 5.12.3 Example 3: Animated Noise Background

```
MainLoop
  |
  Time -> NoiseTexture (animate offset)
```

```
|  
BasicMaterial  
|  
FullscreenRectangle
```

#### 5.12.4 Example 4: PBR Textured Material

```
ImageTexture (albedo)  
ImageTexture (normal)  
ImageTexture (roughness)  
ImageTexture (metalness)  
| (all connected to PBRMaterial)  
PBRMaterial  
|  
Mesh
```

### 5.13 Featured Videos

### 5.14 Exercises

1. Create a textured cube that rotates and displays different images on each face
  2. Build a video wall with multiple video textures
  3. Create a procedural noise-based animated background
  4. Apply PBR textures to a loaded 3D model
-

# 6 Shaders & GLSL in Cables.gl

## 6.1 Introduction to Shaders

Shaders are programs that run on the GPU, enabling custom visual effects and rendering techniques. Cables.gl provides powerful tools for writing and using GLSL (OpenGL Shading Language) shaders.

## 6.2 What Are Shaders?

Shaders are small programs that determine how graphics are rendered:

- **Vertex Shaders** - Transform vertex positions
- **Fragment Shaders** - Determine pixel colors

Together, they control everything you see on screen.

## 6.3 Why Use Custom Shaders?

- Create unique visual effects
- Achieve effects impossible with built-in ops
- Optimize performance for specific use cases
- Learn the fundamentals of graphics programming

## 6.4 Shader Ops in Cables.gl

### 6.4.1 ShaderMaterial

Apply custom GLSL code as a material:

```
ShaderMaterial -> Mesh
```

### 6.4.2 TextureEffect (Shader-based)

Process textures with custom fragment shaders.

### 6.4.3 CustomShader

Full control over vertex and fragment shaders.

## 6.5 GLSL Basics

### 6.5.1 Data Types

```
// Scalars
float a = 1.0;
int b = 5;
bool c = true;

// Vectors
vec2 uv = vec2(0.5, 0.5);
vec3 color = vec3(1.0, 0.0, 0.0); // RGB
vec4 rgba = vec4(1.0, 1.0, 1.0, 1.0);

// Matrices
mat4 transform;

// Samplers (textures)
sampler2D myTexture;
```

### 6.5.2 Swizzling

Access vector components in any order:

```
vec4 color = vec4(1.0, 0.5, 0.25, 1.0);
vec3 rgb = color.rgb;      // (1.0, 0.5, 0.25)
vec2 rg = color.rg;       // (1.0, 0.5)
float r = color.r;        // 1.0
vec3 bgr = color.bgr;     // (0.25, 0.5, 1.0) - reversed!
```

### 6.5.3 Built-in Functions

```
// Math
sin(x), cos(x), tan(x)
pow(x, y)
sqrt(x)
abs(x)
min(a, b), max(a, b)
```

```
clamp(x, min, max)

// Interpolation
mix(a, b, t)           // Linear interpolation
smoothstep(edge0, edge1, x)

// Vector operations
length(v)
normalize(v)
dot(a, b)
cross(a, b)
reflect(incident, normal)

// Texture sampling
texture(sampler, uv)
```

## 6.6 Your First Fragment Shader

A simple color gradient:

```
// Fragment Shader
precision mediump float;

varying vec2 vUV; // UV coordinates from vertex shader

void main() {
    // Create gradient based on UV
    vec3 color = vec3(vUV.x, vUV.y, 0.5);

    gl_FragColor = vec4(color, 1.0);
}
```

## 6.7 Common Shader Patterns

### 6.7.1 Solid Color

```
void main() {
    gl_FragColor = vec4(1.0, 0.0, 0.0, 1.0); // Red
}
```

## 6.7.2 UV Gradient

```
void main() {
    gl_FragColor = vec4(vUV, 0.0, 1.0);
}
```

## 6.7.3 Circle (SDF)

```
void main() {
    vec2 center = vec2(0.5, 0.5);
    float dist = length(vUV - center);
    float circle = step(dist, 0.3);

    gl_FragColor = vec4(vec3(circle), 1.0);
}
```

## 6.7.4 Smooth Circle

```
void main() {
    vec2 center = vec2(0.5, 0.5);
    float dist = length(vUV - center);
    float circle = smoothstep(0.3, 0.28, dist);

    gl_FragColor = vec4(vec3(circle), 1.0);
}
```

## 6.7.5 Animated Pattern

```
uniform float time;

void main() {
    float wave = sin(vUV.x * 10.0 + time) * 0.5 + 0.5;
    gl_FragColor = vec4(vec3(wave), 1.0);
```

```
}
```

## 6.8 Uniforms

Uniforms are values passed from cables.gl to your shader:

```
uniform float time;           // Current time
uniform vec2 resolution;     // Canvas size
uniform sampler2D tex;       // Texture
uniform vec3 color;          // Custom color
```

In cables.gl, connect ops to shader uniform inputs.

## 6.9 Advanced Shader Workflows in cables.gl

The biggest jump in quality comes from treating shaders like reusable “modules”:

- a **clear input contract** (uniforms you expect: time, resolution, textures, parameters)
- predictable **coordinate conventions** (UV vs screen space vs world space)
- a **debug strategy** (visualize intermediate values)
- performance awareness (texture samples, loops, precision)

### 6.9.1 A Practical Uniform “Contract”

In most patches you’ll end up with a small set of recurring uniforms:

- **time** (float): animation driver
- **resolution** (vec2): coordinate normalization
- **tex / tex0 / tex1** (sampler2D): one or more textures
- **amount / strength** (float): effect intensity
- **colorA / colorB** (vec3): palette endpoints

**Tip:** name your uniforms consistently so you can reuse the same patch wiring across multiple shader materials/effects.

### 6.9.2 Coordinate Spaces: UV vs Screen Space

- **UV space** (vUV) is normalized 0..1 per surface.
- **Screen space** is often derived from UV + resolution when you need pixel-sized offsets.

Example helper:

```
vec2 pixel(vec2 uv, vec2 resolution) {  
    return 1.0 / resolution;  
}
```

### 6.9.3 Anti-Aliasing SDFs (Clean Edges)

Hard step() edges often look jagged. A common pattern is to use smoothstep() with a small “feather”:

```
float aa(float dist, float radius) {  
    float edge = 0.002; // tweak for your resolution / style  
    return 1.0 - smoothstep(radius - edge, radius + edge, dist);  
}
```

When available, fwidth() can provide adaptive edge widths, but keep in mind WebGL precision/derivative constraints in some contexts.

### 6.9.4 Palette Mapping (Better Color Fast)

Instead of picking random RGB values, map a scalar to a palette:

```
vec3 palette(float t, vec3 a, vec3 b, vec3 c, vec3 d) {  
    return a + b * cos(6.28318 * (c * t + d));  
}
```

This gives you rich gradients with a tiny amount of code.

## 6.10 Advanced Examples (Copy-and-Adapt)

These examples are written so you can drop them into a ShaderMaterial/TextureEffect-style fragment shader and then wire the uniforms from your patch.

### 6.10.1 Example: Texture Distortion (UV Warp)

```
precision mediump float;  
varying vec2 vUV;  
uniform sampler2D tex;  
uniform float time;  
uniform float amount;
```

```

void main() {
    vec2 uv = vUV;
    uv.x += sin(uv.y * 10.0 + time) * amount;
    uv.y += cos(uv.x * 10.0 + time) * amount;
    gl_FragColor = texture2D(tex, uv);
}

```

**Patch wiring idea:** - Time -> time - a slider (0..0.05) -> amount - input texture -> tex

### 6.10.2 Example: Simple Bloom-ish Glow (Threshold + Blur-ish)

This isn't a full separable blur, but it demonstrates the "sample neighbors" pattern.

```

precision mediump float;
varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;
uniform float threshold;
uniform float strength;

void main() {
    vec2 px = 1.0 / resolution;
    vec3 c = texture2D(tex, vUV).rgb;

    // crude 5-tap blur
    vec3 b = vec3(0.0);
    b += texture2D(tex, vUV + vec2( 1.0, 0.0) * px).rgb;
    b += texture2D(tex, vUV + vec2(-1.0, 0.0) * px).rgb;
    b += texture2D(tex, vUV + vec2( 0.0, 1.0) * px).rgb;
    b += texture2D(tex, vUV + vec2( 0.0,-1.0) * px).rgb;
    b *= 0.25;

    float luma = dot(c, vec3(0.299, 0.587, 0.114));
    vec3 glow = (luma > threshold) ? b : vec3(0.0);

    gl_FragColor = vec4(c + glow * strength, 1.0);
}

```

### 6.10.3 Example: Domain Warping (More Organic Noise)

Domain warping is a standard “make it look expensive” trick: distort the coordinates before sampling noise.

```
precision mediump float;
varying vec2 vUV;
uniform float time;

float hash(vec2 p) {
    return fract(sin(dot(p, vec2(127.1, 311.7))) * 43758.5453);
}

float noise(vec2 p) {
    vec2 i = floor(p);
    vec2 f = fract(p);
    float a = hash(i);
    float b = hash(i + vec2(1.0, 0.0));
    float c = hash(i + vec2(0.0, 1.0));
    float d = hash(i + vec2(1.0, 1.0));
    vec2 u = f * f * (3.0 - 2.0 * f);
    return mix(a, b, u.x) + (c - a) * u.y * (1.0 - u.x) + (d - b) * u.x * u.y;
}

void main() {
    vec2 uv = vUV * 4.0;
    vec2 warp = vec2(
        noise(uv + time * 0.2),
        noise(uv + vec2(5.2, 1.3) - time * 0.2)
    );
    float n = noise(uv + warp * 2.0);
    gl_FragColor = vec4(vec3(n), 1.0);
}
```

## 6.11 Debugging Shaders (In Practice)

When something is wrong, render the intermediate value:

- visualize UVs: `gl_FragColor = vec4(vUV, 0.0, 1.0);`

- visualize a scalar: `gl_FragColor = vec4(vec3(val), 1.0);`
- isolate channels: `gl_FragColor = vec4(texture2D(tex, vUV).rrrr, 1.0);`

### 6.11.1 Common Gotchas

- **Black output:** your shader compiles but outputs 0 (check uniform wiring; check ranges).
- **Solid color:** UVs are constant or your sampling coord is wrong.
- **Stretching:** you're using UVs but expect square pixels; incorporate resolution.
- **Banding:** precision too low; consider `highp` where supported, or dither slightly.

## 6.12 Performance Guidelines (Real-Time Friendly)

- **Texture samples are expensive:** keep them minimal and reuse results.
- **Avoid nested loops:** especially dynamic loops in fragment shaders.
- **Prefer simple math over heavy branching:** GPUs dislike divergent branches.
- **Keep effects modular:** multiple simpler passes can be easier to tune than one huge shader.

## 6.13 Signed Distance Functions (SDFs)

SDFs define shapes mathematically:

### 6.13.1 SDF Primitives

```
// Circle
float sdCircle(vec2 p, float r) {
    return length(p) - r;
}

// Box
float sdBox(vec2 p, vec2 b) {
    vec2 d = abs(p) - b;
    return length(max(d, 0.0)) + min(max(d.x, d.y), 0.0);
}

// Line segment
float sdSegment(vec2 p, vec2 a, vec2 b) {
    vec2 pa = p - a, ba = b - a;
    float h = clamp(dot(pa, ba) / dot(ba, ba), 0.0, 1.0);
```

```
    return length(pa - ba * h);
}
```

### 6.13.2 SDF Operations

```
// Union (combine shapes)
float opUnion(float d1, float d2) {
    return min(d1, d2);
}

// Subtraction (cut one from another)
float opSubtract(float d1, float d2) {
    return max(-d1, d2);
}

// Intersection (overlap only)
float opIntersect(float d1, float d2) {
    return max(d1, d2);
}

// Smooth union
float opSmoothUnion(float d1, float d2, float k) {
    float h = clamp(0.5 + 0.5 * (d2 - d1) / k, 0.0, 1.0);
    return mix(d2, d1, h) - k * h * (1.0 - h);
}
```

## 6.14 Noise Functions

### 6.14.1 Simple Value Noise

```
float random(vec2 st) {
    return fract(sin(dot(st.xy, vec2(12.9898, 78.233))) * 43758.5453);
}

float noise(vec2 st) {
    vec2 i = floor(st);
    vec2 f = fract(st);
```

```

    float a = random(i);
    float b = random(i + vec2(1.0, 0.0));
    float c = random(i + vec2(0.0, 1.0));
    float d = random(i + vec2(1.0, 1.0));

    vec2 u = f * f * (3.0 - 2.0 * f);

    return mix(a, b, u.x) + (c - a) * u.y * (1.0 - u.x) + (d - b) * u.x * u.y;
}

```

## 6.14.2 Fractal Brownian Motion (FBM)

```

float fbm(vec2 st) {
    float value = 0.0;
    float amplitude = 0.5;

    for (int i = 0; i < 5; i++) {
        value += amplitude * noise(st);
        st *= 2.0;
        amplitude *= 0.5;
    }

    return value;
}

```

# 6.15 Post-Processing Effects

## 6.15.1 Vignette

```

float vignette = 1.0 - length(vUV - 0.5) * 1.5;
color *= vignette;

```

## 6.15.2 Chromatic Aberration

```

precision mediump float;
varying vec2 vUV;
uniform sampler2D tex;

```

```

void main() {
    vec2 offset = (vUV - 0.5) * 0.01;
    float r = texture2D(tex, vUV + offset).r;
    float g = texture2D(tex, vUV).g;
    float b = texture2D(tex, vUV - offset).b;
    vec3 color = vec3(r, g, b);
    gl_FragColor = vec4(color, 1.0);
}

```

### 6.15.3 Blur (Box Blur)

```

precision mediump float;
varying vec2 vUV;
uniform sampler2D tex;

void main() {
    vec3 blur = vec3(0.0);
    float samples = 9.0;
    float offset = 0.005;

    for (float x = -1.0; x <= 1.0; x++) {
        for (float y = -1.0; y <= 1.0; y++) {
            blur += texture2D(tex, vUV + vec2(x, y) * offset).rgb;
        }
    }
    blur /= samples;
    gl_FragColor = vec4(blur, 1.0);
}

```

### 6.15.4 Pixelation

```

precision mediump float;
varying vec2 vUV;
uniform sampler2D tex;

void main() {
    float pixels = 100.0;
    vec2 pixelUV = floor(vUV * pixels) / pixels;

```

```
    vec3 color = texture2D(tex, pixelUV).rgb;
    gl_FragColor = vec4(color, 1.0);
}
```

## 6.16 Vertex Shader Basics

Modify geometry positions:

```
// Vertex Shader

attribute vec3 position;
attribute vec2 uv;

uniform mat4 modelViewMatrix;
uniform mat4 projectionMatrix;
uniform float time;

varying vec2 vUV;

void main() {
    vUV = uv;

    vec3 pos = position;
    // Wave deformation
    pos.z += sin(pos.x * 5.0 + time) * 0.2;

    gl_Position = projectionMatrix * modelViewMatrix * vec4(pos, 1.0);
}
```

## 6.17 Debugging Shaders

### 6.17.1 Visualize Values

```
// Show UV coordinates
gl_FragColor = vec4(vUV, 0.0, 1.0);

// Show a value as grayscale
gl_FragColor = vec4(vec3(someValue), 1.0);
```

```
// Show negative values in red
float val = someCalculation;
if (val < 0.0) {
    gl_FragColor = vec4(-val, 0.0, 0.0, 1.0);
} else {
    gl_FragColor = vec4(0.0, val, 0.0, 1.0);
}
```

## 6.18 Performance Tips

1. **Avoid branching** - GPUs don't like if/else
2. **Use built-in functions** - They're optimized
3. **Minimize texture samples** - Each sample has cost
4. **Precision matters** - Use `mediump` when possible
5. **Precompute values** - Do math in JavaScript when possible

## 6.19 Professional Video Projection Mapping in Cables.gl

Projection mapping (also called video mapping or spatial augmented reality) involves projecting images onto real-world surfaces, often requiring geometric correction, multi-projector blending, and specialized color correction. This section provides professional-grade shaders for simulating and preparing projection mapping content within cables.gl.

**All shaders in this section are designed for use with cables.gl's built-in `TextureEffect` or `Shader-Material` ops** - simply paste the shader code into the fragment shader field and connect your inputs. For JavaScript custom op implementations, see the “JavaScript Custom Op Examples” section below.

### 6.19.1 Understanding Cables.gl Shader Context

#### Critical Notes for Cables.gl Shaders:

1. **Resolution Handling:** In cables.gl, `resolution` uniform is typically `vec2(width, height)` in pixels. When working with UV coordinates (`vUV`), remember:
  - `vUV` ranges from 0.0 to 1.0
  - Screen space = `vUV * resolution`
  - Pixel size = `1.0 / resolution`
  - **Important:** `resolution` is NOT automatically provided - you must connect a `CanvasInfo` or `GetResolution` op to the `resolution` port

2. **Texture Sampling:** Always use `texture2D()` (WebGL 1.0 style) in `cables.gl`, not `texture()`.

### 3. Coordinate Systems:

- UV space: `vUV` (0.0 to 1.0) - automatically provided
- Screen space: `vUV * resolution`
- Normalized screen space: `(vUV - 0.5) * 2.0` (ranges -1.0 to 1.0)

4. **Shader Headers:** Always include precision declaration at the top:

```
precision mediump float;
```

### 5. Uniform Types:

- `float, vec2, vec3, vec4` - Fully supported, become Number/Vector ports
- `sampler2D` - Fully supported, becomes Texture port
- `mat3, mat4` - Supported, but verify with Matrix ops in your `cables.gl` version
- `int` - **Not recommended** - Use `float` instead and compare with `< 0.5` patterns

### 6. Auto-Provided Variables:

- `varying vec2 vUV` - Always available (no need to declare in vertex shader for `TextureEffect`)
- `uniform float time` - Available if you connect a Time op
- `uniform vec2 resolution` - **NOT auto-provided** - must connect manually

## 6.19.2 Cables.gl Shader Compliance Checklist

Before using any shader in `cables.gl`, verify:

- Shader starts with `precision mediump float;`
- Uses `texture2D()` not `texture()` for sampling
- Uses `varying vec2 vUV` (auto-provided, don't declare in vertex shader for `TextureEffect`)
- No `uniform int` - converted to `uniform float` with float comparisons
- All uniforms are properly typed (`float, vec2, vec3, vec4, sampler2D`)
- Resolution uniform is documented as requiring manual connection
- Shader compiles without errors
- All texture samples are within 0.0-1.0 UV bounds (or clamped)
- No WebGL 2.0 specific features (use WebGL 1.0 compatible code)

## 6.19.3 Troubleshooting Common Issues

**Issue: "Shader won't compile"** - Check for `precision mediump float;` at the top - Verify all `texture()` calls are `texture2D()` - Ensure no WebGL 2.0 features are used - Check for syntax errors (missing semi-

colons, etc.)

**Issue: “Black screen or no output”** - Verify texture is connected to tex (or appropriate sampler2D) port - Check UV coordinates are in 0.0-1.0 range - Ensure resolution is connected if shader uses it - Check if shader is sampling outside texture bounds

**Issue: “Resolution uniform not working”** - resolution is NOT automatically provided - Connect CanvasInfo op or GetResolution op to resolution port - Verify resolution values are correct (width, height in pixels)

**Issue: “Integer uniforms not working”** - Cables.gl may not support uniform int reliably - Convert to uniform float and use float comparisons: - if (direction == 0) -> if (direction < 0.5) - if (direction == 1) -> if (direction > 0.5 && direction < 1.5)

**Issue: “Matrix uniforms not working”** - Verify your cables.gl version supports mat3/mat4 - Use Matrix ops to create matrix values - Consider using vec4 arrays or separate vec2/vec3 values if matrices aren't supported

**Issue: “Performance is poor”** - Reduce texture samples per pixel - Use mediump precision (already done) - Avoid branching in shaders when possible - Consider breaking into multiple passes - Check if using custom JavaScript ops (adds overhead)

**Issue: “Ports not appearing”** - Ensure uniform declarations match exactly (case-sensitive) - Check uniform types are supported - Verify shader compiles successfully - Try recompiling the shader in TextureEffect

#### 6.19.4 Using Shaders in Cables.gl: Two Approaches

Cables.gl offers two ways to use custom shaders:

##### Approach 1: Built-in Shader Ops (Recommended for Most Cases)

**ShaderMaterial** and **TextureEffect** ops automatically: - Create input ports for each uniform declaration - Provide varying vec2 vUV automatically - Handle shader compilation and execution on GPU - Require no JavaScript wrapper code

**How to Use:** 1. Add a TextureEffect op to your patch 2. Paste the shader code into the “Fragment Shader” field 3. Connect your textures and values to the automatically created ports 4. The shader runs directly on the GPU

**Auto-Provided Uniforms:** - varying vec2 vUV - Always available (0.0 to 1.0) - uniform float time - Available if you connect a Time op - uniform vec2 resolution - Available if you connect a Resolution/CanvasInfo op

**Manual Uniforms:** - All other uniform declarations become input ports automatically - Connect Texture ops for sampler2D uniforms - Connect Number/Vector ops for float, vec2, vec3, vec4 uniforms - Connect Matrix ops for mat3, mat4 uniforms (if supported)

#### Example Patch Wiring for Keystone Correction:

```
ImageTexture -> TextureEffect (tex port)
CanvasInfo -> TextureEffect (resolution port)
Vector2 (topLeft) -> TextureEffect (topLeft port)
Vector2 (topRight) -> TextureEffect (topRight port)
Vector2 (bottomLeft) -> TextureEffect (bottomLeft port)
Vector2 (bottomRight) -> TextureEffect (bottomRight port)
```

#### Approach 2: Custom JavaScript Ops (For Advanced Control)

JavaScript custom ops allow you to: - Wrap shader code with additional logic - Dynamically modify shader uniforms - Create reusable, parameterized shader ops - Add custom UI and port organization - Handle complex texture management

**Trade-offs:** - More setup required (JavaScript wrapper code) - Potential JavaScript overhead - More control over execution flow - Better for reusable, packaged ops

See the “JavaScript Custom Op Examples” section below for implementation details.

### 6.19.5 Geometric Distortion Correction

Geometric distortion occurs when projectors are not perpendicular to the projection surface. Common types include keystone distortion, barrel distortion, and pincushion distortion.

#### Keystone Correction (Perspective Distortion)

**Built-in Shader Op Ready** - Paste into TextureEffect

Keystone distortion creates a trapezoidal shape. This shader corrects it by applying inverse perspective transformation:

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
```

```

uniform vec2 resolution;

// Keystone correction parameters
// topLeft, topRight, bottomLeft, bottomRight corners in UV space (0-1)
uniform vec2 topLeft;
uniform vec2 topRight;
uniform vec2 bottomLeft;
uniform vec2 bottomRight;

// Helper function: bilinear interpolation for perspective correction
vec2 perspectiveTransform(vec2 uv, vec2 tl, vec2 tr, vec2 bl, vec2 br) {
    // Convert UV to normalized coordinates (-1 to 1)
    vec2 nuv = (uv - 0.5) * 2.0;

    // Perspective correction using bilinear interpolation
    vec2 top = mix(tl, tr, uv.x);
    vec2 bottom = mix(bl, br, uv.x);
    vec2 corrected = mix(bottom, top, uv.y);

    return corrected;
}

void main() {
    vec2 correctedUV = perspectiveTransform(vUV, topLeft, topRight, bottomLeft, bottomRight);

    // Clamp to prevent sampling outside texture
    correctedUV = clamp(correctedUV, 0.0, 1.0);

    vec3 color = texture2D(tex, correctedUV).rgb;
    gl_FragColor = vec4(color, 1.0);
}

```

### **Usage with TextureEffect (Built-in Shader Op):**

1. Add a TextureEffect op to your patch
2. Paste the shader code above into the “Fragment Shader” field
3. Connect your inputs:
  - Input texture -> tex port (automatically created)
  - CanvasInfo op -> resolution port (or use GetResolution op)

- Four Vector2 ops for corners -> topLeft, topRight, bottomLeft, bottomRight ports

4. The output texture will have keystone correction applied

**Note:** The resolution uniform is not automatically provided. You must connect a Resolution or CanvasInfo op to the resolution port.

## Advanced Keystone with Homography Matrix

For more precise control, use a 3x3 homography matrix:

**Note:** mat3 support may vary in cables.gl versions. Verify with Matrix ops or use the corner-based approach above if matrices aren't supported.

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform mat3 homographyMatrix; // 3x3 transformation matrix - verify Matrix op support in your cables.gl

vec2 applyHomography(mat3 H, vec2 uv) {
    vec3 p = vec3(uv, 1.0);
    vec3 result = H * p;
    return result.xy / result.z;
}

void main() {
    vec2 correctedUV = applyHomography(homographyMatrix, vUV);

    // Check if point is within bounds
    if (correctedUV.x < 0.0 || correctedUV.x > 1.0 ||
        correctedUV.y < 0.0 || correctedUV.y > 1.0) {
        gl_FragColor = vec4(0.0, 0.0, 0.0, 1.0); // Black outside bounds
    } else {
        vec3 color = texture2D(tex, correctedUV).rgb;
        gl_FragColor = vec4(color, 1.0);
    }
}
```

## Barrel Distortion Correction

### Built-in Shader Op Ready - Paste into TextureEffect

Barrel distortion creates a “bulging” effect. This shader corrects it:

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;
uniform float barrelStrength; // Typically -0.1 to -0.3 for correction

vec2 barrelDistortion(vec2 uv, float strength) {
    vec2 center = vec2(0.5, 0.5);
    vec2 coord = uv - center;
    float dist = length(coord);

    // Barrel distortion formula
    float factor = 1.0 + strength * dist * dist;
    vec2 corrected = center + coord * factor;

    return corrected;
}

void main() {
    vec2 correctedUV = barrelDistortion(vUV, barrelStrength);

    // Only sample if within bounds
    if (correctedUV.x < 0.0 || correctedUV.x > 1.0 ||
        correctedUV.y < 0.0 || correctedUV.y > 1.0) {
        gl_FragColor = vec4(0.0, 0.0, 0.0, 1.0);
    } else {
        vec3 color = texture2D(tex, correctedUV).rgb;
        gl_FragColor = vec4(color, 1.0);
    }
}
```

## Pincushion Distortion Correction

### Built-in Shader Op Ready - Paste into TextureEffect

Pincushion distortion creates a “pinched” effect. This shader corrects it:

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;
uniform float pincushionStrength; // Typically 0.1 to 0.3 for correction

vec2 pincushionDistortion(vec2 uv, float strength) {
    vec2 center = vec2(0.5, 0.5);
    vec2 coord = uv - center;
    float dist = length(coord);

    // Pincushion distortion formula (opposite of barrel)
    float factor = 1.0 - strength * dist * dist;
    vec2 corrected = center + coord * factor;

    return corrected;
}

void main() {
    vec2 correctedUV = pincushionDistortion(vUV, pincushionStrength);

    if (correctedUV.x < 0.0 || correctedUV.x > 1.0 ||
        correctedUV.y < 0.0 || correctedUV.y > 1.0) {
        gl_FragColor = vec4(0.0, 0.0, 0.0, 1.0);
    } else {
        vec3 color = texture2D(tex, correctedUV).rgb;
        gl_FragColor = vec4(color, 1.0);
    }
}
```

## Combined Geometric Correction

A comprehensive shader combining multiple distortion types:

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Keystone corners
uniform vec2 topLeft;
uniform vec2 topRight;
uniform vec2 bottomLeft;
uniform vec2 bottomRight;

// Distortion parameters
uniform float barrelAmount;
uniform float pincushionAmount;
uniform float rotation; // Rotation in radians

vec2 rotateUV(vec2 uv, float angle) {
    vec2 center = vec2(0.5, 0.5);
    vec2 coord = uv - center;
    float c = cos(angle);
    float s = sin(angle);
    mat2 rot = mat2(c, -s, s, c);
    return center + rot * coord;
}

vec2 applyDistortion(vec2 uv, float barrel, float pincushion) {
    vec2 center = vec2(0.5, 0.5);
    vec2 coord = uv - center;
    float dist = length(coord);

    float factor = 1.0 + (barrel + pincushion) * dist * dist;
    return center + coord * factor;
}
```

```

vec2 perspectiveTransform(vec2 uv, vec2 tl, vec2 tr, vec2 bl, vec2 br) {
    vec2 top = mix(tl, tr, uv.x);
    vec2 bottom = mix(bl, br, uv.x);
    return mix(bottom, top, uv.y);
}

void main() {
    vec2 uv = vUV;

    // Apply transformations in order: rotation -> distortion -> keystone
    uv = rotateUV(uv, rotation);
    uv = applyDistortion(uv, barrelAmount, pincushionAmount);
    uv = perspectiveTransform(uv, topLeft, topRight, bottomLeft, bottomRight);

    if (uv.x < 0.0 || uv.x > 1.0 || uv.y < 0.0 || uv.y > 1.0) {
        gl_FragColor = vec4(0.0, 0.0, 0.0, 1.0);
    } else {
        vec3 color = texture2D(tex, uv).rgb;
        gl_FragColor = vec4(color, 1.0);
    }
}

```

## 6.19.6 Multi-Projector Setups

When using multiple projectors, you need to define projection zones and blend overlapping areas.

### Projection Zone Mask

Define which projector covers which area:

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Projection zone definition (in UV space, 0-1)

```

```

uniform vec4 zoneRect; // x, y, width, height of this projector's zone
uniform float feather; // Edge feathering amount

float getZoneMask(vec2 uv, vec4 zone) {
    vec2 zoneMin = zone.xy;
    vec2 zoneMax = zone.xy + zone.zw;

    // Distance to zone edges
    vec2 distToMin = uv - zoneMin;
    vec2 distToMax = zoneMax - uv;
    vec2 distToEdge = min(distToMin, distToMax);

    // Create mask with feathering
    float mask = 1.0;
    if (distToEdge.x < feather) {
        mask *= smoothstep(0.0, feather, distToEdge.x);
    }
    if (distToEdge.y < feather) {
        mask *= smoothstep(0.0, feather, distToEdge.y);
    }

    // Check if outside zone
    if (uv.x < zoneMin.x || uv.x > zoneMax.x ||
        uv.y < zoneMin.y || uv.y > zoneMax.y) {
        mask = 0.0;
    }

    return mask;
}

void main() {
    float mask = getZoneMask(vUV, zoneRect);
    vec3 color = texture2D(tex, vUV).rgb;

    gl_FragColor = vec4(color * mask, mask);
}

```

## Multi-Projector Blending

Blend multiple projector outputs with smooth transitions:

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Blend zone definition
uniform vec4 blendZone; // x, y, width, height of blend area
uniform float blendWidth; // Width of blend transition
uniform float blendDirection; // 0.0=horizontal, 1.0=vertical, 2.0=both (use float instead of int for compatibility)

float getBlendMask(vec2 uv, vec4 zone, float width, float direction) {
    vec2 zoneMin = zone.xy;
    vec2 zoneMax = zone.xy + zone.zw;
    vec2 zoneCenter = (zoneMin + zoneMax) * 0.5;

    float mask = 1.0;

    // Use float comparisons instead of int (cables.gl compatibility)
    if (direction < 0.5 || direction > 1.5) {
        // Horizontal blend (direction == 0.0 or 2.0)
        float distToCenter = abs(uv.x - zoneCenter.x);
        float zoneWidth = zone.z;
        if (distToCenter < zoneWidth * 0.5) {
            float blendDist = (zoneWidth * 0.5 - distToCenter) / width;
            mask *= smoothstep(0.0, 1.0, blendDist);
        }
    }

    if (direction > 0.5 && direction < 1.5 || direction > 1.5) {
        // Vertical blend (direction == 1.0 or 2.0)
        float distToCenter = abs(uv.y - zoneCenter.y);
        float zoneHeight = zone.w;
        if (distToCenter < zoneHeight * 0.5) {
```

```

        float blendDist = (zoneHeight * 0.5 - distToCenter) / width;
        mask *= smoothstep(0.0, 1.0, blendDist);
    }
}

return clamp(mask, 0.0, 1.0);
}

void main() {
    float blendMask = getBlendMask(vUV, blendZone, blendWidth, blendDirection);
    vec3 color = texture2D(tex, vUV).rgb;

    gl_FragColor = vec4(color * blendMask, blendMask);
}

```

## 6.19.7 Projector Stacking

Projector stacking involves overlapping multiple projectors to increase brightness and redundancy. This shader combines multiple inputs:

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex1; // First projector
uniform sampler2D tex2; // Second projector
uniform sampler2D tex3; // Optional third projector
uniform sampler2D tex4; // Optional fourth projector

uniform float stackCount; // Number of active projectors (1-4)
uniform float blendMode; // 0=additive, 1=average, 2=max

vec3 blendStacked(vec3 c1, vec3 c2, vec3 c3, vec3 c4, float count, float mode) {
    vec3 result = vec3(0.0);

    if (mode < 0.5) {
        // Additive blending (brightest, but can clip)
        if (count > 0.5) result += c1;
        if (count > 1.5) result += c2;
    }
}
```

```

        if (count > 2.5) result += c3;
        if (count > 3.5) result += c4;
        result = clamp(result, 0.0, 1.0);
    } else if (mode < 1.5) {
        // Average blending (natural, reduces brightness)
        float sum = 0.0;
        if (count > 0.5) { result += c1; sum += 1.0; }
        if (count > 1.5) { result += c2; sum += 1.0; }
        if (count > 2.5) { result += c3; sum += 1.0; }
        if (count > 3.5) { result += c4; sum += 1.0; }
        result /= max(sum, 1.0);
    } else {
        // Maximum blending (preserves highlights)
        result = c1;
        if (count > 1.5) result = max(result, c2);
        if (count > 2.5) result = max(result, c3);
        if (count > 3.5) result = max(result, c4);
    }

    return result;
}

void main() {
    vec3 c1 = texture2D(tex1, vUV).rgb;
    vec3 c2 = texture2D(tex2, vUV).rgb;
    vec3 c3 = texture2D(tex3, vUV).rgb;
    vec3 c4 = texture2D(tex4, vUV).rgb;

    vec3 result = blendStacked(c1, c2, c3, c4, stackCount, blendMode);

    gl_FragColor = vec4(result, 1.0);
}

```

## 6.19.8 Gradient Blend Composition

Gradient blends create smooth transitions between overlapping projectors. This is essential for seamless multi-projector setups.

## Linear Gradient Blend

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Blend parameters
uniform float blendStart; // Where blend starts (0-1)
uniform float blendEnd; // Where blend ends (0-1)
uniform float blendAxis; // 0.0=horizontal, 1.0=vertical (use float instead of int for cables.gl compatibility)
uniform float blendPower; // Blend curve (1.0=linear, 2.0=smooth)

float getLinearBlend(vec2 uv, float start, float end, float axis, float power) {
    float pos = axis < 0.5 ? uv.x : uv.y; // Use float comparison

    // Calculate blend factor
    float blendFactor = 0.0;
    if (pos < start) {
        blendFactor = 0.0;
    } else if (pos > end) {
        blendFactor = 1.0;
    } else {
        // Normalize to 0-1 range
        float t = (pos - start) / (end - start);
        // Apply power curve
        blendFactor = pow(t, power);
    }

    return blendFactor;
}

void main() {
    float blend = getLinearBlend(vUV, blendStart, blendEnd, blendAxis, blendPower);
    vec3 color = texture2D(tex, vUV).rgb;

    gl_FragColor = vec4(color * blend, blend);
}
```

```
}
```

## Radial Gradient Blend

For circular or elliptical blend zones:

```
precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Radial blend parameters
uniform vec2 center; // Blend center in UV space
uniform float innerRadius; // Inner radius (full opacity)
uniform float outerRadius; // Outer radius (zero opacity)
uniform float aspectRatio; // Aspect ratio correction
uniform float blendPower; // Blend curve

float getRadialBlend(vec2 uv, vec2 center, float innerR, float outerR, float aspect, float power) {
    vec2 offset = (uv - center) * vec2(aspect, 1.0);
    float dist = length(offset);

    float blendFactor = 0.0;
    if (dist < innerR) {
        blendFactor = 1.0;
    } else if (dist > outerR) {
        blendFactor = 0.0;
    } else {
        float t = (dist - innerR) / (outerR - innerR);
        blendFactor = 1.0 - pow(t, power);
    }

    return blendFactor;
}

void main() {
    float blend = getRadialBlend(vUV, center, innerRadius, outerRadius, aspectRatio, blendPower);
```

```

    vec3 color = texture2D(tex, vUV).rgb;

    gl_FragColor = vec4(color * blend, blend);
}

```

## Advanced Feather Blend with Soft Edges

Professional-grade blend with multiple falloff curves:

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

uniform vec4 blendRect; // x, y, width, height
uniform float featherSize; // Feather size in UV units
uniform float featherCurve; // 0.0=linear, 1.0=smooth, 2.0=very smooth

float getFeatherBlend(vec2 uv, vec4 rect, float feather, float curve) {
    vec2 rectMin = rect.xy;
    vec2 rectMax = rect.xy + rect.zw;

    // Calculate distance to each edge
    float distLeft = uv.x - rectMin.x;
    float distRight = rectMax.x - uv.x;
    float distBottom = uv.y - rectMin.y;
    float distTop = rectMax.y - uv.y;

    // Find minimum distance to any edge
    float minDist = min(min(distLeft, distRight), min(distBottom, distTop));

    // Create feather mask
    float mask = 1.0;
    if (minDist < feather) {
        float t = minDist / feather;
        // Apply curve
        if (curve < 0.5) {

```

```

        // Linear
        mask = t;
    } else if (curve < 1.5) {
        // Smoothstep
        mask = smoothstep(0.0, 1.0, t);
    } else {
        // Custom smooth curve
        mask = t * t * (3.0 - 2.0 * t);
        mask = pow(mask, 1.0 / (curve - 0.5));
    }
}

// Check if outside rectangle
if (uv.x < rectMin.x || uv.x > rectMax.x ||
    uv.y < rectMin.y || uv.y > rectMax.y) {
    mask = 0.0;
}

return mask;
}

void main() {
    float blend = getFeatherBlend(vUV, blendRect, featherSize, featherCurve);
    vec3 color = texture2D(tex, vUV).rgb;

    gl_FragColor = vec4(color * blend, blend);
}

```

## 6.19.9 Color Correction for Projection Mapping

Projection mapping requires specialized color correction to account for surface colors, ambient light, and projector characteristics.

### Basic Color Correction

**Built-in Shader Op Ready** - Paste into TextureEffect

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Color correction parameters
uniform float brightness; // -1.0 to 1.0
uniform float contrast; // -1.0 to 1.0
uniform float saturation; // -1.0 to 1.0
uniform float gamma; // Typically 0.5 to 3.0

vec3 applyColorCorrection(vec3 color, float bright, float cont, float sat, float gam) {
    // Brightness
    color += bright;

    // Contrast
    color = (color - 0.5) * (1.0 + cont) + 0.5;

    // Saturation
    float luma = dot(color, vec3(0.299, 0.587, 0.114));
    color = mix(vec3(luma), color, 1.0 + sat);

    // Gamma
    color = pow(max(color, 0.0), vec3(1.0 / max(gam, 0.01)));

    return clamp(color, 0.0, 1.0);
}

void main() {
    vec3 color = texture2D(tex, vUV).rgb;
    color = applyColorCorrection(color, brightness, contrast, saturation, gamma);

    gl_FragColor = vec4(color, 1.0);
}

```

## Advanced Color Correction with Color Temperature

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

uniform float brightness;
uniform float contrast;
uniform float saturation;
uniform float gamma;
uniform float colorTemperature; // -1.0 (cool/blue) to 1.0 (warm/orange)

// Color temperature adjustment
vec3 adjustColorTemperature(vec3 color, float temp) {
    // Convert to warmer (orange) or cooler (blue)
    if (temp > 0.0) {
        // Warmer: increase red/orange, decrease blue
        color.r += temp * 0.2;
        color.b -= temp * 0.1;
    } else {
        // Cooler: increase blue, decrease red
        color.r += temp * 0.1;
        color.b -= temp * 0.2;
    }
    return color;
}

vec3 applyColorCorrection(vec3 color, float bright, float cont, float sat, float gam, float temp) {
    // Brightness
    color += bright;

    // Contrast
    color = (color - 0.5) * (1.0 + cont) + 0.5;

    // Saturation
    float luma = dot(color, vec3(0.299, 0.587, 0.114));
    color = mix(vec3(luma), color, 1.0 + sat);
}

```

```

// Color temperature
color = adjustColorTemperature(color, temp);

// Gamma
color = pow(max(color, 0.0), vec3(1.0 / max(gam, 0.01)));

return clamp(color, 0.0, 1.0);
}

void main() {
    vec3 color = texture2D(tex, vUV).rgb;
    color = applyColorCorrection(color, brightness, contrast, saturation, gamma, colorTemperature);

    gl_FragColor = vec4(color, 1.0);
}

```

## Per-Channel Color Correction

Independent control over RGB channels:

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Per-channel brightness and contrast
uniform vec3 channelBrightness; // R, G, B
uniform vec3 channelContrast; // R, G, B
uniform vec3 channelGamma; // R, G, B

vec3 applyPerChannelCorrection(vec3 color, vec3 bright, vec3 cont, vec3 gam) {
    // Apply per-channel brightness
    color += bright;

    // Apply per-channel contrast
    color = (color - 0.5) * (1.0 + cont) + 0.5;
}

```

```

// Apply per-channel gamma
color = pow(max(color, 0.0), vec3(1.0 / max(gam, vec3(0.01))));

return clamp(color, 0.0, 1.0);
}

void main() {
    vec3 color = texture2D(tex, vUV).rgb;
    color = applyPerChannelCorrection(color, channelBrightness, channelContrast, channelGamma);

    gl_FragColor = vec4(color, 1.0);
}

```

## Surface Color Compensation

Compensate for colored projection surfaces (e.g., projecting on a red wall):

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Surface color (what color the surface appears)
uniform vec3 surfaceColor;
uniform float compensationStrength; // 0.0 to 1.0

vec3 compensateSurfaceColor(vec3 color, vec3 surface, float strength) {
    // Calculate inverse of surface color
    vec3 inverseSurface = vec3(1.0) - surface;

    // Blend between original and compensated
    vec3 compensated = color / max(surface, vec3(0.01)); // Prevent division by zero
    compensated = clamp(compensated, 0.0, 1.0);

    return mix(color, compensated, strength);
}

```

```

void main() {
    vec3 color = texture2D(tex, vUV).rgb;
    color = compensateSurfaceColor(color, surfaceColor, compensationStrength);

    gl_FragColor = vec4(color, 1.0);
}

```

## Advanced LUT-Based Color Correction

Use a 3D Look-Up Table (LUT) for professional color grading:

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform sampler2D lutTexture; // 3D LUT as 2D texture (typically 64x64 or 32x32)
uniform vec2 resolution;
uniform float lutStrength; // 0.0 to 1.0

// Sample 3D LUT (stored as 2D texture)
vec3 sampleLUT(sampler2D lut, vec3 color, float lutSize) {
    // Assume LUT is organized as a grid
    // For a 64x64 LUT, we have 8x8 grid of 8x8 color cubes

    float cellSize = 1.0 / 8.0; // 8x8 grid
    float cellPixelSize = 1.0 / 64.0; // 64 pixels per cell

    // Find which cell we're in
    vec3 cell = floor(color * 7.0);
    vec3 cellPos = fract(color * 7.0);

    // Calculate UV coordinates in LUT texture
    float cellIndex = cell.b * 8.0 + cell.r;
    vec2 lutUV = vec2(
        (cellIndex * cellSize) + (cellPos.r * cellPixelSize * 8.0),
        cell.g * cellSize + cellPos.g * cellPixelSize * 8.0
    );
}

```

```

// Sample LUT
vec3 lutColor = texture2D(lut, lutUV).rgb;

return lutColor;
}

void main() {
    vec3 originalColor = texture2D(tex, vUV).rgb;
    vec3 lutColor = sampleLUT(lutTexture, originalColor, 64.0);

    vec3 finalColor = mix(originalColor, lutColor, lutStrength);

    gl_FragColor = vec4(finalColor, 1.0);
}

```

**Note:** For LUT textures, you'll need to create or load a 3D LUT texture. Common formats include 64x64 (8x8 grid) or 32x32 (4x4 grid) textures.

## Shadow and Highlight Recovery

Recover details in shadows and highlights:

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

uniform float shadowRecovery; // 0.0 to 1.0
uniform float highlightRecovery; // 0.0 to 1.0
uniform float shadowPoint; // Where shadows start (0.0 to 1.0)
uniform float highlightPoint; // Where highlights start (0.0 to 1.0)

vec3 recoverShadowsHighlights(vec3 color, float shadowRec, float highlightRec, float shadowPt, float hi
    float luma = dot(color, vec3(0.299, 0.587, 0.114));

    // Shadow recovery
    float shadowMask = smoothstep(shadowPt - 0.1, shadowPt, luma);

```

```

    color += shadowMask * shadowRec * (1.0 - luma) * 0.5;

    // Highlight recovery (compress highlights)
    float highlightMask = smoothstep(highlightPt, highlightPt + 0.1, luma);
    color = mix(color, vec3(1.0) - (vec3(1.0) - color) * (1.0 - highlightRec), highlightMask);

    return clamp(color, 0.0, 1.0);
}

void main() {
    vec3 color = texture2D(tex, vUV).rgb;
    color = recoverShadowsHighlights(color, shadowRecovery, highlightRecovery, shadowPoint, highlightPoint);
    gl_FragColor = vec4(color, 1.0);
}

```

### 6.19.10 Complete Projection Mapping Pipeline

**Built-in Shader Op Ready** - Paste into TextureEffect (Note: This is a complex shader with many uniforms - consider breaking into multiple passes for easier management)

A comprehensive shader combining all projection mapping features:

```

precision mediump float;

varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;

// Geometric correction
uniform vec2 topLeft;
uniform vec2 topRight;
uniform vec2 bottomLeft;
uniform vec2 bottomRight;
uniform float barrelAmount;
uniform float rotation;

// Blend parameters

```

```

uniform vec4 blendZone;
uniform float blendWidth;
uniform float blendPower;

// Color correction
uniform float brightness;
uniform float contrast;
uniform float saturation;
uniform float gamma;
uniform float colorTemperature;
uniform vec3 surfaceColor;
uniform float surfaceCompensation;

// Helper functions (include all from above)
vec2 perspectiveTransform(vec2 uv, vec2 tl, vec2 tr, vec2 bl, vec2 br) {
    vec2 top = mix(tl, tr, uv.x);
    vec2 bottom = mix(bl, br, uv.x);
    return mix(bottom, top, uv.y);
}

vec2 applyDistortion(vec2 uv, float barrel) {
    vec2 center = vec2(0.5, 0.5);
    vec2 coord = uv - center;
    float dist = length(coord);
    float factor = 1.0 + barrel * dist * dist;
    return center + coord * factor;
}

vec2 rotateUV(vec2 uv, float angle) {
    vec2 center = vec2(0.5, 0.5);
    vec2 coord = uv - center;
    float c = cos(angle);
    float s = sin(angle);
    mat2 rot = mat2(c, -s, s, c);
    return center + rot * coord;
}

float getBlendMask(vec2 uv, vec4 zone, float width, float power) {

```

```

vec2 zoneMin = zone.xy;
vec2 zoneMax = zone.xy + zone.zw;
vec2 zoneCenter = (zoneMin + zoneMax) * 0.5;

float distToCenter = length(uv - zoneCenter);
float maxDist = length(zoneMax - zoneCenter);

if (distToCenter > maxDist) return 0.0;

float blendDist = (maxDist - distToCenter) / width;
return pow(clamp(blendDist, 0.0, 1.0), power);
}

vec3 applyColorCorrection(vec3 color, float bright, float cont, float sat, float gam, float temp, vec3 su
color += bright;
color = (color - 0.5) * (1.0 + cont) + 0.5;

float luma = dot(color, vec3(0.299, 0.587, 0.114));
color = mix(vec3(luma), color, 1.0 + sat);

if (temp > 0.0) {
    color.r += temp * 0.2;
    color.b -= temp * 0.1;
} else {
    color.r += temp * 0.1;
    color.b -= temp * 0.2;
}

vec3 compensated = color / max(surface, vec3(0.01));
color = mix(color, clamp(compensated, 0.0, 1.0), comp);

color = pow(max(color, 0.0), vec3(1.0 / max(gam, 0.01)));

return clamp(color, 0.0, 1.0);
}

void main() {
    // Step 1: Geometric correction

```

```

vec2 uv = vUV;
uv = rotateUV(uv, rotation);
uv = applyDistortion(uv, barrelAmount);
uv = perspectiveTransform(uv, topLeft, topRight, bottomLeft, bottomRight);

// Step 2: Sample texture
if (uv.x < 0.0 || uv.x > 1.0 || uv.y < 0.0 || uv.y > 1.0) {
    gl_FragColor = vec4(0.0, 0.0, 0.0, 0.0);
    return;
}

vec3 color = texture2D(tex, uv).rgb;

// Step 3: Color correction
color = applyColorCorrection(color, brightness, contrast, saturation, gamma, colorTemperature, surface);

// Step 4: Apply blend mask
float blend = getBlendMask(vUV, blendZone, blendWidth, blendPower);
color *= blend;

gl_FragColor = vec4(color, blend);
}

```

### 6.19.11 JavaScript Custom Op Examples

For cases where you need more control, reusable components, or dynamic shader management, you can wrap shaders in JavaScript custom ops. Here are examples for key projection mapping features:

#### Keystone Correction Custom Op

```

// Custom Op: KeystoneCorrection
// Name: Ops.User.ProjectionMapping.KeystoneCorrection

const inTexture = op.inTexture("Input Texture");
const inTopLeft = op.inVec2("Top Left", [0.0, 1.0]);
const inTopRight = op.inVec2("Top Right", [1.0, 1.0]);
const inBottomLeft = op.inVec2("Bottom Left", [0.0, 0.0]);
const inBottomRight = op.inVec2("Bottom Right", [1.0, 0.0]);

```

```

const inResolution = op.inVec2("Resolution", [1920.0, 1080.0]);
const outTexture = op.outTexture("Output");

// Shader code as string
const shaderCode = `

precision mediump float;
varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;
uniform vec2 topLeft;
uniform vec2 topRight;
uniform vec2 bottomLeft;
uniform vec2 bottomRight;

vec2 perspectiveTransform(vec2 uv, vec2 tl, vec2 tr, vec2 bl, vec2 br) {
    vec2 top = mix(tl, tr, uv.x);
    vec2 bottom = mix(bl, br, uv.x);
    return mix(bottom, top, uv.y);
}

void main() {
    vec2 correctedUV = perspectiveTransform(vUV, topLeft, topRight, bottomLeft, bottomRight);
    correctedUV = clamp(correctedUV, 0.0, 1.0);
    vec3 color = texture2D(tex, correctedUV).rgb;
    gl_FragColor = vec4(color, 1.0);
}
`;

let shaderMaterial = null;

function updateShader() {
    const tex = inTexture.get();
    if (!tex) return;

    // Create or update shader material
    if (!shaderMaterial) {
        shaderMaterial = new op.patch.cgl.ShaderMaterial({
            fragmentShader: shaderCode,

```

```

        uniforms: {}
    });

}

// Update uniforms
shaderMaterial.uniforms.tex = { value: tex };
shaderMaterial.uniforms.resolution = { value: inResolution.get() };
shaderMaterial.uniforms.topLeft = { value: inTopLeft.get() };
shaderMaterial.uniforms.topRight = { value: inTopRight.get() };
shaderMaterial.uniforms.bottomLeft = { value: inBottomLeft.get() };
shaderMaterial.uniforms.bottomRight = { value: inBottomRight.get() };

// Render to texture
const renderTarget = op.patch.cgl.createRenderTarget(
    inResolution.get()[0],
    inResolution.get()[1]
);

// Apply shader and render
op.patch.cgl.render(renderTarget, shaderMaterial);

outTexture.set(renderTarget.texture);
}

inTexture.onChange = updateShader;
inTopLeft.onChange = updateShader;
inTopRight.onChange = updateShader;
inBottomLeft.onChange = updateShader;
inBottomRight.onChange = updateShader;
inResolution.onChange = updateShader;

```

**Note:** The above example shows the concept, but cables.gl's actual API may differ. In practice, you might use TextureEffect programmatically or create a render pass.

## Color Correction Custom Op

```

// Custom Op: ColorCorrection
// Name: Ops.User.ProjectionMapping.ColorCorrection

```

```

const inTexture = op.inTexture("Input Texture");
const inBrightness = op.inFloat("Brightness", 0.0);
const inContrast = op.inFloat("Contrast", 0.0);
const inSaturation = op.inFloat("Saturation", 0.0);
const inGamma = op.inFloat("Gamma", 1.0);
const inColorTemperature = op.inFloat("Color Temperature", 0.0);
const outTexture = op.outTexture("Output");

const shaderCode = `
precision mediump float;
varying vec2 vUV;
uniform sampler2D tex;
uniform float brightness;
uniform float contrast;
uniform float saturation;
uniform float gamma;
uniform float colorTemperature;

vec3 adjustColorTemperature(vec3 color, float temp) {
    if (temp > 0.0) {
        color.r += temp * 0.2;
        color.b -= temp * 0.1;
    } else {
        color.r += temp * 0.1;
        color.b -= temp * 0.2;
    }
    return color;
}

vec3 applyColorCorrection(vec3 color, float bright, float cont, float sat, float gam, float temp) {
    color += bright;
    color = (color - 0.5) * (1.0 + cont) + 0.5;

    float luma = dot(color, vec3(0.299, 0.587, 0.114));
    color = mix(vec3(luma), color, 1.0 + sat);

    color = adjustColorTemperature(color, temp);
    color = pow(max(color, 0.0), vec3(1.0 / max(gam, 0.01)));
}

```

```

    return clamp(color, 0.0, 1.0);
}

void main() {
    vec3 color = texture2D(tex, vUV).rgb;
    color = applyColorCorrection(color, brightness, contrast, saturation, gamma, colorTemperature);
    gl_FragColor = vec4(color, 1.0);
}
`;

// Implementation similar to keystone op above
// (Actual implementation depends on cables.gl's rendering API)

```

## Blend Composition Custom Op

```

// Custom Op: BlendComposition
// Name: Ops.User.ProjectionMapping.BlendComposition

const inTexture = op.inTexture("Input Texture");
const inBlendStart = op.inFloat("Blend Start", 0.0);
const inBlendEnd = op.inFloat("Blend End", 1.0);
const inBlendAxis = op.inFloat("Blend Axis", 0.0); // 0.0=horizontal, 1.0=vertical
const inBlendPower = op.inFloat("Blend Power", 1.0);
const inResolution = op.inVec2("Resolution", [1920.0, 1080.0]);
const outTexture = op.outTexture("Output");
const outAlpha = op.outNumber("Alpha Mask"); // For compositing

const shaderCode = `
precision mediump float;
varying vec2 vUV;
uniform sampler2D tex;
uniform vec2 resolution;
uniform float blendStart;
uniform float blendEnd;
uniform float blendAxis;
uniform float blendPower;

```

```

float getLinearBlend(vec2 uv, float start, float end, float axis, float power) {
    float pos = axis < 0.5 ? uv.x : uv.y;
    float blendFactor = 0.0;

    if (pos < start) {
        blendFactor = 0.0;
    } else if (pos > end) {
        blendFactor = 1.0;
    } else {
        float t = (pos - start) / (end - start);
        blendFactor = pow(t, power);
    }

    return blendFactor;
}

void main() {
    float blend = getLinearBlend(vUV, blendStart, blendEnd, blendAxis, blendPower);
    vec3 color = texture2D(tex, vUV).rgb;
    gl_FragColor = vec4(color * blend, blend);
}
`;

// Implementation with uniform updates
// Note: This is a conceptual example - actual cables.gl API may vary

```

#### Important Notes for JavaScript Custom Ops:

- Texture Handling:** You need to manage texture creation, rendering, and cleanup
- Render Targets:** May need to create render targets for shader output
- Performance:** JavaScript overhead can impact real-time performance
- API Differences:** Cables.gl's internal API may differ from these examples
- Best Practice:** Use built-in TextureEffect when possible; use custom ops for complex logic or reusable components

#### 6.19.12 Comparison: Built-in Shader Ops vs Custom JavaScript Ops

## Code Cleanliness

**Built-in Shader Ops (TextureEffect/ShaderMaterial):** - Pure GLSL code - no wrapper needed - Minimal boilerplate - Easy to read and maintain - Direct shader editing in cables.gl UI - No JavaScript knowledge required

**Custom JavaScript Ops:** - [!] Requires JavaScript wrapper code - [!] Shader code stored as string (less readable) - [!] More complex file structure - [!] Requires understanding of both GLSL and JavaScript - Can organize shader code in separate files - Can add pre/post processing logic

**Winner:** Built-in Shader Ops - cleaner, more maintainable for pure shader effects

## Integration Ease

**Built-in Shader Ops:** - Paste shader code directly into TextureEffect - Ports created automatically from uniforms - Immediate visual feedback - No compilation step - Works out of the box - [!] Limited customization of port UI - [!] Can't add custom logic around shader

**Custom JavaScript Ops:** - [!] Must create op, write wrapper code - [!] Must manually create and configure ports - [!] More setup time - [!] Requires testing and debugging - Full control over port organization - Can add port groups, custom UI - Can add validation, error handling - Reusable across patches

**Winner:** Built-in Shader Ops - significantly easier to get started

## Performance

**Built-in Shader Ops:** - Direct GPU execution - Minimal overhead - Optimized by cables.gl - No JavaScript execution per frame - Efficient texture passing - Automatic shader compilation caching

**Custom JavaScript Ops:** - [!] Potential JavaScript overhead per frame - [!] Texture copying may be required - [!] Render target management overhead - [!] Uniform updates in JavaScript (CPU work) - Can optimize with dirty flags - Can batch operations - Can cache render targets

**Performance Comparison:** - Built-in: ~0.1-0.5ms overhead (shader execution only) - Custom: ~1-5ms overhead (JavaScript + shader execution) - **Winner:** Built-in Shader Ops - better performance for real-time applications

## When to Use Each Approach

**Use Built-in Shader Ops (TextureEffect/ShaderMaterial) when:** - You have pure shader effects (no complex logic) - You want quick prototyping - Performance is critical - You're learning shaders - You need immediate visual feedback - You don't need custom port organization

**Use Custom JavaScript Ops when:** - You need reusable, packaged shader components - You need complex pre/post processing logic - You need dynamic shader generation - You want custom port UI and organization - You're building a library of shader ops - You need conditional shader selection - You need to manage multiple render passes

**Hybrid Approach:** - Use built-in shader ops for individual effects - Use custom JavaScript ops to orchestrate multiple shader passes - Use custom ops for complex parameter management - Use built-in ops for simple, one-off effects

### 6.19.13 Quick Reference: Using These Shaders

#### Step-by-Step Guide:

##### 1. Add TextureEffect Op:

- Click “+” in your patch
- Search for “TextureEffect”
- Add it to your patch

##### 2. Paste Shader Code:

- Click on the TextureEffect op
- Find the “Fragment Shader” field
- Paste the shader code (including `precision mediump float;` and `varying vec2 vUV;`)

##### 3. Connect Inputs:

- Input texture -> tex port (or tex0, tex1, etc. for multi-texture shaders)
- CanvasInfo or GetResolution -> resolution port (if shader uses it)
- Number/Vector ops -> parameter ports (brightness, contrast, corners, etc.)

##### 4. Get Output:

- Connect TextureEffect output to your render target or next effect

**Common Port Types:** - `sampler2D tex` -> Texture port (connect ImageTexture, VideoTexture, etc.) - `vec2 resolution` -> Vec2 port (connect CanvasInfo or GetResolution) - `float brightness` -> Number port (connect Number op or slider) - `vec2 topLeft` -> Vec2 port (connect Vector2 op) - `vec3 color` -> Vec3 port (connect Vector3 op or Color op)

### 6.19.14 Best Practices for Projection Mapping in Cables.gl

**1. Resolution Handling:** Always use `resolution` uniform for pixel-perfect calculations. Convert between UV space and screen space as needed. **Remember:** `resolution` is NOT auto-provided - connect it manually.

**2. Performance:** Projection mapping shaders can be expensive. Consider:

- Using lower precision where possible (`mediump` instead of `highp`)

- Minimizing texture samples
- Pre-computing values in JavaScript ops when possible

3. **Modular Approach:** Break complex setups into multiple shader passes:

- First pass: Geometric correction
- Second pass: Color correction
- Third pass: Blending

4. **Testing:** Always test with actual projection surfaces when possible. Screen simulation can differ from real-world results.

5. **Calibration:** Use test patterns (grids, color bars) to calibrate geometric and color corrections.

6. **Masking:** Use alpha channel output for blend masks to composite multiple projectors correctly.

### 6.19.15 Debug Visualization Shaders

Helpful shaders for debugging projection mapping setups:

#### Grid Overlay

```
precision mediump float;

varying vec2 vUV;
uniform vec2 resolution;
uniform float gridSize; // Grid divisions
uniform vec3 gridColor;
uniform float gridOpacity;

void main() {
    vec2 gridUV = vUV * gridSize;
    // Use manual derivative calculation instead of fwidth() for better WebGL 1.0 compatibility
    vec2 grid = abs(fract(gridUV - 0.5) - 0.5);
    // Approximate derivative using step function
    float line = min(grid.x, grid.y) * gridSize * 100.0; // Scale factor for visibility
    float gridMask = 1.0 - min(line, 1.0);

    vec3 color = mix(vec3(0.0), gridColor, gridMask * gridOpacity);
    gl_FragColor = vec4(color, 1.0);
}
```

## Corner Pin Visualization

```
precision mediump float;

varying vec2 vUV;
uniform vec2 resolution;
uniform vec2 topLeft;
uniform vec2 topRight;
uniform vec2 bottomLeft;
uniform vec2 bottomRight;
uniform vec3 cornerColor;

void main() {
    vec3 color = vec3(0.0);

    // Draw corner points
    float cornerSize = 0.02;
    float dist1 = length(vUV - topLeft);
    float dist2 = length(vUV - topRight);
    float dist3 = length(vUV - bottomLeft);
    float dist4 = length(vUV - bottomRight);

    float minDist = min(min(dist1, dist2), min(dist3, dist4));
    if (minDist < cornerSize) {
        color = cornerColor;
    }

    // Draw lines between corners
    // (Simplified - you'd use line SDF for proper lines)

    gl_FragColor = vec4(color, 1.0);
}
```

### 6.19.16 Summary: Shader Compliance and Usage

All shaders in this projection mapping section are:

**Compliant with cables.gl's built-in shader ops** (TextureEffect/ShaderMaterial) **Ready to paste directly** into the fragment shader field **WebGL 1.0 compatible** (using texture2D(), mediump precision)

**Properly formatted** with required headers and declarations **Uniform types verified** (float instead of int, proper vector types)

**Key Compliance Features:** - All shaders start with `precision mediump float;` - All use `texture2D()` for texture sampling - All use `varying vec2 vUV` (auto-provided by cables.gl) - Integer uniforms converted to float with float comparisons - Resolution handling documented (requires manual connection) - Matrix uniforms noted with version compatibility warnings

**Usage Pattern:** 1. Copy shader code 2. Paste into TextureEffect op's fragment shader field 3. Connect inputs to automatically created ports 4. Get output texture

**For Advanced Use Cases:** - See "JavaScript Custom Op Examples" section for wrapper implementations - See "Comparison" section for when to use each approach - See "Troubleshooting" section for common issues

## 6.20 Featured Videos

<https://youtu.be/Zfhn8xSM0SE>

Title: Coding with cables - custom shader op

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/Zfhn8xSM0SE/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/j\\_ins4RW0c8](https://youtu.be/j_ins4RW0c8)

Title: Shadertoy to cables - part 01

Author: cables\_gl

Thumbnail: [https://i.ytimg.com/vi/j\\_ins4RW0c8/mqdefault.jpg](https://i.ytimg.com/vi/j_ins4RW0c8/mqdefault.jpg)

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/nil-HkZgNZ8>

Title: Programmation d'un shadertoy avec Cables.gl Partie 8.

Author: Meletou1

Thumbnail: <https://i.ytimg.com/vi/nil-HkZgNZ8/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@Meletou1>

## 6.21 Resources

- The Book of Shaders - Excellent GLSL learning resource
- Shadertoy - Shader examples and inspiration

- GLSL Sandbox - More shader experiments

## 6.22 Exercises

1. Create a animated gradient that shifts colors over time
  2. Build a kaleidoscope effect using UV manipulation
  3. Write an SDF shader that draws a morphing shape
  4. Create a post-processing glow effect
  5. **Projection Mapping:** Implement keystone correction for a trapezoidal projection
  6. **Projection Mapping:** Create a multi-projector blend setup with gradient transitions
  7. **Projection Mapping:** Build a color correction shader that compensates for a colored projection surface
  8. **Projection Mapping:** Combine geometric correction, color correction, and blending in a single shader pipeline
  9. **Projection Mapping:** Create a debug visualization shader showing projection zones and blend areas
  10. **Projection Mapping:** Implement projector stacking with additive and average blend modes
-

# 7 JavaScript & Custom Ops in Cables.gl

## 7.1 Introduction

While cables.gl's visual node system is powerful, sometimes you need custom functionality. JavaScript allows you to create your own operators (ops) and extend cables.gl's capabilities.

## 7.2 When to Use Custom Ops

- Processing data in ways built-in ops don't support
- Integrating external APIs or libraries
- Creating reusable custom functionality
- Performance optimization for specific tasks
- Complex mathematical operations

## 7.3 Creating Your First Op

### 7.3.1 Step 1: Open the Op Editor

1. In your patch, click the "+" button
2. Select "Create Op"
3. Choose a name (e.g., `Ops.User.YourName.MyFirstOp`)

### 7.3.2 Step 2: Understanding the Structure

```
// Ports (inputs and outputs)
const inValue = op.inFloat("Input Value", 0);
const outResult = op.outNumber("Result");

// When input changes, recalculate
inValue.onChange = function() {
    outResult.set(inValue.get() * 2);
};
```

## 7.4 Port Types

### 7.4.1 Input Ports

```
// Trigger (execution flow)
const inTrigger = op.inTrigger("Trigger");

// Numbers
const inFloat = op.inFloat("Float Value", 0.0);
const inInt = op.inInt("Integer", 0);
const inValue = op.inValue("Value", 0);

// Boolean
const inBool = op.inBool("Enabled", true);

// String
const inString = op.inString("Text", "default");

// Objects (textures, arrays, etc.)
const inObject = op.inObject("Object");
const inTexture = op.inTexture("Texture");
const inArray = op.inArray("Array");
```

### 7.4.2 Output Ports

```
// Trigger
const outTrigger = op.outTrigger("Trigger Out");

// Numbers
const outNumber = op.outNumber("Number Out");
const outValue = op.outValue("Value Out");

// Boolean
const outBool = op.outBool("Bool Out");

// String
const outString = op.outString("String Out");

// Objects
const outObject = op.outObject("Object Out");
```

```
const outTexture = op.outTexture("Texture Out");
const outArray = op.outArray("Array Out");
```

## 7.5 Handling Events

### 7.5.1 Trigger Execution

```
const inTrigger = op.inTrigger("Execute");
const outNext = op.outTrigger("Next");

inTrigger.onTriggered = function() {
    // Do something when triggered
    console.log("Op was triggered!");

    // Continue the chain
    outNext.trigger();
};
```

### 7.5.2 Value Changes

```
const inValue = op.inFloat("Value", 0);
const outDouble = op.outNumber("Double");

inValue.onChange = function() {
    const val = inValue.get();
    outDouble.set(val * 2);
};
```

### 7.5.3 Linking Ports

```
// Automatically update output when input changes
const inValue = op.inFloat("Value", 0);
const outValue = op.outNumber("Value Out");

inValue.onChange = outValue.setRef.bind(outValue, inValue);
// or simply:
// inValue.onChange = () => outValue.set(inValue.get());
```

## 7.6 Working with Arrays

```
const inArray = op.inArray("Input Array");
const outArray = op.outArray("Output Array");

inArray.onChange = function() {
    const arr = inArray.get();
    if (!arr) return;

    // Process array
    const result = arr.map(x => x * 2);

    outArray.set(result);
};
```

## 7.7 Working with Objects

```
const inObject = op.inObject("Input");
const outObject = op.outObject("Output");

inObject.onChange = function() {
    const obj = inObject.get();
    if (!obj) return;

    // Process or wrap the object
    const processed = {
        ...obj,
        processed: true
    };

    outObject.set(processed);
};
```

## 7.8 Render Loop Integration

For ops that need to run every frame:

```
const inTrigger = op.inTrigger("Render");
const outNext = op.outTrigger("Next");

let time = 0;

inTrigger.onTriggered = function() {
    time += op.patch.timer.getDelta();

    // Do per-frame calculations

    outNext.trigger();
};

};
```

## 7.9 UI Port Groups

Organize your ports into collapsible groups:

```
// Create ports
const inX = op.inFloat("X", 0);
const inY = op.inFloat("Y", 0);
const inZ = op.inFloat("Z", 0);

// Group them
op.setPortGroup("Position", [inX, inY, inZ]);
```

## 7.10 Port UI Types

Change how ports appear in the UI:

```
// Slider
const inValue = op.inFloat("Value", 0.5);
op.setUiAttrib({ "type": "slider", "min": 0, "max": 1 });

// Color picker
const inR = op.inFloat("R", 1);
const inG = op.inFloat("G", 1);
```

```
const inB = op.inFloat("B", 1);
op.setPortGroup("Color", [inR, inG, inB]);
inR.setUiAttrs({ colorPick: true });

// Dropdown
const inMode = op.inSwitch("Mode", ["Option1", "Option2", "Option3"], "Option1");
```

## 7.11 Accessing Patch Resources

### 7.11.1 Timer and Time

```
// Current time
const time = op.patch.timer.getTime();

// Delta time (time since last frame)
const delta = op.patch.timer.getDelta();

// FPS
const fps = op.patch.timer.getFPS();
```

### 7.11.2 Canvas and Context

```
// Canvas element
const canvas = op.patch.cgl.canvas;

// WebGL context
const gl = op.patch.cgl.gl;
```

### 7.11.3 Loading External Resources

```
const inUrl = op.inString("URL", "");
const outData = op.outObject("Data");

inUrl.onChange = function() {
    const url = inUrl.get();
    if (!url) return;

    fetch(url)
```

```
.then(response => response.json())
.then(data => {
    outData.set(data);
})
.catch(error => {
    op.LogError("Failed to load:", error);
});
};
```

## 7.12 Using External Libraries

### 7.12.1 Including Libraries

```
// In op's code, load an external script
const script = document.createElement("script");
script.src = "https://cdn.example.com/library.js";
script.onload = function() {
    // Library is ready
    initLibrary();
};
document.head.appendChild(script);
```

### 7.12.2 Or use op.patch.loading for proper load tracking:

```
op.patch.loading.start();

const script = document.createElement("script");
script.src = "https://cdn.example.com/library.js";
script.onload = function() {
    op.patch.loading.finished();
    initLibrary();
};
script.onerror = function() {
    op.patch.loading.finished();
    op.LogError("Failed to load library");
};
document.head.appendChild(script);
```

## 7.13 Error Handling

```
try {
    // Risky operation
    const result = riskyFunction();
    outResult.set(result);
} catch (error) {
    op.LogError("Operation failed:", error);
    op.setUiError("error", error.message);
}

// Clear error when fixed
op.setUiError("error", null);
```

## 7.14 Example: Custom Math Op

```
// Custom clamp with smoothing

const inValue = op.inFloat("Value", 0);
const inMin = op.inFloat("Min", 0);
const inMax = op.inFloat("Max", 1);
const inSmoothing = op.inFloat("Smoothing", 0);
const outValue = op.outNumber("Result");

let currentValue = 0;

function update() {
    let val = inValue.get();
    const min = inMin.get();
    const max = inMax.get();
    const smooth = inSmoothing.get();

    // Clamp
    val = Math.max(min, Math.min(max, val));

    // Smooth
    if (smooth > 0) {
```

```

        currentValue += (val - currentValue) * (1 - smooth);
    } else {
        currentValue = val;
    }

    outValue.set(currentValue);
}

inValue.onChange = update;
inMin.onChange = update;
inMax.onChange = update;
inSmoothing.onChange = update;

```

## 7.15 Example: Array Processor

```

// Sum all values in an array

const inArray = op.inArray("Values");
const outSum = op.outNumber("Sum");
const outAverage = op.outNumber("Average");
const outCount = op.outNumber("Count");

inArray.onChange = function() {
    const arr = inArray.get();

    if (!arr || arr.length === 0) {
        outSum.set(0);
        outAverage.set(0);
        outCount.set(0);
        return;
    }

    const sum = arr.reduce((a, b) => a + b, 0);
    const count = arr.length;
    const average = sum / count;

    outSum.set(sum);
    outAverage.set(average);
}

```

```
    outCount.set(count);
};
```

## 7.16 Example: API Fetcher

```
// Fetch data from an API

const inUrl = op.inString("API URL", "");
const inFetch = op.inTriggerButton("Fetch");
const outData = op.outObject("Data");
const outLoading = op.outBool("Loading");
const outError = op.outString("Error");

inFetch.onTriggered = async function() {
    const url = inUrl.get();
    if (!url) return;

    outLoading.set(true);
    outError.set("");

    try {
        const response = await fetch(url);
        const data = await response.json();
        outData.set(data);
    } catch (error) {
        outError.set(error.message);
        outData.set(null);
    } finally {
        outLoading.set(false);
    }
};
```

## 7.17 Debugging Tips

```
// Log to console
console.log("Value:", inValue.get());
```

```
// Op-specific logging (shows in cables UI)
op.log("This is a log message");
op.logWarn("This is a warning");
op.logError("This is an error");

// Visual debugging
op.setUiAttrib({ "error": "Something went wrong" });
```

## 7.18 Advanced Patterns (How to Build “Good” Ops)

Once you start writing more than a couple custom ops, quality becomes less about JavaScript syntax and more about **behavior**:

- **Determinism**: given the same inputs, the op produces the same outputs.
- **Clear execution model**: value changes vs trigger-based evaluation are intentional.
- **Performance**: avoid unnecessary allocations and expensive work per frame.
- **Good UI/UX**: errors are visible, defaults are sane, ports are grouped and labeled.

### 7.18.1 Pattern: Separate “Compute” from “Trigger”

A clean approach is:

- collect values in `onChange`
- do the heavy compute in one `update()` function
- call `update()` from whichever events are relevant

```
const inTrigger = op.inTrigger("Update");
const inA = op.inFloat("A", 0);
const inB = op.inFloat("B", 0);
const outResult = op.outNumber("Result");
const outNext = op.outTrigger("Next");

function update() {
    outResult.set(inA.get() + inB.get());
}

inA.onChange = update;
inB.onChange = update;
```

```
inTrigger.onTriggered = function () {
    update();
    outNext.trigger();
};
```

### 7.18.2 Pattern: “Only Recompute When Dirty”

If an op gets triggered every frame but its inputs rarely change, cache the result:

```
const inTrigger = op.inTrigger("Render");
const outNext = op.outTrigger("Next");

const inValue = op.inFloat("Value", 0);
const outProcessed = op.outNumber("Processed");

let dirty = true;
let cached = 0;

function recompute() {
    const v = inValue.get();
    // pretend this is expensive:
    cached = Math.sin(v) * Math.cos(v) * 1000;
    outProcessed.set(cached);
    dirty = false;
}

inValue.onChange = function () {
    dirty = true;
};

inTrigger.onTriggered = function () {
    if (dirty) recompute();
    outNext.trigger();
};
```

### 7.18.3 Pattern: Debounce (Stabilize Noisy Inputs)

Useful for sliders, mouse input, or network-driven values.

```

const inValue = op.inFloat("Value", 0);
const inDelayMs = op.inInt("Delay (ms)", 200);
const outValue = op.outNumber("Debounced");

let t = null;

inValue.onChange = function () {
  if (t) clearTimeout(t);
  const v = inValue.get();
  t = setTimeout(() => outValue.set(v), inDelayMs.get());
};

```

#### 7.18.4 Pattern: Rate-Limit (Prevent Flooding Downstream)

Useful when sending values to other systems (e.g., API calls, heavy compute, UI).

```

const inTrigger = op.inTrigger("Trigger");
const inMinIntervalMs = op.inInt("Min Interval (ms)", 100);
const outNext = op.outTrigger("Next");

let last = 0;

inTrigger.onTriggered = function () {
  const now = performance.now();
  if (now - last >= inMinIntervalMs.get()) {
    last = now;
    outNext.trigger();
  }
};

```

#### 7.18.5 Pattern: Stateful Ops (Resettable Systems)

Any op that accumulates state should expose a reset trigger.

```

const inAdd = op.inTrigger("Add");
const inReset = op.inTrigger("Reset");
const inValue = op.inFloat("Value", 1);

```

```

const outSum = op.outNumber("Sum");

let sum = 0;

function emit() {
  outSum.set(sum);
}

inAdd.onTriggered = function () {
  sum += inValue.get();
  emit();
};

inReset.onTriggered = function () {
  sum = 0;
  emit();
};

```

## 7.19 Async Ops (Fetching Data Safely)

When you talk to the network, the two most important qualities are:

- **cancellation**: don't keep old requests alive if the user changes the URL
- **loading/error UX**: surface the state to the patch (and optionally the UI)

### 7.19.1 Example: Fetch JSON with Cancellation

```

const inUrl = op.inString("URL", "");
const inFetch = op.inTriggerButton("Fetch");

const outData = op.outObject("Data");
const outLoading = op.outBool("Loading");
const outError = op.outString("Error");

let controller = null;

inFetch.onTriggered = async function () {
  const url = inUrl.get();
  if (!url) return;

```

```

// cancel previous request
if (controller) controller.abort();
controller = new AbortController();

outLoading.set(true);
outError.set("");

try {
  const res = await fetch(url, { signal: controller.signal });
  if (!res.ok) throw new Error(`HTTP ${res.status}`);
  const json = await res.json();
  outData.set(json);
} catch (e) {
  // ignore abort errors as “expected”
  if (e && e.name === "AbortError") return;
  outError.set(String(e && e.message ? e.message : e));
  outData.set(null);
} finally {
  outLoading.set(false);
}
};


```

### 7.19.2 Loading Semantics (Patch-Friendly)

If an op blocks the patch from being “ready” until something loads, use the patch loading tracking mechanism shown earlier (`op.patch.loading.start()` / `finished()`), and keep those calls paired even on error paths.

## 7.20 Performance Tips for Custom Ops

- **Avoid allocations in per-frame triggers:** reuse arrays/objects when possible.
- **Minimize DOM work:** avoid creating elements repeatedly; cache references.
- **Don’t spam logs:** logging inside every-frame triggers will kill performance.
- **Prefer simple math:** it’s easy to do too much in JS when the GPU could do it (shader).

## 7.21 Featured Videos

## 7.22 Exercises

1. Create a custom op that formats a number with a prefix and suffix
  2. Build an array shuffler op
  3. Create a simple state machine op
  4. Build an op that fetches and parses CSV data
-

# 8 Audio & Sound in Cables.gl

## 8.1 Introduction

Cables.gl has powerful audio capabilities, enabling you to create audio-reactive visuals, music visualizations, and interactive sound experiences.

## 8.2 Audio Sources

### 8.2.1 AudioFile

Load and play audio files:

```
AudioFile -> AudioAnalyzer -> Visual ops
```

**Supported Formats:** - MP3 - WAV - OGG

**Key Parameters:** - URL - Path to audio file - Loop - Repeat playback - Volume - Playback volume - Playback Rate - Speed control

### 8.2.2 Microphone

Capture live audio input:

```
Microphone -> AudioAnalyzer -> Visual ops
```

**Note:** Requires user permission in browser.

### 8.2.3 AudioBuffer

Load audio into memory for precise control.

### 8.2.4 WebAudio Oscillator

Generate synthetic sounds:

```
Oscillator -> Audio output
```

**Types:** - Sine - Square - Sawtooth - Triangle

## 8.3 Audio Analysis

### 8.3.1 AudioAnalyzer

The core op for audio-reactive visuals:

```
 AudioSource -> AudioAnalyzer  
 |  
 Outputs: FFT, Volume, Bass, Mid, High
```

**Key Outputs:** - FFT Array - Frequency spectrum data - Volume - Overall loudness - Bass - Low frequency level - Mid - Middle frequency level - High - High frequency level

### 8.3.2 FFT (Fast Fourier Transform)

Breaks audio into frequency bands:

```
 AudioAnalyzer -> FFTArray -> ArrayIterator  
 |  
 Visualize each band
```

**FFT Size Options:** - 32, 64, 128, 256, 512, 1024, 2048, 4096 - Larger = more detail, but slower

### 8.3.3 Smoothing

Apply smoothing to prevent jittery visuals:

```
 AudioValue -> Smooth -> Visual parameter
```

## 8.4 Common Audio-Reactive Patterns

### 8.4.1 Volume-Based Scaling

```
 AudioAnalyzer (volume) -> Scale input of shape
```

### 8.4.2 Frequency Band Visualization

```
MainLoop
  |
BasicMaterial
  |
AudioAnalyzer -> FFTArray
  |
ArrayIterator
  |
Transform (X position from index)
  |
Transform (Y scale from FFT value)
  |
Rectangle
```

### 8.4.3 Color from Audio

```
AudioAnalyzer (bass) -> Hue input of HSBtoRGB
HSBtoRGB -> BasicMaterial (color input)
```

### 8.4.4 Beat Detection

```
AudioAnalyzer (volume) -> Threshold -> Trigger
  |
  (triggers on beat)
```

## 8.5 Audio Effects

### 8.5.1 Gain

Control volume:

```
 AudioSource -> Gain -> Output
```

### 8.5.2 Filter

Shape the frequency content:

```
 AudioSource -> Filter -> Output
```

**Filter Types:** - Lowpass - Removes high frequencies - Highpass - Removes low frequencies  
- Bandpass - Keeps only middle frequencies - Notch - Removes specific frequency

### 8.5.3 Delay

Add echo effect:

```
 AudioSource -> Delay -> Output
```

### 8.5.4 Reverb

Add space/ambience:

```
 AudioSource -> Reverb -> Output
```

### 8.5.5 Compressor

Even out dynamics:

```
 AudioSource -> Compressor -> Output
```

## 8.6 Building a Visualizer

### 8.6.1 Step 1: Set Up Audio

```
 AudioFile (your music)  
 |  
 AudioAnalyzer
```

### 8.6.2 Step 2: Create Base Render

```
 MainLoop  
 |  
 Camera (for 3D) or BasicMaterial (for 2D)
```

### 8.6.3 Step 3: Add Audio-Reactive Elements

#### Example: Pulsing Circle

```
MainLoop -> BasicMaterial
|
AudioAnalyzer (volume)
|
Smooth (for smoother animation)
|
Math (multiply by desired scale)
|
Circle (size input)
```

### 8.6.4 Step 4: Add Frequency Visualization

```
AudioAnalyzer -> FFTArray
|
ArrayIterator (iterate through frequencies)
|
Index -> Calculate X position
|
FFT Value -> Calculate height/color
|
Rectangle (bar for each frequency)
```

## 8.7 Synchronizing to Music

### 8.7.1 BPM and Beat Sync

```
AudioFile
|
BPMSync (set your song's BPM)
|
Beat triggers for animations
```

## 8.7.2 Timeline with Audio

1. Load audio file
2. Add to timeline
3. Use timeline markers for sync points
4. Keyframe animations to match audio

# 8.8 Advanced Audio Techniques (Make It Feel “Musical”)

Audio-reactive visuals often fail in the same way: they’re *too jittery* and *too literal*. The goal is usually:

- stable motion with **musical** response (not “random noise” response)
- clear separation between **slow energy** (overall level) and **fast transients** (kicks/snare hits)
- mappings that feel good: log frequency, clamped ranges, smoothing that doesn’t lag

## 8.8.1 Technique: Energy vs Transient (Two-Signal Approach)

Treat audio as two complementary control signals:

- **Energy:** smoothed volume/bass/mid/high (drives slow changes: camera drift, fog density, palette)
- **Transients:** thresholded + debounced triggers (drives discrete events: flashes, spawns, scene cuts)

**Typical building blocks:**

```
AudioAnalyzer (volume/bass/mid/high)
  +-> Smooth (slow) -> Energy signal
  +-> Threshold -> (optional Delay/Interval gating) -> Transient trigger
```

## 8.8.2 Technique: Log Frequency Mapping (Better Spectra)

FFT bins are linear in frequency, but our hearing is closer to logarithmic. If your spectrum visualization looks “all action on the left”, try mapping indices in a non-linear way:

- compress the low bins less (give bass more space)
- compress high bins more (reduce over-detail)

Conceptually:

```
Index -> Normalize (0..1) -> Pow (curve) -> Sample FFT
```

### 8.8.3 Technique: Peak Hold (Readable Visuals)

Human-friendly meters often have a “peak hold” that decays slowly. You can build this by:

- capturing the max value over a short window
- then decaying it over time

Conceptually:

```
AudioValue -> Max (with previous peak) -> Decay over time -> Peak output
```

### 8.8.4 Technique: Band-Specific Control (Bass Drives Scale, High Drives Detail)

Instead of driving everything from overall volume:

- **bass** -> big scale/position changes
- **mid** -> color shifts or mid-size motion
- **high** -> small jitter/detail/particles

This makes visuals feel much more “mixed”.

### 8.8.5 Technique: Audio -> Shader (The “Pro” Move)

Shading is where audio-reactive projects often become cinematic.

High-level pattern:

```
AudioAnalyzer (energy) -> Smooth -> Shader uniform (e.g., amount)  
FFTArray -> (reduce / select bands) -> Shader uniform(s)  
Time -> Shader uniform (time)
```

Then, in the shader, use audio as **a modulation source**, not as the final value. (Example: warp UVs slightly, not wildly.)

## 8.9 Advanced Patch Recipes

### 8.9.1 Recipe: Stable Beat Trigger (Avoid Double-Triggers)

The simplest fix for “machine-gun” beats is gating:

```
AudioAnalyzer (volume or bass)
|
Threshold (set just above noise floor)
|
(Gate / minimum time between triggers)
|
Trigger (spawn / flash / step timeline)
```

### 8.9.2 Recipe: Audio-Reactive Post-Processing

Drive a texture effect strength from music:

```
MainLoop -> Camera -> RenderToTexture -> TextureEffect -> Output
^
AudioAnalyzer (volume) -> Smooth -> Map -> effect strength
```

### 8.9.3 Recipe: Audio-Reactive 3D Equalizer (Optimized)

If you build an equalizer with many bars:

- keep geometry simple
- reduce FFT size to what you need
- avoid doing heavy work per bar per frame

Conceptually:

```
AudioAnalyzer -> FFTArray
|
ArrayIterator (N bands)
|
Transform (X from index, Y scale from FFT)
|
Cube (bar)
```

## 8.9.4 Recipe: Audio-Driven Palette

Map energy to hue/saturation to get coherent color shifts:

```
AudioAnalyzer (mid) -> Smooth -> Map -> Hue  
AudioAnalyzer (bass) -> Smooth -> Map -> Saturation  
HSBtoRGB -> BasicMaterial (color)
```

## 8.10 Practical Examples

### 8.10.1 Example 1: Bass-Reactive Background

```
MainLoop  
|  
AudioFile -> AudioAnalyzer (bass)  
|  
Smooth (0.9)  
|  
Map (0-1 to desired range)  
|  
HSBtoRGB (bass controls saturation) -> BasicMaterial (color input)  
|  
BasicMaterial  
|  
FullscreenRectangle
```

### 8.10.2 Example 2: Circular Spectrum

```
MainLoop  
|  
BasicMaterial  
|  
AudioAnalyzer -> FFTArray  
|  
ArrayIterator  
|  
Transform (rotate based on index)  
|
```

```
Transform (translate by FFT value)
|
Circle (small)
```

### 8.10.3 Example 3: Waveform Display

```
MainLoop
|
BasicMaterial
|
AudioAnalyzer -> WaveformArray
|
PointCloud or LineStrip
```

### 8.10.4 Example 4: 3D Audio Visualization

```
MainLoop
|
Camera -> OrbitControls
|
AudioAnalyzer -> FFTArray
|
ArrayIterator (creates ring)
|
Transform (position in circle)
|
Transform (scale Y by FFT)
|
Cube
```

## 8.11 Performance Considerations

1. **FFT Size** - Use smallest size that gives needed detail
2. **Smoothing** - Higher smoothing = less CPU for animations
3. **Update Rate** - Don't need 60fps for all audio analysis
4. **Visualizer Complexity** - Balance detail with performance

## 8.12 Browser Audio Policies

Modern browsers require user interaction before playing audio:

1. Add a “Start” button
2. Start audio on button click
3. Or use `AudioContext.resume()` on first interaction

```
// In custom op or patch
document.addEventListener('click', () => {
    if (audioContext.state === 'suspended') {
        audioContext.resume();
    }
}, { once: true });
```

## 8.13 Featured Videos

## 8.14 Exercises

1. Create a simple volume meter with animated bars
  2. Build a circular frequency spectrum visualizer
  3. Make a 3D landscape that morphs to music
  4. Create a beat-triggered strobe effect
-

# 9 Animation & Timeline in Cables.gl

## 9.1 Introduction

Cables.gl provides multiple ways to create animations, from simple time-based movements to complex keyframed sequences using the timeline.

## 9.2 Types of Animation

### 9.2.1 1. Procedural Animation

Using math and time to create continuous motion.

### 9.2.2 2. Keyframe Animation

Defining specific values at specific times.

### 9.2.3 3. Physics-Based Animation

Simulating natural motion with springs, gravity, etc.

### 9.2.4 4. Data-Driven Animation

Animating based on input data or user interaction.

## 9.3 Procedural Animation

### 9.3.1 The Time Op

The foundation of procedural animation:

Time -> Outputs current time in seconds

**Uses:** - Input for trigonometric functions - Driving continuous rotation - Creating loops and cycles

### 9.3.2 Basic Movement Patterns

**Linear Movement:**

```
Time -> Modulo (loop duration) -> Position
```

### Oscillation (Sine Wave):

```
Time -> Sin -> Scale/Position
```

### Bounce:

```
Time -> Sin -> Abs -> Position
```

### Circular Motion:

```
Time -> Cos -> X position
```

```
Time -> Sin -> Y position
```

## 9.3.3 Easing Functions

Transform linear time into smooth curves:

### Ease In (slow start):

```
t * t // Quadratic  
t * t * t // Cubic
```

### Ease Out (slow end):

```
1 - (1 - t) * (1 - t)
```

### Ease In-Out (smooth both):

```
t < 0.5 ? 2 * t * t : 1 - pow(-2 * t + 2, 2) / 2
```

## 9.3.4 The Smooth Op

Smoothly interpolate towards target values:

```
TargetValue -> Smooth -> AnimatedValue
```

**Parameter:** - Smoothing - Higher = slower, smoother transitions

### 9.3.5 Spring Animation

Create bouncy, natural motion:

```
TargetValue -> Spring -> AnimatedValue
```

**Parameters:** - Stiffness - How quickly it moves - Damping - How quickly it settles

## 9.4 Timeline Animation

### 9.4.1 Opening the Timeline

1. Click the timeline icon in the toolbar
2. Or press T to toggle timeline visibility

### 9.4.2 Timeline Interface

|  |         |        |                  |            |  |
|--|---------|--------|------------------|------------|--|
| [Play]                                   | [Pause] | [Stop] | [Time: 00:00:00] | [BPM: 120] |  |
| Property Name   o-----o-----o-----o----- |         |        |                  |            |  |
| Property 2   o-----o-----o-----          |         |        |                  |            |  |
| Property 3   o-----o-----                |         |        |                  |            |  |
| <- 0s   5s   10s   15s   20s ->          |         |        |                  |            |  |

### 9.4.3 Adding Keyframes

1. Select the op with the property to animate
2. Move the timeline playhead to the desired time
3. Set the value
4. Click the keyframe button (or right-click the property)

### 9.4.4 Keyframe Types

- **Linear** - Straight line between keyframes
- **Step** - Instant change at keyframe
- **Ease In** - Slow start

- **Ease Out** - Slow end
- **Ease In-Out** - Smooth start and end
- **Bezier** - Custom curve with handles

### 9.4.5 Editing Keyframes

- **Move:** Drag keyframe left/right (time) or up/down (value)
- **Delete:** Select and press Delete
- **Copy/Paste:** Ctrl+C, Ctrl+V
- **Multi-select:** Shift+click or drag box

### 9.4.6 Timeline Tracks

Organize animations into tracks:

- **Property tracks** - Individual values
- **Trigger tracks** - Fire events at specific times
- **Audio tracks** - Sync with music

## 9.5 Non-Linear Animation Clips (New Animation System - November 2025)

The new animation system in Cables.gl introduces powerful non-linear animation capabilities through **animation clips**. Clips are reusable, addable, and mixable animation sequences that can be layered and blended to create complex motion.

### 9.5.1 What Are Animation Clips?

Animation clips are self-contained animation sequences that can be:

- **Reusable** - Create once, apply to multiple parameters
- **Addable** - Layer multiple clips together (additive blending)
- **Mixable** - Blend between clips with different weights
- **Non-linear** - Don't require strict sequential playback

### 9.5.2 Creating Animation Clips

#### Step 1: Enable Clip Mode

1. Add an **Anim** operator to your patch
2. Connect it to the parameter you want to animate
3. Open the Anim operator's properties

4. Enable the **Clip** option
5. Assign a **Clip Name** (e.g., "bounce", "fadeln", "rotate360")

Parameter -> Anim (Clip enabled, Name: "myClip") -> Animated Value

## Step 2: Define Keyframes

1. With the Anim operator selected, open the Timeline
2. Set keyframes for your animation sequence
3. Adjust easing curves and timing
4. The animation is now stored as a named clip

## Step 3: Apply Clips to Other Parameters

Once created, clips can be applied to any other Anim operator:

1. Add another Anim operator
2. In the Timeline, right-click on a keyframe
3. Select "Apply Clip" and choose your clip name
4. The clip's animation will be applied at that keyframe

### 9.5.3 Clip Properties and Options

#### Looping Modes

Clips support different looping behaviors:

- **None** - Play once and stop
- **Repeat** - Loop from start to end
- **Mirror** - Play forward, then backward
- **Offset** - Continue from end value

#### Interpolation Methods

- **Linear** - Straight interpolation
- **Ease In/Out** - Smooth acceleration/deceleration
- **Bezier** - Custom curve control
- **Step** - Instant value changes

## 9.5.4 Additive Animation (Layering Clips)

Multiple clips can be **added together** to create combined effects:

```
Base Value  
|  
Anim Clip 1 ("bounce") -> Add  
|  
Anim Clip 2 ("rotate") -> Add  
|  
Anim Clip 3 ("scale") -> Add  
|  
Final Animated Value
```

**Use Cases:** - Base idle animation + triggered bounce effect - Procedural motion + keyframed structure  
- Multiple independent motion layers

### Example: Character Animation

```
Idle Clip (continuous breathing)  
|  
Walk Clip (additive, triggered on movement)  
|  
Jump Clip (additive, triggered on jump)  
|  
Final Position
```

## 9.5.5 Mixable Animation (Blending Clips)

Clips can be **mixed** with different weights to blend between animations:

```
Clip A ("walk") -> Mix (weight: 0.7)  
Clip B ("run") -> Mix (weight: 0.3)  
|  
Blended Animation
```

**Blending Modes:** - **Linear Blend** - Simple weighted average - **Smooth Blend** - Eased transition between clips - **Additive Blend** - Add clips together with weights

### Example: Walk-to-Run Transition

```
Walk Clip -> Mix (weight: 1.0 - runProgress)
Run Clip -> Mix (weight: runProgress)
|
Smooth transition from walk to run
```

## 9.5.6 Clip Management

### Organizing Clips

Clips are stored within your project and can be: - **Renamed** - Right-click clip in timeline -> Rename - **Duplicated** - Copy clip to create variations - **Deleted** - Remove unused clips - **Exported/Imported** - Share clips between projects

### Clip Library

Access all clips in your project: 1. Open Timeline 2. Click “Clips” tab 3. View all available clips 4. Drag clips onto timeline tracks

## 9.5.7 Advanced Clip Techniques

### Clip Offsets and Time Remapping

Apply clips at different time offsets:

```
Clip "bounce" (duration: 2s)
|
Apply at t=0s: Full clip
Apply at t=5s: Clip starts here
Apply at t=10s: Clip with 0.5x speed (time remap)
```

### Clip Masking

Use clips to mask or modulate other animations:

```
Base Animation -> Multiply
Clip "mask" (0 to 1) -> Multiply
|
Masked Animation (only active where mask = 1)
```

## Conditional Clip Playback

Control clip playback based on conditions:

```
Condition -> If
  +-> True: Play Clip A
  +-> False: Play Clip B
```

## 9.6 JavaScript Custom Op Integration with Animation System

The new animation system integrates seamlessly with JavaScript custom operators, allowing programmatic control and extension of animation capabilities.

### 9.6.1 Accessing Animation Data from Custom Ops

#### Reading Animation Values

```
// Get current animation value from an Anim op
const animOp = op.patch.findOpByName("MyAnimOp");
if (animOp) {
    const currentValue = animOp.outValue.get();
    // Use the animated value
}
```

#### Monitoring Animation State

```
const inTrigger = op.inTrigger("Render");
const outAnimValue = op.outNumber("Animation Value");
const outIsPlaying = op.outBool("Is Playing");

let animOp = null;

// Find the Anim op (call once on init)
op.onInit = function() {
    animOp = op.patch.findOpByName("MyAnimOp");
};
```

```

inTrigger.onTriggered = function() {
    if (animOp) {
        // Get current animated value
        outAnimValue.set(animOp.outValue.get());

        // Check if timeline is playing
        const timeline = op.patch.timeline;
        if (timeline) {
            outIsPlaying.set(timeline.isPlaying());
        }
    }
};

```

## 9.6.2 Controlling Timeline from Custom Ops

### Playback Control

```

const inPlay = op.inTriggerButton("Play");
const inPause = op.inTriggerButton("Pause");
const inStop = op.inTriggerButton("Stop");
const inSeek = op.inFloat("Seek Time", 0);
const inSeekTrigger = op.inTrigger("Seek");

inPlay.onTriggered = function() {
    const timeline = op.patch.timeline;
    if (timeline) timeline.play();
};

inPause.onTriggered = function() {
    const timeline = op.patch.timeline;
    if (timeline) timeline.pause();
};

inStop.onTriggered = function() {
    const timeline = op.patch.timeline;
    if (timeline) timeline.stop();
};

```

```

inSeekTrigger.onTriggered = function() {
    const timeline = op.patch.timeline;
    if (timeline) {
        timeline.seek(inSeek.get());
    }
};

```

## Timeline Time and Progress

```

const inTrigger = op.inTrigger("Render");
const outTime = op.outNumber("Current Time");
const outProgress = op.outNumber("Progress (0-1)");
const outDuration = op.outNumber("Total Duration");

inTrigger.onTriggered = function() {
    const timeline = op.patch.timeline;
    if (timeline) {
        const currentTime = timeline.getTime();
        const duration = timeline.getDuration();

        outTime.set(currentTime);
        outDuration.set(duration);
        outProgress.set(duration > 0 ? currentTime / duration : 0);
    }
};

```

## 9.6.3 Creating Animation Clips Programmatically

### Generating Clip Data

```

// Custom op that generates animation clip data
const inDuration = op.inFloat("Duration", 2.0);
const inAmplitude = op.inFloat("Amplitude", 1.0);
const inFrequency = op.inFloat("Frequency", 1.0);
const inGenerate = op.inTriggerButton("Generate Clip");
const outClipData = op.outObject("Clip Data");

```

```

inGenerate.onTriggered = function() {
    const duration = inDuration.get();
    const amplitude = inAmplitude.get();
    const freq = inFrequency.get();
    const sampleRate = 60; // samples per second
    const numSamples = Math.floor(duration * sampleRate);

    const keyframes = [];
    for (let i = 0; i <= numSamples; i++) {
        const t = i / numSamples;
        const time = t * duration;
        // Generate sine wave animation
        const value = Math.sin(time * freq * Math.PI * 2) * amplitude;
        keyframes.push({
            time: time,
            value: value,
            easing: "easeInOut"
        });
    }

    outClipData.set({
        name: "generatedSine",
        duration: duration,
        keyframes: keyframes,
        loop: "repeat"
    });
};

```

## 9.6.4 Manipulating Animation Clips

### Blending Multiple Clips

```

// Custom op that blends multiple animation clips
const inClipA = op.inObject("Clip A Data");
const inClipB = op.inObject("Clip B Data");
const inBlendFactor = op.inFloat("Blend Factor", 0.5); // 0 = A, 1 = B
const inTime = op.inFloat("Time", 0);
const outBlendedValue = op.outNumber("Blended Value");

```

```

inTime.onChange = function() {
    const clipA = inClipA.get();
    const clipB = inClipB.get();
    const blend = inBlendFactor.get();
    const t = inTime.get();

    if (!clipA || !clipB) return;

    // Sample both clips at time t
    const valueA = sampleClip(clipA, t);
    const valueB = sampleClip(clipB, t);

    // Blend
    const blended = valueA * (1 - blend) + valueB * blend;
    outBlendedValue.set(blended);
};

function sampleClip(clip, time) {
    const keyframes = clip.keyframes;
    if (!keyframes || keyframes.length === 0) return 0;

    // Clamp time to clip duration
    time = time % clip.duration;

    // Find surrounding keyframes
    for (let i = 0; i < keyframes.length - 1; i++) {
        if (time >= keyframes[i].time && time <= keyframes[i + 1].time) {
            // Interpolate
            const t0 = keyframes[i].time;
            const t1 = keyframes[i + 1].time;
            const v0 = keyframes[i].value;
            const v1 = keyframes[i + 1].value;

            const t = (time - t0) / (t1 - t0);
            return v0 + (v1 - v0) * t;
        }
    }
}

```

```
    return keyframes[keyframes.length - 1].value;
}
```

## Additive Clip Combination

```
// Custom op that adds multiple clips together
const inClips = op.inArray("Clips Array");
const inTime = op.inFloat("Time", 0);
const outCombinedValue = op.outNumber("Combined Value");

inTime.onChange = function() {
    const clips = inClips.get();
    const t = inTime.get();

    if (!clips || clips.length === 0) {
        outCombinedValue.set(0);
        return;
    }

    let sum = 0;
    for (let i = 0; i < clips.length; i++) {
        const clip = clips[i];
        if (clip && clip.keyframes) {
            sum += sampleClip(clip, t);
        }
    }

    outCombinedValue.set(sum);
};

};
```

### 9.6.5 Advanced: Custom Easing Functions

```
// Custom op with advanced easing functions
const inValue = op.inFloat("Input (0-1)", 0);
const inEasingType = op.inSwitch("Easing",
    ["linear", "easeInQuad", "easeOutQuad", "easeInOutQuad",
     "easeInCubic", "easeOutCubic", "easeInOutCubic",
```

```

    "easeInElastic", "easeOutBounce"],
    "easeInOutQuad");
const outEased = op.outNumber("Eased Value");

inValue.onChange = function() {
  const t = Math.max(0, Math.min(1, inValue.get()));
  const type = inEasingType.get();
  let eased = 0;

  switch(type) {
    case "linear":
      eased = t;
      break;
    case "easeInQuad":
      eased = t * t;
      break;
    case "easeOutQuad":
      eased = 1 - (1 - t) * (1 - t);
      break;
    case "easeInOutQuad":
      eased = t < 0.5
        ? 2 * t * t
        : 1 - Math.pow(-2 * t + 2, 2) / 2;
      break;
    case "easeInCubic":
      eased = t * t * t;
      break;
    case "easeOutCubic":
      eased = 1 - Math.pow(1 - t, 3);
      break;
    case "easeInOutCubic":
      eased = t < 0.5
        ? 4 * t * t * t
        : 1 - Math.pow(-2 * t + 2, 3) / 2;
      break;
    case "easeInElastic":
      const c4 = (2 * Math.PI) / 3;
      eased = t === 0 ? 0 : t === 1 ? 1

```

```

        : -Math.pow(2, 10 * t - 10) * Math.sin((t * 10 - 10.75) * c4);
    break;
case "easeOutBounce":
    const n1 = 7.5625;
    const d1 = 2.75;
    if (t < 1 / d1) {
        eased = n1 * t * t;
    } else if (t < 2 / d1) {
        eased = n1 * (t -= 1.5 / d1) * t + 0.75;
    } else if (t < 2.5 / d1) {
        eased = n1 * (t -= 2.25 / d1) * t + 0.9375;
    } else {
        eased = n1 * (t -= 2.625 / d1) * t + 0.984375;
    }
    break;
}

outEased.set(eased);
};

```

## 9.6.6 Real-Time Animation Modification

```

// Custom op that modifies animation in real-time based on input
const inBaseAnim = op.inObject("Base Animation Clip");
const inModifier = op.inFloat("Modifier", 1.0);
const inTime = op.inFloat("Time", 0);
const outModifiedValue = op.outNumber("Modified Value");

inTime.onChange = function() {
    const clip = inBaseAnim.get();
    const mod = inModifier.get();
    const t = inTime.get();

    if (!clip) return;

    // Sample base animation
    let value = sampleClip(clip, t);

```

```

    // Apply modifier (could be scale, offset, etc.)
    value *= mod;

    outModifiedValue.set(value);
};


```

### 9.6.7 Integration Example: Physics-Driven Animation

```

// Custom op that combines physics simulation with animation clips
const inAnimClip = op.inObject("Animation Clip");
const inPhysicsForce = op.inFloat("Physics Force", 0);
const inDamping = op.inFloat("Damping", 0.9);
const inTime = op.inFloat("Time", 0);
const outCombinedValue = op.outNumber("Combined Value");

let velocity = 0;
let position = 0;

inTime.onChange = function() {
    const clip = inAnimClip.get();
    const force = inPhysicsForce.get();
    const damp = inDamping.get();
    const t = inTime.get();

    // Get base animation value
    const animValue = clip ? sampleClip(clip, t) : 0;

    // Apply physics
    velocity += force;
    velocity *= damp;
    position += velocity;

    // Combine animation + physics
    const combined = animValue + position;
    outCombinedValue.set(combined);
};


```

## 9.6.8 Best Practices for Animation + Custom Ops

1. **Cache Clip Sampling** - If sampling clips every frame, cache results when time hasn't changed
2. **Batch Operations** - Process multiple clips in one op rather than multiple ops
3. **Use Native Anim Op When Possible** - Only use custom ops when you need functionality beyond built-in features
4. **Optimize Keyframe Lookups** - Use binary search for large clip keyframe arrays
5. **Handle Edge Cases** - Always check for null/undefined clips and handle time out of bounds

## 9.6.9 Example: Complete Animation Controller Op

```
// Comprehensive animation controller custom op
const inPlay = op.inTriggerButton("Play");
const inPause = op.inTriggerButton("Pause");
const inStop = op.inTriggerButton("Stop");
const inSeek = op.inFloat("Seek", 0);
const inSpeed = op.inFloat("Speed", 1.0);
const inLoop = op.inBool("Loop", true);

const outTime = op.outNumber("Current Time");
const outProgress = op.outNumber("Progress");
const outIsPlaying = op.outBool("Is Playing");

let currentTime = 0;
let isPlaying = false;
let lastFrameTime = 0;

op.onInit = function() {
    lastFrameTime = op.patch.timer.getTime();
};

const inRender = op.inTrigger("Render");
inRender.onTriggered = function() {
    const now = op.patch.timer.getTime();
    const delta = now - lastFrameTime;
    lastFrameTime = now;

    if (isPlaying) {
```

```

currentTime += delta * inSpeed.get();

const timeline = op.patch.timeline;
if (timeline) {
    const duration = timeline.getDuration();
    if (currentTime >= duration) {
        if (inLoop.get()) {
            currentTime = currentTime % duration;
        } else {
            currentTime = duration;
            isPlaying = false;
        }
    }
}

timeline.seek(currentTime);
}

};

outTime.set(currentTime);
const timeline = op.patch.timeline;
if (timeline) {
    const duration = timeline.getDuration();
    outProgress.set(duration > 0 ? currentTime / duration : 0);
}
outIsPlaying.set(isPlaying);
};

inPlay.onTriggered = function() {
    isPlaying = true;
    const timeline = op.patch.timeline;
    if (timeline) timeline.play();
};

inPause.onTriggered = function() {
    isPlaying = false;
    const timeline = op.patch.timeline;
    if (timeline) timeline.pause();
};

```

```

inStop.onTriggered = function() {
    isPlaying = false;
    currentTime = 0;
    const timeline = op.patch.timeline;
    if (timeline) {
        timeline.stop();
        timeline.seek(0);
    }
};

inSeek.onChange = function() {
    currentTime = inSeek.get();
    const timeline = op.patch.timeline;
    if (timeline) timeline.seek(currentTime);
};

```

## 9.7 Sequence and Timing Ops

### 9.7.1 Sequence

Chain multiple actions in order:

```

Trigger -> Sequence
    +-> Action 1
    +-> Action 2 (after delay)
    +-> Action 3 (after delay)

```

### 9.7.2 Delay

Pause before triggering:

```
Trigger -> Delay (seconds) -> DelayedAction
```

### 9.7.3 Timer

Count down or up:

```
StartTrigger -> Timer -> TimeValue
```

## 9.7.4 Interval

Trigger repeatedly:

```
Interval (every X seconds) -> RepeatedAction
```

# 9.8 Animation Patterns

## 9.8.1 Staggered Animation

Animate multiple items with offset timing:

```
ArrayIterator  
|  
Index -> Delay offset  
|  
AnimatedProperty
```

## 9.8.2 Loop with Pause

```
Time -> Modulo (total duration)  
-> If < activeTime: animate  
-> Else: hold at end value
```

## 9.8.3 Ping-Pong (Back and Forth)

```
Time -> Sin -> Map to range -> Property
```

Or with timeline: set keyframes to go forward then backward.

## 9.8.4 One-Shot Animation

```
Trigger -> SetValue (start)  
-> Smooth -> AnimatedValue
```

## 9.9 State Machines

Create complex animation logic:

### 9.9.1 Simple States

```
// In custom op
let state = "idle";

function setState(newState) {
    state = newState;
    switch(state) {
        case "idle":
            // Set idle animation params
            break;
        case "active":
            // Set active animation params
            break;
        case "exit":
            // Set exit animation params
            break;
    }
}
```

### 9.9.2 Transition Between States

Use Smooth or Spring ops to blend between state values.

## 9.10 Interactive Animation

### 9.10.1 Mouse-Based

```
MouseX -> Map to range -> Target value -> Smooth -> Property
```

### 9.10.2 Scroll-Based

```
ScrollPosition -> Map (0 to page height) -> (0 to 1) -> Animation progress
```

### 9.10.3 Click-Triggered

```
MouseClick -> Toggle state -> Smooth -> Animated property
```

## 9.11 Advanced Animation Systems (How to Build “Scenes”)

As patches grow, animation becomes less about a single value moving and more about **systems**:

- multiple objects animated together (“shots” / “scenes”)
- blending procedural motion with keyframed structure
- sequencing events reliably (no double-triggers, no race conditions)
- keeping things readable and maintainable

### 9.11.1 Layering: Timeline for Structure, Procedural for Life

A reliable pattern is:

- **Timeline**: controls the big structure (when things appear, when the camera moves, when a section starts/ends)
- **Procedural**: adds micro-motion (subtle noise, breathing, idle motion, wobble)

Example idea:

```
Timeline -> Base position  
Time -> Sin (small) -> Add  
Result -> Transform position
```

### 9.11.2 Shot-Based Timelines (Cinematic Organization)

Instead of one giant timeline track list, treat the timeline as a set of “shots”:

- Shot 1: intro framing
- Shot 2: reveal
- Shot 3: close-up detail
- Shot 4: outro / logo

Each shot has:

- a start time, end time
- a camera pose
- a set of object visibility/alpha states

### 9.11.3 Animation Curves: Clamp Early, Map Late

If you see overshoot or sudden jumps, it's usually a range mismatch.

Good practice:

- normalize to 0..1 early
- clamp to 0..1 before sensitive operations
- map to target range at the end

Conceptually:

```
t (0..1) -> Clamp -> Ease -> Map (min..max)
```

### 9.11.4 Reusable “Rig” Pattern

For any object you animate often, create a mini rig:

- one Transform for position
- one Transform for rotation
- one Transform for scale
- optional “wobble” layer

This makes it easy to swap animation sources later without rewiring the whole patch.

### 9.11.5 Avoiding Jitter in Interactive Animation

If input is noisy (mouse, audio, sensors):

- map input into a safe range
- apply Smooth/Spring
- optionally add dead zones

```
Input -> Map -> Clamp -> Smooth -> Property
```

### 9.11.6 Choreographing Triggers Reliably

For sequences of actions:

- use Sequence for deterministic ordering
- use Delay for spacing
- use Interval for periodic triggers

The key is to avoid “implicit timing” where the order depends on frame timing.

## 9.12 Advanced Recipes

### 9.12.1 Recipe: Scroll-Driven Scene (Interactive Storytelling)

Use scroll position as a normalized progress value:

```
ScrollPosition -> Map (0..pageHeight -> 0..1) -> Clamp -> progress  
progress -> Ease -> Drive camera/object parameters
```

Then you can tie multiple properties to the same progress signal for a coherent experience.

### 9.12.2 Recipe: Beat-Synced Timeline Sections

Use BPM sync to trigger timeline jumps or section changes:

```
AudioFile -> BPMSync -> Beat trigger  
Beat trigger -> Sequence -> (advance state) -> set target animation values
```

### 9.12.3 Recipe: One-Shot “Punch” Animation (No Keyframes)

Great for UI hits, impacts, kick drums:

```
Trigger -> SetValue (1)  
-> Smooth (fast decay) -> scale/brightness
```

You can combine a fast rise + slower decay by chaining two Smooth ops with different parameters.

### 9.12.4 Recipe: Camera Rig (Orbit + Handheld Micro Motion)

```
Time -> Sin/Cos -> Orbit position  
Random (small) -> Smooth -> micro offset  
Add (orbit + micro) -> Camera position  
LookAt -> Camera aim
```

This produces camera movement that feels “alive” but still controlled.

## 9.13 Practical Examples

### 9.13.1 Example 1: Bouncing Ball

```
MainLoop
|
BasicMaterial
|
Time -> Sin -> Abs -> Y position
|
Transform
|
Circle
```

### 9.13.2 Example 2: Rotating Carousel

```
MainLoop
|
Camera
|
ArrayIterator (items)
|
Time + (Index * offset) -> Cos -> X position
Time + (Index * offset) -> Sin -> Z position
|
Transform
|
Item
```

### 9.13.3 Example 3: Fade In Sequence

```
MainLoop
|
BasicMaterial
|
ArrayIterator
|
Time - (Index * staggerDelay) -> Clamp (0, 1) -> BasicMaterial (alpha input)
```

|  
Shape

#### 9.13.4 Example 4: Timeline-Based Scene

```
Timeline
--- 0s: Camera position keyframe
--- 2s: Object appears (alpha 0->1)
--- 4s: Object rotates
--- 6s: Color change
--- 8s: Fade out
```

#### 9.13.5 Example 5: Layered Animation Clips (Additive)

Create a character with multiple animation layers:

```
Base Position (0, 0, 0)
|
Anim Clip "idleBreath" (vertical oscillation) -> Add
|
Anim Clip "walkCycle" (horizontal movement, triggered) -> Add
|
Anim Clip "jump" (vertical boost, triggered) -> Add
|
Final Position -> Transform
```

**Setup:** 1. Create “idleBreath” clip: 2-second vertical sine wave (amplitude: 0.1) 2. Create “walkCycle” clip: 1-second horizontal movement (0 to 1, repeat) 3. Create “jump” clip: 0.5-second vertical boost (0 to 2, one-shot) 4. Connect all three Anim ops to Add ops in sequence 5. Trigger walkCycle and jump clips via user input

#### 9.13.6 Example 6: Blended Animation Clips (Mixable)

Smooth transition between walk and run:

```
Walk Clip -> Anim (weight: 1.0 - runBlend)
Run Clip -> Anim (weight: runBlend)
|
Mix -> Final Position
```

**Setup:** 1. Create “walk” clip: slow horizontal movement  
2. Create “run” clip: fast horizontal movement  
3. Use a Smooth op to blend between 0 (walk) and 1 (run)  
4. Connect both clips to Mix op with blend factor

### 9.13.7 Example 7: Reusable Clip System

Create a library of reusable animation clips:

Clip Library:

- "fadeIn" (alpha 0->1, 1s, easeOut)
- "fadeOut" (alpha 1->0, 1s, easeIn)
- "bounce" (scale 1->1.2->1, 0.5s, easeOut)
- "slideInLeft" (x: -100->0, 1s, easeOut)
- "rotate360" (rotation 0->360, 2s, linear)

Apply to multiple objects:

Object 1: fadeIn at t=0s, bounce at t=2s

Object 2: slideInLeft at t=1s, fadeOut at t=5s

Object 3: rotate360 at t=3s (looping)

### 9.13.8 Example 8: JavaScript-Controlled Animation

Custom op that controls animation based on game state:

```
Game State -> Custom Op
    +-> State = "idle": Play "idle" clip
    +-> State = "walk": Play "walk" clip
    +-> State = "run": Play "run" clip
    +-> State = "jump": Play "jump" clip (one-shot)
    |
Selected Clip -> Anim -> Position
```

**Custom Op Code:**

```
const inState = op.inString("State", "idle");
const inTime = op.inFloat("Time", 0);
const outClipName = op.outString("Clip Name");
const outValue = op.outNumber("Animation Value");
```

```

let currentClip = null;

inState.onChange = function() {
    const state = inState.get();
    switch(state) {
        case "idle":
            currentClip = "idle";
            break;
        case "walk":
            currentClip = "walk";
            break;
        case "run":
            currentClip = "run";
            break;
        case "jump":
            currentClip = "jump";
            break;
    }
    outClipName.set(currentClip);
};

inTime.onChange = function() {
    // Sample the current clip
    if (currentClip) {
        const animOp = op.patch.findOpByName("Anim_" + currentClip);
        if (animOp) {
            outValue.set(animOp.outValue.get());
        }
    }
};

```

### 9.13.9 Example 9: Physics + Animation Clip Hybrid

Combine procedural physics with keyframed animation:

```
Anim Clip "baseMotion" (keyframed path)
```

```
|
```

```
Add
Physics Force (gravity, wind) -> Integrate -> Add
|
Final Position
```

#### Custom Op for Physics Integration:

```
const inAnimValue = op.inFloat("Animation Value", 0);
const inPhysicsForce = op.inFloat("Physics Force", 0);
const inDamping = op.inFloat("Damping", 0.95);
const inRender = op.inTrigger("Render");
const outCombined = op.outNumber("Combined Value");

let velocity = 0;
let position = 0;

inRender.onTriggered = function() {
    const delta = op.patch.timer.getDelta();
    const anim = inAnimValue.get();
    const force = inPhysicsForce.get();
    const damp = inDamping.get();

    // Update physics
    velocity += force * delta;
    velocity *= damp;
    position += velocity * delta;

    // Combine with animation
    outCombined.set(anim + position);
};
```

#### 9.13.10 Example 10: Conditional Clip Playback

Play different clips based on conditions:

```
Condition A -> If (True: Clip A, False: Clip B)
Condition B -> If (True: Clip C, False: Clip D)
|
```

```
Mix (blend between conditional results)
|
Final Animation
```

## 9.14 Performance Tips

1. **Limit active animations** - Don't animate everything
2. **Use requestAnimationFrame** - Built into cables.gl
3. **Cache calculations** - Don't recalculate every frame
4. **Simplify when far** - Reduce animation complexity for distant objects
5. **Use GPU** - Animate in shaders when possible

## 9.15 Debugging Animation

### 9.15.1 Slow Motion

```
Time -> Multiply (0.1) -> SlowTime
```

### 9.15.2 Visualize Values

Add a DrawNumber op to see animated values in real-time.

### 9.15.3 Pause at Problem

Use timeline pause to inspect a specific frame.

## 9.16 Featured Videos

## 9.17 Exercises

### 9.17.1 Basic Animation

1. Create a loading animation with staggered dots
2. Build an interactive hover animation
3. Design a full intro sequence with timeline
4. Create a physics-based pendulum

## **9.17.2 Animation Clips**

5. Create a reusable “bounce” clip and apply it to 5 different objects
6. Build a character animation system with 3 additive clips (idle, walk, jump)
7. Create a smooth walk-to-run transition using clip blending
8. Design a clip library with 5 common animations (fade, slide, scale, rotate, bounce)

## **9.17.3 JavaScript Integration**

9. Build a custom op that generates a sine wave animation clip programmatically
10. Create an animation controller op with play/pause/stop/seek functionality
11. Design a custom op that blends two animation clips with a configurable blend factor
12. Build a state machine op that switches between different animation clips based on input

## **9.17.4 Advanced**

13. Combine procedural animation (Time -> Sin) with a keyframed clip using additive blending
  14. Create a custom easing function op and apply it to an animation clip
  15. Build a system that plays different animation clips based on user interaction (mouse, keyboard, touch)
  16. Design a complex scene with multiple objects, each using a combination of clips and procedural motion
-

# 10 Interfaces in Cables.gl

## 10.1 Introduction

Cables.gl provides multiple ways to create user interfaces for your patches. You can build interfaces using HTML and CSS for full customization, or use native Cables sidebar interface operators for quick, integrated controls. This chapter covers both approaches in detail.

## 10.2 Interface Approaches Overview

| INTERFACE OPTIONS               |  |
|---------------------------------|--|
| 1. HTML/CSS Interfaces          |  |
| Full DOM control                |  |
| Custom styling                  |  |
| Overlay on canvas               |  |
| Complete flexibility            |  |
| 2. Native Sidebar Interface Ops |  |
| Built-in UI elements            |  |
| Integrated with patch           |  |
| CSS-stylable                    |  |
| Quick to implement              |  |

## 10.3 HTML/CSS Interfaces

### 10.3.1 Overview

HTML/CSS interfaces give you complete control over the user interface. You can create custom overlays, forms, buttons, and any HTML element positioned over or alongside your canvas.

### 10.3.2 The HTML Op

The HTML op allows you to create and manipulate DOM elements directly within your patch.

#### Basic HTML Op Setup

```
+-----+
|           HTML OP FLOW
+-----+
|
|   MainLoop
|
|   |
|   HTML Op
|     +-> HTML Content (string)
|     +-> CSS Styles (string)
|     +-> Position (x, y)
|     +-> Size (width, height)
|     +-> Visibility (bool)
|
|   |
|   DOM Element (rendered on page)
|
+-----+
```

#### Creating a Simple HTML Interface

##### Step 1: Add HTML Op

1. Add a MainLoop op
2. Add an HTML op
3. Connect MainLoop -> HTML

##### Step 2: Define HTML Content

In the HTML op's "HTML" parameter, enter your HTML:

```

<div id="myInterface">
  <h1>My Interface</h1>
  <button id="myButton">Click Me</button>
  <input type="range" id="mySlider" min="0" max="100" value="50">
  <p id="myText">Value: <span id="valueDisplay">50</span></p>
</div>

```

### Step 3: Add CSS Styling

In the HTML op's "CSS" parameter:

```

#myInterface {
  position: absolute;
  top: 20px;
  left: 20px;
  background: rgba(30, 30, 30, 0.9);
  padding: 20px;
  border-radius: 8px;
  color: white;
  font-family: Arial, sans-serif;
  z-index: 1000;
}


```

```

#myButton {
  background: #4a9eff;
  color: white;
  border: none;
  padding: 10px 20px;
  border-radius: 4px;
  cursor: pointer;
  font-size: 16px;
}


```

```

#myButton:hover {
  background: #5aaeff;
}


```

```

#mySlider {


```

```

    width: 200px;
    margin: 10px 0;
}

#myText {
    margin-top: 10px;
    font-size: 14px;
}

```

#### **Step 4: Position the Interface**

Set the HTML op's position parameters: - X: 0 (or desired x position) - Y: 0 (or desired y position) - Width: 300 - Height: 200

### **10.3.3 Connecting HTML to Patch Logic**

#### **Using JavaScript Custom Op for Interaction**

To make HTML elements interactive with your patch, use a JavaScript custom op:

```

// Custom Op: HTML Controller
const inTrigger = op.inTrigger("Render");
const outSliderValue = op.outNumber("Slider Value");
const outButtonClicked = op.outTrigger("Button Clicked");

let sliderValue = 50;
let buttonClicked = false;

// Access DOM elements
op.onInit = function() {
    const slider = document.getElementById("mySlider");
    const button = document.getElementById("myButton");
    const display = document.getElementById("valueDisplay");

    if (slider) {
        slider.addEventListener("input", function(e) {
            sliderValue = parseFloat(e.target.value);
            if (display) {
                display.textContent = sliderValue;
            }
        });
    }
}

```

```

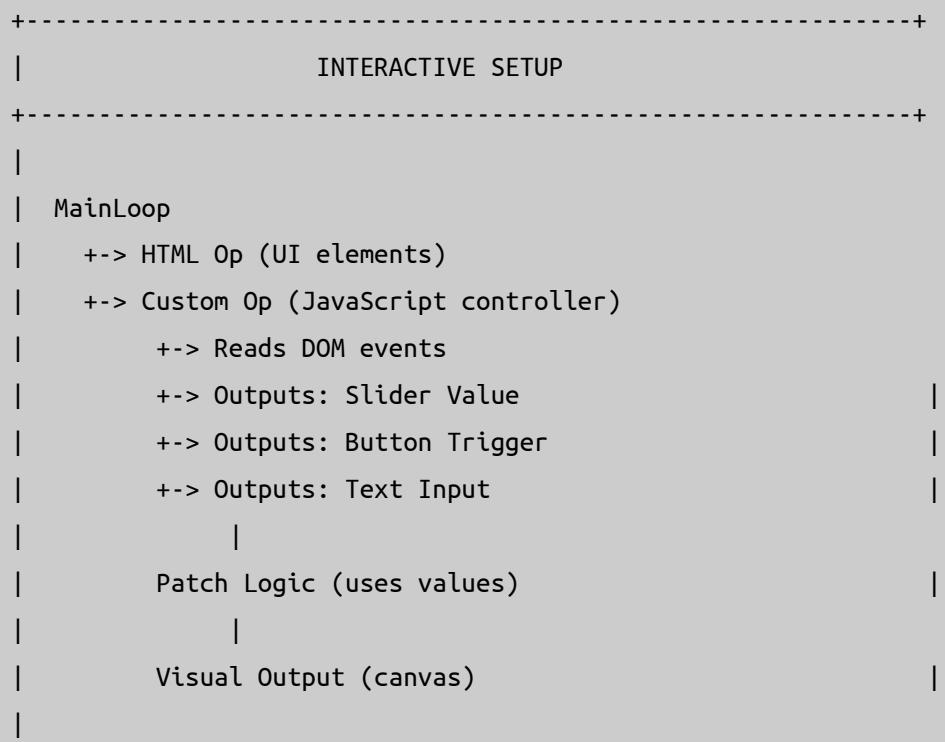
        }
        outSliderValue.set(sliderValue);
    });
}

if (button) {
    button.addEventListener("click", function() {
        buttonClicked = true;
        outButtonClicked.trigger();
    });
}
};

inTrigger.onTriggered = function() {
    outSliderValue.set(sliderValue);
    if (buttonClicked) {
        buttonClicked = false;
    }
};

```

## Complete Example: Interactive Control Panel



```
+-----+
```

## HTML Content:

```
<div id="controlPanel">
    <h2>Animation Controls</h2>

    <div class="control-group">
        <label>Speed:</label>
        <input type="range" id="speedSlider" min="0.1" max="5" step="0.1" value="1">
        <span id="speedValue">1.0</span>
    </div>

    <div class="control-group">
        <label>Color:</label>
        <input type="color" id="colorPicker" value="#4a9eff">
    </div>

    <div class="control-group">
        <label>Mode:</label>
        <select id="modeSelect">
            <option value="normal">Normal</option>
            <option value="fast">Fast</option>
            <option value="slow">Slow</option>
        </select>
    </div>

    <button id="resetButton">Reset</button>
    <button id="playButton">Play/Pause</button>
</div>
```

## CSS Styling:

```
#controlPanel {
    position: fixed;
    top: 20px;
    right: 20px;
    width: 280px;
    background: linear-gradient(135deg, #1e1e1e 0%, #2d2d2d 100%);
```

```
padding: 24px;
border-radius: 12px;
box-shadow: 0 8px 32px rgba(0, 0, 0, 0.4);
border: 1px solid rgba(255, 255, 255, 0.1);
font-family: 'Segoe UI', Tahoma, Geneva, Verdana, sans-serif;
z-index: 1000;
}

#controlPanel h2 {
    margin: 0 0 20px 0;
    color: #ffffff;
    font-size: 20px;
    font-weight: 600;
    border-bottom: 2px solid #4a9eff;
    padding-bottom: 10px;
}

.control-group {
    margin-bottom: 20px;
}

.control-group label {
    display: block;
    color: #b0b0b0;
    font-size: 14px;
    margin-bottom: 8px;
    font-weight: 500;
}

#speedSlider {
    width: 100%;
    height: 6px;
    border-radius: 3px;
    background: #3a3a3a;
    outline: none;
    -webkit-appearance: none;
}
```

```
#speedSlider::-webkit-slider-thumb {  
    -webkit-appearance: none;  
    appearance: none;  
    width: 18px;  
    height: 18px;  
    border-radius: 50%;  
    background: #4a9eff;  
    cursor: pointer;  
    box-shadow: 0 2px 4px rgba(0, 0, 0, 0.3);  
}  
  
#speedSlider::-moz-range-thumb {  
    width: 18px;  
    height: 18px;  
    border-radius: 50%;  
    background: #4a9eff;  
    cursor: pointer;  
    border: none;  
    box-shadow: 0 2px 4px rgba(0, 0, 0, 0.3);  
}  
  
#speedValue {  
    color: #4a9eff;  
    font-weight: 600;  
    margin-left: 10px;  
}  
  
#colorPicker {  
    width: 100%;  
    height: 40px;  
    border: 2px solid #3a3a3a;  
    border-radius: 6px;  
    cursor: pointer;  
    background: transparent;  
}  
  
#modeSelect {  
    width: 100%;
```

```
padding: 10px;
background: #3a3a3a;
color: #ffffff;
border: 2px solid #3a3a3a;
border-radius: 6px;
font-size: 14px;
cursor: pointer;
}

#modeSelect:hover {
    border-color: #4a9eff;
}

#modeSelect:focus {
    outline: none;
    border-color: #4a9eff;
}

button {
    width: 100%;
    padding: 12px;
    margin-top: 10px;
    background: #4a9eff;
    color: white;
    border: none;
    border-radius: 6px;
    font-size: 14px;
    font-weight: 600;
    cursor: pointer;
    transition: all 0.2s ease;
}

button:hover {
    background: #5aaeff;
    transform: translateY(-1px);
    box-shadow: 0 4px 12px rgba(74, 158, 255, 0.3);
}
```

```
button:active {  
    transform: translateY(0);  
}
```

### 10.3.4 Advanced HTML Interface Patterns

#### Pattern 1: Responsive Overlay

```
#myInterface {  
    position: fixed;  
    top: 0;  
    left: 0;  
    width: 100vw;  
    height: 100vh;  
    background: rgba(0, 0, 0, 0.8);  
    display: flex;  
    align-items: center;  
    justify-content: center;  
    z-index: 10000;  
}  
  
#myInterface .content {
```

```
background: #2d2d2d;  
padding: 40px;  
border-radius: 12px;  
max-width: 500px;  
width: 90%;  
}
```

#### Pattern 2: Sidebar Panel

```
#sidebar {  
    position: fixed;  
    top: 0;  
    right: 0;  
    width: 300px;  
    height: 100vh;  
    background: #1e1e1e;
```

```

    box-shadow: -4px 0 16px rgba(0, 0, 0, 0.3);
    padding: 20px;
    overflow-y: auto;
    z-index: 1000;
    transform: translateX(0);
    transition: transform 0.3s ease;
}

#sidebar.hidden {
    transform: translateX(100%);
}

```

### Pattern 3: HUD (Heads-Up Display)

```

#hud {
    position: fixed;
    top: 0;
    left: 0;
    width: 100%;
    height: 100%;
    pointer-events: none;
    z-index: 100;
}

#hud .info {
    position: absolute;
    top: 20px;
    left: 20px;
    color: white;
    font-family: monospace;
    font-size: 14px;
    text-shadow: 2px 2px 4px rgba(0, 0, 0, 0.8);
}

#hud .crosshair {
    position: absolute;
    top: 50%;
    left: 50%;

```

```

    transform: translate(-50%, -50%);
    width: 20px;
    height: 20px;
    border: 2px solid rgba(255, 255, 255, 0.5);
    border-radius: 50%;
}

```

## 10.4 Native Sidebar Interface Ops

### 10.4.1 Overview

Cables.gl provides native interface operators that create UI elements directly in the sidebar. These are faster to set up and integrate seamlessly with the patch system.

### 10.4.2 Available Interface Ops

| NATIVE INTERFACE OPS |                            |
|----------------------|----------------------------|
| • Slider             | - Numeric input with range |
| • Button             | - Clickable trigger        |
| • Toggle             | - Boolean on/off switch    |
| • Text Input         | - String input field       |
| • Color Picker       | - Color selection          |
| • Dropdown           | - Selection from options   |
| • Number Input       | - Direct numeric input     |
| • Text Display       | - Display text/values      |

### 10.4.3 Basic Interface Op Setup

#### Example: Simple Control Panel

| SIDEBAR INTERFACE |  |
|-------------------|--|
|                   |  |

```

|   |
|   | Slider Op (Speed)
|   |   +-> Min: 0.1
|   |   +-> Max: 5.0
|   |   +-> Default: 1.0
|   |   +-> Output: Speed Value
|   |
|   | Patch Logic
|
|   |
|   | Button Op (Reset)
|   |   +-> Output: Trigger
|   |
|   | Reset Logic
|
|   |
|   | Toggle Op (Enabled)
|   |   +-> Output: Boolean
|   |
|   | Conditional Logic
|
+-----+

```

## Step-by-Step: Creating a Sidebar Interface

### Step 1: Add Interface Ops

1. Add a Slider op for speed control
2. Add a Button op for actions
3. Add a Toggle op for enable/disable
4. Add a ColorPicker op for color selection

### Step 2: Configure Each Op

**Slider Op:** - Name: "Speed" - Min: 0.1 - Max: 5.0 - Default: 1.0 - Step: 0.1

**Button Op:** - Name: "Reset" - Label: "Reset Animation"

**Toggle Op:** - Name: "Enabled" - Default: true

**ColorPicker Op:** - Name: "Base Color" - Default: #4a9eff

### Step 3: Connect to Patch

```
Speed Slider -> Multiply -> Animation Speed  
Reset Button -> SetValue -> Reset Position  
Enabled Toggle -> If -> Conditional Execution  
ColorPicker -> SetColor -> Material Color
```

#### 10.4.4 Styling Native Sidebar with CSS

This is a powerful technique that allows you to customize the appearance of native sidebar interface ops using CSS.

##### Understanding the Sidebar Structure

The sidebar interface ops render in a specific DOM structure that you can target with CSS:

```
+-----+  
|       SIDEBAR DOM STRUCTURE |  
+-----+  
|  
| <div class="cables-sidebar">  
|   <div class="cables-sidebar-content">  
|     <div class="cables-op-slider" data-op-name="Speed">  
|       <label>Speed</label>  
|       <input type="range" ...>  
|       <span class="value">1.0</span>  
|     </div>  
|     <div class="cables-op-button" data-op-name="Reset">  
|       <button>Reset</button>  
|     </div>  
|     ...  
|   </div>  
| </div>  
|  
+-----+
```

##### Method 1: Global CSS Injection

Use an HTML op to inject CSS that styles the entire sidebar:

**HTML Op Setup:**

```
<style id="sidebar-styles">
/* Sidebar styling will go here */
</style>
```

## CSS Content:

```
/* Target the entire sidebar */
.cables-sidebar {
    background: linear-gradient(180deg, #1a1a1a 0%, #2d2d2d 100%);
    border-left: 2px solid #4a9eff;
}

/* Style all interface ops */
.cables-sidebar-content > div {
    background: rgba(255, 255, 255, 0.05);
    border-radius: 8px;
    padding: 16px;
    margin-bottom: 12px;
    border: 1px solid rgba(255, 255, 255, 0.1);
    transition: all 0.2s ease;
}

.cables-sidebar-content > div:hover {
    background: rgba(255, 255, 255, 0.08);
    border-color: #4a9eff;
}

/* Style slider ops specifically */
.cables-op-slider {
    /* Custom slider container */
}

.cables-op-slider label {
    color: #b0b0b0;
    font-size: 14px;
    font-weight: 500;
    margin-bottom: 8px;
    display: block;
```

```
    text-transform: uppercase;
    letter-spacing: 0.5px;
}

.cables-op-slider input[type="range"] {
    width: 100%;
    height: 6px;
    border-radius: 3px;
    background: #3a3a3a;
    outline: none;
    -webkit-appearance: none;
    margin: 10px 0;
}

.cables-op-slider input[type="range"]::-webkit-slider-thumb {
    -webkit-appearance: none;
    appearance: none;
    width: 20px;
    height: 20px;
    border-radius: 50%;
    background: #4a9eff;
    cursor: pointer;
    box-shadow: 0 2px 8px rgba(74, 158, 255, 0.4);
    transition: all 0.2s ease;
}

.cables-op-slider input[type="range"]::-webkit-slider-thumb:hover {
    background: #5aaeff;
    transform: scale(1.1);
    box-shadow: 0 4px 12px rgba(74, 158, 255, 0.6);
}

.cables-op-slider input[type="range"]::-moz-range-thumb {
    width: 20px;
    height: 20px;
    border-radius: 50%;
    background: #4a9eff;
    cursor: pointer;
```

```
border: none;
box-shadow: 0 2px 8px rgba(74, 158, 255, 0.4);
}

.cables-op-slider .value {
  color: #4a9eff;
  font-weight: 600;
  font-size: 16px;
  float: right;
  margin-top: -24px;
}

/* Style button ops */
.cables-op-button button {
  width: 100%;
  padding: 12px 24px;
  background: linear-gradient(135deg, #4a9eff 0%, #3a8eef 100%);
  color: white;
  border: none;
  border-radius: 6px;
  font-size: 14px;
  font-weight: 600;
  cursor: pointer;
  transition: all 0.2s ease;
  text-transform: uppercase;
  letter-spacing: 1px;
  box-shadow: 0 4px 12px rgba(74, 158, 255, 0.3);
}

.cables-op-button button:hover {
  background: linear-gradient(135deg, #5aaeff 0%, #4a9eff 100%);
  transform: translateY(-2px);
  box-shadow: 0 6px 16px rgba(74, 158, 255, 0.4);
}

.cables-op-button button:active {
  transform: translateY(0);
  box-shadow: 0 2px 8px rgba(74, 158, 255, 0.3);
```

```
}

/* Style toggle ops */
.cables-op-toggle {
    display: flex;
    align-items: center;
    justify-content: space-between;
}

.cables-op-toggle label {
    color: #b0b0b0;
    font-size: 14px;
    font-weight: 500;
}

.cables-op-toggle input[type="checkbox"] {
    width: 50px;
    height: 26px;
    -webkit-appearance: none;
    appearance: none;
    background: #3a3a3a;
    border-radius: 13px;
    position: relative;
    cursor: pointer;
    transition: background 0.3s ease;
    border: 2px solid #2a2a2a;
}

.cables-op-toggle input[type="checkbox"]:checked {
    background: #4a9eff;
    border-color: #4a9eff;
}

.cables-op-toggle input[type="checkbox"]::before {
    content: '';
    position: absolute;
    width: 20px;
    height: 20px;
```

```
border-radius: 50%;  
background: white;  
top: 1px;  
left: 1px;  
transition: transform 0.3s ease;  
box-shadow: 0 2px 4px rgba(0, 0, 0, 0.3);  
}  
  
.cables-op-toggle input[type="checkbox"]:checked::before {  
    transform: translateX(24px);  
}  
  
/* Style color picker ops */  
.cables-op-colorpicker {  
    display: flex;  
    align-items: center;  
    gap: 12px;  
}  
  
.cables-op-colorpicker label {  
    color: #b0b0b0;  
    font-size: 14px;  
    font-weight: 500;  
    flex: 1;  
}  
  
.cables-op-colorpicker input[type="color"] {  
    width: 60px;  
    height: 40px;  
    border: 2px solid #3a3a3a;  
    border-radius: 6px;  
    cursor: pointer;  
    background: transparent;  
    transition: border-color 0.2s ease;  
}  
  
.cables-op-colorpicker input[type="color"]:hover {  
    border-color: #4a9eff;
```

```
}

/* Style text input ops */
.cables-op-textinput input[type="text"] {
    width: 100%;
    padding: 10px 12px;
    background: #3a3a3a;
    color: #ffffff;
    border: 2px solid #3a3a3a;
    border-radius: 6px;
    font-size: 14px;
    transition: all 0.2s ease;
}

.cables-op-textinput input[type="text"]:focus {
    outline: none;
    border-color: #4a9eff;
    background: #404040;
    box-shadow: 0 0 0 3px rgba(74, 158, 255, 0.1);
}

/* Style dropdown ops */
.cables-op-dropdown select {
    width: 100%;
    padding: 10px 12px;
    background: #3a3a3a;
    color: #ffffff;
    border: 2px solid #3a3a3a;
    border-radius: 6px;
    font-size: 14px;
    cursor: pointer;
    transition: all 0.2s ease;
}

.cables-op-dropdown select:hover {
    border-color: #4a9eff;
}
```

```
.cables-op-dropdown select:focus {  
    outline: none;  
    border-color: #4a9eff;  
    box-shadow: 0 0 0 3px rgba(74, 158, 255, 0.1);  
}
```

## Method 2: Targeted Op Styling

Style specific ops by their data attributes:

```
/* Style a specific slider by op name */  
.cables-op-slider[data-op-name="Speed"] {  
    background: rgba(74, 158, 255, 0.1);  
    border: 2px solid #4a9eff;  
}  
  
.cables-op-slider[data-op-name="Speed"] label {  
    color: #4a9eff;  
    font-weight: 600;  
}  
  
/* Style a specific button */  
.cables-op-button[data-op-name="Reset"] button {  
    background: linear-gradient(135deg, #ff4a4a 0%, #ef3a3a 100%);  
}  
  
.cables-op-button[data-op-name="Reset"] button:hover {  
    background: linear-gradient(135deg, #ff5a5a 0%, #ff4a4a 100%);  
}
```

## Method 3: Dynamic CSS with JavaScript Custom Op

Create a custom op that injects CSS based on patch state:

```
// Custom Op: Dynamic Sidebar Styling  
const inTheme = op.inSwitch("Theme", ["dark", "light", "neon"], "dark");  
const inAccentColor = op.inString("Accent Color", "#4a9eff");
```

```

let currentTheme = "dark";
let currentAccent = "#4a9eff";

function updateStyles() {
    const theme = inTheme.get();
    const accent = inAccentColor.get();

    if (theme === currentTheme && accent === currentAccent) return;

    currentTheme = theme;
    currentAccent = accent;

    let styleElement = document.getElementById("dynamic-sidebar-styles");
    if (!styleElement) {
        styleElement = document.createElement("style");
        styleElement.id = "dynamic-sidebar-styles";
        document.head.appendChild(styleElement);
    }

    let css = "";

    if (theme === "dark") {
        css = `
            .cables-sidebar {
                background: linear-gradient(180deg, #1a1a1a 0%, #2d2d2d 100%);
            }
            .cables-sidebar-content > div {
                background: rgba(255, 255, 255, 0.05);
                border-color: rgba(255, 255, 255, 0.1);
            }
        `;
    } else if (theme === "light") {
        css = `
            .cables-sidebar {
                background: linear-gradient(180deg, #f5f5f5 0%, #e0e0e0 100%);
            }
            .cables-sidebar-content > div {
                background: rgba(0, 0, 0, 0.05);
            }
        `;
    }
}

updateStyles();

```

```

        border-color: rgba(0, 0, 0, 0.1);
    }
    .cables-op-slider label,
    .cables-op-button label {
        color: #333;
    }
    `;
} else if (theme === "neon") {
    css = `
        .cables-sidebar {
            background: #0a0a0a;
            border-left: 2px solid ${accent};
            box-shadow: -4px 0 20px ${accent}40;
        }
        .cables-sidebar-content > div {
            background: rgba(0, 0, 0, 0.5);
            border: 1px solid ${accent}40;
            box-shadow: 0 0 10px ${accent}20;
        }
    `;
}
// Apply accent color
css += `
    .cables-op-slider input[type="range"]::-webkit-slider-thumb {
        background: ${accent};
        box-shadow: 0 2px 8px ${accent}60;
    }
    .cables-op-button button {
        background: linear-gradient(135deg, ${accent} 0%, ${adjustBrightness(accent, -20)} 100%);
    }
    .cables-op-toggle input[type="checkbox"]:checked {
        background: ${accent};
    }
`;
styleElement.textContent = css;

```

```

}

function adjustBrightness(color, percent) {
    // Simple brightness adjustment (simplified)
    const num = parseInt(color.replace("#", ""), 16);
    const r = Math.max(0, Math.min(255, (num >> 16) + percent));
    const g = Math.max(0, Math.min(255, ((num >> 8) & 0x00FF) + percent));
    const b = Math.max(0, Math.min(255, (num & 0x0000FF) + percent));
    return "#" + ((r << 16) | (g << 8) | b).toString(16).padStart(6, "0");
}

inTheme.onChange = updateStyles;
inAccentColor.onChange = updateStyles;

op.onInit = function() {
    updateStyles();
};

```

#### 10.4.5 Complete Styling Example: Professional Control Panel

Here's a complete example that styles all interface ops with a cohesive, professional design:

##### HTML Op (CSS Injection):

```

<style id="professional-sidebar-styles">
/* Professional Sidebar Styling */

/* Sidebar Container */
.cables-sidebar {
    background: linear-gradient(180deg,
        #1a1a1a 0%,
        #1e1e1e 50%,
        #2d2d2d 100%);
    border-left: 3px solid #4a9eff;
    box-shadow: -4px 0 24px rgba(0, 0, 0, 0.5);
    font-family: 'Inter', 'Segoe UI', system-ui, sans-serif;
}

```

```
/* Sidebar Header (if exists) */
.cables-sidebar-header {
  padding: 20px;
  border-bottom: 2px solid rgba(74, 158, 255, 0.2);
  background: rgba(74, 158, 255, 0.05);
}

.cables-sidebar-header h2 {
  margin: 0;
  color: #ffffff;
  font-size: 18px;
  font-weight: 600;
  text-transform: uppercase;
  letter-spacing: 1px;
}

/* Content Container */
.cables-sidebar-content {
  padding: 16px;
}

/* All Interface Op Containers */
.cables-sidebar-content > div {
  background: rgba(255, 255, 255, 0.03);
  border: 1px solid rgba(255, 255, 255, 0.08);
  border-radius: 10px;
  padding: 18px;
  margin-bottom: 16px;
  transition: all 0.3s cubic-bezier(0.4, 0, 0.2, 1);
  position: relative;
  overflow: hidden;
}

.cables-sidebar-content > div::before {
  content: '';
  position: absolute;
  top: 0;
  left: 0;
```

```
width: 100%;  
height: 2px;  
background: linear-gradient(90deg,  
    transparent 0%,  
    #4a9eff 50%,  
    transparent 100%);  
opacity: 0;  
transition: opacity 0.3s ease;  
}  
  
.cables-sidebar-content > div:hover {  
background: rgba(255, 255, 255, 0.06);  
border-color: rgba(74, 158, 255, 0.3);  
transform: translateX(4px);  
box-shadow: 0 4px 16px rgba(0, 0, 0, 0.3);  
}  
  
.cables-sidebar-content > div:hover::before {  
    opacity: 1;  
}  
  
/* Slider Styling */  
.cables-op-slider label {  
display: block;  
color: #b0b0b0;  
font-size: 12px;  
font-weight: 600;  
margin-bottom: 10px;  
text-transform: uppercase;  
letter-spacing: 0.5px;  
}  
  
.cables-op-slider input[type="range"] {  
width: 100%;  
height: 8px;  
border-radius: 4px;  
background: linear-gradient(90deg,  
    #2a2a2a 0%,
```

```

        #3a3a3a 100%);

outline: none;
-webkit-appearance: none;
margin: 12px 0;
position: relative;
}

.cables-op-slider input[type="range"]::-webkit-slider-thumb {
-webkit-appearance: none;
appearance: none;
width: 24px;
height: 24px;
border-radius: 50%;
background: linear-gradient(135deg, #4a9eff 0%, #3a8eef 100%);
cursor: pointer;
box-shadow:
    0 2px 8px rgba(74, 158, 255, 0.4),
    0 0 0 4px rgba(74, 158, 255, 0.1),
    inset 0 1px 0 rgba(255, 255, 255, 0.2);
transition: all 0.2s ease;
border: 2px solid rgba(255, 255, 255, 0.1);
}

.cables-op-slider input[type="range"]::-webkit-slider-thumb:hover {
background: linear-gradient(135deg, #5aaeff 0%, #4a9eff 100%);
transform: scale(1.15);
box-shadow:
    0 4px 12px rgba(74, 158, 255, 0.6),
    0 0 0 6px rgba(74, 158, 255, 0.15),
    inset 0 1px 0 rgba(255, 255, 255, 0.3);
}

.cables-op-slider input[type="range"]::-webkit-slider-thumb:active {
transform: scale(1.05);
}

.cables-op-slider input[type="range"]::-moz-range-thumb {
width: 24px;
}

```

```

height: 24px;
border-radius: 50%;
background: linear-gradient(135deg, #4a9eff 0%, #3a8eef 100%);
cursor: pointer;
border: 2px solid rgba(255, 255, 255, 0.1);
box-shadow:
  0 2px 8px rgba(74, 158, 255, 0.4),
  0 0 0 4px rgba(74, 158, 255, 0.1);
}

.cables-op-slider .value {
  color: #4a9eff;
  font-weight: 700;
  font-size: 18px;
  float: right;
  margin-top: -32px;
  font-variant-numeric: tabular-nums;
  text-shadow: 0 0 8px rgba(74, 158, 255, 0.5);
}

/* Button Styling */
.cables-op-button button {
  width: 100%;
  padding: 14px 24px;
  background: linear-gradient(135deg, #4a9eff 0%, #3a8eef 100%);
  color: white;
  border: none;
  border-radius: 8px;
  font-size: 14px;
  font-weight: 600;
  cursor: pointer;
  transition: all 0.3s cubic-bezier(0.4, 0, 0.2, 1);
  text-transform: uppercase;
  letter-spacing: 1.2px;
  box-shadow:
    0 4px 12px rgba(74, 158, 255, 0.3),
    inset 0 1px 0 rgba(255, 255, 255, 0.2);
  position: relative;
}

```

```

        overflow: hidden;
    }

.cables-op-button button::before {
    content: '';
    position: absolute;
    top: 50%;
    left: 50%;
    width: 0;
    height: 0;
    border-radius: 50%;
    background: rgba(255, 255, 255, 0.3);
    transform: translate(-50%, -50%);
    transition: width 0.6s, height 0.6s;
}

.cables-op-button button:hover {
    background: linear-gradient(135deg, #5aaeff 0%, #4a9eff 100%);
    transform: translateY(-2px);
    box-shadow:
        0 6px 20px rgba(74, 158, 255, 0.4),
        inset 0 1px 0 rgba(255, 255, 255, 0.3);
}

.cables-op-button button:hover::before {
    width: 300px;
    height: 300px;
}

.cables-op-button button:active {
    transform: translateY(0);
    box-shadow:
        0 2px 8px rgba(74, 158, 255, 0.3),
        inset 0 1px 0 rgba(255, 255, 255, 0.1);
}

/* Toggle Styling */
.cables-op-toggle {

```

```

    display: flex;
    align-items: center;
    justify-content: space-between;
}

.cables-op-toggle label {
    color: #b0b0b0;
    font-size: 14px;
    font-weight: 500;
    flex: 1;
}

.cables-op-toggle input[type="checkbox"] {
    width: 56px;
    height: 30px;
    -webkit-appearance: none;
    appearance: none;
    background: #2a2a2a;
    border-radius: 15px;
    position: relative;
    cursor: pointer;
    transition: all 0.3s cubic-bezier(0.4, 0, 0.2, 1);
    border: 2px solid #1a1a1a;
    box-shadow: inset 0 2px 4px rgba(0, 0, 0, 0.3);
}

.cables-op-toggle input[type="checkbox"]:checked {
    background: linear-gradient(135deg, #4a9eff 0%, #3a8eef 100%);
    border-color: #4a9eff;
    box-shadow:
        inset 0 2px 4px rgba(0, 0, 0, 0.2),
        0 0 12px rgba(74, 158, 255, 0.4);
}

.cables-op-toggle input[type="checkbox"]::before {
    content: '';
    position: absolute;
    width: 24px;
}

```

```
height: 24px;
border-radius: 50%;
background: linear-gradient(135deg, #ffffff 0%, #f0f0f0 100%);
top: 1px;
left: 1px;
transition: transform 0.3s cubic-bezier(0.4, 0, 0.2, 1);
box-shadow:
  0 2px 6px rgba(0, 0, 0, 0.3),
  inset 0 1px 0 rgba(255, 255, 255, 0.5);
}

.cables-op-toggle input[type="checkbox"]::checked::before {
  transform: translateX(26px);
}

/* Color Picker Styling */
.cables-op-colorpicker {
  display: flex;
  align-items: center;
  gap: 16px;
}

.cables-op-colorpicker label {
  color: #b0b0b0;
  font-size: 14px;
  font-weight: 500;
  flex: 1;
}

.cables-op-colorpicker input[type="color"] {
  width: 70px;
  height: 50px;
  border: 3px solid #3a3a3a;
  border-radius: 8px;
  cursor: pointer;
  background: transparent;
  transition: all 0.3s ease;
  box-shadow: 0 2px 8px rgba(0, 0, 0, 0.3);
```

```
}

.cables-op-colorpicker input[type="color"]:hover {
    border-color: #4a9eff;
    transform: scale(1.05);
    box-shadow:
        0 4px 12px rgba(0, 0, 0, 0.4),
        0 0 0 4px rgba(74, 158, 255, 0.1);
}

/* Text Input Styling */
.cables-op-textinput label {
    display: block;
    color: #b0b0b0;
    font-size: 12px;
    font-weight: 600;
    margin-bottom: 8px;
    text-transform: uppercase;
    letter-spacing: 0.5px;
}

.cables-op-textinput input[type="text"] {
    width: 100%;
    padding: 12px 16px;
    background: #2a2a2a;
    color: #ffffff;
    border: 2px solid #3a3a3a;
    border-radius: 8px;
    font-size: 14px;
    transition: all 0.3s ease;
    box-sizing: border-box;
}

.cables-op-textinput input[type="text"]:focus {
    outline: none;
    border-color: #4a9eff;
    background: #333333;
    box-shadow:
```

```
    0 0 0 4px rgba(74, 158, 255, 0.1),
    inset 0 2px 4px rgba(0, 0, 0, 0.2);
}

/* Dropdown Styling */
.cables-op-dropdown label {
    display: block;
    color: #b0b0b0;
    font-size: 12px;
    font-weight: 600;
    margin-bottom: 8px;
    text-transform: uppercase;
    letter-spacing: 0.5px;
}

.cables-op-dropdown select {
    width: 100%;
    padding: 12px 16px;
    background: #2a2a2a;
    color: #ffffff;
    border: 2px solid #3a3a3a;
    border-radius: 8px;
    font-size: 14px;
    cursor: pointer;
    transition: all 0.3s ease;
    appearance: none;
    background-image: url("data:image/svg+xml,%3Csvg xmlns='http://www.w3.org/2000/svg' width='12' height='12' viewBox='0 0 12 12' fill='none' stroke='#3a3a3a' stroke-width='2' stroke-linecap='round' stroke-linejoin='round'%3Cpath d='M 2 10 L 10 2 M 10 10 L 8 8'/%3E");
    background-repeat: no-repeat;
    background-position: right 12px center;
    padding-right: 40px;
}

.cables-op-dropdown select:hover {
    border-color: #4a9eff;
    background-color: #333333;
}

.cables-op-dropdown select:focus {
```

```
outline: none;
border-color: #4a9eff;
box-shadow:
  0 0 0 4px rgba(74, 158, 255, 0.1),
  inset 0 2px 4px rgba(0, 0, 0, 0.2);
}

/* Number Input Styling */
.cables-op-numberinput {
  display: flex;
  align-items: center;
  gap: 12px;
}

.cables-op-numberinput label {
  color: #b0b0b0;
  font-size: 14px;
  font-weight: 500;
  flex: 1;
}

.cables-op-numberinput input[type="number"] {
  width: 100px;
  padding: 10px 12px;
  background: #2a2a2a;
  color: #ffffff;
  border: 2px solid #3a3a3a;
  border-radius: 6px;
  font-size: 14px;
  text-align: center;
  transition: all 0.3s ease;
}

.cables-op-numberinput input[type="number"]:focus {
  outline: none;
  border-color: #4a9eff;
  background: #333333;
  box-shadow: 0 0 0 3px rgba(74, 158, 255, 0.1);
```

```

}

/* Text Display Styling */
.cables-op-textdisplay {
    padding: 12px;
    background: rgba(74, 158, 255, 0.1);
    border: 1px solid rgba(74, 158, 255, 0.3);
    border-radius: 6px;
    color: #4a9eff;
    font-family: 'Courier New', monospace;
    font-size: 14px;
    text-align: center;
    font-weight: 600;
}

/* Responsive adjustments */
@media (max-width: 768px) {
    .cables-sidebar {
        width: 100% !important;
        height: auto !important;
        position: relative !important;
    }
}
</style>

```

## 10.4.6 Advanced CSS Techniques

### Technique 1: Animated Transitions

```

.cables-sidebar-content > div {
    animation: slideIn 0.3s ease-out;
}

@keyframes slideIn {
    from {
        opacity: 0;
        transform: translateX(-20px);
    }
}

```

```

        to {
          opacity: 1;
          transform: translateX(0);
        }
      }

/* Stagger animation delays */
.cables-sidebar-content > div:nth-child(1) { animation-delay: 0.05s; }
.cables-sidebar-content > div:nth-child(2) { animation-delay: 0.10s; }
.cables-sidebar-content > div:nth-child(3) { animation-delay: 0.15s; }
.cables-sidebar-content > div:nth-child(4) { animation-delay: 0.20s; }

```

## Technique 2: Custom Scrollbar

```

.cables-sidebar-content::-webkit-scrollbar {
  width: 8px;
}

.cables-sidebar-content::-webkit-scrollbar-track {
  background: #1a1a1a;
  border-radius: 4px;
}

.cables-sidebar-content::-webkit-scrollbar-thumb {
  background: #4a9eff;
  border-radius: 4px;
  border: 2px solid #1a1a1a;
}

.cables-sidebar-content::-webkit-scrollbar-thumb:hover {
  background: #5aaeff;
}

```

## Technique 3: Glassmorphism Effect

```

.cables-sidebar {
  background: rgba(30, 30, 30, 0.7);
  backdrop-filter: blur(20px);
}

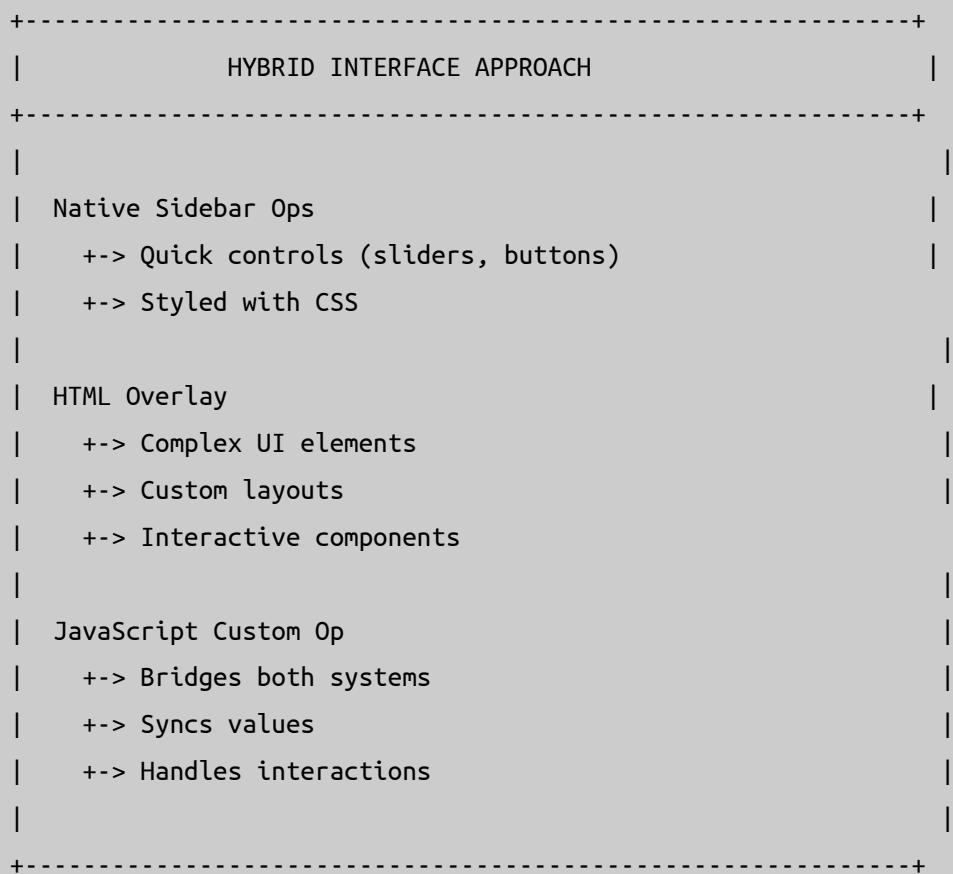
```

```
-webkit-backdrop-filter: blur(20px);
border-left: 1px solid rgba(255, 255, 255, 0.1);
}

.cables-sidebar-content > div {
background: rgba(255, 255, 255, 0.05);
backdrop-filter: blur(10px);
-webkit-backdrop-filter: blur(10px);
border: 1px solid rgba(255, 255, 255, 0.1);
}
```

## 10.5 Combining HTML and Native Interfaces

You can combine both approaches for maximum flexibility:



## 10.6 Best Practices

## 10.6.1 1. Performance

- **Minimize DOM Manipulation:** Cache element references
- **Use CSS Transforms:** For animations instead of position changes
- **Debounce Inputs:** For sliders and text inputs that trigger heavy computations

## 10.6.2 2. Accessibility

- **Labels:** Always provide clear labels for controls
- **Keyboard Navigation:** Ensure keyboard accessibility
- **Color Contrast:** Maintain sufficient contrast ratios
- **Focus States:** Provide visible focus indicators

## 10.6.3 3. Responsive Design

```
/* Mobile-first approach */  
cables-sidebar {  
    width: 100%;  
    height: auto;  
    position: relative;  
}  
  
@media (min-width: 768px) {  
    .cables-sidebar {  
        width: 320px;  
        height: 100vh;  
        position: fixed;  
    }  
}
```

## 10.6.4 4. Organization

- **Group Related Controls:** Use visual grouping
- **Clear Hierarchy:** Use size, color, and spacing
- **Consistent Spacing:** Maintain uniform margins and padding

# 10.7 Practical Examples

### 10.7.1 Example 1: Animation Control Panel

Create a comprehensive control panel for animation parameters:

```
Speed Slider -> Animation Speed  
Color Picker -> Material Color  
Toggle (Loop) -> Loop Animation  
Button (Reset) -> Reset Animation  
Text Display -> Current Frame
```

### 10.7.2 Example 2: Game UI Overlay

HTML overlay for game-like interface:

```
<div id="gameUI">  
  <div class="hud-top">  
    <div class="score">Score: <span id="score">0</span></div>  
    <div class="health">Health: <span id="health">100</span></div>  
  </div>  
  <div class="hud-bottom">  
    <button id="pauseBtn">Pause</button>  
    <button id="menuBtn">Menu</button>  
  </div>  
</div>
```

### 10.7.3 Example 3: Data Visualization Dashboard

Combine native ops with HTML for a data dashboard:

- Native sliders for filtering
- HTML charts and graphs
- Real-time data display

## 10.8 Debugging Interface Issues

### 10.8.1 Common Issues

1. **CSS Not Applying**
  - Check selector specificity

- Verify CSS is injected after sidebar renders
- Use !important sparingly

## 2. Elements Not Visible

- Check z-index values
- Verify position properties
- Check for overflow: hidden

## 3. Events Not Firing

- Ensure JavaScript runs after DOM is ready
- Check event listener attachment
- Verify element selectors

### 10.8.2 Debugging Tools

```
// Log sidebar structure
console.log(document.querySelector('.cables-sidebar'));

// Check computed styles
const element = document.querySelector('.cables-op-slider');
console.log(window.getComputedStyle(element));

// Monitor style changes
const observer = new MutationObserver((mutations) => {
  console.log('DOM changed:', mutations);
});
observer.observe(document.querySelector('.cables-sidebar'), {
  childList: true,
  subtree: true,
  attributes: true
});
```

### 10.9 Exercises

1. **Basic HTML Interface:** Create a simple HTML overlay with a button and slider that control patch parameters
2. **Styled Sidebar:** Style native sidebar ops with a cohesive color scheme and modern design
3. **Responsive Panel:** Create a sidebar that adapts to different screen sizes
4. **Interactive Dashboard:** Build a complete control panel combining HTML and native ops

5. **Theme Switcher:** Create a custom op that dynamically changes sidebar styling based on user selection
  6. **Advanced Styling:** Implement glassmorphism or other modern design trends in your sidebar
-

# 11 Export & Deployment in Cables.gl

## 11.1 Introduction

Once you've created your cables.gl project, you'll want to share it with the world. This chapter covers all the ways to export and deploy your creations.

## 11.2 Export Options

### 11.2.1 1. Public Patch Link

The simplest way to share - just make your patch public and share the URL.

**Pros:** - Instant sharing - Always up-to-date - No hosting needed

**Cons:** - Requires internet - Cables.gl branding - Limited customization

### 11.2.2 2. Embedded iframe

Embed your patch in any website:

```
<iframe  
  src="https://cables.gl/view/YOUR_PATCH_ID"  
  width="800"  
  height="600"  
  frameborder="0"  
  allowfullscreen>  
</iframe>
```

### 11.2.3 3. Standalone Export

Download your patch as a standalone web application.

**Includes:** - HTML file - JavaScript bundle - Assets (textures, models, audio) - No cables.gl dependency

### 11.2.4 4. npm Package Export

Export as an npm package for integration with other JavaScript projects.

## 11.3 Standalone Export Process

### 11.3.1 Step 1: Prepare Your Patch

1. Test thoroughly in the editor
2. Optimize assets (compress images, reduce model complexity)
3. Remove unused ops and connections
4. Set default camera/view position

### 11.3.2 Step 2: Export

1. Click the export/download button in the editor
2. Choose “Standalone” export
3. Configure options:
  - Include minified code
  - Include source maps (for debugging)
  - Asset optimization level

### 11.3.3 Step 3: Download

You'll receive a ZIP file containing:

```
exported-patch/
+-- index.html          # Main HTML file
+-- js/
|   +-- cables.min.js    # Cables runtime
|   +-- ops.js           # Your patch's operators
|   +-- patch.js         # Patch configuration
+-- assets/
|   +-- textures/        # Image files
|   +-- audio/           # Sound files
|   +-- models/          # 3D models
+-- css/
    +-- style.css        # Optional styles
```

### 11.3.4 Step 4: Test Locally

```
# Using Python
python -m http.server 8000

# Using Node.js
npx serve .

# Using PHP
php -S localhost:8000
```

Then open <http://localhost:8000> in your browser.

## 11.4 Customizing the Export

### 11.4.1 Custom HTML Template

```
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>My Cables Project</title>
    <style>
        body { margin: 0; overflow: hidden; }
        #cables-container { width: 100vw; height: 100vh; }
    </style>
</head>
<body>
    <div id="cables-container"></div>

    <script src="js/cables.min.js"></script>
    <script src="js/ops.js"></script>
    <script>
        CABLES.patch = new CABLES.Patch({
            patchFile: 'js/patch.js',
            prefixAssetPath: 'assets/',
            glCanvasId: 'cables-container',
            onFinishedLoading: function() {
                console.log('Patch loaded!');
            }
        });
    </script>
</body>
</html>
```

```
        }
    });
</script>
</body>
</html>
```

## 11.4.2 Configuration Options

```
new CABLES.Patch({
    patchFile: 'js/patch.js',
    prefixAssetPath: 'assets/',
    glCanvasId: 'myCanvas',
    glCanvasResizeToWindow: true,
    onFinishedLoading: callback,
    onError: errorCallback,
    variables: {
        // Pass custom variables to the patch
        customColor: '#ff0000',
        userName: 'Guest'
    }
});
```

## 11.5 Communicating with Your Patch

### 11.5.1 Setting Variables from JavaScript

```
// Get the patch instance
const patch = CABLES.patch;

// Set a variable
patch.setVariable('myValue', 42);
patch.setVariable('myColor', [1, 0, 0, 1]);
```

### 11.5.2 Getting Values from the Patch

```
// Get a variable
const value = patch.getVariable('myValue');
```

```
// Listen for variable changes
patch.on('variableChanged', function(name, value) {
  console.log(name, 'changed to', value);
});
```

### 11.5.3 Triggering Events

```
// Trigger an op
patch.getOpById('YOUR_OP_ID').trigger();

// Or use variables as triggers
patch.setVariable('doSomething', true);
```

## 11.6 Advanced Embedding & Integration

When cables.gl becomes part of a larger website/app, you want the embed to be **robust**:

- correct sizing and device pixel ratio handling
- pause/resume behavior when the tab is hidden
- a clean integration API (events in, telemetry out)
- predictable asset paths across dev/staging/prod

### 11.6.1 Responsive Canvas: Beyond Width/Height

If you embed into dynamic layouts (resizable panels, CSS grid, etc.), treat `resize` as a first-class event:

- call your `resize` function on load
- call it on `resize`
- call it when layout changes (route changes, UI toggles, etc.)

### 11.6.2 Pausing When Not Visible

For performance and battery life, consider pausing expensive animation when the page is hidden:

```
document.addEventListener("visibilitychange", () => {
  if (!window.CABLES || !CABLES.patch) return;
  // Depending on your patch/runtime, you may gate updates via a variable:
  CABLES.patch.setVariable("isVisible", !document.hidden);
});
```

Then in your patch, use `isVisible` to reduce workload (lower particle count, skip effects, etc.).

### 11.6.3 postMessage Integration (iframe Control)

If you embed via iframe, `postMessage` is the clean way to send commands and data.

**Parent page -> iframe:**

```
const iframe = document.getElementById("cablesFrame");
iframe.contentWindow.postMessage(
  { type: "CABLES_SET", name: "myValue", value: 0.75 },
  "*"
);
```

**Inside the exported patch wrapper page:**

```
window.addEventListener("message", (event) => {
  const msg = event.data;
  if (!msg || !window.CABLES || !CABLES.patch) return;

  if (msg.type === "CABLES_SET") {
    CABLES.patch.setVariable(msg.name, msg.value);
  }
});
```

### 11.6.4 Environment-Specific Configuration (dev / test / prod)

Keep environment differences in **configuration**, not in the patch logic:

- dev: verbose logging, source maps, local asset path
- test/staging: production-like hosting + debug overlays
- prod: minified, caching enabled, stable URLs

Common patterns:

- query string flags: ?debug=1
- separate config.json loaded at runtime
- environment variables handled by the site that embeds the patch

## 11.6.5 Asset Path Gotchas

Most “works locally but not in prod” issues come down to:

- wrong prefixAssetPath
- case-sensitive paths on Linux hosts
- missing assets in the exported zip upload

If you deploy under a sub-path (e.g., <https://site.com/myproject/>), ensure all paths are relative or correctly prefixed.

## 11.7 Hosting Options

### 11.7.1 Static Hosting

Your exported patch is static files - host anywhere:

- **GitHub Pages** - Free, great for projects
- **Netlify** - Free tier, easy deployment
- **Vercel** - Free tier, automatic deploys
- **Amazon S3** - Scalable, pay-per-use
- **Any web server** - Apache, Nginx, etc.

### 11.7.2 GitHub Pages Deployment

```
# Create a gh-pages branch
git checkout -b gh-pages

# Add your exported files
git add .

git commit -m "Deploy cables patch"

# Push to GitHub
git push origin gh-pages
```

Enable GitHub Pages in repository settings.

### 11.7.3 Netlify Deployment

1. Connect your GitHub repository
2. Set build command: (none needed for static)

3. Set publish directory: / or your export folder
4. Deploy!

## 11.8 Embedding in Existing Websites

### 11.8.1 As a Background

```
<style>
  #cables-bg {
    position: fixed;
    top: 0;
    left: 0;
    width: 100%;
    height: 100%;
    z-index: -1;
  }
</style>
<canvas id="cables-bg"></canvas>
<script>
  CABLES.patch = new CABLES.Patch({
    patchFile: 'patch.js',
    glCanvasId: 'cables-bg'
  });
</script>
```

### 11.8.2 As a Hero Section

```
<section class="hero">
  <div id="cables-hero"></div>
  <div class="hero-content">
    <h1>Welcome</h1>
    <p>Your content here</p>
  </div>
</section>
```

### 11.8.3 Responsive Embedding

```

function resizeCables() {
    const container = document.getElementById('cables-container');
    container.style.width = window.innerWidth + 'px';
    container.style.height = window.innerHeight + 'px';

    // Notify cables of resize
    if (CABLES.patch) {
        CABLES.patch.cgl.setSize(window.innerWidth, window.innerHeight);
    }
}

window.addEventListener('resize', resizeCables);
resizeCables();

```

## 11.9 Performance Optimization

### 11.9.1 Before Export

1. **Remove unused ops** - Clean up your patch
2. **Optimize textures** - Use appropriate sizes
3. **Reduce polygon count** - Simplify 3D models
4. **Minimize audio files** - Compress audio

### 11.9.2 Asset Optimization

**Images:** - Use WebP format when possible - Use power-of-2 dimensions - Compress with tools like TinyPNG

**3D Models:** - Use glTF/GLB format - Remove unnecessary detail - Use Draco compression

**Audio:** - Use MP3 or OGG - Compress appropriately - Consider streaming for long files

### 11.9.3 Loading Optimization

```

// Show loading progress
CABLES.patch = new CABLES.Patch({
    patchFile: 'patch.js',
    onLoadingProgress: function(percent) {
        document.getElementById('loader').style.width = percent + '%';
}

```

```
        },
        onFinishedLoading: function() {
            document.getElementById('loader').style.display = 'none';
        }
    );
}
```

## 11.10 Deployment Checklist (The Stuff That Breaks at the Worst Time)

Before you publish, run through this list:

- **Loading**: Do you show a loader/progress bar for heavy patches?
- **Autoplay policies**: If you use audio/video/webcam, do you require a user click?
- **Mobile sanity**: Does it run on a mid-tier phone without overheating?
- **Resize**: Does it handle orientation changes and dynamic layout resizing?
- **Asset paths**: Are all assets included and paths correct on a case-sensitive host?
- **Cache behavior**: Are you accidentally serving old JS after updates?
- **Console**: Is the browser console clean (no noisy logs, no repeated warnings)?

### 11.10.1 Cache Busting and Versioning

Static hosts cache aggressively. If you deploy a new version and still see the old one:

- add a version/hash to filenames (e.g. ops.v123.js)
- or configure cache headers (short cache for HTML, long cache for hashed assets)

### 11.10.2 MIME Types (Especially for Wasm / Binary Assets)

Some servers mis-serve file types. If a resource fails to load, check response headers:

- .wasm should be served as application/wasm
- .json as application/json
- textures as correct image mime types

### 11.10.3 CORS (Cross-Origin Assets)

If you load assets from another domain:

- ensure that server sends correct CORS headers
- prefer hosting assets alongside the patch when possible (simpler)

## 11.10.4 Content Security Policy (CSP)

If your patch is embedded into a site with strict CSP, you may need to allow:

- fetching assets from required domains
- media playback sources

When possible, avoid “unsafe-inline” and instead rely on your host app’s approved patterns.

## 11.11 CI/CD Ideas (Optional, But Great for Teams)

If you repeatedly export and deploy:

- treat the export zip as a build artifact
- deploy to staging on every change
- promote to prod when approved

Even a simple workflow that publishes static files to GitHub Pages can save time and reduce mistakes.

## 11.12 Offline/PWA

Make your patch work offline as a Progressive Web App:

### 11.12.1 manifest.json

```
{  
  "name": "My Cables App",  
  "short_name": "CablesApp",  
  "start_url": "/",  
  "display": "standalone",  
  "background_color": "#000000",  
  "theme_color": "#000000",  
  "icons": [  
    {  
      "src": "icon-192.png",  
      "sizes": "192x192",  
      "type": "image/png"  
    },  
    {  
      "src": "icon-512.png",  
      "sizes": "512x512",  
      "type": "image/png"  
    }  
  ]}
```

```

        "sizes": "512x512",
        "type": "image/png"
    }
]
}

```

## 11.12.2 Service Worker

```

// sw.js
const CACHE_NAME = 'cables-app-v1';
const urlsToCache = [
    '/',
    '/index.html',
    '/js/cables.min.js',
    '/js/ops.js',
    '/js/patch.js',
    // Add your assets
];

self.addEventListener('install', event => {
    event.waitUntil(
        caches.open(CACHE_NAME)
            .then(cache => cache.addAll(urlsToCache))
    );
});

self.addEventListener('fetch', event => {
    event.respondWith(
        caches.match(event.request)
            .then(response => response || fetch(event.request))
    );
});

```

## 11.13 Electron Desktop Applications

For a truly native desktop experience, you can package your cables.gl export as an Electron application. Electron allows you to create cross-platform desktop apps using web technologies, perfect for distributing your cables.gl creations as standalone applications.

### 11.13.1 Why Electron?

**Advantages:** - Native desktop experience (menus, system tray, notifications) - Full file system access  
- Better performance control - No browser UI chrome - Can work offline completely - Access to native OS APIs - Professional distribution via installers

**Considerations:** - Larger app size (~100-200MB) - Requires code signing for distribution - More complex build process - Platform-specific considerations

### 11.13.2 Getting Started with Electron

#### Project Structure

After exporting your cables.gl patch, set up an Electron project:

```
electron-app/
+-- package.json
+-- main.js          # Main Electron process
+-- preload.js       # Preload script (optional)
+-- renderer/
|   +-- index.html    # Your exported cables HTML
|   +-- js/
|   |   +-- cables.min.js
|   |   +-- ops.js
|   |   +-- patch.js
|   +-- assets/        # Your exported assets
+-- assets/
|   +-- icon.ico      # Windows icon
|   +-- icon.icns      # macOS icon
|   +-- icon.png       # Linux icon
+-- build/           # Build configuration
  +-- mac/
  +-- win/
  +-- linux/
```

#### Initial Setup

**package.json:**

```
{  
  "name": "my-cables-app",  
  "version": "1.0.0",  
  "description": "My Cables.gl Desktop App",  
  "main": "main.js",  
  "scripts": {  
    "start": "electron .",  
    "build": "electron-builder",  
    "build:mac": "electron-builder --mac",  
    "build:win": "electron-builder --win",  
    "build:linux": "electron-builder --linux"  
  },  
  "build": {  
    "appId": "com.yourcompany.cablesapp",  
    "productName": "My Cables App",  
    "directories": {  
      "output": "dist"  
    },  
    "files": [  
      "main.js",  
      "preload.js",  
      "renderer/**/*"  
    ],  
    "mac": {  
      "icon": "assets/icon.icns",  
      "category": "public.app-category.graphics-design"  
    },  
    "win": {  
      "icon": "assets/icon.ico",  
      "target": ["nsis", "portable"]  
    },  
    "linux": {  
      "icon": "assets/icon.png",  
      "target": ["AppImage", "deb"]  
    }  
  },  
  "devDependencies": {
```

```
    "electron": "^28.0.0",
    "electron-builder": "^24.9.1"
  }
}
```

### Install dependencies:

```
npm install --save-dev electron electron-builder
```

### 11.13.3 Main Process (main.js)

The main process controls the application lifecycle and creates windows:

```
const { app, BrowserWindow, Menu, ipcMain, dialog, shell } = require('electron');
const path = require('path');
const fs = require('fs').promises;

// Keep a global reference of the window object
let mainWindow;
let splashWindow;

// Determine if we're in development
const isDev = process.env.NODE_ENV === 'development' || !app.isPackaged;

function createSplashWindow() {
  splashWindow = new BrowserWindow({
    width: 400,
    height: 300,
    frame: false,
    transparent: true,
    alwaysOnTop: true,
    resizable: false,
    webPreferences: {
      nodeIntegration: false,
      contextIsolation: true
    }
  });
}
```

```

// Load splash screen HTML
splashWindow.loadFile('splash.html');

// Center the window
splashWindow.center();

return splashWindow;
}

function createMainWindow() {
  // Create the browser window
  mainWindow = new BrowserWindow({
    width: 1280,
    height: 720,
    minWidth: 800,
    minHeight: 600,
    show: false, // Don't show until ready
    frame: true,
    titleBarStyle: process.platform === 'darwin' ? 'hiddenInset' : 'default',
    backgroundColor: '#000000',
    icon: getIconPath(),
    webPreferences: {
      nodeIntegration: false, // Security: don't expose Node.js
      contextIsolation: true, // Security: isolate context
      preload: path.join(__dirname, 'preload.js'), // Preload script
      webSecurity: !isDev, // Disable in dev for easier debugging
      enableRemoteModule: false
    }
  });
}

// Load your exported cables.gl patch
if (isDev) {
  mainWindow.loadFile('renderer/index.html');
  // Open DevTools in development
  mainWindow.webContents.openDevTools();
} else {
  mainWindow.loadFile(path.join(__dirname, 'renderer/index.html'));
}

```

```

// Show window when ready to prevent visual flash
mainWindow.once('ready-to-show', () => {
  if (splashWindow) {
    splashWindow.close();
    splashWindow = null;
  }
  mainWindow.show();

  // Focus the window
  if (isDev) {
    mainWindow.focus();
  }
});

// Handle window closed
mainWindow.on('closed', () => {
  mainWindow = null;
});

// Handle external links
mainWindow.webContents.setWindowOpenHandler(({ url }) => {
  shell.openExternal(url);
  return { action: 'deny' };
});

// Prevent navigation to external URLs
mainWindow.webContents.on('will-navigate', (event, navigationUrl) => {
  const parsedUrl = new URL(navigationUrl);

  if (parsedUrl.origin !== 'file://') {
    event.preventDefault();
    shell.openExternal(navigationUrl);
  }
});

return mainWindow;
}

```

```

function getIconPath() {
  if (process.platform === 'win32') {
    return path.join(__dirname, 'assets/icon.ico');
  } else if (process.platform === 'darwin') {
    return path.join(__dirname, 'assets/icon.icns');
  } else {
    return path.join(__dirname, 'assets/icon.png');
  }
}

function createMenu() {
  const template = [
    {
      label: 'File',
      submenu: [
        {
          label: 'Load Settings',
          accelerator: 'CmdOrCtrl+O',
          click: async () => {
            const result = await dialog.showOpenDialog(mainWindow, {
              properties: ['openFile'],
              filters: [
                { name: 'JSON Files', extensions: ['json'] },
                { name: 'All Files', extensions: ['*'] }
              ]
            });
            if (!result.canceled && result.filePaths.length > 0) {
              mainWindow.webContents.send('load-settings', result.filePaths[0]);
            }
          }
        },
        {
          label: 'Save Settings',
          accelerator: 'CmdOrCtrl+S',
          click: async () => {
            const result = await dialog.showSaveDialog(mainWindow, {

```

```

        filters: [
            { name: 'JSON Files', extensions: ['json'] },
            { name: 'All Files', extensions: ['*'] }
        ],
        defaultPath: 'settings.json'
    });

    if (!result.canceled) {
        mainWindow.webContents.send('save-settings', result.filePath);
    }
},
{ type: 'separator' },
{
    label: 'Exit',
    accelerator: process.platform === 'darwin' ? 'Cmd+Q' : 'Ctrl+Q',
    click: () => {
        app.quit();
    }
}
],
},
{
    label: 'Edit',
    submenu: [
        { role: 'undo', label: 'Undo' },
        { role: 'redo', label: 'Redo' },
        { type: 'separator' },
        { role: 'cut', label: 'Cut' },
        { role: 'copy', label: 'Copy' },
        { role: 'paste', label: 'Paste' },
        { role: 'selectAll', label: 'Select All' }
    ]
},
{
    label: 'View',
    submenu: [
        { role: 'reload', label: 'Reload' },

```

```

        { role: 'forceReload', label: 'Force Reload' },
        { role: 'toggleDevTools', label: 'Toggle Developer Tools' },
        { type: 'separator' },
        { role: 'resetZoom', label: 'Actual Size' },
        { role: 'zoomIn', label: 'Zoom In' },
        { role: 'zoomOut', label: 'Zoom Out' },
        { type: 'separator' },
        { role: 'togglefullscreen', label: 'Toggle Fullscreen' }
    ]
},
{
    label: 'Window',
    submenu: [
        { role: 'minimize', label: 'Minimize' },
        { role: 'close', label: 'Close' }
    ],
    {
        label: 'Help',
        submenu: [
            {
                label: 'About',
                click: () => {
                    dialog.showMessageBox(mainWindow, {
                        type: 'info',
                        title: 'About',
                        message: 'My Cables App',
                        detail: 'Version 1.0.0\nBuilt with cables.gl and Electron'
                    });
                }
            }
        ]
    }
];
};

// macOS specific menu adjustments
if (process.platform === 'darwin') {
    template.unshift({

```

```

label: app.getName(),
submenu: [
  { role: 'about', label: 'About ' + app.getName() },
  { type: 'separator' },
  { role: 'services', label: 'Services' },
  { type: 'separator' },
  { role: 'hide', label: 'Hide ' + app.getName() },
  { role: 'hideOthers', label: 'Hide Others' },
  { role: 'unhide', label: 'Show All' },
  { type: 'separator' },
  { role: 'quit', label: 'Quit ' + app.getName() }
]
]);
}

// Window menu
template[4].submenu = [
  { role: 'close', label: 'Close' },
  { role: 'minimize', label: 'Minimize' },
  { role: 'zoom', label: 'Zoom' },
  { type: 'separator' },
  { role: 'front', label: 'Bring All to Front' }
];
}

const menu = Menu.buildFromTemplate(template);
Menu.setApplicationMenu(menu);
}

// IPC Handlers for inter-process communication
function setupIpcHandlers() {
  // Handle file reading
  ipcMain.handle('read-file', async (event, filePath) => {
    try {
      const data = await fs.readFile(filePath, 'utf-8');
      return { success: true, data: JSON.parse(data) };
    } catch (error) {
      return { success: false, error: error.message };
    }
  })
}

```

```
});

// Handle file writing
ipcMain.handle('write-file', async (event, filePath, data) => {
  try {
    await fs.writeFile(filePath, JSON.stringify(data, null, 2), 'utf-8');
    return { success: true };
  } catch (error) {
    return { success: false, error: error.message };
  }
});

// Get app version
ipcMain.handle('get-app-version', () => {
  return app.getVersion();
});

// Get user data path
ipcMain.handle('get-user-data-path', () => {
  return app.getPath('userData');
});

// Window control
ipcMain.on('window-minimize', () => {
  if (mainWindow) mainWindow.minimize();
});

ipcMain.on('window-maximize', () => {
  if (mainWindow) {
    if (mainWindow.isMaximized()) {
      mainWindow.unmaximize();
    } else {
      mainWindow.maximize();
    }
  }
});

ipcMain.on('window-close', () => {
```

```

        if (mainWindow) mainWindow.close();
    });
}

// App event handlers
app.whenReady().then(() => {
    // Create splash screen
    createSplashWindow();

    // Create main window after a short delay (simulate loading)
    setTimeout(() => {
        createMainWindow();
        createMenu();
        setupIpcHandlers();
    }, 1500);

    app.on('activate', () => {
        // On macOS, re-create window when dock icon is clicked
        if (BrowserWindow.getAllWindows().length === 0) {
            createMainWindow();
        }
    });
});

app.on('window-all-closed', () => {
    // On macOS, keep app running even when all windows are closed
    if (process.platform !== 'darwin') {
        app.quit();
    }
});

// Security: Prevent new window creation
app.on('web-contents-created', (event, contents) => {
    contents.on('new-window', (event, navigationUrl) => {
        event.preventDefault();
        shell.openExternal(navigationUrl);
    });
});

```

#### 11.13.4 Preload Script (preload.js)

The preload script safely exposes Node.js APIs to the renderer process:

```
const { contextBridge, ipcRenderer } = require('electron');

// Expose protected methods that allow the renderer process
// to use ipcRenderer without exposing the entire object
contextBridge.exposeInMainWorld('electronAPI', {
  // File operations
  readFile: (filePath) => ipcRenderer.invoke('read-file', filePath),
  writeFile: (filePath, data) => ipcRenderer.invoke('write-file', filePath, data),

  // App info
  getAppVersion: () => ipcRenderer.invoke('get-app-version'),
  getUserDataPath: () => ipcRenderer.invoke('get-user-data-path'),

  // Window control
  minimizeWindow: () => ipcRenderer.send('window-minimize'),
  maximizeWindow: () => ipcRenderer.send('window-maximize'),
  closeWindow: () => ipcRenderer.send('window-close'),

  // Listen for messages from main process
  onLoadSettings: (callback) => {
    ipcRenderer.on('load-settings', (event, filePath) => callback(filePath));
  },
  onSaveSettings: (callback) => {
    ipcRenderer.on('save-settings', (event, filePath) => callback(filePath));
  },

  // Remove listeners
  removeAllListeners: (channel) => {
    ipcRenderer.removeAllListeners(channel);
  }
});
```

#### 11.13.5 Advanced Window Configuration

## Window Options Deep Dive

```
const mainWindow = new BrowserWindow({  
  // Size and position  
  width: 1280,  
  height: 720,  
  minWidth: 800,  
  minHeight: 600,  
  maxWidth: 3840,  
  maxHeight: 2160,  
  x: undefined, // Center if undefined  
  y: undefined,  
  center: true, // Center on screen  
  
  // Appearance  
  frame: true, // Show window frame  
  titleBarStyle: 'default', // 'default', 'hidden', 'hiddenInset', 'customButtonsOnHover'  
  transparent: false, // Transparent window (performance impact)  
  backgroundColor: '#000000', // Background color before content loads  
  opacity: 1.0, // Window opacity (0.0 to 1.0)  
  vibrancy: 'ultra-dark', // macOS only: 'appearance-based', 'light', 'dark', etc.  
  visualEffectState: 'active', // macOS only: 'active', 'inactive', 'followsWindowActiveState'  
  
  // Behavior  
  show: false, // Don't show until ready  
  alwaysOnTop: false, // Keep window on top  
  fullscreen: false, // Start in fullscreen  
  fullscreensable: true, // Allow fullscreen  
  simpleFullscreen: false, // macOS simple fullscreen  
  skipTaskbar: false, // Don't show in taskbar  
  kiosk: false, // Kiosk mode (fullscreen, no exit)  
  closable: true, // Allow closing  
  minimizable: true, // Allow minimizing  
  maximizable: true, // Allow maximizing  
  resizable: true, // Allow resizing  
  movable: true, // Allow moving  
  focusable: true, // Can receive focus
```

```

// Window state
autoHideMenuBar: false, // Auto-hide menu bar
useContentSize: false, // Use content size instead of window size
title: 'My Cables App', // Window title

// Icon
icon: getIconPath(), // Window icon

// Web preferences
webPreferences: {
  nodeIntegration: false,
  contextIsolation: true,
  preload: path.join(__dirname, 'preload.js'),
  webSecurity: true,
  allowRunningInsecureContent: false,
  experimentalFeatures: false,
  enableBlinkFeatures: '',
  disableBlinkFeatures: '',
  sandbox: false, // Enable sandbox for extra security
  enableRemoteModule: false,
  backgroundThrottling: true, // Throttle when backgrounded
  offscreen: false, // Use offscreen rendering
  webviewTag: false // Disable webview tag
}
});

```

## Window State Persistence

Save and restore window position and size:

```

const Store = require('electron-store');

const store = new Store({
  name: 'window-state',
  defaults: {
    width: 1280,
    height: 720,
    x: undefined,
  }
});

```

```
        y: undefined,
        isMaximized: false
    }
});

function createMainWindow() {
    const windowState = store.get('windowState', {});

    const mainWindow = new BrowserWindow({
        width: windowState.width || 1280,
        height: windowState.height || 720,
        x: windowState.x,
        y: windowState.y,
        // ... other options
    });

    // Restore maximized state
    if (windowState.isMaximized) {
        mainWindow.maximize();
    }

    // Save window state on move/resize
    const saveWindowState = () => {
        const bounds = mainWindow.getBounds();
        store.set('windowState', {
            width: bounds.width,
            height: bounds.height,
            x: bounds.x,
            y: bounds.y,
            isMaximized: mainWindow.isMaximized()
        });
    };

    mainWindow.on('moved', saveWindowState);
    mainWindow.on('resized', saveWindowState);
    mainWindow.on('maximize', () => {
        store.set('windowState.isMaximized', true);
    });
}
```

```
 mainWindow.on('unmaximize', () => {
    store.set('windowState.isMaximized', false);
});

return mainWindow;
}
```

Install electron-store:

```
npm install electron-store
```

### 11.13.6 Inter-Window Communication

Electron supports multiple windows with various communication patterns:

#### Method 1: IPC (Inter-Process Communication)

##### Main Process -> Renderer Process:

```
// In main.js
mainWindow.webContents.send('message-from-main', {
  type: 'update',
  data: { value: 42 }
});

// In renderer (index.html or your cables patch)
window.electronAPI.onMessage((data) => {
  console.log('Received:', data);
});
```

##### Renderer Process -> Main Process:

```
// In preload.js
contextBridge.exposeInMainWorld('electronAPI', {
  sendToMain: (channel, data) => {
    ipcRenderer.send(channel, data);
  },
  onMessage: (callback) => {
    ipcRenderer.on('message-from-main', (event, data) => callback(data));
  }
});
```

```

    }
});

// In renderer
window.electronAPI.sendToMain('message-from-renderer', {
  action: 'save',
  data: { settings: {...} }
});

```

## Method 2: Multiple Windows Communication

```

// In main.js
let windows = [];

function createWindow(id) {
  const window = new BrowserWindow({
    // ... window options
    webPreferences: {
      // ... web preferences
    }
  });

  window.id = id;
  windows.push(window);

  window.on('closed', () => {
    windows = windows.filter(w => w.id !== id);
  });
}

return window;
}

// Broadcast to all windows
function broadcastToAllWindows(channel, data) {
  windows.forEach(window => {
    if (window && !window.isDestroyed()) {
      window.webContents.send(channel, data);
    }
  });
}

```

```

    });

}

// Send to specific window

function sendToWindow(windowId, channel, data) {
  const window = windows.find(w => w.id === windowId);
  if (window && !window.isDestroyed()) {
    window.webContents.send(channel, data);
  }
}

// Example: Sync settings across windows

ipcMain.on('update-settings', (event, settings) => {
  // Save settings
  store.set('settings', settings);

  // Broadcast to all windows
  broadcastToAllWindows('settings-updated', settings);
});

```

### Method 3: Shared Data via Main Process

```

// In main.js

let sharedData = {
  settings: {},
  state: {}
};

// Get shared data
ipcMain.handle('get-shared-data', (event, key) => {
  return sharedData[key];
});

// Set shared data
ipcMain.handle('set-shared-data', (event, key, value) => {
  sharedData[key] = value;
  // Notify all windows
  broadcastToAllWindows('shared-data-changed', { key, value });
});

```

```
    return true;  
});
```

#### Method 4: Window-to-Window via Main Process

```
// Window A sends message to Window B  
ipcMain.on('send-to-window', (event, targetWindowId, channel, data) => {  
  sendToWindow(targetWindowId, channel, data);  
});  
  
// In preload.js  
contextBridge.exposeInMainWorld('electronAPI', {  
  sendToWindow: (targetWindowId, channel, data) => {  
    ipcRenderer.send('send-to-window', targetWindowId, channel, data);  
  },  
  onWindowMessage: (callback) => {  
    ipcRenderer.on('window-message', (event, data) => callback(data));  
  }  
});
```

#### 11.13.7 Splash Screen Implementation

A professional splash screen improves perceived performance:

##### splash.html:

```
<!DOCTYPE html>  
<html>  
<head>  
  <meta charset="UTF-8">  
  <style>  
    * {  
      margin: 0;  
      padding: 0;  
      box-sizing: border-box;  
    }  
  
    body {
```

```
width: 400px;
height: 300px;
background: linear-gradient(135deg, #667eea 0%, #764ba2 100%);
display: flex;
flex-direction: column;
justify-content: center;
align-items: center;
font-family: -apple-system, BlinkMacSystemFont, 'Segoe UI', Roboto, sans-serif;
color: white;
overflow: hidden;
}

.logo {
width: 80px;
height: 80px;
margin-bottom: 20px;
animation: pulse 2s ease-in-out infinite;
}

@keyframes pulse {
0%, 100% { transform: scale(1); opacity: 1; }
50% { transform: scale(1.1); opacity: 0.8; }
}

.app-name {
font-size: 24px;
font-weight: 600;
margin-bottom: 10px;
}

.version {
font-size: 12px;
opacity: 0.8;
margin-bottom: 30px;
}

.loader {
width: 200px;
```

```

height: 4px;
background: rgba(255, 255, 255, 0.2);
border-radius: 2px;
overflow: hidden;
position: relative;
}

.loader-bar {
height: 100%;
background: white;
width: 0%;
animation: loading 2s ease-in-out infinite;
border-radius: 2px;
}

@keyframes loading {
0% { width: 0%; }
50% { width: 70%; }
100% { width: 100%; }
}

.status {
margin-top: 20px;
font-size: 12px;
opacity: 0.7;
}

</style>
</head>
<body>
<div class="logo">
<!-- Your logo SVG or image --&gt;
&lt;svg viewBox="0 0 100 100" fill="white"&gt;
&lt;circle cx="50" cy="50" r="40" stroke="white" stroke-width="2" fill="none"/&gt;
&lt;path d="M30 50 L45 65 L70 35" stroke="white" stroke-width="3" fill="none"/&gt;
&lt;/svg&gt;
&lt;/div&gt;
&lt;div class="app-name"&gt;My Cables App&lt;/div&gt;
&lt;div class="version"&gt;Version 1.0.0&lt;/div&gt;
</pre>

```

```

<div class="loader">
  <div class="loader-bar"></div>
</div>
<div class="status" id="status">Loading...</div>

<script>
  // Update status from main process
  const { ipcRenderer } = require('electron');

  ipcRenderer.on('splash-status', (event, message) => {
    document.getElementById('status').textContent = message;
  });

  ipcRenderer.on('splash-progress', (event, percent) => {
    document.querySelector('.loader-bar').style.width = percent + '%';
  });
</script>
</body>
</html>

```

### **Enhanced main.js with splash screen:**

```

function createSplashWindow() {
  splashWindow = new BrowserWindow({
    width: 400,
    height: 300,
    frame: false,
    transparent: true,
    alwaysOnTop: true,
    resizable: false,
    webPreferences: {
      nodeIntegration: true, // Needed for splash screen
      contextIsolation: false
    }
  });

  splashWindow.loadFile('splash.html');
  splashWindow.center();
}

```

```

// Update splash screen status
const updateSplashStatus = (message) => {
  if (splashWindow && !splashWindow.isDestroyed()) {
    splashWindow.webContents.send('splash-status', message);
  }
};

const updateSplashProgress = (percent) => {
  if (splashWindow && !splashWindow.isDestroyed()) {
    splashWindow.webContents.send('splash-progress', percent);
  }
};

// Simulate loading progress
updateSplashStatus('Initializing...');

updateSplashProgress(10);

setTimeout(() => {
  updateSplashStatus('Loading assets...');

  updateSplashProgress(40);
}, 300);

setTimeout(() => {
  updateSplashStatus('Preparing renderer...');

  updateSplashProgress(70);
}, 800);

setTimeout(() => {
  updateSplashStatus('Almost ready...');

  updateSplashProgress(90);
}, 1200);

return { splashWindow, updateSplashStatus, updateSplashProgress };
}

// In app.whenReady()
app.whenReady().then(() => {

```

```

const { splashWindow, updateSplashStatus } = createSplashWindow();

updateSplashStatus('Creating main window...');

setTimeout(() => {
  createMainWindow();
  createMenu();
  setupIpcHandlers();

  // Close splash when main window is ready
  mainWindow.once('ready-to-show', () => {
    setTimeout(() => {
      if (splash && !splash.isDestroyed()) {
        splash.close();
      }
      mainWindow.show();
    }, 500); // Small delay for smooth transition
  });
}, 1500);
});

```

### 11.13.8 JSON File Operations

Saving and loading JSON data is essential for app settings, user preferences, and state persistence:

#### Method 1: Using IPC Handlers (Recommended)

In `main.js`:

```

const fs = require('fs').promises;
const path = require('path');

// Get user data directory
const getUserDataPath = () => {
  return app.getPath('userData');
};

// Ensure directory exists

```

```

async function ensureDirectory(dirPath) {
  try {
    await fs.mkdir(dirPath, { recursive: true });
  } catch (error) {
    console.error('Error creating directory:', error);
  }
}

// IPC Handlers for JSON operations
ipcMain.handle('save-json', async (event, filename, data) => {
  try {
    const userDataPath = getUserDataPath();
    const filePath = path.join(userDataPath, filename);

    await ensureDirectory(path.dirname(filePath));
    await fs.writeFile(filePath, JSON.stringify(data, null, 2), 'utf-8');

    return { success: true, path: filePath };
  } catch (error) {
    console.error('Error saving JSON:', error);
    return { success: false, error: error.message };
  }
});

ipcMain.handle('load-json', async (event, filename) => {
  try {
    const userDataPath = getUserDataPath();
    const filePath = path.join(userDataPath, filename);

    const data = await fs.readFile(filePath, 'utf-8');
    return { success: true, data: JSON.parse(data) };
  } catch (error) {
    if (error.code === 'ENOENT') {
      // File doesn't exist, return default
      return { success: true, data: null };
    }
    console.error('Error loading JSON:', error);
    return { success: false, error: error.message };
  }
});

```

```

    }
});

ipcMain.handle('delete-json', async (event, filename) => {
  try {
    const userDataPath = getUserDataPath();
    const filePath = path.join(userDataPath, filename);

    await fs.unlink(filePath);
    return { success: true };
  } catch (error) {
    if (error.code === 'ENOENT') {
      return { success: true }; // Already deleted
    }
    console.error('Error deleting JSON:', error);
    return { success: false, error: error.message };
  }
});

ipcMain.handle('list-json-files', async (event, directory = '') => {
  try {
    const userDataPath = getUserDataPath();
    const dirPath = path.join(userDataPath, directory);

    const files = await fs.readdir(dirPath);
    const jsonFiles = files.filter(file => file.endsWith('.json'));

    return { success: true, files: jsonFiles };
  } catch (error) {
    console.error('Error listing JSON files:', error);
    return { success: false, error: error.message };
  }
});

```

### In preload.js:

```

contextBridge.exposeInMainWorld('electronAPI', {
  // JSON file operations
}

```

```

saveJSON: async (filename, data) => {
  return await ipcRenderer.invoke('save-json', filename, data);
},

loadJSON: async (filename) => {
  return await ipcRenderer.invoke('load-json', filename);
},

deleteJSON: async (filename) => {
  return await ipcRenderer.invoke('delete-json', filename);
},

listJSONFiles: async (directory = '') => {
  return await ipcRenderer.invoke('list-json-files', directory);
}
);

```

**In your renderer (cables patch or HTML):**

```

// Save settings
async function saveSettings(settings) {
  const result = await window.electronAPI.saveJSON('settings.json', settings);
  if (result.success) {
    console.log('Settings saved to:', result.path);
  } else {
    console.error('Failed to save settings:', result.error);
  }
}

// Load settings
async function loadSettings() {
  const result = await window.electronAPI.loadJSON('settings.json');
  if (result.success) {
    if (result.data) {
      console.log('Settings loaded:', result.data);
      return result.data;
    } else {
      // Return default settings
    }
  }
}

```

```

        return getDefaultSettings();
    }
} else {
    console.error('Failed to load settings:', result.error);
    return getDefaultSettings();
}
}

// Example usage with cables.gl patch
async function initializeApp() {
    // Load saved settings
    const settings = await loadSettings();

    // Apply settings to cables patch
    if (window.CABLES && window.CABLES.patch) {
        Object.keys(settings).forEach(key => {
            window.CABLES.patch.setVariable(key, settings[key]);
        });
    }

    // Listen for settings changes and auto-save
    if (window.CABLES && window.CABLES.patch) {
        window.CABLES.patch.on('variableChanged', async (name, value) => {
            const currentSettings = await loadSettings();
            currentSettings[name] = value;
            await saveSettings(currentSettings);
        });
    }
}

// Save cables patch state
async function savePatchState() {
    if (!window.CABLES || !window.CABLES.patch) return;

    const state = {
        timestamp: new Date().toISOString(),
        variables: {},
        camera: {

```

```

        position: window.CABLES.patch.cgl?.camera?.position || null,
        rotation: window.CABLES.patch.cgl?.camera?.rotation || null
    }
};

// Save all variables
// (You'll need to track variable names or get them from your patch)
const variableNames = ['color', 'speed', 'intensity']; // Your variable names
variableNames.forEach(name => {
    state.variables[name] = window.CABLES.patch.getVariable(name);
});

await window.electronAPI.saveJSON('patch-state.json', state);
}

// Load patch state
async function loadPatchState() {
    const result = await window.electronAPI.loadJSON('patch-state.json');
    if (result.success && result.data) {
        const state = result.data;

        // Restore variables
        Object.keys(state.variables).forEach(name => {
            window.CABLES.patch.setVariable(name, state.variables[name]);
        });

        // Restore camera if available
        if (state.camera && window.CABLES.patch.cgl?.camera) {
            // Camera restoration depends on your cables setup
        }
    }
}

```

## Method 2: Using electron-store (Simpler)

```
npm install electron-store
```

```
// In main.js
const Store = require('electron-store');

const store = new Store({
  name: 'app-settings',
  defaults: {
    theme: 'dark',
    windowState: {
      width: 1280,
      height: 720
    },
    cablesSettings: {
      color: [1, 0, 0, 1],
      speed: 1.0
    }
  }
});

// Expose store to renderer
ipcMain.handle('store-get', (event, key) => {
  return store.get(key);
});

ipcMain.handle('store-set', (event, key, value) => {
  store.set(key, value);
  return true;
});

ipcMain.handle('store-delete', (event, key) => {
  store.delete(key);
  return true;
});

ipcMain.handle('store-clear', () => {
  store.clear();
  return true;
});
```

```
ipcMain.handle('store-all', () => {
  return store.store;
});
```

```
// In preload.js
contextBridge.exposeInMainWorld('electronAPI', {
  store: {
    get: (key) => ipcRenderer.invoke('store-get', key),
    set: (key, value) => ipcRenderer.invoke('store-set', key, value),
    delete: (key) => ipcRenderer.invoke('store-delete', key),
    clear: () => ipcRenderer.invoke('store-clear'),
    all: () => ipcRenderer.invoke('store-all')
  }
});
```

```
// In renderer
// Get setting
const theme = await window.electronAPI.store.get('theme');

// Set setting
await window.electronAPI.store.set('cablesSettings.color', [0, 1, 0, 1]);

// Get all settings
const allSettings = await window.electronAPI.store.all();
```

### 11.13.9 Code Signing for Distribution

Code signing is essential for smooth app distribution on macOS and Windows. Unsigned apps trigger security warnings and may be blocked.

#### macOS Code Signing

**Requirements:** - Apple Developer Account (\$99/year) - Valid code signing certificate - Notarization (required for macOS 10.15+)

**package.json configuration:**

```
{
  "build": {
    "appId": "com.yourcompany.cablesapp",
    "mac": {
      "icon": "assets/icon.icns",
      "category": "public.app-category.graphics-design",
      "target": [
        {
          "target": "dmg",
          "arch": ["x64", "arm64"]
        },
        {
          "target": "zip",
          "arch": ["x64", "arm64"]
        }
      ],
      "hardenedRuntime": true,
      "gatekeeperAssess": false,
      "entitlements": "build/mac/entitlements.mac.plist",
      "entitlementsInherit": "build/mac/entitlements.mac.plist"
    },
    "afterSign": "scripts/notarize.js",
    "notarize": {
      "teamId": "YOUR_TEAM_ID"
    }
  }
}
```

### **entitlements.mac.plist:**

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN" "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
  <key>com.apple.security.cs.allow-jit</key>
  <true/>
  <key>com.apple.security.cs.allow-unsigned-executable-memory</key>
```

```
<true/>
<key>com.apple.security.cs.allow-dyld-environment-variables</key>
<true/>
<key>com.apple.security.cs.disable-library-validation</key>
<true/>
</dict>
</plist>
```

### **scripts/notarize.js:**

```
const { notarize } = require('@electron/notarize');

exports.default = async function notarizing(context) {
  const { electronPlatformName, appOutDir } = context;

  if (electronPlatformName !== 'darwin') {
    return;
  }

  const appName = context.packager.appInfo.productFilename;

  return await notarize({
    appBundleId: 'com.yourcompany.cablesapp',
    appPath: `${appOutDir}/${appName}.app`,
    appleId: process.env.APPLE_ID,
    appleIdPassword: process.env.APPLE_ID_PASSWORD,
    teamId: process.env.APPLE_TEAM_ID
  });
};
```

### **Environment variables (.env or export):**

```
export APPLE_ID="your@email.com"
export APPLE_ID_PASSWORD="app-specific-password"
export APPLE_TEAM_ID="YOUR_TEAM_ID"
```

### **Build command:**

```
npm run build:mac
```

## Windows Code Signing

**Requirements:** - Code signing certificate (purchased from certificate authority) - Or use self-signed certificate for testing (not recommended for distribution)

**package.json configuration:**

```
{
  "build": {
    "win": {
      "icon": "assets/icon.ico",
      "target": [
        {
          "target": "nsis",
          "arch": ["x64", "ia32"]
        },
        {
          "target": "portable",
          "arch": ["x64"]
        }
      ],
      "signingHashAlgorithms": ["sha256"],
      "sign": "build/win/sign.js",
      "certificateFile": "path/to/certificate.pfx",
      "certificatePassword": "${env.CERTIFICATE_PASSWORD}"
    }
  }
}
```

**build/win/sign.js:**

```
const path = require('path');

exports.default = async function(configuration) {
  const { path: filePath } = configuration;
```

```

// Only sign on Windows
if (process.platform !== 'win32') {
  return;
}

// Use electron-builder's built-in signing
// Or use signtool directly
const { execSync } = require('child_process');

const certPath = process.env.CERTIFICATE_PATH;
const certPassword = process.env.CERTIFICATE_PASSWORD;

if (!certPath || !certPassword) {
  console.warn('Certificate not configured, skipping signing');
  return;
}

try {
  execSync(
    `signtool sign /f "${certPath}" /p "${certPassword}" /t http://timestamp.digicert.com /d "My Cables"
      { stdio: 'inherit' }
    );
} catch (error) {
  console.error('Signing failed:', error);
  throw error;
}
};

```

### **Alternative: Using electron-builder's built-in signing:**

```
{
  "build": {
    "win": {
      "certificateFile": "path/to/certificate.pfx",
      "certificatePassword": "${env.CERTIFICATE_PASSWORD}",
      "signingHashAlgorithms": ["sha256"],
      "signDlls": true
    }
  }
}
```

```
    }  
}
```

**Build command:**

```
npm run build:win
```

## App Registration and Metadata

**package.json - Complete build configuration:**

```
{  
  "name": "my-cables-app",  
  "version": "1.0.0",  
  "description": "My amazing Cables.gl application",  
  "author": {  
    "name": "Your Name",  
    "email": "your@email.com"  
  },  
  "license": "MIT",  
  "main": "main.js",  
  "build": {  
    "appId": "com.yourcompany.cablesapp",  
    "productName": "My Cables App",  
    "copyright": "Copyright © 2024 Your Company",  
    "directories": {  
      "output": "dist",  
      "buildResources": "build"  
    },  
    "files": [  
      "main.js",  
      "preload.js",  
      "renderer/**/*",  
      "!renderer/**/*.map"  
    ],  
    "extraResources": [  
      {  
        "from": "assets/",  
        "to": "assets/  
      }  
    ]  
  }  
}
```

```
        "to": "assets/",
        "filter": ["**/*"]
    },
],
"mac": {
    "icon": "assets/icon.icns",
    "category": "public.app-category.graphics-design",
    "minimumSystemVersion": "10.13",
    "darkModeSupport": true,
    "target": [
        {
            "target": "dmg",
            "arch": ["x64", "arm64"]
        }
    ],
    "hardenedRuntime": true,
    "entitlements": "build/mac/entitlements.mac.plist",
    "entitlementsInherit": "build/mac/entitlements.mac.plist"
},
"win": {
    "icon": "assets/icon.ico",
    "target": [
        {
            "target": "nsis",
            "arch": ["x64"]
        }
    ],
    "publisherName": "Your Company Name",
    "verifyUpdateCodeSignature": false
},
"linux": {
    "icon": "assets/icon.png",
    "target": [
        {
            "target": "AppImage",
            "arch": ["x64"]
        },
        {

```

```
        "target": "deb",
        "arch": ["x64"]
    },
],
"category": "Graphics"
},
"nsis": {
    "oneClick": false,
    "allowToChangeInstallationDirectory": true,
    "createDesktopShortcut": true,
    "createStartMenuShortcut": true,
    "shortcutName": "My Cables App"
},
"dmg": {
    "title": "${productName} ${version}",
    "icon": "assets/icon.icns",
    "background": "build/mac/dmg-background.png",
    "contents": [
        {
            "x": 410,
            "y": 150,
            "type": "link",
            "path": "/Applications"
        },
        {
            "x": 130,
            "y": 150,
            "type": "file"
        }
    ],
    "window": {
        "width": 540,
        "height": 380
    }
}
}
```

## 11.13.10 Building and Distributing

### Development Build

```
# Start in development mode  
npm start
```

### Production Build

```
# Build for current platform  
npm run build  
  
# Build for specific platforms  
npm run build:mac  
npm run build:win  
npm run build:linux  
  
# Build for all platforms (requires platform-specific tools)  
npm run build:all
```

### Distribution Checklist

**Before Building:** - [ ] Update version in package.json - [ ] Test app thoroughly - [ ] Optimize assets - [ ] Prepare code signing certificates - [ ] Set up environment variables - [ ] Test on target platforms

**After Building:** - [ ] Test installer on clean system - [ ] Verify code signing - [ ] Test auto-updater (if implemented) - [ ] Check file associations - [ ] Verify menu items work - [ ] Test file operations - [ ] Check window state persistence

## 11.13.11 Advanced Electron Features

### Auto-Updater

```
npm install electron-updater
```

```
// In main.js  
const { autoUpdater } = require('electron-updater');  
  
autoUpdater.checkForUpdatesAndNotify();
```

```

autoUpdater.on('update-available', () => {
  dialog.showMessageBox(mainWindow, {
    type: 'info',
    title: 'Update Available',
    message: 'A new version is available. It will be downloaded in the background.',
    buttons: ['OK']
  });
});

autoUpdater.on('update-downloaded', () => {
  dialog.showMessageBox(mainWindow, {
    type: 'info',
    title: 'Update Ready',
    message: 'Update downloaded. The application will restart to apply the update.',
    buttons: ['Restart Now', 'Later']
  }).then(result => {
    if (result.response === 0) {
      autoUpdater.quitAndInstall();
    }
  });
});

```

## System Tray

```

const { Tray, Menu } = require('electron');
const path = require('path');

let tray = null;

function createTray() {
  const iconPath = path.join(__dirname, 'assets', 'tray-icon.png');
  tray = new Tray(iconPath);

  const contextMenu = Menu.buildFromTemplate([
    {
      label: 'Show App',
      click: () => {
        mainWindow.show();
      }
    }
  ]);
}

tray.setToolTip('My Electron App');
tray.setContextMenu(contextMenu);

```

```

        mainWindow.show();
    }
},
{
    label: 'Quit',
    click: () => {
        app.quit();
    }
}
]);
}

tray.setToolTip('My Cables App');
tray.setContextMenu(contextMenu);

tray.on('click', () => {
    mainWindow.isVisible() ? mainWindow.hide() : mainWindow.show();
});
}

```

## Native Notifications

```

const { Notification } = require('electron');

function showNotification(title, body) {
    if (Notification.isSupported()) {
        new Notification({
            title: title,
            body: body,
            icon: getIconPath()
        }).show();
    }
}

```

## 11.13.12 Performance Optimization for Electron

1. **Disable Node Integration in Renderer** - Use contextBridge instead
2. **Enable Context Isolation** - Better security and performance
3. **Use Hardware Acceleration** - Enabled by default

4. **Optimize Asset Loading** - Lazy load when possible
5. **Throttle Background Processes** - Use backgroundThrottling: true
6. **Monitor Memory Usage** - Use DevTools memory profiler

### 11.13.13 Security Best Practices

1. **Never use nodeIntegration: true** - Use preload scripts instead
2. **Always use contextIsolation: true** - Isolates your code
3. **Validate all IPC messages** - Don't trust renderer input
4. **Use Content Security Policy** - Restrict resource loading
5. **Keep Electron updated** - Security patches are important
6. **Sanitize file paths** - Prevent directory traversal attacks

### 11.13.14 Troubleshooting Electron Issues

**App won't start:** - Check main.js for syntax errors - Verify all dependencies are installed - Check console for error messages

**Window is blank:** - Verify file paths are correct - Check DevTools for errors - Ensure renderer files are included in build

**Code signing fails:** - Verify certificate is valid - Check environment variables are set - Ensure certificate password is correct

**App is slow:** - Check for memory leaks - Optimize asset loading - Use performance profiling tools

## 11.14 Troubleshooting

### 11.14.1 Common Issues

**"Assets not loading"** - Check file paths are correct - Ensure CORS headers are set for cross-origin assets - Verify assets are included in export

**"Blank screen"** - Check browser console for errors - Verify all JavaScript files loaded - Test on a local server (not file://)

**"Poor performance"** - Reduce canvas resolution - Lower texture sizes - Simplify shaders - Check for memory leaks

**"Works locally but not on server"** - Check file paths (case-sensitive on Linux) - Verify all files uploaded - Check server MIME types

## 11.15 Featured Videos

<https://youtu.be/hVxrxXhH7vQ>

Title: Cables.gl Standalone (Offline) Build: Create Without Limits!

Author: Decode GL

Thumbnail: <https://i.ytimg.com/vi/hVxrxXhH7vQ/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

## 11.16 Exercises

1. Export a simple patch and host it on GitHub Pages
  2. Embed a cables patch as a website background
  3. Create a loading screen for your patch
  4. Set up communication between your patch and external JavaScript
  5. **Electron Exercise:** Package your cables.gl export as an Electron app with a custom splash screen
  6. **Electron Exercise:** Implement JSON save/load functionality to persist your patch settings
  7. **Electron Exercise:** Set up code signing for macOS or Windows (requires developer account/certificate)
  8. **Electron Exercise:** Create a multi-window Electron app with inter-window communication
  9. **Electron Exercise:** Implement window state persistence (save/restore window position and size)
  10. **Electron Exercise:** Add a system tray icon with context menu for your Electron app
- 
- 

## 11.17 Congratulations!

You've completed the Cables.gl book! You now have the knowledge to:

- Create stunning 2D and 3D graphics
- Apply textures and materials
- Write custom shaders
- Build custom operators
- Create audio-reactive visuals
- Animate with timeline and code
- Export and deploy your creations

Keep experimenting, join the community, and share your creations!

**Resources:** - [cables.gl](https://cables.gl) - Official website - [cables.gl/docs](https://cables.gl/docs) - Documentation - Discord - Community chat

# 12 Video Tutorials

This page is a **best-effort, heavily searched** index of cables.gl videos.

- **Source:** generated from multiple YouTube searches using yt-dlp (then de-duplicated and filtered).

## 12.1 Getting Started & Overviews

<https://youtu.be/iXKo7mU422M>

Title: Array from Numbers Operator tutorial - byte size

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/iXKo7mU422M/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/koLSrHFyIUY>

Title: Arrays in cables - tutorial 03

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/koLSrHFyIUY/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/FRFfvVgWFcs>

Title: Arrays in cables tutorial 01

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/FRFfvVgWFcs/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/F-CUdHq40Pc>

Title: Basic material op tutorial - Byte size

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/F-CUdHq40Pc/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/EPFNHYah9F4>

Title: cables gl introduction

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/EPFNHYah9F4/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/M0dVmJ6MYQE>

Title: Creating your own cables.gl operators - custom and user ops tutorial

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/M0dVmJ6MYQE/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/EzV5CRAMyTA>

Title: Depth texture op tutorial - Byte size

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/EzV5CRAMyTA/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/knGnukutZeM>

Title: Lights and Shadows Operators - getting started - Video Tutorial

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/knGnukutZeM/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/7xlElfbMWgw>

Title: MeshInstancer tutorial 01

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/7xlElfbMWgw/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/XvVBnPakE28>

Title: Midi Input Device - intro to MIDI in cables - Byte Size

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/XvVBnPakE28/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/Ds4fPcxyBvM>

Title: Noise Texture Operator for generating color palettes for various design techniques - Video Tutorial

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/Ds4fPcxyBvM/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/P6esDOFHm6w>

Title: Particle system in cables tutorial 01

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/P6esDOFHm6w/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/Nre7LH00Vw4>

Title: Particle system in cables tutorial 02

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/Nre7LH00Vw4/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/x2jKZgmFVq4>

Title: Post processing tutorial for beginners

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/x2jKZgmFVq4/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/z1Qf9dE67-w>

Title: Text Texture op tutorial - Byte size

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/z1Qf9dE67-w/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/mQN8VtV0ltQ>

Title: Texture2ColorArray op tutorial

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/mQN8VtV0ltQ/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/wzpKR7vbCXg>

Title: Timeline - Part 1: Overview

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/wzpKR7vbCXg/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/SaKWF6RnsyI>

Title: Transform Vertex Operator tutorial (GPU vs CPU based animation) - byte size

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/SaKWF6RnsyI/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/B9GyRzov5Bg>

Title: tutorial demo effect / render2textures world position target tricks

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/B9GyRzov5Bg/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/T0djoWQkBew>

Title: Cables.GL: Introduction

Author: Creative Tech Talks

Thumbnail: <https://i.ytimg.com/vi/T0djoWQkBew/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@webtvmaster>

<https://youtu.be/sbML3B3Vu4g>

Title: Cables.GL: Tutorial

Author: Creative Tech Talks

Thumbnail: <https://i.ytimg.com/vi/sbML3B3Vu4g/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@webtvmaster>

<https://youtu.be/kgXpXsLtv1M>

Title: Assets (6/13) - Intro to Cables.gl

Author: Decode\_GL

Thumbnail: <https://i.ytimg.com/vi/kgXpXsLtv1M/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/vzWrCGfU7uw>

Title: Control Flow (3/13) - Intro to Cables.gl

Author: Decode\_GL

Thumbnail: <https://i.ytimg.com/vi/vzWrCGfU7uw/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/2YFB4MuN8y8>

Title: Data Types (2/13) - Intro to Cables.gl

Author: Decode GL

Thumbnail: <https://i.ytimg.com/vi/2YFB4MuN8y8/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/Z4gReZ34SHU>

Title: Interactions (5/13) - Intro to Cables.gl

Author: Decode GL

Thumbnail: <https://i.ytimg.com/vi/Z4gReZ34SHU/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/VsS4gaJ7pMw>

Title: Introduction to Cables.gl (1/13)

Author: Decode GL

Thumbnail: <https://i.ytimg.com/vi/VsS4gaJ7pMw/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/RhbId-kUWig>

Title: Texture Effects (8/13) - Intro to Cables.gl

Author: Decode GL

Thumbnail: <https://i.ytimg.com/vi/RhbId-kUWig/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/qEno30S8CBc>

Title: Glitch Art Tutorial using Cables.gl

Author: Jaalibandar

Thumbnail: <https://i.ytimg.com/vi/qEno30S8CBc/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@jaalibandar>

<https://youtu.be/go03PhuenBI>

Title: First Steps in Cables.gl - Tutorial

Author: The Interactive & Immersive HQ

Thumbnail: <https://i.ytimg.com/vi/go03PhuenBI/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@TheInteractiveImmersiveHQ>

## 12.2 Core Concepts & Workflow

<https://youtu.be/lj6REnNZU0s>  
Title: converter ops  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/lj6REnNZU0s/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/M1A8S98U0uI>  
Title: how to reroute cables #gui #uxdesign #motiondesign  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/M1A8S98U0uI/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/ZCKrhswQiyc>  
Title: you can cut cables with the [Y] key #animation #motiondesign #design #web #3danimation  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/ZCKrhswQiyc/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/xawlfxKpxRQ>  
Title: you can replace cables that easy #animation #motiondesign #design #web  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/xawlfxKpxRQ/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/GQc6JF\\_jy6M](https://youtu.be/GQc6JF_jy6M)  
Title: Debug View in Cables.gl | Setting up multiple views in your patch  
Author: Jaalibandar  
Thumbnail: [https://i.ytimg.com/vi/GQc6JF\\_jy6M/mqdefault.jpg](https://i.ytimg.com/vi/GQc6JF_jy6M/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@jaalibandar>

<https://youtu.be/uzqplBUGMWg>  
Title: 01 Jam Sessions : Generative Fluid Graphic in Cables.gl

Author: FahmiMursyid

Thumbnail: <https://i.ytimg.com/vi/uzqplBUGMWg/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@fahmimursyid>

<https://youtu.be/wERboDg6zOI>

Title: Impactful Transitions under 10 minutes using cables.gl | Genuary 04: Intersections

Author: Jaalibandar

Thumbnail: <https://i.ytimg.com/vi/wERboDg6zOI/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@jaalibandar>

[https://youtu.be/\\_CltN9uQhoU](https://youtu.be/_CltN9uQhoU)

Title: Procedurally generated plants in Cables.gl #genuary

Author: Jaalibandar

Thumbnail: [https://i.ytimg.com/vi/\\_CltN9uQhoU/mqdefault.jpg](https://i.ytimg.com/vi/_CltN9uQhoU/mqdefault.jpg)

AuthorUrl: <https://www.youtube.com/@jaalibandar>

<https://youtu.be/5Jc3woVozNc>

Title: Cables.gl | Generative Poster 05

Author: Karthik Dondeti

Thumbnail: <https://i.ytimg.com/vi/5Jc3woVozNc/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@karthikdondeti1672>

<https://youtu.be/DsSPcNSLyAw>

Title: Cables.gl | Generative Poster 06

Author: Karthik Dondeti

Thumbnail: <https://i.ytimg.com/vi/DsSPcNSLyAw/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@karthikdondeti1672>

<https://youtu.be/gRV0DqpSd-4>

Title: Cables.gl | Generative Poster 09

Author: Karthik Dondeti

Thumbnail: <https://i.ytimg.com/vi/gRV0DqpSd-4/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@karthikdondeti1672>

<https://youtu.be/3tZQtsEiicw>

Title: February 2022 Release Chat - cables.gl updated - PBR, Geometry from Textures, Teams, EXR support

Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/3tZQtsEiicw/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/a56wk9Xm9dY>  
Title: Using Vertex Displacement with Normal maps in cables.gl  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/a56wk9Xm9dY/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/NjG85Qbb10w>  
Title: Vertex displacement op - byte size  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/NjG85Qbb10w/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/lOMplXy\\_JV0](https://youtu.be/lOMplXy_JV0)  
Title: Visualize any YouTube playlist in 3D with n8n.io & cables.gl (part 1)  
Author: Decode GL  
Thumbnail: [https://i.ytimg.com/vi/lOMplXy\\_JV0/mqdefault.jpg](https://i.ytimg.com/vi/lOMplXy_JV0/mqdefault.jpg)  
AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

<https://youtu.be/AZrWNl3MwHQ>  
Title: Scrolling Terrain with UFO in 10 minutes using cables.gl  
Author: Jaalibandar  
Thumbnail: <https://i.ytimg.com/vi/AZrWNl3MwHQ/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@jaalibandar>

<https://youtu.be/sbqE83ZHtU>  
Title: Scrolling Terrain with UFO in 10 minutes using cables.gl  
Author: Jaalibandar  
Thumbnail: <https://i.ytimg.com/vi/sbqE83ZHtU/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@jaalibandar>

<https://youtu.be/3KSS1nrv6t0>  
Title: cables.gl web demo - realtime visualizer soundcloud globe | Exyl - Ping! Moai

Author: stobelights  
Thumbnail: <https://i.ytimg.com/vi/3KSS1nrv6t0/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@stobelights>

## 12.3 3D / 3D Meshes

<https://youtu.be/iqIXSb-kAws>  
Title: Importing GLTF 3D Scenes with Camera positions and animating them in cables.gl  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/iqIXSb-kAws/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/I\\_eD5nml\\_5A](https://youtu.be/I_eD5nml_5A)  
Title: More GLTF operators - animated rig support, position data, separate animation timing - Byte Size  
Author: cables\_gl  
Thumbnail: [https://i.ytimg.com/vi/I\\_eD5nml\\_5A/mqdefault.jpg](https://i.ytimg.com/vi/I_eD5nml_5A/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/DW9U5tv1GHM>  
Title: Varying Mesh Instances with color, animation and textures - Video Tutorial  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/DW9U5tv1GHM/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/PrkdnENo8wQ>  
Title: Vertex Textures - Point Clouds and Mesh Instancing from Textures - Introduction  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/PrkdnENo8wQ/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

## 12.4 Textures / Post-Processing

<https://youtu.be/uwoj7R52yU8>  
Title: PBR Material & PBR Environment Light Op - Byte Size - Physically Based Rendering in Cables  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/uwoj7R52yU8/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/Yf84KQc9jzU>

Title: Copy Texture operator deep dive - basics and use cases

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/Yf84KQc9jzU/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/cc5Vlmvlq6A>

Title: Pixel displace op - byte size

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/cc5Vlmvlq6A/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/rtDA2S9SPQ4>

Title: Exploring Matcap Creator by bagoof - a new tool made with cables

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/rtDA2S9SPQ4/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

## 12.5 Shaders / Shadertoy / GLSL

<https://youtu.be/Zfhn8xSM0SE>

Title: Coding with cables - custom shader op

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/Zfhn8xSM0SE/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/j\\_ins4RW0c8](https://youtu.be/j_ins4RW0c8)

Title: Shadertoy to cables - part 01

Author: cables\_gl

Thumbnail: [https://i.ytimg.com/vi/j\\_ins4RW0c8/mqdefault.jpg](https://i.ytimg.com/vi/j_ins4RW0c8/mqdefault.jpg)

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/nil-HkZgNZ8>

Title: Programmation d'un shadertoy avec Cables.gl Partie 8.

Author: Meletou1

Thumbnail: <https://i.ytimg.com/vi/nil-HkZgNZ8/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@Meletou1>

## 12.6 Audio / Music / MIDI

<https://youtu.be/SFXvtm-vkvE>

Title: Introduction to Generative Music and Audio Reactive Systems with Cables.gl

Author: Jaalibandar

Thumbnail: <https://i.ytimg.com/vi/SFXvtm-vkvE/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@jaalibandar>

<https://youtu.be/h20ZH-xD8Ts>

Title: Microphone Input & Audio Reactivity in Cables.gl - Tutorial

Author: The Interactive & Immersive HQ

Thumbnail: <https://i.ytimg.com/vi/h20ZH-xD8Ts/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@TheInteractiveImmersiveHQ>

<https://youtu.be/uYk7-9dZ8Ys>

Title: MidiFighter cables.gl Vjing

Author: Alberto Barrios L. ([nahui-ocelotl.com](http://nahui-ocelotl.com))

Thumbnail: <https://i.ytimg.com/vi/uYk7-9dZ8Ys/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/KZbhVCIahv4>

Title: Páginas WEB Interactivas con cables.gl | 13 Audio

Author: Alberto Barrios L. ([nahui-ocelotl.com](http://nahui-ocelotl.com))

Thumbnail: <https://i.ytimg.com/vi/KZbhVCIahv4/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/3m-2F2T1f6w>

Title: Audio analyzer op - audio reactive

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/3m-2F2T1f6w/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/68iSILnuLnA>  
Title: BiQuadFilter op- audio reactive tut  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/68iSILnuLnA/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/eDlaFD\\_d5lc](https://youtu.be/eDlaFD_d5lc)  
Title: Connecting Midi controllers to Cables  
Author: cables\_gl  
Thumbnail: [https://i.ytimg.com/vi/eDlaFD\\_d5lc/mqdefault.jpg](https://i.ytimg.com/vi/eDlaFD_d5lc/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/wKQN2BZPtyU>  
Title: Exploring Spatial Audio in Cables.gl  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/wKQN2BZPtyU/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/3owzsIzvkdQ>  
Title: Let's make some noise! Building a drum machine with Cables.gl.  
Author: Kirell Benzi  
Thumbnail: <https://i.ytimg.com/vi/3owzsIzvkdQ/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@KirellB>

<https://youtu.be/KtREXHa9tS8>  
Title: Programmation Cables.gl Audio Analyzer Partie 7.  
Author: Meletou1  
Thumbnail: <https://i.ytimg.com/vi/KtREXHa9tS8/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@Meletou1>

<https://youtu.be/TyEIawM-ll0>  
Title: Syncing Cables.gl with Bitwig Studio  
Author: Stefan Sauer  
Thumbnail: <https://i.ytimg.com/vi/TyEIawM-ll0/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@StefanSauer>

<https://youtu.be/TlDHrXS06-A>  
Title: [animatic] Better! // bitwig studio, cables.gl  
Author: vozh-kc  
Thumbnail: <https://i.ytimg.com/vi/TlDHrXS06-A/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@vozh-kc>

<https://youtu.be/S-KyCySVucM>  
Title: [HD] Sidereal Collapse // cables.gl, Bitwig Studio  
Author: vozh-kc  
Thumbnail: <https://i.ytimg.com/vi/S-KyCySVucM/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@vozh-kc>

## 12.7 Physics

[https://youtu.be/hlmNf\\_42raY](https://youtu.be/hlmNf_42raY)  
Title: AmmoRaycast Operator - creating a simple 3D menu UI - Tutorial  
Author: cables\_gl  
Thumbnail: [https://i.ytimg.com/vi/hlmNf\\_42raY/mqdefault.jpg](https://i.ytimg.com/vi/hlmNf_42raY/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/TAhAqqY\\_EEs](https://youtu.be/TAhAqqY_EEs)  
Title: AmmoWorld and AmmoBody Operators - physics simulations in cables.gl - Video Tutorial  
Author: cables\_gl  
Thumbnail: [https://i.ytimg.com/vi/TAhAqqY\\_EEs/mqdefault.jpg](https://i.ytimg.com/vi/TAhAqqY_EEs/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@cablesgl>

## 12.8 Export / Deployment / Embedding

[https://youtu.be/DX0slSkR\\_Hg](https://youtu.be/DX0slSkR_Hg)  
Title: Páginas WEB Interactivas con cables.gl | 20 Exportación  
Author: Alberto Barrios L. ([nahui-oceotl.com](http://nahui-oceotl.com))  
Thumbnail: [https://i.ytimg.com/vi/DX0slSkR\\_Hg/mqdefault.jpg](https://i.ytimg.com/vi/DX0slSkR_Hg/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/J8yJtcd1Jeg>  
Title: CABLES Command Line export

Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/J8yJtcd1Jeg/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/YUAYs\\_NcwTA](https://youtu.be/YUAYs_NcwTA)  
Title: embed a cables patch into a html website  
Author: cables\_gl  
Thumbnail: [https://i.ytimg.com/vi/YUAYs\\_NcwTA/mqdefault.jpg](https://i.ytimg.com/vi/YUAYs_NcwTA/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/B4M9FddXk1I>  
Title: Exporting your Project - .zip Export - Byte Size  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/B4M9FddXk1I/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/L5BGMs7vKuI>  
Title: Exporting your Project - Netlify export - Byte Size  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/L5BGMs7vKuI/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/hVxrxXhH7vQ>  
Title: Cables.gl Standalone (Offline) Build: Create Without Limits!  
Author: Decode GL  
Thumbnail: <https://i.ytimg.com/vi/hVxrxXhH7vQ/mqdefault.jpg>  
AuthorUrl: [https://www.youtube.com/@Decode\\_gl](https://www.youtube.com/@Decode_gl)

## 12.9 Hardware / External Tools

<https://youtu.be/vebGfUp9vJ4>  
Title: Getting cables.gl to talk to hardware, using Chataigne!  
Author: Rob Duarte  
Thumbnail: <https://i.ytimg.com/vi/vebGfUp9vJ4/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@RobDuarte>

<https://youtu.be/4YsuGFAEvEE>  
Title: Phidget Encoder in cables.gl  
Author: wirmachenbunt  
Thumbnail: <https://i.ytimg.com/vi/4YsuGFAEvEE/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@wirmachenbunt>

## 12.10 Talks / Meetups / Release Notes

[https://youtu.be/FvC3Ec\\_38Jo](https://youtu.be/FvC3Ec_38Jo)  
Title: Inércia 2023 | Seminar: Cables.gl as a demo making tool by anticore feat. liquube  
Author: Associação Inércia  
Thumbnail: [https://i.ytimg.com/vi/FvC3Ec\\_38Jo/mqdefault.jpg](https://i.ytimg.com/vi/FvC3Ec_38Jo/mqdefault.jpg)  
AuthorUrl: [https://www.youtube.com/@inercia\\_pt](https://www.youtube.com/@inercia_pt)

<https://youtu.be/xLBLo601kXg>  
Title: cables.gl october meetup  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/xLBLo601kXg/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/xRbg1Az0k8k>  
Title: November Update - cables.gl monthly meetup  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/xRbg1Az0k8k/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/C2FjpdRWPxw>  
Title: Updated Physically Based Rendering Operators - discussion with the developer AMajesticSeaFlapFlap  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/C2FjpdRWPxw/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/v4rYqHuT-0E>  
Title: Seminar: Making demos with cables.gl (speaker: pandur)  
Author: psenough  
Thumbnail: <https://i.ytimg.com/vi/v4rYqHuT-0E/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@psenough>

## 12.11 Showcases / Demos / Visualizers

<https://youtu.be/oLPsJd0e4Gc>

Title: antonymph - vylet pony (avoset remix; cables.gl visualiser)

Author: avoset

Thumbnail: <https://i.ytimg.com/vi/oLPsJd0e4Gc/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@avoset>

<https://youtu.be/CfPJZMAXcTU>

Title: Lines / Live experience with Cables.gl

Author: BoatBoat\_Station

Thumbnail: <https://i.ytimg.com/vi/CfPJZMAXcTU/mqdefault.jpg>

AuthorUrl: [https://www.youtube.com/@Boatboat\\_station](https://www.youtube.com/@Boatboat_station)

[https://youtu.be/Zr\\_7wRBmRmA](https://youtu.be/Zr_7wRBmRmA)

Title: Building a VJ patch mixer with cables.gl

Author: cables\_gl

Thumbnail: [https://i.ytimg.com/vi/Zr\\_7wRBmRmA/mqdefault.jpg](https://i.ytimg.com/vi/Zr_7wRBmRmA/mqdefault.jpg)

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/84pXsmJghdM>

Title: demomaking with cables

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/84pXsmJghdM/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/M8Is131LSzE>

Title: hydra - demo by mfx

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/M8Is131LSzE/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/R9-D4SxBd90>

Title: Ninja de Gaia - Inércia 2023 - creating a demo with cables.gl

Author: cables\_gl

Thumbnail: <https://i.ytimg.com/vi/R9-D4SxBd90/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/auvD8oSxMew>

Title: cables.gl - Drifting Apart (FXHash Project)

Author: Creative Exploration /w Purz

Thumbnail: <https://i.ytimg.com/vi/auvD8oSxMew/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@PurzBeats>

[https://youtu.be/9vZzrXX\\_2jM](https://youtu.be/9vZzrXX_2jM)

Title: cables.gl - purzOS - Low Poly Lavalamp (FXHash Project)

Author: Creative Exploration /w Purz

Thumbnail: [https://i.ytimg.com/vi/9vZzrXX\\_2jM/mqdefault.jpg](https://i.ytimg.com/vi/9vZzrXX_2jM/mqdefault.jpg)

AuthorUrl: <https://www.youtube.com/@PurzBeats>

<https://youtu.be/a0lJ8DF-v8o>

Title: cables.gl - purzOS - Ring Worlds (Screensaver)

Author: Creative Exploration /w Purz

Thumbnail: <https://i.ytimg.com/vi/a0lJ8DF-v8o/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@PurzBeats>

<https://youtu.be/E03UdeBQ9m0>

Title: EroLogo - Visual Demo Length 12:37 made with Cables.gl

Author: faktisProductions

Thumbnail: <https://i.ytimg.com/vi/E03UdeBQ9m0/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@faktisProductions>

<https://youtu.be/xba3e91Fum4>

Title: Design Designs Design - "Smorp" (A Cables.gl demo for Evoke 2022)

Author: Jan-Jozef Tuigstra

Thumbnail: <https://i.ytimg.com/vi/xba3e91Fum4/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@jan-jozeftuigstra2218>

## 12.12 Unsorted (Still cables.gl-related)

<https://youtu.be/1FqBKJ1RXdY>

Title: Entornos virtuales WEB con programación visual en cables.gl Parte 1

Author: Alberto Barrios L. (nahui-ocelotl.com)

Thumbnail: <https://i.ytimg.com/vi/1FqBKJ1RXdY/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@4183RtdF>

[https://youtu.be/oBoH\\_7uHv-E](https://youtu.be/oBoH_7uHv-E)

Title: Páginas WEB Interactivas con cables.gl | 02 Enlace

Author: Alberto Barrios L. (nahui-ocelotl.com)

Thumbnail: [https://i.ytimg.com/vi/oBoH\\_7uHv-E/mqdefault.jpg](https://i.ytimg.com/vi/oBoH_7uHv-E/mqdefault.jpg)

AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/-9QrZSoAPPQ>

Title: Páginas WEB Interactivas con cables.gl | 07 Botones

Author: Alberto Barrios L. (nahui-ocelotl.com)

Thumbnail: <https://i.ytimg.com/vi/-9QrZSoAPPQ/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/MTeI06T-kGw>

Title: Páginas WEB Interactivas con cables.gl | 08 Menu

Author: Alberto Barrios L. (nahui-ocelotl.com)

Thumbnail: <https://i.ytimg.com/vi/MTeI06T-kGw/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/iFDD4tm7-Uw>

Title: Páginas WEB Interactivas con cables.gl | 15 Valores Aleatorios

Author: Alberto Barrios L. (nahui-ocelotl.com)

Thumbnail: <https://i.ytimg.com/vi/iFDD4tm7-Uw/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/a2H8vk3Ko1M>

Title: Páginas WEB Interactivas con cables.gl | 18 FPS

Author: Alberto Barrios L. (nahui-ocelotl.com)

Thumbnail: <https://i.ytimg.com/vi/a2H8vk3Ko1M/mqdefault.jpg>

AuthorUrl: <https://www.youtube.com/@4183RtdF>

<https://youtu.be/cVpC9IS6kI0>  
Title: Substitution Pattern / Testing / CABLES.GL /  
Author: Antiguo Autómata Mexicano  
Thumbnail: <https://i.ytimg.com/vi/cVpC9IS6kI0/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@antiguoautomata>

<https://youtu.be/7BiDxNc7D7g>  
Title: Create awesome Visuals using OpenDAW and cables.gl!  
Author: BeatMax\_Prediction  
Thumbnail: <https://i.ytimg.com/vi/7BiDxNc7D7g/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@BeatMax2023>

<https://youtu.be/omIK1Y0tb70>  
Title: Copy cat with cables- live stream - Inconvergent  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/omIK1Y0tb70/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/tu49qg8BpBU>  
Title: copy cat(s) with cables live stream - Junkiyoshi  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/tu49qg8BpBU/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

[https://youtu.be/Gr3iVMUs\\_hA](https://youtu.be/Gr3iVMUs_hA)  
Title: Copycat with Cables - Tyler hobbs - Untitled  
Author: cables\_gl  
Thumbnail: [https://i.ytimg.com/vi/Gr3iVMUs\\_hA/mqdefault.jpg](https://i.ytimg.com/vi/Gr3iVMUs_hA/mqdefault.jpg)  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/hZQZh5UHSE>  
Title: did you know, you can add multiple ops one go  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/hZQZh5UHSE/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/jiOLZaMUH78>  
Title: Repeat op tut 01 - Byte size  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/jiOLZaMUH78/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/00Rvb749wrc>  
Title: Smooth Operator - Byte Size  
Author: cables\_gl  
Thumbnail: <https://i.ytimg.com/vi/00Rvb749wrc/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@cablesgl>

<https://youtu.be/8LfR8iLLbMA>  
Title: Infinite Looping Motion Graphic in 10 minutes using cables.gl  
Author: Jaalibandar  
Thumbnail: <https://i.ytimg.com/vi/8LfR8iLLbMA/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@jaalibandar>

<https://youtu.be/WGoM1AmFW7g>  
Title: Getting data from an API with cables.gl - data-driven gradient from geo-located weather - part 1  
Author: Kirell Benzi  
Thumbnail: <https://i.ytimg.com/vi/WGoM1AmFW7g/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@KirellB>

<https://youtu.be/G1HKysL8iVw>  
Title: Présentation du logiciel Cables.gl par les étudiants en UI/UX design  
Author: L'École de design Nantes Atlantique  
Thumbnail: <https://i.ytimg.com/vi/G1HKysL8iVw/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@lecolenantes>

<https://youtu.be/40p74uIzH5c>  
Title: Retour sur le programme Cables.gl  
Author: Meletou1  
Thumbnail: <https://i.ytimg.com/vi/40p74uIzH5c/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@Meletou1>

<https://youtu.be/tdbTTxDu7Qk>  
Title: Cables.gl  
Author: Nathan Sonzogni  
Thumbnail: <https://i.ytimg.com/vi/tdbTTxDu7Qk/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@nathansonzogni>

<https://youtu.be/n4UPiZhbcRU>  
Title: StableDiffusion and ControlNet in Cables.gl via the WebUI  
Author: Neight Allen  
Thumbnail: <https://i.ytimg.com/vi/n4UPiZhbcRU/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@CzechNeight>

<https://youtu.be/lImv9ZJshUE>  
Title: cables.gl and ollama API  
Author: Tobias Hartmann  
Thumbnail: <https://i.ytimg.com/vi/lImv9ZJshUE/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@tobiashartmann>

<https://youtu.be/vOVKpppw1ds>  
Title: Class 30: Learning how to mint a cables.gl patch on fx hash w/ Somaticbits  
Author: VERTICAL  
Thumbnail: <https://i.ytimg.com/vi/vOVKpppw1ds/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@verticalcrypto>

<https://youtu.be/4PsWzWHsiV4>  
Title: cables.gl ink spill  
Author: Video Art Duo  
Thumbnail: <https://i.ytimg.com/vi/4PsWzWHsiV4/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@videoartduo>

<https://youtu.be/9UR8upg0g54>  
Title: Pod005 - Flicker | Distortion | cables.gl  
Author: zuggamasta  
Thumbnail: <https://i.ytimg.com/vi/9UR8upg0g54/mqdefault.jpg>  
AuthorUrl: <https://www.youtube.com/@zuggamasta>

# 13 All Operators Reference

This chapter provides a comprehensive reference for all operators (ops) available in cables.gl.

**Note:** This reference is based on the cables.gl ops documentation. For the most up-to-date information, visit the official documentation.

## 13.1 How to Use This Reference

- **Op Name:** The full namespace and name of the operator
  - **Description:** What the op does
  - **> Input Ports:** Input ports with their types and descriptions
  - **< Output Ports:** Output ports with their types and descriptions
  - **Docs:** Link to the official op documentation page
- 

## 13.2 Ops.Anim

### 13.2.1 AnimNumber



**Full Name:** Ops.Anim.AnimNumber **Description:**

**> Input Ports:** - Visit *Ops.Anim.AnimNumber documentation* for input port details **< Output Ports:** - Visit *Ops.Anim.AnimNumber documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AnimNumber"  
**Docs:** <https://cables.gl/op/Ops.Anim.AnimNumber>

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### 13.2.2 Bang



**Full Name:** Ops.Anim.Bang **Description:** ... also helpful for animated scene transitions: [https://cables.gl/p/o4\\_6Bo](https://cables.gl/p/o4_6Bo)

➤ **Input Ports:** - Visit *Ops.Anim.Bang* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.Bang* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Bang" **Docs:** <https://cables.gl/op/Ops.Anim.Bang>

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### 13.2.3 BoolAnim



**Full Name:** Ops.Anim.BoolAnim **Description:** This op allows you to create simple animations with a definable animation time and easing mode. Try combining it with the ToggleBool op.

➤ **Input Ports:** - Visit *Ops.Anim.BoolAnim* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.BoolAnim* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BoolAnim" **Docs:** <https://cables.gl/op/Ops.Anim.BoolAnim>

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### 13.2.4 Crossfade



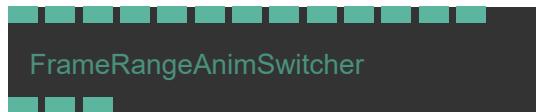
**Full Name:** Ops.Anim.Crossfade **Description:** This handy op allows you to crossfade between 2 numbers. You can set the min and max range.

➤ **Input Ports:** - Visit *Ops.Anim.Crossfade* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.Crossfade* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Crossfade" **Docs:** <https://cables.gl/op/Ops.Anim.Crossfade>

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### 13.2.5 FrameRangeAnimSwitcher



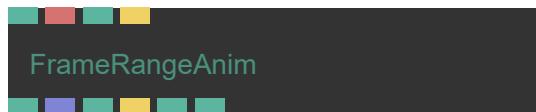
**Full Name:** Ops.Anim.FrameRangeAnimSwitcher **Description:** Full NameOps.Anim.FrameRangeAnimSwitcherVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSIndex (Number: integer)Duration (Number)easing index (Number: integer)Value 0 (Number)Value 1 (Number)Value 2 (Number)Value 3 (Number)Value 4 (Number)Value 5 (Number)Value 6 (Number)Value 7 (Number)Value 8 (Number)Value 9 (Number)OUTPUT PORTSTime 1 (Number)Time Fade (Number)Time 2 (Number)SaveCancel ChangelogPatches using FrameRangeAnimSwitcherExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Anim.FrameRangeAnimSwitcher documentation* for input port details < **Output Ports:** - Visit *Ops.Anim.FrameRangeAnimSwitcher documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FrameRangeAnimSwitcher" **Docs:** <https://cables.gl/op/Ops.Anim.FrameRangeAnimSwitcher>

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### 13.2.6 FrameRangeAnim\_v2



**Full Name:** Ops.Anim.FrameRangeAnim\_v2 **Description:** enter comma seperated frames or frame ranges

➤ **Input Ports:** - **frame range (ex. "0-10"):** Loop (Number: boolean)Rewind (Trigger) < **Output Ports:** - Visit *Ops.Anim.FrameRangeAnim\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FrameRangeAnim\_v2" **Docs:** [https://cables.gl/op/Ops.Anim.FrameRangeAnim\\_v2](https://cables.gl/op/Ops.Anim.FrameRangeAnim_v2)

---

### 13.2.7 InOutInAnim



**Full Name:** Ops.Anim.InOutInAnim **Description:** Full NameOps.Anim.InOutInAnimVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch In Out AnimClick to start the animation

► **Input Ports:** - Visit *Ops.Anim.InOutInAnim documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Anim.InOutInAnim documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InOutInAnim"

**Docs:** <https://cables.gl/op/Ops.Anim.InOutInAnim>

---

### 13.2.8 LFO\_v3



**Full Name:** Ops.Anim.LFO\_v3 **Description:** Use this op to generate different different oscillation patterns based upon a timer signal. Standard output is -1 to 1.

► **Input Ports:** - Visit *Ops.Anim.LFO\_v3 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Anim.LFO\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LFO\_v3" **Docs:**

[https://cables.gl/op/Ops.Anim.LFO\\_v3](https://cables.gl/op/Ops.Anim.LFO_v3)

---

### 13.2.9 RandomAnim\_v2



**Full Name:** Ops.Anim.RandomAnim\_v2 **Description:** Full NameOps.Anim.RandomAnim\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Random Animation ExampleRandom animation between a min and max value.

**> Input Ports:** - Visit *Ops.Anim.RandomAnim\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Anim.RandomAnim\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomAnim\_v2"

**Docs:** [https://cables.gl/op/Ops.Anim.RandomAnim\\_v2](https://cables.gl/op/Ops.Anim.RandomAnim_v2)

---

### 13.2.10 SimpleAnim



**Full Name:** Ops.Anim.SimpleAnim **Description:** Full NameOps.Anim.SimpleAnimVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch simpleanimon click a simple anim is triggered (using bounce easing)

**> Input Ports:** - Visit *Ops.Anim.SimpleAnim* documentation for input port details **< Output Ports:** - Visit *Ops.Anim.SimpleAnim* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SimpleAnim"

**Docs:** <https://cables.gl/op/Ops.Anim.SimpleAnim>

---

### 13.2.11 SineAnim



**Full Name:** Ops.Anim.SineAnim **Description:** Full NameOps.Anim.SineAnimVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch sineanimon click a sine anim is triggered (using bounce easing)

tion (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch graph exampleOpen In EditorINPUT PORTSExe (Trigger)Executes the op

➤ **Input Ports:** - Visit *Ops.Anim.SineAnim documentation for input port details* < **Output Ports:** - Visit *Ops.Anim.SineAnim documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SineAnim" **Docs:** <https://cables.gl/op/Ops.Anim.SineAnim>

---

### 13.2.12 Smooth



**Full Name:** Ops.Anim.Smooth **Description:** Use this op to smoothly interpolate between differences in values.

➤ **Input Ports:** - Visit *Ops.Anim.Smooth documentation for input port details* < **Output Ports:** - Visit *Ops.Anim.Smooth documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Smooth" **Docs:** <https://cables.gl/op/Ops.Anim.Smooth>

---

### 13.2.13 Snap



**Full Name:** Ops.Anim.Snap **Description:** Full NameOps.Anim.SnapVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch SnappingOpen In EditorINPUT PORTSDelta (Number)Snap at Values (Array)Snap Distance (Number)Snap Distance Release (Number)Slowdown (Number)slows down value increase while near a snappoint

> **Input Ports:** - Visit *Ops.Anim.Snap* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.Snap* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Snap" **Docs:** <https://cables.gl/op/Ops.Anim.Snap>

---

### 13.2.14 Spring



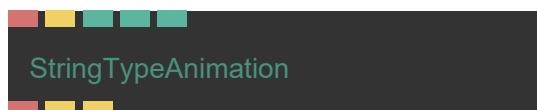
**Full Name:** Ops.Anim.Spring **Description:** Full NameOps.Anim.SpringVisibilityCore Op - visible for everyoneLicenseMITAuthorlorenzomfgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Spring ExampleOpen In EditorINPUT PORTSexe (Trigger)value (Number)damping (Number)stiffness (Number)OUTPUT PORTTrigger (Trigger)result (Number)SaveCancel Changelog- Patches using SpringExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Anim.Spring* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.Spring* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Spring" **Docs:** <https://cables.gl/op/Ops.Anim.Spring>

---

### 13.2.15 StringTypeAnimation\_v2



**Full Name:** Ops.Anim.StringTypeAnimation\_v2 **Description:** Full NameOps.Anim.StringTypeAnimation\_v2Visibility Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch StringTypeOpen In EditorINPUT PORTStext (String)The text/string which will typed out

> **Input Ports:** - Visit *Ops.Anim.StringTypeAnimation\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.StringTypeAnimation\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "StringTypeAnimation\_v2" **Docs:** [https://cables.gl/op/Ops.Anim.StringTypeAnimation\\_v2](https://cables.gl/op/Ops.Anim.StringTypeAnimation_v2)

---

### 13.2.16 TimeDelta



**Full Name:** `Ops.Anim.TimeDelta` **Description:** Op gives the delta time. The difference in time between each trigger coming in.

> **Input Ports:** - Visit *Ops.Anim.TimeDelta* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.TimeDelta* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TimeDelta" **Docs:** <https://cables.gl/op/Ops.Anim.TimeDelta>

---

### 13.2.17 Timer\_v2



**Full Name:** `Ops.Anim.Timer_v2` **Description:** Full NameOps.Anim.Timer\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Timer exampleOpen In EditorINPUT PORTSControlsSpeed (Number)Multiply time by this amount

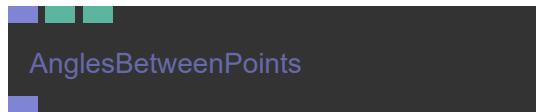
> **Input Ports:** - Visit *Ops.Anim.Timer\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Anim.Timer\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Timer\_v2" **Docs:** [https://cables.gl/op/Ops.Anim.Timer\\_v2](https://cables.gl/op/Ops.Anim.Timer_v2)

---

## 13.3 Ops.Array

### 13.3.1 AnglesBetweenPoints



**Full Name:** Ops.Array.AnglesBetweenPoints **Description:** This op will take an incoming array of point locations in 3D space (groups of X,Y,Z coordinates) and output an array of angles between the points.

**> Input Ports:** - Visit [Ops.Array.AnglesBetweenPoints documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.AnglesBetweenPoints documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AnglesBetweenPoints" **Docs:** <https://cables.gl/op/Ops.Array.AnglesBetweenPoints>

---

### 13.3.2 AnimArray\_v2



**Full Name:** Ops.Array.AnimArray\_v2 **Description:** Full NameOps.Array.AnimArray\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch animarray exampleOpen In EditorINPUT PORTSUpdate (Trigger)Next Array (Array)Duration (Number)easing index (Number: integer)OUTPUT PORTSNext (Trigger)Matrix (Array)SaveCancel ChangelogPatches using AnimArray\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Array.AnimArray\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.AnimArray\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AnimArray\_v2" **Docs:** [https://cables.gl/op/Ops.Array.AnimArray\\_v2](https://cables.gl/op/Ops.Array.AnimArray_v2)

---

### 13.3.3 Array1toX\_v2



**Full Name:** Ops.Array.Array1toX\_v2 **Description:** Full NameOps.Array.Array1toX\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch Array1toX ExampleOpen In EditorINPUT PORTSArray1x (Array)Format  
index (Number: integer) AB ABC ABCD A index (Number: integer) Input index 0-1 -1-1 0 1 B index  
(Number: integer) Input index 0-1 -1-1 0 1 C index (Number: integer) Input index 0-1 -1-1 0 1 D  
index (Number: integer) Input index 0-1 -1-1 0 1 OUTPUT PORTSArray3x (Array)Total points  
(Number)Array length (Number)SaveCancel ChangelogPatches using Array1toX\_v2Examples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.Array1toX\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.Array1toX\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Array1toX\_v2"*  
**Docs:** [https://cables.gl/op/Ops.Array.Array1toX\\_v2](https://cables.gl/op/Ops.Array.Array1toX_v2)

---

### 13.3.4 Array2To3



**Full Name:** Ops.Array.Array2To3 **Description:** [1,2,3,4] becomes [1,2,0,3,4,0]

**> Input Ports:** - Visit *Ops.Array.Array2To3 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.Array2To3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Array2To3"* **Docs:** <https://cables.gl/op/Ops.Array.Array2To3>

---

### 13.3.5 Array3



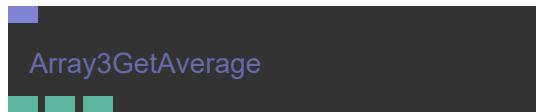
**Full Name:** Ops.Array.Array3 **Description:** result will look like this: [XYZXYZXYZXYZ.....]

**> Input Ports:** - Visit *Ops.Array.Array3 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.Array3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array3" **Docs:** <https://cables.gl/op/Ops.Array.Array3>

---

### 13.3.6 Array3GetAverage



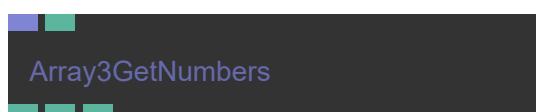
**Full Name:** Ops.Array.Array3GetAverage **Description:** Full NameOps.Array.Array3GetAverageVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Array3 ExampleOpen In EditorINPUT PORTSArray (Array)The xyz array to  
analyze

**> Input Ports:** - Visit *Ops.Array.Array3GetAverage documentation* for input port details **< Output Ports:**  
- Visit *Ops.Array.Array3GetAverage documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Ar-  
ray3GetAverage" **Docs:** <https://cables.gl/op/Ops.Array.Array3GetAverage>

---

### 13.3.7 Array3GetNumbers



**Full Name:** Ops.Array.Array3GetNumbers **Description:** If an array contains :

> **Input Ports:** - Visit *Ops.Array.Array3GetNumbers* documentation for input port details < **Output Ports:** - Visit *Ops.Array.Array3GetNumbers* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array3GetNumbers" **Docs:** <https://cables.gl/op/Ops.Array.Array3GetNumbers>

---

### 13.3.8 Array3InterpolateDistributed



**Full Name:** Ops.Array.Array3InterpolateDistributed **Description:** the arrays do not have to be the same length, smaller array will be distributed on the larger array in random order

> **Input Ports:** - Visit *Ops.Array.Array3InterpolateDistributed* documentation for input port details < **Output Ports:** - Visit *Ops.Array.Array3InterpolateDistributed* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array3InterpolateDistributed" **Docs:** <https://cables.gl/op/Ops.Array.Array3InterpolateDistributed>

---

### 13.3.9 Array3Iterator



**Full Name:** Ops.Array.Array3Iterator **Description:** Full NameOps.Array.Array3IteratorVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch Array Iterator - Byte sizeOpen In EditorYoutube Video TutorialINPUT  
PORTSExecute (Trigger)Starts the iteration

> **Input Ports:** - Visit *Ops.Array.Array3Iterator* documentation for input port details < **Output Ports:**  
- **Triggers for every iteration step (triplet in the array):** Index (Number)The index of the triplet -

**First value of the current triplet (e.g. x):** Value 2 (Number)  
**Second value of the current triplet (e.g. y):** Second value of the current triplet (e.g. y)  
**- Third value of the current triplet (e.g. z):** Check documentation

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Array3Iterator"

**Docs:** <https://cables.gl/op/Ops.Array.Array3Iterator>

---

### 13.3.10 Array3Multiply



**Full Name:** Ops.Array.Array3Multiply **Description:** Use this op to multiply individual components of an array

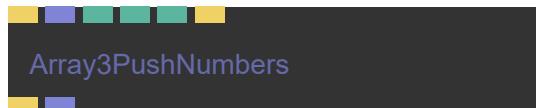
**> Input Ports:** - Visit Ops.Array.Array3Multiply documentation for input port details **< Output Ports:** - Visit Ops.Array.Array3Multiply documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Array3Multiply"

**Docs:** <https://cables.gl/op/Ops.Array.Array3Multiply>

---

### 13.3.11 Array3PushNumbers\_v2



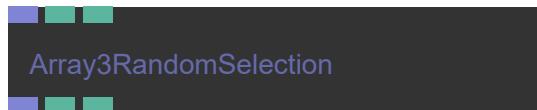
**Full Name:** Ops.Array.Array3PushNumbers\_v2 **Description:** Full NameOps.Array.Array3PushNumbers\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch splineLengthOpen In EditorINPUT PORTSExecute (Trigger)Array (Array)Value 1 (Number)Value 2 (Number)Value 3 (Number)Reset (Trigger)OUTPUT PORTSNext (Trigger)Result Array (Array)SaveCancel ChangelogPatches using Array3PushNumbers\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit Ops.Array.Array3PushNumbers\_v2 documentation for input port details **< Output Ports:** - Visit Ops.Array.Array3PushNumbers\_v2 documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Array3PushNumbers\_v2" **Docs:** [https://cables.gl/op/Ops.Array.Array3PushNumbers\\_v2](https://cables.gl/op/Ops.Array.Array3PushNumbers_v2)

---

### 13.3.12 Array3RandomSelection



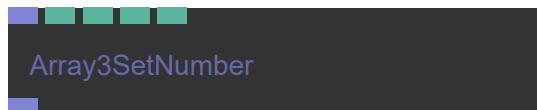
**Full Name:** Ops.Array.Array3RandomSelection **Description:** This op works with a xyz array.

**> Input Ports:** - Visit *Ops.Array.Array3RandomSelection* documentation for input port details **< Output Ports:** - Visit *Ops.Array.Array3RandomSelection* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Array3RandomSelection" **Docs:** <https://cables.gl/op/Ops.Array.Array3RandomSelection>

---

### 13.3.13 Array3SetNumber



**Full Name:** Ops.Array.Array3SetNumber **Description:** This will creates a new copy of an array.

**> Input Ports:** - Visit *Ops.Array.Array3SetNumber* documentation for input port details **< Output Ports:** - Visit *Ops.Array.Array3SetNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Array3SetNumber" **Docs:** <https://cables.gl/op/Ops.Array.Array3SetNumber>

---

### 13.3.14 Array3Sum



**Full Name:** Ops.Array.Array3Sum **Description:** Use this op to add values to individual components of an array

> **Input Ports:** - Visit [Ops.Array.Array3Sum documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.Array3Sum documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Array3Sum" **Docs:** <https://cables.gl/op/Ops.Array.Array3Sum>

---

### 13.3.15 Array3To2



**Full Name:** Ops.Array.Array3To2 **Description:** [xyzxyz] becomes [xyxyxy]

> **Input Ports:** - Visit [Ops.Array.Array3To2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.Array3To2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Array3To2" **Docs:** <https://cables.gl/op/Ops.Array.Array3To2>

---

### 13.3.16 Array3To4



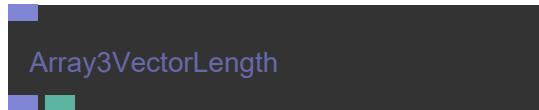
**Full Name:** Ops.Array.Array3To4 **Description:** Full NameOps.Array.Array3To4VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch Array3To4 - ExampleOpen In EditorINPUT PORTSArray3x (Array)OUTPUT PORTSArray4x (Array)Total points (Number)Array length (Number)SaveCancel ChangelogPatches using Array3To4Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Array.Array3To4 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.Array3To4 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Array3To4" **Docs:** <https://cables.gl/op/Ops.Array.Array3To4>

---

### 13.3.17 Array3VectorLength



**Full Name:** Ops.Array.Array3VectorLength **Description:** Array length must be divisible by 3.

**> Input Ports:** - Visit *Ops.Array.Array3VectorLength* documentation for input port details **< Output Ports:** - Visit *Ops.Array.Array3VectorLength* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Array3VectorLength" **Docs:** <https://cables.gl/op/Ops.Array.Array3VectorLength>

---

### 13.3.18 Array4



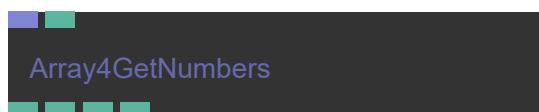
**Full Name:** Ops.Array.Array4 **Description:** result will look like this: [XYZWXYZWXYZWXYZW.....]

**> Input Ports:** - Visit *Ops.Array.Array4* documentation for input port details **< Output Ports:** - Visit *Ops.Array.Array4* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Array4" **Docs:** <https://cables.gl/op/Ops.Array.Array4>

---

### 13.3.19 Array4GetNumbers



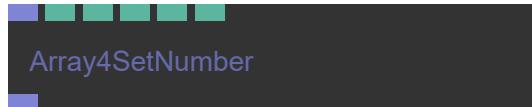
**Full Name:** Ops.Array.Array4GetNumbers **Description:** If an array contains :

> **Input Ports:** - Visit *Ops.Array.Array4GetNumbers* documentation for input port details < **Output Ports:** - Visit *Ops.Array.Array4GetNumbers* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array4GetNumbers" **Docs:** <https://cables.gl/op/Ops.Array.Array4GetNumbers>

---

### 13.3.20 Array4SetNumber



**Full Name:** Ops.Array.Array4SetNumber **Description:** This will creates a new copy of an array.

> **Input Ports:** - Visit *Ops.Array.Array4SetNumber* documentation for input port details < **Output Ports:** - Visit *Ops.Array.Array4SetNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array4SetNumber" **Docs:** <https://cables.gl/op/Ops.Array.Array4SetNumber>

---

### 13.3.21 Array4toArray3



**Full Name:** Ops.Array.Array4toArray3 **Description:** example: [rgbargbargba] becomes [rgbrgbgrgb]

> **Input Ports:** - Visit *Ops.Array.Array4toArray3* documentation for input port details < **Output Ports:** - Visit *Ops.Array.Array4toArray3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array4toArray3" **Docs:** <https://cables.gl/op/Ops.Array.Array4toArray3>

---

### 13.3.22 ArrayAbs



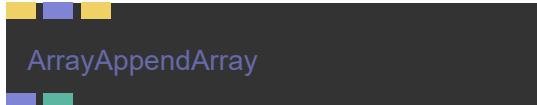
**Full Name:** Ops.Array.ArrayAbs **Description:** Full NameOps.Array.ArrayAbsVisibilityCore Op - visible for everyoneLicenseMITAuthor androgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayAbs example fileOpen In EditorINPUT PORTSIn (Array)The array to process

**> Input Ports:** - Visit *Ops.Array.ArrayAbs documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayAbs documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayAbs" **Docs:** <https://cables.gl/op/Ops.Array.ArrayAbs>

---

### 13.3.23 ArrayAppendArray



**Full Name:** Ops.Array.ArrayAppendArray **Description:** If you have an array with the values

**> Input Ports:** - Visit *Ops.Array.ArrayAppendArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayAppendArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayAppendArray" **Docs:** <https://cables.gl/op/Ops.Array.ArrayAppendArray>

---

### 13.3.24 ArrayBuffer



**Full Name:** Ops.Array.ArrayBuffer **Description:** first element that goes in will be removed first, when buffer size becomes greater than max length

> **Input Ports:** - Visit [Ops.Array.ArrayBuffer documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.ArrayBuffer documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayBuffer" **Docs:** <https://cables.gl/op/Ops.Array.ArrayBuffer>

---

### 13.3.25 ArrayBuffer3



**Full Name:** Ops.Array.ArrayBuffer3 **Description:** Full NameOps.Array.ArrayBuffer3VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch arraybufferOpen In EditorINPUT PORTSexec (Trigger)Trigger in

> **Input Ports:** - Visit [Ops.Array.ArrayBuffer3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.ArrayBuffer3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayBuffer3" **Docs:** <https://cables.gl/op/Ops.Array.ArrayBuffer3>

---

### 13.3.26 ArrayCeil



**Full Name:** Ops.Array.ArrayCeil **Description:** Use to convert floating point values to integers

> **Input Ports:** - Visit [Ops.Array.ArrayCeil documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.ArrayCeil documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayCeil" **Docs:** <https://cables.gl/op/Ops.Array.ArrayCeil>

---

### 13.3.27 ArrayChunk



**Full Name:** Ops.Array.ArrayChunk **Description:** Creates a new array with Chunk Size elements starting from Start Index, copies the values from the input array (shallow copy).

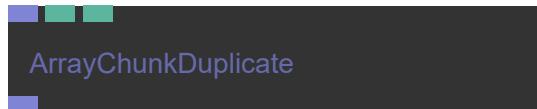
**> Input Ports:** - Visit *Ops.Array.ArrayChunk documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayChunk documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayChunk"

**Docs:** <https://cables.gl/op/Ops.Array.ArrayChunk>

---

### 13.3.28 ArrayChunkDuplicate



**Full Name:** Ops.Array.ArrayChunkDuplicate **Description:** For example:

**> Input Ports:** - Visit *Ops.Array.ArrayChunkDuplicate documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayChunkDuplicate documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayChunkDuplicate" **Docs:** <https://cables.gl/op/Ops.Array.ArrayChunkDuplicate>

---

### 13.3.29 ArrayClamp



**Full Name:** Ops.Array.ArrayClamp **Description:** Full NameOps.Array.ArrayClampVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Array clamp exampleOpen In EditorINPUT PORTSArray In (Array)Array in

**> Input Ports:** - Visit *Ops.Array.ArrayClamp documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayClamp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayClamp" **Docs:** <https://cables.gl/op/Ops.Array.ArrayClamp>

---

### 13.3.30 ArrayContains\_v2



**Full Name:** Ops.Array.ArrayContains\_v2 **Description:** This returns the index of the first occurrence.

**> Input Ports:** - Visit *Ops.Array.ArrayContains\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayContains\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayContains\_v2" **Docs:** [https://cables.gl/op/Ops.Array.ArrayContains\\_v2](https://cables.gl/op/Ops.Array.ArrayContains_v2)

---

### 13.3.31 ArrayDivide



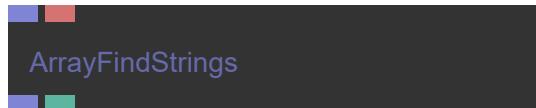
**Full Name:** Ops.Array.ArrayDivide **Description:** Full NameOps.Array.ArrayDivideVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayMathArrayOpsThe ArrayMath op performs the following math operations on two arrays

**> Input Ports:** - Visit [Ops.Array.ArrayDivide documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayDivide documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayDivide"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayDivide>

---

### 13.3.32 ArrayFindStrings



**Full Name:** Ops.Array.ArrayFindStrings **Description:** Full Name Ops.Array.ArrayFindStrings Visibility Core Op - visible for everyone License MIT Author stephangithub source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch id Youtube ids (comma separated) Op Licence Can use query Example Patch ArrayFindStrings Example example for ArrayStringIndexes

**> Input Ports:** - Visit [Ops.Array.ArrayFindStrings documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayFindStrings documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayFindStrings"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayFindStrings>

---

### 13.3.33 ArrayFloor



**Full Name:** Ops.Array.ArrayFloor **Description:** 5.95 becomes 5

**> Input Ports:** - Visit [Ops.Array.ArrayFloor documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayFloor documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayFloor" **Docs:** <https://cables.gl/op/Ops.Array.ArrayFloor>

---

### 13.3.34 ArrayFract



**Full Name:** Ops.Array.ArrayFract **Description:** Only works with positive numbers

**> Input Ports:** - Visit *Ops.Array.ArrayFract documentation for input port details* < **Output Ports:** - Visit *Ops.Array.ArrayFract documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayFract"* **Docs:** <https://cables.gl/op/Ops.Array.ArrayFract>

---

### 13.3.35 ArrayFromNumbers



**Full Name:** Ops.Array.ArrayFromNumbers **Description:** Full NameOps.Array.ArrayFromNumbersVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch arrayFromNumbers exampleOpen In EditorYoutube Video TutorialINPUT  
PORTSUpdate (Trigger)operator must be updated any time you change values in it, or connected to  
the mainloop op

**> Input Ports:** - Visit *Ops.Array.ArrayFromNumbers documentation for input port details* < **Output Ports:** - Visit *Ops.Array.ArrayFromNumbers documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayFromNumbers"* **Docs:** <https://cables.gl/op/Ops.Array.ArrayFromNumbers>

---

### 13.3.36 ArrayGetArray



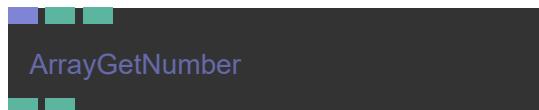
**Full Name:** Ops.Array.ArrayGetArray **Description:** Full NameOps.Array.ArrayGetArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch ArrayGetArray exampleOpen In EditorINPUT PORTSArray of Arrays  
(Array)must contain an array of only arrays

➤ **Input Ports:** - Visit *Ops.Array.ArrayGetArray documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayGetArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayGetArray"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayGetArray>

---

### 13.3.37 ArrayGetNumber



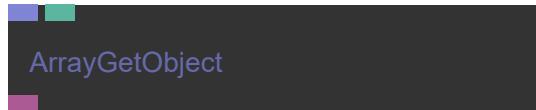
**Full Name:** Ops.Array.ArrayGetNumber **Description:** Example: If you have an array [100, 200, 300] setting the Index to 1 will return 200. Please note that the first index is 0, not 1!

➤ **Input Ports:** - Visit *Ops.Array.ArrayGetNumber documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayGetNumber documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayGetNumber"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayGetNumber>

---

### 13.3.38 ArrayGetObject



**Full Name:** Ops.Array.ArrayGetObject **Description:** Returns a single object from an array based upon the index.

► **Input Ports:** - Visit [Ops.Array.ArrayGetObject documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Array.ArrayGetObject documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayGetObject" **Docs:** <https://cables.gl/op/Ops.Array.ArrayGetObject>

---

### 13.3.39 ArrayGetString\_v2



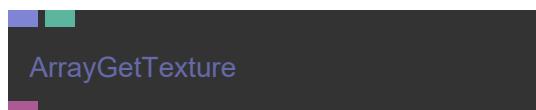
**Full Name:** Ops.Array.ArrayGetString\_v2 **Description:** Returns one string from an array based upon index.

► **Input Ports:** - Visit [Ops.Array.ArrayGetString\\_v2 documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Array.ArrayGetString\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayGetString\_v2" **Docs:** [https://cables.gl/op/Ops.Array.ArrayGetString\\_v2](https://cables.gl/op/Ops.Array.ArrayGetString_v2)

---

### 13.3.40 ArrayGetTexture



**Full Name:** Ops.Array.ArrayGetTexture **Description:** Full NameOps.Array.ArrayGetTextureVisibilityCore  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists-

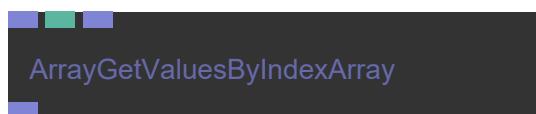
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch ArrayGetTexture TextureArrayLoaderFromArray ExampleOpen In Editor-INPUT PORTSArray (Array)index (Number: integer)OUTPUT PORTSvalue (Object)SaveCancel ChangelogPatches using ArrayGetTextureExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Array.ArrayGetTexture documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Array.ArrayGetTexture documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayGetTexture"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayGetTexture>

---

### 13.3.41 ArrayGetValuesByIndexArray



**Full Name:** Ops.Array.ArrayGetValuesByIndexArray **Description:** Base example

**> Input Ports:** - Visit [Ops.Array.ArrayGetValuesByIndexArray documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Array.ArrayGetValuesByIndexArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayGetValues-ByIndexArray" **Docs:** <https://cables.gl/op/Ops.Array.ArrayGetValuesByIndexArray>

---

### 13.3.42 ArrayIndexBetween



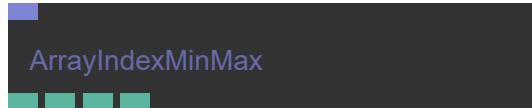
**Full Name:** Ops.Array.ArrayIndexBetween **Description:** Full NameOps.Array.ArrayIndexBetweenVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch arrayIndexInBetweenOpen In EditorINPUT PORTSArray (Array)Value (Number)OUTPUT PORTSIndex (Number)SaveCancel ChangelogPatches using ArrayIndexBetweenExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Array.ArrayIndexBetween](#) documentation for input port details < **Output Ports:** - Visit [Ops.Array.ArrayIndexBetween](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayIndexBetween" **Docs:** <https://cables.gl/op/Ops.Array.ArrayIndexBetween>

---

### 13.3.43 ArrayIndexMinMax



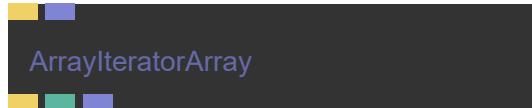
**Full Name:** Ops.Array.ArrayIndexMinMax **Description:** Full NameOps.Array.ArrayIndexMinMaxVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Example ArrayIndexMinMax Outputs the index and values of the biggest  
number in an Array.

> **Input Ports:** - Visit [Ops.Array.ArrayIndexMinMax](#) documentation for input port details < **Output Ports:**  
- Visit [Ops.Array.ArrayIndexMinMax](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayIndexMin-  
Max" **Docs:** <https://cables.gl/op/Ops.Array.ArrayIndexMinMax>

---

### 13.3.44 ArrayIteratorArray



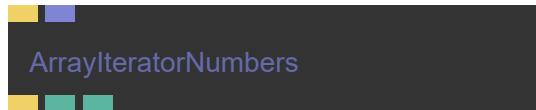
**Full Name:** Ops.Array.ArrayIteratorArray **Description:** Full NameOps.Array.ArrayIteratorArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch ArrayIteratorArray exampleOpen In EditorINPUT PORTSx (Trigger)array  
(Array)OUTPUT PORTStrigger (Trigger)index (Number)Result (Array)SaveCancel ChangelogPatches  
using ArrayIteratorArrayExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Array.ArrayIteratorArray` documentation for input port details < **Output Ports:**  
- Visit `Ops.Array.ArrayIteratorArray` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ArrayIteratorArray"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayIteratorArray>

---

### 13.3.45 ArrayIteratorNumbers



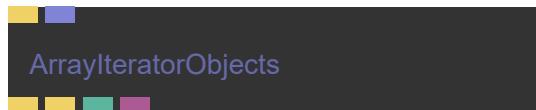
**Full Name:** `Ops.Array.ArrayIteratorNumbers` **Description:** Similar to the repeat op but then for all values in an array

> **Input Ports:** - Visit `Ops.Array.ArrayIteratorNumbers` documentation for input port details < **Output Ports:**  
- Visit `Ops.Array.ArrayIteratorNumbers` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ArrayIteratorNumbers"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayIteratorNumbers>

---

### 13.3.46 ArrayIteratorObjects



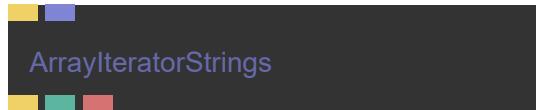
**Full Name:** `Ops.Array.ArrayIteratorObjects` **Description:** Full NameOps.Array.ArrayIteratorObjectsVisibilityCor  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch ArrayIteratorObjects CsvArray ExampleOpen In EditorINPUT PORTSexe  
(Trigger)Trigger the op

> **Input Ports:** - Visit `Ops.Array.ArrayIteratorObjects` documentation for input port details < **Output Ports:**  
- Visit `Ops.Array.ArrayIteratorObjects` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ArrayIteratorObjects"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayIteratorObjects>

---

### 13.3.47 ArrayIteratorStrings



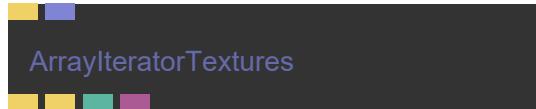
**Full Name:** Ops.Array.ArrayIteratorStrings **Description:** Similar to the repeat op but then for all values in an array

**> Input Ports:** - Visit *Ops.Array.ArrayIteratorStrings documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayIteratorStrings documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayIteratorStrings" **Docs:** <https://cables.gl/op/Ops.Array.ArrayIteratorStrings>

---

### 13.3.48 ArrayIteratorTextures



**Full Name:** Ops.Array.ArrayIteratorTextures **Description:** Full NameOps.Array.ArrayIteratorTexturesVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma separated)Op Licence-Canuse queryExample Patch ArrayIteratorTextures TextureArray TextureArrayInfo ExampleOpen In EditorINPUT PORTSexe (Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Array.ArrayIteratorTextures documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayIteratorTextures documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayIteratorTextures" **Docs:** <https://cables.gl/op/Ops.Array.ArrayIteratorTextures>

---

### 13.3.49 ArrayLength\_v2



**Full Name:** Ops.Array.ArrayLength\_v2 **Description:** Full NameOps.Array.ArrayLength\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch array exampleOpen In EditorINPUT PORTSarray (Array)Array in

**> Input Ports:** - Visit *Ops.Array.ArrayLength\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayLength\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayLength\_v2"

**Docs:** [https://cables.gl/op/Ops.Array.ArrayLength\\_v2](https://cables.gl/op/Ops.Array.ArrayLength_v2)

---

### 13.3.50 ArrayLogic



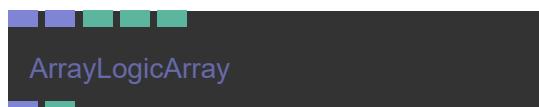
**Full Name:** Ops.Array.ArrayLogic **Description:** The following operations are available

**> Input Ports:** - Visit *Ops.Array.ArrayLogic documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayLogic documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayLogic" **Docs:** <https://cables.gl/op/Ops.Array.ArrayLogic>

---

### 13.3.51 ArrayLogicArray



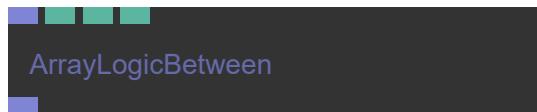
**Full Name:** Ops.Array.ArrayLogicArray **Description:** The following operations are available, if they evaluate to true then the value becomes 1 else 0 :

> **Input Ports:** - Visit *Ops.Array.ArrayLogicArray documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayLogicArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayLogicArray" **Docs:** <https://cables.gl/op/Ops.Array.ArrayLogicArray>

---

### 13.3.52 ArrayLogicBetween\_v2



**Full Name:** Ops.Array.ArrayLogicBetween\_v2 **Description:** It's also possible to pass values through when between min and max

> **Input Ports:** - Visit *Ops.Array.ArrayLogicBetween\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayLogicBetween\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayLogicBetween\_v2" **Docs:** [https://cables.gl/op/Ops.Array.ArrayLogicBetween\\_v2](https://cables.gl/op/Ops.Array.ArrayLogicBetween_v2)

---

### 13.3.53 ArrayLookup



**Full Name:** Ops.Array.ArrayLookup **Description:** Full NameOps.Array.ArrayLookupVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch arraylookupOpen In EditorINPUT PORTSIndices (Array)Values (Array)Stride (Number: integer)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using ArrayLookupExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Array.ArrayLookup* documentation for input port details < **Output Ports:** - Visit *Ops.Array.ArrayLookup* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayLookup"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayLookup>

---

### 13.3.54 ArrayMath



**Full Name:** `Ops.Array.ArrayMath` **Description:** The op has a dropdown menu which allows easy switching between multiple mathematical modes. A single number is used for the mathematical operations on all values in the array.

> **Input Ports:** - Visit *Ops.Array.ArrayMath* documentation for input port details < **Output Ports:** - Visit *Ops.Array.ArrayMath* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayMath" **Docs:** <https://cables.gl/op/Ops.Array.ArrayMath>

---

### 13.3.55 ArrayMathArray



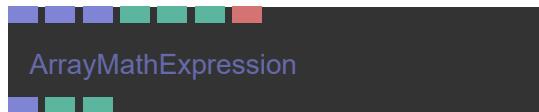
**Full Name:** `Ops.Array.ArrayMathArray` **Description:** This op allows a math operation to be performed on two arrays which must have the same length.

> **Input Ports:** - Visit *Ops.Array.ArrayMathArray* documentation for input port details < **Output Ports:** - Visit *Ops.Array.ArrayMathArray* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayMathArray"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayMathArray>

---

### 13.3.56 ArrayMathExpression



**Full Name:** Ops.Array.ArrayMathExpression **Description:** Use this op to write your own mathematical functions.

**> Input Ports:** - Visit *Ops.Array.ArrayMathExpression documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayMathExpression documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayMathExpression" **Docs:** <https://cables.gl/op/Ops.Array.ArrayMathExpression>

---

### 13.3.57 ArrayMathExpressionTrigger



**Full Name:** Ops.Array.ArrayMathExpressionTrigger **Description:** Use this op to write your own mathematical functions.

**> Input Ports:** - Visit *Ops.Array.ArrayMathExpressionTrigger documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayMathExpressionTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayMathExpressionTrigger" **Docs:** <https://cables.gl/op/Ops.Array.ArrayMathExpressionTrigger>

---

### 13.3.58 ArrayMax



**Full Name:** Ops.Array.ArrayMax **Description:** Full Name Ops.Array.ArrayMaxVisibilityCore Op - visible for everyone License MIT Author androgithub source Maintained by Team cables Patchlists Documentation

tion (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch Spline Sine ArrayPatch that shows how ArraySin and the new Array math ops can be used to alter an array going into a splineMesh

**> Input Ports:** - Visit [Ops.Array.ArrayMax documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayMax documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** *Search cables.gl patches for "ArrayMax"* **Docs:** <https://cables.gl/op/Ops.Array.ArrayMax>

### 13.3.59 ArrayMergeTrigger



**Full Name:** Ops.Array.ArrayMergeTrigger **Description:** Full NameOps.Array.ArrayMergeTriggerVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSMerge (Trigger)Array 0 (Array)Array 1  
(Array)Array 2 (Array)Array 3 (Array)Array 4 (Array)Array 5 (Array)Array 6 (Array)Array 7 (Array)Array  
8 (Array)Array 9 (Array)Array 10 (Array)Array 11 (Array)OUTPUT PORTSNext (Trigger)Result (Ar-  
ray)Array length (Number)SaveCancel ChangelogPatches using ArrayMergeTriggerExamples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Array.ArrayMergeTrigger` documentation for *input port details* **< Output Ports:**  
- Visit `Ops.Array.ArrayMergeTrigger` documentation for *output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayMergeTrigger" **Docs:** <https://cables.gl/op/Ops.Array.ArrayMergeTrigger>

### 13.3.60 ArrayMerge\_v3



**Full Name:** Ops.Array.ArrayMerge v3 **Description:** Merge multiple arrays - in consecutive order

> **Input Ports:** - Visit *Ops.Array.ArrayMerge\_v3* documentation for input port details < **Output Ports:** - Visit *Ops.Array.ArrayMerge\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayMerge\_v3"  
**Docs:** [https://cables.gl/op/Ops.Array.ArrayMerge\\_v3](https://cables.gl/op/Ops.Array.ArrayMerge_v3)

---

### 13.3.61 ArrayMin



**Full Name:** Ops.Array.ArrayMin **Description:** Full NameOps.Array.ArrayMinVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Spline Sine ArrayPatch that shows how ArraySin and the new Array math ops can be used to alter an array going into a splineMesh

> **Input Ports:** - Visit *Ops.Array.ArrayMin* documentation for input port details < **Output Ports:** - Visit *Ops.Array.ArrayMin* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayMin" **Docs:** <https://cables.gl/op/Ops.Array.ArrayMin>

---

### 13.3.62 ArrayModulo



**Full Name:** Ops.Array.ArrayModulo **Description:** Full NameOps.Array.ArrayModuloVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayMathArrayOpsThe ArrayMath op performs the following math operations on two arrays

> **Input Ports:** - Visit *Ops.Array.ArrayModulo* documentation for input port details < **Output Ports:** - Visit *Ops.Array.ArrayModulo* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayModulo"*  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayModulo>

---

### 13.3.63 ArrayMultiply



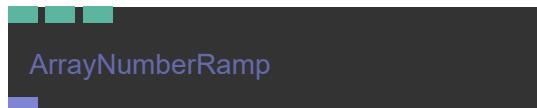
**Full Name:** Ops.Array.ArrayMultiply **Description:** Full NameOps.Array.ArrayMultiplyVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch ArrayMultiply exampleOpen In EditorINPUT PORTSIn (Array)Value  
(Number)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using ArrayMultiplyExamples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.ArrayMultiply documentation* for input port details **< Output Ports:** -  
Visit *Ops.Array.ArrayMultiply documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayMultiply"*  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayMultiply>

---

### 13.3.64 ArrayNumberRamp\_v2



**Full Name:** Ops.Array.ArrayNumberRamp\_v2 **Description:** Full NameOps.Array.ArrayNumberRamp\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch example arrayNumberRamp v2Open In EditorINPUT PORTSStart Value  
(Number)End Value (Number)Entries (Number: integer)OUTPUT PORTSResult (Array)SaveCancel Changel-  
ogPatches using ArrayNumberRamp\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.ArrayNumberRamp\_v2 documentation* for input port details **< Output  
Ports:** - Visit *Ops.Array.ArrayNumberRamp\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ArrayNumberRamp\_v2" **Docs:** [https://cables.gl/op/Ops.Array.ArrayNumberRamp\\_v2](https://cables.gl/op/Ops.Array.ArrayNumberRamp_v2)

---

### 13.3.65 ArrayOfArrays



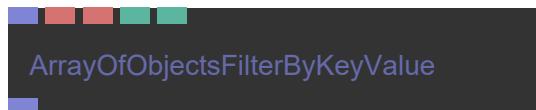
**Full Name:** Ops.Array.ArrayOfArrays **Description:** Full NameOps.Array.ArrayOfArraysVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch Array of arrays exampleOpen In EditorINPUT PORTSUpdate  
(Trigger)combine all arrays

**> Input Ports:** - Visit *Ops.Array.ArrayOfArrays* documentation for input port details **< Output Ports:** - Visit *Ops.Array.ArrayOfArrays* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ArrayOfArrays"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayOfArrays>

---

### 13.3.66 ArrayOfObjectsFilterByKeyValue\_v3



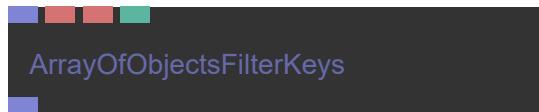
**Full Name:** Ops.Array.ArrayOfObjectsFilterByKeyValue\_v3 **Description:** Use this op to "slim" an array of objects.

**> Input Ports:** - invert result (discard all objects that have key-value pair): Check documentation  
**< Output Ports:** - Visit *Ops.Array.ArrayOfObjectsFilterByKeyValue\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ArrayOfObjects-  
FilterByKeyValue\_v3" **Docs:** [https://cables.gl/op/Ops.Array.ArrayOfObjectsFilterByKeyValue\\_v3](https://cables.gl/op/Ops.Array.ArrayOfObjectsFilterByKeyValue_v3)

---

### 13.3.67 ArrayOfObjectsFilterKeys



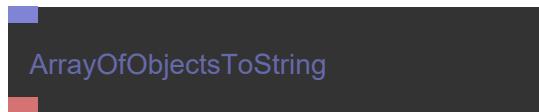
**Full Name:** Ops.Array.ArrayOfObjectsFilterKeys **Description:** Use this op on an array of objects to "slim out" objects.

**> Input Ports:** - Visit *Ops.Array.ArrayOfObjectsFilterKeys documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayOfObjectsFilterKeys documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayOfObjectsFilterKeys" **Docs:** <https://cables.gl/op/Ops.Array.ArrayOfObjectsFilterKeys>

---

### 13.3.68 ArrayOfObjectsToString



**Full Name:** Ops.Array.ArrayOfObjectsToString **Description:** This op converts an array of objects to a string.

**> Input Ports:** - Visit *Ops.Array.ArrayOfObjectsToString documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayOfObjectsToString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayOfObjectsToString" **Docs:** <https://cables.gl/op/Ops.Array.ArrayOfObjectsToString>

---

### 13.3.69 ArrayPack



**Full Name:** Ops.Array.ArrayPack **Description:** This is slower than ArrayPack2,ArrayPack3,ArrayPack4

**> Input Ports:** - Visit [Ops.Array.ArrayPack documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayPack documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayPack" **Docs:** <https://cables.gl/op/Ops.Array.ArrayPack>

---

### 13.3.70 ArrayPack2



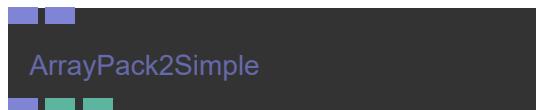
**Full Name:** Ops.Array.ArrayPack2 **Description:** Full NameOps.Array.ArrayPack2VisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Array pack 2 exampleOpen In EditorINPUT PORTSTTrigger in (Trigger)Trigger in

**> Input Ports:** - Visit [Ops.Array.ArrayPack2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayPack2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayPack2" **Docs:** <https://cables.gl/op/Ops.Array.ArrayPack2>

---

### 13.3.71 ArrayPack2Simple



**Full Name:** Ops.Array.ArrayPack2Simple **Description:** Full NameOps.Array.ArrayPack2SimpleVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch arraypack2 exampleOpen In EditorINPUT PORTSArray 1 (Array)Array 2 (Array)OUTPUT PORTSArray out (Array)Num Points (Number)Array length (Number)SaveCancel ChangelogPatches using ArrayPack2SimpleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Array.ArrayPack2Simple documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayPack2Simple documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayPack2Simple" **Docs:** <https://cables.gl/op/Ops.Array.ArrayPack2Simple>

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### 13.3.72 ArrayPack3



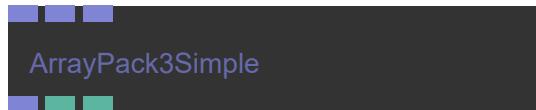
**Full Name:** Ops.Array.ArrayPack3 **Description:** Full NameOps.Array.ArrayPack3VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch arrayPack3 ExampleOpen In EditorINPUT PORTSTrigger in (Trigger)Trigger the op

**> Input Ports:** - Visit [Ops.Array.ArrayPack3 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.ArrayPack3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayPack3" **Docs:** <https://cables.gl/op/Ops.Array.ArrayPack3>

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### 13.3.73 ArrayPack3Simple



**Full Name:** Ops.Array.ArrayPack3Simple **Description:** Full NameOps.Array.ArrayPack3SimpleVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Arraypack3Simple ExampleOpen In EditorINPUT PORTSArray 1 (Array)Array 2 (Array)Array 3 (Array)OUTPUT PORTSArray out (Array)Num Points (Number)Array length (Number)SaveCancel ChangelogPatches using ArrayPack3SimpleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Array.ArrayPack3Simple](#) documentation for input port details **< Output Ports:** - Visit [Ops.Array.ArrayPack3Simple](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayPack3Simple" **Docs:** <https://cables.gl/op/Ops.Array.ArrayPack3Simple>

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### 13.3.74 ArrayPack4



**Full Name:** Ops.Array.ArrayPack4 **Description:** Full NameOps.Array.ArrayPack4VisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Array pack 4 exampleOpen In EditorINPUT PORTSTrigger in (Trigger)Array 1 (Array)Array 2 (Array)Array 3 (Array)Array 4 (Array)OUTPUT PORTSTrigger out (Trigger)Array out (Array)Array length (Number)SaveCancel ChangelogPatches using ArrayPack4Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Array.ArrayPack4](#) documentation for input port details **< Output Ports:** - Visit [Ops.Array.ArrayPack4](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayPack4" **Docs:** <https://cables.gl/op/Ops.Array.ArrayPack4>

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### 13.3.75 ArrayPack4Simple



**Full Name:** Ops.Array.ArrayPack4Simple **Description:** Full NameOps.Array.ArrayPack4SimpleVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Arraypack3Simple ExampleOpen In EditorINPUT PORTSArray 1 (Array)Array 2 (Array)Array 3 (Array)Array 4 (Array)OUTPUT PORTSArray out (Array)Num Points

(Number)Array length (Number)SaveCancel ChangelogPatches using ArrayPack4SimpleExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Array.ArrayPack4Simple documentation for input port details* < **Output Ports:** - Visit *Ops.Array.ArrayPack4Simple documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayPack4Simple"* **Docs:** <https://cables.gl/op/Ops.Array.ArrayPack4Simple>

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### 13.3.76 ArrayPow



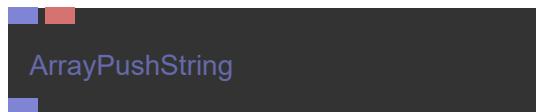
**Full Name:** Ops . Array . ArrayPow **Description:** Full NameOps.Array.ArrayPowVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayPow exampleOpen In EditorINPUT PORTSArray in (Array)The array to apply the pow function to

> **Input Ports:** - Visit *Ops.Array.ArrayPow documentation for input port details* < **Output Ports:** - Visit *Ops.Array.ArrayPow documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayPow"* **Docs:** <https://cables.gl/op/Ops.Array.ArrayPow>

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### 13.3.77 ArrayPushString



**Full Name:** Ops . Array . ArrayPushString **Description:** Full NameOps.Array.ArrayPushStringVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSArray (Array)String (String)OUTPUT

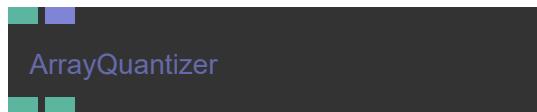
PORTSResult (Array)SaveCancel ChangelogPatches using ArrayPushStringExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Array.ArrayPushString documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayPushString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayPushString"* **Docs:** <https://cables.gl/op/Ops.Array.ArrayPushString>

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### 13.3.78 ArrayQuantizer



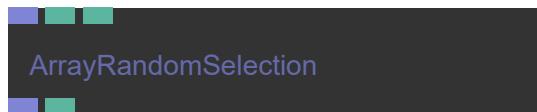
**Full Name:** Ops.Array.ArrayQuantizer **Description:** Full NameOps.Array.ArrayQuantizerVisibilityCore Op - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch ArrayQuantizer exampleExample patch for ArrayQuantizer

➤ **Input Ports:** - Visit *Ops.Array.ArrayQuantizer documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayQuantizer documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayQuantizer"* **Docs:** <https://cables.gl/op/Ops.Array.ArrayQuantizer>

---

### 13.3.79 ArrayRandomSelection



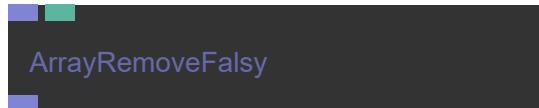
**Full Name:** Ops.Array.ArrayRandomSelection **Description:** Setting elements to 5 on an array with 60 values will extract random 5 values from the array.

➤ **Input Ports:** - Visit *Ops.Array.ArrayRandomSelection documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayRandomSelection documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayRandomSelection" **Docs:** <https://cables.gl/op/Ops.Array.ArrayRandomSelection>

---

### 13.3.80 ArrayRemoveFalsy



**Full Name:** Ops.Array.ArrayRemoveFalsy **Description:** for example empty string, 0, null etc.

► **Input Ports:** - Visit *Ops.Array.ArrayRemoveFalsy documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Array.ArrayRemoveFalsy documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayRemoveFalsy" **Docs:** <https://cables.gl/op/Ops.Array.ArrayRemoveFalsy>

---

### 13.3.81 ArrayReverse



**Full Name:** Ops.Array.ArrayReverse **Description:** Full NameOps.Array.ArrayReverseVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch ReverseArray ExampleOpen In EditorINPUT PORTSInput (Array)Active (Number: boolean)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using ArrayReverse-Examples Team cables Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Array.ArrayReverse documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Array.ArrayReverse documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayReverse" **Docs:** <https://cables.gl/op/Ops.Array.ArrayReverse>

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### 13.3.82 ArrayRound



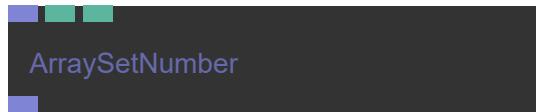
**Full Name:** Ops.Array.ArrayRound **Description:** Use to convert floating point values to integers

**> Input Ports:** - Visit *Ops.Array.ArrayRound documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayRound documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayRound"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayRound>

---

### 13.3.83 ArraySetNumber\_v3



**Full Name:** Ops.Array.ArraySetNumber\_v3 **Description:** This will creates a new copy of an array.

**> Input Ports:** - Visit *Ops.Array.ArraySetNumber\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArraySetNumber\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArraySetNumber\_v3" **Docs:** [https://cables.gl/op/Ops.Array.ArraySetNumber\\_v3](https://cables.gl/op/Ops.Array.ArraySetNumber_v3)

---

### 13.3.84 ArraySetString



**Full Name:** Ops.Array.ArraySetString **Description:** This will creates a new copy of an array.

**> Input Ports:** - Visit *Ops.Array.ArraySetString documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArraySetString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArraySetString"  
**Docs:** <https://cables.gl/op/Ops.Array.ArraySetString>

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### 13.3.85 ArraySin



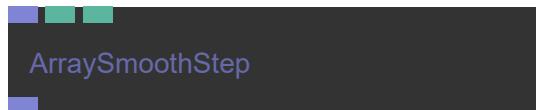
**Full Name:** Ops.Array.ArraySin **Description:** Full NameOps.Array.ArraySinVisibilityCore Op - visible for everyoneLicenseMITAuthor androgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArraySine ExampleOpen In EditorINPUT PORTSarray in (Array)Math function index (Number: integer)Phase (Number)Frequency (Number)Amplitude (Number)OUTPUT PORTSArray result (Array)SaveCancel ChangelogPatches using ArraySinExamples Team cables Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Array.ArraySin documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArraySin documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArraySin" **Docs:** <https://cables.gl/op/Ops.Array.ArraySin>

---

### 13.3.86 ArraySmoothStep



**Full Name:** Ops.Array.ArraySmoothStep **Description:** The fancy way of saying it is

► **Input Ports:** - Visit *Ops.Array.ArraySmoothStep documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArraySmoothStep documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArraySmoothStep" **Docs:** <https://cables.gl/op/Ops.Array.ArraySmoothStep>

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### 13.3.87 ArraySqrt



**Full Name:** Ops.Array.ArraySqrt **Description:** Full NameOps.Array.ArraySqrtVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArraySqrt exampleOpen In EditorINPUT PORTSIn (Array)Array in

**> Input Ports:** - Visit *Ops.Array.ArraySqrt documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArraySqrt documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArraySqrt" **Docs:** <https://cables.gl/op/Ops.Array.ArraySqrt>

---

### 13.3.88 ArraySubtract



**Full Name:** Ops.Array.ArraySubtract **Description:** Full NameOps.Array.ArraySubtractVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayMathArrayOpsThe ArrayMath op performs the following math operations on two arrays

**> Input Ports:** - Visit *Ops.Array.ArraySubtract documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArraySubtract documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArraySubtract" **Docs:** <https://cables.gl/op/Ops.Array.ArraySubtract>

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### 13.3.89 ArraySum



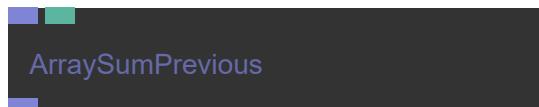
**Full Name:** Ops.Array.ArraySum **Description:** Full NameOps.Array.ArraySumVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayMathArrayOpsThe ArrayMath op performs the following math operations on two arrays

➤ **Input Ports:** - Visit *Ops.Array.ArraySum documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArraySum documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArraySum" **Docs:** <https://cables.gl/op/Ops.Array.ArraySum>

---

### 13.3.90 ArraySumPrevious



**Full Name:** Ops.Array.ArraySumPrevious **Description:** Full NameOps.Array.ArraySumPreviousVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArraySumPrevious ExampleOpen In EditorINPUT PORTSArray (Array)Padding (Number)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using ArraySumPreviousExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Array.ArraySumPrevious documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArraySumPrevious documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArraySumPrevious" **Docs:** <https://cables.gl/op/Ops.Array.ArraySumPrevious>

---

### 13.3.91 ArraySumUp



**Full Name:** Ops.Array.ArraySumUp **Description:** add up all numbers in an array and returns the total

**> Input Ports:** - Visit *Ops.Array.ArraySumUp documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArraySumUp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArraySumUp"

**Docs:** <https://cables.gl/op/Ops.Array.ArraySumUp>

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### 13.3.92 ArraySwizzle



**Full Name:** Ops.Array.ArraySwizzle **Description:** Full NameOps.Array.ArraySwizzleVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch ArraySwizzleOpen In EditorINPUT PORTSArray (Array)Array Stride index (Number: integer) 1 2 3 4 Result Stride index (Number: integer) 1 2 3 4 Content ResultX index (Number: integer) X Y Z W 0 1 0,1,2.. 0-1 Y index (Number: integer) X Y Z W 0 1 0,1,2.. 0-1 Z index (Number: integer) X Y Z W 0 1 0,1,2.. 0-1 W index (Number: integer) X Y Z W 0 1 0,1,2.. 0-1 OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using ArraySwizzleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.ArraySwizzle documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArraySwizzle documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArraySwizzle"

**Docs:** <https://cables.gl/op/Ops.Array.ArraySwizzle>

---

### 13.3.93 ArrayToArrays



**Full Name:** Ops.Array.ArrayToArrays **Description:** e.g. stride of 2: [a,b,c,d,e,f] becomes [[a,b],[c,d],[e,f]]

**> Input Ports:** - Visit *Ops.Array.ArrayToArrays documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayToArrays documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayToArrays"

**Docs:** <https://cables.gl/op/Ops.Array.ArrayToArrays>

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### 13.3.94 ArrayToByteBuffer



**Full Name:** Ops.Array.ArrayToByteBuffer **Description:** Full NameOps.Array.ArrayToByteBufferVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryNo op example found on this serverINPUT PORTSArray (Array)OUTPUT PORTSBuffer  
(Object)SaveCancel ChangelogPatches using ArrayToByteBufferExamples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit *Ops.Array.ArrayToByteBuffer documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayToByteBuffer documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayToByteBuffer" **Docs:** <https://cables.gl/op/Ops.Array.ArrayToByteBuffer>

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### 13.3.95 ArrayToString\_v3



**Full Name:** Ops.Array.ArrayToString\_v3 **Description:** Full NameOps.Array.ArrayToString\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch Array SumOpen In EditorINPUT PORTSArray (Array)Seperator  
(String)New Line (Number: boolean)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches  
using ArrayToString\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.ArrayToString\_v3 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Array.ArrayToString\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayToString\_v3"  
**Docs:** [https://cables.gl/op/Ops.Array.ArrayToString\\_v3](https://cables.gl/op/Ops.Array.ArrayToString_v3)

---

### 13.3.96 ArrayTrigger



**Full Name:** Ops.Array.ArrayTrigger **Description:** Array is only sent out when op is triggered.

**> Input Ports:** - Visit *Ops.Array.ArrayTrigger documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArrayTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayTrigger"  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayTrigger>

---

### 13.3.97 ArrayUnique



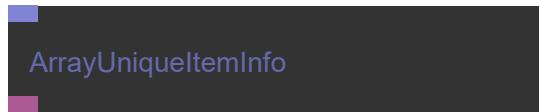
**Full Name:** Ops.Array.ArrayUnique **Description:** when given an array with “non” unique items, like:

➢ **Input Ports:** - Visit *Ops.Array.ArrayUnique documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayUnique documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “ArrayUnique”  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayUnique>

---

### 13.3.98 ArrayUniqueItemInfo



**Full Name:** Ops.Array.ArrayUniqueItemInfo **Description:** when given an array with “non” unique items, like:

➢ **Input Ports:** - Visit *Ops.Array.ArrayUniqueItemInfo documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayUniqueItemInfo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “ArrayUniqueItemInfo” **Docs:** <https://cables.gl/op/Ops.Array.ArrayUniqueItemInfo>

---

### 13.3.99 ArrayUnpack2



**Full Name:** Ops.Array.ArrayUnpack2 **Description:** Full NameOps.Array.ArrayUnpack2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-

cenceCaniuse queryExample Patch ArrayUnpack2 ExampleOpen In EditorINPUT PORTSArray in xyz  
(Array)Array in

> **Input Ports:** - Visit *Ops.Array.ArrayUnpack2 documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayUnpack2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayUnpack2"*  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayUnpack2>

---

### 13.3.100 ArrayUnpack3



**Full Name:** Ops.Array.ArrayUnpack3 **Description:** An array of xyz is split into 3 individual arrays.

> **Input Ports:** - Visit *Ops.Array.ArrayUnpack3 documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayUnpack3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayUnpack3"*  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayUnpack3>

---

### 13.3.101 ArrayUnpack4



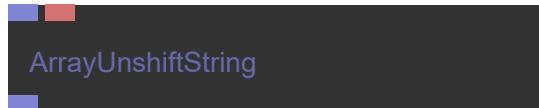
**Full Name:** Ops.Array.ArrayUnpack4 **Description:** An array of xyzw is split into 4 individual arrays.

> **Input Ports:** - Visit *Ops.Array.ArrayUnpack4 documentation* for input port details < **Output Ports:** - Visit *Ops.Array.ArrayUnpack4 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayUnpack4"*  
**Docs:** <https://cables.gl/op/Ops.Array.ArrayUnpack4>

---

### 13.3.102 ArrayUnshiftString



**Full Name:** Ops.Array.ArrayUnshiftString **Description:** Full NameOps.Array.ArrayUnshiftStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch array unshift string exampleexample for Ops.Array.ArrayUnshiftString

**> Input Ports:** - Visit *Ops.Array.ArrayUnshiftString documentation* for input port details **< Output Ports:**  
- Visit *Ops.Array.ArrayUnshiftString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayUnshift-  
String" **Docs:** <https://cables.gl/op/Ops.Array.ArrayUnshiftString>

---

### 13.3.103 Array\_v3



**Full Name:** Ops.Array.Array\_v3 **Description:** This op has three modes

**> Input Ports:** - Visit *Ops.Array.Array\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.Array\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Array\_v3" **Docs:** [https://cables.gl/op/Ops.Array.Array\\_v3](https://cables.gl/op/Ops.Array.Array_v3)

---

### 13.3.104 ArraysToArrayMultiPort



**Full Name:** Ops.Array.ArraysToArrayMultiPort **Description:** Full NameOps.Array.ArraysToArrayMultiPortVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSArraysArrays\_0 (Array)Arrays\_1 (Array)add port (Array)OUTPUT PORTSResult (Array)Num Values (Number)SaveCancel Changelog-Patches using ArraysToArrayMultiPortExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.ArraysToArrayMultiPort documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ArraysToArrayMultiPort documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArraysToArrayMultiPort" **Docs:** <https://cables.gl/op/Ops.Array.ArraysToArrayMultiPort>

---

### 13.3.105 AverageArray



**Full Name:** Ops.Array.AverageArray **Description:** Full NameOps.Array.AverageArrayVisibilityCoreOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch AverageArray ExampleOpen In EditorINPUT PORTSArray (Array)The array in to smooth

**> Input Ports:** - Visit *Ops.Array.AverageArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.AverageArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AverageArray" **Docs:** <https://cables.gl/op/Ops.Array.AverageArray>

---

### 13.3.106 BoolStateArray



**Full Name:** Ops.Array.BoolStateArray **Description:** Outputs an array where only one element is 1, the other elements are 0. By changing the Active Index port you can decide which of the elements is the 1.

> **Input Ports:** - Visit [Ops.Array.BoolStateArray documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.BoolStateArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "BoolStateArray" **Docs:** <https://cables.gl/op/Ops.Array.BoolStateArray>

---

### 13.3.107 CopyArray



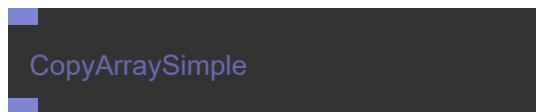
**Full Name:** Ops.Array.CopyArray **Description:** Full NameOps.Array.CopyArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Copy array exampleOpen In EditorINPUT PORTSExec (Trigger)Trigger the op - make a copy

> **Input Ports:** - Visit [Ops.Array.CopyArray documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.CopyArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CopyArray" **Docs:** <https://cables.gl/op/Ops.Array.CopyArray>

---

### 13.3.108 CopyArraySimple



**Full Name:** Ops.Array.CopyArraySimple **Description:** Full NameOps.Array.CopyArraySimpleVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSInput (Array)OUTPUT PORTSResult

(Array)SaveCancel ChangelogPatches using CopyArraySimpleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.CopyArraySimple documentation* for input port details **< Output Ports:** - Visit *Ops.Array.CopyArraySimple documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CopyArraySimple" **Docs:** <https://cables.gl/op/Ops.Array.CopyArraySimple>

---

### 13.3.109 CropArray



**Full Name:** Ops.Array.CropArray **Description:** Full NameOps.Array.CropArrayVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Crop array exampleOpen In EditorINPUT PORTSSource Array (Array)The array to crop

**> Input Ports:** - Visit *Ops.Array.CropArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.CropArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CropArray" **Docs:** <https://cables.gl/op/Ops.Array.CropArray>

---

### 13.3.110 CutArray



**Full Name:** Ops.Array.CutArray **Description:** Full NameOps.Array.CutArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch CutArray - ExampleExample for the CutArray op.

> **Input Ports:** - Visit [Ops.Array.CutArray documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.CutArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "CutArray"](#) **Docs:** <https://cables.gl/op/Ops.Array.CutArray>

---

### 13.3.111 EaseArray



**Full Name:** Ops.Array.EaseArray **Description:** Full NameOps.Array.EaseArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch easearray exampleOpen In EditorINPUT PORTSArray (Array)Min (Number)Max (Number)Easing index (Number: integer)OUTPUT PORTSResult Array (Array)SaveCancel Changelog- Patches using EaseArrayExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Array.EaseArray documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.EaseArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "EaseArray"](#) **Docs:** <https://cables.gl/op/Ops.Array.EaseArray>

---

### 13.3.112 EmptyArray



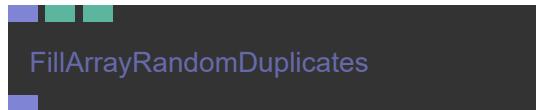
**Full Name:** Ops.Array.EmptyArray **Description:** Full NameOps.Array.EmptyArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverOUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using EmptyArrayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.EmptyArray* documentation for input port details **< Output Ports:** - Visit *Ops.Array.EmptyArray* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "EmptyArray" **Docs:** <https://cables.gl/op/Ops.Array.EmptyArray>

---

### 13.3.113 FillArrayRandomDuplicates\_v2



**Full Name:** Ops.Array.FillArrayRandomDuplicates\_v2 **Description:** example

**> Input Ports:** - Visit *Ops.Array.FillArrayRandomDuplicates\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Array.FillArrayRandomDuplicates\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "FillArrayRandomDuplicates\_v2" **Docs:** [https://cables.gl/op/Ops.Array.FillArrayRandomDuplicates\\_v2](https://cables.gl/op/Ops.Array.FillArrayRandomDuplicates_v2)

---

### 13.3.114 FilterArray



**Full Name:** Ops.Array.FilterArray **Description:** filter an array of arbitrary stride by one set of elements and output the filtered array

**> Input Ports:** - the type of the array (Array3, Array2, ...): Compare Element index (Number: integer) which element to compare (see stride) **< Output Ports:** - Visit *Ops.Array.FilterArray* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "FilterArray" **Docs:** <https://cables.gl/op/Ops.Array.FilterArray>

---

### 13.3.115 FilterValidArray



**Full Name:** Ops.Array.FilterValidArray **Description:** Full NameOps.Array.FilterValidArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryNo op example found on this serverINPUT PORTSArray (Array)Invalid when  
length is 0 (Number: boolean)OUTPUT PORTSLast Valid Array (Array)Is Valid (booleanNum-  
ber)SaveCancel ChangelogPatches using FilterValidArrayExamples Team cables Public My Patches  
My Ops

► **Input Ports:** - Visit *Ops.Array.FilterValidArray documentation* for input port details < **Output Ports:** -  
Visit *Ops.Array.FilterValidArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FilterValidArray"

**Docs:** <https://cables.gl/op/Ops.Array.FilterValidArray>

---

### 13.3.116 FlattenArray



**Full Name:** Ops.Array.FlattenArray **Description:** e.g. [1,2,[3,4,5,[6,7]]] will become [1,2,3,4,5,6,7]

► **Input Ports:** - Visit *Ops.Array.FlattenArray documentation* for input port details < **Output Ports:** -  
Visit *Ops.Array.FlattenArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FlattenArray"

**Docs:** <https://cables.gl/op/Ops.Array.FlattenArray>

---

### 13.3.117 FreezeArray



**Full Name:** Ops.Array.FreezeArray **Description:** Full NameOps.Array.FreezeArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Freeze Operators ExampleOpen In EditorINPUT PORTSNumber (Array)current input value

**> Input Ports:** - Visit *Ops.Array.FreezeArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.FreezeArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FreezeArray"  
**Docs:** <https://cables.gl/op/Ops.Array.FreezeArray>

---

### 13.3.118 GateArray\_v2



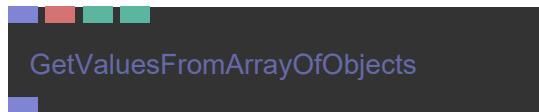
**Full Name:** Ops.Array.GateArray\_v2 **Description:** Full NameOps.Array.GateArray\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch GateArray exampleOpen In EditorYoutube Video TutorialINPUT PORTSArray in (Array)Pass Through (Number: boolean)When False index (Number: integer) keep last array null OUTPUT PORTSArray Out (Array)SaveCancel ChangelogPatches using GateArray\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.GateArray\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.GateArray\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GateArray\_v2"  
**Docs:** [https://cables.gl/op/Ops.Array.GateArray\\_v2](https://cables.gl/op/Ops.Array.GateArray_v2)

---

### 13.3.119 GetValuesFromArrayOfObjects



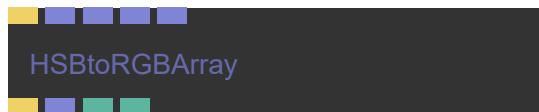
**Full Name:** Ops.Array.GetValuesFromArrayOfObjects **Description:** example:

**> Input Ports:** - Visit *Ops.Array.GetValuesFromArrayOfObjects documentation* for input port details **< Output Ports:** - Visit *Ops.Array.GetValuesFromArrayOfObjects documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GetValuesFromArrayOfObjects" **Docs:** <https://cables.gl/op/Ops.Array.GetValuesFromArrayOfObjects>

---

### 13.3.120 HSBtoRGBArray



**Full Name:** Ops.Array.HSBtoRGBArray **Description:** Create a 4-tuple RGBA array from 4 array inputs.

**> Input Ports:** - Visit *Ops.Array.HSBtoRGBArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.HSBtoRGBArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "HSBtoRGBArray" **Docs:** <https://cables.gl/op/Ops.Array.HSBtoRGBArray>

---

### 13.3.121 InfoArray



**Full Name:** Ops.Array.InfoArray **Description:** Full NameOps.Array.InfoArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch InfoArray example fileOpen In EditorINPUT PORTSArray (Array)Array in

➤ **Input Ports:** - Visit [Ops.Array.InfoArray documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.InfoArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "InfoArray" **Docs:** <https://cables.gl/op/Ops.Array.InfoArray>

---

### 13.3.122 InfoArray2



**Full Name:** Ops.Array.InfoArray2 **Description:** Full NameOps.Array.InfoArray2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSArray (Array)OUTPUT PORTSNum Items (Number)Min X (Number)Max X (Number)Average X (Number)Min Y (Number)Max Y (Number)Average Y (Number)SaveCancel ChangelogPatches using InfoArray2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Array.InfoArray2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.InfoArray2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "InfoArray2" **Docs:** <https://cables.gl/op/Ops.Array.InfoArray2>

---

### 13.3.123 InfoArray3



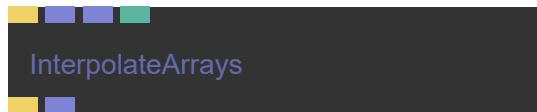
**Full Name:** Ops.Array.InfoArray3 **Description:** Check the example file Ops.Array.InfoArray for a simplified version of infoArray3

➤ **Input Ports:** - Visit [Ops.Array.InfoArray3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.InfoArray3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "InfoArray3" **Docs:** <https://cables.gl/op/Ops.Array.InfoArray3>

---

### 13.3.124 InterpolateArrays



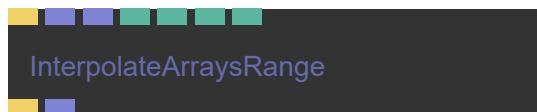
**Full Name:** Ops.Array.InterpolateArrays **Description:** interpolates between every number in the array.

**> Input Ports:** - Visit *Ops.Array.InterpolateArrays* documentation for input port details **< Output Ports:** - Visit *Ops.Array.InterpolateArrays* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "InterpolateArrays" **Docs:** <https://cables.gl/op/Ops.Array.InterpolateArrays>

---

### 13.3.125 InterpolateArraysRange



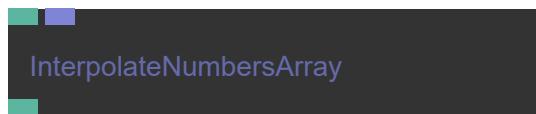
**Full Name:** Ops.Array.InterpolateArraysRange **Description:** Full NameOps.Array.InterpolateArraysRangeVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch Array Interpolate Offset exampleOpen In EditorINPUT PORTSExe (Trigger)Array 1 (Array)Array 2 (Array)Pos (Number)Width (Number)Easing index (Number: integer)Reverse (Number: boolean)OUTPUT PORTSNext (Trigger)Result (Array)SaveCancel Changelog-Patches using InterpolateArraysRangeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.InterpolateArraysRange* documentation for input port details **< Output Ports:** - Visit *Ops.Array.InterpolateArraysRange* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "InterpolateArraysRange" **Docs:** <https://cables.gl/op/Ops.Array.InterpolateArraysRange>

---

### 13.3.126 InterpolateNumbersArray



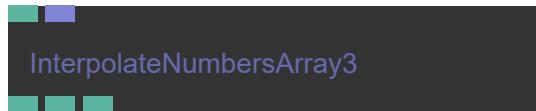
**Full Name:** Ops.Array.InterpolateNumbersArray **Description:** Can be used to create controllable animation sequences.

**> Input Ports:** - Visit *Ops.Array.InterpolateNumbersArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.InterpolateNumbersArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "InterpolateNumbersArray" **Docs:** <https://cables.gl/op/Ops.Array.InterpolateNumbersArray>

---

### 13.3.127 InterpolateNumbersArray3



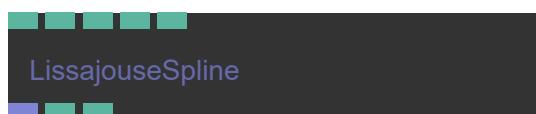
**Full Name:** Ops.Array.InterpolateNumbersArray3 **Description:** e.g. 1.5 - interpolated XYZ values between index 1 and 2

**> Input Ports:** - Visit *Ops.Array.InterpolateNumbersArray3 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.InterpolateNumbersArray3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "InterpolateNumbersArray3" **Docs:** <https://cables.gl/op/Ops.Array.InterpolateNumbersArray3>

---

### 13.3.128 LissajouseSpline



**Full Name:** Ops.Array.LissajouseSpline **Description:** Full NameOps.Array.LissajouseSplineVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch lissajous splinesOpen In EditorINPUT PORTSFormula index (Number: integer)A (Number: integer)Frequency parameter A

**> Input Ports:** - Visit *Ops.Array.LissajouseSpline* documentation for input port details **< Output Ports:** - Visit *Ops.Array.LissajouseSpline* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LissajouseSpline"  
**Docs:** <https://cables.gl/op/Ops.Array.LissajouseSpline>

---

### 13.3.129 LoopArray3



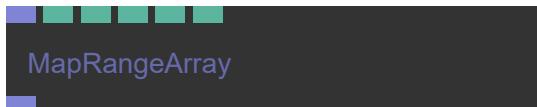
**Full Name:** Ops.Array.LoopArray3 **Description:** Full NameOps.Array.LoopArray3VisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch LoopArray3 exampleOpen In EditorINPUT PORTSArray in (Array)Array in

**> Input Ports:** - Visit *Ops.Array.LoopArray3* documentation for input port details **< Output Ports:** - Visit *Ops.Array.LoopArray3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LoopArray3"  
**Docs:** <https://cables.gl/op/Ops.Array.LoopArray3>

---

### 13.3.130 MapRangeArray



**Full Name:** Ops.Array.MapRangeArray **Description:** Full NameOps.Array.MapRangeArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-

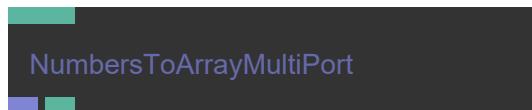
Caniuse queryExample Patch MapRangeArray exampleOpen In EditorYoutube Video TutorialINPUT PORTSArray (Array)the array of values you want to map

➤ **Input Ports:** - Visit [Ops.Array.MapRangeArray documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.MapRangeArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MapRangeArray" **Docs:** <https://cables.gl/op/Ops.Array.MapRangeArray>

---

### 13.3.131 NumbersToArrayMultiPort\_v2



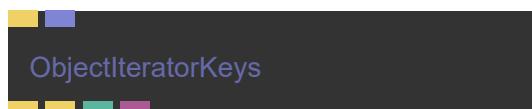
**Full Name:** Ops.Array.NumbersToArrayMultiPort\_v2 **Description:** Full NameOps.Array.NumbersToArrayMultiPort\_v2 Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch NumbersToArrayMultiPort ExampleOpen In EditorINPUT PORTSNumbersNumbers\_0 (Number)add port (Number)OUTPUT PORTSResult (Array)Num Values (Number)SaveCancel ChangelogPatches using NumbersToArrayMultiPort\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Array.NumbersToArrayMultiPort\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.NumbersToArrayMultiPort\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "NumbersToArrayMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Array.NumbersToArrayMultiPort\\_v2](https://cables.gl/op/Ops.Array.NumbersToArrayMultiPort_v2)

---

### 13.3.132 ObjectIteratorKeys



**Full Name:** Ops.Array.ObjectIteratorKeys **Description:** Full NameOps.Array.ObjectIteratorKeysVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-

Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSExe (Trigger)Trigger the op

> **Input Ports:** - Visit *Ops.Array.ObjectIteratorKeys* documentation for input port details < **Output Ports:** - Visit *Ops.Array.ObjectIteratorKeys* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectIteratorKeys" **Docs:** <https://cables.gl/op/Ops.Array.ObjectIteratorKeys>

---

### 13.3.133 PaletteLibrary



**Full Name:** Ops.Array.PaletteLibrary **Description:** 500 palettes are stored in this op as one array.

> **Input Ports:** - Visit *Ops.Array.PaletteLibrary* documentation for input port details < **Output Ports:** - Visit *Ops.Array.PaletteLibrary* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PaletteLibrary" **Docs:** <https://cables.gl/op/Ops.Array.PaletteLibrary>

---

### 13.3.134 PerlinArray



**Full Name:** Ops.Array.PerlinArray **Description:** Full NameOps.Array.PerlinArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-Javascript Librariesperlin.js (perlin noise library)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Perlin array exampleOpen In EditorINPUT PORTSArray in X (Array)X domain

> **Input Ports:** - Visit *Ops.Array.PerlinArray* documentation for input port details < **Output Ports:** - Visit *Ops.Array.PerlinArray* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "PerlinArray"  
**Docs:** <https://cables.gl/op/Ops.Array.PerlinArray>

---

### 13.3.135 Phyllotaxis



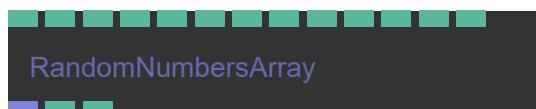
**Full Name:** Ops.Array.Phyllotaxis **Description:** Full NameOps.Array.PhyllotaxisVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence- Caniuse queryExample Patch Phyllotaxis Array OP ExampleOpen In EditorINPUT PORTSRender (Trigger)Num (Number: integer)Scale (Number)Param (Number)OUTPUT PORTSCoordinates (Array)SaveCancel ChangelogPatches using PhyllotaxisExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Array.Phyllotaxis* documentation for input port details < **Output Ports:** - Visit *Ops.Array.Phyllotaxis* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Phyllotaxis"  
**Docs:** <https://cables.gl/op/Ops.Array.Phyllotaxis>

---

### 13.3.136 RandomNumbersArray\_v4



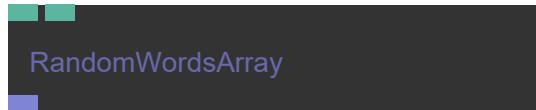
**Full Name:** Ops.Array.RandomNumbersArray\_v4 **Description:** This op lets you create an array of random values. You can choose between 1, 2, 3 or 4 dimensions.

➤ **Input Ports:** - Visit *Ops.Array.RandomNumbersArray\_v4* documentation for input port details < **Output Ports:** - Visit *Ops.Array.RandomNumbersArray\_v4* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RandomNumbersArray\_v4" **Docs:** [https://cables.gl/op/Ops.Array.RandomNumbersArray\\_v4](https://cables.gl/op/Ops.Array.RandomNumbersArray_v4)

---

### 13.3.137 RandomWordsArray



**Full Name:** Ops.Array.RandomWordsArray **Description:** Full NameOps.Array.RandomWordsArrayVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch random words exampleOpen In EditorINPUT PORTSRandom Seed (Number)Content index (Number: integer)OUTPUT PORTSWords (Array)The array with random words

**> Input Ports:** - Visit *Ops.Array.RandomWordsArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.RandomWordsArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomWordsArray" **Docs:** <https://cables.gl/op/Ops.Array.RandomWordsArray>

---

### 13.3.138 ReduceArray3\_v3



**Full Name:** Ops.Array.ReduceArray3\_v3 **Description:** Xth Mode: Copies only every x point from an array

**> Input Ports:** - Visit *Ops.Array.ReduceArray3\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ReduceArray3\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ReduceArray3\_v3" **Docs:** [https://cables.gl/op/Ops.Array.ReduceArray3\\_v3](https://cables.gl/op/Ops.Array.ReduceArray3_v3)

---

### 13.3.139 ReverseArray3



**Full Name:** Ops.Array.ReverseArray3 **Description:** E.g.  $[x_1, y_1, z_1, \dots, x_9, y_9, z_9] \rightarrow [x_9, y_9, z_9, \dots, x_1, y_1, z_1]$

**> Input Ports:** - The Array you want to reverse (containing triplets): *Check documentation < Output Ports:* - Visit *Ops.Array.ReverseArray3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ReverseArray3" **Docs:** <https://cables.gl/op/Ops.Array.ReverseArray3>

---

### 13.3.140 RingBuffer



**Full Name:** Ops.Array.RingBuffer **Description:** See also wikipedia.org/wiki/Circular\_buffer.

**> Input Ports:** - Visit *Ops.Array.RingBuffer* documentation for input port details **< Output Ports:** - Visit *Ops.Array.RingBuffer* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RingBuffer" **Docs:** <https://cables.gl/op/Ops.Array.RingBuffer>

---

### 13.3.141 RotateArray



**Full Name:** Ops.Array.RotateArray **Description:** An array of

**> Input Ports:** - Visit [Ops.Array.RotateArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.RotateArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RotateArray"  
**Docs:** <https://cables.gl/op/Ops.Array.RotateArray>

---

### 13.3.142 RouteArray



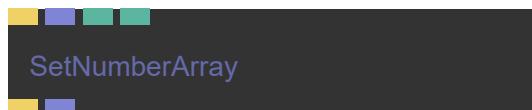
**Full Name:** Ops.Array.RouteArray **Description:** If no array is plugged into the default array port then the output is null

**> Input Ports:** - Visit [Ops.Array.RouteArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.RouteArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RouteArray"  
**Docs:** <https://cables.gl/op/Ops.Array.RouteArray>

---

### 13.3.143 SetNumberArray



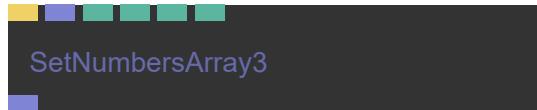
**Full Name:** Ops.Array.SetNumberArray **Description:** Full NameOps.Array.SetNumberArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Array set value exampleBasic example of one way to fill the array object  
with values from another array

**> Input Ports:** - Visit [Ops.Array.SetNumberArray documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Array.SetNumberArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SetNumberArray"  
**Docs:** <https://cables.gl/op/Ops.Array.SetNumberArray>

---

### 13.3.144 SetNumbersArray3



**Full Name:** Ops.Array.SetNumbersArray3 **Description:** Full NameOps.Array.SetNumbersArray3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch SetNumbersArray3 exampleOpen In EditorINPUT PORTS  
(Trigger)Trigger in

➤ **Input Ports:** - Visit *Ops.Array.SetNumbersArray3 documentation* for input port details < **Output Ports:**  
- Visit *Ops.Array.SetNumbersArray3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SetNumbersAr-  
ray3" **Docs:** <https://cables.gl/op/Ops.Array.SetNumbersArray3>

---

### 13.3.145 ShuffleArray3\_v3



**Full Name:** Ops.Array.ShuffleArray3\_v3 **Description:** Shuffles a triplet array based upon a random seed.

➤ **Input Ports:** - Visit *Ops.Array.ShuffleArray3\_v3 documentation* for input port details < **Output Ports:**  
- Visit *Ops.Array.ShuffleArray3\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ShuffleArray3\_v3"  
**Docs:** [https://cables.gl/op/Ops.Array.ShuffleArray3\\_v3](https://cables.gl/op/Ops.Array.ShuffleArray3_v3)

---

### 13.3.146 ShuffleArray\_v3



**Full Name:** Ops.Array.ShuffleArray\_v3 **Description:** Full NameOps.Array.ShuffleArray\_v3VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch shuffle array exampleaaaaqOpen In EditorINPUT PORTSArray3 (Array)Seed (Number)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using ShuffleArray\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.ShuffleArray\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Array.ShuffleArray\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ShuffleArray\_v3"  
**Docs:** [https://cables.gl/op/Ops.Array.ShuffleArray\\_v3](https://cables.gl/op/Ops.Array.ShuffleArray_v3)

---

### 13.3.147 SimplexArray



**Full Name:** Ops.Array.SimplexArray **Description:** Full NameOps.Array.SimplexArrayVisibilityCoreOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatch-listsJavascript Librariesperlin.js (perlin noise library)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Simplex array exampleOpen In EditorINPUT PORTSArray in X (Array)X domain

**> Input Ports:** - Visit *Ops.Array.SimplexArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.SimplexArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SimplexArray"  
**Docs:** <https://cables.gl/op/Ops.Array.SimplexArray>

---

### 13.3.148 SmoothArray



**Full Name:** Ops.Array.SmoothArray **Description:** Use this op to smoothly interpolate between differences in the values of an array.

**> Input Ports:** - Visit [Ops.Array.SmoothArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.SmoothArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SmoothArray" **Docs:** <https://cables.gl/op/Ops.Array.SmoothArray>

---

### 13.3.149 SortArray



**Full Name:** Ops.Array.SortArray **Description:** Full NameOps.Array.SortArrayVisibilityCore Op - visible for everyoneLicenseMITAuthor androgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCan use queryExample Patch SortArray exampleOpen In EditorINPUT PORTSArray to sort (Array)Array in

**> Input Ports:** - Visit [Ops.Array.SortArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Array.SortArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SortArray" **Docs:** <https://cables.gl/op/Ops.Array.SortArray>

---

### 13.3.150 SortArray3



**Full Name:** Ops.Array.SortArray3 **Description:** If we have an array with the following values:

**> Input Ports:** - Visit *Ops.Array.SortArray3 documentation* for input port details < **Output Ports:** - The sorted array (new array): Check documentation

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SortArray3"

**Docs:** <https://cables.gl/op/Ops.Array.SortArray3>

---

### 13.3.151 SortArrayOfObjects



**Full Name:** Ops.Array.SortArrayOfObjects **Description:** Full NameOps.Array.SortArrayOfObjectsVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch SortArrayOfObjects ExampleOpen In EditorINPUT PORTSArray (Array)Key  
(String)Type index (Number: integer) Numbers Strings Reverse (Number: boolean)OUTPUT PORT-  
SResult (Array)SaveCancel ChangelogPatches using SortArrayOfObjectsExamples Team cables Public  
My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.SortArrayOfObjects documentation* for input port details < **Output Ports:**  
- Visit *Ops.Array.SortArrayOfObjects documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SortArrayOfO-  
jects" **Docs:** <https://cables.gl/op/Ops.Array.SortArrayOfObjects>

---

### 13.3.152 SortArrayWithIndices\_v2



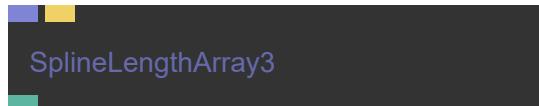
**Full Name:** Ops.Array.SortArrayWithIndices\_v2 **Description:** Full NameOps.Array.SortArrayWithIndices\_v2Visib  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSArray to sort (Array)Array in

**> Input Ports:** - Visit [Ops.Array.SortArrayWithIndices\\_v2](#) documentation for input port details **< Output Ports:** - Visit [Ops.Array.SortArrayWithIndices\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SortArrayWithIndices\_v2" **Docs:** [https://cables.gl/op/Ops.Array.SortArrayWithIndices\\_v2](https://cables.gl/op/Ops.Array.SortArrayWithIndices_v2)

---

### 13.3.153 SplineLengthArray3



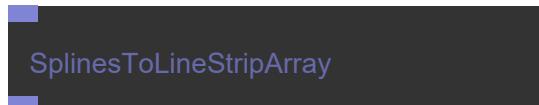
**Full Name:** Ops.Array.SplineLengthArray3 **Description:** Full NameOps.Array.SplineLengthArray3VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch splinelengthOpen In EditorINPUT PORTSArray3x (Array)The array in that is analysed for it's length

**> Input Ports:** - Visit [Ops.Array.SplineLengthArray3](#) documentation for input port details **< Output Ports:** - Visit [Ops.Array.SplineLengthArray3](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SplineLengthArray3" **Docs:** <https://cables.gl/op/Ops.Array.SplineLengthArray3>

---

### 13.3.154 SplinesToLineStripArray



**Full Name:** Ops.Array.SplinesToLineStripArray **Description:** input format is:

**> Input Ports:** - Visit [Ops.Array.SplinesToLineStripArray](#) documentation for input port details **< Output Ports:** - Visit [Ops.Array.SplinesToLineStripArray](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SplinesToLineStripArray" **Docs:** <https://cables.gl/op/Ops.Array.SplinesToLineStripArray>

---

### 13.3.155 StringToArray\_v2



**Full Name:** Ops.Array.StringToArray\_v2 **Description:** Let's you enter multiple values as an array in the editor. The result can then be used by e.g. Ops.Array.ArrayGetString or Ops.Array.ArrayGetNumber.

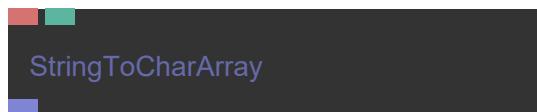
**> Input Ports:** - Visit *Ops.Array.StringToArray\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Array.StringToArray\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringToArray\_v2"

**Docs:** [https://cables.gl/op/Ops.Array.StringToArray\\_v2](https://cables.gl/op/Ops.Array.StringToArray_v2)

---

### 13.3.156 StringToCharArray



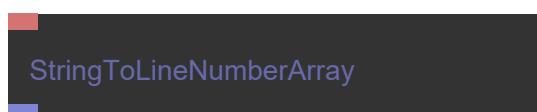
**Full Name:** Ops.Array.StringToCharArray **Description:** Full NameOps.Array.StringToCharArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch StringToCharArray Exampleexample patch for Ops.Array.StringToCharArray

**> Input Ports:** - Visit *Ops.Array.StringToCharArray documentation* for input port details **< Output Ports:**  
- Visit *Ops.Array.StringToCharArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringToCharArray" **Docs:** <https://cables.gl/op/Ops.Array.StringToCharArray>

---

### 13.3.157 StringToLineNumbersArray



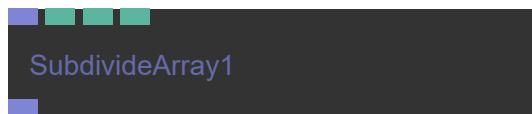
**Full Name:** Ops.Array.StringToLineNumberArray **Description:** Full NameOps.Array.StringToLineNumberArrayVis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSString (String)OUTPUT PORTSResult  
(Array)SaveCancel ChangelogPatches using StringToLineNumberArrayExamples Team cables Public  
My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.StringToLineNumberArray documentation* for input port details **< Output Ports:** - Visit *Ops.Array.StringToLineNumberArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "StringToLineNum-  
berArray" **Docs:** <https://cables.gl/op/Ops.Array.StringToLineNumberArray>

---

### 13.3.158 SubdivideArray1



**Full Name:** Ops.Array.SubdivideArray1 **Description:** This version of the op works on a single array.

**> Input Ports:** - Visit *Ops.Array.SubdivideArray1 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Array.SubdivideArray1 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SubdivideArray1"  
**Docs:** <https://cables.gl/op/Ops.Array.SubdivideArray1>

---

### 13.3.159 SwitchArray



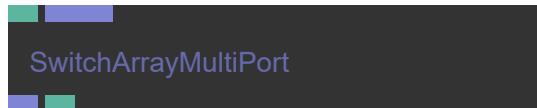
**Full Name:** Ops.Array.SwitchArray **Description:** Full NameOps.Array.SwitchArrayVisibilityCore Op -  
visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDoc-  
umentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse  
queryExample Patch SwitchArray exampleOpen In EditorYoutube Video TutorialINPUT PORTSIndex  
(Number: integer)The array to send to array out

> **Input Ports:** - Visit [Ops.Array.SwitchArray](#) documentation for input port details < **Output Ports:** - Visit [Ops.Array.SwitchArray](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SwitchArray"  
**Docs:** <https://cables.gl/op/Ops.Array.SwitchArray>

---

### 13.3.160 SwitchArrayMultiPort\_v2



**Full Name:** Ops.Array.SwitchArrayMultiPort\_v2 **Description:** Full NameOps.Array.SwitchArrayMultiPort\_v2VisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch SwitchArrayMultiPort ExampleOpen In EditorINPUT PORTSIndex (Number: integer)ArraysArrays\_0 (Array)add port (Array)OUTPUT PORTSNumber (Array)Num Values (Number)SaveCancel ChangelogPatches using SwitchArrayMultiPort\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Array.SwitchArrayMultiPort\\_v2](#) documentation for input port details < **Output Ports:** - Visit [Ops.Array.SwitchArrayMultiPort\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SwitchArrayMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Array.SwitchArrayMultiPort\\_v2](https://cables.gl/op/Ops.Array.SwitchArrayMultiPort_v2)

---

### 13.3.161 SwitchArrayOnTrigger



**Full Name:** Ops.Array.SwitchArrayOnTrigger **Description:** Full NameOps.Array.SwitchArrayOnTriggerVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSTrigger 1 (Trigger)Array 1 (Array)Trigger 2 (Trigger)Array 2 (Array)Trigger 3 (Trigger)Array 3 (Array)Trigger 4 (Trigger)Array 4 (Array)Trigger

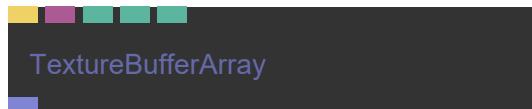
5 (Trigger)Array 5 (Array)Trigger 6 (Trigger)Array 6 (Array)Trigger 7 (Trigger)Array 7 (Array)Trigger  
8 (Trigger)Array 8 (Array)OUTPUT PORTSOut Array (Array)SaveCancel ChangelogPatches using  
SwitchArrayOnTriggerExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Array.SwitchArrayOnTrigger documentation* for input port details **< Output Ports:** - Visit *Ops.Array.SwitchArrayOnTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SwitchArrayOnTrigger" **Docs:** <https://cables.gl/op/Ops.Array.SwitchArrayOnTrigger>

---

### 13.3.162 TextureBufferArray



**Full Name:** Ops.Array.TextureBufferArray **Description:** Similar to Ops.Array.RingBuffer but for textures.

**> Input Ports:** - The size of the ring buffer (how many textures it can hold): Order (Number: boolean)Clear (Number: boolean) **< Output Ports:** - Visit *Ops.Array.TextureBufferArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TextureBufferArray" **Docs:** <https://cables.gl/op/Ops.Array.TextureBufferArray>

---

### 13.3.163 WeaveArrays



**Full Name:** Ops.Array.WeaveArrays **Description:** Full NameOps.Array.WeaveArraysVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch weaveArrays exampleOpen In EditorINPUT PORTSArray 1 (Array)The first array

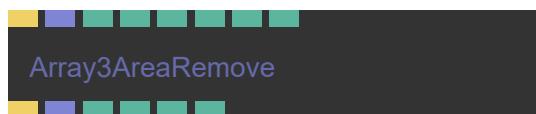
> **Input Ports:** - Visit [Ops.Array.WeaveArrays documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.WeaveArrays documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "WeaveArrays" **Docs:** <https://cables.gl/op/Ops.Array.WeaveArrays>

---

## 13.4 Ops.Array.PointArray

### 13.4.1 Array3AreaRemove



**Full Name:** Ops.Array.PointArray.Array3AreaRemove **Description:** Full NameOps.Array.PointArray.Array3AreaRemoveOp - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Array3AreaRemove exampleExample for Array3AreaRemove.

> **Input Ports:** - Visit [Ops.Array.PointArray.Array3AreaRemove documentation](#) for input port details < **Output Ports:** - Visit [Ops.Array.PointArray.Array3AreaRemove documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Array3AreaRemove" **Docs:** <https://cables.gl/op/Ops.Array.PointArray.Array3AreaRemove>

---

### 13.4.2 Array3PointEditor



**Full Name:** Ops.Array.PointArray.Array3PointEditor **Description:** Full NameOps.Array.PointArray.Array3PointEditorOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch point edit translateOpen In EditorINPUT PORTSExecute (Trigger)Total Points (Number: integer)Edit (Number: boolean)Index (Number: integer)CopyCopy From Index (Number: integer)Copy Coordinates (Trigger)Reset (Trigger)OUTPUT PORTSNext (Trigger)Coordinates

(Array)SaveCancel ChangelogPatches using Array3PointEditorExamples Team cables Public My Patches My Ops

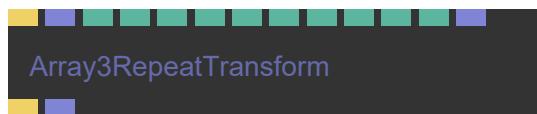
> **Input Ports:** - Visit *Ops.Array.PointArray.Array3PointEditor* documentation for input port details <

**Output Ports:** - Visit *Ops.Array.PointArray.Array3PointEditor* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array3PointEditor" **Docs:** <https://cables.gl/op/Ops.Array.PointArray.Array3PointEditor>

---

### 13.4.3 Array3RepeatTransform



**Full Name:** Ops.Array.PointArray.Array3RepeatTransform **Description:** Full NameOps.Array.PointArray.Array3RepeatTransform Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch Array3RepeatTransform exampleOpen In EditorINPUT PORTSTTrigger (Trigger)Array (Array)Times (Number: integer)Translate X (Number)Translate Y (Number)Translate Z (Number)Scale X (Number)Scale Y (Number)Scale Z (Number)Rotation X (Number)Rotation Y (Number)Rotation Z (Number)Position Array (Array)OUTPUT PORTSNext (Trigger)Result (Array)SaveCancel ChangelogPatches using Array3RepeatTransformExamples Team cables Public My Patches My Ops

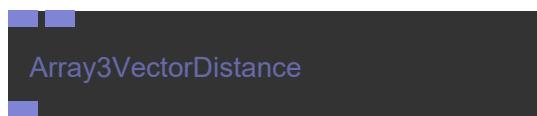
> **Input Ports:** - Visit *Ops.Array.PointArray.Array3RepeatTransform* documentation for input port details <

**Output Ports:** - Visit *Ops.Array.PointArray.Array3RepeatTransform* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Array3RepeatTransform" **Docs:** <https://cables.gl/op/Ops.Array.PointArray.Array3RepeatTransform>

---

### 13.4.4 Array3VectorDistance



**Full Name:** Ops.Array.PointArray.Array3VectorDistance **Description:** Returns a single number with the distance between each point from 2 arrays

> **Input Ports:** - Visit *Ops.Array.PointArray.Array3VectorDistance documentation for input port details* <

**Output Ports:** - Visit *Ops.Array.PointArray.Array3VectorDistance documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Array3VectorDistance"* **Docs:** <https://cables.gl/op/Ops.Array.PointArray.Array3VectorDistance>

---

### 13.4.5 ArraySpray



**Full Name:** Ops.Array.PointArray.ArraySpray **Description:** Creates a kind of spray like effect which outputs 2 arrays for position and scale.

> **Input Ports:** - Visit *Ops.Array.PointArray.ArraySpray documentation for input port details* < **Output**

**Ports:** - Visit *Ops.Array.PointArray.ArraySpray documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArraySpray"* **Docs:** <https://cables.gl/op/Ops.Array.PointArray.ArraySpray>

---

### 13.4.6 CircularPoints\_v2



**Full Name:** Ops.Array.PointArray.CircularPoints\_v2 **Description:** Full NameOps.Array.PointArray.CircularPoints\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch circular exampleOpen In EditorINPUT PORTSRadius (Number)Round  
Segments (Number)Rounds (Number)Radius Add Round (Number)Radius Add Point (Number)Offset  
(Number)Point Offset XY (Number)Point Offset Z (Number)Offset rotation (Number)Plane in-  
dex (Number: integer) XY XZ YZ Loop (Number: boolean)Rotation Direction index (Number:

integer) Clockwise Anticlockwise OUTPUT PORTSPoints (Array)Rotation (Array)Total points (Number)Array lengths (Number)SaveCancel ChangelogPatches using CircularPoints\_v2Examples Team cables Public My Patches My Ops

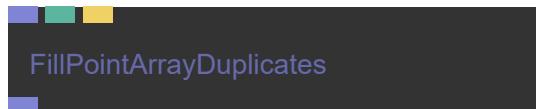
> **Input Ports:** - Visit *Ops.Array.PointArray.CircularPoints\_v2 documentation for input port details* < **Output Ports:** - Visit *Ops.Array.PointArray.CircularPoints\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "CircularPoints\_v2"*

**Docs:** [https://cables.gl/op/Ops.Array.PointArray.CircularPoints\\_v2](https://cables.gl/op/Ops.Array.PointArray.CircularPoints_v2)

---

### 13.4.7 FillPointArrayDuplicates



**Full Name:** Ops.Array.PointArray.FillPointArrayDuplicates **Description:** Full NameOps.Array.PointArray.FillPointArrayDuplicatesOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSArray (Array)Num Elements (Number: integer)Calculate (Trigger)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using FillPointArrayDuplicatesExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Array.PointArray.FillPointArrayDuplicates documentation for input port details* < **Output Ports:** - Visit *Ops.Array.PointArray.FillPointArrayDuplicates documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "FillPointArrayDuplicates"* **Docs:** <https://cables.gl/op/Ops.Array.PointArray.FillPointArrayDuplicates>

---

### 13.4.8 PointsCube



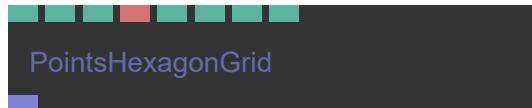
**Full Name:** Ops.Array.PointArray.PointsCube **Description:** Generates a 3d point field. Use the xyz parameters to define how points are created.

> **Input Ports:** - Visit `Ops.Array.PointArray.PointsCube` documentation for input port details < **Output Ports:** - Visit `Ops.Array.PointArray.PointsCube` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "PointsCube"  
**Docs:** <https://cables.gl/op/Ops.Array.PointArray.PointsCube>

---

### 13.4.9 PointsHexagonGrid



**Full Name:** `Ops.Array.PointArray.PointsHexagonGrid` **Description:** Full Name `Ops.Array.PointArray.PointsHexagonGrid`  
Op - visible for everyone License MIT Author androgithub source Maintained by Team cablesPatchlists-  
Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence-  
Can use query Example Patch PointsHexagonGrid Example Example for the PointsHexagonGrid  
op.

> **Input Ports:** - Visit `Ops.Array.PointArray.PointsHexagonGrid` documentation for input port details <  
**Output Ports:** - Visit `Ops.Array.PointArray.PointsHexagonGrid` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "PointsHexagonGrid"  
**Docs:** <https://cables.gl/op/Ops.Array.PointArray.PointsHexagonGrid>

---

### 13.4.10 PointsPlane\_v2



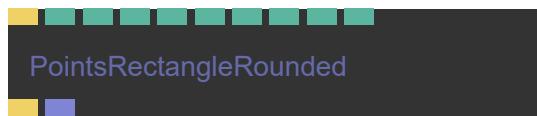
**Full Name:** `Ops.Array.PointArray.PointsPlane_v2` **Description:** Used to generate a field of points/2d array of 3d points.

> **Input Ports:** - Visit `Ops.Array.PointArray.PointsPlane_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Array.PointArray.PointsPlane_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "PointsPlane\_v2"  
**Docs:** [https://cables.gl/op/Ops.Array.PointArray.PointsPlane\\_v2](https://cables.gl/op/Ops.Array.PointArray.PointsPlane_v2)

---

### 13.4.11 PointsRectangleRounded\_v2



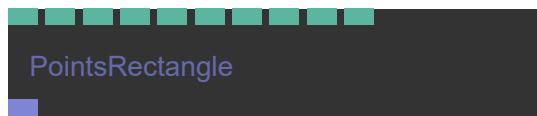
**Full Name:** Ops.Array.PointArray.PointsRectangleRounded\_v2 **Description:** Full NameOps.Array.PointArray.PointsRectangleRounded\_v2 Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch PointsRectangleRounded ExampleOpen In EditorINPUT PORTSrender (Trigger)SizeSegments (Number: integer)amount of segments for corner circles

► **Input Ports:** - Visit *Ops.Array.PointArray.PointsRectangleRounded\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Array.PointArray.PointsRectangleRounded\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PointsRectangleRounded\_v2" **Docs:** [https://cables.gl/op/Ops.Array.PointArray.PointsRectangleRounded\\_v2](https://cables.gl/op/Ops.Array.PointArray.PointsRectangleRounded_v2)

---

### 13.4.12 PointsRectangle\_v2



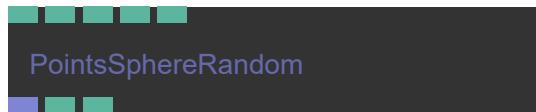
**Full Name:** Ops.Array.PointArray.PointsRectangle\_v2 **Description:** Full NameOps.Array.PointArray.PointsRectangle\_v2 Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch pointsrectangle exampleOpen In EditorINPUT PORTSLine Strip (Number: boolean)SizeSegments (Number: integer)width (Number)height (Number)border radius (Number)Loop (Number: boolean)Round CornerTop Left (Number: boolean)Top Right (Number: boolean)Bottom Left (Number: boolean)Bottom Right (Number: boolean)OUTPUT PORTSPoints (Array)SaveCancel ChangelogPatches using PointsRectangle\_v2Examples Team cables Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Array.PointArray.PointsRectangle\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Array.PointArray.PointsRectangle\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "PointsRectangle\_v2" **Docs:** [https://cables.gl/op/Ops.Array.PointArray.PointsRectangle\\_v2](https://cables.gl/op/Ops.Array.PointArray.PointsRectangle_v2)

---

### 13.4.13 PointsSphereRandom



**Full Name:** Ops.Array.PointArray.PointsSphereRandom **Description:** A point field of xyz coordinates is generated and mapped to a sphere with some randomness applied to the position.

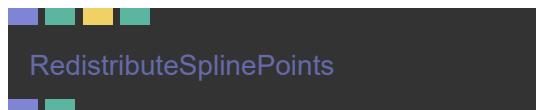
**> Input Ports:** - Visit *Ops.Array.PointArray.PointsSphereRandom* documentation for input port details

**< Output Ports:** - Visit *Ops.Array.PointArray.PointsSphereRandom* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "PointsSphereRandom" **Docs:** <https://cables.gl/op/Ops.Array.PointsSphereRandom>

---

### 13.4.14 RedistributeSplinePoints



**Full Name:** Ops.Array.PointArray.RedistributeSplinePoints **Description:** Full NameOps.Array.PointArray.RedistributeSplinePointsOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryNo op example found on this serverINPUT PORTSArray3x (Array)Num Points (Number: integer)Calculate (Trigger)Normalized (Number: boolean)OUTPUT PORTSResult (Array)Spline Length (Number)SaveCancel ChangelogPatches using RedistributeSplinePointsExamples Team cables Public My Patches My Ops

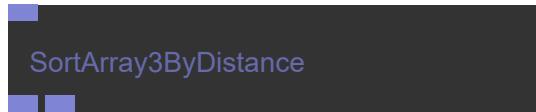
**> Input Ports:** - Visit *Ops.Array.PointArray.RedistributeSplinePoints* documentation for input port details

**< Output Ports:** - Visit *Ops.Array.PointArray.RedistributeSplinePoints* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RedistributeSplinePoints" **Docs:** <https://cables.gl/op/Ops.Array.PointArray.RedistributeSplinePoints>

---

### 13.4.15 SortArray3ByDistance



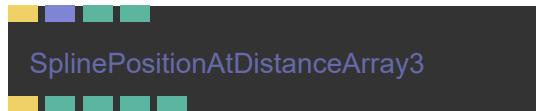
**Full Name:** Ops.Array.PointArray.SortArray3ByDistance **Description:** Sorts an array with the following rules:

➤ **Input Ports:** - Visit *Ops.Array.PointArray.SortArray3ByDistance documentation* for input port details ◀  
➤ **Output Ports:** - Visit *Ops.Array.PointArray.SortArray3ByDistance documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SortArray3ByDistance" **Docs:** <https://cables.gl/op/Ops.Array.PointArray.SortArray3ByDistance>

---

### 13.4.16 SplinePositionAtDistanceArray3



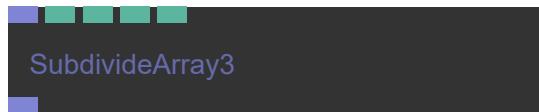
**Full Name:** Ops.Array.PointArray.SplinePositionAtDistanceArray3 **Description:** Full NameOps.Array.PointArrayOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch SplinePositionAtDistanceArray3 exampleOpen In EditorINPUT PORTSCalculate (Trigger)Trigger in

➤ **Input Ports:** - Visit *Ops.Array.PointArray.SplinePositionAtDistanceArray3 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Array.PointArray.SplinePositionAtDistanceArray3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SplinePositionAtDistanceArray3" **Docs:** <https://cables.gl/op/Ops.Array.PointArray.SplinePositionAtDistanceArray3>

---

### 13.4.17 SubdivideArray3\_v2



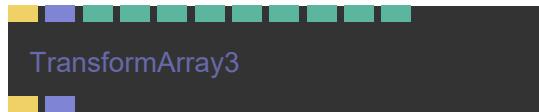
**Full Name:** Ops.Array.PointArray.SubdivideArray3\_v2 **Description:** Full NameOps.Array.PointArray.SubdivideArray3\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Array SubdivideOpen In EditorINPUT PORTSPoints (Array)The array in to subdivide

**> Input Ports:** - Visit *Ops.Array.PointArray.SubdivideArray3\_v2 documentation* for input port details <  
**Output Ports:** - Visit *Ops.Array.PointArray.SubdivideArray3\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SubdivideArray3\_v2" **Docs:** [https://cables.gl/op/Ops.Array.PointArray.SubdivideArray3\\_v2](https://cables.gl/op/Ops.Array.PointArray.SubdivideArray3_v2)

---

### 13.4.18 TransformArray3



**Full Name:** Ops.Array.PointArray.TransformArray3 **Description:** Full NameOps.Array.PointArray.TransformArray3\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch TransformArray3 exampleOpen In EditorINPUT PORTSTransform (Trigger)Array (Array)TranslationTranslate X (Number)Translate Y (Number)Translate Z (Number)ScaleScale X (Number)Scale Y (Number)Scale Z (Number)RotationRotation X (Number)Rotation Y (Number)Rotation Z (Number)OUTPUT PORTSNext (Trigger)Result (Array)SaveCancel ChangelogPatches using TransformArray3Examples Team cables Public My Patches My Ops

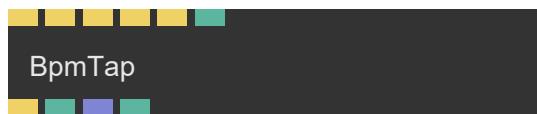
**> Input Ports:** - Visit *Ops.Array.PointArray.TransformArray3 documentation* for input port details < **Output Ports:** - Visit *Ops.Array.PointArray.TransformArray3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TransformArray3" **Docs:** <https://cables.gl/op/Ops.Array.PointArray.TransformArray3>

---

## 13.5 Ops.Audio

### 13.5.1 BpmTap



**Full Name:** Ops.Audio.BpmTap **Description:** Full NameOps.Audio.BpmTapVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch BpmTap ExampleOpen In EditorINPUT PORTSExecute (Trigger)Executes the op

**> Input Ports:** - Visit *Ops.Audio.BpmTap documentation* for input port details **< Output Ports:** - The resulting BPM (beats per minute): States (Array)An array of length 4, e.g. [1, 0, 0, 0] —> first beat

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BpmTap" **Docs:** <https://cables.gl/op/Ops.Audio.BpmTap>

---

### 13.5.2 MidiJson



**Full Name:** Ops.Audio.MidiJson **Description:** also see: Ops.Audio.MidiJsonNote

**> Input Ports:** - Visit *Ops.Audio.MidiJson documentation* for input port details **< Output Ports:** - Visit *Ops.Audio.MidiJson documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MidiJson" **Docs:** <https://cables.gl/op/Ops.Audio.MidiJson>

---

### 13.5.3 MidiJsonNote\_v2



**Full Name:** Ops.Audio.MidiJsonNote\_v2 **Description:** see also Ops.Audio.MidiJson

**> Input Ports:** - Visit *Ops.Audio.MidiJsonNote\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Audio.MidiJsonNote\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiJsonNote\_v2"

**Docs:** [https://cables.gl/op/Ops.Audio.MidiJsonNote\\_v2](https://cables.gl/op/Ops.Audio.MidiJsonNote_v2)

---

## 13.6 Ops.Boolean

### 13.6.1 And



**Full Name:** Ops.Boolean.And **Description:** Bool1

**> Input Ports:** - Visit *Ops.Boolean.And documentation* for input port details **< Output Ports:** - Visit *Ops.Boolean.And documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "And" **Docs:** <https://cables.gl/op/Ops.Boolean.And>

---

### 13.6.2 AndMultiPort\_v2



**Full Name:** Ops.Boolean.AndMultiPort\_v2 **Description:** Full NameOps.Boolean.AndMultiPort\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSBooleansBooleans\_0 (Number: boolean)add port (Number: boolean)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using AndMultiPort\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Boolean.AndMultiPort\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Boolean.AndMultiPort\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AndMultiPort\_v2"

**Docs:** [https://cables.gl/op/Ops.Boolean.AndMultiPort\\_v2](https://cables.gl/op/Ops.Boolean.AndMultiPort_v2)

---

### 13.6.3 BoolByTrigger



**Full Name:** Ops.Boolean.BoolByTrigger **Description:** Full NameOps.Boolean.BoolByTriggerVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch BoolByTrigger ExampleOpen In EditorINPUT PORTSTrue (Trigger)false (Trigger)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using BoolByTriggerExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Boolean.BoolByTrigger documentation* for input port details **< Output Ports:** - Visit *Ops.Boolean.BoolByTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "BoolByTrigger"

**Docs:** <https://cables.gl/op/Ops.Boolean.BoolByTrigger>

---

### 13.6.4 BoolToColor



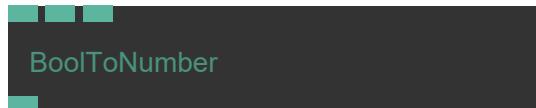
**Full Name:** Ops.Boolean.BoolToColor **Description:** Full NameOps.Boolean.BoolToColorVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSBoolean (Number: boolean)R  
True (Number)G True (Number)B True (Number)A True (Number)R False (Number)G False (Num-  
ber)B False (Number)A False (Number)OUTPUT PORTSR (Number)G (Number)B (Number)A (Num-  
ber)SaveCancel ChangelogPatches using BoolToColorExamples Team cables Public My Patches My  
Ops

➤ **Input Ports:** - Visit *Ops.Boolean.BoolToColor* documentation for input port details < **Output Ports:** - Visit *Ops.Boolean.BoolToColor* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "BoolToColor"  
**Docs:** <https://cables.gl/op/Ops.Boolean.BoolToColor>

---

### 13.6.5 BoolToNumber\_v2



**Full Name:** Ops.Boolean.BoolToNumber\_v2 **Description:** Per default Value 0 will go through to the output port.

➤ **Input Ports:** - Visit *Ops.Boolean.BoolToNumber\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Boolean.BoolToNumber\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "BoolToNumber\_v2" **Docs:** [https://cables.gl/op/Ops.Boolean.BoolToNumber\\_v2](https://cables.gl/op/Ops.Boolean.BoolToNumber_v2)

---

### 13.6.6 BoolToString



**Full Name:** Ops.Boolean.BoolToString **Description:** Full NameOps.Boolean.BoolToStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-

listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch BoolToString exampleOpen In EditorINPUT PORTSBoolean (Number: boolean)False (String)True (String)OUTPUT PORTSString (String)SaveCancel ChangelogPatches using BoolToStringExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Boolean.BoolToString documentation* for input port details **< Output Ports:** - Visit *Ops.Boolean.BoolToString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "BoolToString"* **Docs:** <https://cables.gl/op/Ops.Boolean.BoolToString>

---

### 13.6.7 Boolean



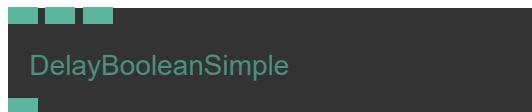
**Full Name:** Ops.Boolean.Boolean **Description:** If you use bool-value on multiple positions in your patch it is handy to just write it down once and connect the op to various other ops which use the value. The output port will mirror the input port.

**> Input Ports:** - Visit *Ops.Boolean.Boolean documentation* for input port details **< Output Ports:** - Visit *Ops.Boolean.Boolean documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Boolean"* **Docs:** <https://cables.gl/op/Ops.Boolean.Boolean>

---

### 13.6.8 DelayBooleanSimple



**Full Name:** Ops.Boolean.DelayBooleanSimple **Description:** Full NameOps.Boolean.DelayBooleanSimpleVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch DelayBooleanSimple ExampleOpen In EditorINPUT PORTSValue (Num-

ber)Delay True (Number)Delay False (Number)OUTPUT PORTSOut Value (Number)SaveCancel ChangeLogPatches using DelayBooleanSimpleExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Boolean.DelayBooleanSimple* documentation for input port details < **Output Ports:** - Visit *Ops.Boolean.DelayBooleanSimple* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DelayBooleanSimple" **Docs:** <https://cables.gl/op/Ops.Boolean.DelayBooleanSimple>

---

### 13.6.9 IfFalseThen



**Full Name:** Ops.Boolean.IfFalseThen **Description:** Basically the same as Ops.Boolean.IfTrueThen, the only difference is that the output ports are switched.

> **Input Ports:** - Visit *Ops.Boolean.IfFalseThen* documentation for input port details < **Output Ports:** - Visit *Ops.Boolean.IfFalseThen* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "IfFalseThen" **Docs:** <https://cables.gl/op/Ops.Boolean.IfFalseThen>

---

### 13.6.10 IfTrueThen\_v2



**Full Name:** Ops.Boolean.IfTrueThen\_v2 **Description:** Can be used as a switch. If the input Boolean is true/ 1 the output port Then will be triggered. If Boolean is false / 0 the output port Else will be triggered.

> **Input Ports:** - Visit *Ops.Boolean.IfTrueThen\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Boolean.IfTrueThen\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "IfTrueThen\_v2" **Docs:** [https://cables.gl/op/Ops.Boolean.IfTrueThen\\_v2](https://cables.gl/op/Ops.Boolean.IfTrueThen_v2)

---

### 13.6.11 IsOne



**Full Name:** Ops.Boolean.IsOne **Description:** Only returns true if the input Value is 1. Returns false in all other cases, e.g. when input value is 0, -1 or 2.

➤ **Input Ports:** - Visit [Ops.Boolean.IsOne documentation](#) for input port details < **Output Ports:** - Visit [Ops.Boolean.IsOne documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IsOne" **Docs:** <https://cables.gl/op/Ops.Boolean.IsOne>

---

### 13.6.12 IsZero



**Full Name:** Ops.Boolean.IsZero **Description:** Only returns true if the input Value is 0. Returns false in all other cases, e.g. when input value is 1, -1 or 2.

➤ **Input Ports:** - Visit [Ops.Boolean.IsZero documentation](#) for input port details < **Output Ports:** - Visit [Ops.Boolean.IsZero documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IsZero" **Docs:** <https://cables.gl/op/Ops.Boolean.IsZero>

---

### 13.6.13 MonoFlop



**Full Name:** Ops.Boolean.MonoFlop **Description:** Imagine a light switch (often found in staircases): Once you press the light switch the light goes on for x seconds, then automatically turns off on its own.

> **Input Ports:** - Visit *Ops.Boolean.MonoFlop documentation* for input port details < **Output Ports:** - Visit *Ops.Boolean.MonoFlop documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MonoFlop" **Docs:** <https://cables.gl/op/Ops.Boolean.MonoFlop>

---

### 13.6.14 Not



**Full Name:** Ops.Boolean.Not **Description:** Full NameOps.Boolean.NotVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch boolean exampleOpen In EditorINPUT PORTSBoolean (Number: boolean)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using NotExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Boolean.Not documentation* for input port details < **Output Ports:** - Visit *Ops.Boolean.Not documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Not" **Docs:** <https://cables.gl/op/Ops.Boolean.Not>

---

### 13.6.15 Or



**Full Name:** Ops.Boolean.Or **Description:** Performs a logical OR operation. If one of the input ports evaluates to true (not 0), the Result will be true as well, false otherwise.

➤ **Input Ports:** - Visit [Ops.Boolean.Or documentation](#) for input port details < **Output Ports:** - Visit [Ops.Boolean.Or documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "Or"](#) **Docs:** <https://cables.gl/op/Ops.Boolean.Or>

---

### 13.6.16 OrNumber\_v2



**Full Name:** Ops.Boolean.OrNumber\_v2 **Description:** Full NameOps.Boolean.OrNumber\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch OrNumber ExampleOpen In EditorINPUT PORTSNumber (Number)Number 2 (Number)Number 3 (Number)Number 4 (Number)Number 5 (Number)Number 6 (Number)Number 7 (Number)Number 8 (Number)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using OrNumber\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Boolean.OrNumber\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Boolean.OrNumber\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "OrNumber\\_v2"](#) **Docs:** [https://cables.gl/op/Ops.Boolean.OrNumber\\_v2](https://cables.gl/op/Ops.Boolean.OrNumber_v2)

---

### 13.6.17 ParseBoolean\_v2



**Full Name:** Ops.Boolean.ParseBoolean\_v2 **Description:** Converts a string / number to a boolean, outputs false when value equals 0, false, null or undefined.

➤ **Input Ports:** - Visit [Ops.Boolean.ParseBoolean\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Boolean.ParseBoolean\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ParseBoolean\_v2"  
**Docs:** [https://cables.gl/op/Ops.Boolean.ParseBoolean\\_v2](https://cables.gl/op/Ops.Boolean.ParseBoolean_v2)

---

### 13.6.18 RouteBoolean



**Full Name:** Ops.Boolean.RouteBoolean **Description:** If nothing is plugged into default then the output is false by default

**> Input Ports:** - Visit *Ops.Boolean.RouteBoolean* documentation for input port details **< Output Ports:**  
- Visit *Ops.Boolean.RouteBoolean* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RouteBoolean"  
**Docs:** <https://cables.gl/op/Ops.Boolean.RouteBoolean>

---

### 13.6.19 ToggleBool\_v2



**Full Name:** Ops.Boolean.ToggleBool\_v2 **Description:** Outputs a boolean value which changes state every time Trigger is executed, this will result in an output like true -> false -> true -> false ...

**> Input Ports:** - Visit *Ops.Boolean.ToggleBool\_v2* documentation for input port details **< Output Ports:**  
- Visit *Ops.Boolean.ToggleBool\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ToggleBool\_v2"  
**Docs:** [https://cables.gl/op/Ops.Boolean.ToggleBool\\_v2](https://cables.gl/op/Ops.Boolean.ToggleBool_v2)

---

## 13.6.20 TriggerChangedFalse



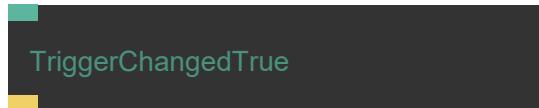
**Full Name:** Ops.Boolean.TriggerChangedFalse **Description:** When the input Value changes from true to false Next is triggered once.

**> Input Ports:** - Visit *Ops.Boolean.TriggerChangedFalse documentation* for input port details **< Output Ports:** - Visit *Ops.Boolean.TriggerChangedFalse documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerChangedFalse" **Docs:** <https://cables.gl/op/Ops.Boolean.TriggerChangedFalse>

---

## 13.6.21 TriggerChangedTrue



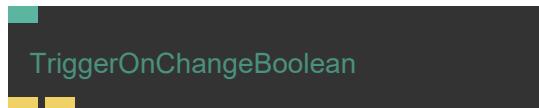
**Full Name:** Ops.Boolean.TriggerChangedTrue **Description:** When the input Value changes from false to true Next is triggered once.

**> Input Ports:** - Visit *Ops.Boolean.TriggerChangedTrue documentation* for input port details **< Output Ports:** - Visit *Ops.Boolean.TriggerChangedTrue documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerChangedTrue" **Docs:** <https://cables.gl/op/Ops.Boolean.TriggerChangedTrue>

---

## 13.6.22 TriggerOnChangeBoolean\_v2



**Full Name:** Ops.Boolean.TriggerOnChangeBoolean\_v2 **Description:** When Value changed from true to false the False trigger port triggers once, when value changed from false to true the True trigger port

triggers once.

**> Input Ports:** - Visit *Ops.Boolean.TriggerOnChangeBoolean\_v2* documentation for input port details <  
**Output Ports:** - Visit *Ops.Boolean.TriggerOnChangeBoolean\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerOnChangeBoolean\_v2" **Docs:** [https://cables.gl/op/Ops.Boolean.TriggerOnChangeBoolean\\_v2](https://cables.gl/op/Ops.Boolean.TriggerOnChangeBoolean_v2)

---

## 13.7 Ops.Cables

### 13.7.1 AssetPathURL



**Full Name:** Ops.Cables.AssetPathURL **Description:** use this if you want to generate filenames in a patch

**> Input Ports:** - Visit *Ops.Cables.AssetPathURL* documentation for input port details < **Output Ports:** - Visit *Ops.Cables.AssetPathURL* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AssetPathURL" **Docs:** <https://cables.gl/op/Ops.Cables.AssetPathURL>

---

### 13.7.2 CablesInfo



**Full Name:** Ops.Cables.CablesInfo **Description:** Full NameOps.Cables.CablesInfoVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch cables infoOpen In EditorOUTPUT PORTSURL (String)SaveCancel Changelog- Patches using CablesInfoExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Cables.CablesInfo](#) documentation for input port details **< Output Ports:** - Visit [Ops.Cables.CablesInfo](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CablesInfo" **Docs:** <https://cables.gl/op/Ops.Cables.CablesInfo>

---

### 13.7.3 CallBack\_v2



**Full Name:** Ops.Cables.CallBack\_v2 **Description:** Useful when a cables patch is embedded into a website. All parameters (Value 1, Value 2, Value 3) will be sent as a parameter array. So e.g. if Callback Name is foo cables would call:

**> Input Ports:** - Visit [Ops.Cables.CallBack\\_v2](#) documentation for input port details **< Output Ports:** - Visit [Ops.Cables.CallBack\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CallBack\_v2" **Docs:** [https://cables.gl/op/Ops.Cables.CallBack\\_v2](https://cables.gl/op/Ops.Cables.CallBack_v2)

---

### 13.7.4 FPS\_v2



**Full Name:** Ops.Cables.FPS\_v2 **Description:** Full Name Ops.Cables.FPS\_v2 VisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence Can use query Example Patch FPS Example Open In Editor OUTPUT PORTS FPS (Number) MS (Number) Save Cancel Changelog Patches using FPS\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Cables.FPS\\_v2](#) documentation for input port details **< Output Ports:** - Visit [Ops.Cables.FPS\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FPS\_v2" **Docs:** [https://cables.gl/op/Ops.Cables.FPS\\_v2](https://cables.gl/op/Ops.Cables.FPS_v2)

---

### 13.7.5 Function\_v2



**Full Name:** Ops.Cables.Function\_v2 **Description:** Execute / trigger from an external script, useful when embedding a cables-patch into a website.

**> Input Ports:** - Visit *Ops.Cables.Function\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Cables.Function\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Function\_v2" **Docs:** [https://cables.gl/op/Ops.Cables.Function\\_v2](https://cables.gl/op/Ops.Cables.Function_v2)

---

### 13.7.6 GetOpName



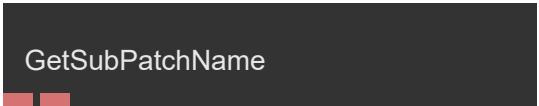
**Full Name:** Ops.Cables.GetOpName **Description:** Full NameOps.Cables.GetOpNameVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch info exampleOpen In EditorINPUT PORTSOId (String)OUTPUT PORTSFound (booleanNumber)Name (String)Shortname (String)Version (Number)SaveCancel ChangelogPatches using GetOpNameExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Cables.GetOpName documentation* for input port details **< Output Ports:** - Visit *Ops.Cables.GetOpName documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GetOpName" **Docs:** <https://cables.gl/op/Ops.Cables.GetOpName>

---

### 13.7.7 GetSubPatchName



GetSubPatchName

**Full Name:** Ops.Cables.GetSubPatchName **Description:** Full NameOps.Cables.GetSubPatchNameVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse query Op is missing in example patch!Example Patch GetSubPatchName exampleOpen  
In EditorOUTPUT PORTSName (String)ShortName (String)SaveCancel ChangelogPatches using  
GetSubPatchNameExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Cables.GetSubPatchName documentation* for input port details < **Output Ports:** - Visit *Ops.Cables.GetSubPatchName documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GetSubPatch-  
Name" **Docs:** <https://cables.gl/op/Ops.Cables.GetSubPatchName>

---

### 13.7.8 LoadingJob



LoadingJob

**Full Name:** Ops.Cables.LoadingJob **Description:** you can create your own tasks that will trigger loadingstatus/loadingindicator ops

➤ **Input Ports:** - Visit *Ops.Cables.LoadingJob documentation* for input port details < **Output Ports:** - Visit *Ops.Cables.LoadingJob documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "LoadingJob"  
**Docs:** <https://cables.gl/op/Ops.Cables.LoadingJob>

---

## 13.7.9 LoadingStatus\_v2



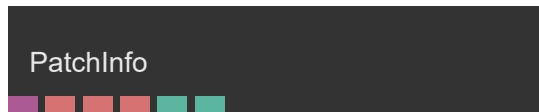
**Full Name:** Ops.Cables.LoadingStatus\_v2 **Description:** Full NameOps.Cables.LoadingStatus\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch LoadingStatus HttpRequest ExampleMakes a request to the MetaWeather  
API and displays the current temperature.

**> Input Ports:** - Visit *Ops.Cables.LoadingStatus\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Cables.LoadingStatus\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "LoadingSta-  
tus\_v2" **Docs:** [https://cables.gl/op/Ops.Cables.LoadingStatus\\_v2](https://cables.gl/op/Ops.Cables.LoadingStatus_v2)

---

## 13.7.10 PatchInfo\_v2



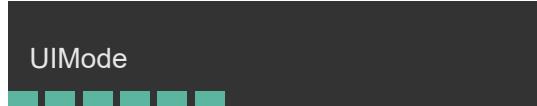
**Full Name:** Ops.Cables.PatchInfo\_v2 **Description:** Full NameOps.Cables.PatchInfo\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch PatchInfo ExampleOpen In EditorOUTPUT PORTSConfig (Object)an object  
with the patch configuration

**> Input Ports:** - Visit *Ops.Cables.PatchInfo\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Cables.PatchInfo\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PatchInfo\_v2"  
**Docs:** [https://cables.gl/op/Ops.Cables.PatchInfo\\_v2](https://cables.gl/op/Ops.Cables.PatchInfo_v2)

---

### 13.7.11 UIMode



**Full Name:** Ops.Cables.UIMode **Description:** This op is useful to find out if the patch is viewed from inside the cables editor UI or embedded into a website. This can be helpful, e.g. if you want to display debug information only when working on the patch, but not when it is shown publicly (outside the editor).

➤ **Input Ports:** - Visit [Ops.Cables.UIMode documentation](#) for input port details < **Output Ports:** - Visit [Ops.Cables.UIMode documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "UIMode" **Docs:** <https://cables.gl/op/Ops.Cables.UIMode>

---

### 13.7.12 UploadAsset



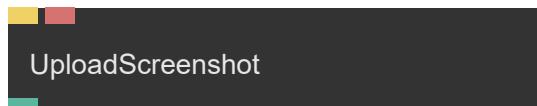
**Full Name:** Ops.Cables.UploadAsset **Description:** this op only works when running in the cables.gl editor ui, and only if you have patch write access.

➤ **Input Ports:** - Visit [Ops.Cables.UploadAsset documentation](#) for input port details < **Output Ports:** - Visit [Ops.Cables.UploadAsset documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "UploadAsset" **Docs:** <https://cables.gl/op/Ops.Cables.UploadAsset>

---

### 13.7.13 UploadScreenshot



**Full Name:** Ops.Cables.UploadScreenshot **Description:** Full NameOps.Cables.UploadScreenshotVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSTrigger (Trigger)DataUrl (String)OUTPUT  
PORTSResult (Number)SaveCancel ChangelogPatches using UploadScreenshotExamples Team cables  
Public My Patches My Ops

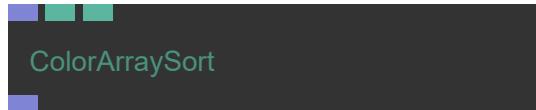
**> Input Ports:** - Visit *Ops.Cables.UploadScreenshot documentation* for input port details **< Output Ports:**  
- Visit *Ops.Cables.UploadScreenshot documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "UploadScreenshot"  
**Docs:** <https://cables.gl/op/Ops.Cables.UploadScreenshot>

---

## 13.8 Ops.Color

### 13.8.1 ColorArraySort



**Full Name:** Ops.Color.ColorArraySort **Description:** Full NameOps.Color.ColorArraySortVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch Color Array SortOpen In EditorINPUT PORTSColors (Array)Sort  
index (Number: integer) No Luminance Hue Saturation Lightness Input Format index (Num-  
ber: integer) RGBA RGB OUTPUT PORTSNew Colors (Array)SaveCancel ChangelogPatches using  
ColorArraySortExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Color.ColorArraySort documentation* for input port details **< Output Ports:**  
- Visit *Ops.Color.ColorArraySort documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ColorArraySort"  
**Docs:** <https://cables.gl/op/Ops.Color.ColorArraySort>

---

## 13.8.2 ColorPalettes



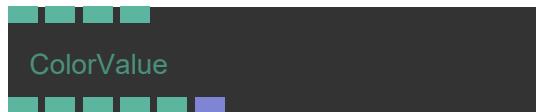
**Full Name:** Ops.Color.ColorPalettes **Description:** Outputs a harmonic color pallet. By changing the Index value, you will get another one. The resulting Color Array contains 15 values ( $5 \times 3$ ) – so 5 colors with a red, green and blue value between 0 and 1.

**> Input Ports:** - Visit *Ops.Color.ColorPalettes documentation* for input port details **< Output Ports:** - Visit *Ops.Color.ColorPalettes documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ColorPalettes"  
**Docs:** <https://cables.gl/op/Ops.Color.ColorPalettes>

---

## 13.8.3 ColorValue



**Full Name:** Ops.Color.ColorValue **Description:** The color can be either picked with the color picker or entered directly.

**> Input Ports:** - Visit *Ops.Color.ColorValue documentation* for input port details **< Output Ports:** - Visit *Ops.Color.ColorValue documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ColorValue"  
**Docs:** <https://cables.gl/op/Ops.Color.ColorValue>

---

## 13.8.4 EyeDropper



**Full Name:** Ops.Color.EyeDropper **Description:** Full NameOps.Color.EyeDropperVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesCompatibility-canuse.com: api\_eyedropperPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch eyedropper exampleOpen In EditorINPUT PORTSOpen (Trigger)OUTPUT PORTSHex (String)R (Number)G (Number)B (Number)Supported (booleanNumber)SaveCancel ChangelogPatches using EyeDropperExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Color.EyeDropper documentation* for input port details < **Output Ports:** - Visit *Ops.Color.EyeDropper documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "EyeDropper" **Docs:** <https://cables.gl/op/Ops.Color.EyeDropper>

---

### 13.8.5 Gradient



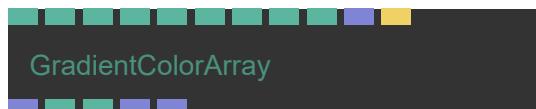
**Full Name:** Ops.Color.Gradient **Description:** This op allows the creation of custom gradients. Click the edit button to get the UI to edit gradient. More colours can be added to the gradient.

➤ **Input Ports:** - Visit *Ops.Color.Gradient documentation* for input port details < **Output Ports:** - Visit *Ops.Color.Gradient documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Gradient" **Docs:** <https://cables.gl/op/Ops.Color.Gradient>

---

### 13.8.6 GradientColorArray



**Full Name:** Ops.Color.GradientColorArray **Description:** This op allows the creation of custom gradients. Click the edit button to get the UI to edit gradient. More colours can be added to the gradient.

> **Input Ports:** - a information (see documentation for format): Randomize Colors (Trigger) < **Output Ports:** - Visit *Ops.Color.GradientColorArray* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GradientColorArray" **Docs:** <https://cables.gl/op/Ops.Color.GradientColorArray>

---

### 13.8.7 HSLtoRGB



**Full Name:** Ops.Color.HSLtoRGB **Description:** Full NameOps.Color.HSLtoRGBVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsJavascript Librarieschroma.js (library for color conversions)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch HSL to RGBOpen In EditorINPUT PORTSHue (Number)Saturation (Number)Lightness (Number)OUTPUT PORTSR (Number)G (Number)B (Number)SaveCancel ChangelogPatches using HSLtoRGBExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Color.HSLtoRGB* documentation for input port details < **Output Ports:** - Visit *Ops.Color.HSLtoRGB* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "HSLtoRGB" **Docs:** <https://cables.gl/op/Ops.Color.HSLtoRGB>

---

### 13.8.8 HexToRGB\_v2



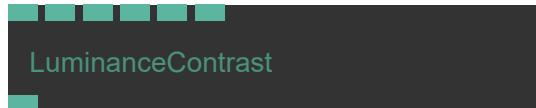
**Full Name:** Ops.Color.HexToRGB\_v2 **Description:** The resulting colors will be in range [0..1].

> **Input Ports:** - ff0000 or 00ff00 (you can omit the # character if you want): Bytes (Number: boolean)If true the output will be in range [0..255], otherwise [0..1] < **Output Ports:** - Visit *Ops.Color.HexToRGB\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "HexToRGB\_v2"  
**Docs:** [https://cables.gl/op/Ops.Color.HexToRGB\\_v2](https://cables.gl/op/Ops.Color.HexToRGB_v2)

---

### 13.8.9 LuminanceContrast



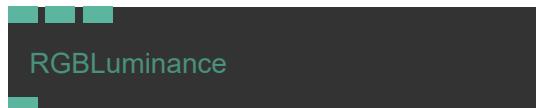
**Full Name:** Ops.Color.LuminanceContrast **Description:** Full NameOps.Color.LuminanceContrastVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch LuminanceContrast ExampleOpen In EditorINPUT PORTSR 1  
(Number)G 1 (Number)B 1 (Number)R 2 (Number)G 2 (Number)B 2 (Number)OUTPUT PORTSContrast  
(Number)SaveCancel ChangelogPatches using LuminanceContrastExamples Team cables Public My  
Patches My Ops

➤ **Input Ports:** - Visit `Ops.Color.LuminanceContrast` documentation for input port details < **Output Ports:**  
- Visit `Ops.Color.LuminanceContrast` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "LuminanceCon-  
trast" **Docs:** <https://cables.gl/op/Ops.Color.LuminanceContrast>

---

### 13.8.10 RGBLuminance



**Full Name:** Ops.Color.RGBLuminance **Description:** Full NameOps.Color.RGBLuminanceVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Javascript Librarieschroma.js (library for color conversions)Documentation (markdown)IssuesExample  
patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RGB to HSOpen  
In EditorINPUT PORTSR (Number)G (Number)B (Number)OUTPUT PORTSLuminance (Num-  
ber)SaveCancel ChangelogPatches using RGBLuminanceExamples Team cables Public My Patches My  
Ops

**> Input Ports:** - Visit [Ops.Color.RGBLuminance documentation](#) for input port details **< Output Ports:** - Visit [Ops.Color.RGBLuminance documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "RGBLuminance"](#) **Docs:** <https://cables.gl/op/Ops.Color.RGBLuminance>

---

### 13.8.11 RGBToCMYK



**Full Name:** Ops.Color.RGBToCMYK **Description:** Full NameOps.Color.RGBToCMYKVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsJavascript Librarieschroma.js (library for color conversions)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RGB to HSOpen In EditorINPUT PORTSR (Number)G (Number)B (Number)OUTPUT PORTSC (Number)M (Number)Y (Number)K (Number)SaveCancel ChangelogPatches using RGBToCMYKExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Color.RGBToCMYK documentation](#) for input port details **< Output Ports:** - Visit [Ops.Color.RGBToCMYK documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "RGBToCMYK"](#) **Docs:** <https://cables.gl/op/Ops.Color.RGBToCMYK>

---

### 13.8.12 RGBtoHSB



**Full Name:** Ops.Color.RGBtoHSB **Description:** Full NameOps.Color.RGBtoHSBVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RgbToHex RGBtoHSB ExampleOpen In EditorINPUT PORTSR (Number)G (Number)B (Number)OUTPUT PORTSHue (Number)Saturation (Number)Brightness

(Number)SaveCancel ChangelogPatches using RGBtoHSBExamples Team cables Public My Patches  
My Ops

➤ **Input Ports:** - Visit *Ops.Color.RGBtoHSB* documentation for input port details < **Output Ports:** - Visit *Ops.Color.RGBtoHSB* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RGBtoHSB" **Docs:** <https://cables.gl/op/Ops.Color.RGBtoHSB>

---

### 13.8.13 RGBtoHSL



**Full Name:** Ops.Color.RGBtoHSL **Description:** Full NameOps.Color.RGBtoHSLVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsJavascript Librarieschroma.js (library for color conversions)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RGB to HSLOpen In EditorINPUT PORTSR (Number)G (Number)B (Number)OUTPUT PORTSHue (Number)Saturation (Number)Lightness (Number)SaveCancel ChangelogPatches using RGBtoHSLEXamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Color.RGBtoHSL* documentation for input port details < **Output Ports:** - Visit *Ops.Color.RGBtoHSL* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RGBtoHSL" **Docs:** <https://cables.gl/op/Ops.Color.RGBtoHSL>

---

### 13.8.14 RgbToHex



**Full Name:** Ops.Color.RgbToHex **Description:** Full NameOps.Color.RgbToHexVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryEx-

ample Patch RgbToHex RGBtoHSB ExampleOpen In EditorINPUT PORTSr (Number)g (Number)b (Number)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using RgbToHexExamples Team cables Public My Patches My Ops

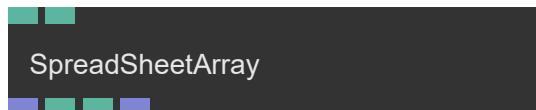
**> Input Ports:** - Visit [Ops.Color.RgbToHex documentation](#) for input port details **< Output Ports:** - Visit [Ops.Color.RgbToHex documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RgbToHex" **Docs:** <https://cables.gl/op/Ops.Color.RgbToHex>

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## 13.9 Ops.Data

### 13.9.1 SpreadSheetArray



**Full Name:** Ops.Data.SpreadSheetArray **Description:** enter data in a spreadsheet user interface.

**> Input Ports:** - Visit [Ops.Data.SpreadSheetArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Data.SpreadSheetArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SpreadSheetArray" **Docs:** <https://cables.gl/op/Ops.Data.SpreadSheetArray>

---

## 13.10 Ops.Data.Compose.Array

### 13.10.1 CompArray



**Full Name:** Ops.Data.Compose.Array.CompArray **Description:** Full NameOps.Data.Compose.Array.CompArrayVisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-

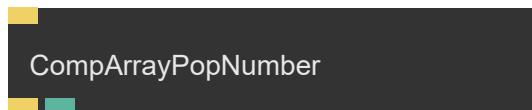
cenceCaniuse queryExample Patch Array Compose ExampleOpen In EditorINPUT PORTSUpdate (Trigger)Active (Number: boolean)Clear (Number: boolean)Reset (Trigger)OUTPUT PORTSNext (Trigger)Result (Array)SaveCancel ChangelogPatches using CompArrayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Array.CompArray* documentation for input port details **< Output Ports:** - Visit *Ops.Data.Compose.Array.CompArray* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CompArray" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArray>

---

## 13.10.2 CompArrayPopNumber



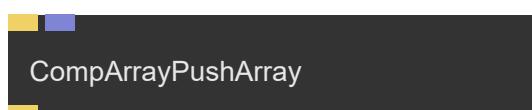
**Full Name:** Ops.Data.Compose.Array.CompArrayPopNumber **Description:** Full NameOps.Data.Compose.Array.CompOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)OUTPUT PORTSNext (Trigger)Result (Number)SaveCancel ChangelogPatches using CompArrayPopNumberExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPopNumber* documentation for input port details **< Output Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPopNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CompArrayPopNumber" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPopNumber>

---

## 13.10.3 CompArrayPushArray



**Full Name:** Ops.Data.Compose.Array.CompArrayPushArray **Description:** Full NameOps.Data.Compose.Array.CompArrayPushArray - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query No op example found on this server INPUT PORTS Update (Trigger) Array (Array) OUTPUT PORTS Next (Trigger) Save Cancel Changelog Patches using CompArrayPushArray Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushArray documentation for input port details* < **Output Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushArray documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompArrayPushArray" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPushArray>

---

#### 13.10.4 CompArrayPushArrayItems

CompArrayPushArrayItems

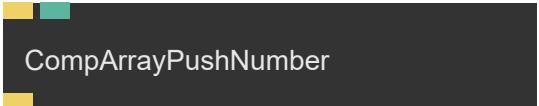
**Full Name:** Ops.Data.Compose.Array.CompArrayPushArrayItems **Description:** Full NameOps.Data.Compose.Array.CompArrayPushArrayItems - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch CompArrayPushArrayItems example Open In Editor INPUT PORTS Update (Trigger) Array (Array) OUTPUT PORTS Next (Trigger) Save Cancel Changelog Patches using CompArrayPushArrayItems Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushArrayItems documentation for input port details* < **Output Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushArrayItems documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompArrayPushArrayItems" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPushArrayItems>

---

### 13.10.5 CompArrayPushNumber



CompArrayPushNumber

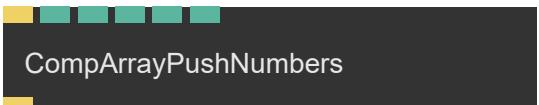
**Full Name:** Ops.Data.Compose.Array.CompArrayPushNumber **Description:** Full NameOps.Data.Compose.Array.CompArrayPushNumber - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Array Compose ExampleOpen In EditorINPUT PORTSUpdate (Trigger)Number (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompArrayPushNumberExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushNumber documentation for input port details* **< Output Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushNumber documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompArrayPushNumber" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPushNumber>

---

### 13.10.6 CompArrayPushNumbers



CompArrayPushNumbers

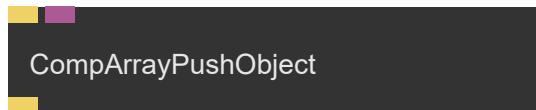
**Full Name:** Ops.Data.Compose.Array.CompArrayPushNumbers **Description:** Full NameOps.Data.Compose.Array.CompArrayPushNumbers - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)X (Number)Y (Number)Z (Number)W (Number)Num index (Number: integer) 1 2 3 4 OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompArrayPushNumbersExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushNumbers documentation for input port details* **< Output Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushNumbers documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CompArrayPushNumbers" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPushNumbers>

---

### 13.10.7 CompArrayPushObject



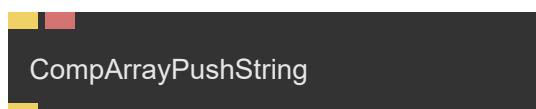
**Full Name:** `Ops.Data.Compose.Array.CompArrayPushObject` **Description:** will try to create a copy of an object

► **Input Ports:** - Visit [Ops.Data.Compose.Array.CompArrayPushObject documentation](#) for input port details  
◀ **Output Ports:** - Visit [Ops.Data.Compose.Array.CompArrayPushObject documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CompArrayPushObject" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPushObject>

---

### 13.10.8 CompArrayPushString



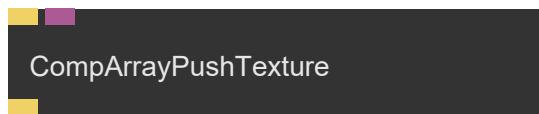
**Full Name:** `Ops.Data.Compose.Array.CompArrayPushString` **Description:** Full Name  
`Ops.Data.Compose.Array.CompArrayPushString` Op - visible for everyone  
License MIT  
Author pandurgithub  
source Maintained by Team cablesPatchlists-  
Documentation (markdown)  
Issues Example patch idYoutube ids (comma seperated)  
Op LicenceCa-  
niuse queryNo op example found on this server  
INPUT PORTS Update (Trigger) String (String)  
OUTPUT PORTS Next (Trigger) Save Cancel Changelog  
Patches using CompArrayPushString Examples Team cables Public My Patches My Ops

► **Input Ports:** - Visit [Ops.Data.Compose.Array.CompArrayPushString documentation](#) for input port details  
◀ **Output Ports:** - Visit [Ops.Data.Compose.Array.CompArrayPushString documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CompArrayPushString" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPushString>

---

### 13.10.9 CompArrayPushTexture



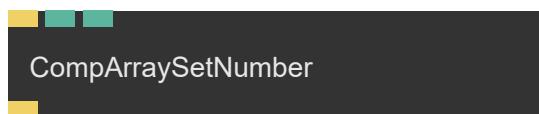
**Full Name:** Ops.Data.Compose.Array.CompArrayPushTexture **Description:** Full NameOps.Data.Compose.Array.ComOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)Object (Object)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompArrayPushTextureExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushTexture documentation* for input port details **< Output Ports:** - Visit *Ops.Data.Compose.Array.CompArrayPushTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompArrayPushTexture" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayPushTexture>

---

### 13.10.10 CompArraySetNumber



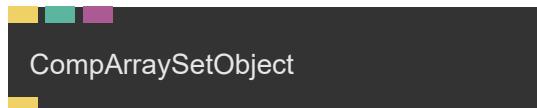
**Full Name:** Ops.Data.Compose.Array.CompArraySetNumber **Description:** Full NameOps.Data.Compose.Array.ComOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)Index (Number)Number (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompArraySetNumberExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Array.CompArraySetNumber documentation* for input port details **< Output Ports:** - Visit *Ops.Data.Compose.Array.CompArraySetNumber documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompArraySetNumber" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArraySetNumber>

---

### 13.10.11 CompArraySetObject



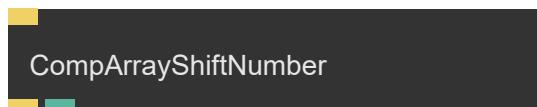
**Full Name:** Ops.Data.Compose.Array.CompArraySetObject **Description:** Full NameOps.Data.Compose.Array.CompOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)Index (Number)Object (Object)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompArraySetObjectEx-amples Team cables Public My Patches My Ops

- **Input Ports:** - Visit *Ops.Data.Compose.Array.CompArraySetObject documentation* for input port details
- ◀ **Output Ports:** - Visit *Ops.Data.Compose.Array.CompArraySetObject documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompArraySetObject" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArraySetObject>

---

### 13.10.12 CompArrayShiftNumber



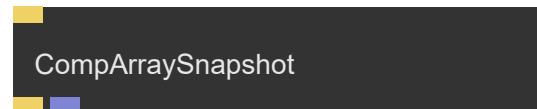
**Full Name:** Ops.Data.Compose.Array.CompArrayShiftNumber **Description:** Full NameOps.Data.Compose.Array.CompOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)OUTPUT PORTSNext (Trigger)Result (Number)SaveCancel ChangelogPatches using CompArrayShiftNumberExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Data.Compose.Array.CompArrayShiftNumber` documentation for input port details < **Output Ports:** - Visit `Ops.Data.Compose.Array.CompArrayShiftNumber` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CompArrayShiftNumber" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArrayShiftNumber>

---

### 13.10.13 CompArraySnapshot



**Full Name:** `Ops.Data.Compose.Array.CompArraySnapshot` **Description:** Full NameOps.Data.Compose.Array.CompA  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)OUTPUT PORTSNext  
(Trigger)Result (Array)SaveCancel ChangelogPatches using CompArraySnapshotExamples Team  
cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Data.Compose.Array.CompArraySnapshot` documentation for input port details  
< **Output Ports:** - Visit `Ops.Data.Compose.Array.CompArraySnapshot` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CompArraySnapshot" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Array.CompArraySnapshot>

---

## 13.11 Ops.Data.Compose.Object

### 13.11.1 CompObject



**Full Name:** `Ops.Data.Compose.Object.CompObject` **Description:** Full NameOps.Data.Compose.Object.CompObject  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-

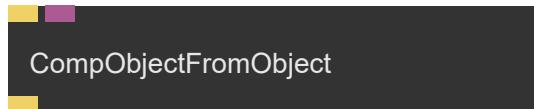
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Compose Object exampleOpen In EditorINPUT PORTSUpdate (Trigger)Clear (Number: boolean)Reset (Trigger)OUTPUT PORTSNext (Trigger)Result (Object)SaveCancel ChangelogPatches using CompObjectExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Object.CompObject* documentation for input port details **< Output Ports:** - Visit *Ops.Data.Compose.Object.CompObject* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "CompObject" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Object.CompObject>

---

### 13.11.2 CompObjectFromObject



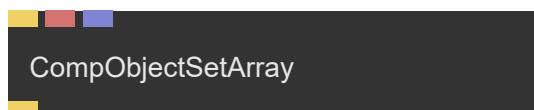
**Full Name:** Ops.Data.Compose.Object.CompObjectFromObject **Description:** Full NameOps.Data.Compose.Object.COp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch CompObjectFromObject ExampleOpen In EditorINPUT PORTSUpdate (Trigger)Object (Object)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompObjectFromObjectExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Object.CompObjectFromObject* documentation for input port details **< Output Ports:** - Visit *Ops.Data.Compose.Object.CompObjectFromObject* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "CompObjectFromObject" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Object.CompObjectFromObject>

---

### 13.11.3 CompObjectSetArray



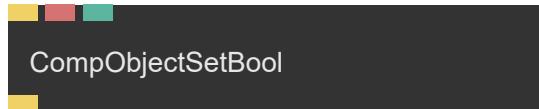
**Full Name:** Ops.Data.Compose.Object.CompObjectSetArray **Description:** Full NameOps.Data.Compose.Object.ComOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Compose Object exampleOpen In EditorINPUT PORTSUpdate (Trigger)Key (String)Array (Array)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompObjectSetArrayExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetArray documentation* for input port details < **Output Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompObjectSetArray" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Object.CompObjectSetArray>

---

#### 13.11.4 CompObjectSetBool



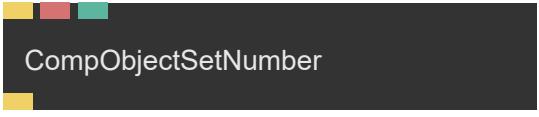
**Full Name:** Ops.Data.Compose.Object.CompObjectSetBool **Description:** Full NameOps.Data.Compose.Object.ComOp - visible for everyoneLicenseMITAuthortob\_hargithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch comp object set bool exampleOpen In EditorINPUT PORTSUpdate (Trigger)Key (String)Boolean (Number: boolean)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompObjectSetBoolExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetBool documentation* for input port details < **Output Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetBool documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompObjectSetBool" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Object.CompObjectSetBool>

---

### 13.11.5 CompObjectSetNumber



CompObjectSetNumber

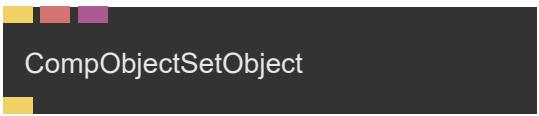
**Full Name:** Ops.Data.Compose.Object.CompObjectSetNumber **Description:** Full NameOps.Data.Compose.Object.Compo  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li  
cenceCaniuse queryExample Patch Compose Object exampleOpen In EditorINPUT PORTSUpdate  
(Trigger)Key (String)Number (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches  
using CompObjectSetNumberExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetNumber* documentation for input port de-  
tails **< Output Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetNumber* documentation for out-  
put port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompObjectSet-  
Number" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Object.CompObjectSetNumber>

---

### 13.11.6 CompObjectSetObject



CompObjectSetObject

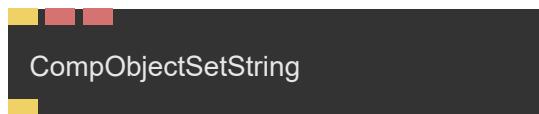
**Full Name:** Ops.Data.Compose.Object.CompObjectSetObject **Description:** Full NameOps.Data.Compose.Object.Compo  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)Key (String)Object  
(Object)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using CompObjectSetObjectEx-  
amples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetObject* documentation for input port de-  
tails **< Output Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetObject* documentation for output  
port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompObjectSe-  
tObject" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Object.CompObjectSetObject>

---

### 13.11.7 CompObjectSetString



**Full Name:** Ops.Data.Compose.Object.CompObjectSetString **Description:** Full NameOps.Data.Compose.Object.CompObjectSetString - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlistsDocumentation (markdown) Issues Example Patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch Compose Object example Open In Editor INPUT PORTS Update (Trigger) Key (String) String (String) OUTPUT PORTS Next (Trigger) Save Cancel Changelog Patches using CompObjectSetString Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetString* documentation for input port details **< Output Ports:** - Visit *Ops.Data.Compose.Object.CompObjectSetString* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompObjectSetString" **Docs:** <https://cables.gl/op/Ops.Data.Compose.Object.CompObjectSetString>

---

## 13.12 Ops.Data.Compose.String

### 13.12.1 CompString



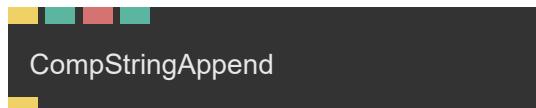
**Full Name:** Ops.Data.Compose.String.CompString **Description:** Full NameOps.Data.Compose.String.CompString - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlistsDocumentation (markdown) Issues Example Patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch compStringAppend example Open In Editor INPUT PORTS Update (Trigger) clear (Number: boolean) Reset (Trigger) OUTPUT PORTS Next (Trigger) Result (String) Save Cancel Changelog Patches using CompString Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Data.Compose.String.CompString` documentation for input port details < **Output Ports:** - Visit `Ops.Data.Compose.String.CompString` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CompString"  
**Docs:** <https://cables.gl/op/Ops.Data.Compose.String.CompString>

---

### 13.12.2 CompStringAppend



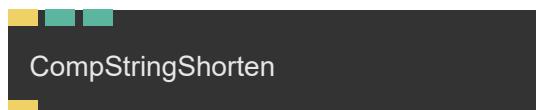
**Full Name:** `Ops.Data.Compose.String.CompStringAppend` **Description:** Full Name `Ops.Data.Compose.String.CompStringAppend` Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch compstring advanced Open In Editor INPUT PORTS Update (Trigger) Direction index (Number: integer) End Begin String (String) Add Break (Number: boolean) OUTPUT PORTS Next (Trigger) Save Cancel Changelog Patches using CompStringAppend Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Data.Compose.String.CompStringAppend` documentation for input port details  
< **Output Ports:** - Visit `Ops.Data.Compose.String.CompStringAppend` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CompStringAppend" **Docs:** <https://cables.gl/op/Ops.Data.Compose.String.CompStringAppend>

---

### 13.12.3 CompStringShorten



**Full Name:** `Ops.Data.Compose.String.CompStringShorten` **Description:** Full Name `Ops.Data.Compose.String.CompStringShorten` Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch compstring advanced Open In Editor INPUT PORTS Update

(Trigger)Direction index (Number: integer)Num Chars (Number: integer)OUTPUT PORTSNext  
(Trigger)SaveCancel ChangelogPatches using CompStringShortenExamples Team cables Public My  
Patches My Ops

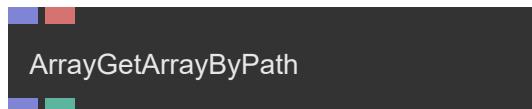
> **Input Ports:** - Visit *Ops.Data.Compose.String.CompStringShorten documentation for input port details*  
< **Output Ports:** - Visit *Ops.Data.Compose.String.CompStringShorten documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "CompStringShorten"* **Docs:** <https://cables.gl/op/Ops.Data.Compose.String.CompStringShorten>

---

## 13.13 Ops.Data.JsonPath

### 13.13.1 ArrayGetArrayByPath



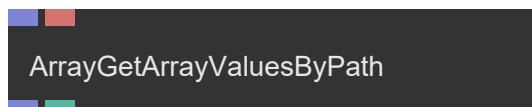
**Full Name:** Ops.Data.JsonPath.ArrayGetArrayByPath **Description:** useful when working with nested data structures.

> **Input Ports:** - path to array (i.e. data.numbers): Check documentation < **Output Ports:** - Visit *Ops.Data.JsonPath.ArrayGetArrayByPath documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ArrayGetArrayByPath"* **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ArrayGetArrayByPath>

---

### 13.13.2 ArrayGetArrayValuesByPath



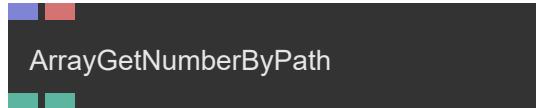
**Full Name:** Ops.Data.JsonPath.ArrayGetArrayValuesByPath **Description:** useful to iterate over nested data structures.

> **Input Ports:** - path to first array field (i.e. "data.0.firstName"): Check documentation < **Output Ports:** - Visit `Ops.Data.JsonPath.ArrayGetArrayValuesByPath` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ArrayGetArrayValuesByPath" **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ArrayGetArrayValuesByPath>

---

### 13.13.3 ArrayGetNumberByPath



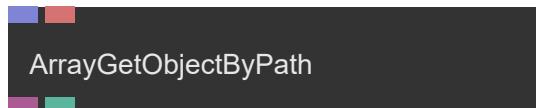
**Full Name:** `Ops.Data.JsonPath.ArrayGetNumberByPath` **Description:** useful when working with nested data structures.

> **Input Ports:** - the past (i.e. `person.age`): Check documentation < **Output Ports:** - Visit `Ops.Data.JsonPath.ArrayGetNumberByPath` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ArrayGetNumberByPath" **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ArrayGetNumberByPath>

---

### 13.13.4 ArrayGetObjectByPath



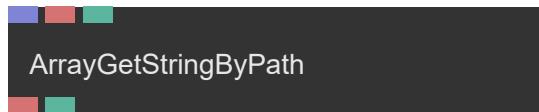
**Full Name:** `Ops.Data.JsonPath.ArrayGetObjectByPath` **Description:** useful when working with nested data structures.

> **Input Ports:** - Visit `Ops.Data.JsonPath.ArrayGetObjectByPath` documentation for input port details < **Output Ports:** - Visit `Ops.Data.JsonPath.ArrayGetObjectByPath` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ArrayGetObjectByPath" **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ArrayGetObjectByPath>

---

### 13.13.5 ArrayGetStringByPath\_v2



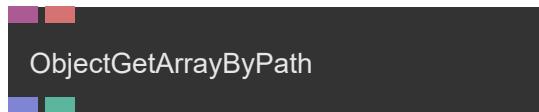
**Full Name:** Ops.Data.JsonPath.ArrayGetStringByPath\_v2 **Description:** useful when working with nested data structures.

➤ **Input Ports:** - **the path (i.e. data.names)**: Return path if missing (Number: boolean) < **Output Ports:** - Visit *Ops.Data.JsonPath.ArrayGetStringByPath\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayGetStringByPath\_v2" **Docs:** [https://cables.gl/op/Ops.Data.JsonPath.ArrayGetStringByPath\\_v2](https://cables.gl/op/Ops.Data.JsonPath.ArrayGetStringByPath_v2)

---

### 13.13.6 ObjectGetArrayByPath



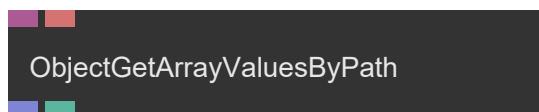
**Full Name:** Ops.Data.JsonPath.ObjectGetArrayByPath **Description:** useful when working with nested data structures.

➤ **Input Ports:** - **path to array (i.e. data.numbers)**: Check documentation < **Output Ports:** - Visit *Ops.Data.JsonPath.ObjectGetArrayByPath documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectGetArrayByPath" **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ObjectGetArrayByPath>

---

### 13.13.7 ObjectGetArrayValuesByPath



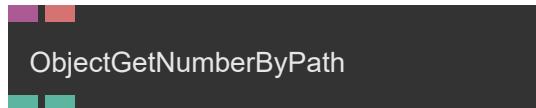
**Full Name:** Ops.Data.JsonPath.ObjectGetArrayValuesByPath **Description:** useful to iterate over nested data structures.

> **Input Ports:** - path to first array field (i.e. "data.0.firstName"): *Check documentation < Output Ports:* - Visit `Ops.Data.JsonPath.ObjectGetArrayValuesByPath` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ObjectGetArrayValuesByPath" **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ObjectGetArrayValuesByPath>

---

### 13.13.8 ObjectGetNumberByPath



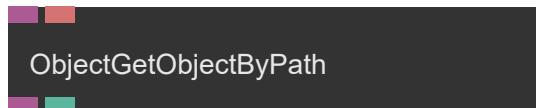
**Full Name:** `Ops.Data.JsonPath.ObjectGetNumberByPath` **Description:** useful when working with nested data structures.

> **Input Ports:** - the past (i.e. `person.age`): *Check documentation < Output Ports:* - Visit `Ops.Data.JsonPath.ObjectGetNumberByPath` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ObjectGetNumberByPath" **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ObjectGetNumberByPath>

---

### 13.13.9 ObjectGetObjectByPath



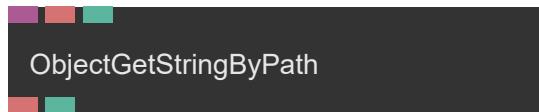
**Full Name:** `Ops.Data.JsonPath.ObjectGetObjectByPath` **Description:** useful when working with nested data structures.

> **Input Ports:** - Visit `Ops.Data.JsonPath.ObjectGetObjectByPath` documentation for input port details < **Output Ports:** - Visit `Ops.Data.JsonPath.ObjectGetObjectByPath` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ObjectGetObjectByPath" **Docs:** <https://cables.gl/op/Ops.Data.JsonPath.ObjectGetObjectByPath>

---

### 13.13.10 ObjectGetStringByPath\_v2



**Full Name:** Ops.Data.JsonPath.ObjectGetStringByPath\_v2 **Description:** useful when working with nested data structures.

**> Input Ports:** - the path (i.e. data.names): Output path if missing (Number: boolean) **< Output Ports:** - Visit *Ops.Data.JsonPath.ObjectGetStringByPath\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectGetStringByPath\_v2" **Docs:** [https://cables.gl/op/Ops.Data.JsonPath.ObjectGetStringByPath\\_v2](https://cables.gl/op/Ops.Data.JsonPath.ObjectGetStringByPath_v2)

---

## 13.14 Ops.Data.StackValues

### 13.14.1 StackGetArray



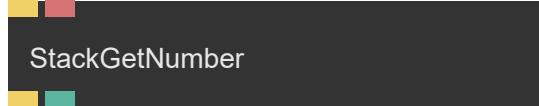
**Full Name:** Ops.Data.StackValues.StackGetArray **Description:** Full NameOps.Data.StackValues.StackGetArrayVis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch stacked valuesOpen In EditorINPUT PORTSTrigger (Trigger)Name  
(String)OUTPUT PORTSNext (Trigger)Array (Array)SaveCancel ChangelogPatches using StackGetAr-  
rayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.StackValues.StackGetArray documentation for input port details* **< Output Ports:** - Visit *Ops.Data.StackValues.StackGetArray documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StackGetArray" **Docs:** <https://cables.gl/op/Ops.Data.StackValues.StackGetArray>

---

## 13.14.2 StackGetNumber



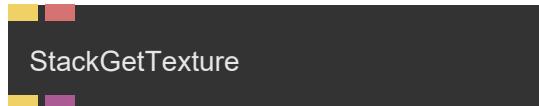
**Full Name:** Ops.Data.StackValues.StackGetNumber **Description:** Full NameOps.Data.StackValues.StackGetNumber  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch stacked valuesOpen In EditorINPUT PORTSExec (Trigger)Name (String)OUTPUT PORTSNext (Trigger)Value (Number)SaveCancel ChangelogPatches using StackGet-NumberExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.StackValues.StackGetNumber documentation* for input port details <  
**Output Ports:** - Visit *Ops.Data.StackValues.StackGetNumber documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "StackGetNumber"  
**Docs:** <https://cables.gl/op/Ops.Data.StackValues.StackGetNumber>

---

## 13.14.3 StackGetTexture



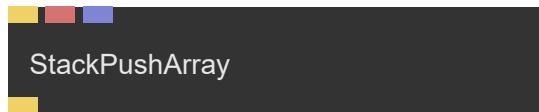
**Full Name:** Ops.Data.StackValues.StackGetTexture **Description:** Full NameOps.Data.StackValues.StackGetTexture  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch stacked valuesOpen In EditorINPUT PORTSExec (Trigger)Name (String)OUTPUT PORTSNext (Trigger)Texture (Object)SaveCancel ChangelogPatches using StackGet-TextureExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.StackValues.StackGetTexture documentation* for input port details <  
**Output Ports:** - Visit *Ops.Data.StackValues.StackGetTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "StackGetTexture"  
**Docs:** <https://cables.gl/op/Ops.Data.StackValues.StackGetTexture>

---

#### 13.14.4 StackPushArray



**Full Name:** Ops.Data.StackValues.StackPushArray **Description:** Full NameOps.Data.StackValues.StackPushArray  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch stacked valuesOpen In EditorINPUT PORTSTTrigger (Trigger)Name (String)ArrayOps.Team.MEvent\_OTjRYN SidebarEventManagement (Array)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using StackPushArrayExamples Team cables Public My Patches My Ops

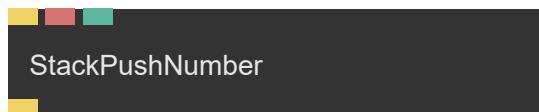
**> Input Ports:** - Visit *Ops.Data.StackValues.StackPushArray documentation* for input port details **< Output Ports:** - Visit *Ops.Data.StackValues.StackPushArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StackPushArray"

**Docs:** <https://cables.gl/op/Ops.Data.StackValues.StackPushArray>

---

#### 13.14.5 StackPushNumber



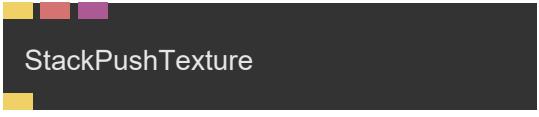
**Full Name:** Ops.Data.StackValues.StackPushNumber **Description:** Full NameOps.Data.StackValues.StackPushNumber  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch stacked valuesOpen In EditorINPUT PORTSExec (Trigger)Name (String)Value (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using StackPush-NumberExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.StackValues.StackPushNumber documentation* for input port details **< Output Ports:** - Visit *Ops.Data.StackValues.StackPushNumber documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StackPushNumber" **Docs:** <https://cables.gl/op/Ops.Data.StackValues.StackPushNumber>

---

## 13.14.6 StackPushTexture



StackPushTexture

**Full Name:** Ops.Data.StackValues.StackPushTexture **Description:** Full NameOps.Data.StackValues.StackPushTexture  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch stacked valuesOpen In EditorINPUT PORTSTTrigger (Trigger)Name (String)Texture (Object:texture)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using StackPushTextureExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Data.StackValues.StackPushTexture documentation* for input port details <  
**Output Ports:** - Visit *Ops.Data.StackValues.StackPushTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StackPushTexture" **Docs:** <https://cables.gl/op/Ops.Data.StackValues.StackPushTexture>

---

## 13.15 Ops.Date

### 13.15.1 DateAndTime



DateAndTime

**Full Name:** Ops.Date.DateAndTime **Description:** Full NameOps.Date.DateAndTimeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ClockThis patch shows how different ops can be combined to create an animated clock.

**> Input Ports:** - Visit *Ops.Date.DateAndTime documentation* for input port details < **Output Ports:** - Visit *Ops.Date.DateAndTime documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DateAndTime" **Docs:** <https://cables.gl/op/Ops.Date.DateAndTime>

---

## 13.15.2 DateCalc



**Full Name:** Ops.Date.DateCalc **Description:** This Op lets you perform date calculations.

**> Input Ports:** - Update time value (not needed if an timestamp input is used): *Check documentation*  
**< Output Ports:** - Visit *Ops.Date.DateCalc documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DateCalc" **Docs:** <https://cables.gl/op/Ops.Date.DateCalc>

---

## 13.15.3 DateDifference



**Full Name:** Ops.Date.DateDifference **Description:** Full NameOps.Date.DateDifferenceVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Can use queryExample Patch date difference exampleOpen In EditorINPUT PORTSTimestamp 1  
(Number)The first timestamp

**> Input Ports:** - Visit *Ops.Date.DateDifference documentation for input port details* **< Output Ports:** - Visit *Ops.Date.DateDifference documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DateDifference" **Docs:** <https://cables.gl/op/Ops.Date.DateDifference>

---

## 13.15.4 DateFormatter



**Full Name:** Ops.Date.DateFormatter **Description:** This Op takes a Date or Timestamp value and creates a String representation for that date.

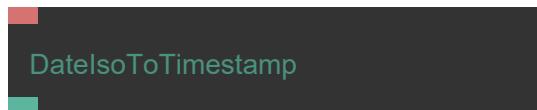
> **Input Ports:** - Visit *Ops.Date.DateFormatter documentation* for input port details < **Output Ports:** - Visit *Ops.Date.DateFormatter documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DateFormatter"

**Docs:** <https://cables.gl/op/Ops.Date.DateFormatter>

---

### 13.15.5 DateIsoToTimestamp



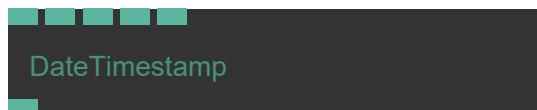
**Full Name:** Ops.Date.DateIsoToTimestamp **Description:** this is basically a wrapper for javascripts Date.parse().

> **Input Ports:** - Visit *Ops.Date.DateIsoToTimestamp documentation* for input port details < **Output Ports:** - Visit *Ops.Date.DateIsoToTimestamp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DateIsoToTimestamp" **Docs:** <https://cables.gl/op/Ops.Date.DateIsoToTimestamp>

---

### 13.15.6 DateTimestamp



**Full Name:** Ops.Date.DateTimestamp **Description:** Full NameOps.Date.DateTimestampVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSYear (Number: integer)The year

> **Input Ports:** - Visit *Ops.Date.DateTimestamp documentation* for input port details < **Output Ports:** - Visit *Ops.Date.DateTimestamp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DateTimestamp"  
**Docs:** <https://cables.gl/op/Ops.Date.DateTimestamp>

---

### 13.15.7 Milliseconds



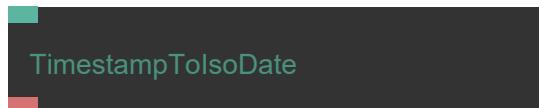
**Full Name:** Ops.Date.Milliseconds **Description:** OP returns a value since time origin, a standard time which is considered to be the beginning of the current document's lifetime, with rounding that depends on the security mitigations implemented by the browser.

**> Input Ports:** - Visit [Ops.Date.Milliseconds documentation](#) for input port details **< Output Ports:** - Visit [Ops.Date.Milliseconds documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Milliseconds"  
**Docs:** <https://cables.gl/op/Ops.Date.Milliseconds>

---

### 13.15.8 TimestampToIsoDate



**Full Name:** Ops.Date.TimestampToIsoDate **Description:** Full NameOps.Date.TimestampToIsoDateVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch timestampToIsoDateOpen In EditorINPUT PORTSTimestamp (Number)OUTPUT PORTSISO Date (String)SaveCancel ChangelogPatches using TimestampToIsoDateExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Date.TimestampToIsoDate documentation](#) for input port details **< Output Ports:** - Visit [Ops.Date.TimestampToIsoDate documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimestampToIsoDate" **Docs:** <https://cables.gl/op/Ops.Date.TimestampToIsoDate>

---

## 13.16 Ops.Debug

### 13.16.1 Console



**Full Name:** Ops.Debug.Console **Description:** Full NameOps.Debug.ConsoleVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example: Ops.Debug.ConsoleOpen In EditorINPUT PORTSvisible (Number: boolean)Set to true to display the console, set to false to hide it

➤ **Input Ports:** - Visit *Ops.Debug.Console documentation for input port details* < **Output Ports:** - Visit *Ops.Debug.Console documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Console" **Docs:** <https://cables.gl/op/Ops.Debug.Console>

---

### 13.16.2 ConsoleLog



**Full Name:** Ops.Debug.ConsoleLog **Description:** Full NameOps.Debug.ConsoleLogVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSNumber (Number)String (String)SaveCancel ChangelogPatches using ConsoleLogExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Debug.ConsoleLog documentation for input port details* < **Output Ports:** - Visit *Ops.Debug.ConsoleLog documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ConsoleLog"  
**Docs:** <https://cables.gl/op/Ops.Debug.ConsoleLog>

---

### 13.16.3 CrashOp



**Full Name:** Ops.Debug.CrashOp **Description:** Full NameOps.Debug.CrashOpVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch crashop exampleOpen In EditorINPUT PORTSAsync crash (Trigger)Undefined crash (Trigger)Throw Exception (Trigger)Float (Number)Array Exception (Trigger)Promise Fail (Trigger)Shader Error (Trigger)OUTPUT PORTSNan (Number)Infinity (Number)SaveCancel ChangelogPatches using CrashOpExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Debug.CrashOp documentation* for input port details < **Output Ports:** - Visit *Ops.Debug.CrashOp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CrashOp" **Docs:** <https://cables.gl/op/Ops.Debug.CrashOp>

---

### 13.16.4 GILogErrors



**Full Name:** Ops.Debug.GILogErrors **Description:** Full NameOps.Debug.GILogErrorsVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSExec (Trigger)Limit Error Logs Num (Number: integer)Stop trigger after limit (Number: boolean)show gl history (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using GILogErrorsExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Debug.GlLogErrors` documentation for input port details < **Output Ports:** - Visit `Ops.Debug.GlLogErrors` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "GlLogErrors"  
**Docs:** <https://cables.gl/op/Ops.Debug.GlLogErrors>

---

### 13.16.5 GlStates



**Full Name:** `Ops.Debug.GlStates` **Description:** Full Name `Ops.Debug.GlStatesVisibilityCore` Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch id [Youtube](#) ids (comma seperated) Op Licence Caniuse query No op example found on this server INPUT PORTS Update (Trigger) OUTPUT PORTS Next (Trigger) `glGetError` (Number) `Depthtest` (Number) Stack Depthtest (Number) Depth Writing (Number) Stack Depth Writing (Number) `DepthFunc` (Number) Stack DepthFunc (Number) Blend (Number) Blend Stack (Number) Cull Mode (Number) Face Culling (Number) Is Shadowpass (boolean) Number Save Cancel Changelog Patches using GlStates Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Debug.GlStates` documentation for input port details < **Output Ports:** - Visit `Ops.Debug.GlStates` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "GlStates" **Docs:** <https://cables.gl/op/Ops.Debug.GlStates>

---

### 13.16.6 ProfileGL



**Full Name:** `Ops.Debug.ProfileGL` **Description:** Full Name `Ops.Debug.ProfileGLVisibilityCore` Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch id [Youtube](#) ids (comma seperated) Op Licence Caniuse

queryNo op example found on this serverINPUT PORTSExec (Trigger)Debug one Frame (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using ProfileGLExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Debug.ProfileGL* documentation for input port details **< Output Ports:** - Visit *Ops.Debug.ProfileGL* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ProfileGL" **Docs:** <https://cables.gl/op/Ops.Debug.ProfileGL>

---

## 13.16.7 StopWatch



**Full Name:** Ops.Debug.StopWatch **Description:** Full NameOps.Debug.StopWatchVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSexec (Trigger)OUTPUT PORTSnext (Trigger)Time used (Number)Times (Array)SaveCancel ChangelogPatches using StopWatchExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Debug.StopWatch* documentation for input port details **< Output Ports:** - Visit *Ops.Debug.StopWatch* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "StopWatch" **Docs:** <https://cables.gl/op/Ops.Debug.StopWatch>

---

## 13.17 Ops.Devices

### 13.17.1 TouchGesture



**Full Name:** Ops.Devices.TouchGesture **Description:** Full NameOps.Devices.TouchGestureVisibilityCore  
Op - visible for everyoneLicenseMITAuthorgithub sourceMaintained by Team cablesPatchlists-  
Javascript Librarieshammer.js (touch gesture detection)Documentation (markdown)IssuesExample  
patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this  
serverINPUT PORTSActive (Number: boolean)Vertical Swipe (Number: boolean)Vertical Pan  
(Number: boolean)OUTPUT PORTSPress (Trigger)Press Up (Trigger)Pan Left (Trigger)Pan Right  
(Trigger)Swipe Left (Trigger)Swipe Right (Trigger)Swipe Up (Trigger)Swipe Down (Trigger)Event  
(Object)SaveCancel ChangelogPatches using TouchGestureExamples Team cables Public My Patches  
My Ops

➤ **Input Ports:** - Visit *Ops.Devices.TouchGesture documentation* for input port details < **Output Ports:** -  
Visit *Ops.Devices.TouchGesture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "TouchGesture"*  
**Docs:** <https://cables.gl/op/Ops.Devices.TouchGesture>

---

### 13.17.2 TouchScreen



**Full Name:** Ops.Devices.TouchScreen **Description:** Full NameOps.Devices.TouchScreenVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryNo op example found on this serverINPUT PORTSDisable Scaling (Number:  
boolean)Disable Scroll (Number: boolean)HDPI Coordinates (Number: boolean)Active (Num-  
ber: boolean)Area index (Number: integer) Canvas Document Normalize Coordinates (Number:  
boolean)Flip Y (Number: boolean)Only applies to Finger1

➤ **Input Ports:** - Visit *Ops.Devices.TouchScreen documentation* for input port details < **Output Ports:** -  
Visit *Ops.Devices.TouchScreen documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "TouchEvent"*  
**Docs:** <https://cables.gl/op/Ops.Devices.TouchScreen>

---

## 13.18 Ops.Devices.Browser

### 13.18.1 BrowserInfo\_v3



**Full Name:** Ops.Devices.Browser.BrowserInfo\_v3 **Description:** Performs a browser check. Some ops only work with certain browsers, you can use this op to create fallbacks.

**> Input Ports:** - Visit *Ops.Devices.Browser.BrowserInfo\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Browser.BrowserInfo\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BrowserInfo\_v3"  
**Docs:** [https://cables.gl/op/Ops.Devices.Browser.BrowserInfo\\_v3](https://cables.gl/op/Ops.Devices.Browser.BrowserInfo_v3)

---

### 13.18.2 ColorScheme



**Full Name:** Ops.Devices.Browser.ColorScheme **Description:** Uses CSS media queries to find out if the user has set a preference for light or dark colors.

**> Input Ports:** - Visit *Ops.Devices.Browser.ColorScheme documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Browser.ColorScheme documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ColorScheme"  
**Docs:** <https://cables.gl/op/Ops.Devices.Browser.ColorScheme>

---

### 13.18.3 History



**Full Name:** Ops.Devices.Browser.History **Description:** Full NameOps.Devices.Browser.HistoryVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-

listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSBack (Trigger)Forward (Trigger)SaveCancel ChangelogPatches using HistoryExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Browser.History* documentation for input port details **< Output Ports:** - Visit *Ops.Devices.Browser.History* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "History" **Docs:** <https://cables.gl/op/Ops.Devices.Browser.History>

---

#### 13.18.4 JsExpression



**Full Name:** Ops.Devices.Browser.JsExpression **Description:** Full NameOps.Devices.Browser.JsExpressionVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch JsExpression ExampleOpen In EditorINPUT PORTSJJS Expression (String)OUTPUT PORTSResult String (String)Result Number (Number)Result Array (Array)Result Object (Object)Error (booleanNumber)SaveCancel ChangelogPatches using JsExpressionExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Browser.JsExpression* documentation for input port details **< Output Ports:** - Visit *Ops.Devices.Browser.JsExpression* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "JsExpression" **Docs:** <https://cables.gl/op/Ops.Devices.Browser.JsExpression>

---

#### 13.18.5 JsMemory



**Full Name:** Ops.Devices.Browser.JsMemory **Description:** The total allocated heap size, in megabytes.

> **Input Ports:** - Visit *Ops.Devices.Browser.JsMemory* documentation for input port details < **Output Ports:** - Visit *Ops.Devices.Browser.JsMemory* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "JsMemory" **Docs:** <https://cables.gl/op/Ops.Devices.Browser.JsMemory>

---

### 13.18.6 UserActivation



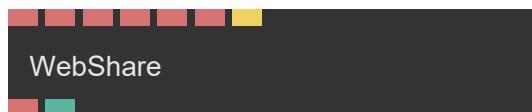
**Full Name:** Ops.Devices.Browser.UserActivation **Description:** <https://developer.mozilla.org/en-US/docs/Web/API/UserActivation>

> **Input Ports:** - Visit *Ops.Devices.Browser.UserActivation* documentation for input port details < **Output Ports:** - Visit *Ops.Devices.Browser.UserActivation* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "UserActivation" **Docs:** <https://cables.gl/op/Ops.Devices.Browser.UserActivation>

---

### 13.18.7 WebShare



**Full Name:** Ops.Devices.Browser.WebShare **Description:** some browsers (mostly mobile) support the native web-share-api and open a sharing dialog that let's you select an app to share content with.

> **Input Ports:** - Visit *Ops.Devices.Browser.WebShare* documentation for input port details < **Output Ports:** - Visit *Ops.Devices.Browser.WebShare* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "WebShare" **Docs:** <https://cables.gl/op/Ops.Devices.Browser.WebShare>

---

## 13.19 Ops.Devices.GamePad

### 13.19.1 GamePad

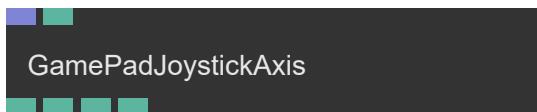


**Full Name:** Ops.Devices.GamePad. **Description:** to use this, connect to a pad of Ops.Devices.GamePad.GamePads

**> Input Ports:** - Visit `Ops.Devices.GamePad.GamePad` documentation for input port details **< Output Ports:** - Visit `Ops.Devices.GamePad.GamePad` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "GamePad" **Docs:** <https://cables.gl/op/Ops.Devices.GamePad.GamePad>

## 13.19.2 GamePadJoystickAxis



**Full Name:** Ops.Devices.GamePad.GamePadJoystickAxis **Description:** Full NameOps.Devices.GamePad.GamePadJoystickAxis - Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch gamepad testercharacter controller driven by gamepad

**> Input Ports:** - Visit `Ops.Devices.GamePad.GamePadJoystickAxis` documentation for input port details <  
**Output Ports:** - Visit `Ops.Devices.GamePad.GamePadJoystickAxis` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GamePadJoy-stickAxis" **Docs:** <https://cables.gl/op/Ops.Devices.GamePad.GamePadJoystickAxis>

### 13.19.3 GamePads



**Full Name:** Ops.Devices.GamePad.GamePads **Description:** pad outputs can be connected to Ops.Devices.GamePad.GamePad to receive button states

**> Input Ports:** - Visit *Ops.Devices.GamePad.GamePads documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.GamePad.GamePads documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GamePads" **Docs:** <https://cables.gl/op/Ops.Devices.GamePad.GamePads>

---

## 13.20 Ops.Devices.Keyboard

### 13.20.1 CursorKeys



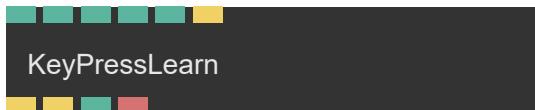
**Full Name:** Ops.Devices.Keyboard.CursorKeys **Description:** Full NameOps.Devices.Keyboard.CursorKeysVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch CursorKeyscharacter controller using WASD keyboard keys that outputs sprite sheet texture offsets.

**> Input Ports:** - Visit *Ops.Devices.Keyboard.CursorKeys documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Keyboard.CursorKeys documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CursorKeys" **Docs:** <https://cables.gl/op/Ops.Devices.Keyboard.CursorKeys>

---

## 13.20.2 KeyPressLearn



**Full Name:** Ops.Devices.Keyboard.KeyPressLearn **Description:** Can be used to trigger on a certain key press. Press the Learn button and then press a certain key – you should see the Key Code value change.

**> Input Ports:** - Visit [Ops.Devices.Keyboard.KeyPressLearn documentation](#) for input port details **< Output Ports:** - Visit [Ops.Devices.Keyboard.KeyPressLearn documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "KeyPressLearn"  
**Docs:** <https://cables.gl/op/Ops.Devices.Keyboard.KeyPressLearn>

---

## 13.20.3 KeyPress\_v2



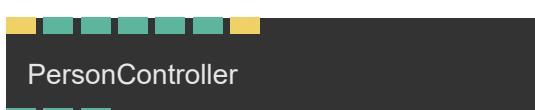
**Full Name:** Ops.Devices.Keyboard.KeyPress\_v2 **Description:** Triggers every time a key has been pressed. Click inside the renderer and hit a key, you will then see the Key Code change. KeyPress uses the Character key codes, an a e.g. will result in the key code 97.

**> Input Ports:** - Visit [Ops.Devices.Keyboard.KeyPress\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Devices.Keyboard.KeyPress\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "KeyPress\_v2"  
**Docs:** [https://cables.gl/op/Ops.Devices.Keyboard.KeyPress\\_v2](https://cables.gl/op/Ops.Devices.Keyboard.KeyPress_v2)

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## 13.20.4 PersonController



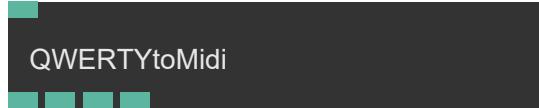
**Full Name:** Ops.Devices.Keyboard.PersonController **Description:** Full NameOps.Devices.Keyboard.PersonControllerOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch CursorKeyscharacter controller using WASD keyboard keys that outputs sprite sheet texture offsets.

**> Input Ports:** - Visit *Ops.Devices.Keyboard.PersonController* documentation for input port details <  
**Output Ports:** - Visit *Ops.Devices.Keyboard.PersonController* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PersonController"  
**Docs:** <https://cables.gl/op/Ops.Devices.Keyboard.PersonController>

---

### 13.20.5 QWERTYtoMidi



**Full Name:** Ops.Devices.Keyboard.QWERTYtoMidi **Description:** Full NameOps.Devices.Keyboard.QWERTYtoMidiViOp - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch QWERTYtoMidi ExampleOpen In EditorINPUT PORTScanvas only (Number: boolean)OUTPUT PORTSNote Number (Number)Velocity (Number)Channel (Number)Command (Number)SaveCancel ChangelogPatches using QWERTYtoMidiExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Keyboard.QWERTYtoMidi* documentation for input port details < **Output Ports:** - Visit *Ops.Devices.Keyboard.QWERTYtoMidi* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "QWERTYtoMidi"  
**Docs:** <https://cables.gl/op/Ops.Devices.Keyboard.QWERTYtoMidi>

---

## 13.21 Ops.Devices.Midi

### 13.21.1 DeviceList



**Full Name:** Ops.Devices.Midi.DeviceList **Description:** Full NameOps.Devices.Midi.DeviceListVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesCompatibilitycaniuse.com: Web MIDI APIPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch DeviceListOpen In EditorOUTPUT PORTSNum Devices (Number)Midi Support (booleanNumber)Device Names (Array)SaveCancel ChangelogPatches using DeviceListExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Devices.Midi.DeviceList documentation for input port details* < **Output Ports:**  
- Visit *Ops.Devices.Midi.DeviceList documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "DeviceList"* **Docs:** <https://cables.gl/op/Ops.Devices.Midi.DeviceList>

---

### 13.21.2 MidiCCOut\_v2



**Full Name:** Ops.Devices.Midi.MidiCCOut\_v2 **Description:** Use this op to create MIDI CC data to send out to your MIDI device.

➤ **Input Ports:** - Visit *Ops.Devices.Midi.MidiCCOut\_v2 documentation for input port details* < **Output Ports:**  
- Visit *Ops.Devices.Midi.MidiCCOut\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "MidiCCOut\_v2"* **Docs:** [https://cables.gl/op/Ops.Devices.Midi.MidiCCOut\\_v2](https://cables.gl/op/Ops.Devices.Midi.MidiCCOut_v2)

---

### 13.21.3 MidiCC\_v3



**Full Name:** Ops.Devices.Midi.MidiCC\_v3 **Description:** Gets incoming midi cc messages from the selected midi channel.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiCC\_v3 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Devices.Midi.MidiCC\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiCC\_v3" **Docs:** [https://cables.gl/op/Ops.Devices.Midi.MidiCC\\_v3](https://cables.gl/op/Ops.Devices.Midi.MidiCC_v3)

---

### 13.21.4 MidiChord3



**Full Name:** Ops.Devices.Midi.MidiChord3 **Description:** This op is able to output the note numbers and velocities of up to 3 different midi notes at once. Useful when playing chords.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiChord3 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Devices.Midi.MidiChord3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiChord3" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiChord3>

---

### 13.21.5 MidiClock



**Full Name:** Ops.Devices.Midi.MidiClock **Description:** This op is able to output a midi clock signal as triggers. It also outputs different musical subdivisions as trigger, ranging from a full note (one bar) to

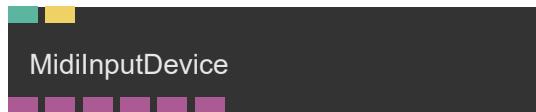
a sixteenth note.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiClock* documentation for input port details **< Output Ports:** - **current subtick (value between 0 - 24):** 1/1 (Trigger)outputs a trigger every bar (dotted: 1.5 bars, triplet: full-note triplet) - **outputs a trigger every half note (dotted: trigger every 3/4, triplet: half-note triplet):** 1/4 (Trigger)outputs a trigger every quarter note (dotted: trigger every 3/8, triplet: quarter-note triplet) - **outputs a trigger every eighth note (dotted: trigger every 3/16, triplet: eighth-note triplet):** 1/16 (Trigger)outputs a trigger every sixteenth note (dotted: trigger every 3/32, triplet: sixteenth-note triplet)

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "MidiClock" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiClock>

---

### 13.21.6 MidilInputDevice\_v2



**Full Name:** Ops.Devices.Midi.MidilInputDevice\_v2 **Description:** This reworked midi device is the heart of all midi operations in cables.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidilInputDevice\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Devices.Midi.MidilInputDevice\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "MidilInputDevice\_v2" **Docs:** [https://cables.gl/op/Ops.Devices.Midi.MidilInputDevice\\_v2](https://cables.gl/op/Ops.Devices.Midi.MidilInputDevice_v2)

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### 13.21.7 MidiMonitor



**Full Name:** Ops.Devices.Midi.MidiMonitor **Description:** MidiMonitor allows you to monitor incoming midi events.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiMonitor* documentation for input port details **< Output Ports:** - the type of the message (CC, Note, NRPN, Clock, ...): Note (Number) displays the sent note index if message is a note

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiMonitor" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiMonitor>

---

### 13.21.8 MidiNRPN



**Full Name:** Ops.Devices.Midi.MidiNRPN **Description:** This op is able to output the index and value of a midi NRPN signal.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiNRPN* documentation for input port details **< Output Ports:** - Visit *Ops.Devices.Midi.MidiNRPN* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiNRPN" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiNRPN>

---

### 13.21.9 MidiNRPNOout



**Full Name:** Ops.Devices.Midi.MidiNRPNOout **Description:** Use this op to create MIDI NRPN data out to your MIDI device.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiNRPNOout* documentation for input port details **< Output Ports:** - Visit *Ops.Devices.Midi.MidiNRPNOout* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiNRPNOout" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiNRPNOout>

---

### 13.21.10 MidiNote



**Full Name:** Ops.Devices.Midi.MidiNote **Description:** This op replaces the older MidiButton op

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiNote documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Midi.MidiNote documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiNote" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiNote>

---

### 13.21.11 MidiNoteFilter



**Full Name:** Ops.Devices.Midi.MidiNoteFilter **Description:** Allows you to limit the amount of midi notes that are read.

**> Input Ports:** - Visit *Ops.Devices.Midi.MidiNoteFilter documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Midi.MidiNoteFilter documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiNoteFilter" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiNoteFilter>

---

### 13.21.12 MidiNoteOut



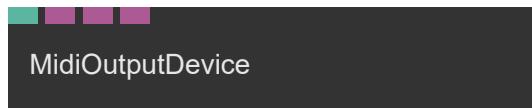
**Full Name:** Ops.Devices.Midi.MidiNoteOut **Description:** Use this op to create MIDI notes data to send out to your MIDI device.

> **Input Ports:** - Visit *Ops.Devices.Midi.MidiNoteOut* documentation for input port details < **Output Ports:** - Visit *Ops.Devices.Midi.MidiNoteOut* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiNoteOut" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiNoteOut>

---

### 13.21.13 MidiOutputDevice



**Full Name:** Ops.Devices.Midi.MidiOutputDevice **Description:** This op lets you choose an output device to which you want to transmit midi data to your DAW, sequencer, synthesizer, etc..

> **Input Ports:** - Visit *Ops.Devices.Midi.MidiOutputDevice* documentation for input port details < **Output Ports:** - Visit *Ops.Devices.Midi.MidiOutputDevice* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiOutputDevice" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiOutputDevice>

---

### 13.21.14 MidiTranspose



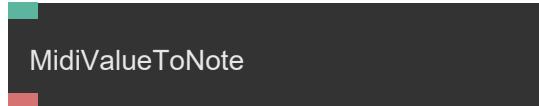
**Full Name:** Ops.Devices.Midi.MidiTranspose **Description:** This op lets you transpose MIDI notes by x semitones up or down.

> **Input Ports:** - Visit *Ops.Devices.Midi.MidiTranspose* documentation for input port details < **Output Ports:** - Visit *Ops.Devices.Midi.MidiTranspose* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MidiTranspose" **Docs:** <https://cables.gl/op/Ops.Devices.Midi.MidiTranspose>

---

### 13.21.15 MidiValueToNote\_v2



**Full Name:** Ops.Devices.Midi.MidiValueToNote\_v2 **Description:** Converts a MIDI value (e.g. 60 coming from a connected MIDI keyboard) to a note (e.g. "C4"). The octave will always be included at the end of the string, if it is below 0, it will look like A#-1.

**> Input Ports:** - Visit [Ops.Devices.Midi.MidiValueToNote\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Devices.Midi.MidiValueToNote\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "MidiValueToNote\_v2" **Docs:** [https://cables.gl/op/Ops.Devices.Midi.MidiValueToNote\\_v2](https://cables.gl/op/Ops.Devices.Midi.MidiValueToNote_v2)

---

## 13.22 Ops.Devices.Mobile

### 13.22.1 DeviceVibrate



**Full Name:** Ops.Devices.Mobile.DeviceVibrate **Description:** Full NameOps.Devices.Mobile.DeviceVibrateVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesCompatibilitycaniuse.com: Navigator API: vibratePatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Device Vibrate examplethis example will vibrate your device if the command is supported in your device's browser.

**> Input Ports:** - Visit [Ops.Devices.Mobile.DeviceVibrate documentation](#) for input port details **< Output Ports:** - Visit [Ops.Devices.Mobile.DeviceVibrate documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "DeviceVibrate" **Docs:** <https://cables.gl/op/Ops.Devices.Mobile.DeviceVibrate>

---

## 13.22.2 GeoLocation



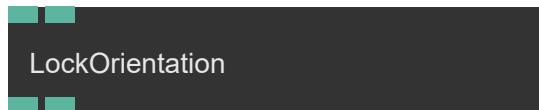
**Full Name:** Ops.Devices.Mobile.GeoLocation **Description:** Full NameOps.Devices.Mobile.GeoLocationVisibilityCodeOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch geo location mapOpen In EditorOUTPUT PORTSBrowser Support (booleanNumber)Latitude (Number)Longitude (Number)Data (Object)SaveCancel ChangelogPatches using GeoLocationExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Mobile.GeoLocation documentation for input port details* **< Output Ports:** - Visit *Ops.Devices.Mobile.GeoLocation documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "GeoLocation"* **Docs:** <https://cables.gl/op/Ops.Devices.Mobile.GeoLocation>

---

## 13.22.3 LockOrientation



**Full Name:** Ops.Devices.Mobile.LockOrientation **Description:** Note: This method only works for installed Web apps or for Web pages in full-screen mode.

**> Input Ports:** - Visit *Ops.Devices.Mobile.LockOrientation documentation for input port details* **< Output Ports:** - Visit *Ops.Devices.Mobile.LockOrientation documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "LockOrientation"* **Docs:** <https://cables.gl/op/Ops.Devices.Mobile.LockOrientation>

---

## 13.22.4 MotionSensor\_v2



**Full Name:** Ops.Devices.Mobile.MotionSensor\_v2 **Description:** alpha value represents the motion of the device around the z axis, represented in degrees with values ranging from 0 to 360.

**> Input Ports:** - Visit *Ops.Devices.Mobile.MotionSensor\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Mobile.MotionSensor\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MotionSensor\_v2" **Docs:** [https://cables.gl/op/Ops.Devices.Mobile.MotionSensor\\_v2](https://cables.gl/op/Ops.Devices.Mobile.MotionSensor_v2)

---

## 13.22.5 Pinch



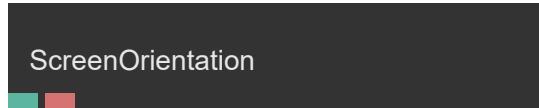
**Full Name:** Ops.Devices.Mobile.Pinch **Description:** Full NameOps.Devices.Mobile.PinchVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlists-Javascript Librarieshammer.js (touch gesture detection)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSEnabled (Number: boolean)Min Scale (Number)Max Scale (Number)Reset Scale (Trigger)Limit (Number: boolean)OUTPUT PORTSScale (Number)Event Details (Object)Delta (Number)SaveCancel ChangelogPatches using PinchExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Mobile.Pinch documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Mobile.Pinch documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Pinch" **Docs:** <https://cables.gl/op/Ops.Devices.Mobile.Pinch>

---

## 13.22.6 ScreenOrientation\_v2



**Full Name:** Ops.Devices.Mobile.ScreenOrientation\_v2 **Description:** Orientation of the device/screen. e.g. Screen is in 0 Degree rotated Landscape mode, or 90 Degree rotated to Portrait mode.

**> Input Ports:** - Visit *Ops.Devices.Mobile.ScreenOrientation\_v2 documentation* for input port details <  
**Output Ports:** - Visit *Ops.Devices.Mobile.ScreenOrientation\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ScreenOrientation\_v2" **Docs:** [https://cables.gl/op/Ops.Devices.Mobile.ScreenOrientation\\_v2](https://cables.gl/op/Ops.Devices.Mobile.ScreenOrientation_v2)

---

## 13.22.7 ShakeGesture



**Full Name:** Ops.Devices.Mobile.ShakeGesture **Description:** Full Name Ops.Devices.Mobile.ShakeGestureVisibility  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch id Youtube ids (comma seperated) Op Licence Caniuse query No op example found on this server OUTPUT PORTS Acceleration X (Number) Acceleration Y (Number) Acceleration Z (Number) Save Cancel Changelog Patches using ShakeGesture Examples Team cables Public My Patches My Ops

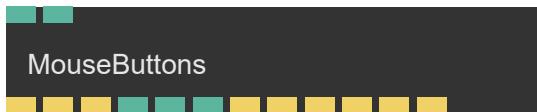
**> Input Ports:** - Visit *Ops.Devices.Mobile.ShakeGesture documentation* for input port details < **Output Ports:** - Visit *Ops.Devices.Mobile.ShakeGesture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ShakeGesture" **Docs:** <https://cables.gl/op/Ops.Devices.Mobile.ShakeGesture>

---

## 13.23 Ops.Devices.Mouse

### 13.23.1 MouseButtons



**Full Name:** Ops.Devices.Mouse.MouseButtons **Description:** Full NameOps.Devices.Mouse.MouseButtonsVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Mouse Picking with StateOpen In EditorINPUT PORTSArea index (Number: integer)Active (Number: boolean)OUTPUT PORTSClick Left (Trigger)Click Right (Trigger)Double Click (Trigger)Button pressed Left (Number)Button pressed Middle (Number)Button pressed Right (Number)Mouse Down Left (Trigger)Mouse Down Middle (Trigger)Mouse Down Right (Trigger)Mouse Up Left (Trigger)Mouse Up Middle (Trigger)Mouse Up Right (Trigger)SaveCancel ChangelogPatches using MouseButtonsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Mouse.MouseButtons* documentation for input port details **< Output Ports:** - Visit *Ops.Devices.Mouse.MouseButtons* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MouseButtons" **Docs:** <https://cables.gl/op/Ops.Devices.Mouse.MouseButtons>

---

### 13.23.2 MouseDrag



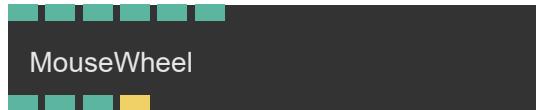
**Full Name:** Ops.Devices.Mouse.MouseDrag **Description:** Full NameOps.Devices.Mouse.MouseDragVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch scrollOpen In EditorINPUT PORTSActive (Number: boolean)Speed (Number)Input Type index (Number: integer)Area index (Number: integer)OUTPUT PORTSDelta X (Number)Delta Y (Number)Is Dragging (Number)SaveCancel ChangelogPatches using MouseDragExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Mouse.MouseDrag* documentation for input port details **< Output Ports:** - Visit *Ops.Devices.Mouse.MouseDrag* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MouseDrag"  
**Docs:** <https://cables.gl/op/Ops.Devices.Mouse.MouseDrag>

---

### 13.23.3 MouseWheel\_v2



**Full Name:** Ops.Devices.Mouse.MouseWheel\_v2 **Description:** Full NameOps.Devices.Mouse.MouseWheel\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch scrollOpen In EditorINPUT PORTSSpeed (Number)prevent scroll (Number: boolean)Flip Direction (Number: boolean)Simple Delta (Number: boolean)Area index (Number: integer) Canvas Document Parent active (Number: boolean)OUTPUT PORTSdelta (Number)delta X (Number)browser event delta (Number)Wheel Action (Trigger)SaveCancel ChangelogPatches using MouseWheel\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Devices.Mouse.MouseWheel\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Devices.Mouse.MouseWheel\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MouseWheel\_v2"  
**Docs:** [https://cables.gl/op/Ops.Devices.Mouse.MouseWheel\\_v2](https://cables.gl/op/Ops.Devices.Mouse.MouseWheel_v2)

---

### 13.23.4 Mouse\_v4



**Full Name:** Ops.Devices.Mouse.Mouse\_v4 **Description:** Full NameOps.Devices.Mouse.Mouse\_v4VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch Mouse Draw Spline ExampleUsing the ScreenPosTo3d op we can convert the mouse coordinates to 3D coordinates. For this you need to disable the Flip Y port of the Mouse op.

> **Input Ports:** - Visit `Ops.Devices.Mouse.Mouse_v4` documentation for input port details < **Output Ports:** - Visit `Ops.Devices.Mouse.Mouse_v4` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Mouse\_v4" **Docs:** [https://cables.gl/op/Ops.Devices.Mouse.Mouse\\_v4](https://cables.gl/op/Ops.Devices.Mouse.Mouse_v4)

---

### 13.23.5 PointerLock



**Full Name:** `Ops.Devices.Mouse.PointerLock` **Description:** The Pointer Lock API provides input methods based on the movement of the mouse over time (i.e., deltas), not just the absolute position of the mouse cursor in the viewport. It gives you access to raw mouse movement, locks the target of mouse events to a single element, eliminates limits on how far mouse movement can go in a single direction, and removes the cursor from view. It is ideal for first-person 3D games, for example.

> **Input Ports:** - Visit `Ops.Devices.Mouse.PointerLock` documentation for input port details < **Output Ports:** - Visit `Ops.Devices.Mouse.PointerLock` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "PointerLock" **Docs:** <https://cables.gl/op/Ops.Devices.Mouse.PointerLock>

---

## 13.24 Ops.Devices.WebXr.Vr

### 13.24.1 Vr



**Full Name:** `Ops.Devices.WebXr.Vr.Vr` **Description:** Full NameOps.Devices.WebXr.Vr.VrVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch cablesverseOpen In EditorINPUT PORTSMainloop (Trigger)Stop (Trigger)StartbuttonShow Button (Number: boolean)Button Style (String)TextureRender to texture

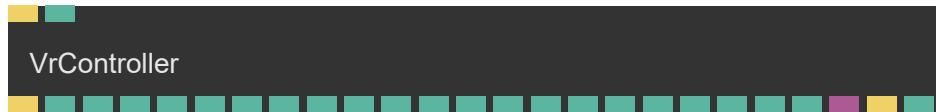
(Number: boolean)Shader (Object:shader)TextureMSAA index (Number: integer) none 2x 4x 8x OUTPUT PORTSNext (Trigger)Render After Eyes (Trigger)Viewer Pose (Object)Eye Index (Number)VR Support (booleanNumber)Matrix (Array)DOM Overlay Ele (Object)In Session (booleanNumber)Ms per eye (Array)Texture (Object)Texture Depth (Object)SaveCancel ChangelogPatches using VrExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Devices.WebXr.Vr.Vr documentation](#) for input port details < **Output Ports:** - Visit [Ops.Devices.WebXr.Vr.Vr documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "Vr"](#) **Docs:** <https://cables.gl/op/Ops.Devices.WebXr.Vr.Vr>

---

## 13.24.2 VrController



**Full Name:** Ops.Devices.WebXr.Vr.VrController **Description:** Full NameOps.Devices.WebXr.Vr.VrControllerVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch cablesverseOpen In EditorINPUT PORTSUpdate (Trigger)Handedness index (Number: integer)OUTPUT PORTSNext (Trigger)Axis 1 (Number)Axis 2 (Number)Axis 3 (Number)Axis 4 (Number)Button 1 Pressed (Number)Button 2 Pressed (Number)Button 3 Pressed (Number)Button 4 Pressed (Number)Button 5 Pressed (Number)Button 6 Pressed (Number)Button 7 Pressed (Number)Button 1 Touched (Number)Button 2 Touched (Number)Button 3 Touched (Number)Button 4 Touched (Number)Button 5 Touched (Number)Button 6 Touched (Number)Button 7 Touched (Number)Position X (Number)Position Y (Number)Position Z (Number)Gamepad Values (Object)Transformed Position (Trigger)Found (Number)SaveCancel ChangelogPatches using VrControllerExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Devices.WebXr.Vr.VrController documentation](#) for input port details < **Output Ports:** - Visit [Ops.Devices.WebXr.Vr.VrController documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "VrController"](#) **Docs:** <https://cables.gl/op/Ops.Devices.WebXr.Vr.VrController>

---

## 13.25 Ops.Extension.Ai

### 13.25.1 LLmModelList



**Full Name:** Ops.Extension.Ai.LLmModelList **Description:** Full NameOps.Extension.Ai.LLmModelListVisibility Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team AIPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSString1 (String)headers (Object)Reload (Trigger)OUTPUT PORTSz2gtag4y7 (Array)42rvai2nv (booleanNumber)jcju8npa2 (booleanNumber)ozg9pnd1z (String)SaveCancel ChangelogPatches using LLmModelListExamples Team AI Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Ai.LLmModelList documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Ai.LLmModelList documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LLmModelList" **Docs:** <https://cables.gl/op/Ops.Extension.Ai.LLmModelList>

---

### 13.25.2 LlmPrompt



**Full Name:** Ops.Extension.Ai.LlmPrompt **Description:** Full NameOps.Extension.Ai.LlmPromptVisibility Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team AIPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSPrompt (String) Value (String) API URL (String) Authentication (String) Run (Trigger) Auto request (Number: boolean) OUTPUT PORTS4sn5cnszp (String)i4feefw9n (Object)klu6r35ga (booleanNumber)xs18z73z0 (booleanNumber)aosval1gx (String)SaveCancel ChangelogPatches using LlmPromptExamples Team AI Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Ai.LlmPrompt documentation* for input port details **< Output Ports:**

- Visit `Ops.Extension.Ai.LlmPrompt` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "LlmPrompt"  
**Docs:** <https://cables.gl/op/Ops.Extension.Ai.LlmPrompt>

---

## 13.26 Ops.Extension.AmmoPhysics

### 13.26.1 AmmoBody



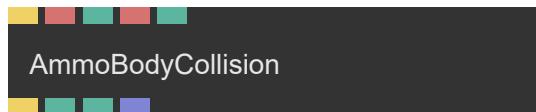
**Full Name:** `Ops.Extension.AmmoPhysics.AmmoBody` **Description:** Full Name `Ops.Extension.AmmoPhysics.AmmoBody`  
tension Op - visible for everyone License MIT Author pandurgithub source Maintained by Team Ammo  
Physics Patchlists Documentation (markdown) Issues Example patch id Youtube ids (comma separated)  
Op Licence Can i use query Example Patch AmmoBody AmmoBodyCollision Example Open In  
Editor INPUT PORTS Update (Trigger) Name (String) name of this physics body

**> Input Ports:** - Visit `Ops.Extension.AmmoPhysics.AmmoBody` documentation for input port details <  
**Output Ports:** - Visit `Ops.Extension.AmmoPhysics.AmmoBody` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "AmmoBody"  
**Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoBody>

---

### 13.26.2 AmmoBodyCollision



**Full Name:** `Ops.Extension.AmmoPhysics.AmmoBodyCollision` **Description:** This op will allow you to output a Boolean state change (true/false) if the specified physics objects have collided together.

**> Input Ports:** - **name of physics object (optional):** Match Name 2 index (Number: integer) match name 2 (if set) **< Output Ports:** - **collision detected (Boolean):** Num Collisions (Number) number of collisions

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "AmmoBodyCollision" **Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoBodyCollision>

---

### 13.26.3 AmmoCharacter



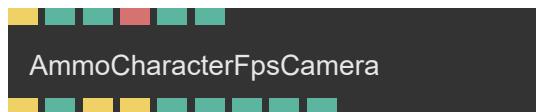
**Full Name:** `Ops.Extension.AmmoPhysics.AmmoCharacter` **Description:** this OP allows you to create a capsule shaped collision body that will move around a 3D space of an Ammo World scene driven by user input commands.

> **Input Ports:** - X axis rotation value (from **AmmoCharacterFpsCamera** for example): Dir Y (Number)  
Y axis rotation value (from **AmmoCharacterFpsCamera** for example) - Z axis rotation value (from **AmmoCharacterFpsCamera** for example): ResetSet Pos X (Number)Set Pos Y (Number)Set Pos Z (Number)Reset (Trigger)reset location < **Output Ports:** - Visit `Ops.Extension.AmmoPhysics.AmmoCharacter` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "AmmoCharacter" **Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoCharacter>

---

### 13.26.4 AmmoCharacterFpsCamera



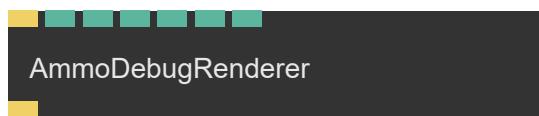
**Full Name:** `Ops.Extension.AmmoPhysics.AmmoCharacterFpsCamera` **Description:** This specialized camera operator is used with an **AmmoCharacter** physics body and can transmit direction to the controlled character and affect how the character will move.

> **Input Ports:** - Visit `Ops.Extension.AmmoPhysics.AmmoCharacterFpsCamera` documentation for input port details < **Output Ports:** - has the mouse cursor been locked (Boolean): Mouse Left (Trigger)mouse left click

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "AmmoCharacterFpsCamera" **Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoCharacterFpsCamera>

---

### 13.26.5 AmmoDebugRenderer



**Full Name:** Ops.Extension.AmmoPhysics.AmmoDebugRenderer **Description:** This handy operator will let you debug your physics simulation and hitboxes/meshes. One great use case is to check that your GLTF scene hitboxes are in the correct locations or to find the best setting for a convex hull triangle simplification parameter.

➤ **Input Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoDebugRenderer documentation for input port details* ◀ **Output Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoDebugRenderer documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AmmoDebugRenderer" **Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoDebugRenderer>

---

### 13.26.6 AmmoEmitter



**Full Name:** Ops.Extension.AmmoPhysics.AmmoEmitter **Description:** The emitter operator will create a physics object with the specified parameters including velocity and direction. You can create more than one parameter and also remove and limit the number of objects that are created.

➤ **Input Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoEmitter documentation for input port details* ◀ **Output Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoEmitter documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AmmoEmitter" **Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoEmitter>

---

## 13.26.7 AmmoRaycast



**Full Name:** Ops.Extension.AmmoPhysics.AmmoRaycast **Description:** This operator will report if there is a physics object at the specific location and will also output the name of the object from the string output port. With something like a Mouse Op you can use this for navigation or user interaction. Of course you are not limited to using mouse coordinates, but can get creative and use any other input method.

➤ **Input Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoRaycast documentation for input port details* ◀

**Output Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoRaycast documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "AmmoRaycast"*

**Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoRaycast>

---

## 13.26.8 AmmoWorld



**Full Name:** Ops.Extension.AmmoPhysics.AmmoWorld **Description:** This is the first op in your physics scene setup. Put it down, connect and setup the parameters and then place all other Ammo Physics operators underneath.

➤ **Input Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoWorld documentation for input port details* ◀

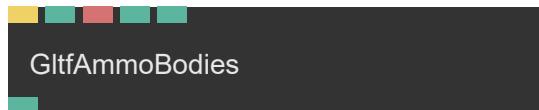
**Output Ports:** - Visit *Ops.Extension.AmmoPhysics.AmmoWorld documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "AmmoWorld"*

**Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.AmmoWorld>

---

## 13.26.9 GltfAmmoBodies



**Full Name:** Ops.Extension.AmmoPhysics.GltfAmmoBodies **Description:** When working with a GLTF scene with lots of geometry objects you can use this operator to filter your entire GLTF scene for object names and create a collision mesh.

**> Input Ports:** - Visit *Ops.Extension.AmmoPhysics.GltfAmmoBodies documentation* for input port details  
**< Output Ports:** - Visit *Ops.Extension.AmmoPhysics.GltfAmmoBodies documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GltfAmmoBodies"

**Docs:** <https://cables.gl/op/Ops.Extension.AmmoPhysics.GltfAmmoBodies>

---

## 13.27 Ops.Extension.DetectGpu

### 13.27.1 DetectGPU



**Full Name:** Ops.Extension.DetectGpu.DetectGPU **Description:** This OP loads data from the web to benchmark the GPU. Don't use it offline.

**> Input Ports:** - Visit *Ops.Extension.DetectGpu.DetectGPU documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.DetectGpu.DetectGPU documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DetectGPU"

**Docs:** <https://cables.gl/op/Ops.Extension.DetectGpu.DetectGPU>

---

## 13.28 Ops.Extension.ECharts

### 13.28.1 ECharts



**Full Name:** Ops.Extension.ECharts.ECharts **Description:** This OP wraps the ECharts data visualization library: <https://echarts.apache.org/en/tutorial.html> and allows to create more than a hundred charts with a single configuration object, focusing on the description of the charts instead of its implementation.

**> Input Ports:** - Visit [Ops.Extension.ECharts.ECharts documentation](#) for input port details **< Output Ports:** - Visit [Ops.Extension.ECharts.ECharts documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ECharts" **Docs:** <https://cables.gl/op/Ops.Extension.ECharts.ECharts>

---

### 13.28.2 EChartsEvent



**Full Name:** Ops.Extension.ECharts.EChartsEvent **Description:** Using this op you can capture ECharts events: <https://echarts.apache.org/en/api.html#events>

**> Input Ports:** - Visit [Ops.Extension.ECharts.EChartsEvent documentation](#) for input port details **< Output Ports:** - Visit [Ops.Extension.ECharts.EChartsEvent documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "EChartsEvent" **Docs:** <https://cables.gl/op/Ops.Extension.ECharts.EChartsEvent>

---

## 13.29 Ops.Extension.FxHash

## 13.29.1 FxHash



**Full Name:** Ops.Extension.FxHash **Description:** How to use:

**> Input Ports:** - Visit *Ops.Extension.FxHash.FxHash documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.FxHash.FxHash documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "FxHash"* **Docs:** <https://cables.gl/op/Ops.Extension.FxHash.FxHash>

---

## 13.30 Ops.Extension.GlParticles

### 13.30.1 VelocityBoundaries



**Full Name:** Ops.Extension.GlParticles.VelocityBoundaries **Description:** Full NameOps.Extension.GlParticles.Ve  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team Parti  
clesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryNo op example found on this serverINPUT PORTSRender (Trigger)Area in  
dex (Number: integer)Method index (Number: integer)Invert Area (Number: boolean)Strength  
(Number)Size (Number)Falloff (Number)CollisionBouncyness (Number)Collision fade (Number)Dir  
Randomness (Number)inForceOutwards (Number)Positionx (Number)y (Number)z (Number)Velocity  
Dir X (Number)Velocity Dir Y (Number)Velocity Dir Z (Number)Size X (Number)Size Y (Number)Size  
Z (Number)Multiply (Object:texture)Age ActivationAge Start (Number)Age End (Number)Age Fade  
(Number)OUTPUT PORTSTrigger (Trigger)Velocity (Object)Collision (Object)SaveCancel Changelog  
Patches using VelocityBoundariesExamples Team Particles Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.GlParticles.VelocityBoundaries documentation* for input port details  
**< Output Ports:** - Visit *Ops.Extension.GlParticles.VelocityBoundaries documentation* for output port de  
tails

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "VelocityBoundaries" **Docs:** <https://cables.gl/op/Ops.Extension.GlParticles.VelocityBoundaries>

---

## 13.31 Ops.Extension.HtmlElementArray

### 13.31.1 DivElements



**Full Name:** Ops.Extension.HtmlElementArray.DivElements **Description:** Full NameOps.Extension.HtmlElementArray Extension Op - visible for everyone License MIT Author pandurgithub source Maintained by Team HtmlElementArraysPatchlistsDocumentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence Can use query Example Patch reckless html example Open In Editor INPUT PORTS Class (String) Parent (Object:element) Num (Number: integer) Active (Number: boolean) Text (Array) Reset Hover (Trigger) OUTPUT PORTS Elements (Array) Index Clicked (Number) Element Clicked (Trigger) Pointer Up (Trigger) Index Hovered (Number) Save Cancel Changelog Patches using DivElements Examples Team HtmlElementArrays Public My Patches My Ops

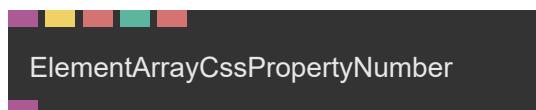
> **Input Ports:** - Visit `Ops.Extension.HtmlElementArray.DivElements` documentation for input port details

< **Output Ports:** - Visit `Ops.Extension.HtmlElementArray.DivElements` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "DivElements" **Docs:** <https://cables.gl/op/Ops.Extension.HtmlElementArray.DivElements>

---

### 13.31.2 ElementArrayCssPropertyName



**Full Name:** Ops.Extension.HtmlElementArray.ElementArrayCssPropertyName **Description:** Full NameOps.Extension.HtmlElementArray.ElementArrayCssPropertyName Visibility Extension Op

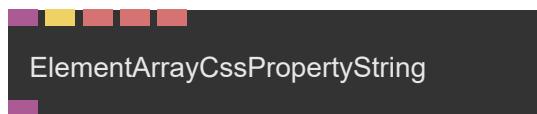
- visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team HtmlElementsPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma separated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSElementElement (Object)Update (Trigger)AttributesProperty (String)Value (Number)Value Suffix (String)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ElementArrayCssPropertyNumberExamples Team HtmlElementArrays Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Extension.HtmlElementArray.ElementArrayCssPropertyNumber documentation for input port details* < **Output Ports:** - Visit *Ops.Extension.HtmlElementArray.ElementArrayCssPropertyNumber documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementArrayCssPropertyNumber" **Docs:** <https://cables.gl/op/Ops.Extension.HtmlElementArray.ElementArrayCssPropertyNumber>

---

### 13.31.3 ElementArrayCssPropertyString



**Full Name:** Ops.Extension.HtmlElementArray.ElementArrayCssPropertyString **Description:** Full NameOps.Extension.HtmlElementArray.ElementArrayCssPropertyStringVisibility Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team HtmlElementsPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma separated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSElementElement (Object)Update (Trigger)AttributesProperty (String)Value (String)Value Suffix (String)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ElementArrayCssPropertyStringExamples Team HtmlElementArrays Public My Patches My Ops

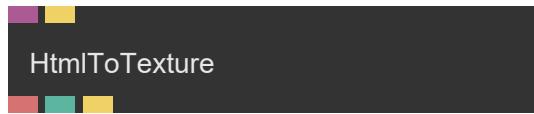
➤ **Input Ports:** - Visit *Ops.Extension.HtmlElementArray.ElementArrayCssPropertyString documentation for input port details* < **Output Ports:** - Visit *Ops.Extension.HtmlElementArray.ElementArrayCssPropertyString documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementArrayCssPropertyString" **Docs:** <https://cables.gl/op/Ops.Extension.HtmlElementArray.ElementArrayCssPropertyString>

---

## 13.32 Ops.Extension.HtmlToTexture

### 13.32.1 HtmlToTexture



**Full Name:** Ops.Extension.HtmlToTexture.HtmlToTexture **Description:** Full NameOps.Extension.HtmlToTexture.HtmlToTexture Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team HtmlToTexturePatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch HtmlToTexture ExampleOpen In EditorINPUT PORTSElement (Object:element)Update (Trigger)OUTPUT PORTSImage dataUrl (String)Progress (Number)Finished (Trigger)SaveCancel ChangelogPatches using HtmlToTextureExamples Team HtmlToTexture Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.HtmlToTexture.HtmlToTexture documentation for input port details*  
**< Output Ports:** - Visit *Ops.Extension.HtmlToTexture.HtmlToTexture documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HtmlToTexture"  
**Docs:** <https://cables.gl/op/Ops.Extension.HtmlToTexture.HtmlToTexture>

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## 13.33 Ops.Extension.LSystem

### 13.33.1 Lsystem\_v2



**Full Name:** Ops.Extension.LSystem.Lsystem\_v2 **Description:** Basic Lsystem explanation:

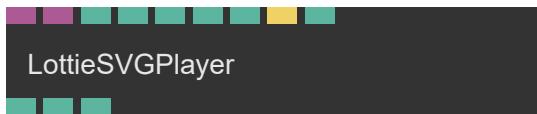
**> Input Ports:** - Visit *Ops.Extension.LSystem.Lsystem\_v2 documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.LSystem.Lsystem\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Lsystem\_v2"  
**Docs:** [https://cables.gl/op/Ops.Extension.LSystem.Lsystem\\_v2](https://cables.gl/op/Ops.Extension.LSystem.Lsystem_v2)

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## 13.34 Ops.Extension.Lottie

### 13.34.1 LottieSVGPlayer



**Full Name:** Ops.Extension.Lottie.LottieSVGPlayer **Description:** Full NameOps.Extension.Lottie.LottieSVGPlayer extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team LottiePatchlistsJavascript Librarieslottie for web (lottie for web)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch LottieSVGPlayer ExampleOpen In EditorINPUT PORTSHTML Element (Object:element)JSON Data (Object)TimingPlay Mode index (Number: integer) Auto Frame Render Frame (Number)Loop (Number: boolean)Play (Number: boolean)Play Backward (Number: boolean)Rewind (Trigger)Active (Number: boolean)OUTPUT PORTSCompleted (booleanNumber)Progress (Number)Total Frames (Number)SaveCancel ChangelogPatches using LottieSVGPlayerExamples Team Lottie Public My Patches My Ops

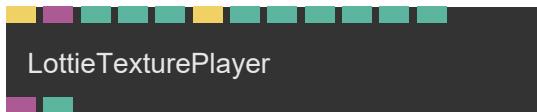
**> Input Ports:** - Visit *Ops.Extension.Lottie.LottieSVGPlayer documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Lottie.LottieSVGPlayer documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LottieSVGPlayer"

**Docs:** <https://cables.gl/op/Ops.Extension.Lottie.LottieSVGPlayer>

---

### 13.34.2 LottieTexturePlayer\_v2



**Full Name:** Ops.Extension.Lottie.LottieTexturePlayer\_v2 **Description:** Full NameOps.Extension.Lottie.LottieTexturePlayer extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team LottiePatchlistsJavascript Librarieslottie for web (lottie for web)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch LottieTexturePlayer Exampleexample usage of bodymovin library:

**> Input Ports:** - Visit [Ops.Extension.Lottie.LottieTexturePlayer\\_v2](#) documentation for input port details <  
**Output Ports:** - Visit [Ops.Extension.Lottie.LottieTexturePlayer\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "LottieTexturePlayer\_v2" **Docs:** [https://cables.gl/op/Ops.Extension.Lottie.LottieTexturePlayer\\_v2](https://cables.gl/op/Ops.Extension.Lottie.LottieTexturePlayer_v2)

---

## 13.35 Ops.Extension.Mediapipe

### 13.35.1 FaceMesh



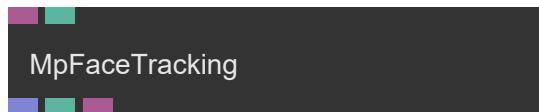
**Full Name:** Ops.Extension.Mediapipe.FaceMesh **Description:** read more on the mediapipe project page:

**> Input Ports:** - Visit [Ops.Extension.Mediapipe.FaceMesh](#) documentation for input port details <  
**Output Ports:** - Visit [Ops.Extension.Mediapipe.FaceMesh](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "FaceMesh" **Docs:** <https://cables.gl/op/Ops.Extension.Mediapipe.FaceMesh>

---

### 13.35.2 MpFaceTracking



**Full Name:** Ops.Extension.Mediapipe.MpFaceTracking **Description:** read more on the mediapipe project page:

**> Input Ports:** - Visit [Ops.Extension.Mediapipe.MpFaceTracking](#) documentation for input port details <  
**Output Ports:** - Visit [Ops.Extension.Mediapipe.MpFaceTracking](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "MpFaceTracking" **Docs:** <https://cables.gl/op/Ops.Extension.Mediapipe.MpFaceTracking>

---

### 13.35.3 MpHand



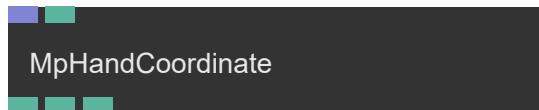
**Full Name:** Ops.Extension.Mediapipe.MpHand **Description:** Full NameOps.Extension.Mediapipe.MpHandVisibility  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team  
MediaPipePatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)  
Op LicenceCaniuse queryExample Patch MpHands - ExampleOpen In EditorINPUT PORTSHands  
Result (Object)Hand index (Number: integer)Min Score (Number)OUTPUT PORTSPoints (Array)Lines  
(Array)Data (Object)Found Hand (Number)Score (Number)SaveCancel ChangelogPatches using  
MpHandExamples Team MediaPipe Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Mediapipe.MpHand documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Mediapipe.MpHand documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MpHand" **Docs:** <https://cables.gl/op/Ops.Extension.Mediapipe.MpHand>

---

### 13.35.4 MpHandCoordinate



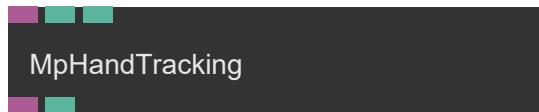
**Full Name:** Ops.Extension.Mediapipe.MpHandCoordinate **Description:** read more on the mediapipe project page:

**> Input Ports:** - Visit *Ops.Extension.Mediapipe.MpHandCoordinate documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Mediapipe.MpHandCoordinate documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MpHandCoordinate" **Docs:** <https://cables.gl/op/Ops.Extension.Mediapipe.MpHandCoordinate>

---

### 13.35.5 MpHandTracking



**Full Name:** Ops.Extension.Mediapipe.MpHandTracking **Description:** read more on the mediapipe project page:

**> Input Ports:** - Visit *Ops.Extension.Mediapipe.MpHandTracking* documentation for *input port details* <

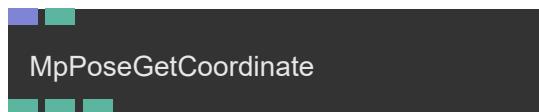
**Output Ports:** - Visit *Ops.Extension.Mediapipe.MpHandTracking* documentation for *output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MpHandTracking"

**Docs:** <https://cables.gl/op/Ops.Extension.Mediapipe.MpHandTracking>

---

### 13.35.6 MpPoseGetCoordinate



**Full Name:** Ops.Extension.Mediapipe.MpPoseGetCoordinate **Description:** read more on the mediapipe project page:

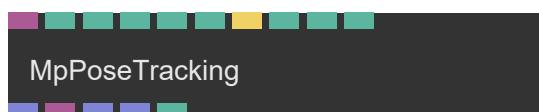
**> Input Ports:** - Visit *Ops.Extension.Mediapipe.MpPoseGetCoordinate* documentation for *input port details* <

**Output Ports:** - Visit *Ops.Extension.Mediapipe.MpPoseGetCoordinate* documentation for *output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MpPoseGetCoordinate" **Docs:** <https://cables.gl/op/Ops.Extension.Mediapipe.MpPoseGetCoordinate>

---

### 13.35.7 MpPoseTracking



**Full Name:** Ops.Extension.Mediapipe.MpPoseTracking **Description:** read more on the mediapipe project page:

> **Input Ports:** - Visit *Ops.Extension.Mediapipe.MpPoseTracking* documentation for input port details <

**Output Ports:** - Visit *Ops.Extension.Mediapipe.MpPoseTracking* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "MpPoseTracking"

**Docs:** <https://cables.gl/op/Ops.Extension.Mediapipe.MpPoseTracking>

---

## 13.36 Ops.Extension.OpenType

### 13.36.1 OpentypeFont



**Full Name:** Ops.Extension.OpenType.OpentypeFont **Description:** more information:

> **Input Ports:** - Visit *Ops.Extension.OpenType.OpentypeFont* documentation for input port details <

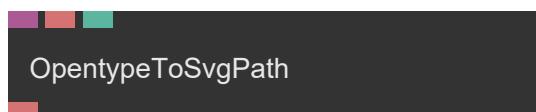
**Output Ports:** - Visit *Ops.Extension.OpenType.OpentypeFont* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "OpentypeFont"

**Docs:** <https://cables.gl/op/Ops.Extension.OpenType.OpentypeFont>

---

### 13.36.2 OpentypeToSvgPath



**Full Name:** Ops.Extension.OpenType.OpentypeToSvgPath **Description:** more information:

> **Input Ports:** - Visit *Ops.Extension.OpenType.OpentypeToSvgPath* documentation for input port details <

**Output Ports:** - Visit *Ops.Extension.OpenType.OpentypeToSvgPath* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "OpentypeToSvgPath"

**Docs:** <https://cables.gl/op/Ops.Extension.OpenType.OpentypeToSvgPath>

---

## 13.37 Ops.Extension.Osc2Ws

### 13.37.1 Osc2WsArray



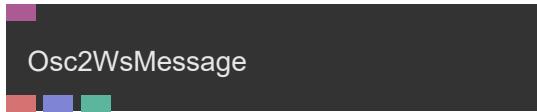
**Full Name:** Ops.Extension.Osc2Ws.Osc2WsArray **Description:** To get OSC data into cables you will need to install Osc2ws (Osc to web socket) from the following repo

**> Input Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsArray documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsArray documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Osc2WsArray"*  
**Docs:** <https://cables.gl/op/Ops.Extension.Osc2Ws.Osc2WsArray>

---

### 13.37.2 Osc2WsMessage



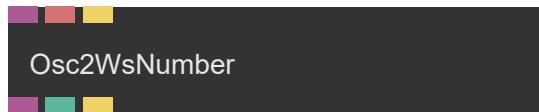
**Full Name:** Ops.Extension.Osc2Ws.Osc2WsMessage **Description:** To get OSC data into cables you will need to install Osc2ws (Osc to web socket) from the following repo

**> Input Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsMessage documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsMessage documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Osc2WsMessage"*  
**Docs:** <https://cables.gl/op/Ops.Extension.Osc2Ws.Osc2WsMessage>

---

### 13.37.3 Osc2WsNumber



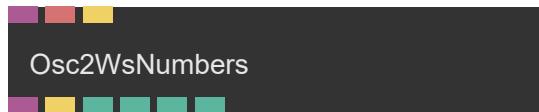
**Full Name:** Ops.Extension.Osc2Ws.Osc2WsNumber **Description:** To get OSC data into cables you will need to install Osc2ws (Osc to web socket) from the following repo

**> Input Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsNumber documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsNumber documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Osc2WsNumber"*  
**Docs:** <https://cables.gl/op/Ops.Extension.Osc2Ws.Osc2WsNumber>

---

### 13.37.4 Osc2WsNumbers



**Full Name:** Ops.Extension.Osc2Ws.Osc2WsNumbers **Description:** To get OSC data into cables you will need to install Osc2ws (Osc to web socket) from the following repo

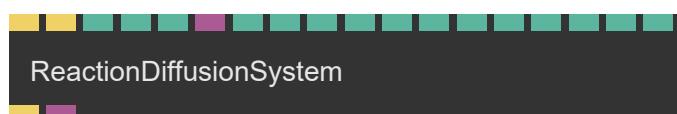
**> Input Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsNumbers documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Osc2Ws.Osc2WsNumbers documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Osc2WsNumbers"*  
**Docs:** <https://cables.gl/op/Ops.Extension.Osc2Ws.Osc2WsNumbers>

---

## 13.38 Ops.Extension.ReactionDiffusion

### 13.38.1 ReactionDiffusionSystem\_v2



**Full Name:** Ops.Extension.ReactionDiffusion.ReactionDiffusionSystem\_v2 **Description:** Use Red (1,0,0) or Green (0,1,0) on the 'draw' Output-Port to inject component A / B.

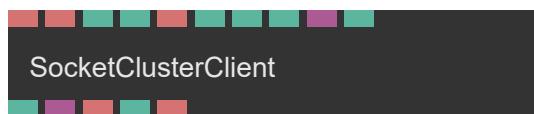
> **Input Ports:** - Visit *Ops.Extension.ReactionDiffusion.ReactionDiffusionSystem\_v2 documentation for input port details* < **Output Ports:** - Visit *Ops.Extension.ReactionDiffusion.ReactionDiffusionSystem\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ReactionDiffusionSystem\_v2"* **Docs:** [https://cables.gl/op/Ops.Extension.ReactionDiffusion.ReactionDiffusionSystem\\_v2](https://cables.gl/op/Ops.Extension.ReactionDiffusion.ReactionDiffusionSystem_v2)

---

## 13.39 Ops.Extension.SocketCluster

### 13.39.1 SocketClusterClient\_v2



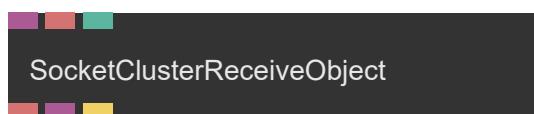
**Full Name:** Ops.Extension.SocketCluster.SocketClusterClient\_v2 **Description:** SocketCluster connects to the websocket at the given hostname. Then you define a channel that all the messages will be sent to. SocketCluster outputs a socket that has to be used in senders and receivers.

> **Input Ports:** - **enable encryption (needs to be supported by server):** Server path (String)path of url  
< **Output Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterClient\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "SocketClusterClient\_v2"* **Docs:** [https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterClient\\_v2](https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterClient_v2)

---

### 13.39.2 SocketClusterReceiveObject



**Full Name:** Ops.Extension.SocketCluster.SocketClusterReceiveObject **Description:** Full NameOps.Extension.SocketCluster Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team

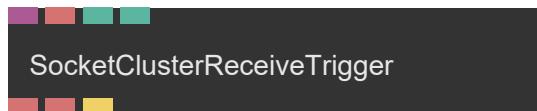
SocketClusterPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch socketcluster exampleopen this page in another browser or share the url of this patch!

> **Input Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterReceiveObject* documentation for input port details < **Output Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterReceiveObject* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SocketClusterReceiveObject" **Docs:** <https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterReceiveObject>

---

### 13.39.3 SocketClusterReceiveTrigger



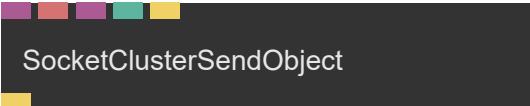
**Full Name:** Ops.Extension.SocketCluster.SocketClusterReceiveTrigger **Description:** Full NameOps.Extension.SocketCluster.SocketClusterReceiveTriggerVisibility Extension Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team SocketClusterPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch SocketClusterReceiveTrigger SocketClusterSendTrigger ExampleOpen In EditorINPUT PORTSsocket (Object:socketcluster)the socketcluster socket

> **Input Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterReceiveTrigger* documentation for input port details < **Output Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterReceiveTrigger* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SocketClusterReceiveTrigger" **Docs:** <https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterReceiveTrigger>

---

### 13.39.4 SocketClusterSendObject



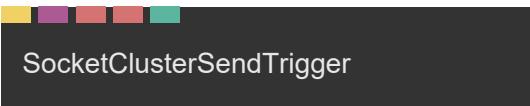
**Full Name:** Ops.Extension.SocketCluster.SocketClusterSendObject **Description:** Full NameOps.Extension.SocketClusterOp - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team SocketClusterPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch socketcluster exampleopen this page in another browser or share the url of this patch!

➤ **Input Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterSendObject documentation for input port details* < **Output Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterSendObject documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SocketClusterSendObject" **Docs:** <https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterSendObject>

---

### 13.39.5 SocketClusterSendTrigger



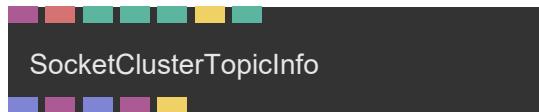
**Full Name:** Ops.Extension.SocketCluster.SocketClusterSendTrigger **Description:** Full NameOps.Extension.SocketClusterOp - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team SocketClusterPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch SocketClusterReceiveTrigger SocketClusterSendTrigger ExampleOpen In EditorINPUT PORTSdata (Trigger)trigger

➤ **Input Ports:** - the name of the trigger (created with TriggerSend): delay (ms) (Number: integer) < **Output Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterSendTrigger documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SocketClusterSendTrigger" **Docs:** <https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterSendTrigger>

---

## 13.39.6 SocketClusterTopicInfo\_v2



**Full Name:** Ops.Extension.SocketCluster.SocketClusterTopicInfo\_v2 **Description:** Socket Cluster Topic Info gives you information about active clients that are subscribed to a topic.

**> Input Ports:** - keep this small (but not 0): Update (Trigger)trigger updates **< Output Ports:** - Visit *Ops.Extension.SocketCluster.SocketClusterTopicInfo\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "SocketClusterTopicInfo\_v2"* **Docs:** [https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterTopicInfo\\_v2](https://cables.gl/op/Ops.Extension.SocketCluster.SocketClusterTopicInfo_v2)

---

## 13.40 Ops.Extension.Standalone

### 13.40.1 Ffmpeg



**Full Name:** Ops.Extension.Standalone.Ffmpeg **Description:** You need to have FFMPEG installed locally.

**> Input Ports:** - Visit *Ops.Extension.Standalone.Ffmpeg documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Standalone.Ffmpeg documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Ffmpeg"* **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Ffmpeg>

---

## 13.41 Ops.Extension.Standalone.Files

### 13.41.1 CreateFile



**Full Name:** Ops.Extension.Standalone.Files.CreateFile **Description:** Full NameOps.Extension.Standalone.Files extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorstehangithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Standalone CreateFileexample patch for Ops.Extension.Standalone.Files.CreateFile

➤ **Input Ports:** - Visit *Ops.Extension.Standalone.Files.CreateFile documentation* for input port details ◀  
**Output Ports:** - Visit *Ops.Extension.Standalone.Files.CreateFile documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “CreateFile” **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.CreateFile>

---

### 13.41.2 Exist



**Full Name:** Ops.Extension.Standalone.Files.Exist **Description:** Full NameOps.Extension.Standalone.Files.Exist extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch File Exists Op ExampleOpen In EditorINPUT PORTSPPath (String)Execute (Trigger)OUTPUT PORTSExists (boolean-Number)SaveCancel ChangelogPatches using ExistExamples Team Standalone Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Extension.Standalone.Files.Exist documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Extension.Standalone.Files.Exist documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “Exist” **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.Exist>

---

### 13.41.3 FileUrlToPath



**Full Name:** Ops.Extension.Standalone.Files.FileUrlToPath **Description:** wrapper for nodejs fileURLToPath

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.FileUrlToPath documentation* for input port details  
**< Output Ports:** - Visit *Ops.Extension.Standalone.Files.FileUrlToPath documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FileUrlToPath" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.FileUrlToPath>

---

### 13.41.4 Makedir



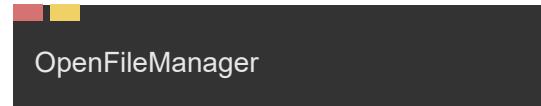
**Full Name:** Ops.Extension.Standalone.Files.Makedir **Description:** Full NameOps.Extension.Standalone.Files.Mak extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source- Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY- outube ids (comma seperated)Op LicenceCaniuse queryExample Patch Standalone Example MakedirOpen In EditorINPUT PORTSPPath (String)Create (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using MakedirExamples Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.Makedir documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Standalone.Files.Makedir documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Makedir" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.Makedir>

---

### 13.41.5 OpenFileManager



**Full Name:** Ops.Extension.Standalone.Files.OpenFileManager **Description:** Full NameOps.Extension.Standalone extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY-outube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSPPath (String)Open File Manager (Trigger)SaveCancel ChangelogPatches using OpenFileManagerExamples Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.OpenFileManager documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Standalone.Files.OpenFileManager documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "OpenFileManager" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.OpenFileManager>

---

### 13.41.6 PathToFileUrl



**Full Name:** Ops.Extension.Standalone.Files.PathToFileUrl **Description:** wrapper for nodejs pathToFileURL

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.PathToFileUrl documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Standalone.Files.PathToFileUrl documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PathToFileUrl" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.PathToFileUrl>

---

### 13.41.7 ReadDir



**Full Name:** Ops.Extension.Standalone.Files.ReadDir **Description:** Outputs an array of strings containing names of directories and files

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.ReadDir documentation for input port details* <  
**Output Ports:** - Visit *Ops.Extension.Standalone.Files.ReadDir documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ReadDir"* **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.ReadDir>

---

### 13.41.8 ResolvePath



**Full Name:** Ops.Extension.Standalone.Files.ResolvePath **Description:** Full NameOps.Extension.Standalone.File extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY-outube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this server-INPUT PORTSPPath (String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using ResolvePathExamples Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.ResolvePath documentation for input port details* <  
**Output Ports:** - Visit *Ops.Extension.Standalone.Files.ResolvePath documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ResolvePath"* **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.ResolvePath>

---

### 13.41.9 SelectDir



**Full Name:** Ops.Extension.Standalone.Files.SelectDir **Description:** Full NameOps.Extension.Standalone.Files.S  
tension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-  
Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY-  
outube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this server-  
INPUT PORTSDefault Path (String)Select Directory (Trigger)OUTPUT PORTSPPath (String)Next  
(Trigger)SaveCancel ChangelogPatches using SelectDirExamples Team Standalone Public My Patches  
My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.SelectDir documentation* for input port details <  
**Output Ports:** - Visit *Ops.Extension.Standalone.Files.SelectDir documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SelectDir" **Docs:**  
<https://cables.gl/op/Ops.Extension.Standalone.Files.SelectDir>

---

### 13.41.10 SelectFile



**Full Name:** Ops.Extension.Standalone.Files.SelectFile **Description:** Full NameOps.Extension.Standalone.Files  
tension Op - visible for everyone, use with cables standaloneLicenseMITAuthorstephangithub source-  
Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY-  
outube ids (comma seperated)Op LicenceCaniuse queryExample Patch Standalone SelectFileexample  
patch for Ops.Extension.Standalone.Files.CreateFile

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.SelectFile documentation* for input port details <  
**Output Ports:** - Visit *Ops.Extension.Standalone.Files.SelectFile documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SelectFile" **Docs:**  
<https://cables.gl/op/Ops.Extension.Standalone.Files.SelectFile>

---

### 13.41.11 Stat



**Full Name:** Ops.Extension.Standalone.Files.Stat **Description:** see <https://nodejs.org/en/learn/manipulating-files/nodejs-file-stats>

**> Input Ports:** - Visit [Ops.Extension.Standalone.Files.Stat documentation](#) for input port details **< Output Ports:** - Visit [Ops.Extension.Standalone.Files.Stat documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Stat" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.Stat>

---

### 13.41.12 SystemDirs



**Full Name:** Ops.Extension.Standalone.Files.SystemDirs **Description:** Full NameOps.Extension.Standalone.Files extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY-outube ids (comma seperated)Op LicenceCaniuse queryExample Patch home dirsOpen In EditorOUTPUT PORTSHome (String)Downloads (String)Documents (String)Desktop (String)Exe (String)SaveCancel ChangelogPatches using SystemDirsExamples Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Extension.Standalone.Files.SystemDirs documentation](#) for input port details **< Output Ports:** - Visit [Ops.Extension.Standalone.Files.SystemDirs documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SystemDirs" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.SystemDirs>

---

### 13.41.13 Watch



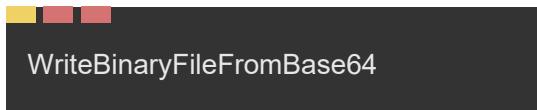
**Full Name:** Ops.Extension.Standalone.Files.Watch **Description:** Wait for files changing, renamed or moved etc.

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.Watch documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Standalone.Files.Watch documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Watch" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.Watch>

---

### 13.41.14 WriteBinaryFileFromBase64



**Full Name:** Ops.Extension.Standalone.Files.WriteBinaryFileFromBase64 **Description:** Full NameOps.Extension.Standalone.Files.WriteBinaryFileFromBase64Visibility Extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub sourceMaintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryNo op example found on this serverINPUT PORTSTTrigger (Trigger)Base64 (String)Filename (String)SaveCancel ChangelogPatches using WriteBinaryFileFromBase64Examples Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Files.WriteBinaryFileFromBase64 documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Standalone.Files.WriteBinaryFileFromBase64 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WriteBinaryFileFromBase64" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.WriteBinaryFileFromBase64>

---

### 13.41.15 WriteTextFile



**Full Name:** Ops.Extension.Standalone.Files.WriteTextFile **Description:** Full NameOps.Extension.Standalone.F tension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source- Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY- outube ids (comma seperated)Op LicenceCaniuse queryExample Patch Standalone Example: Read Write and Watch filesOpen In EditorINPUT PORTSFilename (String)Content (String)Write (Trigger)OUTPUT PORTSNext (Trigger)Has Error (booleanNumber)Error (String)SaveCancel ChangelogPatches using WriteTextFileExamples Team Standalone Public My Patches My Ops

- > **Input Ports:** - Visit *Ops.Extension.Standalone.Files.WriteTextFile documentation for input port details*  
< **Output Ports:** - Visit *Ops.Extension.Standalone.Files.WriteTextFile documentation for output port de- tails*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WriteTextFile"  
**Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Files.WriteTextFile>

---

## 13.42 Ops.Extension.Standalone.Net

### 13.42.1 HttpServer



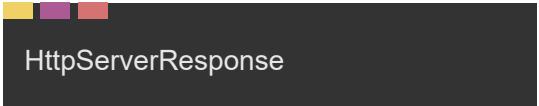
**Full Name:** Ops.Extension.Standalone.Net.HttpServer **Description:** Create a HTTP server, that can answer requests by sending strings

- > **Input Ports:** - Visit *Ops.Extension.Standalone.Net.HttpServer documentation for input port details*  
< **Output Ports:** - Visit *Ops.Extension.Standalone.Net.HttpServer documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HttpServer"  
**Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Net.HttpServer>

---

## 13.42.2 HttpServerResponse



HttpServerResponse

**Full Name:** Ops.Extension.Standalone.Net.HttpServerResponse **Description:** Full NameOps.Extension.Standalone extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY-outube ids (comma seperated)Op LicenceCaniuse queryExample Patch http serverOpen In Editor-INPUT PORTSTrigger (Trigger)Response (Object)Body (String)SaveCancel ChangelogPatches using HttpServerResponseExamples Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Net.HttpServerResponse documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Standalone.Net.HttpServerResponse documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HttpServerResponse" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Net.HttpServerResponse>

---

## 13.42.3 IpAddress



IpAddress

**Full Name:** Ops.Extension.Standalone.Net.IpAddress **Description:** Full NameOps.Extension.Standalone.Net.IpAddress extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idY-outube ids (comma seperated)Op LicenceCaniuse queryExample Patch IpAddress ExampleOpen In EditorOUTPUT PORTSLocal IP (String)Interface (String)Data (Object)SaveCancel ChangelogPatches using IpAddressExamples Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Net.IpAddress documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.Standalone.Net.IpAddress documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IpAddress" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Net.IpAddress>

---

#### 13.42.4 OscSend



**Full Name:** Ops.Extension.Standalone.Net.OscSend **Description:** Full NameOps.Extension.Standalone.Net.OscSend  
extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-  
Maintained by Team StandalonePatchlistsNPM PackagesoscDocumentation (markdown)IssuesExample  
patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this  
serverINPUT PORTSConnection (Object)Net Address (String)Port (Number: integer)OSC Address  
(String)Number (Number)Send (Trigger)SaveCancel ChangelogPatches using OscSendExamples Team  
Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Net.OscSend documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Standalone.Net.OscSend documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "OscSend" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Net.OscSend>

---

#### 13.42.5 Osc\_v2



**Full Name:** Ops.Extension.Standalone.Net.Osc\_v2 **Description:** Full NameOps.Extension.Standalone.Net.Osc\_v2  
extension Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-  
Maintained by Team StandalonePatchlistsNPM PackagesoscDocumentation (markdown)IssuesExample  
patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch OSC ExampleOpen  
In EditorINPUT PORTSPort (Number: integer)OUTPUT PORTSMassage Received (Trigger)Message  
(Object)Connection (Object)Status (String)SaveCancel ChangelogPatches using Osc\_v2Examples  
Team Standalone Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.Standalone.Net.Osc\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Standalone.Net.Osc\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Osc\_v2" **Docs:** [https://cables.gl/op/Ops.Extension.Standalone.Net.Osc\\_v2](https://cables.gl/op/Ops.Extension.Standalone.Net.Osc_v2)

---

### 13.42.6 ReadTextFile



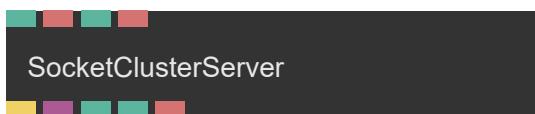
**Full Name:** Ops.Extension.Standalone.Net.ReadTextFile **Description:** Full NameOps.Extension.Standalone.Net.Operations Op - visible for everyone, use with cables standaloneLicenseMITAuthorpandurgithub source-Maintained by Team StandalonePatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma separated)Op LicenceCaniuse queryExample Patch Standalone Example: Read Write and Watch filesOpen In EditorINPUT PORTSFilename (String)Read (Trigger)OUTPUT PORTSNext (Trigger)Content (String)Has Error (booleanNumber)Error (String)SaveCancel ChangelogPatches using ReadTextFileExamples Team Standalone Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Extension.Standalone.Net.ReadTextFile documentation for input port details* ◀  
► **Output Ports:** - Visit *Ops.Extension.Standalone.Net.ReadTextFile documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ReadTextFile"  
**Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Net.ReadTextFile>

---

### 13.42.7 SocketClusterServer



**Full Name:** Ops.Extension.Standalone.Net.SocketClusterServer **Description:** start a socketcluster/websocket server listening on all interfaces.

► **Input Ports:** - Visit *Ops.Extension.Standalone.Net.SocketClusterServer documentation for input port details* ◀  
► **Output Ports:** - Visit *Ops.Extension.Standalone.Net.SocketClusterServer documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SocketClusterServer" **Docs:** <https://cables.gl/op/Ops.Extension.Standalone.Net.SocketClusterServer>

---

## 13.43 Ops.Extension.SuperShapes

### 13.43.1 SuperShapesCpu



**Full Name:** Ops.Extension.SuperShapes.SuperShapesCpu **Description:** Full NameOps.Extension.SuperShapes.SuperShapes Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team SuperShapesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch supershapez cpuOpen In EditorINPUT PORTSUpdate (Trigger)ShapeShape index (Number: integer)Tesselation (Number: integer)Param 0 (Number)Param 1 (Number)Param 2 (Number)Param 3 (Number)Param 4 (Number)Param 5 (Number)Param 6 (Number)Param 7 (Number)Param 8 (Number)Param 9 (Number)Param 10 (Number)Param 11 (Number)Param 12 (Number)Param 13 (Number)Param 14 (Number)Param 15 (Number)OUTPUT PORTSNext (Trigger)Coords (Array)Faces (Array)TexCoords (Array)SaveCancel ChangelogPatches using SuperShapesCpuExamples Team SuperShapes Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Extension.SuperShapes.SuperShapesCpu documentation* for input port details

< **Output Ports:** - Visit *Ops.Extension.SuperShapes.SuperShapesCpu documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SuperShapesCpu"

**Docs:** <https://cables.gl/op/Ops.Extension.SuperShapes.SuperShapesCpu>

---

### 13.43.2 SuperShapesGpu



**Full Name:** Ops.Extension.SuperShapes.SuperShapesGpu **Description:** Full NameOps.Extension.SuperShapes.SuperShapes Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team SuperShapesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch supershapez gpuOpen In EditorINPUT PORTSUpdate (Trigger)Render (Number: boolean)ShapeShape index (Number: integer)Tesselation (Number: integer)Param 0 (Number)Param 1 (Number)Param 2 (Number)Param 3 (Number)Param

4 (Number)Param 5 (Number)Param 6 (Number)Param 7 (Number)Param 8 (Number)Param 9 (Number)Param 10 (Number)Param 11 (Number)Param 12 (Number)Param 13 (Number)Param 14 (Number)Param 15 (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using SuperShapesGpuExamples Team SuperShapes Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Extension.SuperShapes.SuperShapesGpu* documentation for input port details  
◀ **Output Ports:** - Visit *Ops.Extension.SuperShapes.SuperShapesGpu* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SuperShapesGpu"

**Docs:** <https://cables.gl/op/Ops.Extension.SuperShapes.SuperShapesGpu>

---

## 13.44 Ops.Extension.TeachableMachines

### 13.44.1 AudioClassifier



**Full Name:** Ops.Extension.TeachableMachines.AudioClassifier **Description:** got to <https://teachablemachine.withgoogle.com/> to train a model

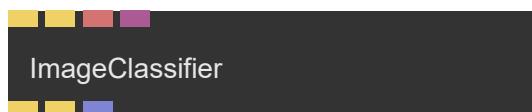
➤ **Input Ports:** - Visit *Ops.Extension.TeachableMachines.AudioClassifier* documentation for input port details  
◀ **Output Ports:** - Visit *Ops.Extension.TeachableMachines.AudioClassifier* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AudioClassifier"

**Docs:** <https://cables.gl/op/Ops.Extension.TeachableMachines.AudioClassifier>

---

### 13.44.2 ImageClassifier\_v2



**Full Name:** Ops.Extension.TeachableMachines.ImageClassifier\_v2 **Description:** got to <https://teachablemachine.withgoogle.com/> to train a model

> **Input Ports:** - Visit *Ops.Extension.TeachableMachines.ImageClassifier\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Extension.TeachableMachines.ImageClassifier\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ImageClassifier\_v2" **Docs:** [https://cables.gl/op/Ops.Extension.TeachableMachines.ImageClassifier\\_v2](https://cables.gl/op/Ops.Extension.TeachableMachines.ImageClassifier_v2)

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### 13.44.3 PoseDetection\_v2



**Full Name:** Ops.Extension.TeachableMachines.PoseDetection\_v2 **Description:** got to <https://teachablemachine.w> to train a model

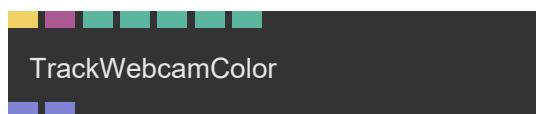
> **Input Ports:** - Visit *Ops.Extension.TeachableMachines.PoseDetection\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Extension.TeachableMachines.PoseDetection\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PoseDetection\_v2" **Docs:** [https://cables.gl/op/Ops.Extension.TeachableMachines.PoseDetection\\_v2](https://cables.gl/op/Ops.Extension.TeachableMachines.PoseDetection_v2)

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## 13.45 Ops.Extension.Trackingjs

### 13.45.1 TrackWebcamColor



**Full Name:** Ops.Extension.Trackingjs.TrackWebcamColor **Description:** this needs quite some processing power, be sure to limit resolution and/or frequency of execution

> **Input Ports:** - Visit *Ops.Extension.Trackingjs.TrackWebcamColor* documentation for input port details < **Output Ports:** - Visit *Ops.Extension.Trackingjs.TrackWebcamColor* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TrackWebcam-Color" **Docs:** <https://cables.gl/op/Ops.Extension.Trackingjs.TrackWebcamColor>

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## 13.46 Ops.Extension.Voice

### 13.46.1 MeSpeak



**Full Name:** Ops.Extension.Voice.MeSpeak **Description:** see <https://www.masswerk.at/mespeak/>

**> Input Ports:** - Visit *Ops.Extension.Voice.MeSpeak* documentation for input port details **< Output Ports:**  
- Visit *Ops.Extension.Voice.MeSpeak* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "MeSpeak" **Docs:** <https://cables.gl/op/Ops.Extension.Voice.MeSpeak>

---

### 13.46.2 Say\_v2



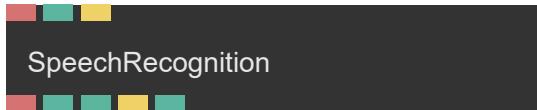
**Full Name:** Ops.Extension.Voice.Say\_v2 **Description:** Text-to-Speech, says things with synthetic voice. Enter some text to Text and trigger the Say-port.

**> Input Ports:** - Visit *Ops.Extension.Voice.Say\_v2* documentation for input port details **< Output Ports:**  
- Visit *Ops.Extension.Voice.Say\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Say\_v2" **Docs:** [https://cables.gl/op/Ops.Extension.Voice.Say\\_v2](https://cables.gl/op/Ops.Extension.Voice.Say_v2)

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### 13.46.3 SpeechRecognition



**Full Name:** Ops.Extension.Voice.SpeechRecognition **Description:** this op will send recorded data to google servers for speech analysis

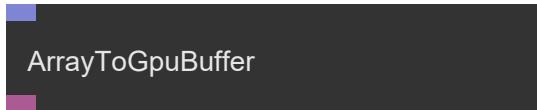
**> Input Ports:** - Visit *Ops.Extension.Voice.SpeechRecognition documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.Voice.SpeechRecognition documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SpeechRecognition" **Docs:** <https://cables.gl/op/Ops.Extension.Voice.SpeechRecognition>

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## 13.47 Ops.Extension.WebGpu

### 13.47.1 ArrayToGpuBuffer



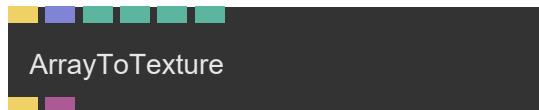
**Full Name:** Ops.Extension.WebGpu.ArrayToGpuBuffer **Description:** Full NameOps.Extension.WebGpu.ArrayToGpu extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPUCompatibilitycaniuse.com: webgpuPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch gpubuffer from arrayOpen In EditorINPUT PORTSArr (Array)OUTPUT PORTSGPUBuffer (Object)SaveCancel ChangelogPatches using ArrayToGpuBufferExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.ArrayToGpuBuffer documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.WebGpu.ArrayToGpuBuffer documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayToGpuBuffer" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.ArrayToGpuBuffer>

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## 13.47.2 ArrayToTexture



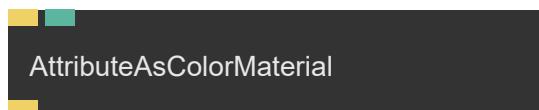
**Full Name:** Ops.Extension.WebGpu.ArrayToTexture **Description:** Full NameOps.Extension.WebGpu.ArrayToTexture  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebG-  
PUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryExample Patch ArrayToTexture ExampleOpen In EditorINPUT PORTSUp-  
date (Trigger)Array (Array)Filter index (Number: integer) nearest linear Wrap index (Number:  
integer)Width (Number: integer)Height (Number: integer)OUTPUT PORTSNext (Trigger)Texture  
(Object)SaveCancel ChangelogPatches using ArrayToTextureExamples Team WebGPU Public My  
Patches My Ops

► **Input Ports:** - Visit *Ops.Extension.WebGpu.ArrayToTexture documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Extension.WebGpu.ArrayToTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayToTexture"  
**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.ArrayToTexture>

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## 13.47.3 AttributeAsColorMaterial



**Full Name:** Ops.Extension.WebGpu.AttributeAsColorMaterial **Description:** Full NameOps.Extension.WebGpu.At-  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team  
WebGPUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seper-  
ated)Op LicenceCaniuse queryExample Patch webgpu attribute materialOpen In EditorINPUT  
PORTSRender (Trigger)Attribute index (Number: integer) Position TexCoords Normals Normal  
Mat Tangents BiTangents OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using  
AttributeAsColorMaterialExamples Team WebGPU Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Extension.WebGpu.AttributeAsColorMaterial documentation* for input port de-  
tails ◀ **Output Ports:** - Visit *Ops.Extension.WebGpu.AttributeAsColorMaterial documentation* for output  
port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "AttributeAsColorOrMaterial" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.AttributeAsColorMaterial>

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#### 13.47.4 BasicMaterial



**Full Name:** Ops.Extension.WebGpu.BasicMaterial **Description:** Full NameOps.Extension.WebGpu.BasicMaterialVis  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team We-  
bGPUCompatibilitycaniuse.com: webgpuPatchlistsDocumentation (markdown)IssuesExample  
patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch BasicMaterial  
ExampleOpen In EditorINPUT PORTSRender (Trigger)r (Number)g (Number)b (Number)a (Num-  
ber)Colorize Texture (Number: boolean)diffuseRepeatX (Number)diffuseRepeatY (Number)Tex  
Offset X (Number)Tex Offset Y (Number)Texture (Object:texture)Mask (Object:texture)OUTPUT  
PORTSNext (Trigger)SaveCancel ChangelogPatches using BasicMaterialExamples Team WebGPU  
Public My Patches My Ops

➤ **Input Ports:** - Visit `Ops.Extension.WebGpu.BasicMaterial` documentation for input port details < **Output Ports:** - Visit `Ops.Extension.WebGpu.BasicMaterial` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "BasicMaterial"  
**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.BasicMaterial>

---

#### 13.47.5 ColorTexture



**Full Name:** Ops.Extension.WebGpu.ColorTexture **Description:** Full NameOps.Extension.WebGpu.ColorTextureVis  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team  
WebGPUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seper-  
ated)Op LicenceCaniuse queryExample Patch colorTextureOpen In EditorINPUT PORTSRender  
(Trigger)r (Number)g (Number)b (Number)a (Number)OUTPUT PORTSNext (Trigger)texture\_out (Ob-

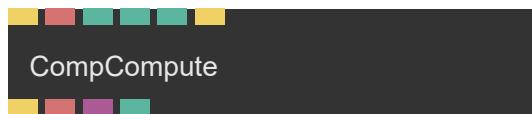
ject)SaveCancel ChangelogPatches using ColorTextureExamples Team WebGPU Public My Patches  
My Ops

> **Input Ports:** - Visit `Ops.Extension.WebGpu.ColorTexture` documentation for input port details < **Output Ports:** - Visit `Ops.Extension.WebGpu.ColorTexture` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "ColorTexture"  
**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.ColorTexture>

---

### 13.47.6 CompCompute



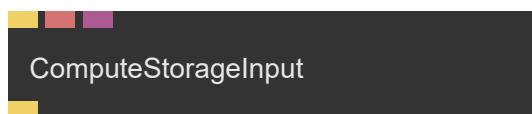
**Full Name:** `Ops.Extension.WebGpu.CompCompute` **Description:** Full NameOps.Extension.WebGpu.CompComputeVis  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebG-  
PUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryExample Patch CompCompute ComputeStorageOutput ExampleOpen In  
EditorINPUT PORTSCompute (Trigger)Source (String)Workgroups 1 (Number: integer)Workgroups  
2 (Number: integer)Workgroups 3 (Number: integer)Force Update (Trigger)OUTPUT PORTSNext  
(Trigger)Code (String)Buffer (Object)Length (Number)SaveCancel ChangelogPatches using Com-  
ComputeExamples Team WebGPU Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Extension.WebGpu.CompCompute` documentation for input port details < **Output Ports:** - Visit `Ops.Extension.WebGpu.CompCompute` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "CompCompute"  
**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.CompCompute>

---

### 13.47.7 ComputeStorageInput



**Full Name:** `Ops.Extension.WebGpu.ComputeStorageInput` **Description:** Full NameOps.Extension.WebGpu.Comput  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebG-

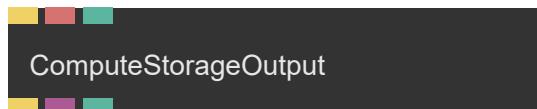
PUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSTrigger (Trigger)Name (String)Buffer (Object)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using ComputeStorageInputExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.ComputeStorageInput documentation for input port details*  
**< Output Ports:** - Visit *Ops.Extension.WebGpu.ComputeStorageInput documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ComputeStorageInput" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.ComputeStorageInput>

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### 13.47.8 ComputeStorageOutput



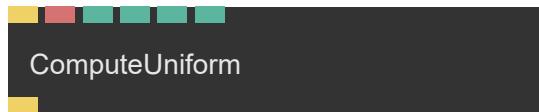
**Full Name:** Ops.Extension.WebGpu.ComputeStorageOutput **Description:** Full NameOps.Extension.WebGpu.ComputerStorageOutput Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPU  
PUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch CompCompute ComputeStorageOutput ExampleOpen In EditorINPUT PORTSTrigger (Trigger)Name (String)Length (Number: integer)OUTPUT PORTSNext (Trigger)Buffer (Object)Buffer Length (Number)SaveCancel ChangelogPatches using ComputeStorageOutputExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.ComputeStorageOutput documentation for input port details* **< Output Ports:** - Visit *Ops.Extension.WebGpu.ComputeStorageOutput documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ComputeStorageOutput" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.ComputeStorageOutput>

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### 13.47.9 ComputeUniform



**Full Name:** Ops.Extension.WebGpu.ComputeUniform **Description:** Full NameOps.Extension.WebGpu.ComputeUniform  
extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPU-PatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSTTrigger (Trigger)Name (String)X (Number)Y (Number)Z (Number)W (Number)OUTPUT PORTSNext (Trigger)SaveCancel Changelog-Patches using ComputeUniformExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.ComputeUniform documentation for input port details* <

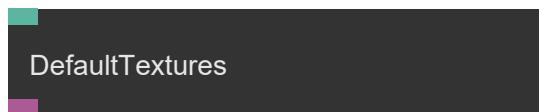
**Output Ports:** - Visit *Ops.Extension.WebGpu.ComputeUniform documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ComputeUniform"

**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.ComputeUniform>

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### 13.47.10 DefaultTextures



**Full Name:** Ops.Extension.WebGpu.DefaultTextures **Description:** Full NameOps.Extension.WebGpu.DefaultTextures  
extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPUCompatibilitycaniuse.com: webgpuPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch webgpu defaultTexturesOpen In EditorINPUT PORTSTexture index (Number: integer) Default Error Empty OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using DefaultTexturesExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.DefaultTextures documentation for input port details* <

**Output Ports:** - Visit *Ops.Extension.WebGpu.DefaultTextures documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DefaultTextures"

**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.DefaultTextures>

---

### 13.47.11 FaceCulling



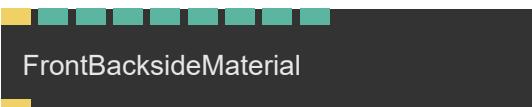
**Full Name:** Ops.Extension.WebGpu.FaceCulling **Description:** Full NameOps.Extension.WebGpu.FaceCullingVisibility  
extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team  
WebGPUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)  
Op LicenceCaniuse queryExample Patch webgpu face cullingOpen In EditorINPUT PORT-  
Srender (Trigger)Discard index (Number: integer) none front back OUTPUT PORTStrigger (Trig-  
ger)SaveCancel ChangelogPatches using FaceCullingExamples Team WebGPU Public My Patches My  
Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.FaceCulling documentation* for input port details **< Output  
Ports:** - Visit *Ops.Extension.WebGpu.FaceCulling documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FaceCulling"  
**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.FaceCulling>

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### 13.47.12 FrontBacksideMaterial



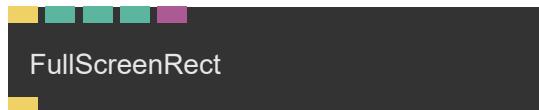
**Full Name:** Ops.Extension.WebGpu.FrontBacksideMaterial **Description:** Full NameOps.Extension.WebGpu.FrontBacksideMaterial  
extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)  
Op LicenceCaniuse queryExample Patch webgpu frontBackSideMaterialOpen In EditorINPUT PORTSRender (Trigger)r (Number)g (Number)b (Number)a (Number)r 2 (Number)g 2 (Number)b 2 (Number)a  
2 (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using FrontBacksideMaterialExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.FrontBacksideMaterial documentation* for input port details  
**< Output Ports:** - Visit *Ops.Extension.WebGpu.FrontBacksideMaterial documentation* for output port  
details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "FrontBackside-Material" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.FrontBacksideMaterial>

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### 13.47.13 FullScreenRect



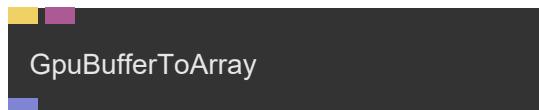
**Full Name:** `Ops.Extension.WebGpu.FullScreenRect` **Description:** Full Name `Ops.Extension.WebGpu.FullScreenRect` extension Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team WebGPUCompatibility [caniuse.com](#): [webgpuPatchlistsDocumentation](#) ([markdown](#)) [Issues](#) Example patch id [Youtube](#) ids (comma seperated) Op Licence [Caniuse](#) query Example Patch Fullscreenrect Open In Editor INPUT PORTS render (Trigger) Scale index (Number: integer) Stretch Fit Flip Y (Number: boolean) Flip X (Number: boolean) Texture (Object: texture) OUTPUT PORTS trigger (Trigger) Save Cancel Changelog Patches using FullScreenRect Examples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Extension.WebGpu.FullScreenRect documentation](#) for input port details **< Output Ports:** - Visit [Ops.Extension.WebGpu.FullScreenRect documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "FullScreenRect" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.FullScreenRect>

---

### 13.47.14 GpuBufferToArray



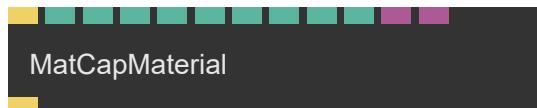
**Full Name:** `Ops.Extension.WebGpu.GpuBufferToArray` **Description:** Full Name `Ops.Extension.WebGpu.GpuBufferToArray` extension Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team WebGPUPatchlistsDocumentation ([markdown](#)) [Issues](#) Example patch id [Youtube](#) ids (comma seperated) Op Licence [Caniuse](#) query Example Patch GpuBufferToArray MeshInstancer Example Open In Editor INPUT PORTS trigger (Trigger) Pos Buffer (Object) OUTPUT PORTS Result (Array) Save Cancel Changelog Patches using GpuBufferToArray Examples Team WebGPU Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Extension.WebGpu.GpuBufferToArray` documentation for input port details <  
 **Output Ports:** - Visit `Ops.Extension.WebGpu.GpuBufferToArray` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for “`GpuBufferToArray`” **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.GpuBufferToArray>

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### 13.47.15 MatCapMaterial



**Full Name:** `Ops.Extension.WebGpu.MatCapMaterial` **Description:** Full Name `Ops.Extension.WebGpu.MatCapMaterial` extension Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team WebGPU Compatibility [caniuse.com](#): [webgpuPatchlistsDocumentation](#) (markdown) Issues [Example patch id](#) [Youtube ids](#) (comma seperated) Op Licence Caniuse query Example Patch `MatCapMaterial` Example Open In Editor INPUT PORTS `Render (Trigger)r (Number)` `g (Number)` `b (Number)` `a (Number)` Colorize Texture `(Number: boolean)` `diffuseRepeatX (Number)` `diffuseRepeatY (Number)` `Tex Offset X (Number)` `Tex Offset Y (Number)` `Matcap (Object:texture)` `Diffuse (Object:texture)` OUTPUT PORTS `Next (Trigger)` `SaveCancel` Changelog Patches using `MatCapMaterial` Examples Team WebGPU Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Extension.WebGpu.MatCapMaterial` documentation for input port details <  
 **Output Ports:** - Visit `Ops.Extension.WebGpu.MatCapMaterial` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for “`MatCapMaterial`” **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.MatCapMaterial>

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### 13.47.16 MeshInstancer



**Full Name:** `Ops.Extension.WebGpu.MeshInstancer` **Description:** Full Name `Ops.Extension.WebGpu.MeshInstancer` extension Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team WebGPU Patchlists Documentation (markdown) Issues [Example patch id](#) [Youtube ids](#) (comma seperated) Op

LicenceCaniuse queryExample Patch GpuBufferToArray MeshInstancer ExampleOpen In EditorINPUT PORTSRender (Trigger)Geometry (Object:geometry)Pos Buffer (Object)Scale Buffer (Object)Num Instances (Number: integer)Billboarding index (Number: integer) Off Spherical Cylindrical Reset (Trigger)test (Trigger)OUTPUT PORTSNext (Trigger)Total Instances (Number)SaveCancel Changelog Patches using MeshInstancerExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.MeshInstancer* documentation for input port details **< Output Ports:** - Visit *Ops.Extension.WebGpu.MeshInstancer* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MeshInstancer" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.MeshInstancer>

---

## 13.47.17 Pipeline



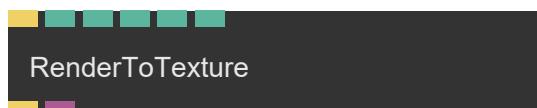
**Full Name:** Ops.Extension.WebGpu.Pipeline **Description:** Full NameOps.Extension.WebGpu.PipelineVisibility Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSTTrigger (Trigger)force re-build (Trigger)OUTPUT PORTSNext (Trigger)Pipeline (Object)Shader Info (Object)Shader Source (String)compile count (Number)Shader id (String)defines (Array)SaveCancel ChangelogPatches using PipelineExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.Pipeline* documentation for input port details **< Output Ports:** - Visit *Ops.Extension.WebGpu.Pipeline* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Pipeline" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.Pipeline>

---

## 13.47.18 RenderToTexture



**Full Name:** Ops.Extension.WebGpu.RenderToTexture **Description:** Full NameOps.Extension.WebGpu.RenderToTexture  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebG-  
PUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryExample Patch render to texture exampleOpen In EditorINPUT PORTSTTrigger  
(Trigger)Size index (Number: integer) Canvas Manual texture width (Number: integer)texture height  
(Number: integer)filter index (Number: integer) nearest linear Clear (Number: boolean)OUTPUT  
PORTSNext (Trigger)Texture (Object)SaveCancel ChangelogPatches using RenderToTextureExam-  
ples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.RenderToTexture documentation for input port details* <

**Output Ports:** - Visit *Ops.Extension.WebGpu.RenderToTexture documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RenderToTexture"

**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.RenderToTexture>

---

### 13.47.19 SaselHund

A dark grey rectangular box containing the text "SaselHund" in a white sans-serif font.

SaselHund

**Full Name:** Ops.Extension.WebGpu.SaselHund **Description:** Full NameOps.Extension.WebGpu.SaselHundVisibility  
tension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebG-  
PUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryNo op example found on this serverSaveCancel ChangelogPatches using  
SaselHundExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.SaselHund documentation for input port details* < **Output**

**Ports:** - Visit *Ops.Extension.WebGpu.SaselHund documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SaselHund" **Docs:**

<https://cables.gl/op/Ops.Extension.WebGpu.SaselHund>

---

## 13.47.20 Texture



**Full Name:** Ops.Extension.WebGpu.Texture **Description:** Full NameOps.Extension.WebGpu.TextureVisibility Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPUCompatibilitycaniuse.com: webgpuPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch texture exampleOpen In EditorINPUT PORTSFile (String)Filter index (Number: integer) nearest linear Wrap index (Number: integer)OUTPUT PORTSTexture (Object)Width (Number)Height (Number)PixelFormat (Number)SaveCancel ChangelogPatches using TextureExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.Texture documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.WebGpu.Texture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Texture" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.Texture>

---

## 13.47.21 VizTexture



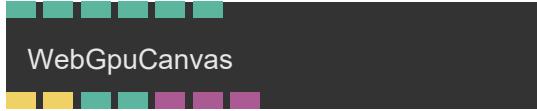
**Full Name:** Ops.Extension.WebGpu.VizTexture **Description:** Full NameOps.Extension.WebGpu.VizTextureVisibility Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPUCompatibilitycaniuse.com: webgpuPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch viztextureOpen In EditorINPUT PORTSTexture In (Object:texture)SaveCancel ChangelogPatches using VizTextureExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Extension.WebGpu.VizTexture documentation* for input port details **< Output Ports:** - Visit *Ops.Extension.WebGpu.VizTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizTexture" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.VizTexture>

---

## 13.47.22 WebGpuCanvas



**Full Name:** Ops.Extension.WebGpu.WebGpuCanvas **Description:** Full NameOps.Extension.WebGpu.WebGpuCanvasVisiblity Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPUCompatibilitycaniuse.com: webgpuPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch WebGpuCanvas ExampleOpen In EditorINPUT PORTSActive (Number: boolean)MSAA samples index (Number: integer) 1 4 Max Pixel Density (DPR) (Number)Catch Errors (Number: boolean)Stop on Errors (Number: boolean)Profile (Number: boolean)OUTPUT PORTSNext (Trigger)Next2 (Trigger)Supported (booleanNumber)MS Frame (Number)Canvas (Object)Canvas Prev (Object)Profiler Data (Object)SaveCancel ChangelogPatches using WebGpuCanvasExamples Team WebGPU Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Extension.WebGpu.WebGpuCanvas documentation](#) for input port details **< Output Ports:** - Visit [Ops.Extension.WebGpu.WebGpuCanvas documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WebGpuCanvas"  
**Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.WebGpuCanvas>

---

## 13.47.23 WebGpuInfo



**Full Name:** Ops.Extension.WebGpu.WebGpuInfo **Description:** Full NameOps.Extension.WebGpu.WebGpuInfoVisiblity Extension Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team WebGPUPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch webgpu infoOpen In EditorINPUT PORTSTrigger (Trigger)OUTPUT PORTSNext (Trigger)Limits (Object)Vendor (String)Architecture (String)Presentation Format (String)SaveCancel ChangelogPatches using WebGpuInfoExamples Team WebGPU Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Extension.WebGpu.WebGpuInfo` documentation for input port details < **Output Ports:** - Visit `Ops.Extension.WebGpu.WebGpuInfo` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "WebGpuInfo" **Docs:** <https://cables.gl/op/Ops.Extension.WebGpu.WebGpuInfo>

---

## 13.48 Ops.Gl

### 13.48.1 ArrayToTexture\_v2



**Full Name:** `Ops.Gl.ArrayToTexture_v2` **Description:** array should consist of RGBA values between 0 and 1

> **Input Ports:** - Visit `Ops.Gl.ArrayToTexture_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Gl.ArrayToTexture_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ArrayToTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ArrayToTexture\\_v2](https://cables.gl/op/Ops.Gl.ArrayToTexture_v2)

---

### 13.48.2 BlendMode



**Full Name:** `Ops.Gl.BlendMode` **Description:** Full NameOps.Gl.BlendModeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch BlendModeOpen In EditorINPUT PORTSRender (Trigger)Trigger the op

> **Input Ports:** - Visit `Ops.Gl.BlendMode` documentation for input port details < **Output Ports:** - Visit `Ops.Gl.BlendMode` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "BlendMode"  
**Docs:** <https://cables.gl/op/Ops.Gl.BlendMode>

---

### 13.48.3 CanvasFocus



**Full Name:** Ops.Gl.CanvasFocus **Description:** Full NameOps.Gl.CanvasFocusVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example: Ops.Gl.CanvasFocusOpen In EditorINPUT PORTSFocus (Trigger)OUTPUT PORTShas focus (booleanNumber)SaveCancel ChangelogPatches using CanvasFocusExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Gl.CanvasFocus documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.CanvasFocus documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CanvasFocus"  
**Docs:** <https://cables.gl/op/Ops.Gl.CanvasFocus>

---

### 13.48.4 CanvasInfo\_v3



**Full Name:** Ops.Gl.CanvasInfo\_v3 **Description:** Full NameOps.Gl.CanvasInfo\_v3VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch CanvasInfo ExampleOpen In EditorOUTPUT PORTSCSS Width (Number)CSS Height (Number)Pixel Ratio (Number)Pixel Width (Number)Pixel Height (Number)Aspect Ratio (Number)Landscape (booleanNumber)Canvas (Object)Canvas Parent (Object)Resized (Trigger)SaveCancel ChangelogPatches using CanvasInfo\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.CanvasInfo\_v3* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.CanvasInfo\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CanvasInfo\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.CanvasInfo\\_v3](https://cables.gl/op/Ops.Gl.CanvasInfo_v3)

---

### 13.48.5 CanvasToTexture



**Full Name:** Ops.Gl.CanvasToTexture **Description:** this operator uses `texImage2D` functionality context `drawImage`

**> Input Ports:** - Visit *Ops.Gl.CanvasToTexture* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.CanvasToTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CanvasToTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.CanvasToTexture>

---

### 13.48.6 ClearColor



**Full Name:** Ops.Gl.ClearColor **Description:** Full NameOps.Gl.ClearColorVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ClearColor ExampleOpen In EditorINPUT PORTSrender (Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Gl.ClearColor* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ClearColor* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ClearColor" **Docs:** <https://cables.gl/op/Ops.Gl.ClearColor>

---

## 13.48.7 ClearDepth



ClearDepth

**Full Name:** Ops.Gl.ClearDepth **Description:** Full NameOps.Gl.ClearDepthVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Clear Depth ExampleOpen In EditorINPUT PORTSrender (Trigger)Clears the depth buffer

**> Input Ports:** - Visit *Ops.Gl.ClearDepth documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.ClearDepth documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ClearDepth"

**Docs:** <https://cables.gl/op/Ops.Gl.ClearDepth>

---

## 13.48.8 ColorMask



ColorMask

**Full Name:** Ops.Gl.ColorMask **Description:** Note this isn't a texture effect - use this op in your Scene layout to disable color channels to create special effects without using Render2Texture and Image-Compose workflows.

**> Input Ports:** - Visit *Ops.Gl.ColorMask documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.ColorMask documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ColorMask" **Docs:** <https://cables.gl/op/Ops.Gl.ColorMask>

---

## 13.48.9 ColorPick



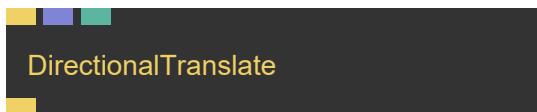
**Full Name:** Ops.Gl.ColorPick **Description:** Get the color at a position of the canvas (picker)

**> Input Ports:** - Visit *Ops.Gl.ColorPick documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ColorPick documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ColorPick" **Docs:** <https://cables.gl/op/Ops.Gl.ColorPick>

---

## 13.48.10 DirectionalTranslate



**Full Name:** Ops.Gl.DirectionnalTranslate **Description:** Full NameOps.Gl.DirectionnalTranslateVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch DirectionalTranslateOpen In EditorINPUT PORTSExec (Trigger)Center  
Model Matrix (Array)Amount (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches  
using DirectionalTranslateExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.DirectionnalTranslate documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.DirectionnalTranslate documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DirectionalTrans-  
late" **Docs:** <https://cables.gl/op/Ops.Gl.DirectionnalTranslate>

---

### 13.48.11 DownloadTexture\_v3



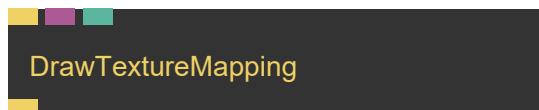
**Full Name:** Ops.Gl.DownloadTexture\_v3 **Description:** Textures can be downloaded as PNG,JPEG or Webp fileformats.

➤ **Input Ports:** - Visit *Ops.Gl.DownloadTexture\_v3 documentation* for input port details < **Output Ports:**  
- Visit *Ops.Gl.DownloadTexture\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DownloadTexture\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.DownloadTexture\\_v3](https://cables.gl/op/Ops.Gl.DownloadTexture_v3)

---

### 13.48.12 DrawTextureMapping



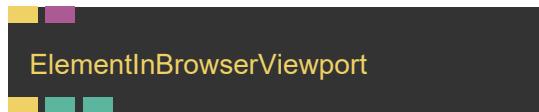
**Full Name:** Ops.Gl.DrawTextureMapping **Description:** Full NameOps.Gl.DrawTextureMappingVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch draw texture mappingOpen In EditorINPUT PORTSRender (Trigger)Geometry (Object:geometry)Num Points (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using DrawTextureMappingExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.DrawTextureMapping documentation* for input port details < **Output Ports:**  
- Visit *Ops.Gl.DrawTextureMapping documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DrawTextureMapping" **Docs:** <https://cables.gl/op/Ops.Gl.DrawTextureMapping>

---

### 13.48.13 ElementInBrowserViewport



**Full Name:** Ops.Gl.ElementInBrowserViewport **Description:** The result gets updated after the window was resized or scrolled. You only need to use the Update trigger if you need to check manually.

**> Input Ports:** - Visit *Ops.Gl.ElementInBrowserViewport documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ElementInBrowserViewport documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementInBrowserViewport" **Docs:** <https://cables.gl/op/Ops.Gl.ElementInBrowserViewport>

---

### 13.48.14 ExternalCanvas



**Full Name:** Ops.Gl.ExternalCanvas **Description:** It is additionally possible to render content in the patch canvas, but NOT in the external window by placing it after the ExternalCanvas (e.g. in a sequence). example

**> Input Ports:** - Visit *Ops.Gl.ExternalCanvas documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ExternalCanvas documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ExternalCanvas" **Docs:** <https://cables.gl/op/Ops.Gl.ExternalCanvas>

---

### 13.48.15 FaceCulling\_v2



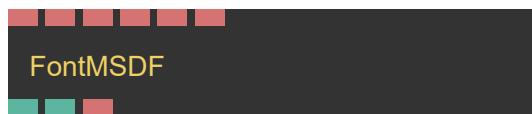
**Full Name:** Ops.Gl.FaceCulling\_v2 **Description:** Reference material: <https://learnopengl.com/Advanced-OpenGL/Face-culling>

**> Input Ports:** - Visit [Ops.Gl.FaceCulling\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.FaceCulling\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "FaceCulling\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.FaceCulling\\_v2](https://cables.gl/op/Ops.Gl.FaceCulling_v2)

---

### 13.48.16 FontMSDF\_v2



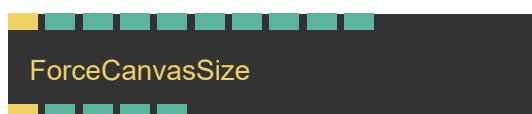
**Full Name:** Ops.Gl.FontMSDF\_v2 **Description:** Full NameOps.Gl.FontMSDF\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch MSDF exampleOpen In EditorINPUT PORTSFont Name (String)Font Data (String)Font Image (String)Font Image 1 (String)Font Image 2 (String)Font Image 3 (String)OUTPUT PORTSLoaded (booleanNumber)Total Chars (Number)Chars (String)SaveCancel ChangelogPatches using FontMSDF\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.FontMSDF\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.FontMSDF\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "FontMSDF\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.FontMSDF\\_v2](https://cables.gl/op/Ops.Gl.FontMSDF_v2)

---

### 13.48.17 ForceCanvasSize



**Full Name:** Ops.Gl.ForceCanvasSize **Description:** for this to work in default exported html, remove "position:absolute;" from styling of the canvas element.

> **Input Ports:** - Visit *Ops.Gl.ForceCanvasSize* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ForceCanvasSize* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ForceCanvasSize"  
**Docs:** <https://cables.gl/op/Ops.Gl.ForceCanvasSize>

---

### 13.48.18 GateTexture



**Full Name:** Ops.Gl.GateTexture **Description:** Full NameOps.Gl.GateTextureVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSObject In (Object:texture)Object in

> **Input Ports:** - Visit *Ops.Gl.GateTexture* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.GateTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GateTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.GateTexture>

---

### 13.48.19 GBlendFunc



**Full Name:** Ops.Gl.GBlendFunc **Description:** Internally this op uses uses gl blendFuncSeperate

> **Input Ports:** - Visit *Ops.Gl.GBlendFunc* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.GBlendFunc* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GBlendFunc"  
**Docs:** <https://cables.gl/op/Ops.Gl.GBlendFunc>

---

## 13.48.20 GlInfo\_v2



**Full Name:** Ops.Gl.GlInfo\_v2 **Description:** Use this to get WEB GL information being used by the browser.

➤ **Input Ports:** - Visit *Ops.Gl.GlInfo\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.GlInfo\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GlInfo\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.GlInfo\\_v2](https://cables.gl/op/Ops.Gl.GlInfo_v2)

---

## 13.48.21 GlPrimitive



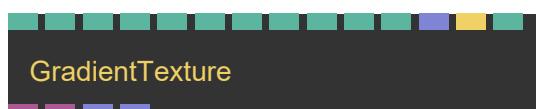
**Full Name:** Ops.Gl.GlPrimitive **Description:** Render the geometry with the following modes :

➤ **Input Ports:** - Visit *Ops.Gl.GlPrimitive documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.GlPrimitive documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GlPrimitive" **Docs:** <https://cables.gl/op/Ops.Gl.GlPrimitive>

---

## 13.48.22 GradientTexture



**Full Name:** Ops.Gl.GradientTexture **Description:** This op allows the creation of custom gradients. Click the edit button to get the UI to edit gradient. More colours can be added to the gradient.

> **Input Ports:** - a information (see documentation for format): Randomize Colors (Trigger)Alpha index (Number: integer) Mask combined < **Output Ports:** - Visit *Ops.Gl.GradientTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GradientTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.GradientTexture>

---

### 13.48.23 GridTransform



**Full Name:** Ops.Gl.GridTransform **Description:** Full NameOps.Gl.GridTransformVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Grid Transform advancedMore complex color and texture lookup techniques can be applied with the grid transform op.

> **Input Ports:** - Visit *Ops.Gl.GridTransform* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.GridTransform* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GridTransform"  
**Docs:** <https://cables.gl/op/Ops.Gl.GridTransform>

---

### 13.48.24 Identity



**Full Name:** Ops.Gl.Identity **Description:** Full NameOps.Gl.IdentityVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch identity exampleOpen In EditorINPUT PORTSexe (Trigger)OUTPUT PORTTrigger (Trigger)SaveCancel ChangelogPatches using IdentityExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Identity* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Identity* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Identity" **Docs:** <https://cables.gl/op/Ops.Gl.Identity>

---

### 13.48.25 IdentityViewMatrix



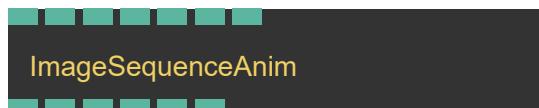
**Full Name:** Ops.Gl.IdentityViewMatrix **Description:** Full Name Ops.Gl.IdentityViewMatrixVisibilityCore  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatch-  
lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence-  
Caniuse query Example Patch identityViewMatrix Open In Editor INPUT PORT Sexe (Trigger) OUTPUT  
PORT Trigger (Trigger) Save Cancel Changelog Patches using IdentityViewMatrix Examples Team  
cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.IdentityViewMatrix* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.IdentityViewMatrix* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IdentityViewMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.IdentityViewMatrix>

---

### 13.48.26 ImageSequenceAnim\_v2



**Full Name:** Ops.Gl.ImageSequenceAnim\_v2 **Description:** Must be used with another op like BasicMaterial.

➤ **Input Ports:** - Visit *Ops.Gl.ImageSequenceAnim\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageSequenceAnim\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ImageSequenceAnim\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageSequenceAnim\\_v2](https://cables.gl/op/Ops.Gl.ImageSequenceAnim_v2)

---

### 13.48.27 InteractiveRectangle\_v2



**Full Name:** Ops.Gl.InteractiveRectangle\_v2 **Description:** Full NameOps.Gl.InteractiveRectangle\_v2VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch InteractiveRectangleOpen In EditorINPUT PORTSTrigger in (Trigger)Width (Number)Height (Number)ID (String)Class (String)Pivot x index (Number: integer)Pivot y index (Number: integer)Axis index (Number: integer)Is Interactive (Number: boolean)Render Rectangle (Number: boolean>Show Boundings (Number: boolean)Cursor index (Number: integer)Active (Number: boolean)OUTPUT PORTSTrigger out (Trigger)geometry (Object)Pointer Hover (booleanNumber)Pointer Down (booleanNumber)Pointer X (Number)Pointer Y (Number)Top (Number)Left (Number)Right (Number)Bottom (Number)Left Click (Trigger)Dom Element (Object)SaveCancel ChangelogPatches using InteractiveRectangle\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.InteractiveRectangle\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.InteractiveRectangle\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InteractiveRectangle\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.InteractiveRectangle\\_v2](https://cables.gl/op/Ops.Gl.InteractiveRectangle_v2)

---

### 13.48.28 LayerSequence



**Full Name:** Ops.Gl.LayerSequence **Description:** Full NameOps.Gl.LayerSequenceVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse

```
queryExample Patch new 2d templateOpen In EditorINPUT PORTSexe (Trigger)OUTPUT PORT-  
Trigger 0 (Trigger)trigger 1 (Trigger)trigger 2 (Trigger)trigger 3 (Trigger)trigger 4 (Trigger)trigger  
5 (Trigger)trigger 6 (Trigger)trigger 7 (Trigger)trigger 8 (Trigger)trigger 9 (Trigger)trigger 10  
(Trigger)trigger 11 (Trigger)trigger 12 (Trigger)trigger 13 (Trigger)trigger 14 (Trigger)trigger 15 (Trigger)  
SaveCancel ChangelogPatches using LayerSequenceExamples Team cables Public My Patches My  
Ops
```

➤ **Input Ports:** - Visit [Ops.Gl.LayerSequence documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.LayerSequence documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "LayerSequence"  
**Docs:** <https://cables.gl/op/Ops.Gl.LayerSequence>

---

### 13.48.29 LineFont\_v2



**Full Name:** Ops.Gl.LineFont\_v2 **Description:** Full NameOps.Gl.LineFont\_v2VisibilityCore Op - visible  
for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation  
(markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryEx-  
ample Patch example linefontOpen In EditorINPUT PORTSrender (Trigger)Text (String)Letter Spac-  
ing (Number)align index (Number: integer) left center right Render (Number: boolean)OUTPUT  
PORTSLines (Array)SaveCancel ChangelogPatches using LineFont\_v2Examples Team cables Public My  
Patches My Ops

➤ **Input Ports:** - Visit [Ops.Gl.LineFont\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.LineFont\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "LineFont\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.LineFont\\_v2](https://cables.gl/op/Ops.Gl.LineFont_v2)

---

### 13.48.30 MainLoop\_v2



**Full Name:** Ops.Gl.MainLoop\_v2 **Description:** The heart-piece of every WebGL-patch, use this as first op in your patch to trigger the other ops (according to the framerate).

► **Input Ports:** - Visit *Ops.Gl.MainLoop\_v2 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.MainLoop\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MainLoop\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.MainLoop\\_v2](https://cables.gl/op/Ops.Gl.MainLoop_v2)

---

### 13.48.31 MediaRecorder\_v2



**Full Name:** Ops.Gl.MediaRecorder\_v2 **Description:** uses the browser to record the renderer-output to any videocodec supported by your browser

► **Input Ports:** - Visit *Ops.Gl.MediaRecorder\_v2 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.MediaRecorder\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MediaRecorder\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.MediaRecorder\\_v2](https://cables.gl/op/Ops.Gl.MediaRecorder_v2)

---

### 13.48.32 MeshInstancer\_v4



**Full Name:** Ops.Gl.MeshInstancer\_v4 **Description:** A performant way to render a 3d object many times.

**> Input Ports:** - Visit [Ops.Gl.MeshInstancer\\_v4 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.MeshInstancer\\_v4 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "MeshInstancer\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.MeshInstancer\\_v4](https://cables.gl/op/Ops.Gl.MeshInstancer_v4)

---

### 13.48.33 MeshMorph



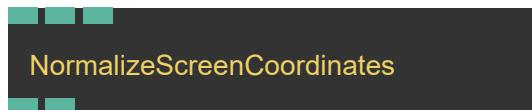
**Full Name:** Ops.Gl.MeshMorph **Description:** Full NameOps.Gl.MeshMorphVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch meshmorph exampleA GLTF scene with multiple meshes is used to populate MeshMorph op that then smoothly transforms the vertices

**> Input Ports:** - Visit [Ops.Gl.MeshMorph documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.MeshMorph documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "MeshMorph" **Docs:** <https://cables.gl/op/Ops.Gl.MeshMorph>

---

### 13.48.34 NormalizeScreenCoordinates



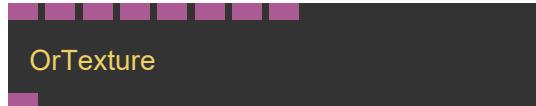
**Full Name:** Ops.Gl.NormalizeScreenCoordinates **Description:** Full NameOps.Gl.NormalizeScreenCoordinatesVisib Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSX (Number)Y (Number)-1 to 1 (Number: boolean)OUTPUT PORTSResult X (Number)Result Y (Number)SaveCancel ChangelogPatches using NormalizeScreenCoordinatesExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Gl.NormalizeScreenCoordinates` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.NormalizeScreenCoordinates` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "NormalizeScreenCoordinates" **Docs:** <https://cables.gl/op/Ops.Gl.NormalizeScreenCoordinates>

---

### 13.48.35 OrTexture



**Full Name:** `Ops.Gl.OrTexture` **Description:** default stripes and empty textures are treated as "invalid"

**> Input Ports:** - Visit `Ops.Gl.OrTexture` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.OrTexture` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "OrTexture" **Docs:** <https://cables.gl/op/Ops.Gl.OrTexture>

---

### 13.48.36 Orthogonal\_v2



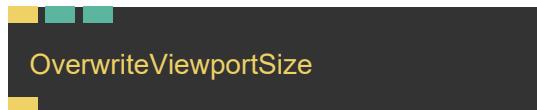
**Full Name:** `Ops.Gl.Orthogonal_v2` **Description:** Full NameOps.Gl.Orthogonal\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCan use queryExample Patch Orthogonal ExampleOpen In EditorINPUT PORTSrender (Trigger)bounds (Number)Axis index (Number: integer)frustum near (Number)frustum far (Number)OUTPUT PORTStrigger (Trigger)Ratio (Number)Width (Number)Height (Number)SaveCancel ChangelogPatches using Orthogonal\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Gl.Orthogonal_v2` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.Orthogonal_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Orthogonal\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Orthogonal\\_v2](https://cables.gl/op/Ops.Gl.Orthogonal_v2)

---

### 13.48.37 OverwriteViewportSize



**Full Name:** Ops.Gl.OverwriteViewportSize **Description:** In cases you need to force a viewport size for your scene but retain the project canvas size, use this op and connect your content below it.

➤ **Input Ports:** - Visit *Ops.Gl.OverwriteViewportSize* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.OverwriteViewportSize* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "OverwriteViewportSize" **Docs:** <https://cables.gl/op/Ops.Gl.OverwriteViewportSize>

---

### 13.48.38 Performance



**Full Name:** Ops.Gl.Performance **Description:** to get meaningful results it should be directly under mainloop and above everything else.

➤ **Input Ports:** - Visit *Ops.Gl.Performance* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Performance* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Performance" **Docs:** <https://cables.gl/op/Ops.Gl.Performance>

---

### 13.48.39 PerformanceMeasure



**Full Name:** Ops.Gl.PerformanceMeasure **Description:** For a CPU profile of your entire patch, you can find the patch profiler under Tools > Profile.

**> Input Ports:** - Visit [Ops.Gl.PerformanceMeasure documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Gl.PerformanceMeasure documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "PerformanceMeasure" **Docs:** <https://cables.gl/op/Ops.Gl.PerformanceMeasure>

---

### 13.48.40 Perspective



**Full Name:** Ops.Gl.Perspective **Description:** Full NameOps.Gl.PerspectiveVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch perspective exampleOpen In EditorINPUT PORTSrender (Trigger)Axis index (Number: integer) Vertical Horizontal Field of ViewFOV Degrees (Number)Frustumfrustum near (Number)frustum far (Number)Auto Aspect Ratio (Number: boolean)Aspect Ratio (Number)OUTPUT PORTStrigger (Trigger)Aspect (Number)SaveCancel ChangelogPatches using PerspectiveExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.Perspective documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.Perspective documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Perspective" **Docs:** <https://cables.gl/op/Ops.Gl.Perspective>

---

## 13.48.41 PixelProjection\_v3



**Full Name:** Ops.Gl.PixelProjection\_v3 **Description:** when enabling using viewport size drawing a rectangle with a width/height of 100, the screen space of that rectangle is exactly 100 pixels

► **Input Ports:** - Visit *Ops.Gl.PixelProjection\_v3 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.PixelProjection\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PixelProjection\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.PixelProjection\\_v3](https://cables.gl/op/Ops.Gl.PixelProjection_v3)

---

## 13.48.42 PointCollector



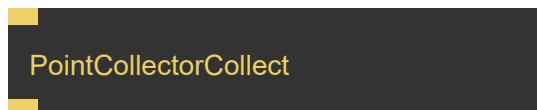
**Full Name:** Ops.Gl.PointCollector **Description:** creates an array, into which PointCollectorCollect will write into

► **Input Ports:** - Visit *Ops.Gl.PointCollector documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.PointCollector documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PointCollector" **Docs:** <https://cables.gl/op/Ops.Gl.PointCollector>

---

## 13.48.43 PointCollectorCollect



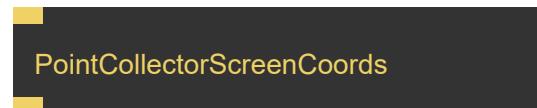
**Full Name:** Ops.Gl.PointCollectorCollect **Description:** saves the current transformation xyz coordinate to an array

**> Input Ports:** - Visit [Ops.Gl.PointCollectorCollect](#) documentation for input port details **< Output Ports:** - Visit [Ops.Gl.PointCollectorCollect](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "PointCollectorCollect" **Docs:** <https://cables.gl/op/Ops.Gl.PointCollectorCollect>

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#### 13.48.44 PointCollectorScreenCoords



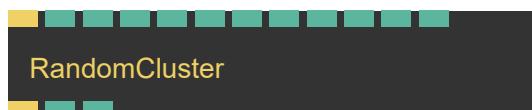
**Full Name:** Ops.Gl.PointCollectorScreenCoords **Description:** Full NameOps.Gl.PointCollectorScreenCoordsVisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryNo op example found on this serverINPUT PORTSrender (Trigger)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using PointCollectorScreenCoordsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.PointCollectorScreenCoords](#) documentation for input port details **< Output Ports:** - Visit [Ops.Gl.PointCollectorScreenCoords](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "PointCollectorScreenCoords" **Docs:** <https://cables.gl/op/Ops.Gl.PointCollectorScreenCoords>

---

#### 13.48.45 RandomCluster



**Full Name:** Ops.Gl.RandomCluster **Description:** Transforms the child meshes randomly in space.

**> Input Ports:** - Visit [Ops.Gl.RandomCluster](#) documentation for input port details **< Output Ports:** - Visit [Ops.Gl.RandomCluster](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RandomCluster" **Docs:** <https://cables.gl/op/Ops.Gl.RandomCluster>

---

## 13.48.46 RenderAnim\_v2



**Full Name:** Ops.Gl.RenderAnim\_v2 **Description:** good ffmpeg settings to create a mp4 from image sequence and music file:

**> Input Ports:** - Visit *Ops.Gl.RenderAnim\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.RenderAnim\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RenderAnim\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.RenderAnim\\_v2](https://cables.gl/op/Ops.Gl.RenderAnim_v2)

---

## 13.48.47 RenderGeometry\_v2



**Full Name:** Ops.Gl.RenderGeometry\_v2 **Description:** Can be used to re use a geometry at multiple places or render a modified geometry (e.g. tessellate)

**> Input Ports:** - Visit *Ops.Gl.RenderGeometry\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.RenderGeometry\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RenderGeometry\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.RenderGeometry\\_v2](https://cables.gl/op/Ops.Gl.RenderGeometry_v2)

---

## 13.48.48 RenderToTexture\_v3



**Full Name:** Ops.Gl.RenderToTexture\_v3 **Description:** Renders the following ops into a texture.

**> Input Ports:** - Visit [Ops.Gl.RenderToTexture\\_v3 documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Gl.RenderToTexture\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RenderToTexture\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.RenderToTexture\\_v3](https://cables.gl/op/Ops.Gl.RenderToTexture_v3)

---

### 13.48.49 RenderToTextures\_v3



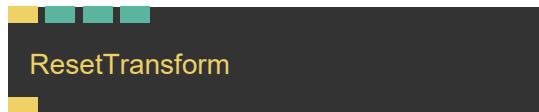
**Full Name:** Ops.Gl.RenderToTextures\_v3 **Description:** Full NameOps.Gl.RenderToTextures\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)Issuesrequires WebGL2Example patch idYoutube ids (comma  
seperated)Op LicenceCaniuse queryExample Patch RenderToTextures ExampleOpen In EditorIN-  
PUT PORTSRender (Trigger)Size index (Number: integer) Canvas Manual texture width (Number:  
integer)texture height (Number: integer)Auto Aspect (Number: boolean)Pixel Format index  
(Number: integer)Filter index (Number: integer) nearest linear mipmap Wrap index (Number:  
integer)MSAA index (Number: integer) none 2x 4x 8x Clear (Number: boolean)Slots index (Number:  
integer) 1 2 3 4 5 6 7 8 Texture 0 index (Number: integer)Texture 1 index (Number: integer)  
Texture 2 index (Number: integer)Texture 3 index (Number: integer)Texture 4 index (Number:  
integer)Texture 5 index (Number: integer)Texture 6 index (Number: integer)Texture 7 index (Num-  
ber: integer)OUTPUT PORTSNext (Trigger)Result Texture 0 (Object)Result Texture 1 (Object)Result  
Texture 2 (Object)Result Texture 3 (Object)Result Texture 4 (Object)Result Texture 5 (Object)Result  
Texture 6 (Object)Result Texture 7 (Object)textureDepth (Object)SaveCancel Known Issuesrequires  
WebGL2

**> Input Ports:** - Visit [Ops.Gl.RenderToTextures\\_v3 documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Gl.RenderToTextures\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RenderToTextures\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.RenderToTextures\\_v3](https://cables.gl/op/Ops.Gl.RenderToTextures_v3)

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## 13.48.50 ResetTransform



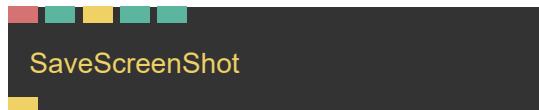
**Full Name:** Ops.Gl.ResetTransform **Description:** Full NameOps.Gl.ResetTransformVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch resetTransform exampleOpen In EditorINPUT PORTSx (Trigger)Reset Model Transform (Number: boolean)Reset View Transform (Number: boolean)Default View (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using ResetTransformExamples Team cables Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Gl.ResetTransform documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.ResetTransform documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ResetTransform" **Docs:** <https://cables.gl/op/Ops.Gl.ResetTransform>

---

## 13.48.51 SaveScreenShot\_v3



**Full Name:** Ops.Gl.SaveScreenShot\_v3 **Description:** use Ops.Gl.DownloadTexture\_v2 if you need more flexibility, like different resolutions, etc.

► **Input Ports:** - Visit *Ops.Gl.SaveScreenShot\_v3 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.SaveScreenShot\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SaveScreenShot\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.SaveScreenShot\\_v3](https://cables.gl/op/Ops.Gl.SaveScreenShot_v3)

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## 13.48.52 ShowNormals\_v2



ShowNormals

**Full Name:** Ops.Gl.ShowNormals\_v2 **Description:** This op is useful for debugging.

► **Input Ports:** - Visit [Ops.Gl.ShowNormals\\_v2 documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Gl.ShowNormals\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ShowNormals\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ShowNormals\\_v2](https://cables.gl/op/Ops.Gl.ShowNormals_v2)

---

## 13.48.53 SurfaceScatter\_v2



**Full Name:** Ops.Gl.SurfaceScatter\_v2 **Description:** Use various distribution methods to place many instances of a geometry along the surface of a mesh.

► **Input Ports:** - Visit [Ops.Gl.SurfaceScatter\\_v2 documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Gl.SurfaceScatter\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SurfaceScatter\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.SurfaceScatter\\_v2](https://cables.gl/op/Ops.Gl.SurfaceScatter_v2)

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## 13.48.54 TextMeshMSDF\_v2



**Full Name:** Ops.Gl.TextMeshMSDF\_v2 **Description:** Signed distance field based font rendering that must be used with Ops.Gl.FontMSDF\_v2

**> Input Ports:** - Visit `Ops.Gl.TextMeshPro_v2` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.TextMeshPro_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "TextMeshPro\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.TextMeshPro\\_v2](https://cables.gl/op/Ops.Gl.TextMeshPro_v2)

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### 13.48.55 TextureArray



**Full Name:** `Ops.Gl.TextureArray` **Description:** Full Name `Ops.Gl.TextureArrayVisibilityCore` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch id Youtube ids (comma separated) Op Licence Can i use query Example Patch ArrayIteratorTextures TextureArray TextureArrayInfo Example Open In Editor INPUT PORTS Texture 0 (Object:texture) Texture 1 (Object:texture) Texture 2 (Object:texture) Texture 3 (Object:texture) Texture 4 (Object:texture) Texture 5 (Object:texture) Texture 6 (Object:texture) Texture 7 (Object:texture) Texture 8 (Object:texture) Texture 9 (Object:texture) Texture 10 (Object:texture) Texture 11 (Object:texture) Texture 12 (Object:texture) Texture 13 (Object:texture) Texture 14 (Object:texture) OUTPUT PORTS Array (Array) Count (Number) Save Cancel Changelog Patches using TextureArray Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Gl.TextureArray` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.TextureArray` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "TextureArray"

**Docs:** <https://cables.gl/op/Ops.Gl.TextureArray>

---

### 13.48.56 TextureArrayLoaderFromArray\_v3



**Full Name:** `Ops.Gl.TextureArrayLoaderFromArray_v3` **Description:** Full Name `Ops.Gl.TextureArrayLoaderFromArray` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists -

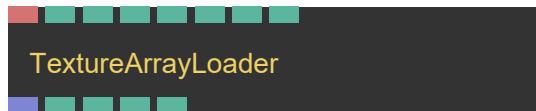
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch ArrayGetTexture TextureArrayLoaderFromArray ExampleOpen In Editor- INPUT PORTSurls (Array)filter index (Number: integer)wrap index (Number: integer)Flip (Number: boolean)unpackPreMultipliedAlpha (Number: boolean)Caching (Number: boolean)Asset in patch (Number: boolean)OUTPUT PORTSTextureArray (Array)width (Number)height (Number)loading (booleanNumber)Aspect Ratio (Number)SaveCancel ChangelogPatches using TextureArrayLoader- FromArray\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.TextureArrayLoaderFromArray\\_v3 documentation](#) for input port details <  
**Output Ports:** - Visit [Ops.Gl.TextureArrayLoaderFromArray\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TextureArray- LoaderFromArray\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.TextureArrayLoaderFromArray\\_v3](https://cables.gl/op/Ops.Gl.TextureArrayLoaderFromArray_v3)

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## 13.48.57 TextureArrayLoader\_v2



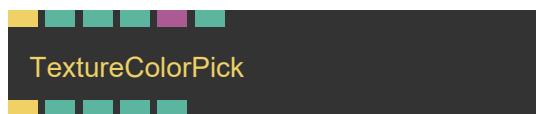
**Full Name:** Ops.Gl.TextureArrayLoader\_v2 **Description:** Use url with XXX as wildcard

**> Input Ports:** - Visit [Ops.Gl.TextureArrayLoader\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.TextureArrayLoader\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TextureArray- Loader\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.TextureArrayLoader\\_v2](https://cables.gl/op/Ops.Gl.TextureArrayLoader_v2)

---

## 13.48.58 TextureColorPick



**Full Name:** Ops.Gl.TextureColorPick **Description:** Full NameOps.Gl.TextureColorPickVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch- listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence- Caniuse queryExample Patch TextureColorPick ExampleOpen In EditorINPUT PORTSupdate (Trig-

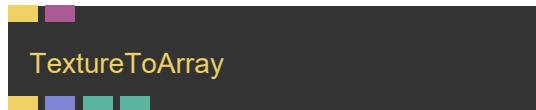
ger)Coordinates index (Number: integer) Pixel 0-1 X (Number: integer)Y (Number: integer)texture (Object:texture)Active (Number: boolean)OUTPUT PORTS trigger (Trigger)Red (Number)Green (Number)Blue (Number)Alpha (Number)SaveCancel Changelog Patches using TextureColorPick Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Gl.TextureColorPick documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.TextureColorPick documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TextureColorPick" **Docs:** <https://cables.gl/op/Ops.Gl.TextureColorPick>

---

### 13.48.59 TextureToArray\_v4



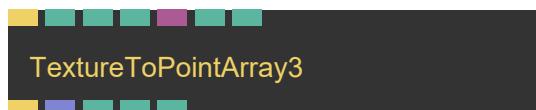
**Full Name:** Ops.Gl.TextureToArray\_v4 **Description:** This op will take an incoming texture and convert each color pixel value to an Array 4 (RGBA).

➤ **Input Ports:** - Visit [Ops.Gl.TextureToArray\\_v4 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.TextureToArray\\_v4 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TextureToArray\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.TextureToArray\\_v4](https://cables.gl/op/Ops.Gl.TextureToArray_v4)

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### 13.48.60 TextureToPointArray3



**Full Name:** Ops.Gl.TextureToPointArray3 **Description:** threshold parameter to remove below a certain luminosity

➤ **Input Ports:** - Visit [Ops.Gl.TextureToPointArray3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.TextureToPointArray3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TextureToPointArray3" **Docs:** <https://cables.gl/op/Ops.Gl.TextureToPointArray3>

---

### 13.48.61 TextureToRandomPoints



**Full Name:** Ops.Gl.TextureToRandomPoints **Description:** Full NameOps.Gl.TextureToRandomPointsVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch texture2random points example2Open In EditorINPUT PORTSupdate  
(Trigger)Num Points (Number: integer)Seed (Number)Seed value 0 will continuously randomize point  
position

**> Input Ports:** - Visit *Ops.Gl.TextureToRandomPoints* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.TextureToRandomPoints* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TextureToRandomPoints" **Docs:** <https://cables.gl/op/Ops.Gl.TextureToRandomPoints>

---

### 13.48.62 Texture\_v2



**Full Name:** Ops.Gl.Texture\_v2 **Description:** Load an image as a webGL Texture.

**> Input Ports:** - Visit *Ops.Gl.Texture\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Texture\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Texture\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Texture\\_v2](https://cables.gl/op/Ops.Gl.Texture_v2)

---

### 13.48.63 TriggerOnCanvasResize



TriggerOnCanvasResize

**Full Name:** Ops.Gl.TriggerOnCanvasResize **Description:** Full NameOps.Gl.TriggerOnCanvasResizeVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverOUTPUT PORTSResized (Trigger)SaveCancel ChangelogPatches using TriggerOnCanvasResizeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.TriggerOnCanvasResize documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.TriggerOnCanvasResize documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerOnCanvasResize" **Docs:** <https://cables.gl/op/Ops.Gl.TriggerOnCanvasResize>

---

### 13.48.64 ValidTexture



ValidTexture

**Full Name:** Ops.Gl.ValidTexture **Description:** Full NameOps.Gl.ValidTextureVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSTexture (Object:texture)Default index (Number: integer) Empty Stripes OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using ValidTextureExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ValidTexture documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ValidTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ValidTexture" **Docs:** <https://cables.gl/op/Ops.Gl.ValidTexture>

---

## 13.48.65 ViewPortSize



**Full Name:** Ops.Gl.ViewPortSize **Description:** Full NameOps.Gl.ViewPortSizeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSExec (Trigger)OUTPUT PORTSNext (Trigger)X (Number)Y (Number)Width (Number)Height (Number)SaveCancel ChangelogPatches using ViewPortSizeExamples Team cables Public My Patches My Ops

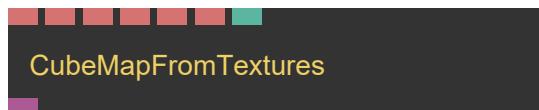
**> Input Ports:** - Visit *Ops.Gl.ViewPortSize documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ViewPortSize documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ViewPortSize" **Docs:** <https://cables.gl/op/Ops.Gl.ViewPortSize>

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## 13.49 Ops.Gl.CubeMap

### 13.49.1 CubeMapFromTextures\_v2



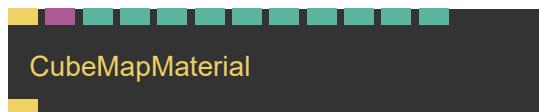
**Full Name:** Ops.Gl.CubeMap.CubeMapFromTextures\_v2 **Description:** Use this op to create cubemaps by adding 6 textures, 1 for each positive and negative axis (x, y, z).

**> Input Ports:** - Visit *Ops.Gl.CubeMap.CubeMapFromTextures\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.CubeMap.CubeMapFromTextures\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CubeMapFromTextures\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.CubeMap.CubeMapFromTextures\\_v2](https://cables.gl/op/Ops.Gl.CubeMap.CubeMapFromTextures_v2)

---

## 13.49.2 CubeMapMaterial\_v2



**Full Name:** Ops.Gl.CubeMap.CubeMapMaterial\_v2 **Description:** This op can be used to render cube-maps onto meshes.

**> Input Ports:** - Visit `Ops.Gl.CubeMap.CubeMapMaterial_v2` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.CubeMap.CubeMapMaterial_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CubeMapMaterial\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.CubeMap.CubeMapMaterial\\_v2](https://cables.gl/op/Ops.Gl.CubeMap.CubeMapMaterial_v2)

### 13.49.3 CubemapToEquirectangularTexture\_v2

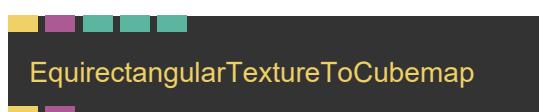


**Full Name:** Ops.Gl.CubeMap.CubemapToEquirectangularTexture\_v2 **Description:** Helper op to visualize a cubemap.

**> Input Ports:** - Visit `Ops.Gl.CubeMap.CubemapToEquirectangularTexture_v2` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.CubeMap.CubemapToEquirectangularTexture_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for “`CubemapToEquirectangularTexture_v2`” **Docs:** [https://cables.gl/op/Ops.Gl.CubeMap.CubemapToEquirectangularTexture\\_v2](https://cables.gl/op/Ops.Gl.CubeMap.CubemapToEquirectangularTexture_v2)

#### 13.49.4 EquirectangularTextureToCubemap



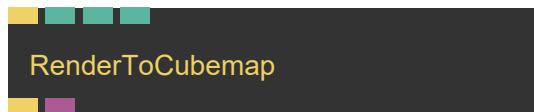
**Full Name:** Ops.Gl.CubeMap.EquirectangularTextureToCubemap **Description:** Handy op to convert an equirectangular map to a cubemap.

> **Input Ports:** - Visit *Ops.Gl.CubeMap.EquirectangularTextureToCubemap* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.CubeMap.EquirectangularTextureToCubemap* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Equirectangular-TextureToCubemap" **Docs:** <https://cables.gl/op/Ops.Gl.CubeMap.EquirectangularTextureToCubemap>

---

### 13.49.5 RenderToCubemap\_v3



**Full Name:** Ops.Gl.CubeMap.RenderToCubemap\_v3 **Description:** Place this op at the beginning of the scene you want to be rendered into the cubemap.

> **Input Ports:** - Visit *Ops.Gl.CubeMap.RenderToCubemap\_v3* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.CubeMap.RenderToCubemap\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RenderToCubemap\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.CubeMap.RenderToCubemap\\_v3](https://cables.gl/op/Ops.Gl.CubeMap.RenderToCubemap_v3)

---

### 13.49.6 Skybox



**Full Name:** Ops.Gl.CubeMap.Skybox **Description:** Use this op to add an environment map to your patch.

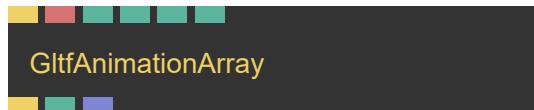
> **Input Ports:** - Visit *Ops.Gl.CubeMap.Skybox* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.CubeMap.Skybox* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Skybox" **Docs:** <https://cables.gl/op/Ops.Gl.CubeMap.Skybox>

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## 13.50 Ops.Gl.GLTF

### 13.50.1 GltfAnimationArray



**Full Name:** Ops.Gl.GLTF.GltfAnimationArray **Description:** Full NameOps.Gl.GLTF.GltfAnimationArrayVisibilityCom  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesCurrently only supports positional data.

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfAnimationArray* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfAnimationArray* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "GltfAnimationAr-  
ray" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfAnimationArray>

---

### 13.50.2 GltfCameraViewMatrix



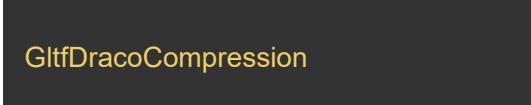
**Full Name:** Ops.Gl.GLTF.GltfCameraViewMatrix **Description:** Full NameOps.Gl.GLTF.GltfCameraViewMatrixVisibili  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Example GLTF Camera View MatrixIn this example the GLTFcameraview-  
matrix OP is used to get one of the views of 3 cameras in a GLTF scene and an AnimMatrix OP is used  
to smoothly interpolate between them.

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfCameraViewMatrix* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfCameraViewMatrix* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfCameraViewMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfCameraViewMatrix>

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### 13.50.3 GltfDracoCompression



GltfDracoCompression

**Full Name:** Ops.Gl.GLTF.GltfDracoCompression **Description:** add this op to your patch to be able to load (draco) compressed GLB files

**> Input Ports:** - Visit [Ops.Gl.GLTF.GltfDracoCompression documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.GLTF.GltfDracoCompression documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfDracoCompression" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfDracoCompression>

---

### 13.50.4 GltfGeometry



**Full Name:** Ops.Gl.GLTF.GltfGeometry **Description:** Full NameOps.Gl.GLTF.GltfGeometryVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch gltf geometry exampleOpen In EditorINPUT PORTSUpdate (Trigger)Name (String)Submesh (Number: integer)OUTPUT PORTSNext (Trigger)Geometry (Object)Found (boolean- Number)SaveCancel ChangelogPatches using GltfGeometryExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.GLTF.GltfGeometry documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.GLTF.GltfGeometry documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfGeometry" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfGeometry>

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## 13.50.5 GltfHierarchy



**Full Name:** Ops.Gl.GLTF.GltfHierarchy **Description:** Full NameOps.Gl.GLTF.GltfHierarchyVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch GLTF hierarchyOpen In EditorYoutube Video TutorialINPUT PORTSTTrigger  
(Trigger)Node name (String)GLTF node name to start hierarchy extraction from

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfHierarchy documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfHierarchy documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfHierarchy"  
**Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfHierarchy>

---

## 13.50.6 GltfInfo



**Full Name:** Ops.Gl.GLTF.GltfInfo **Description:** Full NameOps.Gl.GLTF.GltfInfoVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch gltf info exampleOpen In EditorINPUT PORTSExec (Trigger)OUTPUT  
PORTSNum Nodes (Number)Num Cams (Number)FileUrl (String)FileName (String)Camera Names  
(Array)SaveCancel ChangelogPatches using GltfInfoExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfInfo documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfInfo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfInfo" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfInfo>

---

## 13.50.7 GltfMeshSequence\_v2



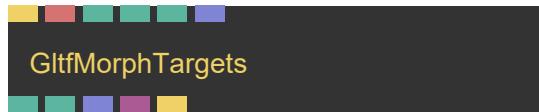
**Full Name:** Ops.Gl.GLTF.GltfMeshSequence\_v2 **Description:** no morphing will happen

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfMeshSequence\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfMeshSequence\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GltfMeshSequence\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.GLTF.GltfMeshSequence\\_v2](https://cables.gl/op/Ops.Gl.GLTF.GltfMeshSequence_v2)

---

## 13.50.8 GltfMorphTargets



**Full Name:** Ops.Gl.GLTF.GltfMorphTargets **Description:** Full NameOps.Gl.GLTF.GltfMorphTargetsVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Can use queryExample Patch shape keys/targets exampleOpen In EditorINPUT PORTSRender  
(Trigger)Node Name (String)Scene Time (Number)Time (Number)Submesh (Number: integer)  
Target Weights (Array)OUTPUT PORTSFound Node (booleanNumber)Found Skin (booleanNum-  
ber)Target Names (Array)MorphTargets Tex (Object)Next (Trigger)SaveCancel ChangelogPatches  
using GltfMorphTargetsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfMorphTargets documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfMorphTargets documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GltfMorphTargets" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfMorphTargets>

---

## 13.50.9 GltfNodeSineAnim



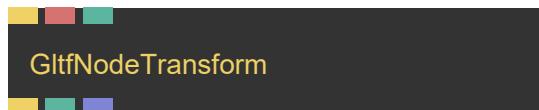
**Full Name:** Ops.Gl.GLTF.GltfNodeSineAnim **Description:** Full NameOps.Gl.GLTF.GltfNodeSineAnimVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch GLTF Node Sine Anim GLTF meshes inside a scene can be individually  
animated with GLTF Node Sine Anim

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfNodeSineAnim documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfNodeSineAnim documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfNodeSineAnim" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfNodeSineAnim>

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## 13.50.10 GltfNodeTransform\_v2



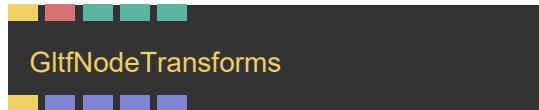
**Full Name:** Ops.Gl.GLTF.GltfNodeTransform\_v2 **Description:** This OP allows you to grab the transform (position) of a node from your GLTF scene hierarchy by name and outputs values that you can use to, for example, bind other objects to your scene - more geometry or perhaps a camera direction.

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfNodeTransform\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfNodeTransform\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfNodeTransform\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.GLTF.GltfNodeTransform\\_v2](https://cables.gl/op/Ops.Gl.GLTF.GltfNodeTransform_v2)

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### 13.50.11 GltfNodeTransforms\_v3



**Full Name:** Ops.Gl.GLTF.GltfNodeTransforms\_v3 **Description:** Full NameOps.Gl.GLTF.GltfNodeTransforms\_v3VisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverYoutube Video TutorialINPUT PORTSRender (Trigger)Search (String)Order index (Number: integer)Space index (Number: integer)Time (Number)OUTPUT PORTSNext (Trigger)Positions (Array)Scale (Array)Rotation (Array)Names (Array)SaveCancel ChangelogPatches using GltfNodeTransforms\_v3Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.GLTF.GltfNodeTransforms\_v3 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.GLTF.GltfNodeTransforms\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfNodeTransforms\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.GLTF.GltfNodeTransforms\\_v3](https://cables.gl/op/Ops.Gl.GLTF.GltfNodeTransforms_v3)

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### 13.50.12 GltfNode\_v2



**Full Name:** Ops.Gl.GLTF.GltfNode\_v2 **Description:** Full NameOps.Gl.GLTF.GltfNode\_v2VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverYoutube Video TutorialINPUT PORTSRender (Trigger)Node Name (String)Transformation (Number: boolean)Draw Mesh (Number: boolean)Draw Childs (Number: boolean)Ignore Material (Number: boolean)Use Scene Time (Number: boolean)Time (Number)OUTPUT PORTSNext (Trigger)Geometry (Object)Found (booleanNumber)SaveCancel ChangelogPatches using GltfNode\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.GLTF.GltfNode\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.GLTF.GltfNode\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "GltfNode\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.GLTF.GltfNode\\_v2](https://cables.gl/op/Ops.Gl.GLTF.GltfNode_v2)

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### 13.50.13 GltfScene\_v4



**Full Name:** Ops.Gl.GLTF.GltfScene\_v4 **Description:** This op currently can only load GLB files, these are binary versions of a GLTF file.

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfScene\_v4* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfScene\_v4* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "GltfScene\_v4"  
**Docs:** [https://cables.gl/op/Ops.Gl.GLTF.GltfScene\\_v4](https://cables.gl/op/Ops.Gl.GLTF.GltfScene_v4)

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### 13.50.14 GltfSetMaterial



**Full Name:** Ops.Gl.GLTF.GltfSetMaterial **Description:** This op can be used to assign a material to parts of mesh.

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfSetMaterial* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfSetMaterial* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "GltfSetMaterial"  
**Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfSetMaterial>

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## 13.50.15 GltfSkin



**Full Name:** Ops.Gl.GLTF.GltfSkin **Description:** by default gltfscene will do this internally for you, so should only be needed in special cases

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfSkin documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfSkin documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfSkin" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfSkin>

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## 13.50.16 GltfTexture



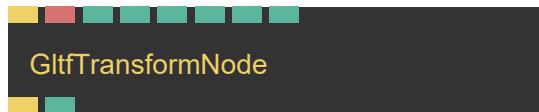
**Full Name:** Ops.Gl.GLTF.GltfTexture **Description:** Full NameOps.Gl.GLTF.GltfTextureVisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Can-iuse query Example Patch GltfTexture op example Open In Editor INPUT PORTS Render (Trigger) Name (String) Filter index (Number: integer) Wrap index (Number: integer) Anisotropic index (Number: integer) Flip (Number: boolean) Pre Multiplied Alpha (Number: boolean) OUTPUT PORTS Texture (Object) Width (Number) Height (Number) Type (String) Found (boolean) Number Save Cancel Change Log Patches using GltfTexture Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfTexture documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfTexture" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfTexture>

---

## 13.50.17 GltfTransformNode



**Full Name:** Ops.Gl.GLTF.GltfTransformNode **Description:** Full NameOps.Gl.GLTF.GltfTransformNodeVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryNo op example found on this serverINPUT PORTSRender (Trigger)Node  
Name (String)Translate X (Number)Translate Y (Number)Translate Z (Number)Rotation X (Num-  
ber)Rotation Y (Number)Rotation Z (Number)OUTPUT PORTSNext (Trigger)Found (booleanNum-  
ber)SaveCancel ChangelogPatches using GltfTransformNodeExamples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfTransformNode documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.GLTF.GltfTransformNode documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GltfTrans-  
formNode" **Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfTransformNode>

---

## 13.50.18 GltfVertexAnim



**Full Name:** Ops.Gl.GLTF.GltfVertexAnim **Description:** Full NameOps.Gl.GLTF.GltfVertexAnimVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryNo op example found on this serverINPUT PORTSRender (Trigger)Node Name  
(String)Scene Time (Number: boolean)Time (Number)OUTPUT PORTSFound Node (Number)Next  
(Trigger)SaveCancel ChangelogPatches using GltfVertexAnimExamples Team cables Public My  
Patches My Ops

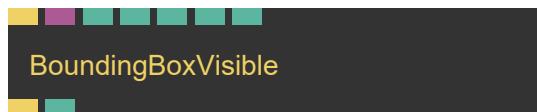
**> Input Ports:** - Visit *Ops.Gl.GLTF.GltfVertexAnim documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.GLTF.GltfVertexAnim documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "GltfVertexAnim"  
**Docs:** <https://cables.gl/op/Ops.Gl.GLTF.GltfVertexAnim>

---

## 13.51 Ops.Gl.Geometry

### 13.51.1 BoundingBoxVisible



**Full Name:** Ops.Gl.Geometry.BoundingBoxVisible **Description:** Full NameOps.Gl.Geometry.BoundingBoxVisibleV  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch bounding box exampleOpen In EditorINPUT PORTSExec (Trig-  
ger)Boundings (Object)Active (Number: boolean)Draw (Number: boolean)Width (Number)Height  
(Number)Length (Number)OUTPUT PORTSNext (Trigger)Visible (booleanNumber)SaveCancel Changel-  
ogPatches using BoundingBoxVisibleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Geometry.BoundingBoxVisible* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Geometry.BoundingBoxVisible* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "BoundingBoxVisible" **Docs:** <https://cables.gl/op/Ops.Gl.Geometry.BoundingBoxVisible>

---

### 13.51.2 GeometryBoundingBox



**Full Name:** Ops.Gl.Geometry.GeometryBoundingBox **Description:** Full NameOps.Gl.Geometry.GeometryBoundingBoxE  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch bounding box exampleOpen In EditorINPUT PORTSGeometry  
(Object)OUTPUT PORTSBoundings (Object)Min X (Number)Min Y (Number)Min Z (Number)Max X

(Number)Max Y (Number)Max Z (Number)MaxMin Points (Array)SaveCancel ChangelogPatches using GeometryBoundingBoxExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.Geometry.GeometryBoundingBox* documentation for input port details <

**Output Ports:** - Visit *Ops.Gl.Geometry.GeometryBoundingBox* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GeometryBoundingBox" **Docs:** <https://cables.gl/op/Ops.Gl.Geometry.GeometryBoundingBox>

---

## 13.52 Ops.Gl.ImageCompose

### 13.52.1 Alpha



**Full Name:** Ops.Gl.ImageCompose.Alpha **Description:** Full NameOps.Gl.ImageCompose.AlphaVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch Alpha TextureEffects - ExampleOpen In EditorINPUT PORTSRender (Trigger)Amount (Number)Method index (Number: integer) Set Add Sub Mul Clamp (Number: boolean)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using AlphaExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.Alpha* documentation for input port details < **Output Ports:**

- Visit *Ops.Gl.ImageCompose.Alpha* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Alpha" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Alpha>

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### 13.52.2 AlphaMask\_v2



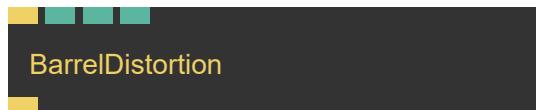
**Full Name:** Ops.Gl.ImageCompose.AlphaMask\_v2 **Description:** make sure imagecompose is set to alpha 0 or not cleared

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.AlphaMask\_v2 documentation for input port details* < **Output Ports:** - Visit *Ops.Gl.ImageCompose.AlphaMask\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "AlphaMask\_v2"* **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.AlphaMask\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.AlphaMask_v2)

---

### 13.52.3 BarrelDistortion\_v3



**Full Name:** Ops.Gl.ImageCompose.BarrelDistortion\_v3 **Description:** Full NameOps.Gl.ImageCompose.BarrelDistortion\_v3Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch BarrelDistortion\_v2 exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)Intensity (Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using BarrelDistortion\_v3Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.BarrelDistortion\_v3 documentation for input port details* < **Output Ports:** - Visit *Ops.Gl.ImageCompose.BarrelDistortion\_v3 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "BarrelDistortion\_v3"* **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.BarrelDistortion\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.BarrelDistortion_v3)

---

### 13.52.4 Blur



**Full Name:** Ops.Gl.ImageCompose.Blur **Description:** Blur the current state of an image compose

> **Input Ports:** - Visit `Ops.Gl.ImageCompose.Blur` documentation for input port details < **Output Ports:**  
- Visit `Ops.Gl.ImageCompose.Blur` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "Blur" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Blur>

---

### 13.52.5 Border\_v2



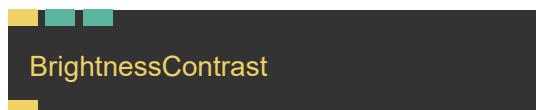
**Full Name:** `Ops.Gl.ImageCompose.Border_v2` **Description:** Full Name `Ops.Gl.ImageCompose.Border_v2` `Visibility` `Code` `Op` - visible for everyone `License` MIT `Author` pandurgithub `source` Maintained by Team cablesPatch-listsDocumentation (markdown) `Issues` Example patch id `Youtube` ids (comma seperated) `Op` Licence-Caniuse query `Example` Patch border example `Open In Editor` `INPUT PORTS` `render (Trigger)` `width (Number)` `BlendingBlend Mode index (Number: integer)` `Alpha Mask index (Number: integer)` `Amount (Number)` `Smooth (Number: boolean)` `r (Number)` `g (Number)` `b (Number)` `SidesSide A (Number)` `Side B (Number)` `Side C (Number)` `Side D (Number)` `OUTPUT PORTS` `trigger (Trigger)` `Save` `Cancel` `Changelog` Patches using `Border_v2` Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Gl.ImageCompose.Border_v2` documentation for input port details < **Output Ports:**  
- Visit `Ops.Gl.ImageCompose.Border_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "Border\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Border\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Border_v2)

---

### 13.52.6 BrightnessContrast



**Full Name:** `Ops.Gl.ImageCompose.BrightnessContrast` **Description:** Full Name `Ops.Gl.ImageCompose.BrightnessContrast` `Op` - visible for everyone `License` MIT `Author` pandurgithub `source` Maintained by Team cablesPatch-listsDocumentation (markdown) `Issues` Example patch id `Youtube` ids (comma seperated) `Op` Licence-Caniuse query `Example` Patch brightness contrast example `Open In Editor` `INPUT PORTS` `render`

(Trigger)contrast (Number)brightness (Number)OUTPUT PORTS trigger (Trigger)SaveCancel ChangelogPatches using BrightnessContrastExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.BrightnessContrast documentation](#) for input port details <

**Output Ports:** - Visit [Ops.Gl.ImageCompose.BrightnessContrast documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BrightnessContrast" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.BrightnessContrast>

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### 13.52.7 BulgePinch



**Full Name:** Ops.Gl.ImageCompose.BulgePinch **Description:** Full NameOps.Gl.ImageCompose.BulgePinchVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch bulge pinch exampleOpen In EditorINPUT PORTSrender (Trigger)Radius (Number)Strength (Number)Center X (Number)Center Y (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using BulgePinchExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.BulgePinch documentation](#) for input port details <

**Output Ports:** - Visit [Ops.Gl.ImageCompose.BulgePinch documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BulgePinch" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.BulgePinch>

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### 13.52.8 CheckerBoard\_v2



**Full Name:** Ops.Gl.ImageCompose.CheckerBoard\_v2 **Description:** Full NameOps.Gl.ImageCompose.CheckerBoard\_v2Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-

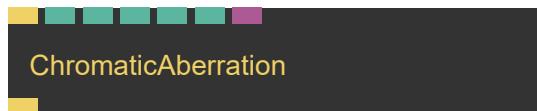
niuse queryExample Patch checkerboardOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Alpha Mask index (Number: integer)Amount (Number)Square (Number: boolean)Num X (Number)Num Y (Number)Rotate (Number)Centered (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using CheckerBoard\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.CheckerBoard\_v2 documentation* for input port details <  
Output Ports: - Visit *Ops.Gl.ImageCompose.CheckerBoard\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CheckerBoard\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.CheckerBoard\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.CheckerBoard_v2)

---

### 13.52.9 ChromaticAberration\_v2



**Full Name:** Ops.Gl.ImageCompose.ChromaticAberration\_v2 **Description:** Full NameOps.Gl.ImageCompose.ChromaticAberration\_v2Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch chromatic aberration exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)Pixel (Number)Lens Distort (Number)Smooth (Number: boolean)Mask (Object:texture)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using ChromaticAberration\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.ChromaticAberration\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.ChromaticAberration\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ChromaticAberration\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ChromaticAberration\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.ChromaticAberration_v2)

---

### 13.52.10 CircleTexture\_v4



**Full Name:** Ops.Gl.ImageCompose.CircleTexture\_v4 **Description:** Full NameOps.Gl.ImageCompose.CircleTexture\_v4  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence Can use query Example Patch circle example Open In Editor INPUT PORTS Render (Trigger) Blending Amount (Number) Blend Mode index (Number: integer) Alpha Mask index (Number: integer) Size Size (Number) Inner (Number) Stretch X (Number) Stretch Y (Number) Position Pos X (Number) Pos Y (Number) Style fallOff index (Number: integer) fade Out (Number) warn overflow (Number: boolean) r (Number) g (Number) b (Number) a (Number) OUTPUT PORTS Next (Trigger) Save Cancel Changelog Patches using CircleTexture\_v4 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.CircleTexture\_v4 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.CircleTexture\_v4 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CircleTexture\_v4"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.CircleTexture\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.CircleTexture_v4)

---

### 13.52.11 ClampTexture\_v2



**Full Name:** Ops.Gl.ImageCompose.ClampTexture\_v2 **Description:** Modes:

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.ClampTexture\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.ClampTexture\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ClampTexture\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ClampTexture\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.ClampTexture_v2)

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## 13.52.12 Clarity



**Full Name:** Ops.Gl.ImageCompose.Clarity **Description:** Full NameOps.Gl.ImageCompose.ClarityVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryNo op example found on this serverINPUT PORTSRender (Trigger)amount  
(Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using ClarityExamples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Clarity documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.ImageCompose.Clarity documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for “Clarity” **Docs:**  
<https://cables.gl/op/Ops.Gl.ImageCompose.Clarity>

---

## 13.52.13 ColorBalance\_v2



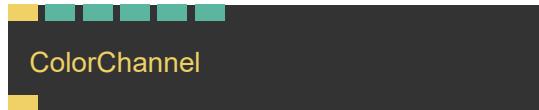
**Full Name:** Ops.Gl.ImageCompose.ColorBalance\_v2 **Description:** Full NameOps.Gl.ImageCompose.ColorBalance\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch color balanceChanges the color-balance of an image (highlights /  
mid-tones / shadows).

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.ColorBalance\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.ImageCompose.ColorBalance\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for “ColorBalance\_v2”  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ColorBalance\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.ColorBalance_v2)

---

### 13.52.14 ColorChannel\_v2



**Full Name:** Ops.Gl.ImageCompose.ColorChannel\_v2 **Description:** Full NameOps.Gl.ImageCompose.ColorChannel\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSrender (Trigger)channelR (Number: boolean)channelG (Number: boolean)channelB (Number: boolean)channelA (Number: boolean)mono (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using ColorChannel\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.ColorChannel\_v2 documentation* for input port details <  
**Output Ports:** - Visit *Ops.Gl.ImageCompose.ColorChannel\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ColorChannel\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ColorChannel\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.ColorChannel_v2)

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### 13.52.15 ColorMap\_v2



**Full Name:** Ops.Gl.ImageCompose.ColorMap\_v2 **Description:** Full NameOps.Gl.ImageCompose.ColorMap\_v2Visibility  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch example gradient colormapOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)Gradient (Object:texture)Method index (Number: integer)Vertical PositionMin (Number)Max (Number)Position (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using ColorMap\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.ColorMap\_v2 documentation* for input port details <  
**Output Ports:** - Visit *Ops.Gl.ImageCompose.ColorMap\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ColorMap\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ColorMap\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.ColorMap_v2)

---

### 13.52.16 Color\_v2



**Full Name:** Ops.Gl.ImageCompose.Color\_v2 **Description:** Full NameOps.Gl.ImageCompose.Color\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch color exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend  
Mode index (Number: integer)Amount (Number)Alpha Mask index (Number: integer)Mask  
(Object:texture)Mask Invert (Number: boolean)Colorr (Number)g (Number)b (Number)a (Num-  
ber)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using Color\_v2Examples Team  
cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.ImageCompose.Color\_v2 documentation* for input port details < **Output  
Ports:** - Visit *Ops.Gl.ImageCompose.Color\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Color\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Color\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Color_v2)

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### 13.52.17 Denoise



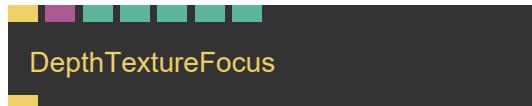
**Full Name:** Ops.Gl.ImageCompose.Denoise **Description:** Full NameOps.Gl.ImageCompose.DenoiseVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Denoise example patchOpen In EditorINPUT PORTSrender (Trigger)Trigger  
in

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.Denoise* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.Denoise* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Denoise" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Denoise>

---

### 13.52.18 DepthTextureFocus\_v2



**Full Name:** *Ops.Gl.ImageCompose.DepthTextureFocus\_v2* **Description:** To get results that align to the scene, make sure you use your scene's camera near- and farplane.

> **Input Ports:** - **focus distance (in world space)**: Width (Number)width of the focus (in world space)  
< **Output Ports:** - Visit *Ops.Gl.ImageCompose.DepthTextureFocus\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DepthTextureFocus\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.DepthTextureFocus\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.DepthTextureFocus_v2)

---

### 13.52.19 DepthTexture\_v2



**Full Name:** *Ops.Gl.ImageCompose.DepthTexture\_v2* **Description:** white pixels are further away

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.DepthTexture\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.DepthTexture\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DepthTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.DepthTexture\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.DepthTexture_v2)

---

## 13.52.20 Desaturate



**Full Name:** Ops.Gl.ImageCompose.Desaturate **Description:** Desaturate (remove color information) the content of current ImageCompose.

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Desaturate documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.Desaturate documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Desaturate" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Desaturate>

---

## 13.52.21 Dither\_v2



**Full Name:** Ops.Gl.ImageCompose.Dither\_v2 **Description:** Full NameOps.Gl.ImageCompose.Dither\_v2VisibilityCom  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryExample Patch dither exampleOpen In EditorINPUT PORTSRender (Trig-  
ger)BlendingBlend Mode index (Number: integer)Amount (Number)threshold (Number)strength  
(Number)Mask (Object:texture)Mask Src index (Number: integer) R 1-R OUTPUT PORTSTTrigger  
(Trigger)SaveCancel ChangelogPatches using Dither\_v2Examples Team cables Public My Patches My  
Ops

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Dither\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.Dither\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Dither\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Dither\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Dither_v2)

---

## 13.52.22 DrawImage\_v3



**Full Name:** Ops.Gl.ImageCompose.DrawImage\_v3 **Description:** Full NameOps.Gl.ImageCompose.DrawImage\_v3Vis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch combining texturesexample showing how to combine multiple textures  
to a new one

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.DrawImage\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.DrawImage\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DrawImage\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.DrawImage\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.DrawImage_v3)

---

## 13.52.23 EdgeDetection\_v4



**Full Name:** Ops.Gl.ImageCompose.EdgeDetection\_v4 **Description:** Full NameOps.Gl.ImageCompose.EdgeDetection\_v4Vis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch EdgeDetection\_v3 example patchOpen In EditorINPUT PORTSRender  
(Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.EdgeDetection\_v4 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.EdgeDetection\_v4 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "EdgeDetection\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.EdgeDetection\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.EdgeDetection_v4)

---

## 13.52.24 Emboss



**Full Name:** Ops.Gl.ImageCompose.Emboss **Description:** Full NameOps.Gl.ImageCompose.EmbossVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch emboss effect exampleOpen In EditorINPUT PORTSrender (Trig-  
ger)Strength (Number)Clear (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel Changel-  
ogPatches using EmbossExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Emboss documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Emboss documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Emboss" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Emboss>

---

## 13.52.25 FXAA



**Full Name:** Ops.Gl.ImageCompose.FXAA **Description:** Post process anti aliasing

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.FXAA documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.ImageCompose.FXAA documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FXAA" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.FXAA>

---

## 13.52.26 FastBlur\_v2



**Full Name:** Ops.Gl.ImageCompose.FastBlur\_v2 **Description:** Full NameOps.Gl.ImageCompose.FastBlur\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch FastBlur ExampleOpen In EditorINPUT PORTSrender (Trigger)Trigger in

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.FastBlur\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.FastBlur\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FastBlur\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.FastBlur\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.FastBlur_v2)

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## 13.52.27 Flip



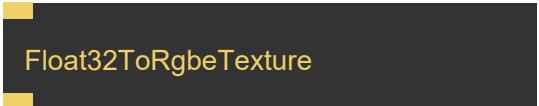
**Full Name:** Ops.Gl.ImageCompose.Flip **Description:** Full NameOps.Gl.ImageCompose.FlipVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch flip exampleOpen In EditorINPUT PORTSrender (Trigger)X (Number: boolean)Y (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using FlipExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Flip documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Flip documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Flip" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Flip>

---

## 13.52.28 Float32ToRgbeTexture



Float32ToRgbeTexture

**Full Name:** Ops.Gl.ImageCompose.Float32ToRgbeTexture **Description:** Full NameOps.Gl.ImageCompose.Float32ToRgbeTexture Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence Can use query Example Patch example rgbeOpen In Editor INPUT PORTS render (Trigger) OUTPUT PORTS trigger (Trigger) Save Cancel Changelog Patches using Float32ToRgbeTexture Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.ImageCompose.Float32ToRgbeTexture* documentation for input port details

◀ **Output Ports:** - Visit *Ops.Gl.ImageCompose.Float32ToRgbeTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Float32ToRgbeTexture"

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Float32ToRgbeTexture>

---

## 13.52.29 Fog\_v4



Fog

**Full Name:** Ops.Gl.ImageCompose.Fog\_v4 **Description:** A little advice for using post processing fog on iOS:

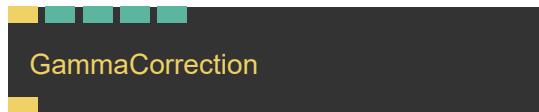
➤ **Input Ports:** - Visit *Ops.Gl.ImageCompose.Fog\_v4* documentation for input port details

◀ **Output Ports:** - Visit *Ops.Gl.ImageCompose.Fog\_v4* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Fog\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Fog\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.Fog_v4)

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### 13.52.30 GammaCorrection\_v2



GammaCorrection

**Full Name:** Ops.Gl.ImageCompose.GammaCorrection\_v2 **Description:** Multiply texture occurs before the gamma correction is applied.

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.GammaCorrection\_v2 documentation* for input port details  
< **Output Ports:** - Visit *Ops.Gl.ImageCompose.GammaCorrection\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GammaCorrection\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.GammaCorrection\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.GammaCorrection_v2)

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### 13.52.31 Gradient\_v2



Gradient

**Full Name:** Ops.Gl.ImageCompose.Gradient\_v2 **Description:** Full NameOps.Gl.ImageCompose.Gradient\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch gradient exampleOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend Mode index (Number: integer)Alpha Mask index (Number: integer)Amount (Number)Width (Number)Type index (Number: integer)Pos (Number)Smoothstep (Number: boolean)sRGB (Number: boolean)color space index (Number: integer)Color Ar (Number)g (Number)b (Number)Color Br2 (Number)g2 (Number)b2 (Number)Color Cr3 (Number)g3 (Number)b3 (Number)Randomize (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using Gradient\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.Gradient\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.Gradient\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Gradient\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Gradient\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Gradient_v2)

---

### 13.52.32 GridTexture\_v2



**Full Name:** Ops.Gl.ImageCompose.GridTexture\_v2 **Description:** Full NameOps.Gl.ImageCompose.GridTexture\_v2  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch GridTexture example Open In Editor INPUT PORTS Render (Trigger) Trigger in

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.GridTexture\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.GridTexture\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GridTexture\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.GridTexture\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.GridTexture_v2)

---

### 13.52.33 GrowPixels\_v2



**Full Name:** Ops.Gl.ImageCompose.GrowPixels\_v2 **Description:** Full NameOps.Gl.ImageCompose.GrowPixels\_v2 Vis  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch growpixels example Open In Editor INPUT PORTS Render (Trigger) Blending Blend Mode index (Number: integer) Amount (Number) strength (Number) iterations (Number: integer) r (Number) g (Number) b (Number) OUTPUT PORTS Trigger (Trigger) Save Cancel Change Log Patches using GrowPixels\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.GrowPixels\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.GrowPixels\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GrowPixels\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.GrowPixels\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.GrowPixels_v2)

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### 13.52.34 Hue



**Full Name:** Ops.Gl.ImageCompose.Hue **Description:** Full NameOps.Gl.ImageCompose.HueVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch hue exampleOpen In EditorINPUT PORTSrender (Trigger)hue  
(Number)Mask (Object:texture)Mask texture for the Offset texture

➤ **Input Ports:** - Visit *Ops.Gl.ImageCompose.Hue documentation for input port details* < **Output Ports:**  
- Visit *Ops.Gl.ImageCompose.Hue documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Hue" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Hue>

---

### 13.52.35 ImageComposeAspectRatio



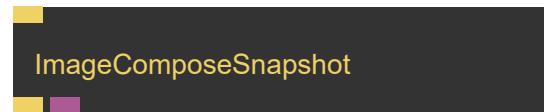
**Full Name:** Ops.Gl.ImageCompose.ImageComposeAspectRatio **Description:** Full NameOps.Gl.ImageCompose.Image  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch aspectOpen In EditorINPUT PORTSupdate (Trigger)Aspect  
(Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using ImageComposeAspec-  
tRatioExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.ImageCompose.ImageComposeAspectRatio documentation for input port de-  
tails* < **Output Ports:** - Visit *Ops.Gl.ImageCompose.ImageComposeAspectRatio documentation for out-  
put port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ImageComposeA-  
spectRatio" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.ImageComposeAspectRatio>

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### 13.52.36 ImageComposeSnapshot



**Full Name:** Ops.Gl.ImageCompose.ImageComposeSnapshot **Description:** trigger this op to grab the state of an imagecompose, depending on where this op is placed in an imagecompose stack. This op can give you live output of your changes, or be triggered on demand by patching something like a GateTrigger.

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.ImageComposeSnapshot documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.ImageComposeSnapshot documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ImageComposeSnapshot" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.ImageComposeSnapshot>

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### 13.52.37 ImageCompose\_v4



**Full Name:** Ops.Gl.ImageCompose.ImageCompose\_v4 **Description:** Full NameOps.Gl.ImageCompose.ImageComposeOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-CreditsUses Photoshop math GLSL shaders by Romain DuraDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ImageCompose ExampleOpen In EditorYoutube Video TutorialINPUT PORTSRender (Trigger)Base Texture (Object:texture)UV Texture (Object:texture)Texture SizeSize index (Number: integer) Auto Canvas Manual Width (Number: integer)Height (Number: integer)Texture ParametersFilter index (Number: integer) nearest linear mipmap Wrap index (Number: integer)Anisotropic index (Number: integer) 0 1 2 4 8 16 Pixel Format index (Number: integer)ColorClear (Number: boolean)R (Number)G (Number)B (Number)A (Number)OUTPUT PORTSNext (Trigger)texture\_out (Object)Aspect Ratio (Number)Texture Width (Number)Texture Height (Number)SaveCancel ChangelogPatches using ImageCompose\_v4Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.ImageCompose\\_v4 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.ImageCompose\\_v4 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ImageCompose\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ImageCompose\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.ImageCompose_v4)

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### 13.52.38 Interlace



**Full Name:** Ops.Gl.ImageCompose.Interlace **Description:** Full NameOps.Gl.ImageCompose.InterlaceVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch interlace exampleOpen In EditorINPUT PORTSrender (Trigger)amount (Number)Lumi Scale (Number)X or Y (Number: boolean)Line Size (Number)Displacement (Number)Add (Number)scroll (Number)OUTPUT PORTTrigger (Trigger)SaveCancel ChangelogPatches using InterlaceExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Interlace* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Interlace* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Interlace" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Interlace>

---

### 13.52.39 Invert\_v2



**Full Name:** Ops.Gl.ImageCompose.Invert\_v2 **Description:** Full NameOps.Gl.ImageCompose.Invert\_v2VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch invert exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)Mask Invert (Number: boolean)Mask (Object:texture)Invert R (Number: boolean)Invert G (Number: boolean)Invert B (Number: boolean)OUTPUT PORTTrigger (Trigger)SaveCancel ChangelogPatches using Invert\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.Invert\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.Invert\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Invert\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Invert\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Invert_v2)

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### 13.52.40 Kaleidoscope\_v2



**Full Name:** Ops.Gl.ImageCompose.Kaleidoscope\_v2 **Description:** Full NameOps.Gl.ImageCompose.Kaleidoscope\_v2 Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch kaleidoscope exampleOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)Sides (Number)Angle (Number)Slide X (Number)Slide Y (Number)Center X (Number)Center Y (Number)Aspect Ratio (Number: boolean)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using Kaleidoscope\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.Kaleidoscope\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.Kaleidoscope\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Kaleidoscope\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Kaleidoscope\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Kaleidoscope_v2)

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### 13.52.41 LUTMap



**Full Name:** Ops.Gl.ImageCompose.LUTMap **Description:** see this post: <http://liovch.blogspot.de/2012/07/add-instagram-like-effects-to-your-ios.html>

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.LUTMap* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.LUTMap* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "LUTMap" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.LUTMap>

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### 13.52.42 LensDirt\_v2



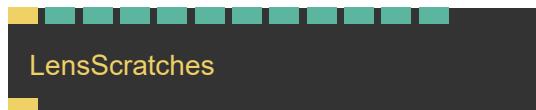
**Full Name:** Ops.Gl.ImageCompose.LensDirt\_v2 **Description:** Full NameOps.Gl.ImageCompose.LensDirt\_v2VisibilityOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Lensdirt texture exampleOpen In EditorINPUT PORTSrender (Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.LensDirt\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.LensDirt\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "LensDirt\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.LensDirt\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.LensDirt_v2)

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### 13.52.43 LensScratches\_v2



**Full Name:** Ops.Gl.ImageCompose.LensScratches\_v2 **Description:** A big thank you to Tropical Trevor for allowing us to use the code.

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.LensScratches\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.LensScratches\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "LensScratches\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.LensScratches\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.LensScratches_v2)

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## 13.52.44 Levels\_v2



**Full Name:** Ops.Gl.ImageCompose.Levels\_v2 **Description:** Full NameOps.Gl.ImageCompose.Levels\_v2VisibilityCom  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch levels exampleOpen In EditorINPUT PORTSRender (Trigger)In Min  
(Number)Midpoint (Number)In Max (Number)Out Min (Number)Out Max (Number)OUTPUT PORT-  
SNext (Trigger)SaveCancel ChangelogPatches using Levels\_v2Examples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Levels\_v2 documentation* for input port details **< Output  
Ports:** - Visit *Ops.Gl.ImageCompose.Levels\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Levels\_v2" **Docs:**  
[https://cables.gl/op/Ops.Gl.ImageCompose.Levels\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Levels_v2)

---

## 13.52.45 LumaKey\_v3



**Full Name:** Ops.Gl.ImageCompose.LumaKey\_v3 **Description:** Full NameOps.Gl.ImageCompose.LumaKey\_v3Visibility  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch lumakey\_v2 exampleOpen In EditorINPUT PORTSrender (Trigger)trigger  
the op

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.LumaKey\_v3 documentation* for input port details **< Output  
Ports:** - Visit *Ops.Gl.ImageCompose.LumaKey\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LumaKey\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.LumaKey\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.LumaKey_v3)

---

## 13.52.46 Mirror



**Full Name:** Ops.Gl.ImageCompose.Mirror **Description:** Full NameOps.Gl.ImageCompose.MirrorVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch mirror exampleOpen In EditorINPUT PORTSrender (Trigger)axis index  
(Number: integer)width (Number)offset (Number)flip (Number: boolean)OUTPUT PORTStrigger  
(Trigger)SaveCancel ChangelogPatches using MirrorExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Mirror documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.ImageCompose.Mirror documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Mirror" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Mirror>

---

## 13.52.47 Mix



**Full Name:** Ops.Gl.ImageCompose.Mix **Description:** mix performs a linear interpolation between x and y using a to weight between them.

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Mix documentation* for input port details **< Output Ports:** -  
Visit *Ops.Gl.ImageCompose.Mix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Mix" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Mix>

---

### 13.52.48 MultiDrawImage



**Full Name:** Ops.Gl.ImageCompose.MultiDrawImage **Description:** this saves some time instead of having many drawimages, especially on hires displays

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.MultiDrawImage documentation for input port details* <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.MultiDrawImage documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "MultiDrawImage"*

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.MultiDrawImage>

---

### 13.52.49 OnePassBlur



**Full Name:** Ops.Gl.ImageCompose.OnePassBlur **Description:** Full NameOps.Gl.ImageCompose.OnePassBlurVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch onePassBlurOpen In EditorINPUT PORTSrender (Trigger)Trigger in

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.OnePassBlur documentation for input port details* < **Output**

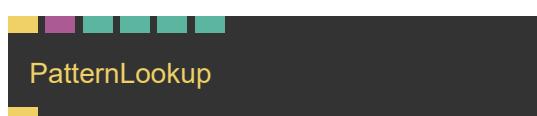
**Ports:** - Visit *Ops.Gl.ImageCompose.OnePassBlur documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "OnePassBlur"*

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.OnePassBlur>

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### 13.52.50 PatternLookup



**Full Name:** Ops.Gl.ImageCompose.PatternLookup **Description:** This op can be used to map a pattern to the brightness values of your texture inside ImageCompose. Use the Width and Height adjustments to adjust the position of the elements of your texture.

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.PatternLookup documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.ImageCompose.PatternLookup documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "PatternLookup"

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.PatternLookup>

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### 13.52.51 PixelColor



**Full Name:** Ops.Gl.ImageCompose.PixelColor **Description:** Full NameOps.Gl.ImageCompose.PixelColorVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch PixelColor PositionAsColorMaterial ExampleOpen In EditorINPUT PORTSrender (Trigger)Source Texture (Object:texture)BlendingBlend Mode index (Number: integer)Amount (Number)Pos X (Number)Pos Y (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using PixelColorExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.PixelColor documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.ImageCompose.PixelColor documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "PixelColor" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.PixelColor>

---

### 13.52.52 PixelDifference



**Full Name:** Ops.Gl.ImageCompose.PixelDifference **Description:** Full NameOps.Gl.ImageCompose.PixelDifference  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch pixel difference exampleOpen In EditorYoutube Video TutorialINPUT PORTSrender (Trigger)Strength (Number)multiplier for colors in resulting texture reporting pixel difference

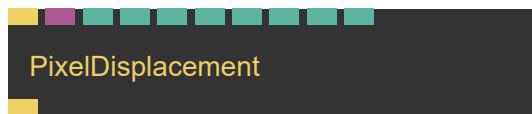
> **Input Ports:** - Visit *Ops.Gl.ImageCompose.PixelDifference documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.PixelDifference documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PixelDifference"

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.PixelDifference>

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### 13.52.53 PixelDisplacement\_v4



**Full Name:** Ops.Gl.ImageCompose.PixelDisplacement\_v4 **Description:** Full NameOps.Gl.ImageCompose.PixelDisplacement\_v4  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch pixeldisplacement exampleOpen In EditorYoutube Video TutorialINPUT PORTSrender (Trigger)displaceTex (Object:texture)BlendingBlend Mode index (Number: integer)Amount (Number)Axis Displacement Strengthamount X (Number)amount Y (Number)ModesWrap index (Number: integer) Mirror Clamp Repeat Input index (Number: integer)Zero Displace index (Number) Grey Black Pixel Mapping index (Number) Stretch Repeat OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using PixelDisplacement\_v4Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ImageCompose.PixelDisplacement\_v4 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.PixelDisplacement\_v4 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PixelDisplacement\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.PixelDisplacement\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.PixelDisplacement_v4)

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## 13.52.54 Pixelate\_v2



**Full Name:** Ops.Gl.ImageCompose.Pixelate\_v2 **Description:** Full NameOps.Gl.ImageCompose.Pixelate\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch pixelate exampleOpen In EditorINPUT PORTSrender (Trigger)Multiplier (Object:texture)BlendingBlend Mode index (Number: integer)Amount (Number)width (Number)height (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using Pixelate\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Pixelate\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Pixelate\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Pixelate\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Pixelate\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Pixelate_v2)

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## 13.52.55 Plasma\_v2



**Full Name:** Ops.Gl.ImageCompose.Plasma\_v2 **Description:** Full NameOps.Gl.ImageCompose.Plasma\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch plasma exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Alpha Mask index (Number: integer)Amount (Number)Width (Number)Height (Number)Aspect (Number: boolean)Mul (Number)X (Number)Y (Number)Time (Number)Greyscale (Number: boolean)Offset MapOffset (Object:texture)Offset Multiply (Number)Offset X index (Number: integer)Offset Y index (Number: integer)Offset Time index (Number: integer)Mask (Object:texture)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using Plasma\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Plasma\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Plasma\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "Plasma\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Plasma\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Plasma_v2)

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### 13.52.56 PolarCoords



**Full Name:** Ops.Gl.ImageCompose.PolarCoords **Description:** Full NameOps.Gl.ImageCompose.PolarCoordsVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch polar coordinates Open In EditorINPUT PORTSrender (Trigger)Radius Inner (Number)Radius Outer (Number)Crop (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using PolarCoordsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.PolarCoords documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.PolarCoords documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "PolarCoords" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.PolarCoords>

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### 13.52.57 Posterize\_v2



**Full Name:** Ops.Gl.ImageCompose.Posterize\_v2 **Description:** Full NameOps.Gl.ImageCompose.Posterize\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch posterize exampleOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)levels (Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using Posterize\_v2Examples Team cables Public My Patches My Ops

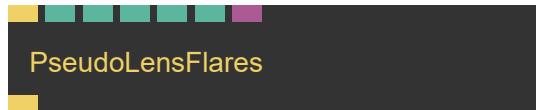
> **Input Ports:** - Visit `Ops.Gl.ImageCompose.Posterize_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Gl.ImageCompose.Posterize_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Posterize\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Posterize\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Posterize_v2)

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### 13.52.58 PseudoLensFlares



**Full Name:** `Ops.Gl.ImageCompose.PseudoLensFlares` **Description:** This is a post-processing effect to simulate lens flares.

> **Input Ports:** - Visit `Ops.Gl.ImageCompose.PseudoLensFlares` documentation for input port details < **Output Ports:** - Visit `Ops.Gl.ImageCompose.PseudoLensFlares` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "PseudoLensFlares" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.PseudoLensFlares>

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### 13.52.59 RGBOffset\_v2



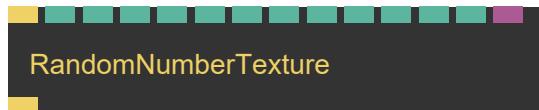
**Full Name:** `Ops.Gl.ImageCompose.RGBOffset_v2` **Description:** Full Name `Ops.Gl.ImageCompose.RGBOffset_v2` Visib  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists-  
Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Ca-  
niuse query Example Patch RGBOffset example Example for the RGBOffset op.

> **Input Ports:** - **amount of red (fade, hide, show):** Green offset X (Number) offset green chan-  
nel on x position - **amount of green (fade, hide, show):** Blue offset X (Number) offset blue chan-  
nel on x position - **amount of blue (fade, hide, show):** Check documentation < **Output Ports:** - Visit  
`Ops.Gl.ImageCompose.RGBOffset_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RGBOffset\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.RGBOffset\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.RGBOffset_v2)

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### 13.52.60 RandomNumberTexture



**Full Name:** Ops.Gl.ImageCompose.RandomNumberTexture **Description:** Full NameOps.Gl.ImageCompose.RandomNumberTexture  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Can use queryExample Patch randomNumberTexture exampleOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend Mode index (Number: integer)index of blend mode in drop down

➢ **Input Ports:** - Visit *Ops.Gl.ImageCompose.RandomNumberTexture* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.RandomNumberTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RandomNumberTexture" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.RandomNumberTexture>

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### 13.52.61 RectangleTexture\_v5



**Full Name:** Ops.Gl.ImageCompose.RectangleTexture\_v5 **Description:** draws a rectangle into a texture.

➢ **Input Ports:** - Visit *Ops.Gl.ImageCompose.RectangleTexture\_v5* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.RectangleTexture\_v5* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RectangleTexture\_v5" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.RectangleTexture\\_v5](https://cables.gl/op/Ops.Gl.ImageCompose.RectangleTexture_v5)

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## 13.52.62 RemoveAlpha



RemoveAlpha

**Full Name:** Ops.Gl.ImageCompose.RemoveAlpha **Description:** Full NameOps.Gl.ImageCompose.RemoveAlphaVisible  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query No op example found on this server INPUT PORTS render (Trigger) OUTPUT PORTS trigger (Trigger) Save Cancel Changelog Patches using RemoveAlpha Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.RemoveAlpha* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.RemoveAlpha* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RemoveAlpha"  
**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.RemoveAlpha>

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## 13.52.63 RepeatTexture\_v2



RepeatTexture

**Full Name:** Ops.Gl.ImageCompose.RepeatTexture\_v2 **Description:** Full NameOps.Gl.ImageCompose.RepeatTexture\_v2  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch repeat example Open In Editor INPUT PORTS render (Trigger) Blending Blend Mode index (Number: integer) Amount (Number) x (Number) y (Number) Clear (Number: boolean) Multiply (Object: texture) OUTPUT PORTS trigger (Trigger) Save Cancel Changelog Patches using RepeatTexture\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.RepeatTexture\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.RepeatTexture\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RepeatTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.RepeatTexture\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.RepeatTexture_v2)

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### 13.52.64 RgbMultiply



**Full Name:** Ops.Gl.ImageCompose.RgbMultiply **Description:** Full NameOps.Gl.ImageCompose.RgbMultiplyVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch rgmbmultiply exampleOpen In EditorINPUT PORTSrender (Trigger)r (Number)g (Number)b (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using RgbMultiplyExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.RgbMultiply* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.RgbMultiply* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RgbMultiply"  
**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.RgbMultiply>

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### 13.52.65 RgbToHsvTexture



**Full Name:** Ops.Gl.ImageCompose.RgbToHsvTexture **Description:** can be used for example to find colorfull areas in an image

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.RgbToHsvTexture* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.RgbToHsvTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RgbToHsvTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.RgbToHsvTexture>

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## 13.52.66 RotateTexture\_v2



**Full Name:** Ops.Gl.ImageCompose.RotateTexture\_v2 **Description:** When the edge is visible during rotating the texture, check the image compose op and tryout the different “wrap” modes.

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.RotateTexture\_v2 documentation* for input port details <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.RotateTexture\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “RotateTexture\_v2” **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.RotateTexture\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.RotateTexture_v2)

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## 13.52.67 RoundCorners



**Full Name:** Ops.Gl.ImageCompose.RoundCorners **Description:** Full NameOps.Gl.ImageCompose.RoundCornersVisiblOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch Round CornersOpen In EditorINPUT PORTSrender (Trigger)radius (Num- ber)r (Number)g (Number)b (Number)a (Number)OUTPUT PORTSnext (Trigger)SaveCancel ChangelogPatches using RoundCornersExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.RoundCorners documentation* for input port details <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.RoundCorners documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “RoundCorners” **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.RoundCorners>

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## 13.52.68 ScaleTexture\_v3



**Full Name:** Ops.Gl.ImageCompose.ScaleTexture\_v3 **Description:** Use this to “zoom” in or out of a texture

► **Input Ports:** - Visit *Ops.Gl.ImageCompose.ScaleTexture\_v3 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.ImageCompose.ScaleTexture\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for “ScaleTexture\_v3”  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ScaleTexture\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.ScaleTexture_v3)

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## 13.52.69 ScrollTexture



**Full Name:** Ops.Gl.ImageCompose.ScrollTexture **Description:** Full NameOps.Gl.ImageCompose.ScrollTextureVisib  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch scroll exampleOpen In EditorINPUT PORTSrender (Trigger)amountX  
(Number)amountY (Number)Mask (Object:texture)Repeat (Number: boolean)OUTPUT PORTStrigger  
(Trigger)SaveCancel ChangelogPatches using ScrollTextureExamples Team cables Public My Patches  
My Ops

► **Input Ports:** - Visit *Ops.Gl.ImageCompose.ScrollTexture documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.ImageCompose.ScrollTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for “ScrollTexture”  
**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.ScrollTexture>

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## 13.52.70 Shapes2d\_v2



**Full Name:** Ops.Gl.ImageCompose.Shapes2d\_v2 **Description:** Generate a variety of 2d shapes as a texture. Combine multiple ops to generate new forms.

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Shapes2d\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.Shapes2d\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Shapes2d\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Shapes2d\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Shapes2d_v2)

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## 13.52.71 Sharpen



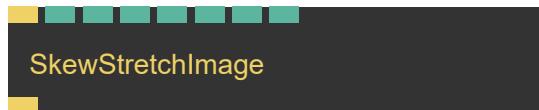
**Full Name:** Ops.Gl.ImageCompose.Sharpen **Description:** Full NameOps.Gl.ImageCompose.SharpenVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch sharpen exampleOpen In EditorINPUT PORTSRender (Trigger)amount (Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using SharpenExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Sharpen documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.Sharpen documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Sharpen" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Sharpen>

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## 13.52.72 SkewStretchImage\_v2



**Full Name:** Ops.Gl.ImageCompose.SkewStretchImage\_v2 **Description:** Full NameOps.Gl.ImageCompose.SkewStretchImage\_v2 - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch SkewStretchImage Example Open In Editor INPUT PORTS render (Trigger) Blending Blend Mode index (Number: integer) Amount (Number) Clamp (Number: boolean) Stretch Top (Number) Stretch Bottom (Number) Stretch Left (Number) Stretch Right (Number) OUTPUT PORTS Trigger (Trigger) Save Cancel Changelog Patches using SkewStretchImage\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Gl.ImageCompose.SkewStretchImage_v2` documentation for input port details  
**< Output Ports:** - Visit `Ops.Gl.ImageCompose.SkewStretchImage_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SkewStretchImage\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.SkewStretchImage\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.SkewStretchImage_v2)

13.52.73 Stripes\_v4



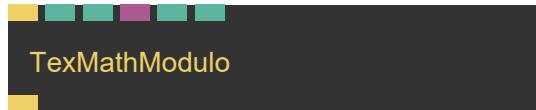
**Full Name:** Ops.Gl.ImageCompose.Stripes\_v4 **Description:** Full NameOps.Gl.ImageCompose.Stripes\_v4VisibilityC  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch Stripes exampleOpen In EditorINPUT PORTSRender (Trigger)Trigger  
in

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Stripes\\_v4](#) documentation for input port details **< Output Ports:** - Visit [Ops.Gl.ImageCompose.Stripes\\_v4](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Stripes\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Stripes\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.Stripes_v4)

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## 13.52.74 TexMathModulo



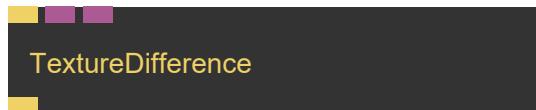
**Full Name:** Ops.Gl.ImageCompose.TexMathModulo **Description:** Full NameOps.Gl.ImageCompose.TexMathModulo  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch texMathModulo exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Mask Invert (Number: boolean)Mask (Object:texture)BlendingAmount (Number)modulo (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using TexMathModuloExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.TexMathModulo documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.TexMathModulo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TexMathModulo"  
**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.TexMathModulo>

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## 13.52.75 TextureDifference



**Full Name:** Ops.Gl.ImageCompose.TextureDifference **Description:** Full NameOps.Gl.ImageCompose.TextureDifference  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch texture difference exampleOpen In EditorINPUT PORTSrender (Trigger)Texture 1 (Object:texture)Texture 2 (Object:texture)OUTPUT PORTSnext (Trigger)SaveCancel ChangelogPatches using TextureDifferenceExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.TextureDifference documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.TextureDifference documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "TextureDifference" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.TextureDifference>

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### 13.52.76 ToNormalMap\_v2



**Full Name:** `Ops.Gl.ImageCompose.ToNormalMap_v2` **Description:** Full Name `Ops.Gl.ImageCompose.ToNormalMap_v2` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Credits Uses NormalMap Shader by moka Documentation (markdown) Issues Example patch id Youtube ids (comma separated) Op Licence Can use query Example Patch toNormalMap example Open In Editor Youtube Video Tutorial INPUT PORTS render (Trigger) Strength (Number) Step Multiplier (Number) OUTPUT PORTS trigger (Trigger) Save Cancel Changelog Patches using ToNormalMap\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Gl.ImageCompose.ToNormalMap_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Gl.ImageCompose.ToNormalMap_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ToNormalMap\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ToNormalMap\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.ToNormalMap_v2)

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### 13.52.77 Twirl\_v4



**Full Name:** `Ops.Gl.ImageCompose.Twirl_v4` **Description:** Full Name `Ops.Gl.ImageCompose.Twirl_v4` Visibility Core Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch id Youtube ids (comma separated) Op Licence Can use query Example Patch twirl image example Open In Editor INPUT PORTS Render (Trigger) Needed to render

**> Input Ports:** - Visit `Ops.Gl.ImageCompose.Twirl_v4` documentation for input port details < **Output Ports:** - Visit `Ops.Gl.ImageCompose.Twirl_v4` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "Twirl\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Twirl\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.Twirl_v4)

---

### 13.52.78 Vibrance



**Full Name:** Ops.Gl.ImageCompose.Vibrance **Description:** Full NameOps.Gl.ImageCompose.VibranceVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch vibrance exampleOpen In EditorINPUT PORTSRender (Trigger)amount  
(Number)OUTPUT PORTSTTrigger (Trigger)SaveCancel ChangelogPatches using VibranceExamples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Gl.ImageCompose.Vibrance` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.ImageCompose.Vibrance` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "Vibrance" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Vibrance>

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### 13.52.79 Vignette\_v3



**Full Name:** Ops.Gl.ImageCompose.Vignette\_v3 **Description:** Full NameOps.Gl.ImageCompose.Vignette\_v3Visibility  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch vignette exampleOpen In EditorINPUT PORTSRender (Trig-  
ger)BlendingBlend Mode index (Number: integer)Alpha Mask index (Number: integer)Amount (Num-  
ber)Strength (Number)Radius (Number)Sharp (Number)Aspect (Number)r (Number)g (Number)b  
(Number)Alpha (Number: boolean)OUTPUT PORTSTTrigger (Trigger)SaveCancel ChangelogPatches  
using Vignette\_v3Examples Team cables Public My Patches My Ops

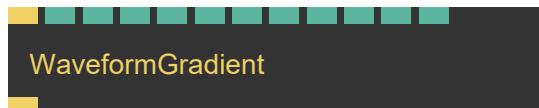
> **Input Ports:** - Visit [Ops.Gl.ImageCompose.Vignette\\_v3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.ImageCompose.Vignette\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Vignette\_v3"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Vignette\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.Vignette_v3)

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### 13.52.80 WaveformGradient\_v4



**Full Name:** Ops.Gl.ImageCompose.WaveformGradient\_v4 **Description:** note square won't be visible unless pow is less than 1

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.WaveformGradient\\_v4 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.ImageCompose.WaveformGradient\\_v4 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "WaveformGradient\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.WaveformGradient\\_v4](https://cables.gl/op/Ops.Gl.ImageCompose.WaveformGradient_v4)

---

### 13.52.81 Waveform\_v3



**Full Name:** Ops.Gl.ImageCompose.Waveform\_v3 **Description:** Full NameOps.Gl.ImageCompose.Waveform\_v3VisibilityOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch Waveform\_v2 exampleCreate a texture with a waveform.

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.Waveform\\_v3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.ImageCompose.Waveform\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Waveform\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Waveform\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.Waveform_v3)

---

## 13.52.82 Wobble\_v2



**Full Name:** Ops.Gl.ImageCompose.Wobble\_v2 **Description:** Can be used to create water wobble like motion in a texture

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Wobble\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Wobble\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Wobble\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Wobble\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Wobble_v2)

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## 13.52.83 ZoomBlur\_v2



**Full Name:** Ops.Gl.ImageCompose.ZoomBlur\_v2 **Description:** Full NameOps.Gl.ImageCompose.ZoomBlur\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch zoomblur exampleOpen In EditorINPUT PORTSrender (Trigger)Strength (Number)Samples (Number: integer)X (Number)Y (Number)Strength MapStrength Map (Object:texture)Source Strength Map index (Number: integer)Invert Strength Map (Number: boolean)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using ZoomBlur\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.ZoomBlur\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.ZoomBlur\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ZoomBlur\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.ZoomBlur\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.ZoomBlur_v2)

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## 13.53 Ops.Gl.ImageCompose.Math

### 13.53.1 ColorMapRange



**Full Name:** Ops.Gl.ImageCompose.Math.ColorMapRange **Description:** Full NameOps.Gl.ImageCompose.Math.ColorMapRange Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch Color Map RangeColor Map Range op allows you to remap pixel color values in textures from one range to another and to do so selectively per color channel, including Alpha. (RGBA).

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Math.ColorMapRange documentation for input port details*

**< Output Ports:** - Visit *Ops.Gl.ImageCompose.Math.ColorMapRange documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ColorMapRange"

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.ColorMapRange>

---

### 13.53.2 Normalize



**Full Name:** Ops.Gl.ImageCompose.Math.Normalize **Description:** Full NameOps.Gl.ImageCompose.Math.Normalize Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch normalize texture exampleOpen In EditorINPUT PORTSRender (Trigger)Fade (Number)Size (Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using NormalizeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Math.Normalize documentation for input port details*

**< Output Ports:** - Visit *Ops.Gl.ImageCompose.Math.Normalize documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Normalize" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.Normalize>

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### 13.53.3 RgbMath



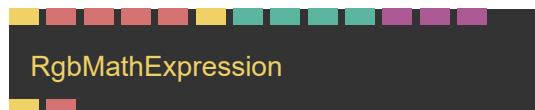
**Full Name:** Ops.Gl.ImageCompose.Math.RgbMath **Description:** This OP enables you to use precise values to modify the pixels in your texture.

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbMath* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbMath* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RgbMath" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.RgbMath>

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### 13.53.4 RgbMathExpression



**Full Name:** Ops.Gl.ImageCompose.Math.RgbMathExpression **Description:** Variables

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbMathExpression* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbMathExpression* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RgbMathExpression" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.RgbMathExpression>

---

### 13.53.5 RgbTransform



**Full Name:** Ops.Gl.ImageCompose.Math.RgbTransform **Description:** Full NameOps.Gl.ImageCompose.Math.RgbTransformOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch rgb transform exampleOpen In EditorINPUT PORTSRender (Trigger)PositionTranslate (Number: boolean)Pos X (Number)Pos Y (Number)Pos Z (Number)ScaleScale (Number: boolean)Scale X (Number)Scale Y (Number)Scale Z (Number)RotationRotate (Number: boolean)Rotation X (Number)Rotation Y (Number)Rotation Z (Number)Mask (Object:texture)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using RgbTransformExamples Team cables Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbTransform documentation* for input port details ◀

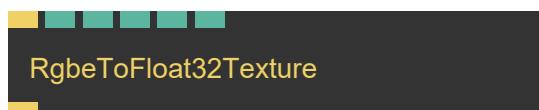
**Output Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbTransform documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RgbTransform"

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.RgbTransform>

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### 13.53.6 RgbeToFloat32Texture



**Full Name:** Ops.Gl.ImageCompose.Math.RgbeToFloat32Texture **Description:** Full NameOps.Gl.ImageCompose.Math.RgbeToFloat32TextureOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RgbeToHdrTexture exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)Mode index (Number: integer)Min (Number)Max (Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using RgbeToFloat32TextureExamples Team cables Public My Patches My Ops

► **Input Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbeToFloat32Texture documentation* for input port details ◀

**Output Ports:** - Visit *Ops.Gl.ImageCompose.Math.RgbeToFloat32Texture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RgbeToFloat32Texture" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.RgbeToFloat32Texture>

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### 13.53.7 Round



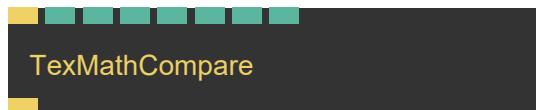
**Full Name:** Ops.Gl.ImageCompose.Math.Round **Description:** Full NameOps.Gl.ImageCompose.Math.RoundVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSrender (Trigger)Amount (Number)Multiplier (Number)name index (Number: integer) R G B A RGB OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using RoundExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Math.Round documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ImageCompose.Math.Round documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Round" **Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.Round>

---

### 13.53.8 TexMathCompare



**Full Name:** Ops.Gl.ImageCompose.Math.TexMathCompare **Description:** Full NameOps.Gl.ImageCompose.Math.TexMOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch TexMathCompare exampleOpen In EditorINPUT PORTSRender (Trigger)Comparison index (Number: integer)Result index (Number: integer)Number (Number)R Active (Number: boolean)G Active (Number: boolean)B Active (Number: boolean)A Active (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using TexMathCompareExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.Math.TexMathCompare](#) documentation for input port details  
< **Output Ports:** - Visit [Ops.Gl.ImageCompose.Math.TexMathCompare](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TexMathCompare"  
**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Math.TexMathCompare>

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## 13.54 Ops.Gl.ImageCompose.Noise

### 13.54.1 CellularNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.CellularNoise\_v2 **Description:** from: [https://github.com/BrianSharpe/GNoise-Lib/blob/master/gpu\\_noise\\_lib.glsl](https://github.com/BrianSharpe/GNoise-Lib/blob/master/gpu_noise_lib.glsl)

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.CellularNoise\\_v2](#) documentation for input port details  
< **Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.CellularNoise\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CellularNoise\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.CellularNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.CellularNoise_v2)

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### 13.54.2 FBMNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.FBMNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.FBMNoise\_v2  
Op - visible for everyone  
LicenseMIT  
Authorpandurgithub  
sourceMaintained by Team cablesPatchlists-Credits  
Uses Domain Warping Shader by inigo quilez  
Documentation (markdown)  
IssuesExample patch idYoutube ids (comma seperated)  
Op LicenceCan use query  
Example Patch fbnnoise example  
Open In Editor  
INPUT PORTS  
render (Trigger)  
Blending Blend Mode index (Number: integer)  
Amount (Number)  
Alpha Mask index (Number: integer)  
r (Number)  
g (Number)  
b (Number)  
scale (Number)  
anim

(Number)scrollX (Number)scrollY (Number)repeat (Number)aspect (Number)Layer 1 (Number: boolean)Layer 2 (Number: boolean)Layer 3 (Number: boolean)Layer 4 (Number: boolean)Tileable (Number: boolean)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using FBMNoise\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.FBMNoise\\_v2 documentation](#) for input port details <

**Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.FBMNoise\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "FBMNoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.FBMNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.FBMNoise_v2)

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### 13.54.3 GaborNoise



**Full Name:** Ops.Gl.ImageCompose.Noise.GaborNoise **Description:** Full NameOps.Gl.ImageCompose.Noise.GaborN  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
CreditsUses Gabor Noise by inigo quilezDocumentation (markdown)IssuesExample patch idYoutube  
ids (comma seperated)Op LicenceCaniuse queryExample Patch Gabor noise exampleOpen In EditorIN-  
PUT PORTSRender (Trigger)BlendingBlend Mode index (Number: integer)Alpha Mask index (Number:  
integer) Off On Amount (Number)Channels index (Number: integer) R G B RGB Phase (Number)Scale  
(Number)X (Number)Y (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using  
GaborNoiseExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.GaborNoise documentation](#) for input port details <

**Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.GaborNoise documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "GaborNoise"

**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Noise.GaborNoise>

---

### 13.54.4 GlitchNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.GlitchNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.GlitchNoise\_v2 - visible for everyone License MIT Author androgithub source Maintained by Team cablesPatchlists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence Caniuse query Example Patch GlitchNoise Op Open In Editor INPUT PORTS render (Trigger) Blending Amount (Number) Blend Mode index (Number: integer) Alpha Mask index (Number: integer) Seed (Number) frequency (Number) strength (Number) Block size small x (Number) Block size small y (Number) Block size large x (Number) Block size large y (Number) Scroll X (Number) Scroll Y (Number) OUTPUT PORTS trigger (Trigger) Save Cancel Changelog Patches using GlitchNoise\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Noise.GlitchNoise\_v2 documentation* for input port details <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.Noise.GlitchNoise\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GlitchNoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.GlitchNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.GlitchNoise_v2)

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### 13.54.5 HexagonNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.HexagonNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.HexagonNoise\_v2 - visible for everyone License MIT Author androgithub source Maintained by Team cablesPatchlists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence Caniuse query Example Patch Hexagon noise texture example Create a tiled hexagonal noise texture.

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Noise.HexagonNoise\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.Noise.HexagonNoise\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HexagonNoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.HexagonNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.HexagonNoise_v2)

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## 13.54.6 LayerNoise\_v3



**Full Name:** Ops.Gl.ImageCompose.Noise.LayerNoise\_v3 **Description:** Full NameOps.Gl.ImageCompose.Noise.LayerNoise\_v3 - visible for everyoneLicenseMITAuthor\_LJ\_github sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch LayerNoiseOpen In EditorINPUT PORTSRender (Trigger)trigger input

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Noise.LayerNoise\_v3 documentation* for input port details <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.Noise.LayerNoise\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LayerNoise\_v3"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.LayerNoise\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.LayerNoise_v3)

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## 13.54.7 Noise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.Noise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.Noise\_v2 - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch noise exampleOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend Mode index (Number: integer)index of blend mode in drop down

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Noise.Noise\_v2 documentation* for input port details <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.Noise.Noise\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Noise\_v2" **Docs:**

[https://cables.gl/op/Ops.Gl.ImageCompose.Noise.Noise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.Noise_v2)

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## 13.54.8 PerlinNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.PerlinNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.PerlinNoise\_v2 - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlists Credits Uses GPU-Noise-Lib by Brian Sharpe Documentation (markdown) Issues Example patch id Youtube ids (comma seperated) Op Licence Caniuse query Example Patch perlin noise example Open In Editor INPUT PORTS Render (Trigger) Mask (Object:texture) Blending Blend Mode index (Number: integer) Alpha Mask index (Number: integer) Amount (Number) Color index (Number: integer) Scale (Number) Multiply (Number) Harmonics index (Number: integer) Position X (Number) Y (Number) Z (Number) Offset Map Offset (Object:texture) Offset Multiply (Number) Offset X index (Number: integer) Offset Y index (Number: integer) Offset Z index (Number: integer) OUTPUT PORTS Trigger (Trigger) Save Cancel Changelog Patches using PerlinNoise\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.PerlinNoise\\_v2 documentation](#) for input port details **<**

**Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.PerlinNoise\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PerlinNoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.PerlinNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.PerlinNoise_v2)

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## 13.54.9 PixelNoise\_v3



**Full Name:** Ops.Gl.ImageCompose.Noise.PixelNoise\_v3 **Description:** Full NameOps.Gl.ImageCompose.Noise.PixelNoise\_v3 - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlists Documentation (markdown) Issues Example patch id Youtube ids (comma seperated) Op Licence Caniuse query Example Patch pixelnoise Open In Editor INPUT PORTS Render (Trigger) Trigger in

**> Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.PixelNoise\\_v3 documentation](#) for input port details **<**

**Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.PixelNoise\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PixelNoise\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.PixelNoise\\_v3](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.PixelNoise_v3)

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### 13.54.10 PolkaDotNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.PolkaDotNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.PolkaDotNoise\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch polka dot noiseOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)Alpha Mask index (Number: integer)Square Look (Number: boolean)Threshold (Number)Radius Low (Number)Radius High (Number)Scale (Number)X (Number)Y (Number)Z (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using PolkaDotNoise\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.ImageCompose.Noise.PolkaDotNoise\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ImageCompose.Noise.PolkaDotNoise\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PolkaDotNoise\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.PolkaDotNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.PolkaDotNoise_v2)

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### 13.54.11 Shardnoise



**Full Name:** Ops.Gl.ImageCompose.Noise.Shardnoise **Description:** Full NameOps.Gl.ImageCompose.Noise.Shardnoise  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsCreditsUses Gabor Noise by inigo quilezUses SHARD NOISE by ENDESGADocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch shard noise exampleOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend Mode

index (Number: integer)Alpha Mask index (Number: integer) Off On Amount (Number)sharpness (Number)Scale (Number)Round (Number: boolean)Harmonics index (Number: integer) 1 2 3 4 5 X (Number)Y (Number)Z (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using ShardnoiseExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.Shardnoise documentation](#) for input port details  
◀ **Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.Shardnoise documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Shardnoise"  
**Docs:** <https://cables.gl/op/Ops.Gl.ImageCompose.Noise.Shardnoise>

---

### 13.54.12 SimplexNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.SimplexNoise\_v2 **Description:** From: Brian Sharpe's GPU-Noise-Lib

➤ **Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.SimplexNoise\\_v2 documentation](#) for input port details  
◀ **Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.SimplexNoise\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SimplexNoise\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.SimplexNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.SimplexNoise_v2)

---

### 13.54.13 TriangleNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.TriangleNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.TriOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch Triangle NoiseOpen In EditorINPUT PORTSRender (Trigger)BlendingBlend

Mode index (Number: integer)Amount (Number)Alpha Mask index (Number: integer)scale (Number)angle (Number)Add (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using TriangleNoise\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.TriangleNoise\\_v2 documentation](#) for input port details

< **Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.TriangleNoise\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TriangleNoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.TriangleNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.TriangleNoise_v2)

---

### 13.54.14 ValueNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.ValueNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.ValueNoise\_v2Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsCreditsUses GPU-Noise-Lib by Brian SharpeDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch valuenoise exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)Amount (Number)LookScale (Number)PositionX (Number)Y (Number)Z (Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using ValueNoise\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ImageCompose.Noise.ValueNoise\\_v2 documentation](#) for input port details

< **Output Ports:** - Visit [Ops.Gl.ImageCompose.Noise.ValueNoise\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ValueNoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.ValueNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.ValueNoise_v2)

---

### 13.54.15 Voronoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.Voronoise\_v2 **Description:** From The Book of Shaders

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Noise.Voronoise\_v2* documentation for input port details <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.Noise.Voronoise\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Voronoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.Voronoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.Voronoise_v2)

---

### 13.54.16 WorleyNoise\_v2



**Full Name:** Ops.Gl.ImageCompose.Noise.WorleyNoise\_v2 **Description:** Full NameOps.Gl.ImageCompose.Noise.Wo  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsCreditsUses Worley Noise by Stefan GustavsonDocumentation (markdown)IssuesExample  
patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch worleynoise op  
exampleOpen In EditorINPUT PORTSrender (Trigger)BlendingBlend Mode index (Number: integer)  
Alpha Mask index (Number: integer)Amount (Number)X (Number)Y (Number)Z (Number)Scale  
(Number)Harmonics index (Number: integer)Invert (Number: boolean)RangeA (Number)RangeB  
(Number)Tileable (Number: boolean)Amount MapAmount Map (Object:texture)Source Strength  
Map index (Number: integer)Invert Strength Map (Number: boolean)Offset MapOffset (Ob-  
ject:texture)Offset Multiply (Number)Offset X index (Number: integer)Offset Y index (Number:  
integer)Offset Z index (Number: integer)OUTPUT PORTStrigger (Trigger)SaveCancel Changelog-  
Patches using WorleyNoise\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ImageCompose.Noise.WorleyNoise\_v2* documentation for input port details <

**Output Ports:** - Visit *Ops.Gl.ImageCompose.Noise.WorleyNoise\_v2* documentation for output port de-  
tails

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "WorleyNoise\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.ImageCompose.Noise.WorleyNoise\\_v2](https://cables.gl/op/Ops.Gl.ImageCompose.Noise.WorleyNoise_v2)

---

## 13.55 Ops.Gl.Matrix

### 13.55.1 AnimMatrix



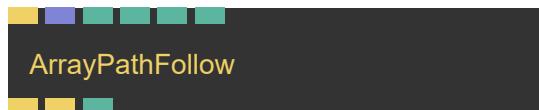
**Full Name:** Ops.Gl.Matrix.AnimMatrix **Description:** Full NameOps.Gl.Matrix.AnimMatrixVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch AnimArray ExampleAnimates changes in an array to allow smoothing of  
camera changes for example as seen here.

➤ **Input Ports:** - Visit *Ops.Gl.Matrix.AnimMatrix documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Matrix.AnimMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AnimMatrix"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.AnimMatrix>

---

### 13.55.2 ArrayPathFollow



**Full Name:** Ops.Gl.Matrix.ArrayPathFollow **Description:** Full NameOps.Gl.Matrix.ArrayPathFollowVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Array path follow exampleOpen In EditorINPUT PORTSexe (Trigger)array  
(Array)time (Number)duration (Number)offset (Number)look ahead (Number)OUTPUT PORTTrigger  
(Trigger)transform lookat (Trigger)index (Number)SaveCancel ChangelogPatches using ArrayPathFol-  
lowExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Matrix.ArrayPathFollow documentation* for input port details < **Output  
Ports:** - Visit *Ops.Gl.Matrix.ArrayPathFollow documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ArrayPathFollow"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.ArrayPathFollow>

---

### 13.55.3 ArrayPathFollowParticles\_v2



ArrayPathFollowParticles

**Full Name:** Ops.Gl.Matrix.ArrayPathFollowParticles\_v2 **Description:** Full NameOps.Gl.Matrix.ArrayPathFollowP  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch array follow path particles exampleOpen In EditorINPUT  
PORTSExec (Trigger)Points (Array)Num Particles (Number)Length (Number)Spread (Number)Offset  
(Number)Max Distance (Number)RandomSpeed (Number: boolean)OUTPUT PORTSNext (Trig-  
ger)SaveCancel ChangelogPatches using ArrayPathFollowParticles\_v2Examples Team cables Public  
My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.ArrayPathFollowParticles\_v2 documentation* for input port details <  
**Output Ports:** - Visit *Ops.Gl.Matrix.ArrayPathFollowParticles\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayPathFollow-  
Particles\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Matrix.ArrayPathFollowParticles\\_v2](https://cables.gl/op/Ops.Gl.Matrix.ArrayPathFollowParticles_v2)

---

### 13.55.4 Billboard



Billboard

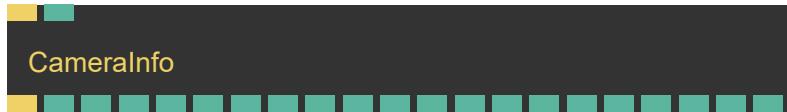
**Full Name:** Ops.Gl.Matrix.Billboard **Description:** Full NameOps.Gl.Matrix.BillboardVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch billboard exampleOpen In EditorINPUT PORTSExec (Trigger)OUTPUT  
PORTSNext (Trigger)SaveCancel ChangelogPatches using BillboardExamples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.Billboard documentation* for input port details < **Output Ports:** -  
Visit *Ops.Gl.Matrix.Billboard documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Billboard" **Docs:**  
<https://cables.gl/op/Ops.Gl.Matrix.Billboard>

---

## 13.55.5 CameraInfo



**Full Name:** Ops.Gl.Matrix.CameraInfo **Description:** Utility op to get camera attributes.

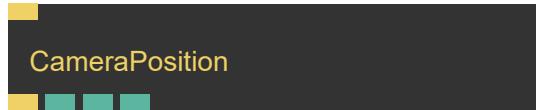
**> Input Ports:** - Visit *Ops.Gl.Matrix.CameraInfo documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.CameraInfo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CameraInfo"

**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.CameraInfo>

---

## 13.55.6 CameraPosition



**Full Name:** Ops.Gl.Matrix.CameraPosition **Description:** Full NameOps.Gl.Matrix.CameraPositionVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch ViewMatrixTranslation example cubes nearer to the camera eye get  
red

**> Input Ports:** - Visit *Ops.Gl.Matrix.CameraPosition documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.CameraPosition documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CameraPosition"

**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.CameraPosition>

---

## 13.55.7 Camera\_v2



**Full Name:** Ops.Gl.Matrix.Camera\_v2 **Description:** Full NameOps.Gl.Matrix.Camera\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthoractiongithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Multiple camerasOp Camera example.

**> Input Ports:** - **Move sideways (in local x axis):** boom (Number)Move up+down (in local y axis). -  
**backward (in local z axis):** tilt (Number)Tilt up+down relative to current orientation (around local x  
axis) **< Output Ports:** - Visit *Ops.Gl.Matrix.Camera\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Camera\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Matrix.Camera\\_v2](https://cables.gl/op/Ops.Gl.Matrix.Camera_v2)

---

## 13.55.8 Coordinates



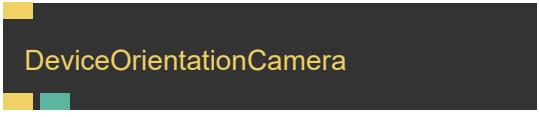
**Full Name:** Ops.Gl.Matrix.Coordinates **Description:** Full NameOps.Gl.Matrix.CoordinatesVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch Ops.Gl.Matrix.CoordinatesOpen In EditorINPUT PORTSrender (Trig-  
ger)OUTPUT PORTTrigger (Trigger)X (Number)Y (Number)Z (Number)SaveCancel ChangelogPatches  
using CoordinatesExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.Coordinates documentation for input port details* **< Output Ports:** -  
Visit *Ops.Gl.Matrix.Coordinates documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Coordinates"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.Coordinates>

---

## 13.55.9 DeviceOrientationCamera



DeviceOrientationCamera

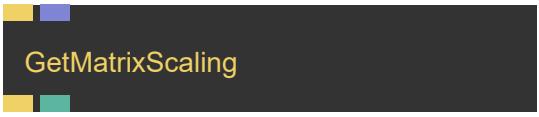
**Full Name:** Ops.Gl.Matrix.DeviceOrientationCamera **Description:** You may need to tap the screen once to enable permissions for the op to work.

**> Input Ports:** - Visit *Ops.Gl.Matrix.DeviceOrientationCamera documentation* for input port details <  
**Output Ports:** - Visit *Ops.Gl.Matrix.DeviceOrientationCamera documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DeviceOrientationCamera" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.DeviceOrientationCamera>

---

## 13.55.10 GetMatrixScaling



GetMatrixScaling

**Full Name:** Ops.Gl.Matrix.GetMatrixScaling **Description:** Full NameOps.Gl.Matrix.GetMatrixScalingVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSrender (Trigger)Matrix (Array)OUTPUT  
PORTStrigger (Trigger)Scaling (Number)SaveCancel ChangelogPatches using GetMatrixScalingExam-  
ples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.GetMatrixScaling documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Matrix.GetMatrixScaling documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GetMatrixScaling" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.GetMatrixScaling>

---

### 13.55.11 GetModelMatrix



GetModelMatrix

**Full Name:** Ops.Gl.Matrix.GetModelMatrix **Description:** Outputs the current modelmatrix on the stack. use MultiplyModelMatrix to use it anywhere else again.

**> Input Ports:** - Visit *Ops.Gl.Matrix.GetModelMatrix documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.GetModelMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GetModelMatrix"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.GetModelMatrix>

---

### 13.55.12 GetProjectionMatrix



GetProjectionMatrix

**Full Name:** Ops.Gl.Matrix.GetProjectionMatrix **Description:** Full NameOps.Gl.Matrix.GetProjectionMatrixVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch projection matrix interpolateOpen In EditorINPUT PORTSrender (Trigger)OUTPUT PORTSTrigger (Trigger)matrix (Array)SaveCancel ChangelogPatches using GetProjectionMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.GetProjectionMatrix documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.GetProjectionMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GetProjectionMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.GetProjectionMatrix>

---

### 13.55.13 GetViewMatrix



GetViewMatrix

**Full Name:** Ops.Gl.Matrix.GetViewMatrix **Description:** Full NameOps.Gl.Matrix.GetViewMatrixVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch GetViewMatrix MulViewMatrix ExampleOpen In EditorINPUT  
PORTSrender (Trigger)OUTPUT PORTStrigger (Trigger)matrix (Array)SaveCancel ChangelogPatches  
using GetViewMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.GetViewMatrix documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.Matrix.GetViewMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GetViewMatrix"

**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.GetViewMatrix>

---

### 13.55.14 InterpolateMatrix



InterpolateMatrix

**Full Name:** Ops.Gl.Matrix.InterpolateMatrix **Description:** Full NameOps.Gl.Matrix.InterpolateMatrixVisibilityCo  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSEXe (Trigger)Array 1 (Array)Array  
2 (Array)perc (Number)OUTPUT PORTSNext (Trigger)Result (Array)SaveCancel ChangelogPatches  
using InterpolateMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.InterpolateMatrix documentation* for input port details **< Output  
Ports:** - Visit *Ops.Gl.Matrix.InterpolateMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InterpolateM-  
atrix" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.InterpolateMatrix>

---

## 13.55.15 InvertMatrix



InvertMatrix

**Full Name:** Ops.Gl.Matrix.InvertMatrix **Description:** Full NameOps.Gl.Matrix.InvertMatrixVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Example Invert MatrixIn this example, Invert Matrix OP is used to negate  
a rotation of a model.

➤ **Input Ports:** - Visit *Ops.Gl.Matrix.InvertMatrix documentation* for input port details < **Output Ports:** -  
Visit *Ops.Gl.Matrix.InvertMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InvertMatrix"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.InvertMatrix>

---

## 13.55.16 LookatCamera



LookatCamera

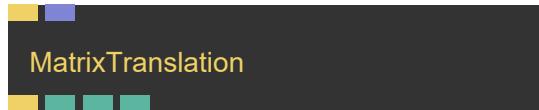
**Full Name:** Ops.Gl.Matrix.LookatCamera **Description:** Full NameOps.Gl.Matrix.LookatCameraVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch LookatCamera exampleOpen In EditorYoutube Video TutorialINPUT  
PORTSrender (Trigger)eyeX (Number)eyeY (Number)eyeZ (Number)centerX (Number)centerY  
(Number)centerZ (Number)upX (Number)upY (Number)upZ (Number)OUTPUT PORTStrigger (Trig-  
ger)Array (Array)SaveCancel ChangelogPatches using LookatCameraExamples Team cables Public My  
Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Matrix.LookatCamera documentation* for input port details < **Output Ports:**  
- Visit *Ops.Gl.Matrix.LookatCamera documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LookatCamera"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.LookatCamera>

---

### 13.55.17 MatrixTranslation



**Full Name:** Ops.Gl.Matrix.MatrixTranslation **Description:** Full NameOps.Gl.Matrix.MatrixTranslationVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch MatrixTranslationOpen In EditorINPUT PORTSrender (Trigger)Matrix (Array)OUTPUT PORTStrigger (Trigger)X (Number)Y (Number)Z (Number)SaveCancel Changelog-Patches using MatrixTranslationExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.MatrixTranslation documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.Matrix.MatrixTranslation documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MatrixTranslation" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.MatrixTranslation>

---

### 13.55.18 MulViewMatrix



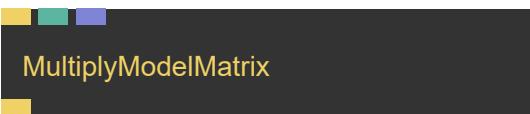
**Full Name:** Ops.Gl.Matrix.MulViewMatrix **Description:** Full NameOps.Gl.Matrix.MulViewMatrixVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch GetViewMatrix MulViewMatrix ExampleOpen In EditorINPUT PORTSrender (Trigger)matrix (Array)Identity (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using MulViewMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.MulViewMatrix documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.Matrix.MulViewMatrix documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MulViewMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.MulViewMatrix>

---

### 13.55.19 MultiplyModelMatrix



**Full Name:** Ops.Gl.Matrix.MultiplyModelMatrix **Description:** Full NameOps.Gl.Matrix.MultiplyModelMatrixVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch GetModelMatrix MultiplyModelMatrix ExampleOpen In EditorINPUT PORTSrender (Trigger)Identity (Number: boolean)matrix (Array)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using MultiplyModelMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.MultiplyModelMatrix documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.MultiplyModelMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MultiplyModelMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.MultiplyModelMatrix>

---

### 13.55.20 Quaternion



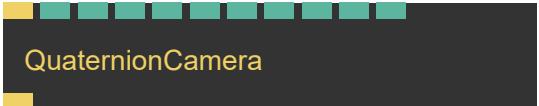
**Full Name:** Ops.Gl.Matrix.Quaternion **Description:** Full NameOps.Gl.Matrix.QuaternionVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSrender (Trigger)x (Number)y (Number)z (Number)w (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using QuaternionExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.Quaternion documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.Quaternion documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Quaternion" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.Quaternion>

---

### 13.55.21 QuaternionCamera



QuaternionCamera

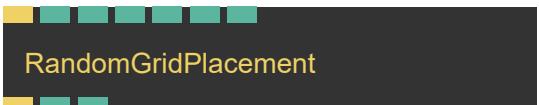
**Full Name:** Ops.Gl.Matrix.QuaternionCamera **Description:** Full NameOps.Gl.Matrix.QuaternionCameraVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSrender (Trigger)eyeX (Number)eyeY (Number)eyeZ (Number)quatX (Number)quatY (Number)quatZ (Number)quatW (Number)upX (Number)upY (Number)upZ (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using QuaternionCameraExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.QuaternionCamera documentation for input port details* < **Output Ports:** - Visit *Ops.Gl.Matrix.QuaternionCamera documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "QuaternionCamera" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.QuaternionCamera>

---

### 13.55.22 RandomGridPlacement



RandomGridPlacement

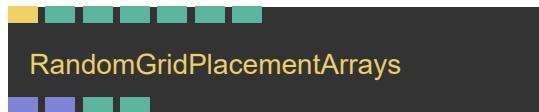
**Full Name:** Ops.Gl.Matrix.RandomGridPlacement **Description:** Full NameOps.Gl.Matrix.RandomGridPlacementVis Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)Issuesthis is slow, you should try the new version: Ops.Gl.Matrix.RandomGridPlacementpatch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch grid random Open In EditorINPUT PORTSExe (Trigger)max Depth (Number)Possibility (Number)Probability to go into a deeper level

**> Input Ports:** - Visit *Ops.Gl.Matrix.RandomGridPlacement documentation for input port details* < **Output Ports:** - Visit *Ops.Gl.Matrix.RandomGridPlacement documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomGridPlacement" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.RandomGridPlacement>

---

### 13.55.23 RandomGridPlacementArrays



**Full Name:** Ops.Gl.Matrix.RandomGridPlacementArrays **Description:** Full NameOps.Gl.Matrix.RandomGridPlacementArrays - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch random grid simple example Open In Editor INPUT PORTS Exe (Trigger) max Depth (Number) Possibility (Number) Propability to go into a deeper level

**> Input Ports:** - Visit *Ops.Gl.Matrix.RandomGridPlacementArrays documentation for input port details* < **Output Ports:** - Visit *Ops.Gl.Matrix.RandomGridPlacementArrays documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomGridPlacementArrays" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.RandomGridPlacementArrays>

---

### 13.55.24 Scale



**Full Name:** Ops.Gl.Matrix.Scale **Description:** Enlarges or shrinks objects by a scale factor that is the same in all directions (uniform scaling).

**> Input Ports:** - Visit *Ops.Gl.Matrix.Scale documentation for input port details* < **Output Ports:** - Visit *Ops.Gl.Matrix.Scale documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Scale" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.Scale>

---

## 13.55.25 ScaleXYZViewMatrix



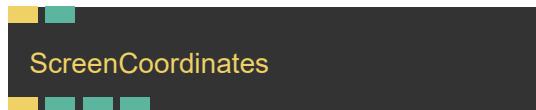
**Full Name:** Ops.Gl.Matrix.ScaleXYZViewMatrix **Description:** Full NameOps.Gl.Matrix.ScaleXYZViewMatrixVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch Ops.Gl.Matrix.ScaleXYZViewMatrixOpen In EditorINPUT PORTSrender (Trigger)x (Number)y (Number)z (Number)OUTPUT PORTStrigger (Trigger)SaveCancel Changelog-Patches using ScaleXYZViewMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.ScaleXYZViewMatrix documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.ScaleXYZViewMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ScaleXYZViewMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.ScaleXYZViewMatrix>

---

## 13.55.26 ScreenCoordinates\_v2



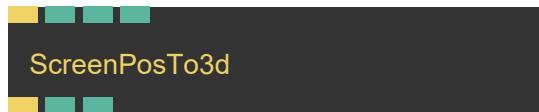
**Full Name:** Ops.Gl.Matrix.ScreenCoordinates\_v2 **Description:** Full NameOps.Gl.Matrix.ScreenCoordinates\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch Screen coordinates exampleOpen In EditorINPUT PORTSExecute (Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Gl.Matrix.ScreenCoordinates\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.ScreenCoordinates\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ScreenCoordinates\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Matrix.ScreenCoordinates\\_v2](https://cables.gl/op/Ops.Gl.Matrix.ScreenCoordinates_v2)

---

## 13.55.27 ScreenPosTo3d\_v3



**Full Name:** Ops.Gl.Matrix.ScreenPosTo3d\_v3 **Description:** Useful when you want to do things like convert the mouse co-ordinates on screen to 3d co-ordinates.

**> Input Ports:** - Visit [Ops.Gl.Matrix.ScreenPosTo3d\\_v3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.Matrix.ScreenPosTo3d\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ScreenPosTo3d\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.Matrix.ScreenPosTo3d\\_v3](https://cables.gl/op/Ops.Gl.Matrix.ScreenPosTo3d_v3)

---

## 13.55.28 SetProjectionMatrix



**Full Name:** Ops.Gl.Matrix.SetProjectionMatrix **Description:** Full NameOps.Gl.Matrix.SetProjectionMatrixVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch projection matrix interpolateOpen In EditorINPUT PORTSx (Trigger)Matrix (Array)OUTPUT PORTSnext (Trigger)SaveCancel ChangelogPatches using SetProjectionMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.Matrix.SetProjectionMatrix documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.Matrix.SetProjectionMatrix documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SetProjectionMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.SetProjectionMatrix>

---

## 13.55.29 Shear



**Full Name:** Ops.Gl.Matrix.Shear **Description:** Full NameOps.Gl.Matrix.ShearVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch shear exampleOpen In EditorINPUT PORTSrender (Trigger)shearX (Number)shearY (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using ShearExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.Shear documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.Shear documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Shear" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.Shear>

---

## 13.55.30 TransformMatrix



**Full Name:** Ops.Gl.Matrix.TransformMatrix **Description:** Full NameOps.Gl.Matrix.TransformMatrixVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch transformmatrix exampleOpen In EditorINPUT PORTSTransform (Trigger)Matrix (Array)TranslationTranslate X (Number)Translate Y (Number)Translate Z (Number)ScaleScale X (Number)Scale Y (Number)Scale Z (Number)RotationRotation X (Number)Rotation Y (Number)Rotation Z (Number)OUTPUT PORTSNext (Trigger)Result (Array)SaveCancel ChangelogPatches using TransformMatrixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.TransformMatrix documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.TransformMatrix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TransformMatrix" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.TransformMatrix>

---

### 13.55.31 TransformMul



**Full Name:** Ops.Gl.Matrix.TransformMul **Description:** Full NameOps.Gl.Matrix.TransformMulVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSrender (Trigger)mul (Number)OUTPUT  
PORTStrigger (Trigger)SaveCancel ChangelogPatches using TransformMulExamples Team cables  
Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Matrix.TransformMul documentation for input port details* **< Output Ports:**  
- Visit *Ops.Gl.Matrix.TransformMul documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TransformMul"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.TransformMul>

---

### 13.55.32 Translate



**Full Name:** Ops.Gl.Matrix.Translate **Description:** All elements which are drawn afterwards will be affected by this. If you use multiple transforms in a row the transformations will be stacked on top of each other (added).

**> Input Ports:** - Visit *Ops.Gl.Matrix.Translate documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.Matrix.Translate documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Translate" **Docs:** <https://cables.gl/op/Ops.Gl.Matrix.Translate>

---

### 13.55.33 TranslateView



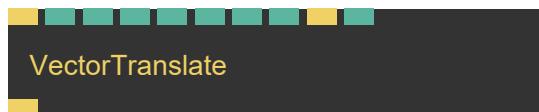
**Full Name:** Ops.Gl.Matrix.TranslateView **Description:** Full NameOps.Gl.Matrix.TranslateViewVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSrender (Trigger)x (Number)y (Number)z  
(Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using TranslateViewExam-  
ples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Matrix.TranslateView documentation* for input port details < **Output Ports:**  
- Visit *Ops.Gl.Matrix.TranslateView documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TranslateView"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.TranslateView>

---

### 13.55.34 VectorTranslate



**Full Name:** Ops.Gl.Matrix.VectorTranslate **Description:** Full NameOps.Gl.Matrix.VectorTranslateVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCanuse queryNo op example found on this serverINPUT PORTSExec (Trigger)Speed (Num-  
ber)Vector X (Number)Vector Y (Number)Vector Z (Number)Reset Position X (Number)Reset Position  
Y (Number)Reset Position Z (Number)reset (Trigger)max (Number)OUTPUT PORTSNext (Trig-  
ger)SaveCancel ChangelogPatches using VectorTranslateExamples Team cables Public My Patches  
My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Matrix.VectorTranslate documentation* for input port details < **Output  
Ports:** - Visit *Ops.Gl.Matrix.VectorTranslate documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VectorTranslate"  
**Docs:** <https://cables.gl/op/Ops.Gl.Matrix.VectorTranslate>

---

## 13.55.35 WASDCamera\_v2



**Full Name:** Ops.Gl.Matrix.WASDCamera\_v2 **Description:** Click in the canvas to enable the wasd camera, this also enables the pointerlock.

**> Input Ports:** - Visit *Ops.Gl.Matrix.WASDCamera\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Matrix.WASDCamera\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "WASDCamera\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.Matrix.WASDCamera\\_v2](https://cables.gl/op/Ops.Gl.Matrix.WASDCamera_v2)

---

## 13.56 Ops.Gl.Meshes

### 13.56.1 ComposingGridOverlay



**Full Name:** Ops.Gl.Meshes.ComposingGridOverlay **Description:** Full NameOps.Gl.Meshes.ComposingGridOverlayV  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch Example ComposingGridOverlayOpen In EditorINPUT PORTSRender  
(Trigger)Scale (Number)Show Center (Number: boolean)SaveCancel ChangelogPatches using Com-  
posingGridOverlayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Meshes.ComposingGridOverlay documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.ComposingGridOverlay documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ComposingGridOverlay" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.ComposingGridOverlay>

---

## 13.56.2 Cone



**Full Name:** Ops.Gl.Meshes.Cone **Description:** Full NameOps.Gl.Meshes.ConeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch cone exampleOpen In EditorINPUT PORTSrender (Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Gl.Meshes.Cone documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.Meshes.Cone documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Cone"* **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.Cone>

---

## 13.56.3 Corner



**Full Name:** Ops.Gl.Meshes.Corner **Description:** Full NameOps.Gl.Meshes.CornerVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch corner exampleOpen In EditorINPUT PORTSRender (Trigger)SizeWidth (Number)Height (Number)Thickness (Number)Draw (Number: boolean)Alignpivot x index (Number: integer)pivot y index (Number: integer)OUTPUT PORTStrigger (Trigger)Geometry (Object)SaveCancel ChangelogPatches using CornerExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Meshes.Corner documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.Meshes.Corner documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Corner"* **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.Corner>

---

## 13.56.4 Cylinder\_v2



**Full Name:** Ops.Gl.Meshes.Cylinder\_v2 **Description:** Full NameOps.Gl.Meshes.Cylinder\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthor\_LJ\_github sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch cylinder exampleOpen In EditorINPUT PORTSrender (Trigger)Trigger  
in

► **Input Ports:** - Visit *Ops.Gl.Meshes.Cylinder\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.Cylinder\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Cylinder\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Meshes.Cylinder\\_v2](https://cables.gl/op/Ops.Gl.Meshes.Cylinder_v2)

---

## 13.56.5 FloorGrid



**Full Name:** Ops.Gl.Meshes.FloorGrid **Description:** can not be used with materials.

► **Input Ports:** - Visit *Ops.Gl.Meshes.FloorGrid documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.FloorGrid documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FloorGrid" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.FloorGrid>

---

## 13.56.6 FreeFormPlane



**Full Name:** Ops.Gl.Meshes.FreeFormPlane **Description:** A simple plane (composed of two triangles), where each vertex can be repositioned individually in all three axis (XYZ).

> **Input Ports:** - Visit *Ops.Gl.Meshes.FreeFormPlane* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.FreeFormPlane* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "FreeFormPlane"* **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.FreeFormPlane>

---

### 13.56.7 FullscreenRectangle\_v2



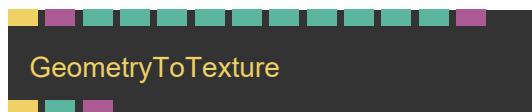
**Full Name:** Ops.Gl.Meshes.FullscreenRectangle\_v2 **Description:** Full NameOps.Gl.Meshes.FullscreenRectangle\_v2 Op - visible for everyone LicenseMIT Authorpandurgithub source Maintained by Team cablesPatchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Can use query Example Patch Fullscreenrect ExampleOpen In Editor INPUT PORTS render (Trigger) Draw the Rectangle

> **Input Ports:** - Visit *Ops.Gl.Meshes.FullscreenRectangle\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.FullscreenRectangle\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "FullscreenRectangle\_v2"* **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.FullscreenRectangle\\_v2](https://cables.gl/op/Ops.Gl.Meshes.FullscreenRectangle_v2)

---

### 13.56.8 GeometryToTexture\_v3



**Full Name:** Ops.Gl.Meshes.GeometryToTexture\_v3 **Description:** Once triggered this operator converts a given geometry to an HDR texture where every pixel contains XYZ position data of the given geometry, represented with RGB values.

> **Input Ports:** - Visit [Ops.Gl.Meshes.GeometryToTexture\\_v3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.Meshes.GeometryToTexture\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "GeometryToTexture\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.GeometryToTexture\\_v3](https://cables.gl/op/Ops.Gl.Meshes.GeometryToTexture_v3)

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### 13.56.9 Grid



**Full Name:** Ops.Gl.Meshes.Grid **Description:** Full NameOps.Gl.Meshes.GridVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch grid exampleOpen In EditorINPUT PORTSRender (Trigger)Num (Number: integer)Spacing (Number)Center (Number: boolean)Axis index (Number: integer)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using GridExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.Meshes.Grid documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.Meshes.Grid documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Grid" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.Grid>

---

### 13.56.10 HeightMap



**Full Name:** Ops.Gl.Meshes.HeightMap **Description:** Full NameOps.Gl.Meshes.HeightMapVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch wireframesOpen In EditorINPUT PORTSrender (Trigger)file (String)extrude (Number)width (Number)height (Number)rows (Number: integer)columns (Number:

integer)texCoords slice (Number: boolean)flat (Number: boolean)OUTPUT PORTS trigger (Trigger)geometry (Object)SaveCancel Changelog Patches using HeightMap Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.Meshes.HeightMap* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.HeightMap* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "HeightMap" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.HeightMap>

---

### 13.56.11 Helix



**Full Name:** Ops.Gl.Meshes.Helix **Description:** Full Name Ops.Gl.Meshes.Helix VisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown)

> **Input Ports:** - Visit *Ops.Gl.Meshes.Helix* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.Helix* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Helix" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.Helix>

---

### 13.56.12 Icosahedron\_v2



**Full Name:** Ops.Gl.Meshes.Icosahedron\_v2 **Description:** Full Name Ops.Gl.Meshes.Icosahedron\_v2 VisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch id Youtube ids (comma seperated) Op Licence Caniuse query Example Patch icosahedron example Open In Editor INPUT PORTS render (Trigger) Renders the icosahedron

> **Input Ports:** - Visit *Ops.Gl.Meshes.Icosahedron\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.Icosahedron\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Icosahedron\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Meshes.Icosahedron\\_v2](https://cables.gl/op/Ops.Gl.Meshes.Icosahedron_v2)

---

### 13.56.13 Line



**Full Name:** Ops.Gl.Meshes.Line **Description:** Full NameOps.Gl.Meshes.LineVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch lineOpen In EditorINPUT PORTSRender (Trigger)X 1 (Number)Y 1 (Number)Z 1 (Number)X 2 (Number)Y 2 (Number)Z 2 (Number)OUTPUT PORTSNext (Trigger)Array (Array)SaveCancel ChangelogPatches using LineExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.Meshes.Line* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Meshes.Line* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Line" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.Line>

---

### 13.56.14 LinesArray



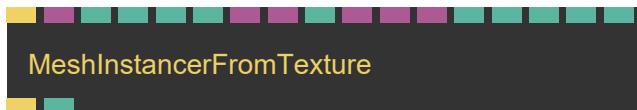
**Full Name:** Ops.Gl.Meshes.LinesArray **Description:** Full NameOps.Gl.Meshes.LinesArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch linearray exampleOpen In EditorINPUT PORTSrender (Trigger)Sizewidth (Number)height (Number)Logarithmic (Number: boolean)pivot x index (Number: integer)pivot y index (Number: integer)num columns (Number: integer)num rows (Number: integer)axis index

(Number: integer)OUTPUT PORTTrigger (Trigger)Point Arrays (Array)SaveCancel ChangelogPatches  
using LinesArrayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.Meshes.LinesArray](#) documentation for input port details **< Output Ports:** - Visit [Ops.Gl.Meshes.LinesArray](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LinesArray" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.LinesArray>

### 13.56.15 MeshInstancerFromTexture\_v3



**Full Name:** Ops.Gl.Meshes.MeshInstancerFromTexture\_v3 **Description:** A performant way to render a 3d object many times.

**> Input Ports:** - Visit [Ops.Gl.Meshes.MeshInstancerFromTexture\\_v3](#) documentation for input port details  
**< Output Ports:** - Visit [Ops.Gl.Meshes.MeshInstancerFromTexture\\_v3](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for “`MeshInstancerFromTexture_v3`” **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.MeshInstancerFromTexture\\_v3](https://cables.gl/op/Ops.Gl.Meshes.MeshInstancerFromTexture_v3)

## 13.56.16 ParametricSurface



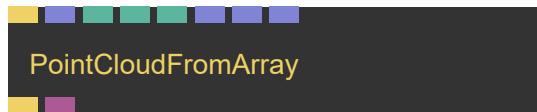
**Full Name:** Ops.Gl.Meshes.ParametricSurface **Description:** A parametric surface is a surface in 3d space that is defined by a parametric equation of 2 parameters.

**> Input Ports:** - Visit `Ops.Gl.Meshes.ParametricSurface` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.Meshes.ParametricSurface` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for “`ParametricSurface`” **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.ParametricSurface>

---

## 13.56.17 PointCloudFromArray\_v2



**Full Name:** Ops.Gl.Meshes.PointCloudFromArray\_v2 **Description:** This op works together with the pointMaterial op and also requires a xyz array to render the points.

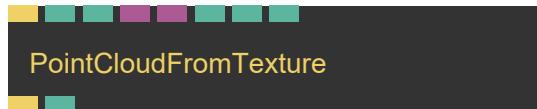
**> Input Ports:** - Visit *Ops.Gl.Meshes.PointCloudFromArray\_v2 documentation* for input port details <

**Output Ports:** - Visit *Ops.Gl.Meshes.PointCloudFromArray\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PointCloudFromArray\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.PointCloudFromArray\\_v2](https://cables.gl/op/Ops.Gl.Meshes.PointCloudFromArray_v2)

---

## 13.56.18 PointCloudFromTexture



**Full Name:** Ops.Gl.Meshes.PointCloudFromTexture **Description:** Full NameOps.Gl.Meshes.PointCloudFromTexture  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch GeometryToTexture and PointCloudFromTextureHow to convert  
geometry into a usable Geometry Texture and then feed it into a PointCloudFromTexture operator.

**> Input Ports:** - Visit *Ops.Gl.Meshes.PointCloudFromTexture documentation* for input port details <

**Output Ports:** - Visit *Ops.Gl.Meshes.PointCloudFromTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PointCloudFrom-  
Texture" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.PointCloudFromTexture>

---

## 13.56.19 Polyhedron\_v2



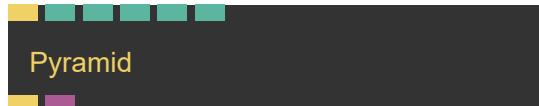
**Full Name:** Ops.Gl.Meshes.Polyhedron\_v2 **Description:** Generate and modify polyhedron meshes to create complex topologies.

**> Input Ports:** - Visit *Ops.Gl.Meshes.Polyhedron\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.Polyhedron\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Polyhedron\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Meshes.Polyhedron\\_v2](https://cables.gl/op/Ops.Gl.Meshes.Polyhedron_v2)

---

## 13.56.20 Pyramid\_v2



**Full Name:** Ops.Gl.Meshes.Pyramid\_v2 **Description:** Full NameOps.Gl.Meshes.Pyramid\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch pyramid exampleOpen In EditorINPUT PORTSRender (Trigger)Width (Num-  
ber)Length (Number)Height (Number)Smooth (Number: boolean)Draw (Number: boolean)OUTPUT  
PORTSTrigger (Trigger)geometry (Object)SaveCancel ChangelogPatches using Pyramid\_v2Examples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Meshes.Pyramid\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.Meshes.Pyramid\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Pyramid\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Meshes.Pyramid\\_v2](https://cables.gl/op/Ops.Gl.Meshes.Pyramid_v2)

---

## 13.56.21 QuadWarpTexture



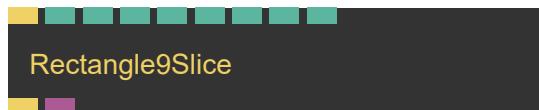
**Full Name:** Ops.Gl.Meshes.QuadWarpTexture **Description:** Full NameOps.Gl.Meshes.QuadWarpTextureVisibilityCo  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch quad warp exampleOpen In EditorINPUT PORTSrender (Trigger)Draw the  
Rectangle

**> Input Ports:** - Visit *Ops.Gl.Meshes.QuadWarpTexture documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.QuadWarpTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "QuadWarpTexture" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.QuadWarpTexture>

---

## 13.56.22 Rectangle9Slice



**Full Name:** Ops.Gl.Meshes.Rectangle9Slice **Description:** see: [https://en.wikipedia.org/wiki/9-slice\\_scaling](https://en.wikipedia.org/wiki/9-slice_scaling)

**> Input Ports:** - Visit *Ops.Gl.Meshes.Rectangle9Slice documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.Rectangle9Slice documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Rectangle9Slice" **Docs:** <https://cables.gl/op/Ops.Gl.Meshes.Rectangle9Slice>

---

### 13.56.23 RectangleFrame\_v2



**Full Name:** Ops.Gl.Meshes.RectangleFrame\_v2 **Description:** Full NameOps.Gl.Meshes.RectangleFrame\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch rectangle frame exampleOpen In EditorINPUT PORTSRender (Trigger)GeometryWidth (Number)Height (Number)Thickness (Number)Transformpivot x index (Number: integer) center left right pivot y index (Number: integer) center top bottom SectionsDraw Top (Number: boolean)Draw Bottom (Number: boolean)Draw Left (Number: boolean)Draw Right (Number: boolean)Active (Number: boolean)OUTPUT PORTStrigger (Trigger)Geometry (Object)SaveCancel ChangelogPatches using RectangleFrame\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Meshes.RectangleFrame\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.RectangleFrame\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RectangleFrame\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.RectangleFrame\\_v2](https://cables.gl/op/Ops.Gl.Meshes.RectangleFrame_v2)

---

### 13.56.24 RectangleRounded\_v2



**Full Name:** Ops.Gl.Meshes.RectangleRounded\_v2 **Description:** Full NameOps.Gl.Meshes.RectangleRounded\_v2VisibilityOp - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RectangleRounded ExampleExample patch for rounded rectangle.

**> Input Ports:** - Visit *Ops.Gl.Meshes.RectangleRounded\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.RectangleRounded\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RectangleRounded\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.RectangleRounded\\_v2](https://cables.gl/op/Ops.Gl.Meshes.RectangleRounded_v2)

---

## 13.56.25 SimpleSpline\_v2



**Full Name:** Ops.Gl.Meshes.SimpleSpline\_v2 **Description:** Full NameOps.Gl.Meshes.SimpleSpline\_v2VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch simplespline exampleOpen In EditorINPUT PORTSRender (Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Gl.Meshes.SimpleSpline\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.SimpleSpline\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SimpleSpline\_v2"

**Docs:** [https://cables.gl/op/Ops.Gl.Meshes.SimpleSpline\\_v2](https://cables.gl/op/Ops.Gl.Meshes.SimpleSpline_v2)

---

## 13.56.26 SimpleWireframe



**Full Name:** Ops.Gl.Meshes.SimpleWireframe **Description:** Render triangles of a geometry as lines

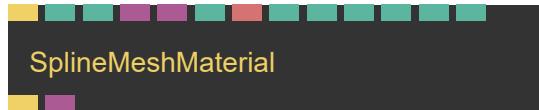
**> Input Ports:** - Visit *Ops.Gl.Meshes.SimpleWireframe documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.SimpleWireframe documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SimpleWireframe"

**Docs:** <https://cables.gl/op/Ops.Gl.Meshes.SimpleWireframe>

---

## 13.56.27 SplineMeshMaterial\_v2



**Full Name:** Ops.Gl.Meshes.SplineMeshMaterial\_v2 **Description:** Full NameOps.Gl.Meshes.SplineMeshMaterial\_v2  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatch-  
lists Documentation (markdown) Issues Example patch id Youtube ids (comma seperated) Op Licence-  
Caniuse query Example Patch SplineMesh V2 Open In Editor INPUT PORTS Render (Trigger) Width  
(Number) Width Perspective (Number: boolean) Texture Texture (Object: texture) Texture Mask (Ob-  
ject: texture) Mapping index (Number: integer) Texture Mapping (String) Colorize Texture (Number:  
boolean) Offset (Number) Color r (Number) g (Number) b (Number) a (Number) OUTPUT PORTS Trigger  
(Trigger) Shader (Object) Save Cancel Changelog Patches using SplineMeshMaterial\_v2 Examples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Gl.Meshes.SplineMeshMaterial_v2` documentation for input port details **< Output Ports:** - Visit `Ops.Gl.Meshes.SplineMeshMaterial_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for “`SplineMeshMaterial_v2`” **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.SplineMeshMaterial\\_v2](https://cables.gl/op/Ops.Gl.Meshes.SplineMeshMaterial_v2)

13.56.28 SplineMesh\_v2



**Full Name:** Ops.Gl.Meshes.SplineMesh\_v2 **Description:** Draws either one polyline (line strip) or a set of polylines, depending on whether the Points input contains an Array3 or an array of Array3.

**> Input Ports:** - Visit *Ops.Gl.Meshes.SplineMesh\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.SplineMesh\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SplineMesh\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Meshes.SplineMesh\\_v2](https://cables.gl/op/Ops.Gl.Meshes.SplineMesh_v2)

## 13.56.29 TextMesh\_v2



**Full Name:** Ops.Gl.Meshes.TextMesh\_v2 **Description:** Flat text in 3d space.

**> Input Ports:** - Visit *Ops.Gl.Meshes.TextMesh\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.TextMesh\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TextMesh\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.Meshes.TextMesh\\_v2](https://cables.gl/op/Ops.Gl.Meshes.TextMesh_v2)

---

## 13.56.30 Torus\_v3



**Full Name:** Ops.Gl.Meshes.Torus\_v3 **Description:** Full NameOps.Gl.Meshes.Torus\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Can use queryExample Patch torus exampleOpen In EditorINPUT PORTSrender (Trigger)sides  
(Number)rings (Number)innerRadius (Number)outerRadius (Number)Render mesh (Number:  
boolean)OUTPUT PORTStrigger (Trigger)geometry (Object)SaveCancel ChangelogPatches using  
Torus\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Meshes.Torus\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.Torus\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Torus\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.Meshes.Torus\\_v3](https://cables.gl/op/Ops.Gl.Meshes.Torus_v3)

---

### 13.56.31 TriangleSphere



**Full Name:** Ops.Gl.Meshes.TriangleSphere **Description:** <http://paulbourke.net/geometry/circlesphere/>

**> Input Ports:** - Visit *Ops.Gl.Meshes.TriangleSphere* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Meshes.TriangleSphere* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TriangleSphere"  
**Docs:** <https://cables.gl/op/Ops.Gl.Meshes.TriangleSphere>

---

## 13.57 Ops.Gl.Pbr

### 13.57.1 PbrEnvironmentLight



**Full Name:** Ops.Gl.Pbr.PbrEnvironmentLight **Description:** This operator is your image based lighting setup for all Ops.Gl.Pbr.PbrMaterial operators that will be located under it in your scene stack. For the highest quality, you will be using RGBE format equirectangular textures as the lighting scene input for this operator.

**> Input Ports:** - Visit *Ops.Gl.Pbr.PbrEnvironmentLight* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Pbr.PbrEnvironmentLight* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "PbrEnvironmentLight" **Docs:** <https://cables.gl/op/Ops.Gl.Pbr.PbrEnvironmentLight>

---

### 13.57.2 PbrMaterial



**Full Name:** Ops.Gl.Pbr.PbrMaterial **Description:** Can be used with Ops.Gl.Pbr.PbrEnvironmentLight for image based lighting or with standard Lights found in the op library.

> **Input Ports:** - Visit *Ops.Gl.Pbr.PbrMaterial documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Pbr.PbrMaterial documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PbrMaterial"  
**Docs:** <https://cables.gl/op/Ops.Gl.Pbr.PbrMaterial>

---

## 13.58 Ops.Gl.Phong

### 13.58.1 AmbientLight\_v4



**Full Name:** Ops.Gl.Phong.AmbientLight\_v4 **Description:** This op adds ambient background light to every mesh that uses the PhongMaterial4. It is additive and its color is not influenced by other lights.

> **Input Ports:** - Visit *Ops.Gl.Phong.AmbientLight\_v4 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Phong.AmbientLight\_v4 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AmbientLight\_v4"  
**Docs:** [https://cables.gl/op/Ops.Gl.Phong.AmbientLight\\_v4](https://cables.gl/op/Ops.Gl.Phong.AmbientLight_v4)

---

### 13.58.2 DirectionalLight\_v5



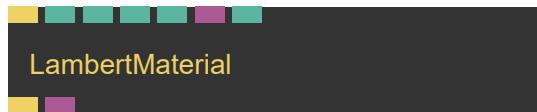
**Full Name:** Ops.Gl.Phong.DirectionalLight\_v5 **Description:** This light illuminates the whole scene. It does not have a position, only a direction. You can think of it as a sunlight.

> **Input Ports:** - Visit *Ops.Gl.Phong.DirectionalLight\_v5 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Phong.DirectionalLight\_v5 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DirectionalLight\_v5" **Docs:** [https://cables.gl/op/Ops.Gl.Phong.DirectionLight\\_v5](https://cables.gl/op/Ops.Gl.Phong.DirectionLight_v5)

---

### 13.58.3 LambertMaterial\_v2



**Full Name:** Ops.Gl.Phong.LambertMaterial\_v2 **Description:** This is a simple material to be used with lights.

**> Input Ports:** - Visit *Ops.Gl.Phong.LambertMaterial\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Phong.LambertMaterial\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "LambertMaterial\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Phong.LambertMaterial\\_v2](https://cables.gl/op/Ops.Gl.Phong.LambertMaterial_v2)

---

### 13.58.4 PhongMaterial\_v6



**Full Name:** Ops.Gl.Phong.PhongMaterial\_v6 **Description:** This is probably the most classic material of them all.

**> Input Ports:** - **texture pixel offset on the C axis (applied to all textures):** Texture Offset Y (Number) texture pixel offset on the Y axis (applied to all textures) **< Output Ports:** - Visit *Ops.Gl.Phong.PhongMaterial\_v6 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PhongMaterial\_v6" **Docs:** [https://cables.gl/op/Ops.Gl.Phong.PhongMaterial\\_v6](https://cables.gl/op/Ops.Gl.Phong.PhongMaterial_v6)

---

### 13.58.5 PointLight\_v5



**Full Name:** Ops.Gl.Phong.PointLight\_v5 **Description:** The point light illuminates in every possible direction.

► **Input Ports:** - Visit *Ops.Gl.Phong.PointLight\_v5 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.Phong.PointLight\_v5 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PointLight\_v5"

**Docs:** [https://cables.gl/op/Ops.Gl.Phong.PointLight\\_v5](https://cables.gl/op/Ops.Gl.Phong.PointLight_v5)

---

### 13.58.6 ResetLights



**Full Name:** Ops.Gl.Phong.ResetLights **Description:** Use this op to exclude parts of your render path from the lighting system.

► **Input Ports:** - Visit *Ops.Gl.Phong.ResetLights documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Gl.Phong.ResetLights documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ResetLights"

**Docs:** <https://cables.gl/op/Ops.Gl.Phong.ResetLights>

---

### 13.58.7 SpotLight\_v5



**Full Name:** Ops.Gl.Phong.SpotLight\_v5 **Description:** The spot light basically is a point light, with the difference that you can set an angle to control where the light gets cut off.

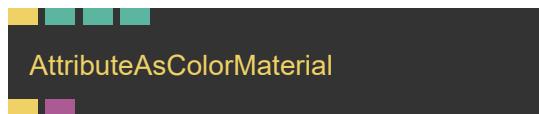
➤ **Input Ports:** - Visit *Ops.Gl.Phong.SpotLight\_v5* documentation for input port details < **Output Ports:**  
- Visit *Ops.Gl.Phong.SpotLight\_v5* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SpotLight\_v5"  
**Docs:** [https://cables.gl/op/Ops.Gl.Phong.SpotLight\\_v5](https://cables.gl/op/Ops.Gl.Phong.SpotLight_v5)

---

## 13.59 Ops.Gl.Shader

### 13.59.1 AttributeAsColorMaterial



**Full Name:** Ops.Gl.Shader.AttributeAsColorMaterial **Description:** Full NameOps.Gl.Shader.AttributeAsColorMaterial  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCanuse queryExample Patch ShowNormalsMaterialOpen In EditorINPUT PORTSrender  
(Trigger)Attribute index (Number: integer) Position TexCoords TexCoords 1 Normals Normal  
Mat Tangents BiTangents Absolute (Number: boolean)World Space (Number: boolean)OUTPUT  
PORTSTrigger (Trigger)Shader (Object)SaveCancel ChangelogPatches using AttributeAsColorMateri-  
alExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Shader.AttributeAsColorMaterial* documentation for input port details <  
**Output Ports:** - Visit *Ops.Gl.Shader.AttributeAsColorMaterial* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AttributeAsCol-  
orMaterial" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.AttributeAsColorMaterial>

---

### 13.59.2 BasicMaterial\_v3



**Full Name:** Ops.Gl.Shader.BasicMaterial\_v3 **Description:** Using the basicmaterial is an easy way to  
set the final color of objects. Despice having Basic in it's name it can be used for lots of use cases.

**> Input Ports:** - Visit `Ops.GlShader.BasicMaterial_v3` documentation for input port details **< Output Ports:** - Visit `Ops.GlShader.BasicMaterial_v3` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "BasicMaterial\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.Shader.BasicMaterial\\_v3](https://cables.gl/op/Ops.Gl.Shader.BasicMaterial_v3)

### 13.59.3 ChromaKeyMaterial

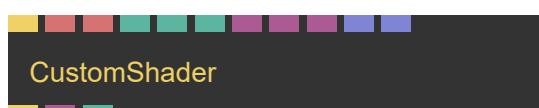


**Full Name:** Ops.Gl.Shader.ChromaKeyMaterial **Description:** Full NameOps.Gl.Shader.ChromaKeyMaterialVisibility  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists-  
Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Ca-  
niuse query Example Patch ChromaKeyMaterial Open In Editor INPUT PORTS render (Trigger) texture  
(Object) Mode index (Number: integer) weightMul (Number) r (Number) g (Number) b (Number) white  
(Number) diffuseRepeatX (Number) diffuseRepeatY (Number) Tex Offset X (Number) Tex Offset Y  
(Number) OUTPUT PORTS trigger (Trigger) Save Cancel Changelog Patches using ChromaKey Materi-  
al Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.GlShader.ChromaKeyMaterial` documentation for input port details **< Output Ports:** - Visit `Ops.GlShader.ChromaKeyMaterial` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ChromaKeyMaterial" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.ChromaKeyMaterial>

13.59.4 CustomShader v2



**Full Name:** Ops.Gl.Shader.CustomShader\_v2 **Description:** Write your own custom shader and use it as a material.

**> Input Ports:** - Visit `Ops.GlShader.CustomShader_v2` documentation for input port details **< Output Ports:** - Visit `Ops.GlShader.CustomShader_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "CustomShader\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Shader.CustomShader\\_v2](https://cables.gl/op/Ops.Gl.Shader.CustomShader_v2)

---

### 13.59.5 ErrorMaterial



ErrorMaterial

**Full Name:** `Ops.Gl.Shader.ErrorMaterial` **Description:** Full Name `Ops.Gl.Shader.ErrorMaterialVisibilityCore`  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists-  
Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Ca-  
niuse query No op example found on this server INPUT PORTS render (Trigger) OUTPUT PORTS trigger  
(Trigger) Save Cancel Changelog Patches using ErrorMaterial Examples Team cables Public My Patches  
My Ops

**> Input Ports:** - Visit `Ops.Gl.Shader.ErrorMaterial` documentation for input port details **< Output Ports:**  
- Visit `Ops.Gl.Shader.ErrorMaterial` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ErrorMaterial"  
**Docs:** <https://cables.gl/op/Ops.Gl.Shader.ErrorMaterial>

---

### 13.59.6 FrontBacksideMaterial



FrontBacksideMaterial

**Full Name:** `Ops.Gl.Shader.FrontBacksideMaterial` **Description:** green is facing front

**> Input Ports:** - Visit `Ops.Gl.Shader.FrontBacksideMaterial` documentation for input port details **< Output Ports:**  
- Visit `Ops.Gl.Shader.FrontBacksideMaterial` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "FrontBackside-  
Material" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.FrontBacksideMaterial>

---

### 13.59.7 GetShader



**Full Name:** Ops.Gl.Shader.GetShader **Description:** Full NameOps.Gl.Shader.GetShaderVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch getshader exampleOpen In EditorINPUT PORTSUpdate (Trigger)OUTPUT  
PORTSNext (Trigger)Shader (Object)SaveCancel ChangelogPatches using GetShaderExamples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Shader.GetShader* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Shader.GetShader* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GetShader" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.GetShader>

---

### 13.59.8 MatCapMaterial\_v3



**Full Name:** Ops.Gl.Shader.MatCapMaterial\_v3 **Description:** In 3D computer graphics, the appearance of an 3D object depends on several things:

**> Input Ports:** - **check to use screen space normals (flat shading):** Calc normal tangents (Number: boolean)calculate normals & tangents **< Output Ports:** - Visit *Ops.Gl.Shader.MatCapMaterial\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MatCapMaterial\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.Shader.MatCapMaterial\\_v3](https://cables.gl/op/Ops.Gl.Shader.MatCapMaterial_v3)

---

### 13.59.9 MinifyGlsl



MinifyGlsl

**Full Name:** Ops.Gl.Shader.MinifyGlsl **Description:** Full NameOps.Gl.Shader.MinifyGlslVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsJavascript Librariesglsltokenizer.js (Maps GLSL string data into GLSL tokens)Documentation  
(markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample  
Patch Shader Code MinifyOpen In EditorINPUT PORTSShader Source (String)OUTPUT PORTSMinified  
Shader Source (String)SaveCancel ChangelogPatches using MinifyGlslExamples Team cables Public  
My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Shader.MinifyGlsl documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.Shader.MinifyGlsl documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "MinifyGlsl"* **Docs:** <https://cables.gl/op/Ops.Gl.Shader.MinifyGlsl>

---

### 13.59.10 PointMaterial\_v6



PointMaterial

**Full Name:** Ops.Gl.Shader.PointMaterial\_v6 **Description:** Draw all vertices as points / circles. Combine this op with pointCloudFromArray to draw point clouds with a xyz array.

**> Input Ports:** - Visit *Ops.Gl.Shader.PointMaterial\_v6 documentation for input port details* **< Output Ports:** - Visit *Ops.Gl.Shader.PointMaterial\_v6 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "PointMaterial\_v6"* **Docs:** [https://cables.gl/op/Ops.Gl.Shader.PointMaterial\\_v6](https://cables.gl/op/Ops.Gl.Shader.PointMaterial_v6)

---

### 13.59.11 PositionAsColorMaterial

PositionAsColorMaterial

**Full Name:** Ops.Gl.Shader.PositionAsColorMaterial **Description:** Full NameOps.Gl.Shader.PositionAsColorMaterial  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch PixelColor PositionAsColorMaterial ExampleOpen In EditorINPUT  
PORTSrender (Trigger)OUTPUT PORTTrigger (Trigger)SaveCancel ChangelogPatches using Posi-  
tionAsColorMaterialExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Shader.PositionAsColorMaterial documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Shader.PositionAsColorMaterial documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PositionAsColor-  
Material" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.PositionAsColorMaterial>

---

### 13.59.12 SetShader

SetShader

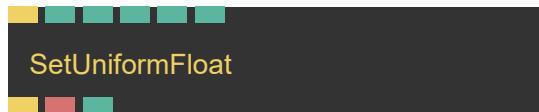
**Full Name:** Ops.Gl.Shader.SetShader **Description:** Reuse another shader at different points in the  
patch.

➤ **Input Ports:** - Visit *Ops.Gl.Shader.SetShader documentation* for input port details < **Output Ports:** -  
Visit *Ops.Gl.Shader.SetShader documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SetShader" **Docs:**  
<https://cables.gl/op/Ops.Gl.Shader.SetShader>

---

### 13.59.13 SetUniformFloat\_v2



**Full Name:** Ops.Gl.Shader.SetUniformFloat\_v2 **Description:** Full NameOps.Gl.Shader.SetUniformFloat\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example: setuniform float/textureOpen In EditorINPUT PORTSRender(Trigger)Uniform index (Number: integer)X (Number)Y (Number)Z (Number)W (Number)OUTPUT PORTSNext (Trigger)Type (String)Found (booleanNumber)SaveCancel ChangelogPatches using SetUniformFloat\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Shader.SetUniformFloat\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Shader.SetUniformFloat\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SetUniformFloat\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Shader.SetUniformFloat\\_v2](https://cables.gl/op/Ops.Gl.Shader.SetUniformFloat_v2)

---

### 13.59.14 SetUniformTexture\_v2



**Full Name:** Ops.Gl.Shader.SetUniformTexture\_v2 **Description:** Full NameOps.Gl.Shader.SetUniformTexture\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example: setuniform float/textureOpen In EditorINPUT PORTSRender(Trigger)Uniform index (Number: integer)Texture (Object:texture)OUTPUT PORTSNext (Trigger)Found (booleanNumber)SaveCancel ChangelogPatches using SetUniformTexture\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Shader.SetUniformTexture\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Shader.SetUniformTexture\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SetUniformTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Shader.SetUniformTexture\\_v2](https://cables.gl/op/Ops.Gl.Shader.SetUniformTexture_v2)

---

## 13.59.15 ShaderDefine



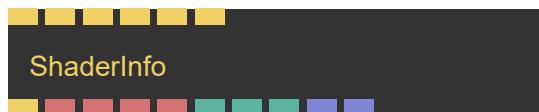
**Full Name:** Ops.Gl.Shader.ShaderDefine **Description:** Full NameOps.Gl.Shader.ShaderDefineVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSShader (Object)Name (String)Value (String)Active (Number: boolean)SaveCancel ChangelogPatches using ShaderDefineExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Shader.ShaderDefine* documentation for input port details < **Output Ports:**  
- Visit *Ops.Gl.Shader.ShaderDefine* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ShaderDefine"  
**Docs:** <https://cables.gl/op/Ops.Gl.Shader.ShaderDefine>

---

## 13.59.16 ShaderInfo



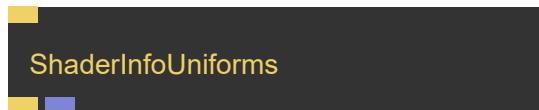
**Full Name:** Ops.Gl.Shader.ShaderInfo **Description:** Full NameOps.Gl.Shader.ShaderInfoVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSExec (Trigger>Show Fragment (Trigger>Show Vertex (Trigger>Show Modules (Trigger>Show Uniforms (Trigger>Show State Info (Trigger)OUTPUT PORTSNext (Trigger)Source Frag (String)Source Vert (String)Name (String)Id (String)needsBarycentric (boolean)Num Uniforms (Number)Num Attributes (Number)Arributes Names (Array)Num Defines (Array)SaveCancel ChangelogPatches using ShaderInfoExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.Shader.ShaderInfo* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.Shader.ShaderInfo* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ShaderInfo" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.ShaderInfo>

---

### 13.59.17 ShaderInfoUniforms\_v2



**Full Name:** Ops.Gl.Shader.ShaderInfoUniforms\_v2 **Description:** Full NameOps.Gl.Shader.ShaderInfoUniforms\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSExec (Trigger)OUTPUT PORTSNext (Trigger)Uniforms (Array)SaveCancel ChangelogPatches using ShaderInfoUniforms\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Shader.ShaderInfoUniforms\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Shader.ShaderInfoUniforms\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ShaderInfoUniforms\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Shader.ShaderInfoUniforms\\_v2](https://cables.gl/op/Ops.Gl.Shader.ShaderInfoUniforms_v2)

---

### 13.59.18 ShaderToTexture\_v2



**Full Name:** Ops.Gl.Shader.ShaderToTexture\_v2 **Description:** Designed to be mainly used with the customShader op.

**> Input Ports:** - Visit *Ops.Gl.Shader.ShaderToTexture\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Shader.ShaderToTexture\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ShaderToTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Shader.ShaderToTexture\\_v2](https://cables.gl/op/Ops.Gl.Shader.ShaderToTexture_v2)

---

## 13.59.19 VertexColorMaterial

VertexColorMaterial

**Full Name:** Ops.Gl.Shader.VertexColorMaterial **Description:** Full NameOps.Gl.Shader.VertexColorMaterialVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch gltf example: vertex colors Open In EditorINPUT PORTSrender (Trigger)opacity (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using VertexColorMaterialExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Shader.VertexColorMaterial documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Shader.VertexColorMaterial documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VertexColorMaterial" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.VertexColorMaterial>

---

## 13.59.20 VertexNumberMaterial

VertexNumberMaterial

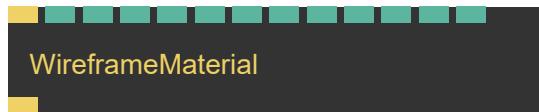
**Full Name:** Ops.Gl.Shader.VertexNumberMaterial **Description:** for use with RenderGeometry op

**> Input Ports:** - Visit *Ops.Gl.Shader.VertexNumberMaterial documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Shader.VertexNumberMaterial documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VertexNumberMaterial" **Docs:** <https://cables.gl/op/Ops.Gl.Shader.VertexNumberMaterial>

---

## 13.59.21 WireframeMaterial\_v2



**Full Name:** Ops.Gl.Shader.WireframeMaterial\_v2 **Description:** This op doesn't work yet on mobile devices.

**> Input Ports:** - Visit [Ops.Gl.Shader.WireframeMaterial\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.Shader.WireframeMaterial\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "WireframeMaterial\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Shader.WireframeMaterial\\_v2](https://cables.gl/op/Ops.Gl.Shader.WireframeMaterial_v2)

---

## 13.60 Ops.Gl.ShaderEffects

### 13.60.1 AreaDiscardPixel\_v2



**Full Name:** Ops.Gl.ShaderEffects.AreaDiscardPixel\_v2 **Description:** This op will discard pixels within the defined area.

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.AreaDiscardPixel\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ShaderEffects.AreaDiscardPixel\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "AreaDiscardPixel\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.AreaDiscardPixel\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.AreaDiscardPixel_v2)

---

### 13.60.2 AreaRotate\_v2



**Full Name:** Ops.Gl.ShaderEffects.AreaRotate\_v2 **Description:** Full NameOps.Gl.ShaderEffects.AreaRotate\_v2Vis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example: Ops.Gl.ShaderEffects.AreaRotateOpen In EditorINPUT PORTSrender (Trigger)Size (Number)Strength (Number)Smooth (Number: boolean)x (Number)y (Number)z (Number)OUTPUT PORTTrigger (Trigger)SaveCancel ChangelogPatches using AreaRotate\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.AreaRotate\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.AreaRotate\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AreaRotate\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.AreaRotate\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.AreaRotate_v2)

---

### 13.60.3 AreaScaler\_v3



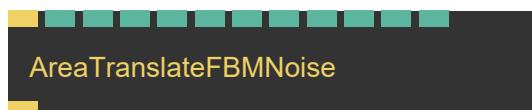
**Full Name:** Ops.Gl.ShaderEffects.AreaScaler\_v3 **Description:** Full NameOps.Gl.ShaderEffects.AreaScaler\_v3Vis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch AreaScaler exampleOpen In EditorINPUT PORTSrender (Trigger)Trigger the op

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.AreaScaler\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.AreaScaler\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AreaScaler\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.AreaScaler\\_v3](https://cables.gl/op/Ops.Gl.ShaderEffects.AreaScaler_v3)

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### 13.60.4 AreaTranslateFBMNoise

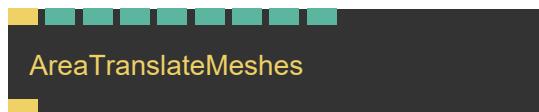


**Full Name:** Ops.Gl.ShaderEffects.AreaTranslateFBMNoise **Description:** Full NameOps.Gl.ShaderEffects.AreaTranslateFBMNoise - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryExample Patch Area Translate FBM noise op exampleOpen In EditorINPUT PORTSrender(Trigger)Trigger the op

**> Input Ports:** - Visit `Ops.Gl.ShaderEffects.AreaTranslateFBMNoise` documentation for input port details  
**< Output Ports:** - Visit `Ops.Gl.ShaderEffects.AreaTranslateFBMNoise` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "AreaTranslateFBMNoise" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.AreaTranslateFBMNoise>

### 13.60.5 AreaTranslateMeshes\_v3



**Full Name:** Ops.Gl.ShaderEffects.AreaTranslateMeshes\_v3 **Description:** Offset the position of all meshes within the spherical area of influence

**> Input Ports:** - Visit `Ops.Gl.ShaderEffects.AreaTranslateMeshes_v3` documentation for input port details  
**< Output Ports:** - Visit `Ops.Gl.ShaderEffects.AreaTranslateMeshes_v3` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "AreaTranslateMeshes v3" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.AreaTranslateMeshes\\_v3](https://cables.gl/op/Ops.Gl.ShaderEffects.AreaTranslateMeshes_v3)

## 13.60.6 Bend v2



**Full Name:** Ops.Gl.ShaderEffects.Bend\_v2 **Description:** Full NameOps.Gl.ShaderEffects.Bend\_v2VisibilityCore  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatch-  
lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence-

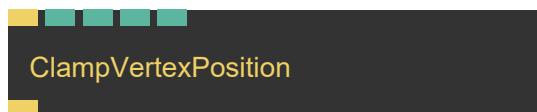
Caniuse queryExample Patch bend exampleOpen In EditorINPUT PORTSrender (Trigger)Amount (Number)RotX (Number)RotY (Number)RotZ (Number)Scale (Number)Offset (Number)Limited (Number: boolean)OUTPUT PORTTrigger (Trigger)SaveCancel ChangelogPatches using Bend\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.Bend\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.ShaderEffects.Bend\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Bend\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.Bend\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.Bend_v2)

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### 13.60.7 ClampVertexPosition\_v2



**Full Name:** Ops.Gl.ShaderEffects.ClampVertexPosition\_v2 **Description:** Full NameOps.Gl.ShaderEffects.ClampV  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch clamp vertex positionOpen In EditorINPUT PORTSrender (Trigger)Axis  
index (Number: integer)min (Number)max (Number)Update Normals (Number: boolean)OUTPUT  
PORTTrigger (Trigger)SaveCancel ChangelogPatches using ClampVertexPosition\_v2Examples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.ClampVertexPosition\\_v2 documentation](#) for input port details  
**< Output Ports:** - Visit [Ops.Gl.ShaderEffects.ClampVertexPosition\\_v2 documentation](#) for output port  
details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ClampVertexPo-  
sition\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.ClampVertexPosition\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.ClampVertexPosition_v2)

---

### 13.60.8 ColorArea\_v5



**Full Name:** Ops.Gl.ShaderEffects.ColorArea\_v5 **Description:** Full NameOps.Gl.ShaderEffects.ColorArea\_v5VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch color area shader effectOpen In EditorYoutube Video TutorialINPUT PORTSRender (Trigger)Area index (Number: integer)Size (Number)Roundness (Number)Amount (Number)Falloff (Number)Falloff Curve index (Number: integer) Linear Smoothstep pow2 pow3 Invert (Number: boolean)ColorBlend index (Number: integer) Normal Multiply Opacity Add Discard r (Number)g (Number)b (Number)Positionx (Number)y (Number)z (Number)ScaleChange Size (Number: boolean)Size X (Number)Size Y (Number)Size Z (Number)Texture (Object:texture)Space index (Number: integer) World Model UV Screen Priority (Number: boolean)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using ColorArea\_v5Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.ColorArea\_v5 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.ColorArea\_v5 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ColorArea\_v5"  
**Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.ColorArea\\_v5](https://cables.gl/op/Ops.Gl.ShaderEffects.ColorArea_v5)

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### 13.60.9 DeformArea



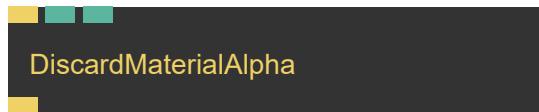
**Full Name:** Ops.Gl.ShaderEffects.DeformArea **Description:** Full NameOps.Gl.ShaderEffects.DeformAreaVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch DeformAreaOpen In EditorINPUT PORTSrender (Trigger)Size (Number)Strength (Number)Smooth (Number: boolean)WorldSpace (Number: boolean)x (Number)y (Number)z (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using DeformAreaExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.DeformArea documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.DeformArea documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DeformArea"  
**Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.DeformArea>

---

## 13.60.10 DiscardMaterialAlpha



**Full Name:** Ops.Gl.ShaderEffects.DiscardMaterialAlpha **Description:** coverage option needs MSAA enabled

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.DiscardMaterialAlpha* documentation for input port details

**< Output Ports:** - Visit *Ops.Gl.ShaderEffects.DiscardMaterialAlpha* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DiscardMaterialAlpha" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.DiscardMaterialAlpha>

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## 13.60.11 ExplodeDividedMesh\_v2



**Full Name:** Ops.Gl.ShaderEffects.ExplodeDividedMesh\_v2 **Description:** Full NameOps.Gl.ShaderEffects.ExplodeDividedMesh\_v2Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch divided mesh explosionOpen In EditorINPUT PORTSRender (Trigger)Distance (Number)Size (Number)Absolute (Number: boolean)Addadd x (Number)add y (Number)add z (Number)Multiplymul x (Number)mul y (Number)mul z (Number)Positionx (Number)y (Number)z (Number)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using ExplodeDividedMesh\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.ExplodeDividedMesh\_v2* documentation for input port details

**< Output Ports:** - Visit *Ops.Gl.ShaderEffects.ExplodeDividedMesh\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ExplodeDividedMesh\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.ExplodeDividedMesh\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.ExplodeDividedMesh_v2)

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## 13.60.12 FogEffect



**Full Name:** Ops.Gl.ShaderEffects.FogEffect **Description:** Full NameOps.Gl.ShaderEffects.FogEffectVisibilityCorOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch fogeffect exampleOpen In EditorINPUT PORTSrender (Trigger)Mode index (Number: integer)Start (Number)End (Number)Amount (Number)r (Number)g (Number)b (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using FogEffectExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.FogEffect* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.FogEffect* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FogEffect" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.FogEffect>

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## 13.60.13 FresnelGlow



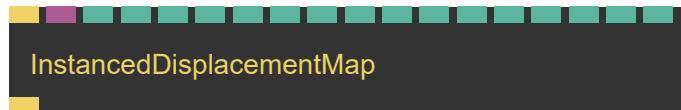
**Full Name:** Ops.Gl.ShaderEffects.FresnelGlow **Description:** Use this op to add a shimmering glow around the edges of a geometry.

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.FresnelGlow* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.FresnelGlow* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FresnelGlow" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.FresnelGlow>

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### 13.60.14 InstancedDisplacementMap\_v2

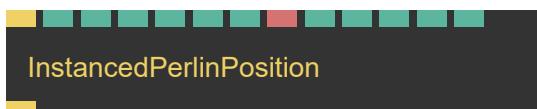


**Full Name:** Ops.Gl.ShaderEffects.InstanceDisplacementMap\_v2 **Description:** Full NameOps.Gl.ShaderEffects.In  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li  
cenceCaniuse queryExample Patch instanced displace and colorize exampleOpen In EditorINPUT  
PORTSTrigger (Trigger)Texture (Object:texture)Source index (Number: integer)Mode index (Number:  
integer)Strength (Number)Min (Number)Scale (Number)Clamp (Number: boolean)Colorize (Number:  
boolean)Debug Bounds (Number: boolean)Normalize (Number: boolean)Offset X (Number)Offset  
Y (Number)Abs (Number: boolean)Channel index (Number: integer)X (Number: boolean)Y (Number:  
boolean)Z (Number: boolean)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using  
InstanceDisplacementMap\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.InstancedDisplacementMap\\_v2](#) documentation for input port details  
**< Output Ports:** - Visit [Ops.Gl.ShaderEffects.InstancedDisplacementMap\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InstancedDisplacementMap\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.InstancedDisplacementMap\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.InstancedDisplacementMap_v2)

### **13.60.15 InstancedPerlinPosition\_v2**



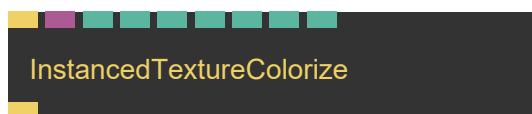
**Full Name:** Ops.Gl.ShaderEffects.InstancedPerlinPosition\_v2 **Description:** Full NameOps.Gl.ShaderEffects.InstancedPerlinPosition\_v2 - visible for everyone License MIT Author pandurg github source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch id Youtube ids (comma seperated) Op Licence Caniuse query Example Patch InstancedPerlinPosition Open In Editor INPUT PORTS Render (Trigger) Strength (Number) Scroll X (Number) Scroll Y (Number) Scroll Z (Number) Scale (Number) Method index (Number: integer) Method (String) Mul X (Number) Mul Y (Number) Mul Z (Number) Min Scale (Number) WorldSpace (Number: boolean) OUTPUT PORTS Next (Trigger) Save Cancel Changelog Patches using InstancedPerlinPosition\_v2 Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ShaderEffects.InstancedPerlinPosition\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ShaderEffects.InstancedPerlinPosition\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "InstancedPerlinPosition\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.InstancedPerlinPosition\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.InstancedPerlinPosition_v2)

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### 13.60.16 InstancedTextureColorize



**Full Name:** Ops.Gl.ShaderEffects.InstancedTextureColorize **Description:** Full NameOps.Gl.ShaderEffects.InstancedTextureColorizeOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch instanced displace and colorize exampleOpen In EditorINPUT PORTSTrigger (Trigger)Texture (Object:texture)Strength (Number)Scale (Number)Clamp (Number: boolean)Debug Bounds (Number: boolean)Offset X (Number)Offset Y (Number)Method index (Number: integer)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using InstancedTextureColorizeExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Gl.ShaderEffects.InstancedTextureColorize* documentation for input port details < **Output Ports:** - Visit *Ops.Gl.ShaderEffects.InstancedTextureColorize* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "InstancedTextureColorize" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.InstancedTextureColorize>

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### 13.60.17 LimitMeshByTexCoord



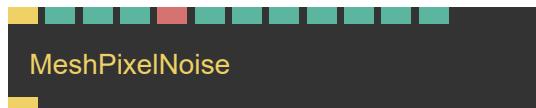
**Full Name:** Ops.Gl.ShaderEffects.LimitMeshByTexCoord **Description:** Uses on screen texture coordinates to discard a pixel if it's below a user defined threshold.

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.LimitMeshByTexCoord documentation](#) for input port details <  
**Output Ports:** - Visit [Ops.Gl.ShaderEffects.LimitMeshByTexCoord documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "LimitMeshByTexCoord"  
**Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.LimitMeshByTexCoord>

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### 13.60.18 MeshPixelNoise\_v2



**Full Name:** Ops.Gl.ShaderEffects.MeshPixelNoise\_v2 **Description:** Full NameOps.Gl.ShaderEffects.MeshPixelNoise\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch meshpixelnoise exampleOpen In EditorINPUT PORTSrender (Trigger)Scale (Number)Amount (Number)Blendmode index (Number: integer)Blendmode (String)WorldSpace (Number: boolean)Colorr (Number)g (Number)b (Number)Positionx (Number)y (Number)z (Number)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using MeshPixelNoise\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.MeshPixelNoise\\_v2 documentation](#) for input port details <  
**Output Ports:** - Visit [Ops.Gl.ShaderEffects.MeshPixelNoise\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "MeshPixelNoise\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.MeshPixelNoise\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.MeshPixelNoise_v2)

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### 13.60.19 ModuloVertexPosition



**Full Name:** Ops.Gl.ShaderEffects.ModuloVertexPosition **Description:** Full NameOps.Gl.ShaderEffects.ModuloVertexPosition  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example for ModuloVertexPositionOpen In EditorINPUT

PORTSrender (Trigger)Axis index (Number: integer)Modulo (Number)OUTPUT PORTSTTrigger (Trigger)SaveCancel ChangelogPatches using ModuloVertexPositionExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.ModuloVertexPosition documentation](#) for input port details **<**  
**Output Ports:** - Visit [Ops.Gl.ShaderEffects.ModuloVertexPosition documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ModuloVertexPosition" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.ModuloVertexPosition>

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### 13.60.20 PerlinAreaDeform\_v4



**Full Name:** Ops.Gl.ShaderEffects.PerlinAreaDeform\_v4 **Description:** Use to get a smooth perlin noise vertex displacement on a mesh.

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.PerlinAreaDeform\\_v4 documentation](#) for input port details **<**  
**Output Ports:** - Visit [Ops.Gl.ShaderEffects.PerlinAreaDeform\\_v4 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "PerlinAreaDeform\_v4" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.PerlinAreaDeform\\_v4](https://cables.gl/op/Ops.Gl.ShaderEffects.PerlinAreaDeform_v4)

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### 13.60.21 ScaleByNormal\_v2



**Full Name:** Ops.Gl.ShaderEffects.ScaleByNormal\_v2 **Description:** Full NameOps.Gl.ShaderEffects.ScaleByNormal\_v2 Op - visible for everyoneLicenseMITAuthorratsnakegithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch scale by normalOpen In EditorINPUT PORTSrender (Trigger)Strength (Number)OUTPUT PORTSTTrigger (Trigger)SaveCancel ChangelogPatches using ScaleByNormal\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ShaderEffects.ScaleByNormal\\_v2 documentation](#) for input port details <  
Output Ports: - Visit [Ops.Gl.ShaderEffects.ScaleByNormal\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ScaleByNormal\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.ScaleByNormal\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.ScaleByNormal_v2)

---

### 13.60.22 Shadow\_v3



**Full Name:** Ops.Gl.ShaderEffects.Shadow\_v3 **Description:** This op is an extension for all materials. If attached after one, the material will have the capabilities to receive shadows.

> **Input Ports:** - Visit [Ops.Gl.ShaderEffects.Shadow\\_v3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.ShaderEffects.Shadow\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Shadow\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.Shadow\\_v3](https://cables.gl/op/Ops.Gl.ShaderEffects.Shadow_v3)

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### 13.60.23 SplineDeform\_v2

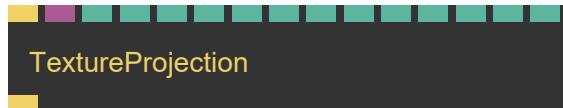


**Full Name:** Ops.Gl.ShaderEffects.SplineDeform\_v2 **Description:** Full NameOps.Gl.ShaderEffects.SplineDeform\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch spline deform meshOpen In EditorINPUT PORTSRender (Trigger)Size  
(Number)offset (Number)Points (Array)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches  
using SplineDeform\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Gl.ShaderEffects.SplineDeform\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.ShaderEffects.SplineDeform\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SplineDeform\_v2"  
**Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.SplineDeform\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.SplineDeform_v2)

## 13.60.24 TextureProjection\_v2



**Full Name:** Ops.Gl.ShaderEffects.TextureProjection\_v2 **Description:** This op allows you to project a texture onto an object such as a 3D mesh or MeshInstancer or Pointcloud. Should be placed after assigning a material.

**> Input Ports:** - Visit `Ops.Gl.ShaderEffects.TextureProjection_v2` documentation for input port details  
**Output Ports:** - Visit `Ops.Gl.ShaderEffects.TextureProjection_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TextureProjection\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.TextureProjection\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.TextureProjection_v2)

## 13.60.25 TransformTextureCoordinates



**Full Name:** Ops.Gl.ShaderEffects.TransformTextureCoordinates **Description:** Example:

**> Input Ports:** - Visit `Ops.Gl.ShaderEffects.TransformTextureCoordinates` documentation for input port details  
**< Output Ports:** - Visit `Ops.Gl.ShaderEffects.TransformTextureCoordinates` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TransformTextureCoordinates" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.TransformTextureCoordinates>

## 13.60.26 TransformVertex



**Full Name:** Ops.Gl.ShaderEffects.TransformVertex **Description:** Example:

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.TransformVertex* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.TransformVertex* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TransformVertex"

**Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.TransformVertex>

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## 13.60.27 Twist\_v3



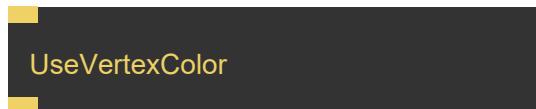
**Full Name:** Ops.Gl.ShaderEffects.Twist\_v3 **Description:** Example:

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.Twist\_v3* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.ShaderEffects.Twist\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Twist\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.Twist\\_v3](https://cables.gl/op/Ops.Gl.ShaderEffects.Twist_v3)

---

## 13.60.28 UseVertexColor



**Full Name:** Ops.Gl.ShaderEffects.UseVertexColor **Description:** currently only works with phong material

> **Input Ports:** - Visit [Ops.Gl.ShaderEffects.UseVertexColor](#) documentation for input port details < **Output Ports:** - Visit [Ops.Gl.ShaderEffects.UseVertexColor](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "UseVertexColor"

**Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.UseVertexColor>

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### 13.60.29 VertexArea



**Full Name:** Ops.Gl.ShaderEffects.VertexArea **Description:** Full NameOps.Gl.ShaderEffects.VertexAreaVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSrender (Trigger)Area index (Number: integer)Visualize Area (Number: boolean)WorldSpace (Number: boolean)x (Number)y (Number)z (Number)AreaRadius (Number)Area Size X (Number)Area Size Y (Number)Area Size Z (Number)Translate X (Number)Translate Y (Number)Translate Z (Number)Scale X (Number)Scale Y (Number)Scale Z (Number)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using VertexAreaExamples Team cables Public My Patches My Ops

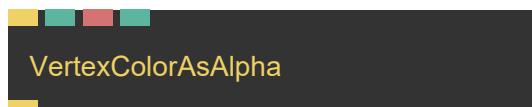
> **Input Ports:** - Visit [Ops.Gl.ShaderEffects.VertexArea](#) documentation for input port details < **Output Ports:** - Visit [Ops.Gl.ShaderEffects.VertexArea](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "VertexArea"

**Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.VertexArea>

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### 13.60.30 VertexColorAsAlpha



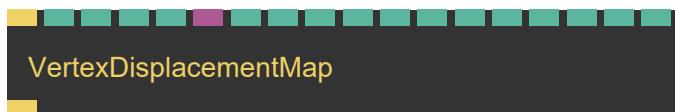
**Full Name:** Ops.Gl.ShaderEffects.VertexColorAsAlpha **Description:** Full NameOps.Gl.ShaderEffects.VertexColorAsAlphaOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-

Caniuse queryExample Patch VertexColorAsAlpha - ExampleOpen In EditorINPUT PORTSRender  
(Trigger)Input index (Number: integer)Input (String)Invert (Number: boolean)OUTPUT PORTSNext  
(Trigger)SaveCancel ChangelogPatches using VertexColorAsAlphaExamples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.VertexColorAsAlpha](#) documentation for input port details <  
**Output Ports:** - Visit [Ops.Gl.ShaderEffects.VertexColorAsAlpha](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "VertexColorAsAlpha" **Docs:** <https://cables.gl/op/Ops.Gl.ShaderEffects.VertexColorAsAlpha>

### **13.60.31 VertexDisplacementMap\_v5**

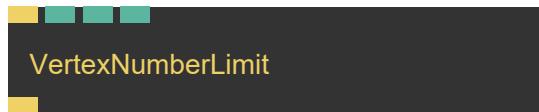


**Full Name:** Ops.Gl.ShaderEffects.VertexDisplacementMap\_v5 **Description:** Full NameOps.Gl.ShaderEffects.VertexDisplacementMap\_v5 - visible for everyone License MIT Author pandurg github source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Can use query Example Patch vertexdisplace v4 example Open In Editor Youtube Video Tutorial INPUT PORTS Render (Trigger) Extrude (Number) Mode index (Number: integer) Norm Tang BiTang Vert Col \* + / Axis index (Number: integer) XYZ XY X Y Z Coordinates index (Number: integer) Tex Coords Mesh XY Mesh XZ InputTexture (Object:texture) Channel index (Number: integer) Luminance R G B A RGB Flip index (Number: integer) None X Y XY Range index (Number: integer) 0-1 1-0 Normalized Offset X (Number) Offset Y (Number) Scale (Number) Calc Normals (Number: boolean) Normal Axis index (Number: integer) X Y Z Colorize Discard Zero Values (Number: boolean) colorize (Number: boolean) Colorize Min (Number) Colorize Max (Number) OUTPUT PORTS Trigger (Trigger) Save Cancel Changelog Patches using VertexDisplacementMap\_v5 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.ShaderEffects.VertexDisplacementMap\\_v5](#) documentation for input port details  
**< Output Ports:** - Visit [Ops.Gl.ShaderEffects.VertexDisplacementMap\\_v5](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "VertexDisplacementMap v5" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.VertexDisplacementMap\\_v5](https://cables.gl/op/Ops.Gl.ShaderEffects.VertexDisplacementMap_v5)

### 13.60.32 VertexNumberLimit\_v2



**Full Name:** Ops.Gl.ShaderEffects.VertexNumberLimit\_v2 **Description:** Full NameOps.Gl.ShaderEffects.VertexNumberLimit\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch Limitvertex ExampleOpen In EditorINPUT PORTSRender (Trigger)Min (Number: integer)Max (Number: integer)Invert (Number: boolean)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using VertexNumberLimit\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.VertexNumberLimit\_v2 documentation* for input port details  
**< Output Ports:** - Visit *Ops.Gl.ShaderEffects.VertexNumberLimit\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VertexNumberLimit\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.VertexNumberLimit\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.VertexNumberLimit_v2)

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### 13.60.33 VertexPositionFromTexture\_v2



**Full Name:** Ops.Gl.ShaderEffects.VertexPositionFromTexture\_v2 **Description:** Full NameOps.Gl.ShaderEffects.VertexPositionFromTexture\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch vertex position from shaderOpen In EditorINPUT PORTSrender (Trigger)Texture (Object:texture)Mode index (Number: integer)OUTPUT PORTSTrigger (Trigger)SaveCancel ChangelogPatches using VertexPositionFromTexture\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.ShaderEffects.VertexPositionFromTexture\_v2 documentation* for input port details  
**< Output Ports:** - Visit *Ops.Gl.ShaderEffects.VertexPositionFromTexture\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "VertexPositionFromTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.VertexPositionFromTexture\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.VertexPositionFromTexture_v2)

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### 13.60.34 VertexWobble\_v2



**Full Name:** Ops.Gl.ShaderEffects.VertexWobble\_v2 **Description:** Full NameOps.Gl.ShaderEffects.VertexWobble\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch example VertexWobbleOpen In EditorINPUT PORTSrender (Trigger)Source index (Number: integer)amount (Number)Time (Number)Scale (Number)axisX (Number: boolean)axisY (Number: boolean)axisZ (Number: boolean)Range index (Number: integer) -1 to 1 0 to 1 AreaArea index (Number: integer)Size (Number)Falloff (Number)x (Number)y (Number)z (Number)WorldSpace (Number: boolean)Invert (Number: boolean)OUTPUT PORTStrigger (Trigger)SaveCancel ChangelogPatches using VertexWobble\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Gl.ShaderEffects.VertexWobble\_v2* documentation for input port details ◀ **Output Ports:** - Visit *Ops.Gl.ShaderEffects.VertexWobble\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "VertexWobble\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.ShaderEffects.VertexWobble\\_v2](https://cables.gl/op/Ops.Gl.ShaderEffects.VertexWobble_v2)

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## 13.61 Ops.Gl.Textures

### 13.61.1 Base64ToTexture



**Full Name:** Ops.Gl.Textures.Base64ToTexture **Description:** This can be handy if you are receiving an image over an AJAXRequest and want to convert it into a texture. Keep in mind that this is a very slow

operation, so be careful with performance.

**> Input Ports:** - Visit [Ops.Gl.Textures.Base64ToTexture documentation](#) for input port details < **Output Ports:** - Visit [Ops.Gl.Textures.Base64ToTexture documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Base64ToTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.Textures.Base64ToTexture>

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### 13.61.2 ColorTexture



**Full Name:** Ops.Gl.Textures.ColorTexture **Description:** Full NameOps.Gl.Textures.ColorTextureVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch texgen ops exampleOpen In EditorINPUT PORTSr (Number)g (Number)b  
(Number)a (Number)OUTPUT PORTStexture\_out (Object)SaveCancel ChangelogPatches using  
ColorTextureExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.Textures.ColorTexture documentation](#) for input port details < **Output Ports:**  
- Visit [Ops.Gl.Textures.ColorTexture documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ColorTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.Textures.ColorTexture>

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### 13.61.3 CombineTextures



**Full Name:** Ops.Gl.Textures.CombineTextures **Description:** Full NameOps.Gl.Textures.CombineTexturesVisibility  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch combinetexOpen In EditorINPUT PORTSExecute (Trigger)Filter index  
(Number: integer)Wrap index (Number: integer)Pixel Format index (Number: integer)Size index

(Number: integer)R RedR (Object:texture)R Source index (Number: integer)R Value index (Number: integer)R Default (Number)GreenG (Object:texture)G Source index (Number: integer)G Value index (Number: integer)G Default (Number)BlueB (Object:texture)B Source index (Number: integer)B Value index (Number: integer)B Default (Number)AlphaA (Object:texture)A Source index (Number: integer)A Value index (Number: integer)A Default (Number)OUTPUT PORTSNext (Trigger)Texture (Object)SaveCancel ChangelogPatches using CombineTexturesExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.CombineTextures* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.CombineTextures* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CombineTextures"  
**Docs:** <https://cables.gl/op/Ops.Gl.Textures.CombineTextures>

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#### 13.61.4 CopyTexture\_v3



**Full Name:** Ops.Gl.Textures.CopyTexture\_v3 **Description:** Full NameOps.Gl.Textures.CopyTexture\_v3VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Can use queryExample Patch copyTextureOpen In EditorINPUT PORTSrender (Trigger)Texture (Object:texture)Alpha Mask (Object:texture)Sizeuse original size (Number: boolean)width (Number: integer)height (Number: integer)filter index (Number: integer) nearest linear mipmap Pixel Format index (Number: integer)Anisotropic index (Number: integer) 0 1 2 4 8 16 wrap index (Number: integer)Invert A (Number: boolean)Flip X (Number: boolean)Flip Y (Number: boolean)OUTPUT PORTSTrigger (Trigger)texture\_out (Object)Aspect Ratio (Number)SaveCancel ChangelogPatches using CopyTexture\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.CopyTexture\_v3* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.CopyTexture\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CopyTexture\_v3"  
**Docs:** [https://cables.gl/op/Ops.Gl.Textures.CopyTexture\\_v3](https://cables.gl/op/Ops.Gl.Textures.CopyTexture_v3)

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### 13.61.5 EmptyTexture



**Full Name:** Ops.Gl.Textures.EmptyTexture **Description:** Full NameOps.Gl.Textures.EmptyTextureVisibilityCore  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlists-Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch texgen ops example Open In Editor INPUT PORTS width (Number) height (Number) OUTPUT PORTS texture (Object) Save Cancel Changelog Patches using EmptyTexture Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.EmptyTexture documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.EmptyTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "EmptyTexture" **Docs:** <https://cables.gl/op/Ops.Gl.Textures.EmptyTexture>

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### 13.61.6 ExrTexture



**Full Name:** Ops.Gl.Textures.ExrTexture **Description:** Full NameOps.Gl.Textures.ExrTextureVisibilityCore  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatchlists Javascript Libraries fflate (High performance (de)compression) exrloader (exrloader from three.js) Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch ExrTexture Example use an EXR texture as image or as vertex coordinates

**> Input Ports:** - Visit *Ops.Gl.Textures.ExrTexture documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.ExrTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ExrTexture" **Docs:** <https://cables.gl/op/Ops.Gl.Textures.ExrTexture>

---

## 13.61.7 GraphTexture



**Full Name:** Ops.Gl.Textures.GraphTexture **Description:** Full NameOps.Gl.Textures.GraphTextureVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Elastic Easing (Bounce)Open In EditorINPUT PORTSTrigger (Trigger)value  
(Number)input value to graph. When using with repeat, use a Number Switch connected to Repeat  
Op's index to feed multiple numbers

**> Input Ports:** - Visit *Ops.Gl.Textures.GraphTexture documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.Textures.GraphTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "GraphTexture"*  
**Docs:** <https://cables.gl/op/Ops.Gl.Textures.GraphTexture>

---

## 13.61.8 Histogram



**Full Name:** Ops.Gl.Textures.Histogram **Description:** Full NameOps.Gl.Textures.HistogramVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch histogramOpen In EditorINPUT PORTSTrigger (Trigger)Texture (Ob-  
ject:texture)OUTPUT PORTSHistogram Texture (Object)Histogram Data (Object)SaveCancel Chang-  
ingPatches using HistogramExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.Histogram documentation* for input port details **< Output Ports:**  
- Visit *Ops.Gl.Textures.Histogram documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Histogram"* **Docs:**  
<https://cables.gl/op/Ops.Gl.Textures.Histogram>

---

### 13.61.9 MontageTextures\_v2



**Full Name:** Ops.Gl.Textures.MontageTextures\_v2 **Description:** Full NameOps.Gl.Textures.MontageTextures\_v2Vi  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch montage texture exampleOpen In EditorINPUT PORTSExecute  
(Trigger)Size index (Number: integer) First Single Manual Arrangement index (Number: inte-  
ger) Columns Rows Grid Overlap X Overlap Y Flip Order (Number: boolean)Width (Number:  
integer)Height (Number: integer)Filter index (Number: integer) nearest linear mipmap Wrap index  
(Number: integer)Pixel Format index (Number: integer)Texture 0 (Object:texture)Texture 1 (Ob-  
ject:texture)Texture 2 (Object:texture)Texture 3 (Object:texture)Texture 4 (Object:texture)Texture 5  
(Object:texture)Texture 6 (Object:texture)Texture 7 (Object:texture)Texture 8 (Object:texture)Texture  
9 (Object:texture)Texture 10 (Object:texture)Texture 11 (Object:texture)Texture 12 (Object:texture)Texture  
13 (Object:texture)Texture 14 (Object:texture)Texture 15 (Object:texture)OUTPUT PORTSNext  
(Trigger)Texture (Object)Columns (Number)Rows (Number)SaveCancel ChangelogPatches using  
MontageTextures\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.MontageTextures\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.MontageTextures\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MontageTextures\_v2" **Docs:** [https://cables.gl/op/Ops.Gl.Textures.MontageTextures\\_v2](https://cables.gl/op/Ops.Gl.Textures.MontageTextures_v2)

---

### 13.61.10 NoiseTexture



**Full Name:** Ops.Gl.Textures.NoiseTexture **Description:** Full NameOps.Gl.Textures.NoiseTextureVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch noisetexture exampleOpen In EditorINPUT PORTSWidth (Number:

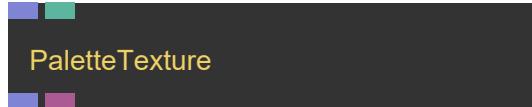
integer)Height (Number: integer)Filter index (Number: integer) nearest linear Wrap index (Number: integer)Color (Number: boolean)Pixel Format index (Number: integer)Integer (Number: boolean)Seed (Number)Channel R (Number: boolean)Min R (Number)Max R (Number)Channel G (Number: boolean)Min G (Number)Max G (Number)Channel B (Number: boolean)Min B (Number)Max B (Number)Channel A (Number: boolean)Min A (Number)Max A (Number)OUTPUT PORTSTexture (Object)Total Pixel (Number)SaveCancel ChangelogPatches using NoiseTextureExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.NoiseTexture* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.NoiseTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "NoiseTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.Textures.NoiseTexture>

---

### 13.61.11 PaletteTexture



**Full Name:** Ops.Gl.Textures.PaletteTexture **Description:** Full NameOps.Gl.Textures.PaletteTextureVisibilityCore  
Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Can use queryExample Patch Palette texture exampleOpen In EditorINPUT PORTSPalette array  
(Array)Array in which defines the palette

**> Input Ports:** - Visit *Ops.Gl.Textures.PaletteTexture* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.PaletteTexture* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PaletteTexture"  
**Docs:** <https://cables.gl/op/Ops.Gl.Textures.PaletteTexture>

---

### 13.61.12 SSAO



**Full Name:** Ops.Gl.Textures.SSAO **Description:** Full NameOps.Gl.Textures.SSAOVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch SSAO ExampleOpen In EditorINPUT PORTSEExecute (Trigger)Depth Texture (Object:texture)SSAORadius (Number)Max Dist (Number)Begin (Number)End (Number)StrengthStrength (Number)Base (Number)Filter index (Number: integer)OUTPUT PORTSNext (Trigger)SSAO (Object)SaveCancel ChangelogPatches using SSAOExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.SSAO* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.SSAO* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "SSAO" **Docs:** <https://cables.gl/op/Ops.Gl.Textures.SSAO>

---

### 13.61.13 SequenceTextures



**Full Name:** Ops.Gl.Textures.SequenceTextures **Description:** Full NameOps.Gl.Textures.SequenceTexturesVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryNo op example found on this serverINPUT PORTSTexture 0 (Object:texture)Texture 1 (Ob- ject:texture)Texture 2 (Object:texture)Texture 3 (Object:texture)Texture 4 (Object:texture)Texture 5 (Object:texture)Texture 6 (Object:texture)Texture 7 (Object:texture)Texture 8 (Object:texture)Texture 9 (Object:texture)Texture 10 (Object:texture)Texture 11 (Object:texture)Texture 12 (Object:texture)Texture 13 (Object:texture)Texture 14 (Object:texture)Texture 15 (Object:texture)OUTPUT PORTSOut- put 0 (Object)Output 1 (Object)Output 2 (Object)Output 3 (Object)Output 4 (Object)Output 5 (Object)Output 6 (Object)Output 7 (Object)Output 8 (Object)Output 9 (Object)Output 10 (Object)Output 11 (Object)Output 12 (Object)Output 13 (Object)Output 14 (Object)Output 15 (Object)SaveCancel ChangelogPatches using SequenceTexturesExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.SequenceTextures* documentation for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.SequenceTextures* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "SequenceTex-

tures” **Docs:** <https://cables.gl/op/Ops.Gl.Textures.SequenceTextures>

---

### 13.61.14 SwitchTextureMultiPort\_v2



**Full Name:** Ops.Gl.Textures.SwitchTextureMultiPort\_v2 **Description:** Full NameOps.Gl.Textures.SwitchTextureMultiPort\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch SwitchTextureMultiPort ExampleOpen In EditorINPUT PORTSIndex (Number: integer)TexturesTextures\_0 (Object)add port (Object)OUTPUT PORTSTexture (Object)Num Textures (Number)SaveCancel ChangelogPatches using SwitchTextureMultiPort\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.SwitchTextureMultiPort\_v2 documentation* for input port details <  
**Output Ports:** - Visit *Ops.Gl.Textures.SwitchTextureMultiPort\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “SwitchTextureMultiPort\_v2” **Docs:** [https://cables.gl/op/Ops.Gl.Textures.SwitchTextureMultiPort\\_v2](https://cables.gl/op/Ops.Gl.Textures.SwitchTextureMultiPort_v2)

---

### 13.61.15 SwitchTextures\_v2



**Full Name:** Ops.Gl.Textures.SwitchTextures\_v2 **Description:** Use an integer to switch between different textures

**> Input Ports:** - Visit *Ops.Gl.Textures.SwitchTextures\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Gl.Textures.SwitchTextures\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “SwitchTextures\_v2” **Docs:** [https://cables.gl/op/Ops.Gl.Textures.SwitchTextures\\_v2](https://cables.gl/op/Ops.Gl.Textures.SwitchTextures_v2)

---

### 13.61.16 TextTexture\_v6



**Full Name:** Ops.Gl.Textures.TextTexture\_v6 **Description:** Render text into a texture.

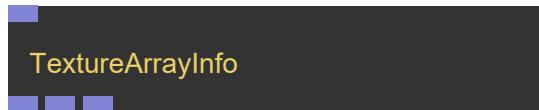
**> Input Ports:** - Visit *Ops.Gl.Textures.TextTexture\_v6 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.TextTexture\_v6 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TextTexture\_v6"

**Docs:** [https://cables.gl/op/Ops.Gl.Textures.TextTexture\\_v6](https://cables.gl/op/Ops.Gl.Textures.TextTexture_v6)

---

### 13.61.17 TextureArrayInfo



**Full Name:** Ops.Gl.Textures.TextureArrayInfo **Description:** Full NameOps.Gl.Textures.TextureArrayInfoVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Can use queryExample Patch ArrayIteratorTextures TextureArray TextureArrayInfo ExampleOpen In EditorINPUT PORTSTexture Array (Array)OUTPUT PORTSnames (Array)Widths (Array)Heights (Array)SaveCancel ChangelogPatches using TextureArrayInfoExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.TextureArrayInfo documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.TextureArrayInfo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TextureArrayInfo"

**Docs:** <https://cables.gl/op/Ops.Gl.Textures.TextureArrayInfo>

---

### 13.61.18 TextureInfo\_v2



**Full Name:** Ops.Gl.Textures.TextureInfo\_v2 **Description:** Full NameOps.Gl.Textures.TextureInfo\_v2VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch TextureInfo ExampleOpen In EditorINPUT PORTSTexture (Object:texture)OUTPUT PORTSName (String)PixelFormat (String)Width (Number)Height (Number)Ratio (Number)Filter (Number)Wrap (Number)Flipped (booleanNumber)HDR (booleanNumber)IsEmpty Default Texture (booleanNumber)Is Default Texture (booleanNumber)Is Cubemap (booleanNumber)Id (Number)SaveCancel ChangelogPatches using TextureInfo\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Gl.Textures.TextureInfo\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.TextureInfo\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "TextureInfo\_v2"*

**Docs:** [https://cables.gl/op/Ops.Gl.Textures.TextureInfo\\_v2](https://cables.gl/op/Ops.Gl.Textures.TextureInfo_v2)

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### 13.61.19 TextureSVG\_v2



**Full Name:** Ops.Gl.Textures.TextureSVG\_v2 **Description:** Full NameOps.Gl.Textures.TextureSVG\_v2VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch SVG textureOpen In EditorINPUT PORTSFile (String)File to load

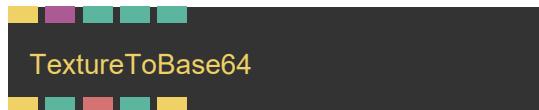
**> Input Ports:** - Visit *Ops.Gl.Textures.TextureSVG\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.TextureSVG\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "TextureSVG\_v2"*

**Docs:** [https://cables.gl/op/Ops.Gl.Textures.TextureSVG\\_v2](https://cables.gl/op/Ops.Gl.Textures.TextureSVG_v2)

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## 13.61.20 TextureToBase64\_v5



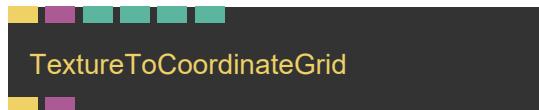
**Full Name:** Ops.Gl.Textures.TextureToBase64\_v5 **Description:** This can be handy if you want to send a texture as an image over an AJAXRequest. Keep in mind that this is a very slow operation, so be careful with performance.

**> Input Ports:** - Visit [Ops.Gl.Textures.TextureToBase64\\_v5 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.Textures.TextureToBase64\\_v5 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TextureToBase64\_v5" **Docs:** [https://cables.gl/op/Ops.Gl.Textures.TextureToBase64\\_v5](https://cables.gl/op/Ops.Gl.Textures.TextureToBase64_v5)

---

## 13.61.21 TextureToCoordinateGrid



**Full Name:** Ops.Gl.Textures.TextureToCoordinateGrid **Description:** Full NameOps.Gl.Textures.TextureToCoordinateGridOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch TextureToCoordinateGrid ExampleOpen In EditorYoutube Video TutorialINPUT PORTSExecute (Trigger)Texture (Object:texture)Aspect (Number)Threshold (Number)Repeats (Number: integer)Repeats Spacing (Number)OUTPUT PORTSNext (Trigger)HDR Texture (Object)SaveCancel ChangelogPatches using TextureToCoordinateGridExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Gl.Textures.TextureToCoordinateGrid documentation](#) for input port details **< Output Ports:** - Visit [Ops.Gl.Textures.TextureToCoordinateGrid documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TextureToCoordinateGrid" **Docs:** <https://cables.gl/op/Ops.Gl.Textures.TextureToCoordinateGrid>

---

## 13.61.22 VideoTexture\_v3



**Full Name:** Ops.Gl.Textures.VideoTexture\_v3 **Description:** Full NameOps.Gl.Textures.VideoTexture\_v3VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch VideoTexture ExampleOpen In EditorINPUT PORTSUpdate (Trigger)file (String)File to play

**> Input Ports:** - Visit *Ops.Gl.Textures.VideoTexture\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.VideoTexture\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VideoTexture\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.Textures.VideoTexture\\_v3](https://cables.gl/op/Ops.Gl.Textures.VideoTexture_v3)

---

## 13.61.23 WebcamTexture\_v3



**Full Name:** Ops.Gl.Textures.WebcamTexture\_v3 **Description:** you need https for webcam to work on many browsers

**> Input Ports:** - Visit *Ops.Gl.Textures.WebcamTexture\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Gl.Textures.WebcamTexture\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "WebcamTexture\_v3" **Docs:** [https://cables.gl/op/Ops.Gl.Textures.WebcamTexture\\_v3](https://cables.gl/op/Ops.Gl.Textures.WebcamTexture_v3)

---

## 13.62 Ops.Graphics

### 13.62.1 ArrayToExr



ArrayToExr

**Full Name:** Ops.Graphics.ArrayToExr **Description:** Full NameOps.Graphics.ArrayToExrVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
CreditsUses three.js .exr exporter by mr doobDocumentation (markdown)IssuesExample patch idY-  
outube ids (comma seperated)Op LicenceCaniuse queryExample Patch EXR File DownloadOpen In  
EditorINPUT PORTSArray (Array)Width (Number: integer)Height (Number: integer)ZIP compression  
(Number: boolean)Filename (String)Download (Trigger)SaveCancel ChangelogPatches using Array-  
ToExrExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Graphics.ArrayToExr documentation* for input port details < **Output Ports:** - Visit *Ops.Graphics.ArrayToExr documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ArrayToExr"  
**Docs:** <https://cables.gl/op/Ops.Graphics.ArrayToExr>

---

### 13.62.2 DepthTest



DepthTest

**Full Name:** Ops.Graphics.DepthTest **Description:** Full NameOps.Graphics.DepthTestVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch depth test exampleOpen In EditorINPUT PORTSRender (Trigger)Enable  
depth testing (Number: boolean)Depth Test Method index (Number: integer)Write to depth buffer  
(Number: boolean)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using DepthTestEx-  
amples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Graphics.DepthTest documentation* for input port details < **Output Ports:** - Visit *Ops.Graphics.DepthTest documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DepthTest" **Docs:** <https://cables.gl/op/Ops.Graphics.DepthTest>

---

### 13.62.3 GeometryMergeSimple



**Full Name:** Ops.Graphics.GeometryMergeSimple **Description:** Full NameOps.Graphics.GeometryMergeSimpleVisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch GeometryMergeSimpleOpen In EditorINPUT PORTSGeometry (Object)Geometry 2 (Object)OUTPUT PORTSGeometry Result (Object)SaveCancel ChangelogPatches using GeometryMergeSimpleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.GeometryMergeSimple* documentation for input port details **< Output Ports:** - Visit *Ops.Graphics.GeometryMergeSimple* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "GeometryMergeSimple" **Docs:** <https://cables.gl/op/Ops.Graphics.GeometryMergeSimple>

---

### 13.62.4 GetMaterialId



**Full Name:** Ops.Graphics.GetMaterialId **Description:** this can be a value in a render2textures target

**> Input Ports:** - Visit *Ops.Graphics.GetMaterialId* documentation for input port details **< Output Ports:** - Visit *Ops.Graphics.GetMaterialId* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "GetMaterialId" **Docs:** <https://cables.gl/op/Ops.Graphics.GetMaterialId>

---

### 13.62.5 GetObjectId



**Full Name:** Ops.Graphics.GetObjectId **Description:** this can be a target for a render2texture data texture

➤ **Input Ports:** - Visit *Ops.Graphics.GetObjectId documentation* for input port details < **Output Ports:** - Visit *Ops.Graphics.GetObjectId documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GetObjectId"  
**Docs:** <https://cables.gl/op/Ops.Graphics.GetObjectId>

---

### 13.62.6 OrbitControls\_v3



**Full Name:** Ops.Graphics.OrbitControls\_v3 **Description:** Adds mouse-interactivity to your patch. After you added the OrbitControls-op you can rotate the viewport by dragging with the mouse and zoom in / out using the mouse wheel.

➤ **Input Ports:** - Visit *Ops.Graphics.OrbitControls\_v3 documentation* for input port details < **Output Ports:** - Visit *Ops.Graphics.OrbitControls\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "OrbitControls\_v3"  
**Docs:** [https://cables.gl/op/Ops.Graphics.OrbitControls\\_v3](https://cables.gl/op/Ops.Graphics.OrbitControls_v3)

---

### 13.62.7 Transform



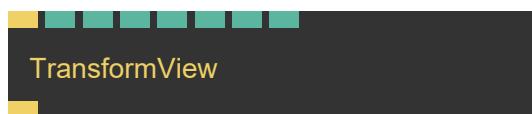
**Full Name:** Ops.Graphics.Transform **Description:** All objects which are drawn after will be affected by this (translated, rotated and scaled).

> **Input Ports:** - Visit *Ops.Graphics.Transform* documentation for input port details < **Output Ports:** - Visit *Ops.Graphics.Transform* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Transform" **Docs:** <https://cables.gl/op/Ops.Graphics.Transform>

---

## 13.62.8 TransformView



**Full Name:** Ops.Graphics.TransformView **Description:** Full Name Ops.Graphics.TransformViewVisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch id Youtube ids (comma seperated) Op Licence Can i use query Example Patch TransformView Example Open In Editor Youtube Video Tutorial INPUT PORTS render (Trigger) Position posX (Number) posY (Number) posZ (Number) Scale scale (Number) Rotation rotX (Number) rotY (Number) rotZ (Number) OUTPUT PORTS Trigger (Trigger) Save Cancel Change log Patches using TransformView Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Graphics.TransformView* documentation for input port details < **Output Ports:** - Visit *Ops.Graphics.TransformView* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TransformView" **Docs:** <https://cables.gl/op/Ops.Graphics.TransformView>

---

## 13.63 Ops.Graphics.Geometry

### 13.63.1 AlignGeometry



**Full Name:** Ops.Graphics.Geometry.AlignGeometry **Description:** Very handy op to change the center and pivot point of a shape or model.

> **Input Ports:** - Visit *Ops.Graphics.Geometry.AlignGeometry* documentation for input port details < **Output Ports:** - Visit *Ops.Graphics.Geometry.AlignGeometry* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AlignGeometry"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.AlignGeometry>

---

### 13.63.2 BoundingBox



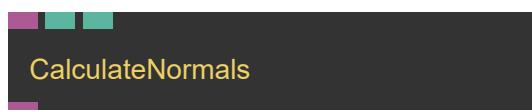
**Full Name:** Ops.Graphics.Geometry.BoundingBox **Description:** Full NameOps.Graphics.Geometry.BoundingBoxVis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSWidth (Number)Height (Number)Depth  
(Number)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using BoundingBoxExamples  
Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Graphics.Geometry.BoundingBox* documentation for input port details < **Output Ports:** - Visit *Ops.Graphics.Geometry.BoundingBox* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BoundingBox"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.BoundingBox>

---

### 13.63.3 CalculateNormals



**Full Name:** Ops.Graphics.Geometry.CalculateNormals **Description:** Full NameOps.Graphics.Geometry.CalculateN  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSGeometry (Object)Smooth (Number):

boolean)Force Z Up (Number: boolean)OUTPUT PORTSGeometry Out (Object)SaveCancel ChangelogPatches using CalculateNormalsExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Graphics.Geometry.CalculateNormals documentation* for input port details <

**Output Ports:** - Visit *Ops.Graphics.Geometry.CalculateNormals documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CalculateNormals" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.CalculateNormals>

---

#### 13.63.4 DivideGeometry



**Full Name:** Ops.Graphics.Geometry.DivideGeometry **Description:** Full NameOps.Graphics.Geometry.DivideGeometryOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch divided mesh explosionOpen In EditorINPUT PORTSGeometry (Object)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using DivideGeometryExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Graphics.Geometry.DivideGeometry documentation* for input port details <

**Output Ports:** - Visit *Ops.Graphics.Geometry.DivideGeometry documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DivideGeometry" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.DivideGeometry>

---

#### 13.63.5 FlipNormals



**Full Name:** Ops.Graphics.Geometry.FlipNormals **Description:** Full NameOps.Graphics.Geometry.FlipNormalsVisibOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch FlipNormals exampleOpen In EditorINPUT PORTSGeometry (Object)Flip

(Number: boolean)Normalize (Number: boolean)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using FlipNormalsExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Graphics.Geometry.FlipNormals documentation* for input port details < **Output Ports:** - Visit *Ops.Graphics.Geometry.FlipNormals documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FlipNormals"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.FlipNormals>

---

### 13.63.6 FreezeMeshes



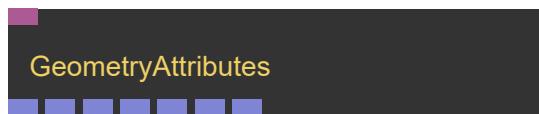
**Full Name:** Ops.Graphics.Geometry.FreezeMeshes **Description:** this currently does not work with mesh instancers

> **Input Ports:** - Visit *Ops.Graphics.Geometry.FreezeMeshes documentation* for input port details < **Output Ports:** - Visit *Ops.Graphics.Geometry.FreezeMeshes documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FreezeMeshes"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.FreezeMeshes>

---

### 13.63.7 GeometryAttributes



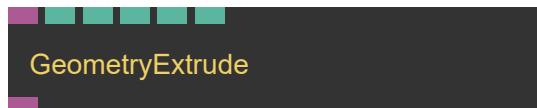
**Full Name:** Ops.Graphics.Geometry.GeometryAttributes **Description:** Full NameOps.Graphics.GeometryOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch geometry points exampleOpen In EditorINPUT PORTSGeometry (Object)OUTPUT PORTSFaces (Array)Vertices (Array)Normals (Array)TexCoords (Array)Vertex Colors (Array)Tangents (Array)BiTangents (Array)SaveCancel ChangelogPatches using GeometryAttribute-Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Graphics.Geometry.GeometryAttributes` documentation for input port details <  
**Output Ports:** - Visit `Ops.Graphics.Geometry.GeometryAttributes` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "GeometryAttributes"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.GeometryAttributes>

---

### 13.63.8 GeometryExtrude



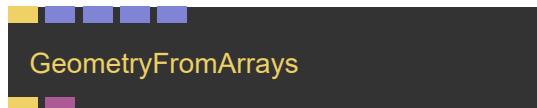
**Full Name:** `Ops.Graphics.GeometryExtrude` **Description:** Full Name `Ops.Graphics.GeometryExtrude`  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Can i use query Example Patch opentype example Open In Editor INPUT PORTS Geometry (Object) Height (Number) Smooth (Number: boolean) Walls (Number: boolean) Top (Number: boolean) Bottom (Number: boolean) OUTPUT PORTS Result Geometry (Object) Save Cancel Change log Patches using GeometryExtrude Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Graphics.GeometryExtrude` documentation for input port details <  
**Output Ports:** - Visit `Ops.Graphics.GeometryExtrude` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "GeometryExtrude"  
**Docs:** <https://cables.gl/op/Ops.Graphics.GeometryExtrude>

---

### 13.63.9 GeometryFromArrays



**Full Name:** `Ops.Graphics.Geometry.GeometryFromArrays` **Description:** Full Name `Ops.Graphics.Geometry.GeometryFromArrays`  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Can i use query Example Patch GeometryFromArrays Open In Editor INPUT PORTS Render (Trigger) Vertices (Array) Faces (Array) Texture Coords (Array) Normals (Array) OUTPUT PORTS Next (Trigger) Geometry

(Object)SaveCancel ChangelogPatches using GeometryFromArraysExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Graphics.Geometry.GeometryFromArrays documentation* for input port details  
< **Output Ports:** - Visit *Ops.Graphics.Geometry.GeometryFromArrays documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GeometryFromArrays" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.GeometryFromArrays>

---

### 13.63.10 GeometryInfo



**Full Name:** Ops.Graphics.Geometry.GeometryInfo **Description:** Full NameOps.Graphics.Geometry.GeometryInfoV  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSGeometry (Object:geometry)OUTPUT  
PORTSIndexed (Number)Faces (Number)Indices (Number)Vertices (Number)Normals (Num-  
ber)TexCoords (Number)Tangents (Number)BiTangents (Number)VertexColors (Number)Other  
Attributes (Number)SaveCancel ChangelogPatches using GeometryInfoExamples Team cables Public  
My Patches My Ops

> **Input Ports:** - Visit *Ops.Graphics.Geometry.GeometryInfo documentation* for input port details < **Output Ports:** - Visit *Ops.Graphics.Geometry.GeometryInfo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GeometryInfo"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.GeometryInfo>

---

### 13.63.11 GeometryMerge



**Full Name:** Ops.Graphics.GeometryMerge **Description:** Full NameOps.Graphics.GeometryMergeOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch geometry merge exampleOpen In EditorINPUT PORTSGeometry (Object)Geometry 2 (Object)Merge (Trigger)Reset (Trigger)OUTPUT PORTSGeometry Result (Object)SaveCancel ChangelogPatches using GeometryMergeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.GeometryMerge* documentation for input port details <  
**Output Ports:** - Visit *Ops.Graphics.GeometryMerge* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GeometryMerge"

**Docs:** <https://cables.gl/op/Ops.Graphics.GeometryMerge>

---

### 13.63.12 GeometryToObj



GeometryToObj

**Full Name:** Ops.Graphics.GeometryToObj **Description:** Full NameOps.Graphics.GeometryToObjOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch geometry freeze and .objOpen In EditorINPUT PORTSGeometry (Object:geometry)OUTPUT PORTSObj (String)SaveCancel ChangelogPatches using GeometryToObjExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.GeometryToObj* documentation for input port details <  
**Output Ports:** - Visit *Ops.Graphics.GeometryToObj* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GeometryToObj"

**Docs:** <https://cables.gl/op/Ops.Graphics.GeometryToObj>

---

### 13.63.13 GeometryToWireframeArray3

GeometryToWireframeArray3

**Full Name:** Ops.Graphics.Geometry.GeometryToWireframeArray3 **Description:** Full NameOps.Graphics.Geometry.Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Geometry To WireframeArrayOpen In EditorINPUT PORTSGeometry (Object)OUTPUT PORTSArray (Array)SaveCancel ChangelogPatches using GeometryToWireframeArray3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Geometry.GeometryToWireframeArray3 documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Geometry.GeometryToWireframeArray3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GeometryToWireframeArray3" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.GeometryToWireframeArray3>

---

### 13.63.14 GeometryUnIndex

GeometryUnIndex

**Full Name:** Ops.Graphics.Geometry.GeometryUnIndex **Description:** Full NameOps.Graphics.Geometry.UnIndexOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSGeometry (Object:geometry)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using GeometryUnIndexExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Geometry.GeometryUnIndex documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Geometry.GeometryUnIndex documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GeometryUnIndex" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.GeometryUnIndex>

---

### 13.63.15 ObjGeometry



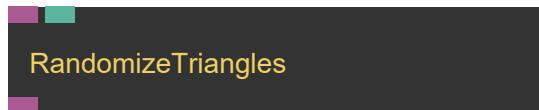
**Full Name:** Ops.Graphics.Geometry.ObjGeometry **Description:** Full NameOps.Graphics.Geometry.ObjGeometryVis  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists-  
Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op LicenceCa-  
niuse query Example Patch ObjGeometry Example Open In Editor INPUT PORTS Obj (String) OUTPUT  
PORTSGeometry (Object) Status (String) Save Cancel Changelog Patches using ObjGeometry Examples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Geometry.ObjGeometry documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Geometry.ObjGeometry documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjGeometry"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.ObjGeometry>

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### 13.63.16 RandomizeTriangles



**Full Name:** Ops.Graphics.Geometry.RandomizeTriangles **Description:** Full NameOps.Graphics.Geometry.Randomi  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists-  
Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op LicenceCa-  
niuse query Example Patch Limitvertex Example Open In Editor INPUT PORTSGeometry (Object) Seed  
(Number) OUTPUT PORTS Result (Object) Save Cancel Changelog Patches using RandomizeTriangles Ex-  
amples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Geometry.RandomizeTriangles documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Geometry.RandomizeTriangles documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomizeTrian-  
gles" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.RandomizeTriangles>

---

### 13.63.17 ReverseVertices



ReverseVertices

**Full Name:** Ops.Graphics.Geometry.ReverseVertices **Description:** Full NameOps.Graphics.Geometry.ReverseVerticesOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch reverse vertex orderOpen In EditorINPUT PORTSGeometry (Object)Flip (Number: boolean)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using ReverseVerticesExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Geometry.ReverseVertices* documentation for input port details <

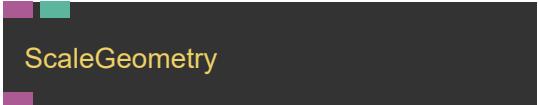
**Output Ports:** - Visit *Ops.Graphics.Geometry.ReverseVertices* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ReverseVertices"

**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.ReverseVertices>

---

### 13.63.18 ScaleGeometry



ScaleGeometry

**Full Name:** Ops.Graphics.Geometry.ScaleGeometry **Description:** Full NameOps.Graphics.Geometry.ScaleGeometryOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSGeometry (Object)Scale (Number)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using ScaleGeometryExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Geometry.ScaleGeometry* documentation for input port details < **Output Ports:**

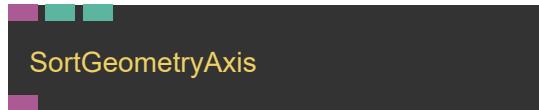
- Visit *Ops.Graphics.Geometry.ScaleGeometry* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ScaleGeometry"

**Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.ScaleGeometry>

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## 13.63.19 SortGeometryAxis



**Full Name:** Ops.Graphics.Geometry.SortGeometryAxis **Description:** Full NameOps.Graphics.Geometry.SortGeometryAxis Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query No op example found on this server INPUT PORTS Geometry (Object) Sort index (Number: integer) Reverse (Number: boolean) OUTPUT PORTS Result (Object) Save Cancel Changelog Patches using SortGeometryAxis Examples Team cables Public My Patches My Ops

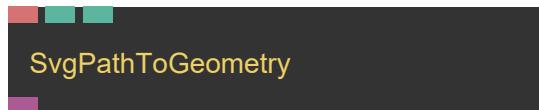
**> Input Ports:** - Visit *Ops.Graphics.Geometry.SortGeometryAxis* documentation for input port details **<**

**Output Ports:** - Visit *Ops.Graphics.Geometry.SortGeometryAxis* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SortGeometryAxis" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.SortGeometryAxis>

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## 13.63.20 SvgPathToGeometry\_v2



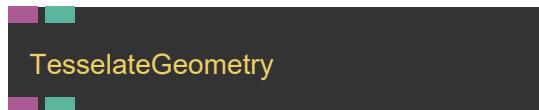
**Full Name:** Ops.Graphics.Geometry.SvgPathToGeometry\_v2 **Description:** Full NameOps.Graphics.Geometry.SvgPathToGeometry\_v2 Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Javascript Libraries [searcut.js](#) (polygon triangulation library) Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch openType example Open In Editor INPUT PORTS SVG Path (String) Bezier Stepsize (Number) Rescale (Number) OUTPUT PORTS Geometry (Object) Save Cancel Changelog Patches using SvgPathToGeometry\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Geometry.SvgPathToGeometry\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Graphics.Geometry.SvgPathToGeometry\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SvgPathToGeometry\_v2" **Docs:** [https://cables.gl/op/Ops.Graphics.Geometry.SvgPathToGeometry\\_v2](https://cables.gl/op/Ops.Graphics.Geometry.SvgPathToGeometry_v2)

---

### 13.63.21 TesselateGeometry



**Full Name:** Ops.Graphics.Geometry.TesselateGeometry **Description:** Full NameOps.Graphics.Geometry.TesselateOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Limitvertex ExampleOpen In EditorINPUT PORTSGeometry (Object)Iterations (Number: integer)OUTPUT PORTSResult (Object)Num Vertices (Number)SaveCancel ChangelogPatches using TesselateGeometryExamples Team cables Public My Patches My Ops

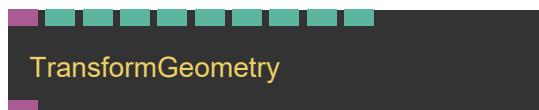
**> Input Ports:** - Visit *Ops.Graphics.Geometry.TesselateGeometry documentation* for input port details **<**

**Output Ports:** - Visit *Ops.Graphics.Geometry.TesselateGeometry documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TesselateGeometry" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.TesselateGeometry>

---

### 13.63.22 TransformGeometry



**Full Name:** Ops.Graphics.Geometry.TransformGeometry **Description:** Full NameOps.Graphics.Geometry.TransformOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch transform geometry exampleOpen In EditorINPUT PORTSGeometry (Object)Translate X (Number)Translate Y (Number)Translate Z (Number)Scale X (Number)Scale Y (Number)Scale Z (Number)Rotation X (Number)Rotation Y (Number)Rotation Z (Number)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using TransformGeometryExamples Team cables Public My Patches My Ops

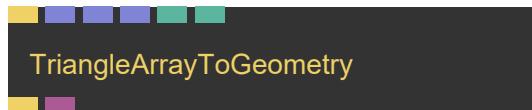
**> Input Ports:** - Visit *Ops.Graphics.Geometry.TransformGeometry documentation* for input port details **<**

**Output Ports:** - Visit *Ops.Graphics.Geometry.TransformGeometry documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TransformGeometry" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.TransformGeometry>

---

### 13.63.23 TriangleArrayToGeometry\_v2



**Full Name:** Ops.Graphics.Geometry.TriangleArrayToGeometry\_v2 **Description:** Array length should be a multiple of 9.

► **Input Ports:** - Visit [Ops.Graphics.Geometry.TriangleArrayToGeometry\\_v2 documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Graphics.Geometry.TriangleArrayToGeometry\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriangleArrayToGeometry\_v2" **Docs:** [https://cables.gl/op/Ops.Graphics.Geometry.TriangleArrayToGeometry\\_v2](https://cables.gl/op/Ops.Graphics.Geometry.TriangleArrayToGeometry_v2)

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### 13.63.24 Triangulate2dPath



**Full Name:** Ops.Graphics.Geometry.Triangulate2dPath **Description:** Full NameOps.Graphics.Geometry.Triangulate2dPathOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistssJavascript Librariestess2 (The tess2.js library performs polygon boolean operations and tesselation to triangles and convex polygons.)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Triangulare 2d Shape ExampleOpen In EditorINPUT PORTSUpdate (Trigger)Combine index (Number: integer)2d Point Path (Array)Path 2 (Array)Path 3 (Array)OUTPUT PORTSNext (Trigger)Geometry (Object)SaveCancel ChangelogPatches using Triangulate2dPathExamples Team cables Public My Patches My Ops

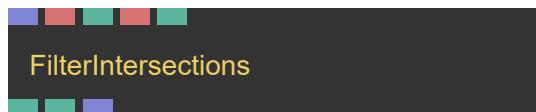
► **Input Ports:** - Visit [Ops.Graphics.Geometry.Triangulate2dPath documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Graphics.Geometry.Triangulate2dPath documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Triangulate2dPath" **Docs:** <https://cables.gl/op/Ops.Graphics.Geometry.Triangulate2dPath>

---

## 13.64 Ops.Graphics.Intersection

### 13.64.1 FilterIntersections



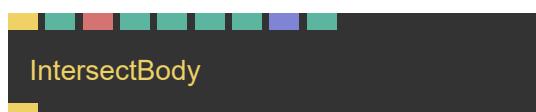
**Full Name:** Ops.Graphics.Intersection.FilterIntersections **Description:** Full NameOps.Graphics.Intersection.Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverYoutube Video TutorialINPUT PORTSCollisions (Array)Name 1 (String)Match Name 1 index (Number: integer)Name 2 (String)Match Name 2 index (Number: integer)OUTPUT PORTSColliding (booleanNumber)Num Collisions (Number)Result Collisions (Array)SaveCancel ChangelogPatches using FilterIntersectionsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Graphics.Intersection.FilterIntersections` documentation for input port details **< Output Ports:** - Visit `Ops.Graphics.Intersection.FilterIntersections` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "FilterIntersections" **Docs:** <https://cables.gl/op/Ops.Graphics.Intersection.FilterIntersections>

---

### 13.64.2 IntersectBody



**Full Name:** Ops.Graphics.Intersection.IntersectBody **Description:** Full NameOps.Graphics.Intersection.Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsIntersect Ops ExamplesDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Intersections ExampleOpen In EditorYoutube

Video Tutorial INPUT PORTS Trigger (Trigger) Shape index (Number: integer) Sphere Box AA Point Name (String) Radius (Number) Size X (Number) Size Y (Number) Size Z (Number) Array Positions (Array) Append Index to name (Number: boolean) OUTPUT PORTS Next (Trigger) Save Cancel Changelog Patches using IntersectBody Intersect Ops Examples (3) Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Graphics.Intersection.IntersectBody documentation](#) for input port details

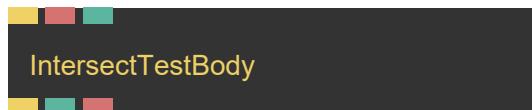
**Output Ports:** - Visit [Ops.Graphics.Intersection.IntersectBody documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "IntersectBody"

**Docs:** <https://cables.gl/op/Ops.Graphics.Intersection.IntersectBody>

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### 13.64.3 IntersectTestBody



**Full Name:** Ops.Graphics.Intersection.IntersectTestBody **Description:** Full Name Ops.Graphics.Intersection.IntersectTestBody Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch lists Documentation (markdown) Issues Example patch id Youtube ids (comma separated) Op Licence Caniuse query Example Patch IntersectBody Test example Open In Editor INPUT PORTS Trigger (Trigger) Name (String) Active (Number: boolean) OUTPUT PORTS Next (Trigger) Has Hit (boolean Number) Hit Body Name (String) Save Cancel Changelog Patches using IntersectTestBody Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Graphics.Intersection.IntersectTestBody documentation](#) for input port details

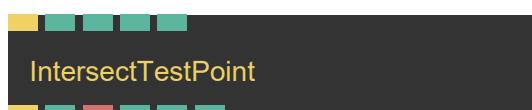
**Output Ports:** - Visit [Ops.Graphics.Intersection.IntersectTestBody documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "IntersectTestBody"

**Docs:** <https://cables.gl/op/Ops.Graphics.Intersection.IntersectTestBody>

---

### 13.64.4 IntersectTestPoint



**Full Name:** Ops.Graphics.Intersection.IntersectTestPoint **Description:** Full NameOps.Graphics.Intersection.InOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch intersectTestPoint Open In EditorINPUT PORTSTTrigger (Trigger)X (Number)Y (Number)Z (Number)Active (Number: boolean)OUTPUT PORTSNext (Trigger)Has Hit (boolean-Number)Hit Body Name (String)Hit X (Number)Hit Y (Number)Hit Z (Number)SaveCancel Changelog-Patches using IntersectTestPointExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Graphics.Intersection.IntersectTestPoint documentation for input port details* <   
 **Output Ports:** - Visit *Ops.Graphics.Intersection.IntersectTestPoint documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "IntersectTestPoint"* **Docs:** <https://cables.gl/op/Ops.Graphics.Intersection.IntersectTestPoint>

---

### 13.64.5 IntersectTestRaycast



**Full Name:** Ops.Graphics.Intersection.IntersectTestRaycast **Description:** Full NameOps.Graphics.Intersection.Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsIntersect Ops ExamplesDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Intersections ExampleOpen In EditorYoutube Video TutorialINPUT PORTSTTrigger (Trigger)Coordinate Format index (Number: integer) -1 to 1 XYZ-XYZ X (Number)Y (Number)Z (Number)To X (Number)To Y (Number)To Z (Number)Active (Number: boolean)Change Cursor (Number: boolean)OUTPUT PORTSNext (Trigger)Has Hit (boolean-Number)Hit Body Name (String)Hit X (Number)Hit Y (Number)Hit Z (Number)SaveCancel ChangelogPatches using IntersectTestRaycastIntersect Ops Examples (3)Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Graphics.Intersection.IntersectTestRaycast documentation for input port details* < **Output Ports:** - Visit *Ops.Graphics.Intersection.IntersectTestRaycast documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "IntersectTestRaycast"* **Docs:** <https://cables.gl/op/Ops.Graphics.Intersection.IntersectTestRaycast>

---

## 13.64.6 IntersectWorld



**Full Name:** Ops.Graphics.Intersection.IntersectWorld **Description:** Full NameOps.Graphics.Intersection.Interse  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsIntersect Ops ExamplesDocumentation (markdown)IssuesExample patch idYoutube ids (comma  
seperated)Op LicenceCaniuse queryExample Patch Intersections ExampleOpen In EditorYoutube  
Video TutorialINPUT PORTSTrigger (Trigger)Check Body Collisions (Number: boolean)OUTPUT  
PORTSNext (Trigger)Total Bodies (Number)Collisions (Array)SaveCancel ChangelogPatches using  
IntersectWorldIntersect Ops Examples (3)Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Intersection.IntersectWorld documentation for input port details* <  
**Output Ports:** - Visit *Ops.Graphics.Intersection.IntersectWorld documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IntersectWorld"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Intersection.IntersectWorld>

---

## 13.65 Ops.Graphics.Meshes

### 13.65.1 CablesLogo



**Full Name:** Ops.Graphics.Meshes.CablesLogo **Description:** Full NameOps.Graphics.Meshes.CablesLogoVisibilityCo  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown) IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch cableslogoOpen In EditorINPUT PORTSrender (Trigger)Scale (Num-  
ber)Draw (Number: boolean)OUTPUT PORTStrigger (Trigger)Geometry (Object)SaveCancel Changel-  
ogPatches using CablesLogoExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Meshes.CablesLogo documentation for input port details* < **Output  
Ports:** - Visit *Ops.Graphics.Meshes.CablesLogo documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "CablesLogo"  
**Docs:** <https://cables.gl/op/Ops.Graphics.Meshes.CablesLogo>

---

## 13.65.2 Circle\_v3



**Full Name:** Ops.Graphics.Meshes.Circle\_v3 **Description:** Draws a circle to the canvas.

► **Input Ports:** - Visit *Ops.Graphics.Meshes.Circle\_v3* documentation for input port details < **Output Ports:** - Visit *Ops.Graphics.Meshes.Circle\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Circle\_v3" **Docs:** [https://cables.gl/op/Ops.Graphics.Meshes.Circle\\_v3](https://cables.gl/op/Ops.Graphics.Meshes.Circle_v3)

---

## 13.65.3 Cross



**Full Name:** Ops.Graphics.Meshes.Cross **Description:** Full NameOps.Graphics.Meshes.CrossVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch Cross mesh Draws a cross mesh with controllable thickness and  
length.

► **Input Ports:** - Visit *Ops.Graphics.Meshes.Cross* documentation for input port details < **Output Ports:** - Visit *Ops.Graphics.Meshes.Cross* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Cross" **Docs:** <https://cables.gl/op/Ops.Graphics.Meshes.Cross>

---

## 13.65.4 Cube\_v2



**Full Name:** Ops.Graphics.Meshes.Cube\_v2 **Description:** Draws a cube to the canvas. Please note that without doing a rotation you will only see a rectangle.

**> Input Ports:** - Visit *Ops.Graphics.Meshes.Cube\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Meshes.Cube\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Cube\_v2" **Docs:** [https://cables.gl/op/Ops.Graphics.Meshes.Cube\\_v2](https://cables.gl/op/Ops.Graphics.Meshes.Cube_v2)

---

## 13.65.5 Rectangle\_v4



**Full Name:** Ops.Graphics.Meshes.Rectangle\_v4 **Description:** Full NameOps.Graphics.Meshes.Rectangle\_v4VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch rect exampleOpen In EditorINPUT PORTSTTrigger (Trigger)Render (Number: boolean)Sizewidth (Number)height (Number)Pivotpivot x index (Number: integer) left center right pivot y index (Number: integer) top center bottom axis index (Number: integer) xy xz Flip TexCoord X (Number: boolean)Flip TexCoord Y (Number: boolean)Structurenum columns (Number: integer)num rows (Number: integer)OUTPUT PORTSTTrigger (Trigger)geometry (Object)SaveCancel ChangelogPatches using Rectangle\_v4Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Meshes.Rectangle\_v4 documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Meshes.Rectangle\_v4 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Rectangle\_v4" **Docs:** [https://cables.gl/op/Ops.Graphics.Meshes.Rectangle\\_v4](https://cables.gl/op/Ops.Graphics.Meshes.Rectangle_v4)

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## 13.65.6 Sphere\_v3



**Full Name:** Ops.Graphics.Meshes.Sphere\_v3 **Description:** Full NameOps.Graphics.Meshes.Sphere\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Sphere ExampleOpen In EditorINPUT PORTSrender (Trigger)radius (Number)stacks (Number)slices (Number)Filloffset (Number)Render (Number: boolean)OUTPUT PORTStrigger (Trigger)geometry (Object)SaveCancel ChangelogPatches using Sphere\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Meshes.Sphere\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Meshes.Sphere\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Sphere\_v3" **Docs:** [https://cables.gl/op/Ops.Graphics.Meshes.Sphere\\_v3](https://cables.gl/op/Ops.Graphics.Meshes.Sphere_v3)

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## 13.65.7 Star\_v2



**Full Name:** Ops.Graphics.Meshes.Star\_v2 **Description:** Full NameOps.Graphics.Meshes.Star\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Star MeshOpen In EditorINPUT PORTSrender (Trigger)segments (Number)radius (Number)Shape index (Number: integer)Length (Number)Peak Z Pos (Number)percent (Number)Fill (Number: boolean)Render Mesh (Number: boolean)OUTPUT PORTStrigger (Trigger)geometry (Object)SaveCancel ChangelogPatches using Star\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Graphics.Meshes.Star\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Graphics.Meshes.Star\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Star\_v2" **Docs:** [https://cables.gl/op/Ops.Graphics.Meshes.Star\\_v2](https://cables.gl/op/Ops.Graphics.Meshes.Star_v2)

---

## 13.65.8 Triangle\_v2



**Full Name:** Ops.Graphics.Meshes.Triangle\_v2 **Description:** Full NameOps.Graphics.Meshes.Triangle\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch triangle exampleOpen In EditorINPUT PORTSrender (Trigger)Renders a triangle to the canvas.

➤ **Input Ports:** - Visit `Ops.Graphics.Meshes.Triangle_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Graphics.Meshes.Triangle_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Triangle\_v2" **Docs:** [https://cables.gl/op/Ops.Graphics.Meshes.Triangle\\_v2](https://cables.gl/op/Ops.Graphics.Meshes.Triangle_v2)

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## 13.66 Ops.Html

### 13.66.1 ActiveElement



**Full Name:** Ops.Html.ActiveElement **Description:** outputs the currently focused element within a web page's DOM, meaning the element that is currently receiving keyboard events or user input, such as a text box during typing or a button when selected. This property helps developers determine which element is currently in focus, making it especially useful for managing keyboard navigation and accessibility features in web applications

➤ **Input Ports:** - Visit `Ops.Html.ActiveElement` documentation for input port details < **Output Ports:** - Visit `Ops.Html.ActiveElement` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ActiveElement"  
**Docs:** <https://cables.gl/op/Ops.Html.ActiveElement>

---

## 13.66.2 AlignElement



**Full Name:** Ops.Html.AlignElement **Description:** Visit documentation for details

**> Input Ports:** - Visit *Ops.Html.AlignElement* documentation for input port details **< Output Ports:** - Visit *Ops.Html.AlignElement* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "AlignElement"  
**Docs:** <https://cables.gl/op/Ops.Html.AlignElement>

---

## 13.66.3 AppendChild\_v2



**Full Name:** Ops.Html.AppendChild\_v2 **Description:** Forms a parent → child relationship.

**> Input Ports:** - Visit *Ops.Html.AppendChild\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Html.AppendChild\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "AppendChild\_v2"  
**Docs:** [https://cables.gl/op/Ops.Html.AppendChild\\_v2](https://cables.gl/op/Ops.Html.AppendChild_v2)

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## 13.66.4 BrowserSpecificFile\_v2



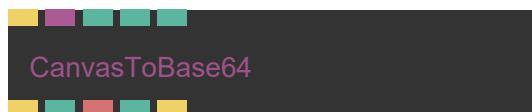
**Full Name:** Ops.Html.BrowserSpecificFile\_v2 **Description:** Browsers support file-types differently. E.g. to create a gapless audio loop, you cannot simply loop an MP3 file, you need to create an M4A-file for Safari, an OGG-file for Firefox and an MP3-file for Chrome (and the other browsers). Otherwise the loop will have a tiny, but noticeable gap.

**> Input Ports:** - Visit [Ops.Html.BrowserSpecificFile\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.BrowserSpecificFile\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BrowserSpecificFile\_v2" **Docs:** [https://cables.gl/op/Ops.Html.BrowserSpecificFile\\_v2](https://cables.gl/op/Ops.Html.BrowserSpecificFile_v2)

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## 13.66.5 CanvasToBase64



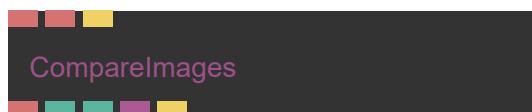
**Full Name:** Ops.Html.CanvasToBase64 **Description:** Full NameOps.Html.CanvasToBase64VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSTrigger (Trigger)Texture (Object)Format index (Number: integer) PNG JPEG WEBP Quality (Number)Output dataUrl (Number: boolean)OUTPUT PORTSnext (Trigger)Binary Size (Number)Base64 string (String)Loading (booleanNumber)Finished (Trigger)SaveCancel ChangelogPatches using CanvasToBase64Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Html.CanvasToBase64 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.CanvasToBase64 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CanvasToBase64" **Docs:** <https://cables.gl/op/Ops.Html.CanvasToBase64>

---

## 13.66.6 CompareImages\_v2



**Full Name:** Ops.Html.CompareImages\_v2 **Description:** Full NameOps.Html.CompareImages\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsJavascript LibrariesResemble.js (Image analysis and comparison)Documentation (mark-  
down)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample  
Patch CompareImages ExampleOpen In EditorINPUT PORTSImage 1 (String)Image 2 (String)Start  
(Trigger)OUTPUT PORTSDifference Image (String)Mismatch Percentage (Number)Same Dimensions  
(booleanNumber)Resemble Data (Object)Finished (Trigger)SaveCancel ChangelogPatches using  
CompareImages\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.CompareImages\_v2 documentation* for input port details < **Output Ports:**  
- Visit *Ops.Html.CompareImages\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CompareImages\_v2" **Docs:** [https://cables.gl/op/Ops.Html.CompareImages\\_v2](https://cables.gl/op/Ops.Html.CompareImages_v2)

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### 13.66.7 DocumentBody

DocumentBody

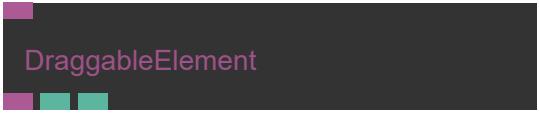
**Full Name:** Ops.Html.DocumentBody **Description:** Full NameOps.Html.DocumentBodyVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverOUTPUT PORTSBody (Object)SaveCancel Changelog-  
Patches using DocumentBodyExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.DocumentBody documentation* for input port details < **Output Ports:** -  
Visit *Ops.Html.DocumentBody documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DocumentBody"  
**Docs:** <https://cables.gl/op/Ops.Html.DocumentBody>

---

## 13.66.8 DraggableElement



DraggableElement

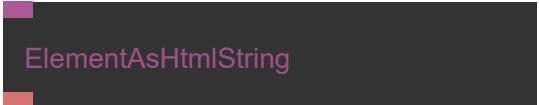
**Full Name:** Ops.Html.DraggableElement **Description:** Full NameOps.Html.DraggableElementVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch DraggableElement ExampleOpen In EditorINPUT PORTSElement  
(Object:element)OUTPUT PORTSElement out (Object)X (Number)Y (Number)SaveCancel Changelog-  
Patches using DraggableElementExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.DraggableElement documentation* for input port details < **Output Ports:**  
- Visit *Ops.Html.DraggableElement documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DraggableEle-  
ment" **Docs:** <https://cables.gl/op/Ops.Html.DraggableElement>

---

## 13.66.9 ElementAsHtmlString



ElementAsHtmlString

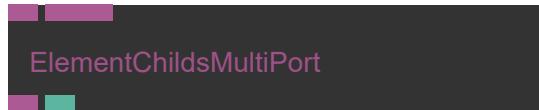
**Full Name:** Ops.Html.ElementAsHtmlString **Description:** Full NameOps.Html.ElementAsHtmlStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch ElementAsHtmlString ExampleOpen In EditorINPUT PORTSParent  
(Object:element)OUTPUT PORTSHTML String (String)SaveCancel ChangelogPatches using Elemen-  
tAsHtmlStringExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.ElementAsHtmlString documentation* for input port details < **Output  
Ports:** - Visit *Ops.Html.ElementAsHtmlString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementAsHtml-  
String" **Docs:** <https://cables.gl/op/Ops.Html.ElementAsHtmlString>

---

## 13.66.10 ElementChildsMultiPort\_v2



**Full Name:** Ops.Html.ElementChildsMultiPort\_v2 **Description:** will replace appendChild and elementChilds ops

**> Input Ports:** - Visit *Ops.Html.ElementChildsMultiPort\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Html.ElementChildsMultiPort\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementChildsMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Html.ElementChildsMultiPort\\_v2](https://cables.gl/op/Ops.Html.ElementChildsMultiPort_v2)

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## 13.66.11 ElementChilds\_v2



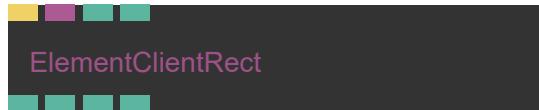
**Full Name:** Ops.Html.ElementChilds\_v2 **Description:** Full NameOps.Html.ElementChilds\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ElementChilds ExampleOpen In EditorINPUT PORTSParent (Object:element)Child 1 (Object:element)Child 2 (Object:element)Child 3 (Object:element)Child 4 (Object:element)Child 5 (Object:element)Child 6 (Object:element)Child 7 (Object:element)Child 8 (Object:element)Child 9 (Object:element)Child 10 (Object:element)OUTPUT PORTSParent Out (Object)SaveCancel ChangelogPatches using ElementChilds\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.ElementChilds\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Html.ElementChilds\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementChilds\_v2" **Docs:** [https://cables.gl/op/Ops.Html.ElementChilds\\_v2](https://cables.gl/op/Ops.Html.ElementChilds_v2)

---

### 13.66.12 ElementClientRect



**Full Name:** Ops.Html.ElementClientRect **Description:** see:

**> Input Ports:** - Visit *Ops.Html.ElementClientRect documentation* for input port details **< Output Ports:**  
- Visit *Ops.Html.ElementClientRect documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementClientRect" **Docs:** <https://cables.gl/op/Ops.Html.ElementClientRect>

---

### 13.66.13 ElementCssCursor\_v3



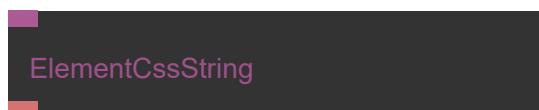
**Full Name:** Ops.Html.ElementCssCursor\_v3 **Description:** Full NameOps.Html.ElementCssCursor\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch ElementCssCursor ExampleChange the look of the mouse cursor

**> Input Ports:** - Visit *Ops.Html.ElementCssCursor\_v3 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Html.ElementCssCursor\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCssCursor\_v3" **Docs:** [https://cables.gl/op/Ops.Html.ElementCssCursor\\_v3](https://cables.gl/op/Ops.Html.ElementCssCursor_v3)

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### 13.66.14 ElementCssString



**Full Name:** Ops.Html.ElementCssString **Description:** Full NameOps.Html.ElementCssStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch elementCssString ExampleOpen In EditorINPUT PORTSElement (Ob-  
ject:element)OUTPUT PORTSCSS (String)SaveCancel ChangelogPatches using ElementCssStringEx-  
amples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.ElementCssString documentation* for input port details < **Output Ports:**  
- Visit *Ops.Html.ElementCssString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCssString"

**Docs:** <https://cables.gl/op/Ops.Html.ElementCssString>

---

### 13.66.15 ElementDataSet



**Full Name:** Ops.Html.ElementDataSet **Description:** The dataset read-only property of the HTMLEle-  
ment interface provides read/write access to custom data attributes (data-) on elements. This op  
outputs and object with properties for each data- attribute.

➤ **Input Ports:** - Visit *Ops.Html.ElementDataSet documentation* for input port details < **Output Ports:**  
- Visit *Ops.Html.ElementDataSet documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementDataSet"

**Docs:** <https://cables.gl/op/Ops.Html.ElementDataSet>

---

### 13.66.16 ElementEquals



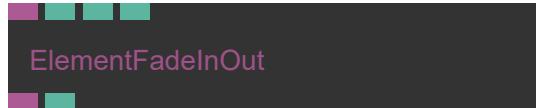
**Full Name:** Ops.Html.ElementEquals **Description:** Two nodes are equal when they have the same type,  
defining characteristics (for elements, this would be their ID, number of children, and so forth), its  
attributes match, and so on.

> **Input Ports:** - Visit `Ops.Html.ElementEquals` documentation for input port details < **Output Ports:** - Visit `Ops.Html.ElementEquals` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ElementEquals"  
**Docs:** <https://cables.gl/op/Ops.Html.ElementEquals>

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### 13.66.17 ElementFadeInOut\_v2



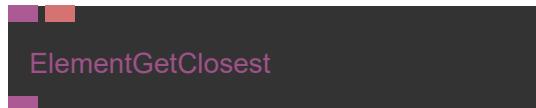
**Full Name:** `Ops.Html.ElementFadeInOut_v2` **Description:** Full Name `Ops.Html.ElementFadeInOut_v2` VisibilityCore  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists-  
Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Ca-  
niuse query Example Patch ElementFadeInOut Example fade html elements in or out

> **Input Ports:** - Visit `Ops.Html.ElementFadeInOut_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Html.ElementFadeInOut_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Element-  
FadeInOut\_v2" **Docs:** [https://cables.gl/op/Ops.Html.ElementFadeInOut\\_v2](https://cables.gl/op/Ops.Html.ElementFadeInOut_v2)

---

### 13.66.18 ElementGetClosest



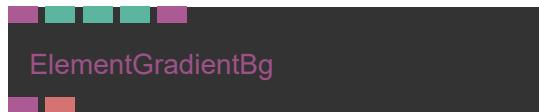
**Full Name:** `Ops.Html.ElementGetClosest` **Description:** Traverses the element and its parents (heading toward the document root) until it finds a node that matches the specified CSS selector.

> **Input Ports:** - Visit `Ops.Html.ElementGetClosest` documentation for input port details < **Output Ports:** - Visit `Ops.Html.ElementGetClosest` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ElementGetClosest" **Docs:** <https://cables.gl/op/Ops.Html.ElementGetClosest>

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## 13.66.19 ElementGradientBg



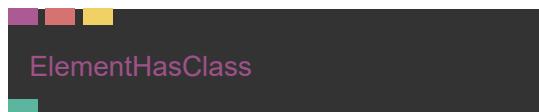
**Full Name:** Ops.Html.ElementGradientBg **Description:** converts a cables gradient object to a css gradient

➤ **Input Ports:** - Visit *Ops.Html.ElementGradientBg documentation* for input port details < **Output Ports:**  
- Visit *Ops.Html.ElementGradientBg documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ElementGradientBg" **Docs:** <https://cables.gl/op/Ops.Html.ElementGradientBg>

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## 13.66.20 ElementHasClass



**Full Name:** Ops.Html.ElementHasClass **Description:** Full NameOps.Html.ElementHasClassVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSElement (Object:element)Classname  
(String)Update (Trigger)OUTPUT PORTSHas Class (booleanNumber)SaveCancel ChangelogPatches  
using ElementHasClassExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.ElementHasClass documentation* for input port details < **Output Ports:**  
- Visit *Ops.Html.ElementHasClass documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ElementHasClass"  
**Docs:** <https://cables.gl/op/Ops.Html.ElementHasClass>

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## 13.66.21 ElementInfo



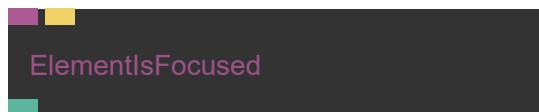
**Full Name:** Ops.Html.ElementInfo **Description:** Full NameOps.Html.ElementInfoVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ActiveElement ElementInfo ExampleOpen In EditorINPUT PORTSElement (Object)OUTPUT PORTSTagname (String)Id (String)SaveCancel ChangelogPatches using ElementInfoExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.ElementInfo* documentation for input port details **< Output Ports:** - Visit *Ops.Html.ElementInfo* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementInfo" **Docs:** <https://cables.gl/op/Ops.Html.ElementInfo>

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## 13.66.22 ElementIsFocused



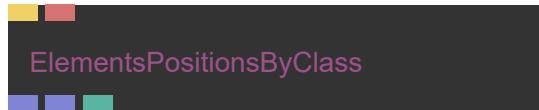
**Full Name:** Ops.Html.ElementIsFocused **Description:** Full NameOps.Html.ElementIsFocusedVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ElementIsFocused ExampleOpen In EditorINPUT PORTSElement (Object:element)Update (Trigger)OUTPUT PORTSHas Focus (booleanNumber)SaveCancel ChangelogPatches using ElementIsFocusedExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.ElementIsFocused* documentation for input port details **< Output Ports:** - Visit *Ops.Html.ElementIsFocused* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementIsFocused" **Docs:** <https://cables.gl/op/Ops.Html.ElementIsFocused>

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### 13.66.23 ElementsPositionsByClass



**Full Name:** Ops.Html.ElementsPositionsByClass **Description:** Full NameOps.Html.ElementsPositionsByClassVisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)Classname (String)OUTPUT PORTSPosition (Array)Size (Array)Total Elements (Number)SaveCancel Changelog Patches using ElementsPositionsByClassExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.ElementsPositionsByClass documentation* for input port details **< Output Ports:** - Visit *Ops.Html.ElementsPositionsByClass documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementsPositionsByClass" **Docs:** <https://cables.gl/op/Ops.Html.ElementsPositionsByClass>

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### 13.66.24 FontFile\_v2



**Full Name:** Ops.Html.FontFile\_v2 **Description:** font is loaded via css. enter a family name and use this as font name in other ops or css properties

**> Input Ports:** - Visit *Ops.Html.FontFile\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Html.FontFile\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FontFile\_v2" **Docs:** [https://cables.gl/op/Ops.Html.FontFile\\_v2](https://cables.gl/op/Ops.Html.FontFile_v2)

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## 13.66.25 FontsLoaded



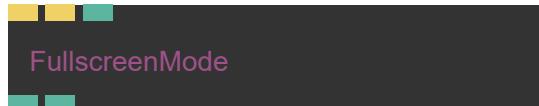
**Full Name:** Ops.Html.FontsLoaded **Description:** Full NameOps.Html.FontsLoadedVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch fontloaded exampleOpen In EditorOUTPUT PORTSFont Loaded (Trigger)SaveCancel ChangelogPatches using FontsLoadedExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.FontsLoaded documentation* for input port details **< Output Ports:** - Visit *Ops.Html.FontsLoaded documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FontsLoaded" **Docs:** <https://cables.gl/op/Ops.Html.FontsLoaded>

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## 13.66.26 FullscreenMode



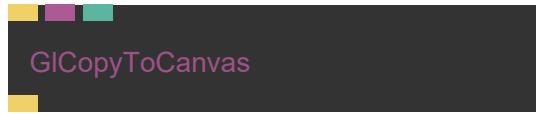
**Full Name:** Ops.Html.FullscreenMode **Description:** Full NameOps.Html.FullscreenModeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesCompatibilitycaniuse.com: Fullscreen APIPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch fullscreenMode exampleOpen In EditorINPUT PORTSRequest Fullscreen (Trigger)Exit Fullscreen (Trigger)Element index (Number: integer) Canvas Document OUTPUT PORTSIs Fullscreen (booleanNumber)Supported (booleanNumber)SaveCancel ChangelogPatches using FullscreenModeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.FullscreenMode documentation* for input port details **< Output Ports:** - Visit *Ops.Html.FullscreenMode documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FullscreenMode" **Docs:** <https://cables.gl/op/Ops.Html.FullscreenMode>

---

## 13.66.27 GlCopyToCanvas



**Full Name:** Ops.Html.GlCopyToCanvas **Description:** the content of the current webgl rendering canvas will be copied to another (2d) canvas. this way you can easily render to multiple canvases with one patch. they could even be split out on a long page

**> Input Ports:** - Visit [Ops.Html.GlCopyToCanvas documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.GlCopyToCanvas documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "GlCopyToCanvas"  
**Docs:** <https://cables.gl/op/Ops.Html.GlCopyToCanvas>

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## 13.66.28 HyperLink\_v3



**Full Name:** Ops.Html.HyperLink\_v3 **Description:** For target name and spec options see: [https://www.w3schools.com/html/html\\_links.asp](https://www.w3schools.com/html/html_links.asp)

**> Input Ports:** - Visit [Ops.Html.HyperLink\\_v3 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.HyperLink\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "HyperLink\_v3"  
**Docs:** [https://cables.gl/op/Ops.Html.HyperLink\\_v3](https://cables.gl/op/Ops.Html.HyperLink_v3)

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## 13.66.29 InnerHTML



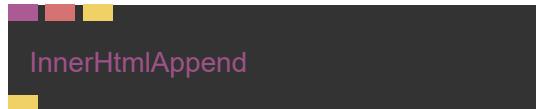
**Full Name:** Ops.Html.InnerHTML **Description:** Full NameOps.Html.InnerHTMLVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch InnerHTML exampleOpen In EditorINPUT PORTSElement (Object)Value (String)Type index (Number: integer) HTML Text Active (Number: boolean)Clear (Trigger)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using InnerHTMLExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.InnerHTML documentation for input port details* < **Output Ports:** - Visit *Ops.Html.InnerHTML documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InnerHTML" **Docs:** <https://cables.gl/op/Ops.Html.InnerHTML>

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### 13.66.30 InnerHtmlAppend



**Full Name:** Ops.Html.InnerHtmlAppend **Description:** Full NameOps.Html.InnerHtmlAppendVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch InnerHtmlAppend ExampleOpen In EditorINPUT PORTSElement (Object:element)Html (String)Trigger (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using InnerHtmlAppendExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Html.InnerHtmlAppend documentation for input port details* < **Output Ports:** - Visit *Ops.Html.InnerHtmlAppend documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InnerHtmlAppend" **Docs:** <https://cables.gl/op/Ops.Html.InnerHtmlAppend>

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### 13.66.31 MailtoLink



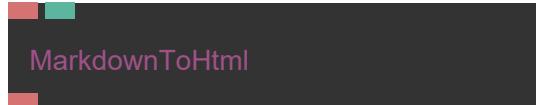
**Full Name:** Ops.Html.MailtoLink **Description:** Full NameOps.Html.MailtoLinkVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch hyperlink example Open another webpage /URL with a trigger

**> Input Ports:** - Visit *Ops.Html.MailtoLink documentation* for input port details **< Output Ports:** - Visit *Ops.Html.MailtoLink documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "mailtoLink" **Docs:** <https://cables.gl/op/Ops.Html.MailtoLink>

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### 13.66.32 MarkdownToHtml



**Full Name:** Ops.Html.MarkdownToHtml **Description:** <https://en.wikipedia.org/wiki/Markdown>

**> Input Ports:** - Visit *Ops.Html.MarkdownToHtml documentation* for input port details **< Output Ports:** - Visit *Ops.Html.MarkdownToHtml documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MarkdownToHtml" **Docs:** <https://cables.gl/op/Ops.Html.MarkdownToHtml>

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### 13.66.33 ModalOverlay



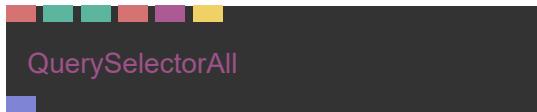
**Full Name:** Ops.Html.ModalOverlay **Description:** Full NameOps.Html.ModalOverlayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ModalOverlay ExampleCreate a modal HTML overlay with a darkened background

**> Input Ports:** - Visit *Ops.Html.ModalOverlay* documentation for input port details **< Output Ports:** - Visit *Ops.Html.ModalOverlay* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ModalOverlay" **Docs:** <https://cables.gl/op/Ops.Html.ModalOverlay>

---

### 13.66.34 QuerySelectorAll\_v2



**Full Name:** Ops.Html.QuerySelectorAll\_v2 **Description:** If you want to do something with multiple elements, you can get it from the DOM using QuerySelectorAll. See developer.mozilla.org – querySelector.

**> Input Ports:** - Visit *Ops.Html.QuerySelectorAll\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Html.QuerySelectorAll\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "QuerySelectorAll\_v2" **Docs:** [https://cables.gl/op/Ops.Html.QuerySelectorAll\\_v2](https://cables.gl/op/Ops.Html.QuerySelectorAll_v2)

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### 13.66.35 QuerySelector\_v3



**Full Name:** Ops.Html.QuerySelector\_v3 **Description:** If you want to do something with an element, you can get it from the DOM using QuerySelector. See developer.mozilla.org – querySelector.

**> Input Ports:** - Visit [Ops.Html.QuerySelector\\_v3 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.QuerySelector\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "QuerySelector\\_v3"](#) **Docs:** [https://cables.gl/op/Ops.Html.QuerySelector\\_v3](https://cables.gl/op/Ops.Html.QuerySelector_v3)

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### 13.66.36 ReloadPage



**Full Name:** Ops.Html.ReloadPage **Description:** Full NameOps.Html.ReloadPageVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch reload exampleOpen In EditorINPUT PORTSExec (Trigger)SaveCancel ChangelogPatches using ReloadPageExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Html.ReloadPage documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.ReloadPage documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "ReloadPage"](#) **Docs:** <https://cables.gl/op/Ops.Html.ReloadPage>

---

### 13.66.37 ScrollIntoView



**Full Name:** Ops.Html.ScrollIntoView **Description:** Full NameOps.Html.ScrollIntoViewVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch HTML CSS OpsOpen In EditorINPUT PORTSElement (Object:element)Behaviour index (Number: integer) smooth instant Scroll Into View (Trigger)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ScrollIntoViewExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Html.ScrollIntoView` documentation for input port details **< Output Ports:** - Visit `Ops.Html.ScrollIntoView` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ScrollIntoView"  
**Docs:** <https://cables.gl/op/Ops.Html.ScrollIntoView>

---

### 13.66.38 ScrollPosition\_v2



**Full Name:** `Ops.Html.ScrollPosition_v2` **Description:** if element is not connected it will use the document body element

**> Input Ports:** - Visit `Ops.Html.ScrollPosition_v2` documentation for input port details **< Output Ports:** - Visit `Ops.Html.ScrollPosition_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ScrollPosition\_v2"  
**Docs:** [https://cables.gl/op/Ops.Html.ScrollPosition\\_v2](https://cables.gl/op/Ops.Html.ScrollPosition_v2)

---

### 13.66.39 ScrollTo



**Full Name:** `Ops.Html.ScrollTo` **Description:** Full NameOps.Html.ScrollToVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch subsequent currentOpen In EditorINPUT PORTSElement (Object:element)Scroll to top (Trigger)Scroll to bottom (Trigger)SaveCancel ChangelogPatches using ScrollToExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Html.ScrollTo` documentation for input port details **< Output Ports:** - Visit `Ops.Html.ScrollTo` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ScrollTo" **Docs:** <https://cables.gl/op/Ops.Html.ScrollTo>

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### 13.66.40 WindowClose



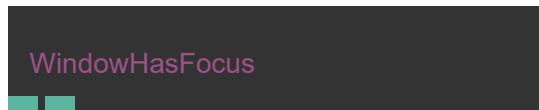
**Full Name:** Ops.Html.WindowClose **Description:** this will not work in cables itself or in iframes.

**> Input Ports:** - Visit *Ops.Html.WindowClose documentation* for input port details **< Output Ports:** - Visit *Ops.Html.WindowClose documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "WindowClose" **Docs:** <https://cables.gl/op/Ops.Html.WindowClose>

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### 13.66.41 WindowHasFocus



**Full Name:** Ops.Html.WindowHasFocus **Description:** Full NameOps.Html.WindowHasFocusVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch WindowHasFocus exampleOpen In EditorOUTPUT PORTShas focus (booleanNumber)Tab Visible (booleanNumber)SaveCancel ChangelogPatches using WindowHasFocusExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.WindowHasFocus documentation* for input port details **< Output Ports:** - Visit *Ops.Html.WindowHasFocus documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "WindowHasFocus" **Docs:** <https://cables.gl/op/Ops.Html.WindowHasFocus>

---

## 13.66.42 WindowInfo



**Full Name:** Ops.Html.WindowInfo **Description:** provides information about the current windows (or iframe) width, height and pixel density.

➤ **Input Ports:** - Visit [Ops.Html.WindowInfo documentation](#) for input port details < **Output Ports:** - Visit [Ops.Html.WindowInfo documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WindowInfo"  
**Docs:** <https://cables.gl/op/Ops.Html.WindowInfo>

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## 13.66.43 WindowScroll



**Full Name:** Ops.Html.WindowScroll **Description:** Full NameOps.Html.WindowScrollVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)OUTPUT PORTSScoll X (Number)Scoll Y (Number)SaveCancel ChangelogPatches using WindowScrollExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Html.WindowScroll documentation](#) for input port details < **Output Ports:** - Visit [Ops.Html.WindowScroll documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WindowScroll"  
**Docs:** <https://cables.gl/op/Ops.Html.WindowScroll>

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## 13.67 Ops.Html.Attributes

### 13.67.1 ElementAccessibility



ElementAccessibility

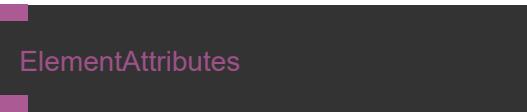
**Full Name:** Ops.Html.Attributes.ElementAccessibility **Description:** Full NameOps.Html.Attributes.ElementAccessibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ElementAccessibilityOpen In EditorINPUT PORTSElementElement (Object)aria Label (String)aria Labeled By (String)aria hidden (Number: boolean)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ElementAccessibilityExamples Team cablesPublic My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.Attributes.ElementAccessibility documentation for input port details* **< Output Ports:** - Visit *Ops.Html.Attributes.ElementAccessibility documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementAccessibility" **Docs:** <https://cables.gl/op/Ops.Html.Attributes.ElementAccessibility>

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### 13.67.2 ElementAttributes



ElementAttributes

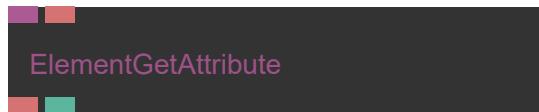
**Full Name:** Ops.Html.Attributes.ElementAttributes **Description:** Full NameOps.Html.Attributes.ElementAttributesOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch element AttributesOpen In EditorINPUT PORTSElement (Object)OUTPUT PORTSAttribs (Object)SaveCancel ChangelogPatches using ElementAttributesExamples Team cablesPublic My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.Attributes.ElementAttributes documentation for input port details* **< Output Ports:** - Visit *Ops.Html.Attributes.ElementAttributes documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementAttributes" **Docs:** <https://cables.gl/op/Ops.Html.Attributes.ElementAttributes>

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### 13.67.3 ElementGetAttribute



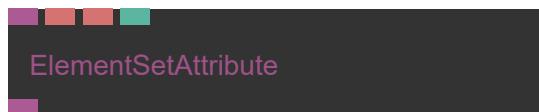
**Full Name:** Ops.Html.Attributes.ElementGetAttribute **Description:** Full NameOps.Html.Attributes.ElementGetAttributeOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Element Attributes ExampleOpen In EditorINPUT PORTSElement (Object)Attribute Name (String)OUTPUT PORTSValue (String)Has Attribute (booleanNumber)SaveCancel ChangelogPatches using ElementGetAttributeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.Attributes.ElementGetAttribute documentation* for input port details <  
**Output Ports:** - Visit *Ops.Html.Attributes.ElementGetAttribute documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ElementGetAttribute" **Docs:** <https://cables.gl/op/Ops.Html.Attributes.ElementGetAttribute>

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### 13.67.4 ElementSetAttribute



**Full Name:** Ops.Html.Attributes.ElementSetAttribute **Description:** Full NameOps.Html.Attributes.ElementSetAttributeOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Element Attributes ExampleOpen In EditorINPUT PORTSElementElement (Object)AttributesAttribute (String)Value (String)Active (Number: boolean)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ElementSetAttributeExamples Team cables Public My Patches My Ops

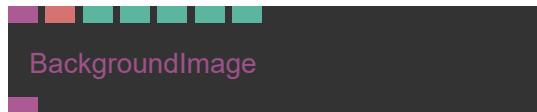
**> Input Ports:** - Visit *Ops.Html.Attributes.ElementSetAttribute documentation* for input port details <  
**Output Ports:** - Visit *Ops.Html.Attributes.ElementSetAttribute documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ElementSetAttribute" **Docs:** <https://cables.gl/op/Ops.Html.Attributes.ElementSetAttribute>

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## 13.68 Ops.Html.CSS

### 13.68.1 BackgroundImage\_v2



**Full Name:** Ops.Html.CSS.BackgroundImage\_v2 **Description:** Full NameOps.Html.CSS.BackgroundImage\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch BackgroundImage ExampleOpen In EditorINPUT PORTSElement (Object)image file (String)Size index (Number: integer)Repeat index (Number: integer)Position index (Number: integer)active (Number: boolean)Never Unset (Number: boolean)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using BackgroundImage\_v2Examples Team cablesPublic My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.BackgroundImage\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.BackgroundImage\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BackgroundImage\_v2" **Docs:** [https://cables.gl/op/Ops.Html.CSS.BackgroundImage\\_v2](https://cables.gl/op/Ops.Html.CSS.BackgroundImage_v2)

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### 13.68.2 CSSFilter



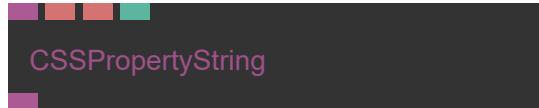
**Full Name:** Ops.Html.CSS.CSSFilter **Description:** Full NameOps.Html.CSS.CSSFilterVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch CSSFilter ExampleOpen In EditorINPUT PORTSElement (Object)method index (Number: integer)Value (Number)SaveCancel ChangelogPatches using CSSFilterExamples Team cablesPublic My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.CSSFilter* documentation for input port details **< Output Ports:** - Visit *Ops.Html.CSS.CSSFilter* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "CSSFilter" **Docs:** <https://cables.gl/op/Ops.Html.CSS.CSSFilter>

---

### 13.68.3 CSSPropertyString



**Full Name:** Ops.Html.CSS.CSSPropertyString **Description:** Example : margin : 10px 5px 10px 5px

**> Input Ports:** - Visit *Ops.Html.CSS.CSSPropertyString* documentation for input port details **< Output Ports:** - Visit *Ops.Html.CSS.CSSPropertyString* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "CSSPropertyString" **Docs:** <https://cables.gl/op/Ops.Html.CSS.CSSPropertyString>

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### 13.68.4 CSSProperty\_v2



**Full Name:** Ops.Html.CSS.CSSProperty\_v2 **Description:** Full Name Ops.Html.CSS.CSSProperty\_v2 VisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch CSSProperty Example Open In Editor Youtube Video Tutorial INPUT PORTS Element (Object) Attributes Property (String) Value (Number) Value Suffix (String) OUTPUT PORTS HTML Element (Object) Save Cancel Changelog Patches using CSSProperty\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.CSSProperty\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Html.CSS.CSSProperty\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "CSSProperty\\_v2"](#) **Docs:** [https://cables.gl/op/Ops.Html.CSS.CSSProperty\\_v2](https://cables.gl/op/Ops.Html.CSS.CSSProperty_v2)

---

## 13.68.5 CSS\_v3



**Full Name:** Ops.Html.CSS.CSS\_v3 **Description:** CSS Rule Conflicts

► **Input Ports:** - Visit [Ops.Html.CSS.CSS\\_v3 documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Html.CSS.CSS\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "CSS\\_v3"](#) **Docs:** [https://cables.gl/op/Ops.Html.CSS.CSS\\_v3](https://cables.gl/op/Ops.Html.CSS.CSS_v3)

---

## 13.68.6 CssClass



**Full Name:** Ops.Html.CSS.CssClass **Description:** Full NameOps.Html.CSS.CssClassVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch CssClass ExampleOpen In EditorINPUT PORTSCSS (String)Class Name (String)SaveCancel ChangelogPatches using CssClassExamples Team cables Public My Patches My Ops

► **Input Ports:** - Visit [Ops.Html.CSS.CssClass documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Html.CSS.CssClass documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "CssClass"](#) **Docs:** <https://cables.gl/op/Ops.Html.CSS.CssClass>

---

## 13.68.7 CssFile



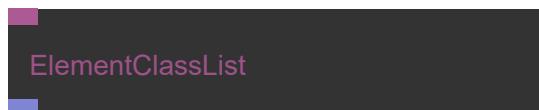
**Full Name:** Ops.Html.CSS.CssFile **Description:** Full NameOps.Html.CSS.CssFileVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence- Caniuse queryExample Patch CssFile ExampleOpen In EditorINPUT PORTSCSS File (String)Media (String)Active (Number: boolean)SaveCancel ChangelogPatches using CssFileExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.CssFile documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.CssFile documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for “CssFile”* **Docs:** <https://cables.gl/op/Ops.Html.CSS.CssFile>

---

## 13.68.8 ElementclassList



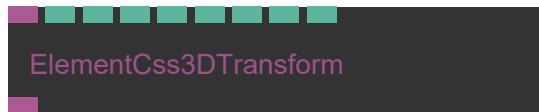
**Full Name:** Ops.Html.CSS.ElementclassList **Description:** Outputs an array containing all the css classes of the connected HTML Element

**> Input Ports:** - Visit *Ops.Html.CSS.ElementclassList documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.ElementclassList documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for “ElementclassList”* **Docs:** <https://cables.gl/op/Ops.Html.CSS.ElementclassList>

---

## 13.68.9 ElementCss3DTransform



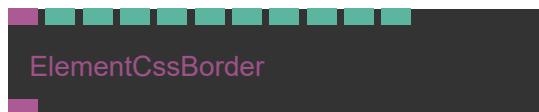
**Full Name:** Ops.Html.CSS.ElementCss3DTransform **Description:** This 3d transformation is unrelated to the webGL transformation matrix.

**> Input Ports:** - Visit [Ops.Html.CSS.ElementCss3DTransform documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.CSS.ElementCss3DTransform documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCss3DTransform" **Docs:** <https://cables.gl/op/Ops.Html.CSS.ElementCss3DTransform>

---

## 13.68.10 ElementCssBorder



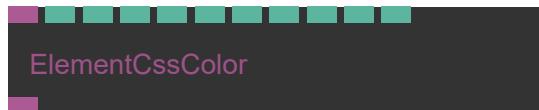
**Full Name:** Ops.Html.CSS.ElementCssBorder **Description:** Full NameOps.Html.CSS.ElementCssBorderVisibilityCom  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch HTML CSS OpsOpen In EditorINPUT PORTSElement (Object)Thickness  
(Number)Radius (Number)Color R (Number)Color G (Number)Color B (Number)Color A (Num-  
ber)Top (Number: boolean)Bottom (Number: boolean)Left (Number: boolean)Right (Number:  
boolean)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ElementCss-  
BorderExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Html.CSS.ElementCssBorder documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.CSS.ElementCssBorder documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCssBorder" **Docs:** <https://cables.gl/op/Ops.Html.CSS.ElementCssBorder>

---

### 13.68.11 ElementCssColor



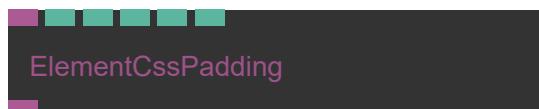
**Full Name:** Ops.Html.CSS.ElementCssColor **Description:** Full NameOps.Html.CSS.ElementCssColorVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch HTML CSS OpsOpen In EditorINPUT PORTSElement (Object:element)Set  
Color (Number: boolean)Color R (Number)Color G (Number)Color B (Number)Color A (Num-  
ber)Set Background (Number: boolean)Background Color R (Number)Background Color G (Num-  
ber)Background Color B (Number)Background Color A (Number)OUTPUT PORTSHTML Element  
(Object)SaveCancel ChangelogPatches using ElementCssColorExamples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.ElementCssColor* documentation for input port details **< Output  
Ports:** - Visit *Ops.Html.CSS.ElementCssColor* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ElementCssColor"  
**Docs:** <https://cables.gl/op/Ops.Html.CSS.ElementCssColor>

---

### 13.68.12 ElementCssPadding\_v2



**Full Name:** Ops.Html.CSS.ElementCssPadding\_v2 **Description:** Full NameOps.Html.CSS.ElementCssPadding\_v2Vis-  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch HTML CSS OpsOpen In EditorINPUT PORTSElement (Ob-  
ject:element)Padding (Number)Padding Top (Number)Padding Bottom (Number)Padding Left  
(Number)Padding Right (Number)OUTPUT PORTSHTML Element (Object)SaveCancel Changelog-  
Patches using ElementCssPadding\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.ElementCssPadding\_v2* documentation for input port details **< Out-  
put Ports:** - Visit *Ops.Html.CSS.ElementCssPadding\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCssPadding\_v2" **Docs:** [https://cables.gl/op/Ops.Html.CSS.ElementCssPadding\\_v2](https://cables.gl/op/Ops.Html.CSS.ElementCssPadding_v2)

---

### 13.68.13 ElementCssShadow



**Full Name:** Ops.Html.CSS.ElementCssShadow **Description:** Full NameOps.Html.CSS.ElementCssShadowVisibilityCode  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch elementShadow ExampleOpen In EditorINPUT PORTSElement  
(Object)Type index (Number: integer) drop filter box text X (Number)Y (Number)Blur (Number)Color  
r (Number)Color g (Number)Color b (Number)Color a (Number)OUTPUT PORTSHTML Element  
(Object)SaveCancel ChangelogPatches using ElementCssShadowExamples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.ElementCssShadow documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.ElementCssShadow documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCssShadow" **Docs:** <https://cables.gl/op/Ops.Html.CSS.ElementCssShadow>

---

### 13.68.14 ElementCssSize



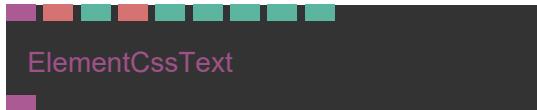
**Full Name:** Ops.Html.CSS.ElementCssSize **Description:** Size can be given in pixels or percent.

**> Input Ports:** - Visit *Ops.Html.CSS.ElementCssSize documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.ElementCssSize documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCssSize" **Docs:** <https://cables.gl/op/Ops.Html.CSS.ElementCssSize>

---

## 13.68.15 ElementCssText



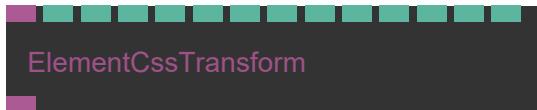
**Full Name:** Ops.Html.CSS.ElementCssText **Description:** Full NameOps.Html.CSS.ElementCssTextVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch HTML CSS OpsOpen In EditorINPUT PORTSElement (Object:element)Font Family (String)Text Size (Number)Font Weight (String)Text Align index (Number: integer) Left Center Right Justify Overflow Ellipsis (Number: boolean)Letter Spacing (Number)Line Height (Number)Disable Text Select (Number: boolean)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ElementCssTextExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.ElementCssText documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.ElementCssText documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementCssText"  
**Docs:** <https://cables.gl/op/Ops.Html.CSS.ElementCssText>

---

## 13.68.16 ElementCssTransform\_v2



**Full Name:** Ops.Html.CSS.ElementCssTransform\_v2 **Description:** Full NameOps.Html.CSS.ElementCssTransform\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ElementCssTransform ExampleOpen In EditorINPUT PORTSElementElement (Object:element)TranslationTranslate Active (Number: boolean)Translate X (Number)Translate Y (Number)Unit index (Number: integer) px % ScalingScale Active (Number: boolean)Scale (Number)RotationRotate Active (Number: boolean)Rot Z (Number)OriginSet Origin (Number:

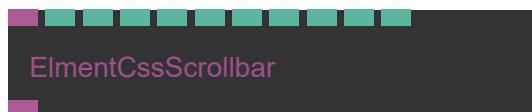
boolean)Origin X index (Number: integer) left center right Origin Y index (Number: integer) top center bottom Z Index Active (Number: boolean)Z Index (Number)OUTPUT PORTSPassthrough (Object)SaveCancel ChangelogPatches using ElementCssTransform\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.ElementCssTransform\_v2 documentation* for input port details <  
**Output Ports:** - Visit *Ops.Html.CSS.ElementCssTransform\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ElementCssTransform\_v2" **Docs:** [https://cables.gl/op/Ops.Html.CSS.ElementCssTransform\\_v2](https://cables.gl/op/Ops.Html.CSS.ElementCssTransform_v2)

---

### 13.68.17 ElmentCssScrollbar



**Full Name:** Ops.Html.CSS.ElmentCssScrollbar **Description:** Change color and thickness of scrollbars of an element

**> Input Ports:** - Visit *Ops.Html.CSS.ElmentCssScrollbar documentation* for input port details < **Output Ports:** - Visit *Ops.Html.CSS.ElmentCssScrollbar documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ElmentCssScrollbar" **Docs:** <https://cables.gl/op/Ops.Html.CSS.ElmentCssScrollbar>

---

### 13.68.18 GetCssVariable



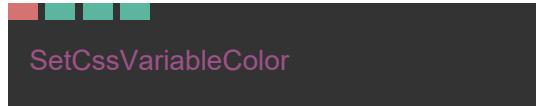
**Full Name:** Ops.Html.CSS.GetCssVariable **Description:** Full NameOps.Html.CSS.GetCssVariableVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch GetCssVariable Exampleclick the ice cream to randomly assign a color to the background color variable.

**> Input Ports:** - Visit `Ops.Html.CSS.GetCssVariable` documentation for input port details **< Output Ports:** - Visit `Ops.Html.CSS.GetCssVariable` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "GetCssVariable" **Docs:** <https://cables.gl/op/Ops.Html.CSS.GetCssVariable>

---

### 13.68.19 SetCssVariableColor



**Full Name:** `Ops.Html.CSS.SetCssVariableColor` **Description:** "CSS variables are entities defined by CSS authors that contain specific values to be reused throughout a document."

**> Input Ports:** - Visit `Ops.Html.CSS.SetCssVariableColor` documentation for input port details **< Output Ports:** - Visit `Ops.Html.CSS.SetCssVariableColor` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "SetCssVariableColor" **Docs:** <https://cables.gl/op/Ops.Html.CSS.SetCssVariableColor>

---

### 13.68.20 SetCssVariableNumber



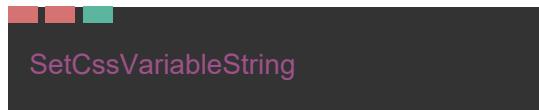
**Full Name:** `Ops.Html.CSS.SetCssVariableNumber` **Description:** Full NameOps.Html.CSS.SetCssVariableNumberVis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch SetCssVariableNumber ExampleOpen In EditorINPUT PORTSVar Name  
(String)Value (Number)Suffix (String)SaveCancel ChangelogPatches using SetCssVariableNumberEx-  
amples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Html.CSS.SetCssVariableNumber` documentation for input port details **< Output Ports:** - Visit `Ops.Html.CSS.SetCssVariableNumber` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SetCssVariableNumber" **Docs:** <https://cables.gl/op/Ops.Html.CSS.SetCssVariableNumber>

---

### 13.68.21 SetCssVariableString



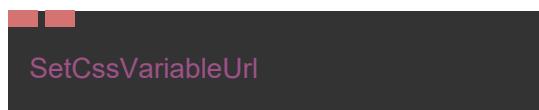
**Full Name:** Ops.Html.CSS.SetCssVariableString **Description:** Full NameOps.Html.CSS.SetCssVariableStringVisibi  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch SetCssVariableString ExampleOpen In EditorINPUT PORTSVar Name  
(String)Value (String)Output quoted string (Number: boolean)SaveCancel ChangelogPatches using  
SetCssVariableStringExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.SetCssVariableString documentation* for input port details **< Output  
Ports:** - Visit *Ops.Html.CSS.SetCssVariableString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SetCssVariableString" **Docs:** <https://cables.gl/op/Ops.Html.CSS.SetCssVariableString>

---

### 13.68.22 SetCssVariableUrl



**Full Name:** Ops.Html.CSS.SetCssVariableUrl **Description:** will set a variable to an url string, e.g:  
url(/assets/xyz/test.png)

**> Input Ports:** - Visit *Ops.Html.CSS.SetCssVariableUrl documentation* for input port details **< Output  
Ports:** - Visit *Ops.Html.CSS.SetCssVariableUrl documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SetCssVariableUrl" **Docs:** <https://cables.gl/op/Ops.Html.CSS.SetCssVariableUrl>

---

### 13.68.23 SwitchClass



**Full Name:** Ops.Html.CSS.SwitchClass **Description:** Full NameOps.Html.CSS.SwitchClassVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch SwitchClass ExampleOpen In EditorINPUT PORTSHTML Element  
(Object)Classname (String)Active (Number: boolean)SaveCancel ChangelogPatches using SwitchClas-  
sExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.CSS.SwitchClass documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.SwitchClass documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SwitchClass"  
**Docs:** <https://cables.gl/op/Ops.Html.CSS.SwitchClass>

---

### 13.68.24 TransformCSS3DElement



**Full Name:** Ops.Html.CSS.TransformCSS3DElement **Description:** converts the current transformation to css3d transforms

**> Input Ports:** - Visit *Ops.Html.CSS.TransformCSS3DElement documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.TransformCSS3DElement documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Transform-  
CSS3DElement" **Docs:** <https://cables.gl/op/Ops.Html.CSS.TransformCSS3DElement>

---

## 13.68.25 TransformElement



**Full Name:** Ops.Html.CSS.TransformElement **Description:** set html element left/top CSS attributes.

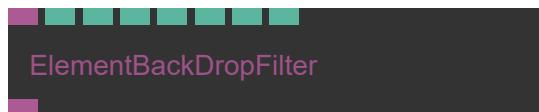
**> Input Ports:** - Visit *Ops.Html.CSS.TransformElement documentation* for input port details **< Output Ports:** - Visit *Ops.Html.CSS.TransformElement documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TransformElement" **Docs:** <https://cables.gl/op/Ops.Html.CSS.TransformElement>

---

## 13.69 Ops.Html.Css

### 13.69.1 ElementBackDropFilter



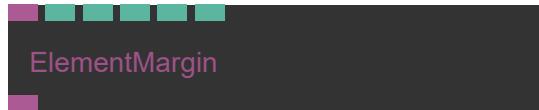
**Full Name:** Ops.Html.Css.ElementBackDropFilter **Description:** Full NameOps.Html.Css.ElementBackDropFilterVi  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch backdropOpen In EditorINPUT PORTSElement (Object)Blur  
(Number)Contrast (Number)Brightness (Number)Hue (Number)Invert (Number)Saturate (Num-  
ber)Sepia (Number)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using  
ElementBackDropFilterExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.Css.ElementBackDropFilter documentation* for input port details **< Output Ports:** - Visit *Ops.Html.Css.ElementBackDropFilter documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementBack-  
DropFilter" **Docs:** <https://cables.gl/op/Ops.Html.Css.ElementBackDropFilter>

---

## 13.69.2 ElementMargin



**Full Name:** Ops.Html.Css.ElementMargin **Description:** Full NameOps.Html.Css.ElementMarginVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSElement (Object:element)Margin  
(Number)Margin Top (Number)Margin Bottom (Number)Margin Left (Number)Margin Right (Num-  
ber)OUTPUT PORTSHTML Element (Object)SaveCancel ChangelogPatches using ElementMarginEx-  
amples Team cables Public My Patches My Ops

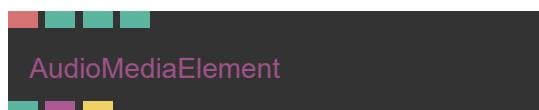
**> Input Ports:** - Visit *Ops.Html.Css.ElementMargin documentation* for input port details **< Output Ports:**  
- Visit *Ops.Html.Css.ElementMargin documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementMargin"  
**Docs:** <https://cables.gl/op/Ops.Html.Css.ElementMargin>

---

## 13.70 Ops.Html.Elements

### 13.70.1 AudioMediaElement



**Full Name:** Ops.Html.Elements.AudioMediaElement **Description:** Full NameOps.Html.Elements.AudioMediaEle-  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch AudioMediaElement ExampleOpen In EditorINPUT PORTSfile  
(String)Play (Number: boolean)Volume (Number)Loop (Number: boolean)OUTPUT PORTSPlaying  
(Number)Element (Object)Has Ended (Trigger)SaveCancel ChangelogPatches using AudioMediaEle-  
mentExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.Elements.AudioMediaElement documentation* for input port details **< Output Ports:**  
- Visit *Ops.Html.Elements.AudioMediaElement documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AudioMediaElement"  
**Docs:** <https://cables.gl/op/Ops.Html.Elements.AudioMediaElement>

---

### 13.70.2 Element\_v2



**Full Name:** Ops.Html.Elements.Element\_v2 **Description:** Full NameOps.Html.Elements.Element\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch HTML CSS OpsOpen In EditorINPUT PORTSText (String)Position index  
(Number: integer) Absolute Static Relative Fixed Interactive index (Number: integer) True False No  
Pointer Events AreaSet Size (Number: boolean)Width (Number)Height (Number)Size Units index  
(Number: integer) px % vwh Overflow index (Number: integer) Visible Hidden Scroll Auto CSSIn-  
line Style (String)CSS Class (String)Disable CSS Props (String)Display index (Number: integer)Tag  
Name (String)Opacity (Number)Propagate Click-Events (Number: boolean)Add to DOM (Num-  
ber: boolean)OUTPUT PORTSDOM Element (Object)Hovering (booleanNumber)Clicked (Trig-  
ger)SaveCancel ChangelogPatches using Element\_v2Examples Team cables Public My Patches My  
Ops

**> Input Ports:** - Visit *Ops.Html.Elements.Element\_v2 documentation* for input port details < **Output  
Ports:** - Visit *Ops.Html.Elements.Element\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Element\_v2"  
**Docs:** [https://cables.gl/op/Ops.Html.Elements.Element\\_v2](https://cables.gl/op/Ops.Html.Elements.Element_v2)

---

### 13.70.3 IFrame\_v3



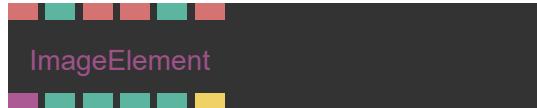
**Full Name:** Ops.Html.Elements.IFrame\_v3 **Description:** Some web addresses will not allow the page  
to be displayed in an iFrame.

> **Input Ports:** - Visit *Ops.Html.Elements.IFrame\_v3* documentation for input port details < **Output Ports:** - Visit *Ops.Html.Elements.IFrame\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "IFrame\_v3" **Docs:** [https://cables.gl/op/Ops.Html.Elements.IFrame\\_v3](https://cables.gl/op/Ops.Html.Elements.IFrame_v3)

---

#### 13.70.4 ImageElement\_v3



**Full Name:** Ops.Html.Elements.ImageElement\_v3 **Description:** Full NameOps.Html.Elements.ImageElement\_v3Vis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch ImageElement ExampleOpen In EditorINPUT PORTSFile (String)Position  
index (Number: integer) Absolute Static Relative Fixed Class (String)Style (String)CSS Display  
index (Number: integer) not set none Alt Text (String)OUTPUT PORTSImage Element (Ob-  
ject)Width (Number)Height (Number)Loading (booleanNumber)Error (booleanNumber)Loaded  
(Trigger)SaveCancel ChangelogPatches using ImageElement\_v3Examples Team cables Public My  
Patches My Ops

> **Input Ports:** - Visit *Ops.Html.Elements.ImageElement\_v3* documentation for input port details < **Output Ports:** - Visit *Ops.Html.Elements.ImageElement\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ImageEle-  
ment\_v3" **Docs:** [https://cables.gl/op/Ops.Html.Elements.ImageElement\\_v3](https://cables.gl/op/Ops.Html.Elements.ImageElement_v3)

---

#### 13.70.5 InputElement



**Full Name:** Ops.Html.Elements.InputElement **Description:** Full NameOps.Html.Elements.InputElementVisibilityC  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-

niuse queryExample Patch html input elementOpen In EditorINPUT PORTSElement index (Number: integer) Input Textarea Type index (Number: integer) Text Number Password Date Default Value (String)Placeholder (String)Id (String)Class (String)Style (String)Autocomplete (Number: boolean)Max Length (Number: integer)Enter Key Prevent Default (Number: boolean)Visible (Number: boolean)Focus (Trigger)Blur (Trigger)Clear (Trigger)Select (Trigger)OUTPUT PORTSDOM Element (Object)Value (String)Hover (booleanNumber)Enter pressed (Trigger)Escape pressed (Trigger)SaveCancel ChangelogPatches using InputElementExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.Elements.InputElement documentation* for input port details **< Output Ports:** - Visit *Ops.Html.Elements.InputElement documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InputElement" **Docs:** <https://cables.gl/op/Ops.Html.Elements.InputElement>

---

## 13.70.6 VideoElement



**Full Name:** Ops.Html.Elements.VideoElement **Description:** Full NameOps.Html.Elements.VideoElementVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch HTML VideoElementOpen In EditorINPUT PORTSAttributesFile (String)ID (String)Play (Number: boolean)Autoplay (Number: boolean)Controls (Number: boolean)Active (Number: boolean)Loop (Number: boolean)Muted (Number: boolean)Style (String)Rewind (Trigger)OUTPUT PORTSElement (Object)Playing (booleanNumber)Can Play Through (booleanNumber)Time (Number)Ended (Trigger)Has Error (booleanNumber)Error Message (String)Video Width (Number)Video Height (Number)SaveCancel ChangelogPatches using VideoElementExamples Team cables Public My Patches My Ops

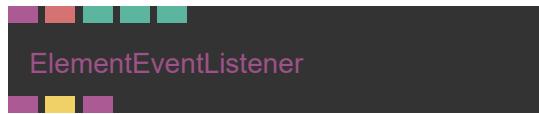
**> Input Ports:** - Visit *Ops.Html.Elements.VideoElement documentation* for input port details **< Output Ports:** - Visit *Ops.Html.Elements.VideoElement documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VideoElement" **Docs:** <https://cables.gl/op/Ops.Html.Elements.VideoElement>

---

## 13.71 Ops.Html.Event

### 13.71.1 ElementEventListener\_v2



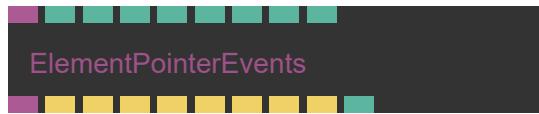
**Full Name:** Ops.Html.Event.ElementEventListener\_v2 **Description:** Adds a custom event listener to the HTML DOM element.

**> Input Ports:** - Visit [Ops.Html.Event.ElementEventListener\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.Event.ElementEventListener\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementEventListener\_v2" **Docs:** [https://cables.gl/op/Ops.Html.Event.ElementEventListener\\_v2](https://cables.gl/op/Ops.Html.Event.ElementEventListener_v2)

---

### 13.71.2 ElementPointerEvents



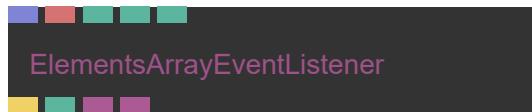
**Full Name:** Ops.Html.Event.ElementPointerEvents **Description:** Full NameOps.Html.Event.ElementPointerEvents  
Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSDom Element (Object)Mouse Down Active (Number: boolean)Mouse Up Active (Number: boolean)Click Active (Number: boolean)Mouse Move Active (Number: boolean)Touch Start Active (Number: boolean)Touch Move Active (Number: boolean)Touch End Active (Number: boolean)Touch Cancel Active (Number: boolean)OUTPUT PORTSEvent Object (Object)Mouse Down (Trigger)Mouse Up (Trigger)Click (Trigger)Mouse Move (Trigger)Touch Start (Trigger)Touch Move (Trigger)Touch End (Trigger)Touch Cancel (Trigger)Event Name (Number)SaveCancel ChangelogPatches using ElementPointerEventsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Html.Event.ElementPointerEvents documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.Event.ElementPointerEvents documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementPointerEvents" **Docs:** <https://cables.gl/op/Ops.Html.Event.ElementPointerEvents>

---

### 13.71.3 ElementsArrayEventListener



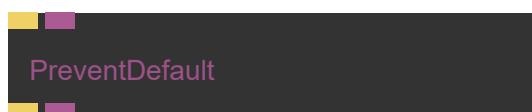
**Full Name:** Ops.Html.Event.ElementsArrayEventListener **Description:** add listeners to every html element in an array and handle these when fired

**> Input Ports:** - Visit *Ops.Html.Event.ElementsArrayEventListener documentation* for input port details  
**< Output Ports:** - Visit *Ops.Html.Event.ElementsArrayEventListener documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ElementsArrayEventListener" **Docs:** <https://cables.gl/op/Ops.Html.Event.ElementsArrayEventListener>

---

### 13.71.4 PreventDefault



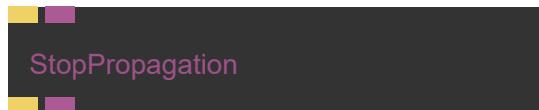
**Full Name:** Ops.Html.Event.PreventDefault **Description:** See w3schools: preventDefault()

**> Input Ports:** - Visit *Ops.Html.Event.PreventDefault documentation* for input port details **< Output Ports:** - Visit *Ops.Html.Event.PreventDefault documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PreventDefault" **Docs:** <https://cables.gl/op/Ops.Html.Event.PreventDefault>

---

## 13.71.5 StopPropagation



**Full Name:** Ops.Html.Event.stopPropagation **Description:** Prevents further propagation of the current event in the capturing and bubbling phases.

**> Input Ports:** - Visit [Ops.Html.Event.stopPropagation documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html.Event.stopPropagation documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "StopPropagation" **Docs:** <https://cables.gl/op/Ops.Html.Event.stopPropagation>

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## 13.72 Ops.Html\_Utils

### 13.72.1 CablesLink



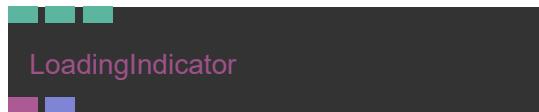
**Full Name:** Ops.Html\_Utils.CablesLink **Description:** Full NameOps.Html\_Utils.CablesLinkVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch hyperlink example Open another webpage /URL with a trigger

**> Input Ports:** - Visit [Ops.Html\\_Utils.CablesLink documentation](#) for input port details **< Output Ports:** - Visit [Ops.Html\\_Utils.CablesLink documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CablesLink" **Docs:** [https://cables.gl/op/Ops.Html\\_Utils.CablesLink](https://cables.gl/op/Ops.Html_Utils.CablesLink)

---

## 13.72.2 LoadingIndicator\_v2



**Full Name:** Ops.Html.Utils.LoadingIndicator\_v2 **Description:** Full NameOps.Html.Utils.LoadingIndicator\_v2VisiblOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch LoadingIndicator ExampleOpen In EditorINPUT PORTSVisible index (Number: integer) Hidden Visible Auto Center Position (Number: boolean)Style index (Number: integer) Spinner Ring Ellipsis OUTPUT PORTSElement (Object)Requests (Array)SaveCancel ChangelogPatches using LoadingIndicator\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html.Utils.LoadingIndicator\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Html.Utils.LoadingIndicator\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LoadingIndicator\_v2" **Docs:** [https://cables.gl/op/Ops.Html.Utils.LoadingIndicator\\_v2](https://cables.gl/op/Ops.Html.Utils.LoadingIndicator_v2)

---

## 13.72.3 Notification



**Full Name:** Ops.Html.Utils.Notification **Description:** The pop up will fade in and move to the end position.

**> Input Ports:** - Visit *Ops.Html.Utils.Notification documentation* for input port details **< Output Ports:** - Visit *Ops.Html.Utils.Notification documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Notification" **Docs:** <https://cables.gl/op/Ops.Html.Utils.Notification>

---

### 13.72.4 PlayButton



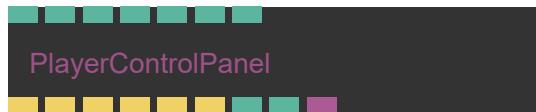
**Full Name:** Ops.Html.Utils.PlayButton **Description:** after the play button is pressed, it will disappear and from then continue triggering the next ops.

➤ **Input Ports:** - Visit [Ops.Html.Utils.PlayButton documentation](#) for input port details < **Output Ports:** - Visit [Ops.Html.Utils.PlayButton documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PlayButton"  
**Docs:** <https://cables.gl/op/Ops.Html.Utils.PlayButton>

---

### 13.72.5 PlayerControlPanel\_v2



**Full Name:** Ops.Html.Utils.PlayerControlPanel\_v2 **Description:** shows a player-ui that can be used to control mediaplayers or the timeline

➤ **Input Ports:** - Visit [Ops.Html.Utils.PlayerControlPanel\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Html.Utils.PlayerControlPanel\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PlayerControlPanel\_v2" **Docs:** [https://cables.gl/op/Ops.Html.Utils.PlayerControlPanel\\_v2](https://cables.gl/op/Ops.Html.Utils.PlayerControlPanel_v2)

---

### 13.72.6 QrCode



**Full Name:** Ops.Html.Utils.QrCode **Description:** Full NameOps.Html.Utils.QrCodeVisibilityCore  
Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-

listsJavascript Librariesqrcode.js (Cross-browser QRCode generator for javascript)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch CanvasToTexture QrCode ExampleOpen In EditorINPUT PORTSText (String)OUTPUT PORTSImage DataUrl (String)Element (Object)SaveCancel ChangelogPatches using QrCodeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Html\_Utils.QrCode* documentation for input port details **< Output Ports:** - Visit *Ops.Html\_Utils.QrCode* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "QrCode" **Docs:** [https://cables.gl/op/Ops.Html\\_Utils.QrCode](https://cables.gl/op/Ops.Html_Utils.QrCode)

---

## 13.72.7 YoutubePlayer



**Full Name:** Ops.Html\_Utils.YoutubePlayer **Description:** create an html element that contains a youtube player

**> Input Ports:** - Visit *Ops.Html\_Utils.YoutubePlayer* documentation for input port details **< Output Ports:** - Visit *Ops.Html\_Utils.YoutubePlayer* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "YoutubePlayer" **Docs:** [https://cables.gl/op/Ops.Html\\_Utils.YoutubePlayer](https://cables.gl/op/Ops.Html_Utils.YoutubePlayer)

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## 13.73 Ops.Json

### 13.73.1 ArrayOfObjectsMultiPort\_v2



**Full Name:** Ops.Json.ArrayOfObjectsMultiPort\_v2 **Description:** Full NameOps.Json.ArrayOfObjectsMultiPort\_v2 Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-

listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSObjectsObjects\_0 (Object)add port (Object)OUTPUT PORTSArray (Array)Num Values (Number)SaveCancel ChangelogPatches using ArrayOfObjectsMultiPort\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Json.ArrayOfObjectsMultiPort\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Json.ArrayOfObjectsMultiPort\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ArrayOfObjects-MultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ArrayOfObjectsMultiPort\\_v2](https://cables.gl/op/Ops.Json.ArrayOfObjectsMultiPort_v2)

---

### 13.73.2 CopyObject



**Full Name:** Ops.Json.CopyObject **Description:** Uses JSON serialization to create a copy of an object.

**> Input Ports:** - Visit [Ops.Json.CopyObject documentation](#) for input port details **< Output Ports:** - Visit [Ops.Json.CopyObject documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CopyObject" **Docs:** <https://cables.gl/op/Ops.Json.CopyObject>

---

### 13.73.3 CsvArray



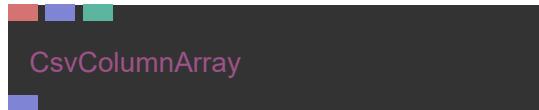
**Full Name:** Ops.Json.CsvArray **Description:** Let's you open uploaded CSV (character-separated-values)-files, which can be used to store tabular data, e.g.

**> Input Ports:** - Visit [Ops.Json.CsvArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Json.CsvArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CsvArray" **Docs:** <https://cables.gl/op/Ops.Json.CsvArray>

---

### 13.73.4 CsvColumnArray\_v2



**Full Name:** Ops.Json.CsvColumnArray\_v2 **Description:** Full NameOps.Json.CsvColumnArray\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSColumn Name (String)CSV Array (Array)Numbers (Number: boolean)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using CsvColumnArray\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.CsvColumnArray\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Json.CsvColumnArray\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CsvColumnArray\_v2" **Docs:** [https://cables.gl/op/Ops.Json.CsvColumnArray\\_v2](https://cables.gl/op/Ops.Json.CsvColumnArray_v2)

---

### 13.73.5 EmptyObject



**Full Name:** Ops.Json.EmptyObject **Description:** Full NameOps.Json.EmptyObjectVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch object manipulation exampleOpen In EditorOUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using EmptyObjectExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.EmptyObject documentation* for input port details **< Output Ports:** - Visit *Ops.Json.EmptyObject documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "EmptyObject" **Docs:** <https://cables.gl/op/Ops.Json.EmptyObject>

---

### 13.73.6 FilterValidObject



**Full Name:** Ops.Json.FilterValidObject **Description:** invalid objects will be ignored and not outputed

**> Input Ports:** - Visit *Ops.Json.FilterValidObject documentation* for input port details **< Output Ports:** - Visit *Ops.Json.FilterValidObject documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FilterValidObject"

**Docs:** <https://cables.gl/op/Ops.Json.FilterValidObject>

---

### 13.73.7 GateObject



**Full Name:** Ops.Json.GateObject **Description:** Full NameOps.Json.GateObjectVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverYoutube Video TutorialINPUT PORTSObject In (Object)Object in

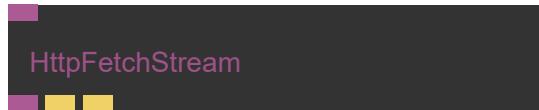
**> Input Ports:** - Visit *Ops.Json.GateObject documentation* for input port details **< Output Ports:** - Visit *Ops.Json.GateObject documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GateObject"

**Docs:** <https://cables.gl/op/Ops.Json.GateObject>

---

### 13.73.8 HttpFetchStream



**Full Name:** Ops.Json.HttpFetchStream **Description:** Full NameOps.Json.HttpFetchStreamVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryNo op example found on this serverINPUT PORTSFetch Response (Object)OUTPUT  
PORTSResult (Object)Received Result (Trigger)Started (Trigger)SaveCancel ChangelogPatches using  
HttpFetchStreamExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.HttpFetchStream documentation for input port details* **< Output Ports:**  
- Visit *Ops.Json.HttpFetchStream documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HttpFetchStream"  
**Docs:** <https://cables.gl/op/Ops.Json.HttpFetchStream>

---

### 13.73.9 HttpRequest\_v4



**Full Name:** Ops.Json.HttpRequest\_v4 **Description:** <https://dev.cables.gl/edit/gSRYVQ>

**> Input Ports:** - the content type of the body sent (if any): Send Credentials (Number: boolean)indicates whether or not cross-site Access-Control requests should be made using cre-  
dentials such as cookies, authorization headers or TLS client certificates. **< Output Ports:** - Visit  
*Ops.Json.HttpRequest\_v4 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HttpRequest\_v4"  
**Docs:** [https://cables.gl/op/Ops.Json.HttpRequest\\_v4](https://cables.gl/op/Ops.Json.HttpRequest_v4)

---

### 13.73.10 Object



Object

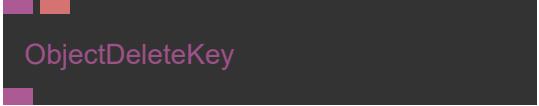
**Full Name:** Ops.Json.Object **Description:** Full NameOps.Json.ObjectVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSObject (Object)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using ObjectExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Json.Object documentation for input port details* < **Output Ports:** - Visit *Ops.Json.Object documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Object" **Docs:** <https://cables.gl/op/Ops.Json.Object>

---

### 13.73.11 ObjectDeleteKey



ObjectDeleteKey

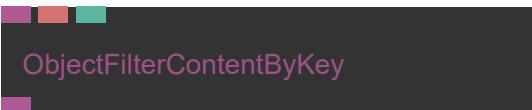
**Full Name:** Ops.Json.ObjectDeleteKey **Description:** Full NameOps.Json.ObjectDeleteKeyVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch object manipulation exampleOpen In EditorINPUT PORTSObject (Object)Key (String)OUTPUT PORTSObject Result (Object)SaveCancel ChangelogPatches using ObjectDeleteKeyExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Json.ObjectDeleteKey documentation for input port details* < **Output Ports:** - Visit *Ops.Json.ObjectDeleteKey documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectDeleteKey" **Docs:** <https://cables.gl/op/Ops.Json.ObjectDeleteKey>

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### 13.73.12 ObjectFilterContentByKey



**Full Name:** Ops.Json.ObjectFilterContentByKey **Description:** Full NameOps.Json.ObjectFilterContentByKeyVisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ObjectFilterContentByKey ExampleOpen In EditorINPUT PORTSObject (Object)name (String)Remove Null (Number: boolean)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using ObjectFilterContentByKeyExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectFilterContentByKey documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectFilterContentByKey documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectFilterContentByKey" **Docs:** <https://cables.gl/op/Ops.Json.ObjectFilterContentByKey>

---

### 13.73.13 ObjectFunnel



**Full Name:** Ops.Json.ObjectFunnel **Description:** Full NameOps.Json.ObjectFunnelVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSObject1 (Object)Object2 (Object)Object3 (Object)Object4 (Object)Object5 (Object)OUTPUT PORTSOut Object (Object)SaveCancel ChangelogPatches using ObjectFunnelExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectFunnel documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectFunnel documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectFunnel" **Docs:** <https://cables.gl/op/Ops.Json.ObjectFunnel>

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### 13.73.14 ObjectGetArray\_v2



**Full Name:** Ops.Json.ObjectGetArray\_v2 **Description:** Can be used e.g. for third-party API requests

**> Input Ports:** - Visit *Ops.Json.ObjectGetArray\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectGetArray\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ObjectGetArray\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectGetArray\\_v2](https://cables.gl/op/Ops.Json.ObjectGetArray_v2)

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### 13.73.15 ObjectGetNumber\_v2



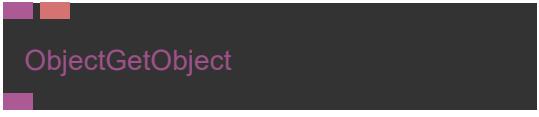
**Full Name:** Ops.Json.ObjectGetNumber\_v2 **Description:** Full NameOps.Json.ObjectGetNumber\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSData (Object)Key (String)OUTPUT  
PORTSResult (Number)Found (booleanNumber)SaveCancel ChangelogPatches using ObjectGetNum-  
ber\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectGetNumber\_v2 documentation* for input port details **< Output  
Ports:** - Visit *Ops.Json.ObjectGetNumber\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ObjectGetNumber\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectGetNumber\\_v2](https://cables.gl/op/Ops.Json.ObjectGetNumber_v2)

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### 13.73.16 ObjectGetObject\_v2



ObjectGetObject

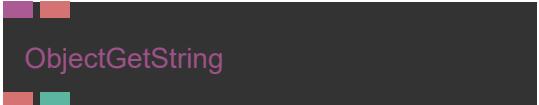
**Full Name:** Ops.Json.ObjectGetObject\_v2 **Description:** Full NameOps.Json.ObjectGetObject\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSObject (Object)Key (String)OUTPUT  
PORTSResult (Object)SaveCancel ChangelogPatches using ObjectGetObject\_v2Examples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectGetObject\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectGetObject\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectGetObject\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectGetObject\\_v2](https://cables.gl/op/Ops.Json.ObjectGetObject_v2)

---

### 13.73.17 ObjectGetString\_v2



ObjectGetString

**Full Name:** Ops.Json.ObjectGetString\_v2 **Description:** Full NameOps.Json.ObjectGetString\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch ObjectGetString ExampleObject Get String will parse an object and  
output contents at a specified key location as a string.

**> Input Ports:** - Visit *Ops.Json.ObjectGetString\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Json.ObjectGetString\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectGetString\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectGetString\\_v2](https://cables.gl/op/Ops.Json.ObjectGetString_v2)

---

### 13.73.18 ObjectIsNull



ObjectIsNull

**Full Name:** Ops.Json.ObjectIsNull **Description:** Full NameOps.Json.ObjectIsNullVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSObject (Object)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using ObjectIsNullExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectIsNull documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectIsNull documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ObjectIsNull"  
**Docs:** <https://cables.gl/op/Ops.Json.ObjectIsNull>

---

### 13.73.19 ObjectKeys



ObjectKeys

**Full Name:** Ops.Json.ObjectKeys **Description:** Full NameOps.Json.ObjectKeysVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch objectKeysOpen In EditorINPUT PORTSObject (Object)OUTPUT PORTSKeys (Array)Num Keys (Number)SaveCancel ChangelogPatches using ObjectKeysExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectKeys documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectKeys documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "ObjectKeys"  
**Docs:** <https://cables.gl/op/Ops.Json.ObjectKeys>

---

## 13.73.20 ObjectMerge



ObjectMerge

**Full Name:** Ops.Json.ObjectMerge **Description:** Full NameOps.Json.ObjectMergeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ObjectMergeOpen In EditorINPUT PORTSObject 1 (Object)Object 2 (Object)OUTPUT PORTSObject Result (Object)SaveCancel ChangelogPatches using ObjectMergeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectMerge documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectMerge documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectMerge" **Docs:** <https://cables.gl/op/Ops.Json.ObjectMerge>

---

## 13.73.21 ObjectOr



ObjectOr

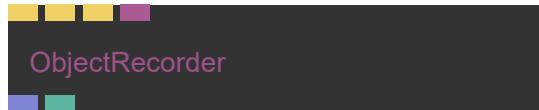
**Full Name:** Ops.Json.ObjectOr **Description:** Full NameOps.Json.ObjectOrVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSObject 1 (Object)Object 2 (Object)Object 3 (Object)Object 4 (Object)Object 5 (Object)Object 6 (Object)Object 7 (Object)Object 8 (Object)OUTPUT PORTSResult (Object)SaveCancel ChangelogPatches using ObjectOrExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectOr documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectOr documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectOr" **Docs:** <https://cables.gl/op/Ops.Json.ObjectOr>

---

## 13.73.22 ObjectRecorder



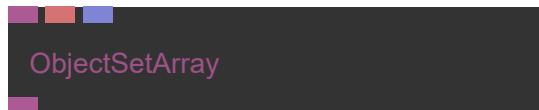
**Full Name:** Ops.Json.ObjectRecorder **Description:** Full NameOps.Json.ObjectRecorderVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSExec (Trigger)reset (Trigger)download  
(Trigger)Object (Object)OUTPUT PORTSResult (Array)Num Objects (Number)SaveCancel Changelog-  
Patches using ObjectRecorderExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectRecorder documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectRecorder documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectRecorder"  
**Docs:** <https://cables.gl/op/Ops.Json.ObjectRecorder>

---

## 13.73.23 ObjectSetArray\_v2



**Full Name:** Ops.Json.ObjectSetArray\_v2 **Description:** Full NameOps.Json.ObjectSetArray\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma separated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSObject (Object)Key (String)Value  
(Array)OUTPUT PORTSResult Object (Object)SaveCancel ChangelogPatches using ObjectSetAr-  
ray\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectSetArray\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.Json.ObjectSetArray\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectSetAr-  
ray\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectSetArray\\_v2](https://cables.gl/op/Ops.Json.ObjectSetArray_v2)

---

## 13.73.24 ObjectSetBool



**Full Name:** Ops.Json.ObjectSetBool **Description:** Full NameOps.Json.ObjectSetBoolVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch ObjectSetBool ExampleOpen In EditorINPUT PORTSObject (Object)Key  
(String)Boolean (Number: boolean)OUTPUT PORTSResult Object (Object)SaveCancel Changelog-  
Patches using ObjectSetBoolExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectSetBool documentation* for input port details **< Output Ports:** -  
Visit *Ops.Json.ObjectSetBool documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectSetBool"  
**Docs:** <https://cables.gl/op/Ops.Json.ObjectSetBool>

---

## 13.73.25 ObjectSetColorArray



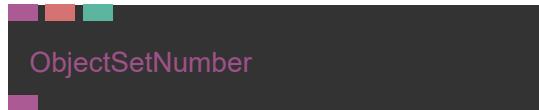
**Full Name:** Ops.Json.ObjectSetColorArray **Description:** Full NameOps.Json.ObjectSetColorArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch example objectSetColorArrayOpen In EditorINPUT PORTSObject  
(Object)Key (String)r (Number)g (Number)b (Number)a (Number)OUTPUT PORTSResult Object (Ob-  
ject)Out R (Number)Out G (Number)Out B (Number)Out A (Number)SaveCancel ChangelogPatches  
using ObjectSetColorArrayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectSetColorArray documentation* for input port details **< Output  
Ports:** - Visit *Ops.Json.ObjectSetColorArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectSetColor-  
Array" **Docs:** <https://cables.gl/op/Ops.Json.ObjectSetColorArray>

---

## 13.73.26 ObjectSetNumber\_v2



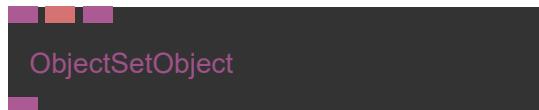
**Full Name:** Ops.Json.ObjectSetNumber\_v2 **Description:** Full Name Ops.Json.ObjectSetNumber\_v2 VisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence-Canuse query No op example found on this server INPUT PORTS Object (Object) Key (String) Number (Number) OUTPUT PORTS Result Object (Object) Save Cancel Changelog Patches using ObjectSetNumber\_v2 Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.ObjectSetNumber\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectSetNumber\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectSetNumber\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectSetNumber\\_v2](https://cables.gl/op/Ops.Json.ObjectSetNumber_v2)

---

## 13.73.27 ObjectSetObject\_v2



**Full Name:** Ops.Json.ObjectSetObject\_v2 **Description:** simple version to set an object as value in an object without a trigger

**> Input Ports:** - Visit *Ops.Json.ObjectSetObject\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ObjectSetObject\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectSetObject\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectSetObject\\_v2](https://cables.gl/op/Ops.Json.ObjectSetObject_v2)

---

### 13.73.28 ObjectSetString\_v2



**Full Name:** Ops.Json.ObjectSetString\_v2 **Description:** Full Name Ops.Json.ObjectSetString\_v2 Visibility Core Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence Caniuse query No op example found on this server INPUT PORTS Object (Object) Key (String) Value (String) OUTPUT PORTS Result Object (Object) Save Cancel Changelog Patches using ObjectSetString\_v2 Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Json.ObjectSetString\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Json.ObjectSetString\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectSetString\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectSetString\\_v2](https://cables.gl/op/Ops.Json.ObjectSetString_v2)

---

### 13.73.29 ObjectStringify\_v2



**Full Name:** Ops.Json.ObjectStringify\_v2 **Description:** basically javascripts JSON.stringify()

➤ **Input Ports:** - Visit *Ops.Json.ObjectStringify\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Json.ObjectStringify\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectStringify\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ObjectStringify\\_v2](https://cables.gl/op/Ops.Json.ObjectStringify_v2)

---

### 13.73.30 ObjectToArray



Ops.Json.ObjectToArray

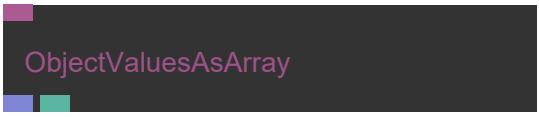
**Full Name:** Ops.Json.ObjectToArray **Description:** this should only be used with ajaxrequest, when you are sure it returns an array.

**> Input Ports:** - Visit [Ops.Json.ObjectToArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Json.ObjectToArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectToArray" **Docs:** <https://cables.gl/op/Ops.Json.ObjectToArray>

---

### 13.73.31 ObjectValuesAsArray



Ops.Json.ObjectValuesAsArray

**Full Name:** Ops.Json.ObjectValuesAsArray **Description:** Full NameOps.Json.ObjectValuesAsArrayVisibilityCore Op - visible for everyoneLicenseMITAuthorkohsgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch Example ObjectValuesExtracts all object values and outputs them as an array.

**> Input Ports:** - Visit [Ops.Json.ObjectValuesAsArray documentation](#) for input port details **< Output Ports:** - Visit [Ops.Json.ObjectValuesAsArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ObjectValue- sAsArray" **Docs:** <https://cables.gl/op/Ops.Json.ObjectValuesAsArray>

---

### 13.73.32 ParseObject\_v2



ParseObject

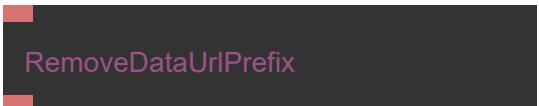
**Full Name:** Ops.Json.ParseObject\_v2 **Description:** Basically JSON.parse(), parses a string to an object. Valid objects are enclosed by {} and use double quotation marks for the keys, e.g.:

**> Input Ports:** - Visit *Ops.Json.ParseObject\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Json.ParseObject\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ParseObject\_v2" **Docs:** [https://cables.gl/op/Ops.Json.ParseObject\\_v2](https://cables.gl/op/Ops.Json.ParseObject_v2)

---

### 13.73.33 RemoveDataUrlPrefix



RemoveDataUrlPrefix

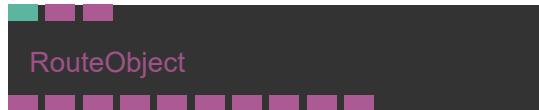
**Full Name:** Ops.Json.RemoveDataUrlPrefix **Description:** Full NameOps.Json.RemoveDataUrlPrefixVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSString Input (String)OUTPUT PORTSString Output (String)SaveCancel ChangelogPatches using RemoveDataUrlPrefixExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.RemoveDataUrlPrefix documentation* for input port details **< Output Ports:** - Visit *Ops.Json.RemoveDataUrlPrefix documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RemoveDataUrlPrefix" **Docs:** <https://cables.gl/op/Ops.Json.RemoveDataUrlPrefix>

---

### 13.73.34 RouteObject



**Full Name:** Ops.Json.RouteObject **Description:** If no object is plugged into the default object port then the output is null

**> Input Ports:** - Visit *Ops.Json.RouteObject documentation* for input port details **< Output Ports:** - Visit *Ops.Json.RouteObject documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RouteObject"  
**Docs:** <https://cables.gl/op/Ops.Json.RouteObject>

---

### 13.73.35 SaveJsonFile



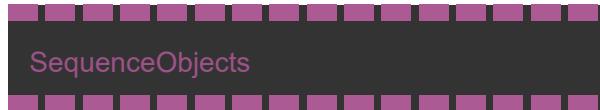
**Full Name:** Ops.Json.SaveJsonFile **Description:** Full NameOps.Json.SaveJsonFileVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch save json fileOpen In EditorINPUT PORTSdownload (Trigger)Filename (String)Object (Object)SaveCancel ChangelogPatches using SaveJsonFileExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.SaveJsonFile documentation* for input port details **< Output Ports:** - Visit *Ops.Json.SaveJsonFile documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SaveJsonFile"  
**Docs:** <https://cables.gl/op/Ops.Json.SaveJsonFile>

---

### 13.73.36 SequenceObjects\_v2



**Full Name:** Ops.Json.SequenceObjects\_v2 **Description:** Full NameOps.Json.SequenceObjects\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSNumber 0 (Object)Number 1 (Object)Number 2 (Object)Number 3 (Object)Number 4 (Object)Number 5 (Object)Number 6 (Object)Number 7 (Object)Number 8 (Object)Number 9 (Object)Number 10 (Object)Number 11 (Object)Number 12 (Object)Number 13 (Object)Number 14 (Object)Number 15 (Object)OUTPUT PORTSOutput 0 (Object)Output 1 (Object)Output 2 (Object)Output 3 (Object)Output 4 (Object)Output 5 (Object)Output 6 (Object)Output 7 (Object)Output 8 (Object)Output 9 (Object)Output 10 (Object)Output 11 (Object)Output 12 (Object)Output 13 (Object)Output 14 (Object)Output 15 (Object)SaveCancel ChangelogPatches using SequenceObjects\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Json.SequenceObjects\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Json.SequenceObjects\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SequenceObjects\_v2" **Docs:** [https://cables.gl/op/Ops.Json.SequenceObjects\\_v2](https://cables.gl/op/Ops.Json.SequenceObjects_v2)

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### 13.73.37 SwitchObject



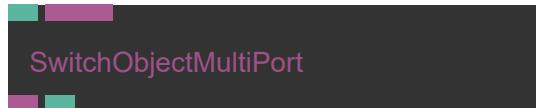
**Full Name:** Ops.Json.SwitchObject **Description:** Full NameOps.Json.SwitchObjectVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch SwitchObject ExampleUsed to switch between objects

**> Input Ports:** - Visit *Ops.Json.SwitchObject documentation* for input port details **< Output Ports:** - Visit *Ops.Json.SwitchObject documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SwitchObject"  
**Docs:** <https://cables.gl/op/Ops.Json.SwitchObject>

---

### 13.73.38 SwitchObjectMultiPort\_v2



**Full Name:** Ops.Json.SwitchObjectMultiPort\_v2 **Description:** Full NameOps.Json.SwitchObjectMultiPort\_v2Visible  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch SwitchObjectMultiPort ExampleOpen In EditorINPUT PORTSIndex  
(Number: integer)ObjectsObjects\_0 (Object)add port (Object)OUTPUT PORTSObject (Object)Num  
Values (Number)SaveCancel ChangelogPatches using SwitchObjectMultiPort\_v2Examples Team  
cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Json.SwitchObjectMultiPort\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Json.SwitchObjectMultiPort\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SwitchObjectMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Json.SwitchObjectMultiPort\\_v2](https://cables.gl/op/Ops.Json.SwitchObjectMultiPort_v2)

---

### 13.73.39 TriggerObject



**Full Name:** Ops.Json.TriggerObject **Description:** Full NameOps.Json.TriggerObjectVisibilityCore Op  
- visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDoc-  
umentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse  
queryNo op example found on this serverINPUT PORTSTrigger (Trigger)Object (Object)OUTPUT  
PORTSNext (Trigger)Result (Object)SaveCancel ChangelogPatches using TriggerObjectExamples  
Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Json.TriggerObject` documentation for input port details < **Output Ports:** - Visit `Ops.Json.TriggerObject` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "TriggerObject"  
**Docs:** <https://cables.gl/op/Ops.Json.TriggerObject>

---

### 13.73.40 TriggerObjectSetNumber



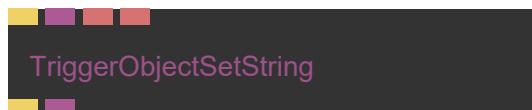
**Full Name:** `Ops.Json.TriggerObjectSetNumber` **Description:** Full Name`Ops.Json.TriggerObjectSetNumberVisibility`  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSTrigger (Trigger)Object (Object)Key  
(String)Number (Number)OUTPUT PORTSNext (Trigger)Result (Object)SaveCancel Changelog-  
Patches using TriggerObjectSetNumberExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Json.TriggerObjectSetNumber` documentation for input port details < **Output Ports:** - Visit `Ops.Json.TriggerObjectSetNumber` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "TriggerObjectSet-  
Number" **Docs:** <https://cables.gl/op/Ops.Json.TriggerObjectSetNumber>

---

### 13.73.41 TriggerObjectSetString



**Full Name:** `Ops.Json.TriggerObjectSetString` **Description:** Full Name`Ops.Json.TriggerObjectSetStringVisibility`  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSTrigger (Trigger)Object (Object)Key  
(String)String (String)OUTPUT PORTSNext (Trigger)Result (Object)SaveCancel ChangelogPatches  
using TriggerObjectSetStringExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Json.TriggerObjectSetString` documentation for input port details < **Output Ports:** - Visit `Ops.Json.TriggerObjectSetString` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "TriggerObjectSetString" **Docs:** <https://cables.gl/op/Ops.Json.TriggerObjectSetString>

---

## 13.74 Ops.Math

### 13.74.1 Abs



**Full Name:** `Ops.Math.Abs` **Description:** Converts negative numbers to positives, e.g.  $-3 \rightarrow 3$ .

> **Input Ports:** - Visit `Ops.Math.Abs` documentation for input port details < **Output Ports:** - The absolute value of Number (always positive): Check documentation

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Abs" **Docs:** <https://cables.gl/op/Ops.Math.Abs>

---

### 13.74.2 Accumulator



**Full Name:** `Ops.Math.Accumulator` **Description:** Handy when used with devices like gamepads or counters

> **Input Ports:** - Visit `Ops.Math.Accumulator` documentation for input port details < **Output Ports:** - Visit `Ops.Math.Accumulator` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Accumulator" **Docs:** <https://cables.gl/op/Ops.Math.Accumulator>

---

### 13.74.3 AddUp



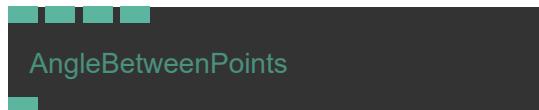
**Full Name:** Ops.Math.AddUp **Description:** Full NameOps.Math.AddUpVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch AddUp ExampleOpen In EditorINPUT PORTSNumber (Number)Add (Trigger)Reset (Trigger)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using AddUpExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.AddUp documentation* for input port details **< Output Ports:** - Visit *Ops.Math.AddUp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AddUp" **Docs:** <https://cables.gl/op/Ops.Math.AddUp>

---

### 13.74.4 AngleBetweenPoints



**Full Name:** Ops.Math.AngleBetweenPoints **Description:** Full NameOps.Math.AngleBetweenPointsVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Angle Between PointsOpen In EditorINPUT PORTSPoint 1 X (Number)Point 1 Y (Number)Point 2 X (Number)Point 2 Y (Number)OUTPUT PORTSAngle (Number)SaveCancel ChangelogPatches using AngleBetweenPointsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.AngleBetweenPoints documentation* for input port details **< Output Ports:** - Visit *Ops.Math.AngleBetweenPoints documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AngleBetweenPoints" **Docs:** <https://cables.gl/op/Ops.Math.AngleBetweenPoints>

---

### 13.74.5 Array3MultiplyMatrix



**Full Name:** Ops.Math.Array3MultiplyMatrix **Description:** Full NameOps.Math.Array3MultiplyMatrixVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)Array (Array)Matrix (Ar-  
ray)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using Array3MultiplyMatrixExamples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.Array3MultiplyMatrix documentation for input port details* **< Output Ports:** - Visit *Ops.Math.Array3MultiplyMatrix documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Ar-  
ray3MultiplyMatrix"* **Docs:** <https://cables.gl/op/Ops.Math.Array3MultiplyMatrix>

---

### 13.74.6 Array3To2dProjection



**Full Name:** Ops.Math.Array3To2dProjection **Description:** project 3d coordinates to a 2d space

**> Input Ports:** - Visit *Ops.Math.Array3To2dProjection documentation for input port details* **< Output Ports:** - Visit *Ops.Math.Array3To2dProjection documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Ar-  
ray3To2dProjection"* **Docs:** <https://cables.gl/op/Ops.Math.Array3To2dProjection>

---

## 13.74.7 Atan2



**Full Name:** Ops.Math.Atan2 **Description:** Full NameOps.Math.Atan2VisibilityCore Op - visible for everyoneLicenseMITAuthoractiongithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSX (Number)Y (Number)Phase (Number)Frequency (Number)OUTPUT PORTSResult (Number)Output as a float in the range from PI to -PI. (radians)

➤ **Input Ports:** - Visit *Ops.Math.Atan2 documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Atan2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Atan2" **Docs:** <https://cables.gl/op/Ops.Math.Atan2>

---

## 13.74.8 Average



**Full Name:** Ops.Math.Average **Description:** Full NameOps.Math.AverageVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSnumber (Number)Influence (Number)OUTPUT PORTSresult (Number)SaveCancel ChangelogPatches using AverageExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.Average documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Average documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Average" **Docs:** <https://cables.gl/op/Ops.Math.Average>

---

### 13.74.9 ButterflyCurve



**Full Name:** Ops.Math.ButterflyCurve **Description:** A curve shaped like a butterfly.

**> Input Ports:** - Visit *Ops.Math.ButterflyCurve documentation* for input port details **< Output Ports:** - Visit *Ops.Math.ButterflyCurve documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ButterflyCurve" **Docs:** <https://cables.gl/op/Ops.Math.ButterflyCurve>

---

### 13.74.10 Ceil



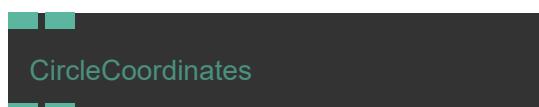
**Full Name:** Ops.Math.Ceil **Description:** Full NameOps.Math.CeilVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch round exampleOpen In EditorINPUT PORTSNumber (Number)The number to process

**> Input Ports:** - Visit *Ops.Math.Ceil documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Ceil documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Ceil" **Docs:** <https://cables.gl/op/Ops.Math.Ceil>

---

### 13.74.11 CircleCoordinates



**Full Name:** Ops.Math.CircleCoordinates **Description:** Full NameOps.Math.CircleCoordinatesVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch circlecoordinates exampleOpen In EditorINPUT PORTSPosition (Number)Radius (Number)OUTPUT PORTSX (Number)Y (Number)SaveCancel ChangelogPatches using CircleCoordinatesExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.CircleCoordinates documentation* for input port details **< Output Ports:**  
- Visit *Ops.Math.CircleCoordinates documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CircleCoordinates"

**Docs:** <https://cables.gl/op/Ops.Math.CircleCoordinates>

---

### 13.74.12 Clamp



**Full Name:** Ops.Math.Clamp **Description:** Full NameOps.Math.ClampVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSval (Number)The number you want to make sure is in range [Minimum, Maximum]

**> Input Ports:** - Visit *Ops.Math.Clamp documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Clamp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Clamp" **Docs:** <https://cables.gl/op/Ops.Math.Clamp>

---

### 13.74.13 Cosine



**Full Name:** Ops.Math.Cosine **Description:** This function expects the values of the angle parameter to be provided in radians.

> **Input Ports:** - Visit *Ops.Math.Cosine documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Cosine documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Cosine" **Docs:** <https://cables.gl/op/Ops.Math.Cosine>

---

### 13.74.14 Cross



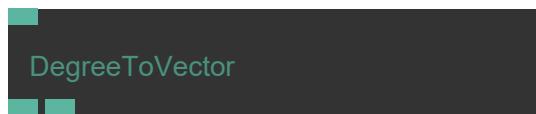
**Full Name:** Ops.Math.Cross **Description:** Full NameOps.Math.CrossVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSExec (Trigger)X1 (Number)Y1 (Number)Z1 (Number)X2 (Number)Y2 (Number)Z2 (Number)OUTPUT PORTSNext (Trigger)X (Number)Y (Number)Z (Number)SaveCancel ChangelogPatches using CrossExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Math.Cross documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Cross documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Cross" **Docs:** <https://cables.gl/op/Ops.Math.Cross>

---

### 13.74.15 DegreeToVector



**Full Name:** Ops.Math.DegreeToVector **Description:** If you e.g. pass in 90, x will be -1 and y 0 (so counter-clockwise)

**> Input Ports:** - The angle you want to convert (in degrees): *Check documentation* **< Output Ports:**  
- Visit *Ops.Math.DegreeToVector documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DegreeToVector"  
**Docs:** <https://cables.gl/op/Ops.Math.DegreeToVector>

---

### 13.74.16 Degrees



**Full Name:** Ops.Math.Degrees **Description:** Trigonometric functions in Javascript require their parameters to be specified in radians.

**> Input Ports:** - Visit *Ops.Math.Degrees documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Degrees documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Degrees" **Docs:** <https://cables.gl/op/Ops.Math.Degrees>

---

### 13.74.17 Delta



**Full Name:** Ops.Math.Delta **Description:** Full NameOps.Math.DeltaVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSValue (Number)Change Always (Number: boolean)Reset (Trigger)OUTPUT PORTSDelta (Number)SaveCancel ChangelogPatches using DeltaExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.Delta documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Delta documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Delta" **Docs:** <https://cables.gl/op/Ops.Math.Delta>

---

### 13.74.18 DeltaSum



**Full Name:** Ops.Math.DeltaSum **Description:** Full NameOps.Math.DeltaSumVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch scrollOpen In EditorINPUT PORTSDelta Value (Number)Default Value (Number)Multiply (Number)Reset (Trigger)LimitLimit (Number: boolean)Min (Number)Max (Num- ber)Rubberband (Number)OUTPUT PORTSAbsolute Value (Number)SaveCancel ChangelogPatches using DeltaSumExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.DeltaSum* documentation for input port details < **Output Ports:** - Visit *Ops.Math.DeltaSum* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DeltaSum" **Docs:** <https://cables.gl/op/Ops.Math.DeltaSum>

---

### 13.74.19 Difference



**Full Name:** Ops.Math.Difference **Description:** result will always be a positive number or zero

➤ **Input Ports:** - Visit *Ops.Math.Difference* documentation for input port details < **Output Ports:** - Visit *Ops.Math.Difference* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Difference" **Docs:** <https://cables.gl/op/Ops.Math.Difference>

---

## 13.74.20 Distance2d



**Full Name:** Ops.Math.Distance2d **Description:** Updates the output (Distance) every time one of the values changes.

**> Input Ports:** - Visit *Ops.Math.Distance2d documentation for input port details* **< Output Ports:** - Visit *Ops.Math.Distance2d documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Distance2d"  
**Docs:** <https://cables.gl/op/Ops.Math.Distance2d>

---

## 13.74.21 Distance3d\_v2



**Full Name:** Ops.Math.Distance3d\_v2 **Description:** Full NameOps.Math.Distance3d\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryNo op example found on this serverINPUT PORTSCalc (Trigger)Point 1x1 (Number)y1  
(Number)z1 (Number)Point 2x2 (Number)y2 (Number)z2 (Number)OUTPUT PORTSNext (Trig-  
ger)distance (Number)SaveCancel ChangelogPatches using Distance3d\_v2Examples Team cables  
Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.Distance3d\_v2 documentation for input port details* **< Output Ports:** - Visit *Ops.Math.Distance3d\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Distance3d\_v2"  
**Docs:** [https://cables.gl/op/Ops.Math.Distance3d\\_v2](https://cables.gl/op/Ops.Math.Distance3d_v2)

---

## 13.74.22 Divide



**Full Name:** Ops.Math.Divide **Description:** Full NameOps.Math.DivideVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSnumber1 (Number)a in a / b

► **Input Ports:** - Visit *Ops.Math.Divide documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Divide documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Divide" **Docs:** <https://cables.gl/op/Ops.Math.Divide>

---

## 13.74.23 Ease



**Full Name:** Ops.Math.Ease **Description:** Check this page for a visual guide to the different easing options.

► **Input Ports:** - Visit *Ops.Math.Ease documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Ease documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Ease" **Docs:** <https://cables.gl/op/Ops.Math.Ease>

---

## 13.74.24 Exp



**Full Name:** Ops.Math.Exp **Description:** See Euler's number ( $e^1, e^2, \dots$ )

> **Input Ports:** - Visit *Ops.Math.Exp* documentation for input port details < **Output Ports:** - Visit *Ops.Math.Exp* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Exp" **Docs:** <https://cables.gl/op/Ops.Math.Exp>

---

### 13.74.25 FlipSign



**Full Name:** Ops.Math.FlipSign **Description:** Full NameOps.Math.FlipSignVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSValue (Number)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using FlipSignExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Math.FlipSign* documentation for input port details < **Output Ports:** - Visit *Ops.Math.FlipSign* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FlipSign" **Docs:** <https://cables.gl/op/Ops.Math.FlipSign>

---

### 13.74.26 Floor



**Full Name:** Ops.Math.Floor **Description:** Full NameOps.Math.FloorVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch round exampleOpen In EditorINPUT PORTSNumber (Number)OUTPUT PORTSResult (Number)floored number

➤ **Input Ports:** - Visit [Ops.Math.Floor documentation](#) for input port details < **Output Ports:** - Visit [Ops.Math.Floor documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "Floor"](#) **Docs:** <https://cables.gl/op/Ops.Math.Floor>

---

### 13.74.27 Fract



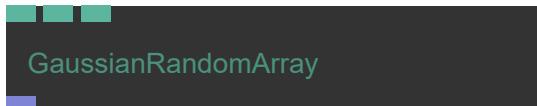
**Full Name:** Ops.Math.Fract **Description:** E.g. value: 1.5, result: 0.5

➤ **Input Ports:** - Visit [Ops.Math.Fract documentation](#) for input port details < **Output Ports:** - Visit [Ops.Math.Fract documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "Fract"](#) **Docs:** <https://cables.gl/op/Ops.Math.Fract>

---

### 13.74.28 GaussianRandomArray



**Full Name:** Ops.Math.GaussianRandomArray **Description:** Full NameOps.Math.GaussianRandomArrayVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch gaussian distributed random numbersOpen In EditorINPUT PORTSNum (Number: integer)Deviation (Number)Random Seed (Number)OUTPUT PORTSArray (Array)SaveCancel ChangelogPatches using GaussianRandomArrayExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Math.GaussianRandomArray documentation](#) for input port details < **Output Ports:** - Visit [Ops.Math.GaussianRandomArray documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GaussianRandomArray" **Docs:** <https://cables.gl/op/Ops.Math.GaussianRandomArray>

---

### 13.74.29 Incrementor



**Full Name:** Ops.Math.Incrementor **Description:** Note updating 'default' input will immediately reset the Incrementor to the default value.

► **Input Ports:** - Visit *Ops.Math.Incrementor documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Math.Incrementor documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Incrementor" **Docs:** <https://cables.gl/op/Ops.Math.Incrementor>

---

### 13.74.30 IndexFraction



**Full Name:** Ops.Math.IndexFraction **Description:** Example:

► **Input Ports:** - Visit *Ops.Math.IndexFraction documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Math.IndexFraction documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "IndexFraction" **Docs:** <https://cables.gl/op/Ops.Math.IndexFraction>

---

### 13.74.31 Interpolate



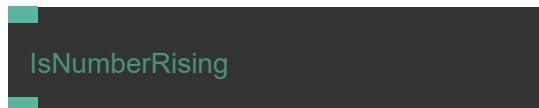
**Full Name:** Ops.Math.Interpolate **Description:** Full NameOps.Math.InterpolateVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSValue 1 (Number)Value 2 (Number)Percentage (Number)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using InterpolateExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.Interpolate documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Interpolate documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Interpolate"  
**Docs:** <https://cables.gl/op/Ops.Math.Interpolate>

---

### 13.74.32 IsNumberRising



**Full Name:** Ops.Math.IsNumberRising **Description:** Full NameOps.Math.IsNumberRisingVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example IsNumberRisingChecks if a number is increasing and outputs a "true" / "false" state.

➤ **Input Ports:** - Visit *Ops.Math.IsNumberRising documentation* for input port details < **Output Ports:** - Visit *Ops.Math.IsNumberRising documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IsNumberRising"  
**Docs:** <https://cables.gl/op/Ops.Math.IsNumberRising>

---

### 13.74.33 Log



**Full Name:** Ops.Math.Log **Description:** Full NameOps.Math.LogVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSnumber (Number)The value you want to know the logarithm of

➤ **Input Ports:** - Visit *Ops.Math.Log* documentation for input port details < **Output Ports:** - Visit *Ops.Math.Log* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Log" **Docs:** <https://cables.gl/op/Ops.Math.Log>

---

### 13.74.34 MapGeoCoordsSpherical



**Full Name:** Ops.Math.MapGeoCoordsSpherical **Description:** Full NameOps.Math.MapGeoCoordsSphericalVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch MapGeoCoordsSpherical exampleOpen In EditorINPUT PORTSCoordinates (Array)Radius (Number)OUTPUT PORTSResult (Array)SaveCancel ChangelogPatches using MapGeoCoordsSphericalExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.MapGeoCoordsSpherical* documentation for input port details < **Output Ports:** - Visit *Ops.Math.MapGeoCoordsSpherical* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MapGeoCoordsSpherical" **Docs:** <https://cables.gl/op/Ops.Math.MapGeoCoordsSpherical>

---

### 13.74.35 MapRange



**Full Name:** Ops.Math.MapRange **Description:** changes a number's relative value by mapping within one range to the equivalent position in another range.

➤ **Input Ports:** - Visit *Ops.Math.MapRange documentation* for input port details < **Output Ports:** - Visit *Ops.Math.MapRange documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MapRange" **Docs:** <https://cables.gl/op/Ops.Math.MapRange>

---

### 13.74.36 Math



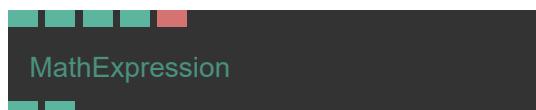
**Full Name:** Ops.Math.Math **Description:** Allows the following mathematical modes to be applied to 2 numbers.

➤ **Input Ports:** - Visit *Ops.Math.Math documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Math documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Math" **Docs:** <https://cables.gl/op/Ops.Math.Math>

---

### 13.74.37 MathExpression



**Full Name:** Ops.Math.MathExpression **Description:** With this op, you can write your own mathematical expression to be calculated. You can use up to 4 numbers (a, b, c, d) in this equation. Just type in the

lower-case letter of the port you want to use in the equation input.

**> Input Ports:** - Visit *Ops.Math.MathExpression* documentation for input port details **< Output Ports:** - Visit *Ops.Math.MathExpression* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MathExpression" **Docs:** <https://cables.gl/op/Ops.Math.MathExpression>

---

### 13.74.38 Max



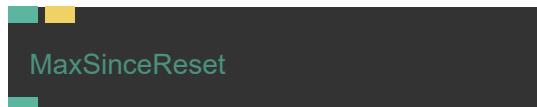
**Full Name:** Ops.Math.Max **Description:** Full NameOps.Math.MaxVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch max exampleOpen In EditorINPUT PORTSValue (Number)Value 1

**> Input Ports:** - Visit *Ops.Math.Max* documentation for input port details **< Output Ports:** - Visit *Ops.Math.Max* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Max" **Docs:** <https://cables.gl/op/Ops.Math.Max>

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### 13.74.39 MaxSinceReset



**Full Name:** Ops.Math.MaxSinceReset **Description:** Full NameOps.Math.MaxSinceResetVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSValue (Number)Reset (Trigger)OUTPUT PORTSMaximum (Number)SaveCancel ChangelogPatches using MaxSinceResetExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Math.MaxSinceReset` documentation for input port details < **Output Ports:** - Visit `Ops.Math.MaxSinceReset` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "MaxSinceReset"  
**Docs:** <https://cables.gl/op/Ops.Math.MaxSinceReset>

---

### 13.74.40 MercatorCoord



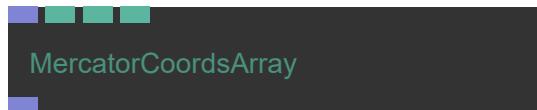
**Full Name:** `Ops.Math.MercatorCoord` **Description:** Full NameOps.Math.MercatorCoordVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch mercator projection map geoOpen In EditorINPUT PORTSLatitude  
(Number)Longitude (Number)MapWidth (Number)MapHeight (Number)OUTPUT PORTSX (Number)Y  
(Number)SaveCancel ChangelogPatches using MercatorCoordExamples Team cables Public My  
Patches My Ops

> **Input Ports:** - Visit `Ops.Math.MercatorCoord` documentation for input port details < **Output Ports:** - Visit `Ops.Math.MercatorCoord` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "MercatorCoord"  
**Docs:** <https://cables.gl/op/Ops.Math.MercatorCoord>

---

### 13.74.41 MercatorCoordsArray



**Full Name:** `Ops.Math.MercatorCoordsArray` **Description:** The globe is unrolled into a flat plane.

> **Input Ports:** - Visit `Ops.Math.MercatorCoordsArray` documentation for input port details < **Output Ports:** - Visit `Ops.Math.MercatorCoordsArray` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "MercatorCoordsArray" **Docs:** <https://cables.gl/op/Ops.Math.MercatorCoordsArray>

---

### 13.74.42 MinSinceReset



**Full Name:** Ops.Math.MinSinceReset **Description:** Full NameOps.Math.MinSinceResetVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCanuse queryNo op example found on this serverINPUT PORTSValue (Number)Reset (Trigger)OUTPUT PORTSMinimum (Number)SaveCancel ChangelogPatches using MinSinceResetExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Math.MinSinceReset documentation](#) for input port details **< Output Ports:** - Visit [Ops.Math.MinSinceReset documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "MinSinceReset" **Docs:** <https://cables.gl/op/Ops.Math.MinSinceReset>

---

### 13.74.43 Min\_v3



**Full Name:** Ops.Math.Min\_v3 **Description:** Result will be the smaller number – either Value or Minimum

**> Input Ports:** - Visit [Ops.Math.Min\\_v3 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Math.Min\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "Min\_v3" **Docs:** [https://cables.gl/op/Ops.Math.Min\\_v3](https://cables.gl/op/Ops.Math.Min_v3)

---

## 13.74.44 Modulo



**Full Name:** Ops.Math.Modulo **Description:** The result of a division, e.g. if you divide 5 by 2, the rest is 1, this is modulo.

➤ **Input Ports:** - Visit *Ops.Math.Modulo documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Modulo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “Modulo” **Docs:** <https://cables.gl/op/Ops.Math.Modulo>

---

## 13.74.45 MulMatrixXyz



**Full Name:** Ops.Math.MulMatrixXyz **Description:** Full NameOps.Math.MulMatrixXyzVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch mulMatrixXYZOpen In EditorINPUT PORTSUpdate (Trigger)X (Number)Y (Number)Z (Number)Matrix (Array)OUTPUT PORTSNext (Trigger)Result X (Number)Result Y (Number)Result Z (Number)SaveCancel ChangelogPatches using MulMatrixXyzExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.MulMatrixXyz documentation* for input port details < **Output Ports:** - Visit *Ops.Math.MulMatrixXyz documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “MulMatrixXyz” **Docs:** <https://cables.gl/op/Ops.Math.MulMatrixXyz>

---

## 13.74.46 Multiply



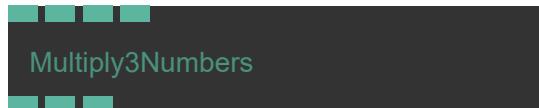
**Full Name:** Ops.Math.Multiply **Description:** Full NameOps.Math.MultiplyVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch multiply exampleOpen In EditorINPUT PORTSnumber1 (Number)number2 (Number)OUTPUT PORTSresult (Number)Result of the multiplication

➤ **Input Ports:** - Visit *Ops.Math.Multiply documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Multiply documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Multiply" **Docs:** <https://cables.gl/op/Ops.Math.Multiply>

---

## 13.74.47 Multiply3Numbers



**Full Name:** Ops.Math.Multiply3Numbers **Description:** Full NameOps.Math.Multiply3NumbersVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSR (Number)G (Number)B (Number)Multiply (Number)OUTPUT PORTSResultR (Number)ResultG (Number)ResultB (Number)SaveCancel ChangelogPatches using Multiply3NumbersExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.Multiply3Numbers documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Multiply3Numbers documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Multiply3Numbers" **Docs:** <https://cables.gl/op/Ops.Math.Multiply3Numbers>

---

## 13.74.48 Normalize



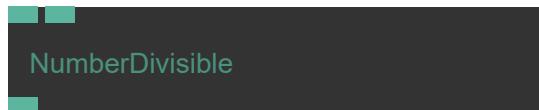
**Full Name:** Ops.Math.Normalize **Description:** Full NameOps.Math.NormalizeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch normalize exampleOpen In EditorINPUT PORTSX (Number)Y (Number)Z (Number)OUTPUT PORTSResult X (Number)Result Y (Number)Result Z (Number)SaveCancel ChangelogPatches using NormalizeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.Normalize documentation for input port details* **< Output Ports:** - Visit *Ops.Math.Normalize documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Normalize"* **Docs:** <https://cables.gl/op/Ops.Math.Normalize>

---

## 13.74.49 NumberDivisible



**Full Name:** Ops.Math.NumberDivisible **Description:** Full NameOps.Math.NumberDivisibleVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch number divisibleOpen In EditorINPUT PORTSNumber (Number)Divisor (Number)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using NumberDivisibleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.NumberDivisible documentation for input port details* **< Output Ports:** - Visit *Ops.Math.NumberDivisible documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "NumberDivisible"* **Docs:** <https://cables.gl/op/Ops.Math.NumberDivisible>

---

## 13.74.50 OneMinus



**Full Name:** Ops.Math.OneMinus **Description:** Full NameOps.Math.OneMinusVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch OneMinus ColorPicker ExampleShows how to use the sidebar Ops.Sidebar.ColorPicker op to control the patch background color. The color components (red / green / blue) are then inverted (with the Ops.Math.OneMinus op) to create the complementary color, which is used as the fill color of the circle.

➤ **Input Ports:** - Visit *Ops.Math.OneMinus documentation* for input port details < **Output Ports:** - Visit *Ops.Math.OneMinus documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "OneMinus" **Docs:** <https://cables.gl/op/Ops.Math.OneMinus>

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## 13.74.51 PerlinNoise\_v2



**Full Name:** Ops.Math.PerlinNoise\_v2 **Description:** Uses a controllable Perlin Noise function to output a value.

➤ **Input Ports:** - Visit *Ops.Math.PerlinNoise\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Math.PerlinNoise\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PerlinNoise\_v2" **Docs:** [https://cables.gl/op/Ops.Math.PerlinNoise\\_v2](https://cables.gl/op/Ops.Math.PerlinNoise_v2)

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## 13.74.52 Pi



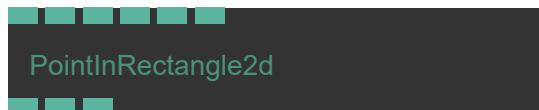
**Full Name:** Ops.Math.Pi **Description:** Outputs PI \* multiply amount.

**> Input Ports:** - Visit [Ops.Math.Pi documentation](#) for input port details **< Output Ports:** - Visit [Ops.Math.Pi documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Pi" **Docs:** <https://cables.gl/op/Ops.Math.Pi>

---

## 13.74.53 PointInRectangle2d



**Full Name:** Ops.Math.PointInRectangle2d **Description:** Full NameOps.Math.PointInRectangle2dVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch PointInRectangle2dOpen In EditorINPUT PORTSx (Number)y  
(Number)rect top (Number)rect left (Number)rect right (Number)rect bottom (Number)OUTPUT  
PORTSResult (Number)Pos x (Number)Pos y (Number)SaveCancel ChangelogPatches using PointIn-  
Rectangle2dExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Math.PointInRectangle2d documentation](#) for input port details **< Output Ports:** - Visit [Ops.Math.PointInRectangle2d documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PointInRectangle2d" **Docs:** <https://cables.gl/op/Ops.Math.PointInRectangle2d>

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## 13.74.54 Pow



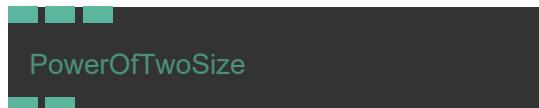
**Full Name:** Ops.Math.Pow **Description:** returns the base to the exponent power, that is, base exponent.

➤ **Input Ports:** - Visit *Ops.Math.Pow documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Pow documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Pow" **Docs:** <https://cables.gl/op/Ops.Math.Pow>

---

## 13.74.55 PowerOfTwoSize



**Full Name:** Ops.Math.PowerOfTwoSize **Description:** Full NameOps.Math.PowerOfTwoSizeVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSWidth (Number: integer)Height  
(Number: integer)Strategy index (Number: integer)OUTPUT PORTSWidth Result (Number)Height  
Result (Number)SaveCancel ChangelogPatches using PowerOfTwoSizeExamples Team cables Public  
My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.PowerOfTwoSize documentation* for input port details < **Output Ports:**  
- Visit *Ops.Math.PowerOfTwoSize documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PowerOfTwoSize"  
**Docs:** <https://cables.gl/op/Ops.Math.PowerOfTwoSize>

---

## 13.74.56 Radians



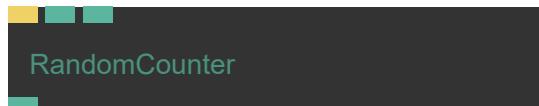
**Full Name:** Ops.Math.Radians **Description:** Trigonometric functions in Javascript require their parameters to be specified in radians.

➤ **Input Ports:** - Visit [Ops.Math.Radians documentation](#) for input port details < **Output Ports:** - Visit [Ops.Math.Radians documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Radians" **Docs:** <https://cables.gl/op/Ops.Math.Radians>

---

## 13.74.57 RandomCounter



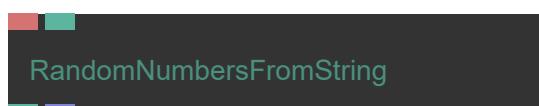
**Full Name:** Ops.Math.RandomCounter **Description:** Full NameOps.Math.RandomCounterVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch Random Counter - ExampleAdd up random numbers by triggering

➤ **Input Ports:** - Visit [Ops.Math.RandomCounter documentation](#) for input port details < **Output Ports:** - Visit [Ops.Math.RandomCounter documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomCounter" **Docs:** <https://cables.gl/op/Ops.Math.RandomCounter>

---

## 13.74.58 RandomNumbersFromString



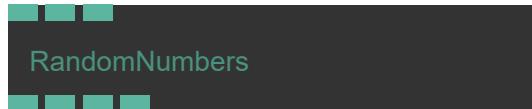
**Full Name:** Ops.Math.RandomNumbersFromString **Description:** Full NameOps.Math.RandomNumbersFromStringVis  
Op - visible for everyoneLicenseMITAuthor kohsgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch randomNumbersFromStringOpen In EditorINPUT PORTSInput string  
(String)Random number count (Number: integer)OUTPUT PORTSRandom value (Number)Random  
Numbers (Array)SaveCancel ChangelogPatches using RandomNumbersFromStringExamples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.RandomNumbersFromString* documentation for input port details **< Output Ports:** - Visit *Ops.Math.RandomNumbersFromString* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomNumbers-  
FromString" **Docs:** <https://cables.gl/op/Ops.Math.RandomNumbersFromString>

---

### 13.74.59 RandomNumbers\_v3



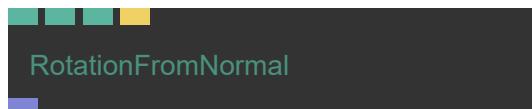
**Full Name:** Ops.Math.RandomNumbers\_v3 **Description:** Outputs four generated numbers of a selected seed within the range set by "Min" and "Max" values.

**> Input Ports:** - Visit *Ops.Math.RandomNumbers\_v3* documentation for input port details **< Output Ports:** - Visit *Ops.Math.RandomNumbers\_v3* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RandomNumbers\_v3" **Docs:** [https://cables.gl/op/Ops.Math.RandomNumbers\\_v3](https://cables.gl/op/Ops.Math.RandomNumbers_v3)

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### 13.74.60 RotationFromNormal



**Full Name:** Ops.Math.RotationFromNormal **Description:** Full NameOps.Math.RotationFromNormalVisibilityCore  
Op - visible for everyoneLicenseMITAuthor\_LJ\_github sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-

niuse queryNo op example found on this serverINPUT PORTSNormal X (Number)Normal Y (Number)Normal Z (Number)recalculate (Trigger)OUTPUT PORTSRotationMatrix (Array)SaveCancel ChangeLogPatches using RotationFromNormalExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Math.RotationFromNormal documentation* for input port details < **Output Ports:** - Visit *Ops.Math.RotationFromNormal documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RotationFromNormal" **Docs:** <https://cables.gl/op/Ops.Math.RotationFromNormal>

---

### 13.74.61 Round



**Full Name:** Ops.Math.Round **Description:** Full NameOps.Math.RoundVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch round exampleOpen In EditorINPUT PORTSnumber (Number)The number to round

> **Input Ports:** - Visit *Ops.Math.Round documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Round documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Round" **Docs:** <https://cables.gl/op/Ops.Math.Round>

---

### 13.74.62 RoundEven



**Full Name:** Ops.Math.RoundEven **Description:** Full NameOps.Math.RoundEvenVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RoundEven ExampleOpen In EditorINPUT PORTSNumber (Number)the number

**> Input Ports:** - or down (floor): Check documentation **< Output Ports:** - Visit `Ops.Math.RoundEven` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "RoundEven"  
**Docs:** <https://cables.gl/op/Ops.Math.RoundEven>

---

### 13.74.63 SchlickBias



**Full Name:** `Ops.Math.SchlickBias` **Description:** Full Name `Ops.Math.SchlickBias` Visibility Core Op - visible for everyone License MIT Author [pandurgithub](#) source Maintained by Team [cables](#) Patchlists Documentation (markdown) Issues Example patch id [Youtube](#) ids (comma seperated) Op Licence Can use query Example Patch schlick bias example Open In Editor INPUT PORTS Value (Number) Gain (Number) Bias (Number) OUTPUT PORTS Result (Number) Save Cancel Changelog Patches using SchlickBias Examples Team [cables](#) Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Math.SchlickBias` documentation for input port details **< Output Ports:** - Visit `Ops.Math.SchlickBias` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "SchlickBias"  
**Docs:** <https://cables.gl/op/Ops.Math.SchlickBias>

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### 13.74.64 Sign



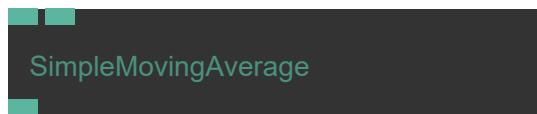
**Full Name:** `Ops.Math.Sign` **Description:** result is 1 if value is positive or -1 if value is negative

**> Input Ports:** - Visit `Ops.Math.Sign` documentation for input port details **< Output Ports:** - Visit `Ops.Math.Sign` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "Sign" **Docs:** <https://cables.gl/op/Ops.Math.Sign>

---

## 13.74.65 SimpleMovingAverage



**Full Name:** Ops.Math.SimpleMovingAverage **Description:** Full NameOps.Math.SimpleMovingAverageVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSValue (Number)Number of Values (Number: integer)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using SimpleMovin-gAverageExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.SimpleMovingAverage documentation* for input port details **< Output Ports:** - Visit *Ops.Math.SimpleMovingAverage documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SimpleMovingAverage" **Docs:** <https://cables.gl/op/Ops.Math.SimpleMovingAverage>

---

## 13.74.66 Sine



**Full Name:** Ops.Math.Sine **Description:** This function expects the values of the angle parameter to be provided in radians.

**> Input Ports:** - Visit *Ops.Math.Sine documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Sine documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Sine" **Docs:** <https://cables.gl/op/Ops.Math.Sine>

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## 13.74.67 Speed



**Full Name:** Ops.Math.Speed **Description:** Full NameOps.Math.SpeedVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch speedOpen In EditorINPUT PORTSUpdate (Trigger)Value (Number)OUTPUT PORTSSpeed (Number)SaveCancel ChangelogPatches using SpeedExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Math.Speed documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Speed documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Speed" **Docs:** <https://cables.gl/op/Ops.Math.Speed>

---

## 13.74.68 Sqrt



**Full Name:** Ops.Math.Sqrt **Description:** Full NameOps.Math.SqrtVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSnumber (Number)OUTPUT PORTSresult (Number)square root of Number

➤ **Input Ports:** - Visit *Ops.Math.Sqrt documentation* for input port details < **Output Ports:** - Visit *Ops.Math.Sqrt documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Sqrt" **Docs:** <https://cables.gl/op/Ops.Math.Sqrt>

---

## 13.74.69 Subtract



**Full Name:** Ops.Math.Subtract **Description:** Full NameOps.Math.SubtractVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSnumber1 (Number)a in a - b

➤ **Input Ports:** - Visit *Ops.Math.Subtract documentation for input port details* < **Output Ports:** - Visit *Ops.Math.Subtract documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Subtract" **Docs:** <https://cables.gl/op/Ops.Math.Subtract>

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## 13.74.70 Sum



**Full Name:** Ops.Math.Sum **Description:** Full NameOps.Math.SumVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch sum exampleOpen In EditorINPUT PORTSnumber1 (Number)number2 (Number)OUTPUT PORTSresult (Number)Result of the addition

➤ **Input Ports:** - Visit *Ops.Math.Sum documentation for input port details* < **Output Ports:** - Visit *Ops.Math.Sum documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Sum" **Docs:** <https://cables.gl/op/Ops.Math.Sum>

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## 13.74.71 Tangent



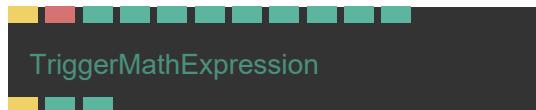
**Full Name:** Ops.Math.Tangent **Description:** This function expects the values of the angle parameter to be provided in radians.

**> Input Ports:** - Visit [Ops.Math.Tangent documentation](#) for input port details **< Output Ports:** - Visit [Ops.Math.Tangent documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Tangent" **Docs:** <https://cables.gl/op/Ops.Math.Tangent>

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## 13.74.72 TriggerMathExpression



**Full Name:** Ops.Math.TriggerMathExpression **Description:** Full NameOps.Math.TriggerMathExpressionVisibilityC  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Example for TriggerMathExpression Open In EditorINPUT PORTSCalculate  
(Trigger)Expression (String)ParametersX (Number)Y (Number)Z (Number)W (Number)A (Number)B  
(Number)C (Number)D (Number)I (Number)OUTPUT PORTSNext (Trigger)Result (Number)Expression  
Valid (booleanNumber)SaveCancel ChangelogPatches using TriggerMathExpressionExamples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Math.TriggerMathExpression documentation](#) for input port details **< Output Ports:** - Visit [Ops.Math.TriggerMathExpression documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerMathExpression" **Docs:** <https://cables.gl/op/Ops.Math.TriggerMathExpression>

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### 13.74.73 TriggerRandomNumber\_v3



**Full Name:** Ops.Math.TriggerRandomNumber\_v3 **Description:** Full NameOps.Math.TriggerRandomNumber\_v3VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example: Ops.Math.TriggerRandomNumberOpen In EditorINPUT PORTSGenerate (Trigger)Value Rangemin (Number)max (Number)Integer (Number: boolean)No consecutive duplicates (Number: boolean)OUTPUT PORTSnext (Trigger)result (Number)SaveCancel ChangelogPatches using TriggerRandomNumber\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.TriggerRandomNumber\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Math.TriggerRandomNumber\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerRandomNumber\_v3" **Docs:** [https://cables.gl/op/Ops.Math.TriggerRandomNumber\\_v3](https://cables.gl/op/Ops.Math.TriggerRandomNumber_v3)

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### 13.74.74 VectorLength



**Full Name:** Ops.Math.VectorLength **Description:** Full NameOps.Math.VectorLengthVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSX (Number)Y (Number)Z (Number)OUTPUT PORTSLength (Number)SaveCancel ChangelogPatches using VectorLengthExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.VectorLength documentation* for input port details **< Output Ports:** - Visit *Ops.Math.VectorLength documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VectorLength" **Docs:** <https://cables.gl/op/Ops.Math.VectorLength>

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## 13.75 Ops.Math.Compare

### 13.75.1 Between



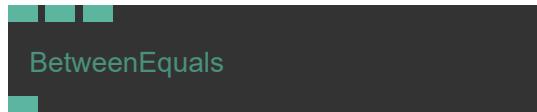
**Full Name:** Ops.Math.Compare.Between **Description:** Checks if Value is in the range [Range 1, Range 2] and returns true then. Range 1 does not have to be smaller than Range 2. Returns false if Value is equal to Range 1 or Range 2 or if it is completely out of range.

**> Input Ports:** - Visit *Ops.Math.Compare.Between documentation* for input port details **< Output Ports:**  
- Visit *Ops.Math.Compare.Between documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Between" **Docs:** <https://cables.gl/op/Ops.Math.Compare.Between>

---

### 13.75.2 BetweenEquals



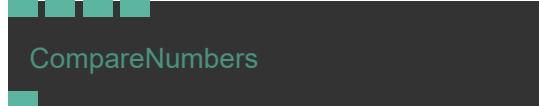
**Full Name:** Ops.Math.Compare.BetweenEquals **Description:** Checks if Value is in the range [Range 1, Range 2] and returns true then. Range 1 does not have to be smaller than Range 2. Also returns true if Value is equal to Range 1 or Range 2.

**> Input Ports:** - Visit *Ops.Math.Compare.BetweenEquals documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Compare.BetweenEquals documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BetweenEquals" **Docs:** <https://cables.gl/op/Ops.Math.Compare.BetweenEquals>

---

### 13.75.3 CompareNumbers



**Full Name:** Ops.Math.Compare.CompareNumbers **Description:** The following modes are available

**> Input Ports:** - Visit *Ops.Math.Compare.CompareNumbers documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Compare.CompareNumbers documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CompareNumbers" **Docs:** <https://cables.gl/op/Ops.Math.Compare.CompareNumbers>

---

### 13.75.4 Equals



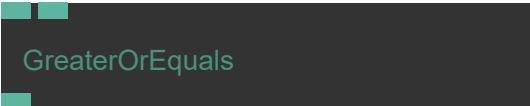
**Full Name:** Ops.Math.Compare.Equals **Description:** Full NameOps.Math.Compare.EqualsVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryNo op example found on this serverINPUT PORTSnumber1 (Number)number2  
(Number)OUTPUT PORTSresult (Number)SaveCancel ChangelogPatches using EqualsExamples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.Compare.Equals documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Compare.Equals documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Equals" **Docs:** <https://cables.gl/op/Ops.Math.Compare.Equals>

---

## 13.75.5 GreaterOrEquals



**Full Name:** Ops.Math.Compare.GreaterOrEquals **Description:** Needs two numbers to work. Outputs a true if number 1 is greater or equal to number 2

**> Input Ports:** - Visit *Ops.Math.Compare.GreaterOrEquals documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Compare.GreaterOrEquals documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GreaterOrEquals" **Docs:** <https://cables.gl/op/Ops.Math.Compare.GreaterOrEquals>

---

## 13.75.6 GreaterThan



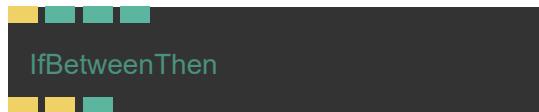
**Full Name:** Ops.Math.Compare.GreaterThan **Description:** Full NameOps.Math.Compare.GreaterThanVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch Between BetweenEquals GreaterThan LessThan Sign ExampleOpen In EditorYoutube Video TutorialINPUT PORTSnumber1 (Number)The number you want to check

**> Input Ports:** - Visit *Ops.Math.Compare.GreaterThan documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Compare.GreaterThan documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GreaterThan" **Docs:** <https://cables.gl/op/Ops.Math.Compare.GreaterThan>

---

### 13.75.7 IfBetweenThen



**Full Name:** Ops.Math.Compare.IfBetweenThen **Description:** Full NameOps.Math.Compare.IfBetweenThenVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTS(Op (Trigger)number (Number)min (Number)max (Number))OUTPUT PORTS(Op (Trigger)then (Trigger)else (Trigger)between (Number))SaveCancel ChangelogPatches using IfBetweenThenExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Math.Compare.IfBetweenThen* documentation for input port details **< Output Ports:** - Visit *Ops.Math.Compare.IfBetweenThen* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IfBetweenThen" **Docs:** <https://cables.gl/op/Ops.Math.Compare.IfBetweenThen>

---

### 13.75.8 IsEven



**Full Name:** Ops.Math.Compare.IsEven **Description:** Full NameOps.Math.Compare.IsEvenVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTS(Op number1 (Number))The number you want to check

**> Input Ports:** - Visit *Ops.Math.Compare.IsEven* documentation for input port details **< Output Ports:** - Visit *Ops.Math.Compare.IsEven* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "IsEven" **Docs:** <https://cables.gl/op/Ops.Math.Compare.IsEven>

---

## 13.75.9 LessThan



**Full Name:** Ops.Math.Compare.LessThan **Description:** Checks if Number 1 is smaller than Number 2 and returns true then, otherwise false.

**> Input Ports:** - Visit *Ops.Math.Compare.LessThan documentation* for input port details **< Output Ports:** - Visit *Ops.Math.Compare.LessThan documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "LessThan" **Docs:** <https://cables.gl/op/Ops.Math.Compare.LessThan>

---

## 13.76 Ops.Net

### 13.76.1 CorsProxy\_v3



**Full Name:** Ops.Net.CorsProxy\_v3 **Description:** Prefixes the given URL with the URL of the cables.gl CORS proxy.

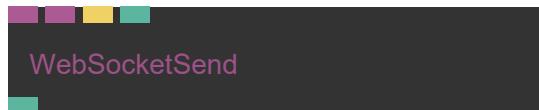
**> Input Ports:** - Visit *Ops.Net.CorsProxy\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.Net.CorsProxy\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "CorsProxy\_v3" **Docs:** [https://cables.gl/op/Ops.Net.CorsProxy\\_v3](https://cables.gl/op/Ops.Net.CorsProxy_v3)

---

## 13.77 Ops.Net.WebSocket

### 13.77.1 WebSocketSend



**Full Name:** Ops.Net.WebSocket.WebSocketSend **Description:** Full NameOps.Net.WebSocket.WebSocketSendVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch WebSocket - ExampleOpen In EditorINPUT PORTSConnection (Object:Websocket)Object (Object)Send (Trigger)Send String (Number: boolean)OUTPUT PORTSSent (Number)SaveCancel ChangelogPatches using WebSocketSendExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Net.WebSocket.WebSocketSend documentation](#) for input port details **< Output Ports:** - Visit [Ops.Net.WebSocket.WebSocketSend documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WebSocketSend"

**Docs:** <https://cables.gl/op/Ops.Net.WebSocket.WebSocketSend>

---

### 13.77.2 WebSocket\_v2



**Full Name:** Ops.Net.WebSocket.WebSocket\_v2 **Description:** Full NameOps.Net.WebSocket.WebSocket\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch WebSocket - ExampleOpen In EditorINPUT PORTSURL (String)OUTPUT PORTSResult (Object)Valid JSON (booleanNumber)Connection (Object)Connected (booleanNumber)Received Data (Trigger)Raw Data (String)SaveCancel ChangelogPatches using WebSocket\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Net.WebSocket.WebSocket\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Net.WebSocket.WebSocket\\_v2 documentation](#) for output port details

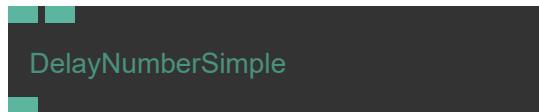
**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WebSocket\_v2"

**Docs:** [https://cables.gl/op/Ops.Net.WebSocket.WebSocket\\_v2](https://cables.gl/op/Ops.Net.WebSocket.WebSocket_v2)

---

## 13.78 Ops.Number

### 13.78.1 DelayNumberSimple



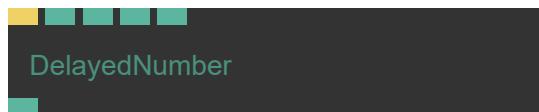
**Full Name:** Ops.Number.DelayNumberSimple **Description:** Full NameOps.Number.DelayNumberSimpleVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSValue (Number)Delay (Number)OUTPUT PORTSOut Value (Number)SaveCancel ChangelogPatches using DelayNumberSimpleExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Number.DelayNumberSimple documentation for input port details* **< Output Ports:** - Visit *Ops.Number.DelayNumberSimple documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "DelayNumberSimple" **Docs:** <https://cables.gl/op/Ops.Number.DelayNumberSimple>

---

### 13.78.2 DelayedNumber



**Full Name:** Ops.Number.DelayedNumber **Description:** Full NameOps.Number.DelayedNumberVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)Value (Number)Delay (Number)Clear on Change (Number: boolean)easing index (Number: integer)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using DelayedNumberExamples Team cables Public My Patches My Ops

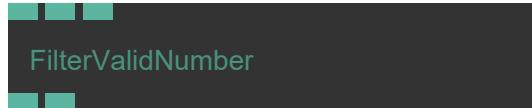
**> Input Ports:** - Visit *Ops.Number.DelayedNumber* documentation for input port details **< Output Ports:**  
- Visit *Ops.Number.DelayedNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DelayedNumber"

**Docs:** <https://cables.gl/op/Ops.Number.DelayedNumber>

---

### 13.78.3 FilterValidNumber



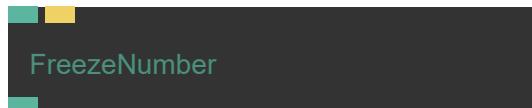
**Full Name:** Ops.Number.FilterValidNumber **Description:** invalid numbers will be ignored and not outputed

**> Input Ports:** - Visit *Ops.Number.FilterValidNumber* documentation for input port details **< Output Ports:** - Visit *Ops.Number.FilterValidNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FilterValidNumber" **Docs:** <https://cables.gl/op/Ops.Number.FilterValidNumber>

---

### 13.78.4 FreezeNumber



**Full Name:** Ops.Number.FreezeNumber **Description:** Full NameOps.Number.FreezeNumberVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCanuse queryExample Patch Freeze Operators ExampleOpen In EditorINPUT PORTSNumber  
(Number)current input value

**> Input Ports:** - Visit *Ops.Number.FreezeNumber* documentation for input port details **< Output Ports:**  
- Visit *Ops.Number.FreezeNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "FreezeNumber"  
**Docs:** <https://cables.gl/op/Ops.Number.FreezeNumber>

---

## 13.78.5 GateNumber



**Full Name:** Ops.Number.GateNumber **Description:** Useful to allow or stop a number from being output

**> Input Ports:** - Visit *Ops.Number.GateNumber documentation* for input port details **< Output Ports:** - Visit *Ops.Number.GateNumber documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GateNumber"

**Docs:** <https://cables.gl/op/Ops.Number.GateNumber>

---

## 13.78.6 Integer



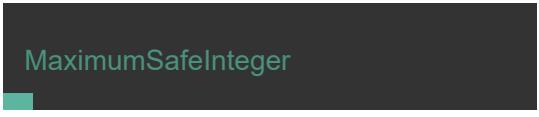
**Full Name:** Ops.Number.Integer **Description:** Full NameOps.Number.IntegerVisibilityCore Op - visible for everyoneLicenseMITAuthor androgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSInteger (Number: integer)Integer number input

**> Input Ports:** - Visit *Ops.Number.Integer documentation* for input port details **< Output Ports:** - Visit *Ops.Number.Integer documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Integer" **Docs:** <https://cables.gl/op/Ops.Number.Integer>

---

### 13.78.7 MaximumSafeInteger



MaximumSafeInteger

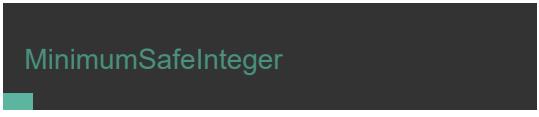
**Full Name:** Ops.Number.MaximumSafeInteger **Description:** The maximum safe integer is the biggest number without digits which can be used in JavaScript.

**> Input Ports:** - Visit *Ops.Number.MaximumSafeInteger documentation* for input port details **< Output Ports:** - Visit *Ops.Number.MaximumSafeInteger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MaximumSafeInteger" **Docs:** <https://cables.gl/op/Ops.Number.MaximumSafeInteger>

---

### 13.78.8 MinimumSafeInteger



MinimumSafeInteger

**Full Name:** Ops.Number.MinimumSafeInteger **Description:** The minimum safe integer is the smallest number without digits which can be used in JavaScript.

**> Input Ports:** - Visit *Ops.Number.MinimumSafeInteger documentation* for input port details **< Output Ports:** - Visit *Ops.Number.MinimumSafeInteger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "MinimumSafeInteger" **Docs:** <https://cables.gl/op/Ops.Number.MinimumSafeInteger>

---

### 13.78.9 Number



Number

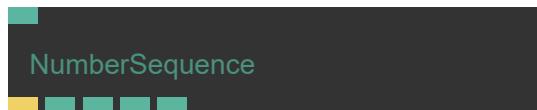
**Full Name:** Ops.Number.Number **Description:** If you want to use the same value on multiple places this op is handy – you can specify the value just one time and connect it to other ops.

> **Input Ports:** - Visit *Ops.Number.Number* documentation for input port details < **Output Ports:** - Visit *Ops.Number.Number* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Number" **Docs:** <https://cables.gl/op/Ops.Number.Number>

---

### 13.78.10 NumberSequence



**Full Name:** Ops.Number.NumberSequence **Description:** This op is very similar to Ops.Sequence – the ports are set in order (from left to right) once the input value changes. This is helpful sometimes when multiple ops depend on the value of another and the order of op-execution matters.

> **Input Ports:** - Visit *Ops.Number.NumberSequence* documentation for input port details < **Output Ports:** - Visit *Ops.Number.NumberSequence* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "NumberSequence" **Docs:** <https://cables.gl/op/Ops.Number.NumberSequence>

---

### 13.78.11 Preset



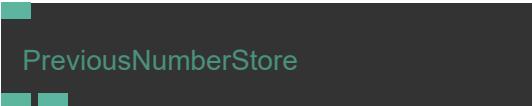
**Full Name:** Ops.Number.Preset **Description:** The preset op allows you to capture the current state of all parameters that have been connected to it.

> **Input Ports:** - Visit *Ops.Number.Preset* documentation for input port details < **Output Ports:** - Visit *Ops.Number.Preset* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Preset" **Docs:** <https://cables.gl/op/Ops.Number.Preset>

---

### 13.78.12 PreviousNumberStore



**Full Name:** Ops.Number.PreviousNumberStore **Description:** Full NameOps.Number.PreviousNumberStoreVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch PreviousValueStoreOpen In EditorINPUT PORTSValue (Number)OUTPUT PORTSCurrent Value (Number)Previous Value (Number)SaveCancel ChangelogPatches using PreviousNumberStoreExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Number.PreviousNumberStore documentation* for input port details **< Output Ports:** - Visit *Ops.Number.PreviousNumberStore documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PreviousNumberStore" **Docs:** <https://cables.gl/op/Ops.Number.PreviousNumberStore>

---

### 13.78.13 RouteNumber



**Full Name:** Ops.Number.RouteNumber **Description:** Full NameOps.Number.RouteNumberVisibilityCoreOp - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch RouteNumber ExampleThe SimpleAnim op outputs a steady signal (in this case between 0 and 1).

**> Input Ports:** - Visit *Ops.Number.RouteNumber documentation* for input port details **< Output Ports:** - Visit *Ops.Number.RouteNumber documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "RouteNumber" **Docs:** <https://cables.gl/op/Ops.Number.RouteNumber>

---

### 13.78.14 SequenceNumbers



**Full Name:** Ops.Number.SequenceNumbers **Description:** Full NameOps.Number.SequenceNumbersVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSNumber 0 (Number)Number 1 (Number)Number 2 (Number)Number 3 (Number)Number 4 (Number)Number 5 (Number)Number 6 (Number)Number 7 (Number)Number 8 (Number)Number 9 (Number)Number 10 (Number)Number 11 (Number)Number 12 (Number)Number 13 (Number)Number 14 (Number)Number 15 (Number)OUTPUT PORTSOutput 0 (Number)Output 1 (Number)Output 2 (Number)Output 3 (Number)Output 4 (Number)Output 5 (Number)Output 6 (Number)Output 7 (Number)Output 8 (Number)Output 9 (Number)Output 10 (Number)Output 11 (Number)Output 12 (Number)Output 13 (Number)Output 14 (Number)Output 15 (Number)SaveCancel ChangelogPatches using SequenceNumbersExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Number.SequenceNumbers documentation for input port details* **< Output Ports:** - Visit *Ops.Number.SequenceNumbers documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "SequenceNumbers"* **Docs:** <https://cables.gl/op/Ops.Number.SequenceNumbers>

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### 13.78.15 SumMultiPort\_v2



**Full Name:** Ops.Number.SumMultiPort\_v2 **Description:** Full NameOps.Number.SumMultiPort\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch SumMultiPort ExampleOpen In EditorINPUT PORTSNumbers\_0 (Number)add port (Number)OUTPUT PORTSNumber (Number)Num Values (Number)SaveCancel ChangelogPatches using SumMultiPort\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Number.SumMultiPort\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Number.SumMultiPort\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SumMultiPort\_v2"

**Docs:** [https://cables.gl/op/Ops.Number.SumMultiPort\\_v2](https://cables.gl/op/Ops.Number.SumMultiPort_v2)

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### 13.78.16 SwitchNumber



**Full Name:** Ops.Number.SwitchNumber **Description:** Full NameOps.Number.SwitchNumberVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverYoutube Video TutorialINPUT PORTSIndex (Number:  
integer)Index to get number from

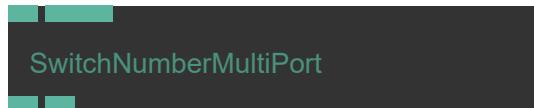
> **Input Ports:** - Visit *Ops.Number.SwitchNumber* documentation for input port details < **Output Ports:**  
- Visit *Ops.Number.SwitchNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SwitchNumber"

**Docs:** <https://cables.gl/op/Ops.Number.SwitchNumber>

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### 13.78.17 SwitchNumberMultiPort\_v2



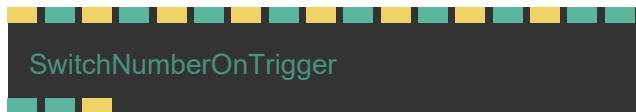
**Full Name:** Ops.Number.SwitchNumberMultiPort\_v2 **Description:** Full NameOps.Number.SwitchNumberMultiPort\_  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryNo op example found on this serverINPUT PORTSIndex (Number: integer)  
NumbersNumbers\_0 (Number)add port (Number)OUTPUT PORTSNumber (Number)Num Values  
(Number)SaveCancel ChangelogPatches using SwitchNumberMultiPort\_v2Examples Team cables  
Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Number.SwitchNumberMultiPort\_v2* documentation for input port details <  
**Output Ports:** - Visit *Ops.Number.SwitchNumberMultiPort\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "SwitchNumberMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Number.SwitchNumberMultiPort\\_v2](https://cables.gl/op/Ops.Number.SwitchNumberMultiPort_v2)

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### 13.78.18 SwitchNumberOnTrigger



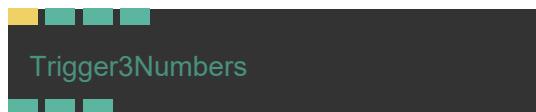
**Full Name:** Ops.Number.SwitchNumberOnTrigger **Description:** Trigger any of the trigger ports to set a specific value. Can be easily used with Ops.Anim.SimpleAnim to animate the value change.

**> Input Ports:** - Visit *Ops.Number.SwitchNumberOnTrigger* documentation for input port details < **Output Ports:** - Visit *Ops.Number.SwitchNumberOnTrigger* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "SwitchNumberOnTrigger" **Docs:** <https://cables.gl/op/Ops.Number.SwitchNumberOnTrigger>

---

### 13.78.19 Trigger3Numbers



**Full Name:** Ops.Number.Trigger3Numbers **Description:** If you use 3D-values on multiple positions in your patch it is handy to just write them down once and connect the Value3d-op to various other ops which use the values. The output ports will mirror the input ports.

**> Input Ports:** - Visit *Ops.Number.Trigger3Numbers* documentation for input port details < **Output Ports:** - Visit *Ops.Number.Trigger3Numbers* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Trigger3Numbers" **Docs:** <https://cables.gl/op/Ops.Number.Trigger3Numbers>

---

## 13.78.20 TriggerOnChangeNumber\_v2



**Full Name:** Ops.Number.TriggerOnChangeNumber\_v2 **Description:** Full NameOps.Number.TriggerOnChangeNumber\_v2 Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch TriggerOnChangeNumber exampleOpen In EditorINPUT PORTSValue (Number)number in

**> Input Ports:** - Visit *Ops.Number.TriggerOnChangeNumber\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Number.TriggerOnChangeNumber\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerOnChangeNumber\_v2" **Docs:** [https://cables.gl/op/Ops.Number.TriggerOnChangeNumber\\_v2](https://cables.gl/op/Ops.Number.TriggerOnChangeNumber_v2)

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## 13.79 Ops Sidebar

### 13.79.1 Button\_v2



**Full Name:** Ops.Sidebar.Button\_v2 **Description:** Full NameOps.Sidebar.Button\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch sidebar exampleOpen In EditorYoutube Video TutorialINPUT PORTSlink (Object)Text (String)Grey Out (Number: boolean)Visible (Number: boolean)OUTPUT PORTSchilds (Object)Pressed Trigger (Trigger)SaveCancel ChangelogPatches using Button\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Sidebar.Button\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.Sidebar.Button\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Button\_v2" **Docs:** [https://cables.gl/op/Ops.Sidebar.Button\\_v2](https://cables.gl/op/Ops.Sidebar.Button_v2)

---

## 13.79.2 ColorPicker\_v3



**Full Name:** Ops.Sidebar.ColorPicker\_v3 **Description:** Full NameOps.Sidebar.ColorPicker\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Javascript LibrariescolorRick (colorpicker without bullshit)Documentation (markdown)IssuesExample  
patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch OneMinus Color-  
Picker ExampleShows how to use the sidebar Ops.Sidebar.ColorPicker op to control the patch  
background color. The color components (red / green / blue) are then inverted (with the  
Ops.Math.OneMinus op) to create the complementary color, which is used as the fill color of  
the circle.

➤ **Input Ports:** - Visit *Ops.Sidebar.ColorPicker\_v3 documentation* for input port details < **Output Ports:**  
- Visit *Ops.Sidebar.ColorPicker\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ColorPicker\_v3"  
**Docs:** [https://cables.gl/op/Ops.Sidebar.ColorPicker\\_v3](https://cables.gl/op/Ops.Sidebar.ColorPicker_v3)

---

## 13.79.3 DisplayValue\_v2



**Full Name:** Ops.Sidebar.DisplayValue\_v2 **Description:** Full NameOps.Sidebar.DisplayValue\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch sidebar exampleOpen In EditorINPUT PORTSlink (Object)Text  
(String)Value (String)OUTPUT PORTSchilds (Object)SaveCancel ChangelogPatches using Display-  
Value\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Sidebar.DisplayValue\_v2 documentation* for input port details < **Output Ports:**  
- Visit *Ops.Sidebar.DisplayValue\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DisplayValue\_v2"  
**Docs:** [https://cables.gl/op/Ops Sidebar.DisplayValue\\_v2](https://cables.gl/op/Ops Sidebar.DisplayValue_v2)

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#### 13.79.4 DropDown\_v2



**Full Name:** Ops Sidebar.DropDown\_v2 **Description:** Use a dropdown if you want to select one value out of many, e.g. Circle with options Circle, Rectangle, Triangle. To enter the values you can use Ops.Array.ParseArray.

➤ **Input Ports:** - Visit *Ops Sidebar.DropDown\_v2* documentation for input port details < **Output Ports:** - Visit *Ops Sidebar.DropDown\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DropDown\_v2"  
**Docs:** [https://cables.gl/op/Ops Sidebar.DropDown\\_v2](https://cables.gl/op/Ops Sidebar.DropDown_v2)

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#### 13.79.5 Group



**Full Name:** Ops Sidebar.Group **Description:** To organize your sidebar controls and content, it helps grouping them into collapsable tabs with the Group operator. To add specific elements to the group, connect them into the "childs" port.

➤ **Input Ports:** - Visit *Ops Sidebar.Group* documentation for input port details < **Output Ports:** - Visit *Ops Sidebar.Group* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "Group" **Docs:** <https://cables.gl/op/Ops Sidebar.Group>

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## 13.79.6 Incrementor\_v3



**Full Name:** Ops.Sidebar.Incrementor\_v3 **Description:** exposes a “plus” and “minus” button to the sidebar and given max/min/stepsizes increments or decrements the current value by the stepsize.

► **Input Ports:** - Visit [Ops.Sidebar.Incrementor\\_v3 documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Sidebar.Incrementor\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for “Incrementor\_v3”

**Docs:** [https://cables.gl/op/Ops.Sidebar.Incrementor\\_v3](https://cables.gl/op/Ops.Sidebar.Incrementor_v3)

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## 13.79.7 LocalFileToDataUrl



**Full Name:** Ops.Sidebar.LocalFileToDataUrl **Description:** Let the user select a file from their local harddrive. The file is not loaded to any server, it is just loaded in to memory.

► **Input Ports:** - Visit [Ops.Sidebar.LocalFileToDataUrl documentation](#) for input port details ◀ **Output Ports:** - Visit [Ops.Sidebar.LocalFileToDataUrl documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for “LocalFileToDataUrl” **Docs:** <https://cables.gl/op/Ops.Sidebar.LocalFileToDataUrl>

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## 13.79.8 NumberInput\_v2



**Full Name:** Ops.Sidebar.NumberInput\_v2 **Description:** In most cases to enter numbers using the Ops.Sidebar.Slider op is recommended, in some cases you want to enter numbers by hand tho

(e.g. when the numbers are not in a specific range).

**> Input Ports:** - Visit [Ops.Sidebar.NumberInput\\_v2 documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Sidebar.NumberInput\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "NumberInput\_v2"  
**Docs:** [https://cables.gl/op/Ops.Sidebar.NumberInput\\_v2](https://cables.gl/op/Ops.Sidebar.NumberInput_v2)

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### 13.79.9 Presets\_v2



**Full Name:** Ops.Sidebar.Presets\_v2 **Description:** Full NameOps.Sidebar.Presets\_v2VisibilityCore Op  
- visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Presets ExampleOpen In EditorINPUT PORTSlink (Object)Text (String)Add Preset (Trigger)Update current Preset (Trigger)Preset Title 0 (String)Preset 0 (Object)Preset Title 1 (String)Preset 1 (Object)Preset Title 2 (String)Preset 2 (Object)Preset Title 3 (String)Preset 3 (Object)Preset Title 4 (String)Preset 4 (Object)Preset Title 5 (String)Preset 5 (Object)Preset Title 6 (String)Preset 6 (Object)Preset Title 7 (String)Preset 7 (Object)OUTPUT PORTSChildren (Object)Index (Number)SaveCancel ChangelogPatches using Presets\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.Sidebar.Presets\\_v2 documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.Sidebar.Presets\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Presets\_v2" **Docs:** [https://cables.gl/op/Ops.Sidebar.Presets\\_v2](https://cables.gl/op/Ops.Sidebar.Presets_v2)

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### 13.79.10 SideBarImage



**Full Name:** Ops.Sidebar.SideBarImage **Description:** Full NameOps.Sidebar.SideBarImageVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch sidebarImage exampleOpen In EditorINPUT PORTSlink (Object)File  
(String)OUTPUT PORTSchilds (Object)Image Element (Object)SaveCancel ChangelogPatches using  
SideBarImageExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Sidebar.SideBarImage* documentation for input port details **< Output Ports:** -  
Visit *Ops.Sidebar.SideBarImage* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SideBarImage"  
**Docs:** <https://cables.gl/op/Ops.Sidebar.SideBarImage>

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### 13.79.11 SideBarStyle



**Full Name:** Ops.Sidebar.SideBarStyle **Description:** Full NameOps.Sidebar.SideBarStyleVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Example Sidebar StyleThis example shows ways to style the sidebar with  
a number of controls.

**> Input Ports:** - Visit *Ops.Sidebar.SideBarStyle* documentation for input port details **< Output Ports:** -  
Visit *Ops.Sidebar.SideBarStyle* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SideBarStyle"  
**Docs:** <https://cables.gl/op/Ops.Sidebar.SideBarStyle>

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### 13.79.12 SideBarSwitch



**Full Name:** Ops.Sidebar.SideBarSwitch **Description:** Full NameOps.Sidebar.SideBarSwitchVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example Sidebar SwitchSidebar Switch allows you to add a group of switches or tabs into your sidebar.

► **Input Ports:** - Visit *Ops.Sidebar.SideBarSwitch documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Sidebar.SideBarSwitch documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SideBarSwitch" **Docs:** <https://cables.gl/op/Ops.Sidebar.SideBarSwitch>

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### 13.79.13 Sidebar



**Full Name:** Ops.Sidebar.Sidebar **Description:** Full NameOps.Sidebar.SidebarVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch sidebar exampleOpen In EditorYoutube Video TutorialINPUT PORTSVisible (Number: boolean)hide sidebar completely

► **Input Ports:** - Visit *Ops.Sidebar.Sidebar documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Sidebar.Sidebar documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Sidebar" **Docs:** <https://cables.gl/op/Ops.Sidebar.Sidebar>

---

### 13.79.14 SidebarDateTime



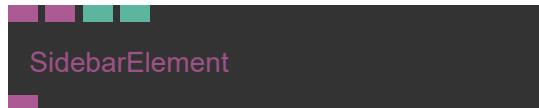
**Full Name:** Ops.Sidebar.SidebarDateTime **Description:** This will show the default html date/datetime picker of your browser

> **Input Ports:** - Visit `Ops.SidebarSidebarDateTime` documentation for input port details < **Output Ports:** - Visit `Ops.SidebarSidebarDateTime` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "SidebarDateTime"  
**Docs:** <https://cables.gl/op/Ops.SidebarSidebarDateTime>

---

### 13.79.15 SidebarElement



**Full Name:** `Ops.Sidebar.SidebarElement` **Description:** Full Name `Ops.SidebarSidebarElementVisibilityCore` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch sidebar Element Open In Editor INPUT PORTS link (Object) Child Element (Object) Border (Number: boolean) Visible (Number: boolean) OUTPUT PORTS chlds (Object) Save Cancel Changelog Patches using SidebarElement Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.SidebarSidebarElement` documentation for input port details < **Output Ports:** - Visit `Ops.SidebarSidebarElement` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "SidebarElement"  
**Docs:** <https://cables.gl/op/Ops.SidebarSidebarElement>

---

### 13.79.16 SidebarText\_v3



**Full Name:** `Ops.Sidebar.SidebarText_v3` **Description:** Full Name `Ops.SidebarSidebarText_v3VisibilityCore` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse query Example Patch SidebarText Example Open In Editor INPUT PORTS link (Object) Text (String) The text you want to show in the sidebar

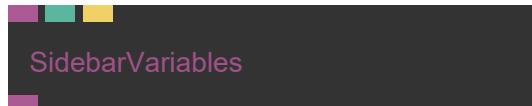
**> Input Ports:** - Visit `Ops Sidebar SidebarText_v3` documentation for input port details **< Output Ports:**  
- Visit `Ops Sidebar SidebarText_v3` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "SidebarText\_v3"

**Docs:** [https://cables.gl/op/Ops Sidebar SidebarText\\_v3](https://cables.gl/op/Ops Sidebar SidebarText_v3)

---

### 13.79.17 SidebarVariables



**Full Name:** `Ops Sidebar SidebarVariables` **Description:** Full Name  
`Ops Sidebar SidebarVariables VisibilityCore`  
Op - visible for everyone  
License MIT  
Author pandurgithub  
source Maintained by Team cablesPatchlistsDocumentation (markdown)  
Issues Example patch id  
Youtube ids (comma seperated)  
Op Licence Caniuse query  
Example Patch sidebar variables  
Open In Editor INPUT PORTS link (Object)  
Id (Number: string) update (Trigger) OUTPUT PORTS  
children (Object) Save Cancel Changelog  
Patches using SidebarVariables Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops Sidebar SidebarVariables` documentation for input port details **< Output Ports:**  
- Visit `Ops Sidebar SidebarVariables` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "SidebarVariables"

**Docs:** <https://cables.gl/op/Ops Sidebar SidebarVariables>

---

### 13.79.18 Slider\_v3



**Full Name:** `Ops Sidebar Slider_v3` **Description:** Full Name  
`Ops Sidebar Slider_v3 VisibilityCore`  
Op - visible for everyone  
License MIT  
Author pandurgithub  
source Maintained by Team cablesPatchlistsDocumentation (markdown)  
Issues Example patch id  
Youtube ids (comma seperated)  
Op Licence Caniuse query  
Example Patch sidebar example  
Open In Editor Youtube Video Tutorial INPUT PORTS link (Object)  
Text (String) RangeMin (Number) Max (Number) Step (Number) Suffix (String) DisplayGrey  
Out (Number: boolean) Visible (Number: boolean) Input (Number) Set Default (Trigger) Reset

(Trigger)OUTPUT PORTS childs (Object)Result (Number)SaveCancel ChangelogPatches using Slider\_v3 Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Sidebar.Slider\\_v3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Sidebar.Slider\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Slider\_v3" **Docs:** [https://cables.gl/op/Ops.Sidebar.Slider\\_v3](https://cables.gl/op/Ops.Sidebar.Slider_v3)

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### 13.79.19 TextInput\_v2



**Full Name:** Ops.Sidebar.TextInput\_v2 **Description:** Let's you enter a string in the sidebar, which you can then e.g. render in your patch

> **Input Ports:** - Visit [Ops.Sidebar.TextInput\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Sidebar.TextInput\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TextInput\_v2" **Docs:** [https://cables.gl/op/Ops.Sidebar.TextInput\\_v2](https://cables.gl/op/Ops.Sidebar.TextInput_v2)

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### 13.79.20 Toggle\_v4



**Full Name:** Ops.Sidebar.Toggle\_v4 **Description:** Full NameOps.Sidebar.Toggle\_v4VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch sidebar exampleOpen In EditorINPUT PORTSlink (Object)Text (String)Input (Number: boolean)Set Default (Trigger)Grey Out (Number: boolean)Visible (Number: boolean)OUTPUT PORTS childs (Object)Value (booleanNumber)Toggled (Trigger)SaveCancel ChangelogPatches using Toggle\_v4 Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops Sidebar.Toggle\\_v4 documentation](#) for input port details < **Output Ports:** - Visit [Ops Sidebar.Toggle\\_v4 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Toggle\_v4" **Docs:** [https://cables.gl/op/Ops Sidebar.Toggle\\_v4](https://cables.gl/op/Ops Sidebar.Toggle_v4)

---

## 13.79.21 XYPad



**Full Name:** Ops Sidebar.XYPad **Description:** Full NameOps Sidebar.XYPadVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch XY Pad ExampleXY Pad in the sidebar.

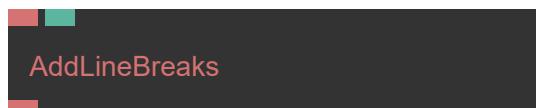
➤ **Input Ports:** - Visit [Ops Sidebar.XYPad documentation](#) for input port details < **Output Ports:** - Visit [Ops Sidebar.XYPad documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "XYPad" **Docs:** <https://cables.gl/op/Ops Sidebar.XYPad>

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## 13.80 Ops.String

### 13.80.1 AddLineBreaks\_v2



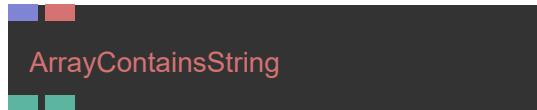
**Full Name:** Ops.String.AddLineBreaks\_v2 **Description:** Specify number of characters for the length of you line of words and break up your string into multiple lines.

➤ **Input Ports:** - Visit [Ops.String.AddLineBreaks\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.String.AddLineBreaks\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "AddLineBreaks\_v2" **Docs:** [https://cables.gl/op/Ops.String.AddLineBreaks\\_v2](https://cables.gl/op/Ops.String.AddLineBreaks_v2)

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### 13.80.2 ArrayContainsString



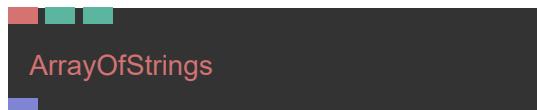
**Full Name:** Ops.String.ArrayContainsString **Description:** Full NameOps.String.ArrayContainsStringVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayContainsString ExampleOpen In EditorINPUT PORTSArray (Array)Array to search through

**> Input Ports:** - Visit *Ops.String.ArrayContainsString* documentation for input port details **< Output Ports:** - Visit *Ops.String.ArrayContainsString* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "ArrayContainsString" **Docs:** <https://cables.gl/op/Ops.String.ArrayContainsString>

---

### 13.80.3ArrayOfStrings



**Full Name:** Ops.String.ArrayOfStrings **Description:** Full NameOps.String.ArrayOfStringsVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch ArrayOfStrings ExampleOpen In EditorINPUT PORTSString (String)Length (Number: integer)Attach Number (Number: boolean)OUTPUT PORTSArray (Array)SaveCancel ChangelogPatches using ArrayOfStringsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.ArrayOfStrings* documentation for input port details **< Output Ports:** - Visit *Ops.String.ArrayOfStrings* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches for "ArrayOfStrings"`  
**Docs:** <https://cables.gl/op/Ops.String.ArrayOfStrings>

---

### 13.80.4 CharacterRotate



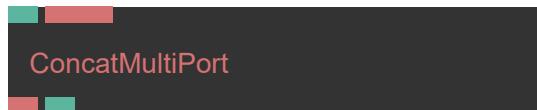
**Full Name:** Ops.String.CharacterRotate **Description:** Full NameOps.String.CharacterRotateVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch CharacterRotate ExampleOpen In EditorINPUT PORTSUpdate  
(Trigger)Reset (Trigger)Text (String)Random Seed (Number)Characters (String)OUTPUT PORTSRe-  
sult (String)SaveCancel ChangelogPatches using CharacterRotateExamples Team cables Public My  
Patches My Ops

➤ **Input Ports:** - Visit `Ops.String.CharacterRotate` documentation for input port details < **Output Ports:**  
- Visit `Ops.String.CharacterRotate` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches for "CharacterRotate"`  
**Docs:** <https://cables.gl/op/Ops.String.CharacterRotate>

---

### 13.80.5 ConcatMultiPort\_v2



**Full Name:** Ops.String.ConcatMultiPort\_v2 **Description:** Full NameOps.String.ConcatMultiPort\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch ConcatMultiPort ExampleOpen In EditorINPUT PORTSSeparator index  
(Number: integer) None LineBreak Space , / StringsStrings\_0 (String)add port (String)OUTPUT  
PORTSString (String)Num Strings (Number)SaveCancel ChangelogPatches using ConcatMulti-  
Port\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.String.ConcatMultiPort\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.ConcatMultiPort\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ConcatMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.String.ConcatMultiPort\\_v2](https://cables.gl/op/Ops.String.ConcatMultiPort_v2)

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## 13.80.6 ConcatMulti\_v2



**Full Name:** Ops.String.ConcatMulti\_v2 **Description:** Joins/merges multiple strings together.

**> Input Ports:** - Visit [Ops.String.ConcatMulti\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.ConcatMulti\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ConcatMulti\_v2" **Docs:** [https://cables.gl/op/Ops.String.ConcatMulti\\_v2](https://cables.gl/op/Ops.String.ConcatMulti_v2)

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## 13.80.7 Concat\_v2



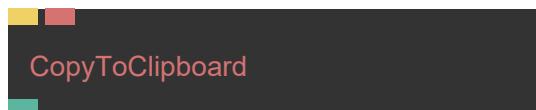
**Full Name:** Ops.String.Concat\_v2 **Description:** Full NameOps.String.Concat\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCan use queryExample Patch Concat Lowercase Uppercase ExampleOpen In EditorINPUT PORTSString1 (String)string2 (String)New Line (Number: boolean)Active (Number: boolean)OUTPUT PORTSresult (String)SaveCancel ChangelogPatches using Concat\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.String.Concat\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.Concat\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Concat\_v2" **Docs:** [https://cables.gl/op/Ops.String.Concat\\_v2](https://cables.gl/op/Ops.String.Concat_v2)

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### 13.80.8 CopyToClipboard



**Full Name:** Ops.String.CopyToClipboard **Description:** Full NameOps.String.CopyToClipboardVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesCompatibilitycaniuse.com: writetextPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch copytoclipboard op exampleOpen In EditorINPUT PORTSCopy (Trigger)String (String)OUTPUT PORTSSuccess (boolean-Number)SaveCancel ChangelogPatches using CopyToClipboardExamples Team cables Public My Patches My Ops

► **Input Ports:** - Visit [Ops.String.CopyToClipboard documentation](#) for input port details ◀ **Output Ports:**  
- Visit [Ops.String.CopyToClipboard documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "CopyToClipboard" **Docs:** <https://cables.gl/op/Ops.String.CopyToClipboard>

---

### 13.80.9 DelayStringSimple



**Full Name:** Ops.String.DelayStringSimple **Description:** Full NameOps.String.DelayStringSimpleVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch DelayStringSimple ExampleDelays an incoming string by X seconds.

► **Input Ports:** - Visit [Ops.String.DelayStringSimple documentation](#) for input port details ◀ **Output Ports:**  
- Visit [Ops.String.DelayStringSimple documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "DelayStringSimple" **Docs:** <https://cables.gl/op/Ops.String.DelayStringSimple>

---

### 13.80.10 EndsWith



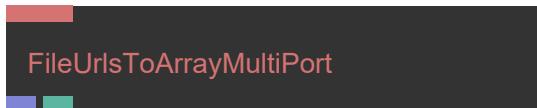
**Full Name:** Ops.String.EndsWith **Description:** outputs true if the string begins with search string

► **Input Ports:** - Visit *Ops.String.EndsWith* documentation for input port details ◀ **Output Ports:** - Visit *Ops.String.EndsWith* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "EndsWith" **Docs:** <https://cables.gl/op/Ops.String.EndsWith>

---

### 13.80.11 FileUrlsToArrayMultiPort\_v2



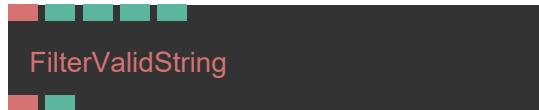
**Full Name:** Ops.String.FileUrlsToArrayMultiPort\_v2 **Description:** Full NameOps.String.FileUrlsToArrayMultiPort\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch FileUrlsToArrayMultiPort ExampleOpen In EditorINPUT PORTSStringsStrings\_0 (String)add port (String)OUTPUT PORTSResult (Array)Num Values (Number)SaveCancel ChangelogPatches using FileUrlsToArrayMultiPort\_v2Examples Team cables Public My Patches My Ops

► **Input Ports:** - Visit *Ops.String.FileUrlsToArrayMultiPort\_v2* documentation for input port details ◀ **Output Ports:** - Visit *Ops.String.FileUrlsToArrayMultiPort\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "FileUrlsToArrayMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.String.FileUrlsToArrayMultiPort\\_v2](https://cables.gl/op/Ops.String.FileUrlsToArrayMultiPort_v2)

---

## 13.80.12 FilterValidString



**Full Name:** Ops.String.FilterValidString **Description:** invalid strings will be ignored and not outputed

**> Input Ports:** - Visit *Ops.String.FilterValidString documentation* for input port details **< Output Ports:**  
- Visit *Ops.String.FilterValidString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FilterValidString"  
**Docs:** <https://cables.gl/op/Ops.String.FilterValidString>

---

## 13.80.13 FreezeString



**Full Name:** Ops.String.FreezeString **Description:** Full NameOps.StringsetVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch Freeze Operators ExampleOpen In EditorINPUT PORTSString  
(String)current input value

**> Input Ports:** - Visit *Ops.String.FreezeString documentation* for input port details **< Output Ports:**  
- Visit *Ops.String.FreezeString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FreezeString"  
**Docs:** <https://cables.gl/op/Ops.String.FreezeString>

---

## 13.80.14 GateString



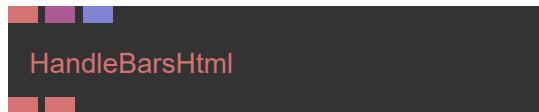
**Full Name:** Ops.String.GateString **Description:** Will only output a String if the pass-through parameter evaluates to true

**> Input Ports:** - Visit [Ops.String.GateString documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.GateString documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "GateString" **Docs:** <https://cables.gl/op/Ops.String.GateString>

---

## 13.80.15 HandleBarsHtml\_v2



**Full Name:** Ops.String.HandleBarsHtml\_v2 **Description:** <https://handlebarsjs.com/>

**> Input Ports:** - Visit [Ops.String.HandleBarsHtml\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.HandleBarsHtml\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HandleBarsHtml\_v2" **Docs:** [https://cables.gl/op/Ops.String.HandleBarsHtml\\_v2](https://cables.gl/op/Ops.String.HandleBarsHtml_v2)

---

## 13.80.16 HtmlDecode



**Full Name:** Ops.String.HtmlDecode **Description:** Full Name Ops.String.HtmlDecodeVisibilityCore Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cablesPatch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma separated) Op Licence-

Caniuse queryExample Patch HtmlDecode HtmlEncode ExampleOpen In EditorINPUT PORTSString  
(String)OUTPUT PORTSresult (String)SaveCancel ChangelogPatches using HtmlDecodeExamples  
Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.String.HtmlDecode* documentation for input port details < **Output Ports:** - Visit *Ops.String.HtmlDecode* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HtmlDecode"  
**Docs:** <https://cables.gl/op/Ops.String.HtmlDecode>

---

### 13.80.17 HtmlEncode



**Full Name:** Ops.String.HtmlEncode **Description:** HTML encoding ensures that text will be correctly displayed in the browser, not interpreted by the browser as HTML

> **Input Ports:** - Visit *Ops.String.HtmlEncode* documentation for input port details < **Output Ports:** - Visit *Ops.String.HtmlEncode* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "HtmlEncode"  
**Docs:** <https://cables.gl/op/Ops.String.HtmlEncode>

---

### 13.80.18 LeftPad\_v2



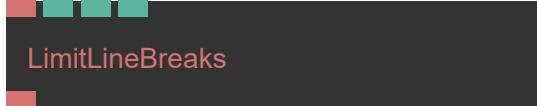
**Full Name:** Ops.String.LeftPad\_v2 **Description:** also see Ops.String.RightPad

> **Input Ports:** - Visit *Ops.String.LeftPad\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.String.LeftPad\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LeftPad\_v2"  
**Docs:** [https://cables.gl/op/Ops.String.LeftPad\\_v2](https://cables.gl/op/Ops.String.LeftPad_v2)

---

## 13.80.19 LimitLineBreaks\_v2



**Full Name:** Ops.String.LimitLineBreaks\_v2 **Description:** Visit documentation for details

**> Input Ports:** - Visit *Ops.String.LimitLineBreaks\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.String.LimitLineBreaks\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LimitLineBreaks\_v2" **Docs:** [https://cables.gl/op/Ops.String.LimitLineBreaks\\_v2](https://cables.gl/op/Ops.String.LimitLineBreaks_v2)

---

## 13.80.20 LineBreak



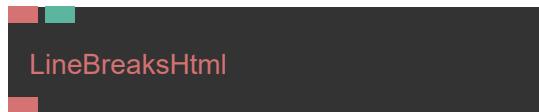
**Full Name:** Ops.String.LineBreak **Description:** Full NameOps.String.LineBreakVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch LineBreak ExampleOpen In EditorINPUT PORTSString (String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using LineBreakExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.LineBreak* documentation for input port details **< Output Ports:** - Visit *Ops.String.LineBreak* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LineBreak" **Docs:** <https://cables.gl/op/Ops.String.LineBreak>

---

## 13.80.21 LineBreaksHtml



**Full Name:** Ops.String.LineBreaksHtml **Description:** Full NameOps.String.LineBreaksHtmlVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch LineBreaksHtml ExampleOpen In EditorINPUT PORTSString (String)Add  
Num Breaks (Number: integer)OUTPUT PORTSHTML (String)SaveCancel ChangelogPatches using  
LineBreaksHtmlExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.LineBreaksHtml documentation* for input port details **< Output Ports:**  
- Visit *Ops.String.LineBreaksHtml documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LineBreaksHtml"

**Docs:** <https://cables.gl/op/Ops.String.LineBreaksHtml>

---

## 13.80.22 LoremIpsum



**Full Name:** Ops.String.LoremIpsum **Description:** “Lorem ipsum dolor sit amet, consectetur adipiscing elit. Mauris pretium tempor enim, sit amet elementum ex sodales eu. Nulla porttitor, ante vel condimentum volutpat, nisi est faucibus enim, sed pulvinar arcu justo eget eros. Vivamus blandit ex et ipsum ornare bibendum.

**> Input Ports:** - Visit *Ops.String.LoremIpsum documentation* for input port details **< Output Ports:** - Visit *Ops.String.LoremIpsum documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LoremIpsum"

**Docs:** <https://cables.gl/op/Ops.String.LoremIpsum>

---

### 13.80.23 Lowercase\_v2



**Full Name:** Ops.String.Lowercase\_v2 **Description:** Full NameOps.String.Lowercase\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch Concat Lowercase Uppercase ExampleOpen In EditorINPUT PORTSString  
(String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using Lowercase\_v2Examples  
Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.String.Lowercase\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.String.Lowercase\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Lowercase\_v2"  
**Docs:** [https://cables.gl/op/Ops.String.Lowercase\\_v2](https://cables.gl/op/Ops.String.Lowercase_v2)

---

### 13.80.24 Md5



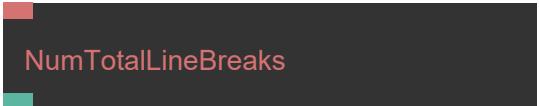
**Full Name:** Ops.String.Md5 **Description:** MD5 is a cryptographic hashing algorithm. By Inputing data, it will output a certain string, called a hash. Any time the same data is run through the operator on any computer, you get this same number.

➤ **Input Ports:** - Visit *Ops.String.Md5 documentation* for input port details < **Output Ports:** - Visit *Ops.String.Md5 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Md5" **Docs:** <https://cables.gl/op/Ops.String.Md5>

---

### 13.80.25 NumTotalLineBreaks



NumTotalLineBreaks

**Full Name:** Ops.String.NumTotalLineBreaks **Description:** Full NameOps.String.NumTotalLineBreaksVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch NumTotalLineBreaks examplesOpen In EditorINPUT PORTSString (String)OUTPUT PORTSTotal Lines (Number)SaveCancel ChangelogPatches using NumTotalLine-BreaksExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.NumTotalLineBreaks documentation* for input port details **< Output Ports:** - Visit *Ops.String.NumTotalLineBreaks documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "NumTotalLine-Breaks" **Docs:** <https://cables.gl/op/Ops.String.NumTotalLineBreaks>

---

### 13.80.26 NumberFormatter



NumberFormatter

**Full Name:** Ops.String.NumberFormatter **Description:** Wrapped standard Javascript function toLocaleString.

**> Input Ports:** - Visit *Ops.String.NumberFormatter documentation* for input port details **< Output Ports:** - Visit *Ops.String.NumberFormatter documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "NumberFormatter" **Docs:** <https://cables.gl/op/Ops.String.NumberFormatter>

---

### 13.80.27 NumberSwitchByString



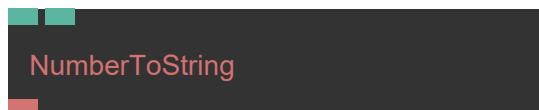
**Full Name:** Ops.String.NumberSwitchByString **Description:** Full NameOps.String.NumberSwitchByStringVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch NumberSwitchByString ExampleOpen In EditorINPUT PORTSString (String)String 1 (String)Number 1 (Number)String 2 (String)Number 2 (Number)String 3 (String)Number 3 (Number)String 4 (String)Number 4 (Number)String 5 (String)Number 5 (Number)String 6 (String)Number 6 (Number)String 7 (String)Number 7 (Number)String 8 (String)Number 8 (Number)String 9 (String)Number 9 (Number)String 10 (String)Number 10 (Number)OUTPUT PORTSResult (Number)SaveCancel ChangelogPatches using NumberSwitchByStringExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.NumberSwitchByString* documentation for input port details **< Output Ports:** - Visit *Ops.String.NumberSwitchByString* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "NumberSwitchByString" **Docs:** <https://cables.gl/op/Ops.String.NumberSwitchByString>

---

### 13.80.28 NumberToString\_v2



**Full Name:** Ops.String.NumberToString\_v2 **Description:** Full NameOps.String.NumberToString\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch numberToString exampleOpen In EditorINPUT PORTSNumber (Number)Decimal Places (Number: integer)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using NumberToString\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.NumberToString\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.String.NumberToString\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "NumberToString\_v2" **Docs:** [https://cables.gl/op/Ops.String.NumberToString\\_v2](https://cables.gl/op/Ops.String.NumberToString_v2)

---

### 13.80.29 OrString



**Full Name:** `Ops.String.OrString` **Description:** Full NameOps.String.OrStringVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSString 1 (String)String 2 (String)String 3 (String)String 4 (String)String 5 (String)String 6 (String)String 7 (String)String 8 (String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using OrStringExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.String.OrString documentation* for input port details < **Output Ports:** - Visit *Ops.String.OrString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "OrString" **Docs:** <https://cables.gl/op/Ops.String.OrString>

---

### 13.80.30 ParseInt\_v2



**Full Name:** `Ops.String.ParseInt_v2` **Description:** Full NameOps.String.ParseInt\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSString (String)OUTPUT PORTSNumber (Number)SaveCancel ChangelogPatches using ParseInt\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.String.ParseInt\_v2 documentation* for input port details < **Output Ports:** - Visit *Ops.String.ParseInt\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "ParseInt\_v2"*  
**Docs:** [https://cables.gl/op/Ops.String.ParseInt\\_v2](https://cables.gl/op/Ops.String.ParseInt_v2)

---

### 13.80.31 RandomString\_v3



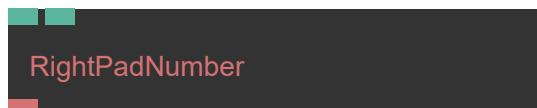
**Full Name:** Ops.String.RandomString\_v3 **Description:** Full NameOps.String.RandomString\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch RandomString exampleOpen In EditorINPUT PORTSchars (String)Length  
(Number: integer)Seed (Number)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using  
RandomString\_v3Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.RandomString\_v3 documentation for input port details* **< Output Ports:**  
- Visit *Ops.String.RandomString\_v3 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "RandomString\_v3"* **Docs:** [https://cables.gl/op/Ops.String.RandomString\\_v3](https://cables.gl/op/Ops.String.RandomString_v3)

---

### 13.80.32 RightPadNumber\_v2



**Full Name:** Ops.String.RightPadNumber\_v2 **Description:** Full NameOps.String.RightPadNumber\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch RightPadNumber exampleOpen In EditorINPUT PORTSValue  
(Number)Num (Number: integer)OUTPUT PORTSString (String)SaveCancel ChangelogPatches using  
RightPadNumber\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.RightPadNumber\_v2 documentation for input port details* **< Output  
Ports:** - Visit *Ops.String.RightPadNumber\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RightPadNumber\_v2" **Docs:** [https://cables.gl/op/Ops.String.RightPadNumber\\_v2](https://cables.gl/op/Ops.String.RightPadNumber_v2)

---

### 13.80.33 RightPad\_v2



**Full Name:** Ops.String.RightPad\_v2 **Description:** e.g. 1.1 can become 1.10

**> Input Ports:** - Visit *Ops.String.RightPad\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.String.RightPad\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RightPad\_v2" **Docs:** [https://cables.gl/op/Ops.String.RightPad\\_v2](https://cables.gl/op/Ops.String.RightPad_v2)

---

### 13.80.34 RouteString



**Full Name:** Ops.String.RouteString **Description:** If no string is plugged into the default string port then the output is an empty string ""

**> Input Ports:** - Visit *Ops.String.RouteString* documentation for input port details **< Output Ports:** - Visit *Ops.String.RouteString* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "RouteString" **Docs:** <https://cables.gl/op/Ops.String.RouteString>

---

### 13.80.35 SaveTextFile



**Full Name:** Ops.String.SaveTextFile **Description:** make your browser download a textfile containing the input-string on trigger

**> Input Ports:** - Visit [Ops.String.SaveTextFile documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.SaveTextFile documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SaveTextFile"  
**Docs:** <https://cables.gl/op/Ops.String.SaveTextFile>

---

### 13.80.36 SequenceStrings



**Full Name:** Ops.String.SequenceStrings **Description:** Full NameOps.String.SequenceStringsVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSString 0 (String)String 1 (String)String  
2 (String)String 3 (String)String 4 (String)String 5 (String)String 6 (String)String 7 (String)String 8  
(String)String 9 (String)String 10 (String)String 11 (String)String 12 (String)String 13 (String)String 14  
(String)String 15 (String)OUTPUT PORTSOutput 0 (String)Output 1 (String)Output 2 (String)Output 3  
(String)Output 4 (String)Output 5 (String)Output 6 (String)Output 7 (String)Output 8 (String)Output  
9 (String)Output 10 (String)Output 11 (String)Output 12 (String)Output 13 (String)Output 14  
(String)Output 15 (String)SaveCancel ChangelogPatches using SequenceStringsExamples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit [Ops.String.SequenceStrings documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.String.SequenceStrings documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SequenceStrings"  
**Docs:** <https://cables.gl/op/Ops.String.SequenceStrings>

---

### 13.80.37 StartsWith



**Full Name:** Ops.String.StartsWith **Description:** outputs true if the string begins with search string

**> Input Ports:** - Visit [Ops.String.StartsWith documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.StartsWith documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StartsWith" **Docs:** <https://cables.gl/op/Ops.String.StartsWith>

---

### 13.80.38 StringCompose\_v3



**Full Name:** Ops.String.StringCompose\_v3 **Description:** Full NameOps.String.StringCompose\_v3VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch Array SumOpen In EditorINPUT PORTSFormat (String)String A  
(String)String B (String)String C (String)String D (String)String E (String)String F (String)OUTPUT  
PORTSResult (String)SaveCancel ChangelogPatches using StringCompose\_v3Examples Team cables  
Public My Patches My Ops

**> Input Ports:** - Visit [Ops.String.StringCompose\\_v3 documentation](#) for input port details **< Output Ports:**  
- Visit [Ops.String.StringCompose\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringCom-  
pose\_v3" **Docs:** [https://cables.gl/op/Ops.String.StringCompose\\_v3](https://cables.gl/op/Ops.String.StringCompose_v3)

---

### 13.80.39 StringContains\_v2



**Full Name:** Ops.String.StringContains\_v2 **Description:** Full NameOps.String.StringContains\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCanuse queryNo op example found on this serverINPUT PORTSString (String)SearchValue  
(String)OUTPUT PORTSFound (Number)Index (Number)SaveCancel ChangelogPatches using String-  
Contains\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.String.StringContains\_v2 documentation* for input port details < **Output Ports:**  
- Visit *Ops.String.StringContains\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringContains\_v2" **Docs:** [https://cables.gl/op/Ops.String.StringContains\\_v2](https://cables.gl/op/Ops.String.StringContains_v2)

---

### 13.80.40 StringEditor



**Full Name:** Ops.String.StringEditor **Description:** Pressing the edit button allows a user to open a text editor which can then be output as a string.

➤ **Input Ports:** - Visit *Ops.String.StringEditor documentation* for input port details < **Output Ports:** - Visit *Ops.String.StringEditor documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringEditor" **Docs:** <https://cables.gl/op/Ops.String.StringEditor>

---

### 13.80.41 StringEquals\_v2



**Full Name:** Ops.String.StringEquals\_v2 **Description:** Full NameOps.String.StringEquals\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch StringEquals ExampleOpen In EditorINPUT PORTSString 1 (String)String  
2 (String)OUTPUT PORTSResult (booleanNumber)SaveCancel ChangelogPatches using StringE-  
quals\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StringEquals\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.String.StringEquals\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringEquals\_v2"  
**Docs:** [https://cables.gl/op/Ops.String.StringEquals\\_v2](https://cables.gl/op/Ops.String.StringEquals_v2)

---

### 13.80.42 StringGetLineNumAtIndex



**Full Name:** Ops.String.StringGetLineNumAtIndex **Description:** Full NameOps.String.StringGetLineNumAtIndexVi  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryNo op example found on this serverINPUT PORTSString (String)Index (Num-  
ber: integer)OUTPUT PORTSLine (Number)Found (Number)SaveCancel ChangelogPatches using  
StringGetLineNumAtIndexExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StringGetLineNumAtIndex documentation* for input port details **< Out-  
put Ports:** - Visit *Ops.String.StringGetLineNumAtIndex documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringGetLineNu-  
mAtIndex" **Docs:** <https://cables.gl/op/Ops.String.StringGetLineNumAtIndex>

---

### 13.80.43 StringIterator\_v2



**Full Name:** Ops.String.StringIterator\_v2 **Description:** Full NameOps.String.StringIterator\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSExec (Trigger)String (String)OUTPUT  
PORTSNext (Trigger)Character (String)Index (Number)Length (Number)SaveCancel Changelog-  
Patches using StringIterator\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.String.StringIterator\_v2 documentation* for input port details < **Output Ports:**  
- Visit *Ops.String.StringIterator\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringIterator\_v2"

**Docs:** [https://cables.gl/op/Ops.String.StringIterator\\_v2](https://cables.gl/op/Ops.String.StringIterator_v2)

---

### 13.80.44 StringLength\_v2



**Full Name:** Ops.String.StringLength\_v2 **Description:** Full NameOps.String.StringLength\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch StringLength exampleOpen In EditorINPUT PORTSString (String)OUTPUT  
PORTSResult (Number)SaveCancel ChangelogPatches using StringLength\_v2Examples Team cables  
Public My Patches My Ops

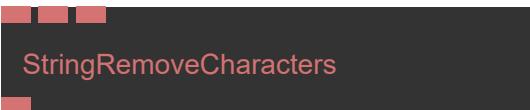
➤ **Input Ports:** - Visit *Ops.String.StringLength\_v2 documentation* for input port details < **Output Ports:**  
- Visit *Ops.String.StringLength\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringLength\_v2"

**Docs:** [https://cables.gl/op/Ops.String.StringLength\\_v2](https://cables.gl/op/Ops.String.StringLength_v2)

---

## 13.80.45 StringRemoveCharacters



**Full Name:** Ops.String.StringRemoveCharacters **Description:** Full NameOps.String.StringRemoveCharactersVisibleOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch StringRemoveCharacters ExampleOpen In EditorINPUT PORTSString (String)Characters (String)Replace (String)OUTPUT PORTSResult (String)SaveCancel Changelog-Patches using StringRemoveCharactersExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StringRemoveCharacters documentation* for input port details **< Output Ports:** - Visit *Ops.String.StringRemoveCharacters documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringRemoveCharacters" **Docs:** <https://cables.gl/op/Ops.String.StringRemoveCharacters>

---

## 13.80.46 StringReplace



**Full Name:** Ops.String.StringReplace **Description:** This operator uses the JavaScript function replace() with a regex syntax. Usually you can simply type an alpha numeric string, but if you want to get fancy or need to replace a character such as a period, you will need to format your string replace according to the Regular Expression syntax ([https://en.wikipedia.org/wiki/Regular\\_expression](https://en.wikipedia.org/wiki/Regular_expression)).

**> Input Ports:** - Visit *Ops.String.StringReplace documentation* for input port details **< Output Ports:** - Visit *Ops.String.StringReplace documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringReplace" **Docs:** <https://cables.gl/op/Ops.String.StringReplace>

---

## 13.80.47 StringSortLines



**Full Name:** Ops.String.StringSortLines **Description:** Full NameOps.String.StringSortLinesVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch StringSortLines ExampleOpen In EditorINPUT PORTSString (String)Reverse (Number: boolean)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using StringSortLinesExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StringSortLines documentation* for input port details **< Output Ports:** - Visit *Ops.String.StringSortLines documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringSortLines"  
**Docs:** <https://cables.gl/op/Ops.String.StringSortLines>

---

## 13.80.48 StringSwitchByString



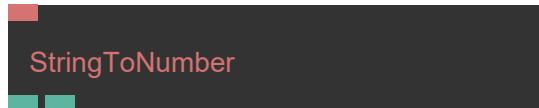
**Full Name:** Ops.String.StringSwitchByString **Description:** Full NameOps.String.StringSwitchByStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSString (String)Default (String)String 1 (String)Result String 1 (String)String 2 (String)Result String 2 (String)String 3 (String)Result String 3 (String)String 4 (String)Result String 4 (String)String 5 (String)Result String 5 (String)String 6 (String)Result String 6 (String)String 7 (String)Result String 7 (String)String 8 (String)Result String 8 (String)String 9 (String)Result String 9 (String)String 10 (String)Result String 10 (String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using StringSwitchByStringExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StringSwitchByString documentation* for input port details **< Output Ports:** - Visit *Ops.String.StringSwitchByString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "StringSwitchByString" **Docs:** <https://cables.gl/op/Ops.String.StringSwitchByString>

---

### 13.80.49 StringToNumber



**Full Name:** Ops.String.StringToNumber **Description:** Full NameOps.String.StringToNumberVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch stringToNumberOpen In EditorINPUT PORTSString (String)OUTPUT PORTSNumber (Number)Not a number (booleanNumber)SaveCancel ChangelogPatches using StringToNumberExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StringToNumber* documentation for input port details **< Output Ports:**  
- Visit *Ops.String.StringToNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "StringToNumber" **Docs:** <https://cables.gl/op/Ops.String.StringToNumber>

---

### 13.80.50 StringTrim\_v2



**Full Name:** Ops.String.StringTrim\_v2 **Description:** Full NameOps.String.StringTrim\_v2VisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch StringTrim ExampleOpen In EditorINPUT PORTSString (String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using StringTrim\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StringTrim\_v2* documentation for input port details **< Output Ports:**  
- Visit *Ops.String.StringTrim\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringTrim\_v2"  
**Docs:** [https://cables.gl/op/Ops.String.StringTrim\\_v2](https://cables.gl/op/Ops.String.StringTrim_v2)

---

### 13.80.51 String\_v3



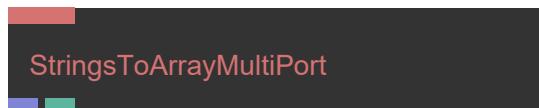
**Full Name:** Ops.String.String\_v3 **Description:** The output port will mirror the input port.

**> Input Ports:** - Visit [Ops.String.String\\_v3 documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.String\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "String\_v3" **Docs:** [https://cables.gl/op/Ops.String.String\\_v3](https://cables.gl/op/Ops.String.String_v3)

---

### 13.80.52 StringsToArrayMultiPort\_v2



**Full Name:** Ops.String.StringsToArrayMultiPort\_v2 **Description:** Full NameOps.String.StringsToArrayMultiPort\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op  
LicenceCaniuse queryExample Patch StringsToArrayMultiPort ExampleOpen In EditorINPUT  
PORTSStringsStrings\_0 (String)add port (String)OUTPUT PORTSResult (Array)Num Values (Num-  
ber)SaveCancel ChangelogPatches using StringsToArrayMultiPort\_v2Examples Team cables Public  
My Patches My Ops

**> Input Ports:** - Visit [Ops.String.StringsToArrayMultiPort\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.String.StringsToArrayMultiPort\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StringsToArray-  
MultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.String.StringsToArrayMultiPort\\_v2](https://cables.gl/op/Ops.String.StringsToArrayMultiPort_v2)

---

### 13.80.53 StripHtml



**Full Name:** Ops.String.StripHtml **Description:** Full NameOps.String.StripHtmlVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch StripHtml ExampleOpen In EditorINPUT PORTSString (String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using StripHtmlExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.StripHtml* documentation for input port details **< Output Ports:** - Visit *Ops.String.StripHtml* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "StripHtml" **Docs:** <https://cables.gl/op/Ops.String.StripHtml>

---

### 13.80.54 SubString\_v2



**Full Name:** Ops.String.SubString\_v2 **Description:** Full NameOps.String.SubString\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch substring exampleOpen In EditorINPUT PORTSString (String)Start (Number: integer)End (Number: integer)End of string (Number: boolean)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using SubString\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.SubString\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.String.SubString\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SubString\_v2" **Docs:** [https://cables.gl/op/Ops.String.SubString\\_v2](https://cables.gl/op/Ops.String.SubString_v2)

---

## 13.80.55 SwitchString



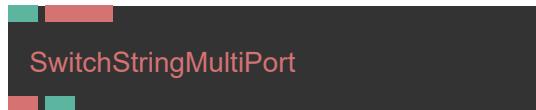
**Full Name:** Ops.String.SwitchString **Description:** Full NameOps.String.SwitchStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch switchstring exampleOpen In EditorYoutube Video TutorialINPUT  
PORTSIndex (Number: integer)Index number determines which string is passed through

**> Input Ports:** - Visit *Ops.String.SwitchString documentation* for input port details **< Output Ports:** - Visit *Ops.String.SwitchString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SwitchString"  
**Docs:** <https://cables.gl/op/Ops.String.SwitchString>

---

## 13.80.56 SwitchStringMultiPort\_v2



**Full Name:** Ops.String.SwitchStringMultiPort\_v2 **Description:** Full NameOps.String.SwitchStringMultiPort\_v2V  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch SwitchStringMultiPort ExampleOpen In EditorINPUT PORTSIndex  
(Number: integer)StringsStrings\_0 (String)add port (String)OUTPUT PORTSString (String)Num Val-  
ues (Number)SaveCancel ChangelogPatches using SwitchStringMultiPort\_v2Examples Team cables  
Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.SwitchStringMultiPort\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.String.SwitchStringMultiPort\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SwitchStringMul-  
tiPort\_v2" **Docs:** [https://cables.gl/op/Ops.String.SwitchStringMultiPort\\_v2](https://cables.gl/op/Ops.String.SwitchStringMultiPort_v2)

---

## 13.80.57 UUID



**Full Name:** Ops.String.UUID **Description:** Full NameOps.String.UUIDVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch UUID exampleOpen In EditorINPUT PORTSGenerate (Trigger)OUTPUT PORTSId (String)SaveCancel ChangelogPatches using UUIDExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.String.UUID* documentation for input port details < **Output Ports:** - Visit *Ops.String.UUID* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "UUID" **Docs:** <https://cables.gl/op/Ops.String.UUID>

---

## 13.80.58 Uppercase\_v2



**Full Name:** Ops.String.Uppercase\_v2 **Description:** Full NameOps.String.Uppercase\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Concat Lowercase Uppercase ExampleOpen In EditorINPUT PORTSString (String)OUTPUT PORTSResult (String)SaveCancel ChangelogPatches using Uppercase\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.String.Uppercase\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.String.Uppercase\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Uppercase\_v2" **Docs:** [https://cables.gl/op/Ops.String.Uppercase\\_v2](https://cables.gl/op/Ops.String.Uppercase_v2)

---

## 13.81 Ops.String.Base64

### 13.81.1 Base64Decode\_v2



Base64Decode

**Full Name:** Ops.String.Base64.Base64Decode\_v2 **Description:** Full NameOps.String.Base64.Base64Decode\_v2Vis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSString (String)OUTPUT PORTSResult  
(String)SaveCancel ChangelogPatches using Base64Decode\_v2Examples Team cables Public My  
Patches My Ops

**> Input Ports:** - Visit *Ops.String.Base64.Base64Decode\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.String.Base64.Base64Decode\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Base64Decode\_v2"  
**Docs:** [https://cables.gl/op/Ops.String.Base64.Base64Decode\\_v2](https://cables.gl/op/Ops.String.Base64.Base64Decode_v2)

---

### 13.81.2 Base64Encode\_v3



Base64Encode

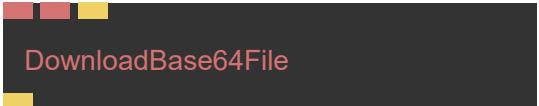
**Full Name:** Ops.String.Base64.Base64Encode\_v3 **Description:** Full NameOps.String.Base64.Base64Encode\_v3Vis  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSString (String)the input string

**> Input Ports:** - Visit *Ops.String.Base64.Base64Encode\_v3 documentation* for input port details **< Output Ports:** - Visit *Ops.String.Base64.Base64Encode\_v3 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Base64Encode\_v3"  
**Docs:** [https://cables.gl/op/Ops.String.Base64.Base64Encode\\_v3](https://cables.gl/op/Ops.String.Base64.Base64Encode_v3)

---

### 13.81.3 DownloadBase64File



DownloadBase64File

**Full Name:** Ops.String.Base64.DownloadBase64File **Description:** Full NameOps.String.Base64.DownloadBase64FileOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch example downloadBase64FileOpen In EditorINPUT PORTSData URL (String)Filename (String)Download (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel Changelog-Patches using DownloadBase64FileExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.Base64.DownloadBase64File* documentation for input port details <

**Output Ports:** - Visit *Ops.String.Base64.DownloadBase64File* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Download-Base64File" **Docs:** <https://cables.gl/op/Ops.String.Base64.DownloadBase64File>

---

## 13.82 Ops.String.File

### 13.82.1 FileInputStream\_v2



FileInputStream

**Full Name:** Ops.String.File.FileInputStream\_v2 **Description:** Full NameOps.String.File.FileInputStream\_v2VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryNo op example found on this serverINPUT PORTSFile (String)OUTPUT PORTSURL (String)SaveCancel ChangelogPatches using FileInputStream\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.String.File.FileInputStream\_v2* documentation for input port details < **Output Ports:**

- Visit *Ops.String.File.FileInputStream\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FileInputStream\_v2" **Docs:** [https://cables.gl/op/Ops.String.File.FileInputStream\\_v2](https://cables.gl/op/Ops.String.File.FileInputStream_v2)

---

## 13.82.2 SwitchFile\_v2



**Full Name:** Ops.String.File.SwitchFile\_v2 **Description:** handy if you just want to load one specific file into memory. the texture will only be loaded when the file is switched.

**> Input Ports:** - Visit *Ops.String.File.SwitchFile\_v2 documentation* for input port details **< Output Ports:**  
- Visit *Ops.String.File.SwitchFile\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SwitchFile\_v2"

**Docs:** [https://cables.gl/op/Ops.String.File.SwitchFile\\_v2](https://cables.gl/op/Ops.String.File.SwitchFile_v2)

---

## 13.83 Ops.Templates

### 13.83.1 ExampleVizOp



**Full Name:** Ops.Templates.ExampleVizOp **Description:** Full NameOps.Templates.ExampleVizOpVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSNumber (Number)SaveCancel Changel-  
ogPatches using ExampleVizOpExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Templates.ExampleVizOp documentation* for input port details **< Output Ports:**  
- Visit *Ops.Templates.ExampleVizOp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ExampleVizOp"

**Docs:** <https://cables.gl/op/Ops.Templates.ExampleVizOp>

---

## 13.83.2 MinimalMaterial



MinimalMaterial

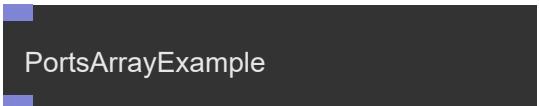
**Full Name:** Ops.Templates.MinimalMaterial **Description:** Colors all subsequent objects yellow, can be useful to quickly highlight and identify objects (debugging).

**> Input Ports:** - Visit *Ops.Templates.MinimalMaterial documentation* for input port details **< Output Ports:** - Visit *Ops.Templates.MinimalMaterial documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "MinimalMaterial" **Docs:** <https://cables.gl/op/Ops.Templates.MinimalMaterial>

---

## 13.83.3 PortsArrayExample



PortsArrayExample

**Full Name:** Ops.Templates.PortsArrayExample **Description:** Full NameOps.Templates.PortsArrayExampleVisibilityOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Canuse queryExample Patch PortsArrayExample PortsBooleanExample PortsObjectExample PortsStringExample PortsTriggerExample PortsValueExample ExampleThis example patch gives an example of how to get started with coding all the basic data type ops inside of cables.

**> Input Ports:** - Visit *Ops.Templates.PortsArrayExample documentation* for input port details **< Output Ports:** - Visit *Ops.Templates.PortsArrayExample documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PortsArrayExample" **Docs:** <https://cables.gl/op/Ops.Templates.PortsArrayExample>

---

### 13.83.4 PortsBooleanExample

PortsBooleanExample

**Full Name:** Ops.Templates.PortsBooleanExample **Description:** Full NameOps.Templates.PortsBooleanExampleVisibl  
Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch PortsArrayExample PortsBooleanExample PortsObjectExample  
PortsStringExample PortsTriggerExample PortsValueExample ExampleThis example patch gives an  
example of how to get started with coding all the basic data type ops inside of cables.

**> Input Ports:** - Visit *Ops.Templates.PortsBooleanExample documentation* for input port details **< Output Ports:** - Visit *Ops.Templates.PortsBooleanExample documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PortsBooleanExample" **Docs:** <https://cables.gl/op/Ops.Templates.PortsBooleanExample>

---

### 13.83.5 PortsObjectExample

PortsObjectExample

**Full Name:** Ops.Templates.PortsObjectExample **Description:** Full NameOps.Templates.PortsObjectExampleVisibl  
Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch PortsArrayExample PortsBooleanExample PortsObjectExample  
PortsStringExample PortsTriggerExample PortsValueExample ExampleThis example patch gives an  
example of how to get started with coding all the basic data type ops inside of cables.

**> Input Ports:** - Visit *Ops.Templates.PortsObjectExample documentation* for input port details **< Output Ports:** - Visit *Ops.Templates.PortsObjectExample documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PortsObjectExample" **Docs:** <https://cables.gl/op/Ops.Templates.PortsObjectExample>

---

### 13.83.6 PortsStringExample

PortsStringExample

**Full Name:** Ops.Templates.PortsStringExample **Description:** Full NameOps.Templates.PortsStringExampleVisibilityOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch PortsArrayExample PortsBooleanExample PortsObjectExample PortsStringExample PortsTriggerExample PortsValueExample ExampleThis example patch gives an example of how to get started with coding all the basic data type ops inside of cables.

**> Input Ports:** - Visit *Ops.Templates.PortsStringExample documentation* for input port details **< Output Ports:** - Visit *Ops.Templates.PortsStringExample documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PortsStringExample" **Docs:** <https://cables.gl/op/Ops.Templates.PortsStringExample>

---

### 13.83.7 PortsTriggerExample

PortsTriggerExample

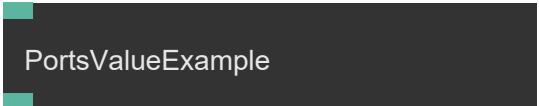
**Full Name:** Ops.Templates.PortsTriggerExample **Description:** Full NameOps.Templates.PortsTriggerExampleVisibilityOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch PortsArrayExample PortsBooleanExample PortsObjectExample PortsStringExample PortsTriggerExample PortsValueExample ExampleThis example patch gives an example of how to get started with coding all the basic data type ops inside of cables.

**> Input Ports:** - Visit *Ops.Templates.PortsTriggerExample documentation* for input port details **< Output Ports:** - Visit *Ops.Templates.PortsTriggerExample documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PortsTriggerExample" **Docs:** <https://cables.gl/op/Ops.Templates.PortsTriggerExample>

---

### 13.83.8 PortsValueExample



PortsValueExample

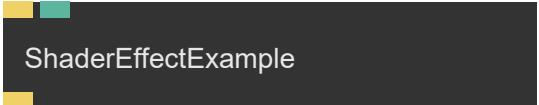
**Full Name:** Ops.Templates.PortsValueExample **Description:** Full NameOps.Templates.PortsValueExampleVisibilityOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch PortsArrayExample PortsBooleanExample PortsObjectExample PortsStringExample PortsTriggerExample PortsValueExample ExampleThis example patch gives an example of how to get started with coding all the basic data type ops inside of cables.

**> Input Ports:** - Visit *Ops.Templates.PortsValueExample* documentation for input port details **< Output Ports:** - Visit *Ops.Templates.PortsValueExample* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PortsValueExample" **Docs:** <https://cables.gl/op/Ops.Templates.PortsValueExample>

---

### 13.83.9 ShaderEffectExample



ShaderEffectExample

**Full Name:** Ops.Templates.ShaderEffectExample **Description:** a shaderEffect extends the current shader/material by its own functions

**> Input Ports:** - Visit *Ops.Templates.ShaderEffectExample* documentation for input port details **< Output Ports:** - Visit *Ops.Templates.ShaderEffectExample* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ShaderEffectExample" **Docs:** <https://cables.gl/op/Ops.Templates.ShaderEffectExample>

---

### 13.83.10 UiTestOp



**Full Name:** Ops.Templates.UiTestOp **Description:** Full NameOps.Templates.UiTestOpVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCanuse queryExample Patch UiTestOp exampleOpen In EditorINPUT PORTSLoading Task  
(Number: boolean)Loading (Number: boolean)WarningsWarning (Number: boolean)Error (Num-  
ber: boolean)Hint (Number: boolean)Not Working (Number: boolean)Slider (Number)Gradient  
(Number)Resizable (Number: boolean)trigger (Trigger)Greyoutgreyout (Number: boolean)this will  
greyout (Number)Loggingop.log() (Trigger)op.logWarn() (Trigger)op.logError() (Trigger)ModalOpen  
Prompt (Trigger)Open Modal (Trigger)Open new Tab (Trigger)OUTPUT PORTSSomething (Num-  
ber)SaveCancel ChangelogPatches using UiTestOpExamples Team cables Public My Patches My  
Ops

➢ **Input Ports:** - Visit *Ops.Templates.UiTestOp documentation* for input port details < **Output Ports:** - Visit *Ops.Templates.UiTestOp documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "UiTestOp"* **Docs:** <https://cables.gl/op/Ops.Templates.UiTestOp>

---

## 13.84 Ops.TimeLine

### 13.84.1 Anim



**Full Name:** Ops.TimeLine.Anim **Description:** check out the youtube tutorials:

➢ **Input Ports:** - Visit *Ops.TimeLine.Anim documentation* for input port details < **Output Ports:** - Visit *Ops.TimeLine.Anim documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Anim"* **Docs:** <https://cables.gl/op/Ops.TimeLine.Anim>

---

## 13.84.2 AnimGetKey



**Full Name:** Ops.TimeLine.AnimGetKey **Description:** Full NameOps.TimeLine.AnimGetKeyVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch AnimGetKey ExampleOpen In EditorINPUT PORTSAnim (Object)Time (Number)OUTPUT PORTSIndex (Number)Key Value (Number)Key Time (Number)SaveCancel ChangelogPatches using AnimGetKeyExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.AnimGetKey documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.AnimGetKey documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AnimGetKey"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.AnimGetKey>

---

## 13.84.3 AnimGetValue



**Full Name:** Ops.TimeLine.AnimGetValue **Description:** Full NameOps.TimeLine.AnimGetValueVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch AnimGetValue ExampleOpen In EditorYoutube Video TutorialINPUT PORTSAnim (Object)Time (Number)OUTPUT PORTSValue (Number)Loop (Number)SaveCancel ChangelogPatches using AnimGetValueExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.AnimGetValue documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.AnimGetValue documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AnimGetValue"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.AnimGetValue>

---

#### 13.84.4 AnimInfo



**Full Name:** Ops.TimeLine.AnimInfo **Description:** Full NameOps.TimeLine.AnimInfoVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSAnim (Object)OUTPUT PORTSTotal Keys (Number)Length Seconds (Number)SaveCancel ChangelogPatches using AnimInfoExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.AnimInfo* documentation for input port details **< Output Ports:** - Visit *Ops.TimeLine.AnimInfo* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AnimInfo" **Docs:** <https://cables.gl/op/Ops.TimeLine.AnimInfo>

---

#### 13.84.5 AutoPlay



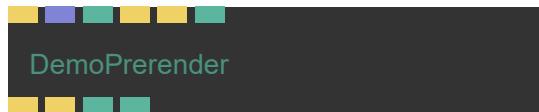
**Full Name:** Ops.TimeLine.AutoPlay **Description:** Full NameOps.TimeLine.AutoPlayVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverSaveCancel ChangelogPatches using AutoPlayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.AutoPlay* documentation for input port details **< Output Ports:** - Visit *Ops.TimeLine.AutoPlay* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "AutoPlay" **Docs:** <https://cables.gl/op/Ops.TimeLine.AutoPlay>

---

## 13.84.6 DemoPrerender



**Full Name:** Ops.TimeLine.DemoPrerender **Description:** This op records “heavy events”, that cause frame drops at runtime (uploading data to gpu/resizing of textures/compiling shaders).

**> Input Ports:** - Visit *Ops.TimeLine.DemoPrerender documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.DemoPrerender documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “DemoPrerender”  
**Docs:** <https://cables.gl/op/Ops.TimeLine.DemoPrerender>

---

## 13.84.7 GotoFrame



**Full Name:** Ops.TimeLine.GotoFrame **Description:** Full NameOps.TimeLine.GotoFrameVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSFrame (Number)SaveCancel Changelog-  
Patches using GotoFrameExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.GotoFrame documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.GotoFrame documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for “GotoFrame”  
**Docs:** <https://cables.gl/op/Ops.TimeLine.GotoFrame>

---

## 13.84.8 PreRender



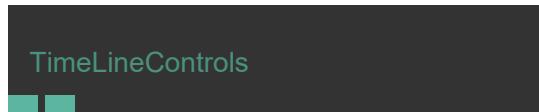
**Full Name:** Ops.TimeLine.PreRender **Description:** You can use this for demos to reduce framedrops - prerender your scenes while showing a loading bar.

**> Input Ports:** - Visit *Ops.TimeLine.PreRender documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.PreRender documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "PreRender" **Docs:** <https://cables.gl/op/Ops.TimeLine.PreRender>

---

## 13.84.9 TimeLineControls



**Full Name:** Ops.TimeLine.TimeLineControls **Description:** Full NameOps.TimeLine.TimeLineControlsVisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverOUTPUT PORTSPlay/Stop (Number)time (Number)SaveCancel ChangelogPatches using TimeLineControlsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.TimeLineControls documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.TimeLineControls documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimeLineControls" **Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineControls>

---

## 13.84.10 TimeLineFrame

TimeLineFrame

**Full Name:** Ops.TimeLine.TimeLineFrame **Description:** Full NameOps.TimeLine.TimeLineFrameVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverOUTPUT PORTStime (Number)SaveCancel ChangelogPatches using TimeLineFrameExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.TimeLineFrame documentation* for input port details **< Output Ports:**  
- Visit *Ops.TimeLine.TimeLineFrame documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimeLineFrame"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineFrame>

---

## 13.84.11 TimeLineLength

TimeLineLength

**Full Name:** Ops.TimeLine.TimeLineLength **Description:** Full NameOps.TimeLine.TimeLineLengthVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch timelineLength exampleOpen In EditorINPUT PORTSupdate (Trig-  
ger)OUTPUT PORTSLength (Number)SaveCancel ChangelogPatches using TimeLineLengthExamples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.TimeLineLength documentation* for input port details **< Output Ports:**  
- Visit *Ops.TimeLine.TimeLineLength documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimeLineLength"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineLength>

---

### 13.84.12 TimeLineLoop



**Full Name:** Ops.TimeLine.TimeLineLoop **Description:** Let timeline restart after it reaches Duration.

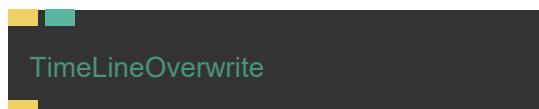
**> Input Ports:** - **How long the loop should be (in seconds):** *Check documentation* **< Output Ports:** - *Visit Ops.TimeLine.TimeLineLoop documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** *Search cables.gl patches for "TimeLineLoop"*

**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineLoop>

---

### 13.84.13 TimeLineOverwrite



**Full Name:** Ops.TimeLine.TimeLineOverwrite **Description:** Full NameOps.TimeLine.TimeLineOverwriteVisibilityCode  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSexe (Trigger)new time (Number)OUTPUT  
PORTTrigger (Trigger)SaveCancel ChangelogPatches using TimeLineOverwriteExamples Team ca-  
bles Public My Patches My Ops

**> Input Ports:** - *Visit Ops.TimeLine.TimeLineOverwrite documentation for input port details* **< Output  
Ports:** - *Visit Ops.TimeLine.TimeLineOverwrite documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** *Search cables.gl patches for "TimeLineOver-  
write"* **Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineOverwrite>

---

## 13.84.14 TimeLinePlay



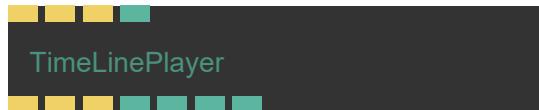
**Full Name:** Ops.TimeLine.TimeLinePlay **Description:** Full NameOps.TimeLine.TimeLinePlayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Canuse queryExample Patch PlayerControlPanel TimeLinePlay TimeLineRewind TimeLineSetTime  
Examplea simple setup of an audioplayer to demostrate the usage of the PlayerControlPanel op

**> Input Ports:** - Visit *Ops.TimeLine.TimeLinePlay documentation* for input port details **< Output Ports:**  
- Visit *Ops.TimeLine.TimeLinePlay documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimeLinePlay"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLinePlay>

---

## 13.84.15 TimeLinePlayer



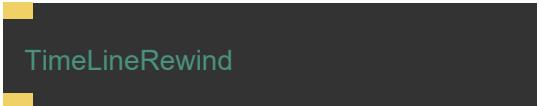
**Full Name:** Ops.TimeLine.TimeLinePlayer **Description:** This op allows complete control over the time-  
line and gives information such as current position.

**> Input Ports:** - Visit *Ops.TimeLine.TimeLinePlayer documentation* for input port details **< Output Ports:**  
- **Current time in frames (30fps):** Check documentation

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimeLinePlayer"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLinePlayer>

---

### 13.84.16 TimeLineRewind



TimeLineRewind

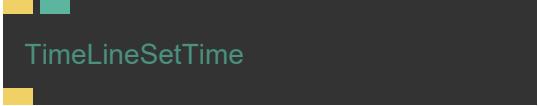
**Full Name:** Ops.TimeLine.TimeLineRewind **Description:** Full NameOps.TimeLine.TimeLineRewindVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch PlayerControlPanel TimeLinePlay TimeLineRewind TimeLineSetTime  
Examplea simple setup of an audioplayer to demostrate the usage of the PlayerControlPanel op

**> Input Ports:** - Visit *Ops.TimeLine.TimeLineRewind documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.TimeLineRewind documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimeLineRewind"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineRewind>

---

### 13.84.17 TimeLineSetTime



TimeLineSetTime

**Full Name:** Ops.TimeLine.TimeLineSetTime **Description:** Full NameOps.TimeLine.TimeLineSetTimeVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch PlayerControlPanel TimeLinePlay TimeLineRewind TimeLineSetTime  
Examplea simple setup of an audioplayer to demostrate the usage of the PlayerControlPanel op

**> Input Ports:** - Visit *Ops.TimeLine.TimeLineSetTime documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.TimeLineSetTime documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimeLineSetTime"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineSetTime>

---

## 13.84.18 TimeLineTime

TimeLineTime

**Full Name:** Ops.TimeLine.TimeLineTime **Description:** Full NameOps.TimeLine.TimeLineTimeVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverOUTPUT PORTStime (Number)The current time of  
the timeline (in seconds)

**> Input Ports:** - Visit *Ops.TimeLine.TimeLineTime documentation for input port details* **< Output Ports:**  
- Visit *Ops.TimeLine.TimeLineTime documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimeLineTime"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineTime>

---

## 13.84.19 TimeLineTogglePlay

TimeLineTogglePlay

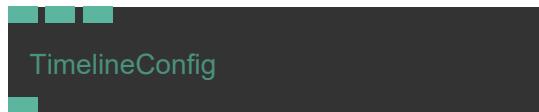
**Full Name:** Ops.TimeLine.TimeLineTogglePlay **Description:** Full NameOps.TimeLine.TimeLineTogglePlayVisibility  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSPlay (Number: boolean)SaveCancel Changel-  
ogPatches using TimeLineTogglePlayExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.TimeLineTogglePlay documentation for input port details* **< Output  
Ports:** - Visit *Ops.TimeLine.TimeLineTogglePlay documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimeLineToggle-  
Play" **Docs:** <https://cables.gl/op/Ops.TimeLine.TimeLineTogglePlay>

---

## 13.84.20 TimelineConfig



**Full Name:** Ops.TimeLine.TimelineConfig **Description:** Full NameOps.TimeLine.TimelineConfigVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSFPS (Number: integer)Restrict to frames (Number: boolean)Fade in Frames (Number: boolean)OUTPUT PORTSDuration Seconds (Number)SaveCancel ChangelogPatches using TimelineConfigExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.TimelineConfig* documentation for input port details **< Output Ports:**  
- Visit *Ops.TimeLine.TimelineConfig* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimelineConfig"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimelineConfig>

---

## 13.84.21 TimelineDebug



**Full Name:** Ops.TimeLine.TimelineDebug **Description:** Full NameOps.TimeLine.TimelineDebugVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverINPUT PORTSupdate (Trigger)OUTPUT PORTSdata (Object)Time Cursor (Number)Visible Duration (Number)Visible Time Start (Number)Loop Start (Number)Loop End (Number)Num selected Keys (Number)Selected Values Min (Number)Selected Values Max (Number)Selected Times Min (Number)Selected Times Max (Number)Selected keys (Array)SaveCancel ChangelogPatches using TimelineDebugExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.TimeLine.TimelineDebug* documentation for input port details **< Output Ports:**  
- Visit *Ops.TimeLine.TimelineDebug* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimelineDebug"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimelineDebug>

---

## 13.84.22 TimelineValue



**Full Name:** Ops.TimeLine.TimelineValue **Description:** Allows you to animate a simple value for use with other ops. Use the timeline to keyframe the animation and attach the output to another op you wish to animate. Useful for reusing values or using a single timeline to animated multiple ops.

**> Input Ports:** - Visit *Ops.TimeLine.TimelineValue documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.TimelineValue documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimelineValue"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.TimelineValue>

---

## 13.85 Ops.TimeLine.Viz

### 13.85.1 TimeLineBPM



**Full Name:** Ops.TimeLine.Viz.TimeLineBPM **Description:** Synchronize animations to music or rhythm. When you add the Timeline BPM operator, it draws visual beat markers directly in the timeline. Each small rectangle represents a beat, with every fourth beat highlighted to indicate the start of a new bar. Adjusting the BPM value updates the spacing of these markers.

**> Input Ports:** - Visit *Ops.TimeLine.Viz.TimeLineBPM documentation* for input port details **< Output Ports:** - Visit *Ops.TimeLine.Viz.TimeLineBPM documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimeLineBPM"  
**Docs:** <https://cables.gl/op/Ops.TimeLine.Viz.TimeLineBPM>

---

## 13.85.2 TimeLineImage



**Full Name:** Ops.TimeLine.Viz.TimeLineImage **Description:** Full NameOps.TimeLine.Viz.TimeLineImageVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch TimeLineImage ExampleOpen In EditorYoutube Video Tuto-  
rialINPUT PORTSFile (String)slot (Number: integer)Opacity (Number)Start (Number)End (Num-  
ber)SaveCancel ChangelogPatches using TimeLineImageExamples Team cables Public My Patches My  
Ops

**> Input Ports:** - Visit *Ops.TimeLine.Viz.TimeLineImage* documentation for input port details **< Output  
Ports:** - Visit *Ops.TimeLine.Viz.TimeLineImage* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimeLineImage"

**Docs:** <https://cables.gl/op/Ops.TimeLine.Viz.TimeLineImage>

---

## 13.86 Ops.Trigger

### 13.86.1 DelayedTrigger



**Full Name:** Ops.Trigger.DelayedTrigger **Description:** Full NameOps.Trigger.DelayedTriggerVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch DelayedTrigger ExampleOpen In EditorINPUT PORTSx (Trigger)  
delay (Number)Cancel (Trigger)OUTPUT PORTSnext (Trigger)Delaying (booleanNum-  
ber)SaveCancel ChangelogPatches using DelayedTriggerExamples Team cables Public My Patches My  
Ops

> **Input Ports:** - Visit *Ops.Trigger.DelayedTrigger* documentation for input port details < **Output Ports:**  
- Visit *Ops.Trigger.DelayedTrigger* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "DelayedTrigger"  
**Docs:** <https://cables.gl/op/Ops.Trigger.DelayedTrigger>

---

## 13.86.2 GateTrigger



**Full Name:** Ops.Trigger.GateTrigger **Description:** Full NameOps.Trigger.GateTriggerVisibilityCore  
Op - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch GateTrigger exampleOpen In EditorYoutube Video TutorialINPUT  
PORTSExecute (Trigger)Trigger in

> **Input Ports:** - Visit *Ops.Trigger.GateTrigger* documentation for input port details < **Output Ports:** -  
Visit *Ops.Trigger.GateTrigger* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GateTrigger"  
**Docs:** <https://cables.gl/op/Ops.Trigger.GateTrigger>

---

## 13.86.3 Interval



**Full Name:** Ops.Trigger.Interval **Description:** Starts a timer which triggers every x milliseconds.

> **Input Ports:** - Visit *Ops.Trigger.Interval* documentation for input port details < **Output Ports:** - Visit  
*Ops.Trigger.Interval* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Interval" **Docs:**  
<https://cables.gl/op/Ops.Trigger.Interval>

---

## 13.86.4 IsTriggered



**Full Name:** Ops.Trigger.IsTriggered **Description:** can be used to check if a branch of ops is being triggered in the last frame.

➤ **Input Ports:** - Visit [Ops.Trigger.IsTriggered documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.IsTriggered documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "IsTriggered"  
**Docs:** <https://cables.gl/op/Ops.Trigger.IsTriggered>

---

## 13.86.5 NthTrigger\_v2



**Full Name:** Ops.Trigger.NthTrigger\_v2 **Description:** Helpful when you want to slow things down. Makes sure only every nth trigger gets through. E.g. when Nth is 3 every 3rd trigger gets through, the others not.

➤ **Input Ports:** - Visit [Ops.Trigger.NthTrigger\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.NthTrigger\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "NthTrigger\_v2"  
**Docs:** [https://cables.gl/op/Ops.Trigger.NthTrigger\\_v2](https://cables.gl/op/Ops.Trigger.NthTrigger_v2)

---

## 13.86.6 NumberByTrigger



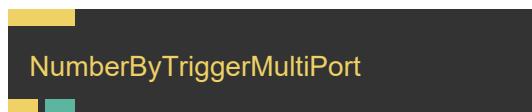
**Full Name:** Ops.Trigger.NumberByTrigger **Description:** Outputs the last number of the input port which was triggered, so e.g. if input port 2 was triggered last, Result will be 2.

> **Input Ports:** - Visit *Ops.Trigger.NumberByTrigger* documentation for input port details < **Output Ports:** - Visit *Ops.Trigger.NumberByTrigger* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "NumberByTrigger" **Docs:** <https://cables.gl/op/Ops.Trigger.NumberByTrigger>

---

### 13.86.7 NumberByTriggerMultiPort\_v2



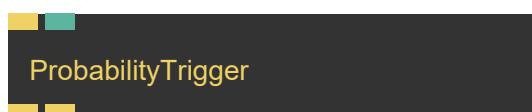
**Full Name:** Ops.Trigger.NumberByTriggerMultiPort\_v2 **Description:** Full NameOps.Trigger.NumberByTriggerMultiPort\_v2 - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch NumberByTriggerMultiPort ExampleOpen In EditorINPUT PORTSTriggerTrigger\_0 (Trigger)add port (Trigger)OUTPUT PORTSNext (Trigger)Number Triggered (Number)SaveCancel ChangelogPatches using NumberByTriggerMultiPort\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Trigger.NumberByTriggerMultiPort\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.Trigger.NumberByTriggerMultiPort\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "NumberByTriggerMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.NumberByTriggerMultiPort\\_v2](https://cables.gl/op/Ops.Trigger.NumberByTriggerMultiPort_v2)

---

### 13.86.8 ProbabilityTrigger



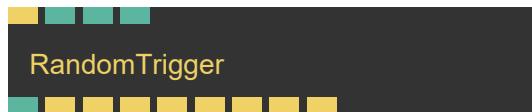
**Full Name:** Ops.Trigger.ProbabilityTrigger **Description:** This op triggers based on a given probability.

> **Input Ports:** - Visit `Ops.Trigger.ProbabilityTrigger` documentation for input port details < **Output Ports:** - Visit `Ops.Trigger.ProbabilityTrigger` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "ProbabilityTrigger" **Docs:** <https://cables.gl/op/Ops.Trigger.ProbabilityTrigger>

---

### 13.86.9 RandomTrigger



**Full Name:** `Ops.Trigger.RandomTrigger` **Description:** Full Name `Ops.Trigger.RandomTriggerVisibilityCore` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patchlists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Ca niuse query Example Patch RandomTrigger Open In Editor INPUT PORTS Render (Trigger) Num Times (Number) how many random ports will be triggered

> **Input Ports:** - Visit `Ops.Trigger.RandomTrigger` documentation for input port details < **Output Ports:** - Visit `Ops.Trigger.RandomTrigger` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "RandomTrigger" **Docs:** <https://cables.gl/op/Ops.Trigger.RandomTrigger>

---

### 13.86.10 Repeat2d



**Full Name:** `Ops.Trigger.Repeat2d` **Description:** Imagine a `Ops.Trigger.Repeat` connected to a `Ops.Trigger.Repeat`, or a for loop inside a for loop. This loop is especially useful for drawing a matrix of objects.

> **Input Ports:** - Centers X and Y around the origin (0/0): Check documentation < **Output Ports:** - Visit `Ops.Trigger.Repeat2d` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Repeat2d" **Docs:** <https://cables.gl/op/Ops.Trigger.Repeat2d>

---

### 13.86.11 Repeat\_v2



**Full Name:** Ops.Trigger.Repeat\_v2 **Description:** All ops connected to the Trigger port will be triggered Num times.

► **Input Ports:** - Visit [Ops.Trigger.Repeat\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.Repeat\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Repeat\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.Repeat\\_v2](https://cables.gl/op/Ops.Trigger.Repeat_v2)

---

### 13.86.12 RouteTrigger



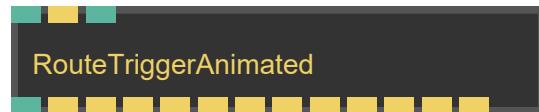
**Full Name:** Ops.Trigger.RouteTrigger **Description:** Full NameOps.Trigger.RouteTriggerVisibilityCore Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Route Trigger ExampleRoute trigger triggers one of the output triggers based on the value of the input port.

► **Input Ports:** - Visit [Ops.Trigger.RouteTrigger documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.RouteTrigger documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RouteTrigger" **Docs:** <https://cables.gl/op/Ops.Trigger.RouteTrigger>

---

### 13.86.13 RouteTriggerAnimated



**Full Name:** Ops.Trigger.RouteTriggerAnimated **Description:** Full NameOps.Trigger.RouteTriggerAnimatedVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch crossfade routeTriggerAnimatedOpen In EditorINPUT PORTSIndex (Number: integer)exe (Trigger)Duration (Number)OUTPUT PORTS4gu5lv66h (Number)qutsn94pc (Trigger)8xpkgorjm (Trigger)hvyzlh9o8 (Trigger)367wv95xd (Trigger)7ju3j2fy0 (Trigger)t8dvyuoq (Trigger)72naih78e (Trigger)0s04tm21u (Trigger)93jpxulns (Trigger)a0w7orgi8 (Trigger)r8h4qx4z8 (Trigger)cr80a86xi (Trigger)SaveCancel ChangelogPatches using RouteTriggerAnimatedExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Trigger.RouteTriggerAnimated documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.RouteTriggerAnimated documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RouteTriggerAnimated" **Docs:** <https://cables.gl/op/Ops.Trigger.RouteTriggerAnimated>

---

### 13.86.14 RouteTriggerMultiPort\_v2



**Full Name:** Ops.Trigger.RouteTriggerMultiPort\_v2 **Description:** Full NameOps.Trigger.RouteTriggerMultiPort\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch RouteTriggerMultiPort ExampleOpen In EditorINPUT PORTSExecute (Trigger)Switch Value (Number: integer)OUTPUT PORTSTotal Connections (Number)Connected Op Names (Array)Trigger\_0 (Trigger)Trigger\_1 (Trigger)Trigger\_2 (Trigger)Trigger\_3 (Trigger)Trigger\_4 (Trigger)Trigger\_5 (Trigger)Trigger\_6 (Trigger)Trigger\_7 (Trigger)Trigger\_8 (Trigger)Trigger\_9 (Trigger)Trigger\_10 (Trigger)Trigger\_11 (Trigger)Trigger\_12 (Trigger)Trigger\_13 (Trigger)Trigger\_14 (Trigger)Trigger\_15 (Trigger)Trigger\_16 (Trigger)Trigger\_17 (Trigger)SaveCancel ChangelogPatches using RouteTriggerMultiPort\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Trigger.RouteTriggerMultiPort\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.RouteTriggerMultiPort\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RouteTriggerMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.RouteTriggerMultiPort\\_v2](https://cables.gl/op/Ops.Trigger.RouteTriggerMultiPort_v2)

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### 13.86.15 RouteTriggerString\_v2



**Full Name:** Ops.Trigger.RouteTriggerString\_v2 **Description:** Full NameOps.Trigger.RouteTriggerString\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Example Route Trigger StringExample shows a Sidebar dropdown selecting between the strings "Circle" and "Square" to route a trigger that then displays the shapes.

> **Input Ports:** - Visit [Ops.Trigger.RouteTriggerString\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.RouteTriggerString\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "RouteTriggerString\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.RouteTriggerString\\_v2](https://cables.gl/op/Ops.Trigger.RouteTriggerString_v2)

---

### 13.86.16 Sequence



**Full Name:** Ops.Trigger.Sequence **Description:** Full NameOps.Trigger.SequenceVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Sequence ExampleOpen In EditorYoutube Video TutorialINPUT PORTSexecute (Trigger)exe 0 (Trigger)exe 1 (Trigger)exe 2 (Trigger)exe 3 (Trigger)exe 4 (Trigger)exe 5 (Trigger)exe 6 (Trigger)exe 7 (Trigger)exe 8 (Trigger)exe 9 (Trigger)exe 10 (Trigger)exe 11 (Trigger)exe 12 (Trigger)exe 13 (Trigger)exe 14 (Trigger)OUTPUT PORTStrigger 0 (Trigger)trigger 1 (Trigger)trigger 2 (Trigger)

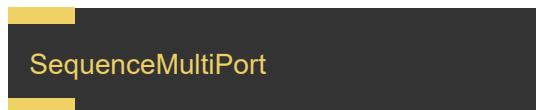
ger)trigger 3 (Trigger)trigger 4 (Trigger)trigger 5 (Trigger)trigger 6 (Trigger)trigger 7 (Trigger)trigger 8 (Trigger)trigger 9 (Trigger)trigger 10 (Trigger)trigger 11 (Trigger)trigger 12 (Trigger)trigger 13 (Trigger)trigger 14 (Trigger)trigger 15 (Trigger)SaveCancel ChangelogPatches using SequenceExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Trigger.Sequence documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.Sequence documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Sequence" **Docs:** <https://cables.gl/op/Ops.Trigger.Sequence>

---

### 13.86.17 SequenceMultiPort\_v2



**Full Name:** Ops.Trigger.SequenceMultiPort\_v2 **Description:** FullNameOps.Trigger.SequenceMultiPort\_v2VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch SequenceMultiPort ExampleOpen In EditorINPUT PORTSInputInput\_0(Trigger)add port (Trigger)OUTPUT PORTSOutput\_0 (Trigger)Output\_1 (Trigger)SaveCancel ChangelogPatches using SequenceMultiPort\_v2Examples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Trigger.SequenceMultiPort\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Trigger.SequenceMultiPort\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "SequenceMultiPort\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.SequenceMultiPort\\_v2](https://cables.gl/op/Ops.Trigger.SequenceMultiPort_v2)

---

### 13.86.18 SwitchTrigger



**Full Name:** Ops.Trigger.SwitchTrigger **Description:** FullNameOps.Trigger.SwitchTriggerVisibilityCoreOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-

Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch SwitchTrigger - ExampleOpen In EditorYoutube Video TutorialINPUT PORTSTrigger Index (Number: integer)index to be used

> **Input Ports:** - Visit *Ops.Trigger.SwitchTrigger documentation* for input port details < **Output Ports:** - Visit *Ops.Trigger.SwitchTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "SwitchTrigger" **Docs:** <https://cables.gl/op/Ops.Trigger.SwitchTrigger>

---

### 13.86.19 Threshold



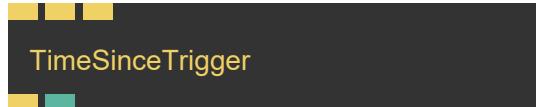
**Full Name:** Ops.Trigger.Threshold **Description:** This op will send one trigger out if the threshold has been crossed

> **Input Ports:** - Visit *Ops.Trigger.Threshold documentation* for input port details < **Output Ports:** - Visit *Ops.Trigger.Threshold documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Threshold" **Docs:** <https://cables.gl/op/Ops.Trigger.Threshold>

---

### 13.86.20 TimeSinceTrigger



**Full Name:** Ops.Trigger.TimeSinceTrigger **Description:** Time elapsed since last trigger

> **Input Ports:** - Visit *Ops.Trigger.TimeSinceTrigger documentation* for input port details < **Output Ports:** - Visit *Ops.Trigger.TimeSinceTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TimeSinceTrigger" **Docs:** <https://cables.gl/op/Ops.Trigger.TimeSinceTrigger>

---

## 13.86.21 TimedSequence



**Full Name:** Ops.Trigger.TimedSequence **Description:** ... can be also used together with a running animation input (like ops.Anim.Bang) to do animated transitions between different scenes: [https://cables.gl/p/o4\\_6Bo](https://cables.gl/p/o4_6Bo)

**> Input Ports:** - Visit [Ops.Trigger.TimedSequence documentation](#) for input port details **< Output Ports:** - Visit [Ops.Trigger.TimedSequence documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TimedSequence"

**Docs:** <https://cables.gl/op/Ops.Trigger.TimedSequence>

---

## 13.86.22 TriggerButton



**Full Name:** Ops.Trigger.TriggerButton **Description:** Full NameOps.Trigger.TriggerButtonVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch triggerButtonOpen In EditorINPUT PORTSTrigger (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel ChangelogPatches using TriggerButtonExamples Team cables Public My Patches My Ops

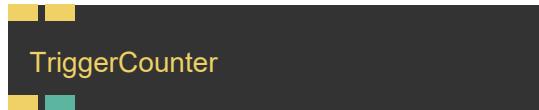
**> Input Ports:** - Visit [Ops.Trigger.TriggerButton documentation](#) for input port details **< Output Ports:** - Visit [Ops.Trigger.TriggerButton documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerButton"

**Docs:** <https://cables.gl/op/Ops.Trigger.TriggerButton>

---

## 13.86.23 TriggerCounter



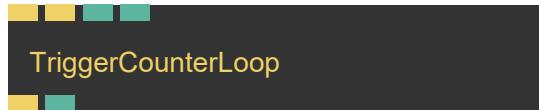
**Full Name:** Ops.Trigger.TriggerCounter **Description:** Useful for e.g. for debugging when you need to know how often Execute has been triggered, or if it was triggered at all.

**> Input Ports:** - Visit *Ops.Trigger.TriggerCounter documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.TriggerCounter documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerCounter" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerCounter>

---

## 13.86.24 TriggerCounterLoop



**Full Name:** Ops.Trigger.TriggerCounterLoop **Description:** Increments with each trigger and loops depending on min and max loop values.

**> Input Ports:** - Visit *Ops.Trigger.TriggerCounterLoop documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.TriggerCounterLoop documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerCounterLoop" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerCounterLoop>

---

## 13.86.25 TriggerDistributeByValue



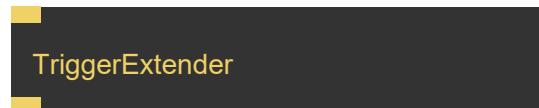
**Full Name:** Ops.Trigger.TriggerDistributeByValue **Description:** like maprange for triggering

> **Input Ports:** - Visit [Ops.Trigger.TriggerDistributeByValue](#) documentation for input port details < **Output Ports:** - Visit [Ops.Trigger.TriggerDistributeByValue](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TriggerDistributeByValue" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerDistributeByValue>

---

## 13.86.26 TriggerExtender



**Full Name:** Ops.Trigger.TriggerExtender **Description:** Full NameOps.Trigger.TriggerExtenderVisibilityCore  
Op - visible for everyoneLicenseMITAuthor sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Mouse Draw Spline ExampleUsing the ScreenPosTo3d op we can convert the mouse coordinates to 3D coordinates. For this you need to disable the Flip Y port of the Mouse op.

> **Input Ports:** - Visit [Ops.Trigger.TriggerExtender](#) documentation for input port details < **Output Ports:** - Visit [Ops.Trigger.TriggerExtender](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TriggerExtender" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerExtender>

---

## 13.86.27 TriggerIfDecreased



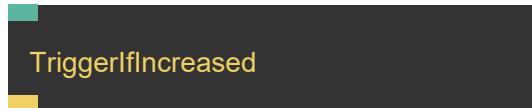
**Full Name:** Ops.Trigger.TriggerIfDecreased **Description:** Full NameOps.Trigger.TriggerIfDecreasedVisibilityCore  
Op - visible for everyoneLicenseMITAuthor sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch trigger if increased decreased example patchOpen In EditorINPUT PORTSValue (Number)Value to evaluate

> **Input Ports:** - Visit [Ops.Trigger.TriggerIfDecreased](#) documentation for input port details < **Output Ports:** - Visit [Ops.Trigger.TriggerIfDecreased](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TriggerIfDecreased" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerIfDecreased>

---

## 13.86.28 TriggerIfIncreased



**Full Name:** Ops.Trigger.TriggerIfIncreased **Description:** Full NameOps.Trigger.TriggerIfIncreasedVisibilityCoreOp - visible for everyoneLicenseMITAuthorandrogithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch trigger if increased decreased example patchOpen In EditorINPUTPORTSValue (Number)Value to evaluate

➤ **Input Ports:** - Visit *Ops.Trigger.TriggerIfIncreased* documentation for input port details < **Output Ports:** - Visit *Ops.Trigger.TriggerIfIncreased* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TriggerIfIncreased" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerIfIncreased>

---

## 13.86.29 TriggerLimiter



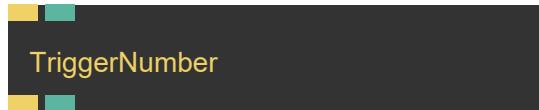
**Full Name:** Ops.Trigger.TriggerLimiter **Description:** This op is handy if you don't know how often another op triggers and you want to make sure it does not trigger more often than x milliseconds.

➤ **Input Ports:** - Visit *Ops.Trigger.TriggerLimiter* documentation for input port details < **Output Ports:** - Visit *Ops.Trigger.TriggerLimiter* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "TriggerLimiter" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerLimiter>

---

### 13.86.30 TriggerNumber



**Full Name:** Ops.Trigger.TriggerNumber **Description:** A very handy op for outputting a number only when triggered

**> Input Ports:** - Visit [Ops.Trigger.TriggerNumber documentation](#) for input port details **< Output Ports:** - Visit [Ops.Trigger.TriggerNumber documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TriggerNumber" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerNumber>

---

### 13.86.31 TriggerOnChangeArray\_v2



**Full Name:** Ops.Trigger.TriggerOnChangeArray\_v2 **Description:** Full NameOps.Trigger.TriggerOnChangeArray\_v2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSArray (Array)Array in

**> Input Ports:** - Visit [Ops.Trigger.TriggerOnChangeArray\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.Trigger.TriggerOnChangeArray\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TriggerOn-  
ChangeArray\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.TriggerOnChangeArray\\_v2](https://cables.gl/op/Ops.Trigger.TriggerOnChangeArray_v2)

---

### 13.86.32 TriggerOnChangeObject\_v2



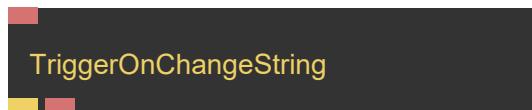
**Full Name:** Ops.Trigger.TriggerOnChangeObject\_v2 **Description:** Full NameOps.Trigger.TriggerOnChangeObject\_V2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSObject (Object)Object in

**> Input Ports:** - Visit *Ops.Trigger.TriggerOnChangeObject\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.TriggerOnChangeObject\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerOn-  
ChangeObject\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.TriggerOnChangeObject\\_v2](https://cables.gl/op/Ops.Trigger.TriggerOnChangeObject_v2)

---

### 13.86.33 TriggerOnChangeString\_v2



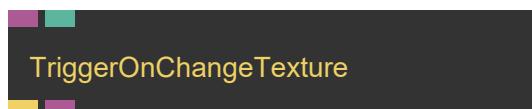
**Full Name:** Ops.Trigger.TriggerOnChangeString\_v2 **Description:** Full NameOps.Trigger.TriggerOnChangeString\_V2  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch triggerOnChangeString exampleOpen In EditorINPUT PORTSString  
(String)String in

**> Input Ports:** - Visit *Ops.Trigger.TriggerOnChangeString\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.TriggerOnChangeString\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerOn-  
ChangeString\_v2" **Docs:** [https://cables.gl/op/Ops.Trigger.TriggerOnChangeString\\_v2](https://cables.gl/op/Ops.Trigger.TriggerOnChangeString_v2)

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### 13.86.34 TriggerOnChangeTexture



**Full Name:** Ops.Trigger.TriggerOnChangeTexture **Description:** Full NameOps.Trigger.TriggerOnChangeTextureVi  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-

niuse queryExample Patch TriggerOnChangeTexture ExampleOpen In EditorINPUT PORTSTexture  
(Object:texture)Ignore empty/default Texture (Number: boolean)OUTPUT PORTSChanged (Trigger)Trigger out - happens only when something in the array has changed

> **Input Ports:** - Visit *Ops.Trigger.TriggerOnChangeTexture documentation* for input port details < **Output Ports:** - Visit *Ops.Trigger.TriggerOnChangeTexture documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerOnChangeTexture"  
**Docs:** <https://cables.gl/op/Ops.Trigger.TriggerOnChangeTexture>

---

### 13.86.35 TriggerOnce



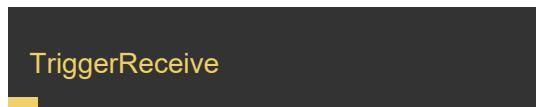
**Full Name:** Ops.Trigger.TriggerOnce **Description:** Full NameOps.Trigger.TriggerOnceVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch TriggerOnce ExampleOpen In EditorINPUT PORTSExec (Trigger)Reset  
(Trigger)OUTPUT PORTSNext (Trigger)Was Triggered (Number)SaveCancel ChangelogPatches using  
TriggerOnceExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Trigger.TriggerOnce documentation* for input port details < **Output Ports:** - Visit *Ops.Trigger.TriggerOnce documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerOnce"  
**Docs:** <https://cables.gl/op/Ops.Trigger.TriggerOnce>

---

### 13.86.36 TriggerReceive



**Full Name:** Ops.Trigger.TriggerReceive **Description:** This op is designed to work with the  
Ops.Trigger.TriggerSend op

➤ **Input Ports:** - Visit *Ops.Trigger.TriggerReceive* documentation for input port details < **Output Ports:** - Visit *Ops.Trigger.TriggerReceive* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerReceive"  
**Docs:** <https://cables.gl/op/Ops.Trigger.TriggerReceive>

---

### 13.86.37 TriggerReceiveFilter



**Full Name:** Ops.Trigger.TriggerReceiveFilter **Description:** Triggers can be sent and received using TriggerSend and TriggerReceive ops.

➤ **Input Ports:** - Visit *Ops.Trigger.TriggerReceiveFilter* documentation for input port details < **Output Ports:** - Visit *Ops.Trigger.TriggerReceiveFilter* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerReceive-Filter" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerReceiveFilter>

---

### 13.86.38 TriggerSend



**Full Name:** Ops.Trigger.TriggerSend **Description:** This op is designed to work with the Ops.Trigger.TriggerReceive op

➤ **Input Ports:** - Visit *Ops.Trigger.TriggerSend* documentation for input port details < **Output Ports:** - Visit *Ops.Trigger.TriggerSend* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "TriggerSend"  
**Docs:** <https://cables.gl/op/Ops.Trigger.TriggerSend>

---

## 13.86.39 TriggerSendNamed

TriggerSendNamed

**Full Name:** Ops.Trigger.TriggerSendNamed **Description:** This op is designed to work with the Ops.Trigger.TriggerReceive op

**> Input Ports:** - Visit *Ops.Trigger.TriggerSendNamed documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.TriggerSendNamed documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerSendNamed" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerSendNamed>

---

## 13.86.40 TriggerString

TriggerString

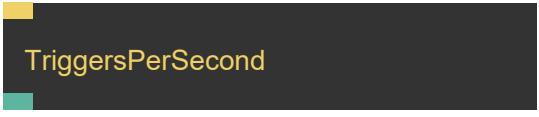
**Full Name:** Ops.Trigger.TriggerString **Description:** Full NameOps.Trigger.TriggerStringVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch TriggerString exampleOpen In EditorINPUT PORTSTrigger (Trigger)trigger to output the string

**> Input Ports:** - Visit *Ops.Trigger.TriggerString documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.TriggerString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggerString" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggerString>

---

## 13.86.41 TriggersPerSecond



TriggersPerSecond

**Full Name:** Ops.Trigger.TriggersPerSecond **Description:** Can be handy for debugging to find out how often a certain trigger port is called.

**> Input Ports:** - Visit *Ops.Trigger.TriggersPerSecond documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.TriggersPerSecond documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "TriggersPerSecond" **Docs:** <https://cables.gl/op/Ops.Trigger.TriggersPerSecond>

---

## 13.86.42 ValueBecameZeroTrigger



ValueBecameZeroTrigger

**Full Name:** Ops.Trigger.ValueBecameZeroTrigger **Description:** Compares the last value to the current one, triggers once when the current value is zero and the last one is something else.

**> Input Ports:** - Visit *Ops.Trigger.ValueBecameZeroTrigger documentation* for input port details **< Output Ports:** - Visit *Ops.Trigger.ValueBecameZeroTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ValueBecameZeroTrigger" **Docs:** <https://cables.gl/op/Ops.Trigger.ValueBecameZeroTrigger>

---

## 13.87 Ops.Ui

### 13.87.1 Area



Area

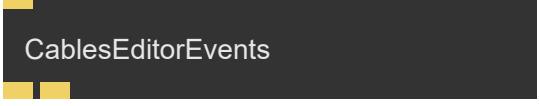
**Full Name:** Ops.Ui.Area **Description:** The Area Operator let's you easily organize your patch into moveable and nameable areas.

> **Input Ports:** - Visit *Ops.Ui.Area documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.Area documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Area" **Docs:** <https://cables.gl/op/Ops.Ui.Area>

---

## 13.87.2 CablesEditorEvents



CablesEditorEvents

**Full Name:** Ops.Ui.CablesEditorEvents **Description:** Full NameOps.Ui.CablesEditorEventsVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch editor eventsOpen In EditorINPUT PORTSSet Changed Patch (Trigger)OUTPUT PORTSSaving Patch (Trigger)PortValueEdited (Trigger)SaveCancel ChangelogPatches using CablesEditorEventsExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit *Ops.Ui.CablesEditorEvents documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.CablesEditorEvents documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "CablesEditorEvents" **Docs:** <https://cables.gl/op/Ops.Ui.CablesEditorEvents>

---

## 13.87.3 Comment\_v2



Comment

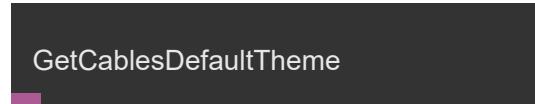
**Full Name:** Ops.Ui.Comment\_v2 **Description:** This can be useful to document your patch. It does not have an effect on the patch itself.

**> Input Ports:** - Visit *Ops.Ui.Comment\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Ui.Comment\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "Comment\_v2"  
**Docs:** [https://cables.gl/op/Ops.Ui.Comment\\_v2](https://cables.gl/op/Ops.Ui.Comment_v2)

---

#### 13.87.4 GetCablesDefaultTheme



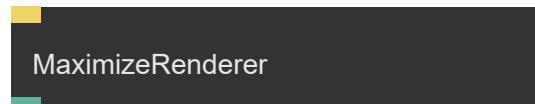
**Full Name:** Ops.Ui.GetCablesDefaultTheme **Description:** Full NameOps.Ui.GetCablesDefaultThemeVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch GetCablesDefaultTheme SetCablesTheme ExampleOpen In EditorOUTPUT  
PORTSTheme (Object)SaveCancel ChangelogPatches using GetCablesDefaultThemeExamples Team  
cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.GetCablesDefaultTheme* documentation for input port details **< Output Ports:** - Visit *Ops.Ui.GetCablesDefaultTheme* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "GetCablesDefaultTheme" **Docs:** <https://cables.gl/op/Ops.Ui.GetCablesDefaultTheme>

---

#### 13.87.5 MaximizeRenderer



**Full Name:** Ops.Ui.MaximizeRenderer **Description:** Shows the render output in the full size of the current window.

**> Input Ports:** - Visit *Ops.Ui.MaximizeRenderer* documentation for input port details **< Output Ports:** - Visit *Ops.Ui.MaximizeRenderer* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "MaximizeRenderer" **Docs:** <https://cables.gl/op/Ops.Ui.MaximizeRenderer>

---

## 13.87.6 PatchInput



PatchInput

**Full Name:** Ops.Ui.PatchInput **Description:** Do not use in your regular patch (outside of a sub-patch)!

➢ **Input Ports:** - Visit *Ops.Ui.PatchInput* documentation for input port details < **Output Ports:** - Visit *Ops.Ui.PatchInput* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "PatchInput" **Docs:** <https://cables.gl/op/Ops.Ui.PatchInput>

---

## 13.87.7 PatchOutput



PatchOutput

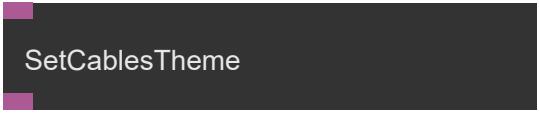
**Full Name:** Ops.Ui.PatchOutput **Description:** Do not use in your regular patch (outside of a sub-patch)!

➢ **Input Ports:** - Visit *Ops.Ui.PatchOutput* documentation for input port details < **Output Ports:** - Visit *Ops.Ui.PatchOutput* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "PatchOutput" **Docs:** <https://cables.gl/op/Ops.Ui.PatchOutput>

---

## 13.87.8 SetCablesTheme



SetCablesTheme

**Full Name:** Ops.Ui.SetCablesTheme **Description:** Full NameOps.Ui.SetCablesThemeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch GetCablesDefaultTheme SetCablesTheme ExampleOpen In EditorINPUT PORTSTheme (Object)OUTPUT PORTSMissing (Object)SaveCancel ChangelogPatches using SetCablesThemeExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.SetCablesTheme documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.SetCablesTheme documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SetCablesTheme" **Docs:** <https://cables.gl/op/Ops.Ui.SetCablesTheme>

---

## 13.87.9 SubPatch



SubPatch

**Full Name:** Ops.Ui.SubPatch **Description:** Creates a sub-patch, so you can bundle together certain ops in a group. To define which ports of the ops should be accessible outside you have to connect ports to the dyn port, you can then use them for the inner routing of the sub-patch (via the PatchInput-op).

**> Input Ports:** - Visit *Ops.Ui.SubPatch documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.SubPatch documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SubPatch" **Docs:** <https://cables.gl/op/Ops.Ui.SubPatch>

---

## 13.87.10 SubPatchInput

SubPatchInput

**Full Name:** Ops.Ui.SubPatchInput **Description:** Full NameOps.Ui.SubPatchInputVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverOUTPUT PORTSa1jf8yr1w (Number)SaveCancel Changelog Patches using SubPatchInputExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.SubPatchInput documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.SubPatchInput documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SubPatchInput" **Docs:** <https://cables.gl/op/Ops.Ui.SubPatchInput>

---

## 13.87.11 SubPatchOutput

SubPatchOutput

**Full Name:** Ops.Ui.SubPatchOutput **Description:** Full NameOps.Ui.SubPatchOutputVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverSaveCancel ChangelogPatches using SubPatchOutputExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.SubPatchOutput documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.SubPatchOutput documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "SubPatchOutput" **Docs:** <https://cables.gl/op/Ops.Ui.SubPatchOutput>

---

## 13.87.12 Subpatch2Template

Subpatch2Template

**Full Name:** Ops.Ui.Subpatch2Template **Description:** Full NameOps.Ui.Subpatch2TemplateVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSpatchId (String)SaveCancel Changelog-  
Patches using Subpatch2TemplateExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.Subpatch2Template documentation for input port details* **< Output Ports:**  
- Visit *Ops.Ui.Subpatch2Template documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Sub-  
patch2Template" **Docs:** <https://cables.gl/op/Ops.Ui.Subpatch2Template>

---

## 13.87.13 VizArrayChart

VizArrayChart

**Full Name:** Ops.Ui.VizArrayChart **Description:** Displays distribution of numerical values in an array  
as a graph or piechart.

**> Input Ports:** - Visit *Ops.Ui.VizArrayChart documentation for input port details* **< Output Ports:** - Visit  
*Ops.Ui.VizArrayChart documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizArrayChart"  
**Docs:** <https://cables.gl/op/Ops.Ui.VizArrayChart>

---

### 13.87.14 VizArrayGraph



**Full Name:** Ops.Ui.VizArrayGraph **Description:** Full NameOps.Ui.VizArrayGraphVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch vizArrayGraphOpen In EditorINPUT PORTSArray Numbers (Array)Curve (Number: boolean)OUTPUT PORTSPassthrough Array (Array)SaveCancel ChangelogPatches using VizArrayGraphExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.VizArrayGraph documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.VizArrayGraph documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizArrayGraph" **Docs:** <https://cables.gl/op/Ops.Ui.VizArrayGraph>

---

### 13.87.15 VizArrayType\_v2



**Full Name:** Ops.Ui.VizArrayType\_v2 **Description:** Full NameOps.Ui.VizArrayType\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch vizArrayType exampleOpen In EditorINPUT PORTSArray (Array)Stride (Number: integer)Scroll (Number)OUTPUT PORTSPassthrough Array (Array)SaveCancel ChangelogPatches using VizArrayType\_v2Examples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.VizArrayType\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.VizArrayType\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizArrayType\_v2" **Docs:** [https://cables.gl/op/Ops.Ui.VizArrayType\\_v2](https://cables.gl/op/Ops.Ui.VizArrayType_v2)

---

### 13.87.16 VizBool



**Full Name:** Ops.Ui.VizBool **Description:** Full NameOps.Ui.VizBoolVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch VizBool ExampleOpen In EditorINPUT PORTSBoolean (Number: boolean)OUTPUT PORTSBool (booleanNumber)SaveCancel ChangelogPatches using VizBoolExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Ui.VizBool documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.VizBool documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizBool" **Docs:** <https://cables.gl/op/Ops.Ui.VizBool>

---

### 13.87.17 VizGraph



**Full Name:** Ops.Ui.VizGraph **Description:** displays a graph of all the numbers connected to the input ports over time, useful so debug animations and easings

➤ **Input Ports:** - Visit *Ops.Ui.VizGraph documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.VizGraph documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizGraph" **Docs:** <https://cables.gl/op/Ops.Ui.VizGraph>

---

### 13.87.18 VizImageUrl



**Full Name:** Ops.Ui.VizImageUrl **Description:** Full NameOps.Ui.VizImageUrlVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch vizImageUrl exampleOpen In EditorINPUT PORTSFile (String)OUTPUT PORTSWidth (Number)Height (Number)Loading (booleanNumber)SaveCancel ChangelogPatches using VizImageUrlExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Ui.VizImageUrl documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.VizImageUrl documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VizImageUrl" **Docs:** <https://cables.gl/op/Ops.Ui.VizImageUrl>

---

### 13.87.19 VizLogger



**Full Name:** Ops.Ui.VizLogger **Description:** Full NameOps.Ui.VizLoggerVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch vizLogger exampleOpen In EditorINPUT PORTSNumber (Number)String (String)Object (Object)Clear (Trigger)SaveCancel ChangelogPatches using VizLoggerExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Ui.VizLogger documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.VizLogger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VizLogger" **Docs:** <https://cables.gl/op/Ops.Ui.VizLogger>

---

## 13.87.20 VizNumber



**Full Name:** Ops.Ui.VizNumber **Description:** display the value of the input port on the op itself, useful for debugging

➤ **Input Ports:** - Visit [Ops.Ui.VizNumber documentation](#) for input port details < **Output Ports:** - Visit [Ops.Ui.VizNumber documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizNumber"  
**Docs:** <https://cables.gl/op/Ops.Ui.VizNumber>

---

## 13.87.21 VizNumberBar



**Full Name:** Ops.Ui.VizNumberBar **Description:** Full NameOps.Ui.VizNumberBarVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch vizNumberBar exampleOpen In EditorINPUT PORTSNumber (Number)OUTPUT PORTSPassthrough (Number)SaveCancel ChangelogPatches using VizNumberBarExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit [Ops.Ui.VizNumberBar documentation](#) for input port details < **Output Ports:** - Visit [Ops.Ui.VizNumberBar documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizNumberBar"  
**Docs:** <https://cables.gl/op/Ops.Ui.VizNumberBar>

---

## 13.87.22 VizObject



**Full Name:** Ops.Ui.VizObject **Description:** Full NameOps.Ui.VizObjectVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch vizObject exampleOpen In EditorINPUT PORTSObject (Object)ZoomText (Number: boolean)Line Numbers (Number: boolean)Experimental Stringify (Number: boolean)Sort Keys (Number: boolean)Font Size (Number)Scroll (Number)SaveCancel ChangelogPatches using VizObjectExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Ui.VizObject documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.VizObject documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizObject" **Docs:** <https://cables.gl/op/Ops.Ui.VizObject>

---

## 13.87.23 VizString



**Full Name:** Ops.Ui.VizString **Description:** display the value of the input port on the op itself, useful for debugging

➤ **Input Ports:** - Visit *Ops.Ui.VizString documentation* for input port details < **Output Ports:** - Visit *Ops.Ui.VizString documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizString" **Docs:** <https://cables.gl/op/Ops.Ui.VizString>

---

## 13.87.24 VizTexture



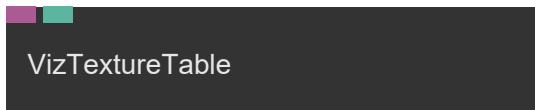
**Full Name:** Ops.Ui.VizTexture **Description:** small preview of the texture put into the op, useful for debugging textureeffects without rendering to the canvas

➤ **Input Ports:** - Visit *Ops.Ui.VizTexture documentation for input port details* < **Output Ports:** - Visit *Ops.Ui.VizTexture documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizTexture" **Docs:** <https://cables.gl/op/Ops.Ui.VizTexture>

---

## 13.87.25 VizTextureTable



**Full Name:** Ops.Ui.VizTextureTable **Description:** Full NameOps.Ui.VizTextureTableVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch vizTextureTable exampleOpen In EditorINPUT PORTSTexture (Object:texture)Row Start (Number: integer)SaveCancel ChangelogPatches using VizTextureTableExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Ui.VizTextureTable documentation for input port details* < **Output Ports:** - Visit *Ops.Ui.VizTextureTable documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizTextureTable" **Docs:** <https://cables.gl/op/Ops.Ui.VizTextureTable>

---

## 13.87.26 VizTrigger



**Full Name:** Ops.Ui.VizTrigger **Description:** Full NameOps.Ui.VizTriggerVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch VizTrigger ExampleOpen In EditorINPUT PORTSTTrigger (Trigger)Reset (Trigger)Count Overlay (Number: boolean)OUTPUT PORTSCount (Number)Next (Trigger)SaveCancel ChangelogPatches using VizTriggerExamples Team cables Public My Patches My Ops

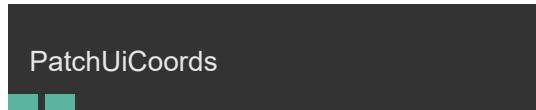
**> Input Ports:** - Visit *Ops.Ui.VizTrigger documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.VizTrigger documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VizTrigger" **Docs:** <https://cables.gl/op/Ops.Ui.VizTrigger>

---

## 13.88 Ops.Ui.Debug

### 13.88.1 PatchUiCoords



**Full Name:** Ops.Ui.Debug.PatchUiCoords **Description:** Full NameOps.Ui.Debug.PatchUiCoordsVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryNo op example found on this serverOUTPUT PORTSX (Number)Y (Number)SaveCancel ChangelogPatches using PatchUiCoordsExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Ui.Debug.PatchUiCoords documentation* for input port details **< Output Ports:** - Visit *Ops.Ui.Debug.PatchUiCoords documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "PatchUiCoords" **Docs:** <https://cables.gl/op/Ops.Ui.Debug.PatchUiCoords>

---

## 13.89 Ops.Ui.Routing

### 13.89.1 RouteArray



**Full Name:** Ops.Ui.Routing.RouteArray **Description:** Full NameOps.Ui.Routing.RouteArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch RouteArray RouteNumber RouteObject RouteString RouteTrigger Exam-  
pleOpen In EditorINPUT PORTSArray In (Array)OUTPUT PORTSArray Out (Array)SaveCancel Chang-  
ingPatches using RouteArrayExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Ui.Routing.RouteArray documentation for input port details* ◀ **Output Ports:**  
- Visit *Ops.Ui.Routing.RouteArray documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "RouteArray"  
**Docs:** <https://cables.gl/op/Ops.Ui.Routing.RouteArray>

---

### 13.89.2 RouteNumber



**Full Name:** Ops.Ui.Routing.RouteNumber **Description:** Full NameOps.Ui.Routing.RouteNumberVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch RouteArray RouteNumber RouteObject RouteString RouteTrigger  
ExampleOpen In EditorINPUT PORTSvalue (Number)The value

➤ **Input Ports:** - Visit *Ops.Ui.Routing.RouteNumber documentation for input port details* ◀ **Output Ports:**  
- Visit *Ops.Ui.Routing.RouteNumber documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "RouteNumber"  
**Docs:** <https://cables.gl/op/Ops.Ui.Routing.RouteNumber>

---

### 13.89.3 RouteObject



RouteObject

**Full Name:** Ops.Ui.Routing.RouteObject **Description:** Full NameOps.Ui.Routing.RouteObjectVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch RouteArray RouteNumber RouteObject RouteString RouteTrigger Exam-  
pleOpen In EditorINPUT PORTSArray In (Object)OUTPUT PORTSArray Out (Object)SaveCancel Changel-  
ogPatches using RouteObjectExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit `Ops.Ui.Routing.RouteObject` documentation for input port details **< Output Ports:**  
- Visit `Ops.Ui.Routing.RouteObject` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "RouteObject"  
**Docs:** <https://cables.gl/op/Ops.Ui.Routing.RouteObject>

---

### 13.89.4 RouteString



RouteString

**Full Name:** Ops.Ui.Routing.RouteString **Description:** Full NameOps.Ui.Routing.RouteStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch RouteArray RouteNumber RouteObject RouteString RouteTrigger  
ExampleOpen In EditorINPUT PORTSvalue (String)The value

**> Input Ports:** - Visit `Ops.Ui.Routing.RouteString` documentation for input port details **< Output Ports:**  
- Visit `Ops.Ui.Routing.RouteString` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "RouteString"](#)  
**Docs:** <https://cables.gl/op/Ops.Ui.Routing.RouteString>

---

## 13.89.5 RouteTrigger



**Full Name:** Ops.Ui.Routing.RouteTrigger **Description:** Full NameOps.Ui.Routing.RouteTriggerVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch RouteArray RouteNumber RouteObject RouteString RouteTrigger Exam-  
pleOpen In EditorINPUT PORTSTrigger (Trigger)OUTPUT PORTSNext (Trigger)SaveCancel Changelog-  
Patches using RouteTriggerExamples Team cables Public My Patches My Ops

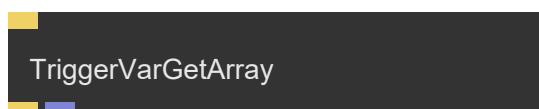
**> Input Ports:** - Visit [Ops.Ui.Routing.RouteTrigger documentation for input port details](#) **< Output Ports:**  
- Visit [Ops.Ui.Routing.RouteTrigger documentation for output port details](#)

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "RouteTrigger"](#)  
**Docs:** <https://cables.gl/op/Ops.Ui.Routing.RouteTrigger>

---

## 13.90 Ops.Vars

### 13.90.1 TriggerVarGetArray



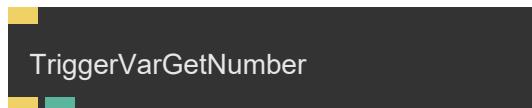
**Full Name:** Ops.Vars.TriggerVarGetArray **Description:** Full NameOps.Vars.TriggerVarGetArrayVisibilityCore  
Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)OUTPUT PORTSNext  
(Trigger)Value (Array)SaveCancel ChangelogPatches using TriggerVarGetArrayExamples Team cables  
Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Vars.TriggerVarGetArray](#) documentation for input port details < **Output Ports:**  
- Visit [Ops.Vars.TriggerVarGetArray](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TriggerVarGetArray"  
**Docs:** <https://cables.gl/op/Ops.Vars.TriggerVarGetArray>

---

## 13.90.2 TriggerVarGetNumber



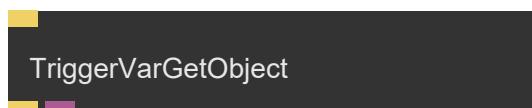
**Full Name:** Ops.Vars.TriggerVarGetNumber **Description:** Full NameOps.Vars.TriggerVarGetNumberVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryExample Patch TriggerVarGetNumber exampleOpen In EditorYoutube Video Tutorial-  
INPUT PORTSUpdate (Trigger)OUTPUT PORTSNext (Trigger)Value (Number)SaveCancel Changelog-  
Patches using TriggerVarGetNumberExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Vars.TriggerVarGetNumber](#) documentation for input port details < **Output  
Ports:** - Visit [Ops.Vars.TriggerVarGetNumber](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "TriggerVarGet-  
Number" **Docs:** <https://cables.gl/op/Ops.Vars.TriggerVarGetNumber>

---

## 13.90.3 TriggerVarGetObject



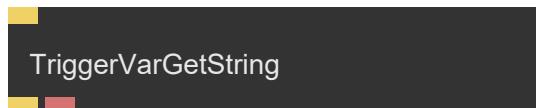
**Full Name:** Ops.Vars.TriggerVarGetObject **Description:** Full NameOps.Vars.TriggerVarGetObjectVisibilityCore  
Op - visible for everyoneLicenseMITAuthorstephangithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryNo op example found on this serverINPUT PORTSUpdate (Trigger)OUTPUT PORTSNext  
(Trigger)Value (Object)SaveCancel ChangelogPatches using TriggerVarGetObjectExamples Team  
cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Vars.TriggerVarGetObject` documentation for input port details < **Output Ports:** - Visit `Ops.Vars.TriggerVarGetObject` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "TriggerVarGetObject" **Docs:** <https://cables.gl/op/Ops.Vars.TriggerVarGetObject>

---

#### 13.90.4 TriggerVarGetString



**Full Name:** `Ops.Vars.TriggerVarGetString` **Description:** Full Name `Ops.Vars.TriggerVarGetString` Visibility Core Op - visible for everyone License MIT Author stephangithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch id Youtube ids (comma separated) Op Licence Caniuse query Example Patch TriggerVarGetString Example Open In Editor Youtube Video Tutorial INPUT PORTS Update (Trigger) OUTPUT PORTS Next (Trigger) Value (String) Save Cancel Changelog Patches using TriggerVarGetString Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Vars.TriggerVarGetString` documentation for input port details < **Output Ports:** - Visit `Ops.Vars.TriggerVarGetString` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "TriggerVarGetString" **Docs:** <https://cables.gl/op/Ops.Vars.TriggerVarGetString>

---

#### 13.90.5 VarGetArray\_v2



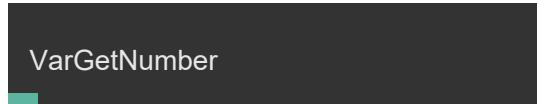
**Full Name:** `Ops.Vars.VarGetArray_v2` **Description:** Full Name `Ops.Vars.VarGetArray_v2` Visibility Core Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch id Youtube ids (comma separated) Op Licence Caniuse query Example Patch VarGetArray VarSetArray Example Shows how to use the ops SetVariableArray and VariableArray. In complex patches variables can be useful to reduce cable salad and bring some order into your patch.

> **Input Ports:** - Visit `Ops.Vars.VarGetArray_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Vars.VarGetArray_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "VarGetArray\_v2"  
**Docs:** [https://cables.gl/op/Ops.Vars.VarGetArray\\_v2](https://cables.gl/op/Ops.Vars.VarGetArray_v2)

---

### 13.90.6 VarGetNumber\_v2



**Full Name:** `Ops.Vars.VarGetNumber_v2` **Description:** Full NameOps.Vars.VarGetNumber\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch variablesOpen In EditorYoutube Video TutorialOUTPUT PORTSValue (Number)SaveCancel ChangelogPatches using VarGetNumber\_v2Examples Team cables Public My Patches My Ops

> **Input Ports:** - Visit `Ops.Vars.VarGetNumber_v2` documentation for input port details < **Output Ports:** - Visit `Ops.Vars.VarGetNumber_v2` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl patches` for "VarGetNumber\_v2" **Docs:** [https://cables.gl/op/Ops.Vars.VarGetNumber\\_v2](https://cables.gl/op/Ops.Vars.VarGetNumber_v2)

---

### 13.90.7 VarGetObject\_v2



**Full Name:** `Ops.Vars.VarGetObject_v2` **Description:** Full NameOps.Vars.VarGetObject\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch VarGetObject VarSetObject ExampleThis example shows how to use VariableObject & SetVariableObject. These ops are handy to reduce cable salad in big patches when

using object and to set or get an object from outside cables (e.g. when you embed your patch into a website).

➤ **Input Ports:** - Visit [Ops.Vars.VarGetObject\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Vars.VarGetObject\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "VarGetObject\_v2"  
**Docs:** [https://cables.gl/op/Ops.Vars.VarGetObject\\_v2](https://cables.gl/op/Ops.Vars.VarGetObject_v2)

---

## 13.90.8 VarGetString



VarGetString

**Full Name:** Ops.Vars.VarGetString **Description:** Full NameOps.Vars.VarGetStringVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch VarGetString VarSetString ExampleOpen In EditorYoutube Video TutorialOUTPUT PORTSValue (String)String out

➤ **Input Ports:** - Visit [Ops.Vars.VarGetString documentation](#) for input port details < **Output Ports:** - Visit [Ops.Vars.VarGetString documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "VarGetString"  
**Docs:** <https://cables.gl/op/Ops.Vars.VarGetString>

---

## 13.90.9 VarGetTexture\_v2



VarGetTexture

**Full Name:** Ops.Vars.VarGetTexture\_v2 **Description:** Use to get a texture from an assigned variable with the Ops.Vars.VarSetTexture op

➤ **Input Ports:** - Visit [Ops.Vars.VarGetTexture\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.Vars.VarGetTexture\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "VarGetTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Vars.VarGetTexture\\_v2](https://cables.gl/op/Ops.Vars.VarGetTexture_v2)

---

### 13.90.10 VarSetArray\_v2



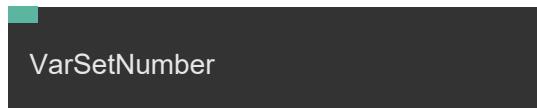
**Full Name:** Ops.Vars.VarSetArray\_v2 **Description:** Full NameOps.Vars.VarSetArray\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch VarGetArray VarSetArray ExampleShows how to use the ops SetVariableArray and VariableArray.In complex patches variables can be useful to reduce cable salad and bring some order into your patch.

**> Input Ports:** - Visit *Ops.Vars.VarSetArray\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Vars.VarSetArray\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "VarSetArray\_v2" **Docs:** [https://cables.gl/op/Ops.Vars.VarSetArray\\_v2](https://cables.gl/op/Ops.Vars.VarSetArray_v2)

---

### 13.90.11 VarSetNumber\_v2



**Full Name:** Ops.Vars.VarSetNumber\_v2 **Description:** variables are numbers you can read anywhere in your patch without creating very long cables

**> Input Ports:** - Visit *Ops.Vars.VarSetNumber\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.Vars.VarSetNumber\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "VarSetNumber\_v2" **Docs:** [https://cables.gl/op/Ops.Vars.VarSetNumber\\_v2](https://cables.gl/op/Ops.Vars.VarSetNumber_v2)

---

## 13.90.12 VarSetObject\_v2

VarSetObject

**Full Name:** Ops.Vars.VarSetObject\_v2 **Description:** Full NameOps.Vars.VarSetObject\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch VarGetObject VarSetObject ExampleThis example shows how to use VariableObject & SetVariableObject. These ops are handy to reduce cable salad in big patches when using object and to set or get an object from outside cables (e.g. when you embed your patch into a website).

► **Input Ports:** - Visit *Ops.Vars.VarSetObject\_v2 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Vars.VarSetObject\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VarSetObject\_v2"

**Docs:** [https://cables.gl/op/Ops.Vars.VarSetObject\\_v2](https://cables.gl/op/Ops.Vars.VarSetObject_v2)

---

## 13.90.13 VarSetString\_v2

VarSetString

**Full Name:** Ops.Vars.VarSetString\_v2 **Description:** Full NameOps.Vars.VarSetString\_v2VisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-Caniuse queryExample Patch VarGetString VarSetString ExampleOpen In EditorYoutube Video TutorialINPUT PORTSValue (String)String in

► **Input Ports:** - Visit *Ops.Vars.VarSetString\_v2 documentation* for input port details ◀ **Output Ports:** - Visit *Ops.Vars.VarSetString\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VarSetString\_v2"

**Docs:** [https://cables.gl/op/Ops.Vars.VarSetString\\_v2](https://cables.gl/op/Ops.Vars.VarSetString_v2)

---

## 13.90.14 VarSetTexture\_v2



VarSetTexture

**Full Name:** Ops.Vars.VarSetTexture\_v2 **Description:** Use to assign a texture to a variable, access it with the Ops.Vars.VarGetTexture op

**> Input Ports:** - Visit *Ops.Vars.VarSetTexture\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.Vars.VarSetTexture\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VarSetTexture\_v2" **Docs:** [https://cables.gl/op/Ops.Vars.VarSetTexture\\_v2](https://cables.gl/op/Ops.Vars.VarSetTexture_v2)

---

## 13.90.15 VarTriggerArray



VarTriggerArray

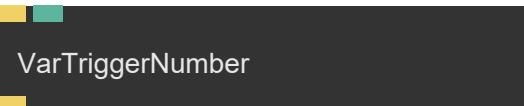
**Full Name:** Ops.Vars.VarTriggerArray **Description:** Use a trigger to change an Array Variable

**> Input Ports:** - Visit *Ops.Vars.VarTriggerArray documentation* for input port details **< Output Ports:** - Visit *Ops.Vars.VarTriggerArray documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "VarTriggerArray" **Docs:** <https://cables.gl/op/Ops.Vars.VarTriggerArray>

---

## 13.90.16 VarTriggerNumber



VarTriggerNumber

**Full Name:** Ops.Vars.VarTriggerNumber **Description:** Full NameOps.Vars.VarTriggerNumberVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-

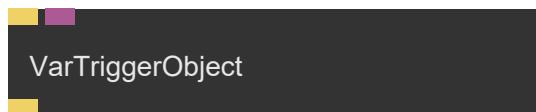
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch Example VarTriggerNumberSet Number Variable by Trigger

- > **Input Ports:** - Visit *Ops.Vars.VarTriggerNumber* documentation for input port details < **Output Ports:**  
- Visit *Ops.Vars.VarTriggerNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VarTriggerNumber" **Docs:** <https://cables.gl/op/Ops.Vars.VarTriggerNumber>

---

### 13.90.17 VarTriggerObject



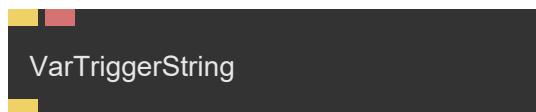
**Full Name:** Ops.Vars.VarTriggerObject **Description:** Full NameOps.Vars.VarTriggerObjectVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Licence-  
Caniuse queryNo op example found on this serverYoutube Video TutorialINPUT PORTSTrigger  
(Trigger)Value (Object)textures, geometry, api request returns, etc

- > **Input Ports:** - Visit *Ops.Vars.VarTriggerObject* documentation for input port details < **Output Ports:**  
- Visit *Ops.Vars.VarTriggerObject* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VarTriggerObject" **Docs:** <https://cables.gl/op/Ops.Vars.VarTriggerObject>

---

### 13.90.18 VarTriggerString



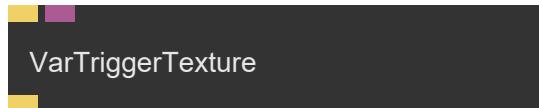
**Full Name:** Ops.Vars.VarTriggerString **Description:** Full NameOps.Vars.VarTriggerStringVisibilityCore  
Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch Example Var Trigger StringThis op allows you to set a String variable by a trigger.

> **Input Ports:** - Visit `Ops.Vars.VarTriggerString` documentation for input port details < **Output Ports:** - Visit `Ops.Vars.VarTriggerString` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "VarTriggerString"  
**Docs:** <https://cables.gl/op/Ops.Vars.VarTriggerString>

---

### 13.90.19 VarTriggerTexture



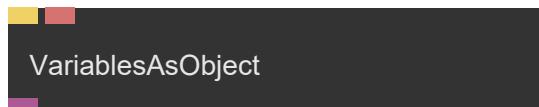
**Full Name:** `Ops.Vars.VarTriggerTexture` **Description:** Full Name `Ops.Vars.VarTriggerTextureVisibilityCore` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse queryNo op example found on this server INPUT PORTS Trigger (Trigger) Value (Object:texture) textures, geometry, api request returns, etc

> **Input Ports:** - Visit `Ops.Vars.VarTriggerTexture` documentation for input port details < **Output Ports:** - Visit `Ops.Vars.VarTriggerTexture` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "VarTriggerTexture" **Docs:** <https://cables.gl/op/Ops.Vars.VarTriggerTexture>

---

### 13.90.20 VariablesAsObject



**Full Name:** `Ops.Vars.VariablesAsObject` **Description:** Full Name `Ops.Vars.VariablesAsObjectVisibilityCore` Op - visible for everyone License MIT Author pandurgithub source Maintained by Team cables Patch-lists Documentation (markdown) Issues Example patch idYoutube ids (comma seperated) Op Licence Caniuse queryNo op example found on this server INPUT PORTS Execute (Trigger) Filter Prefix (String) OUTPUT PORTS Result (Object) Save Cancel Changelog Patches using VariablesAsObject Examples Team cables Public My Patches My Ops

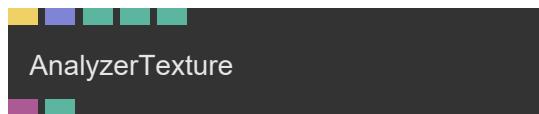
> **Input Ports:** - Visit *Ops.Vars.VariablesAsObject* documentation for input port details < **Output Ports:**  
- Visit *Ops.Vars.VariablesAsObject* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "VariablesAsObject"  
**Docs:** <https://cables.gl/op/Ops.Vars.VariablesAsObject>

---

## 13.91 Ops.WebAudio

### 13.91.1 AnalyzerTexture\_v2



**Full Name:** Ops.WebAudio.AnalyzerTexture\_v2 **Description:** Full NameOps.WebAudio.AnalyzerTexture\_v2VisibilityOp - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch AnalyzerTexture ExampleExample patch for AnalyzerTexture\_v2

> **Input Ports:** - Visit *Ops.WebAudio.AnalyzerTexture\_v2* documentation for input port details < **Output Ports:** - Visit *Ops.WebAudio.AnalyzerTexture\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches* for "AnalyzerTexture\_v2"  
**Docs:** [https://cables.gl/op/Ops.WebAudio.AnalyzerTexture\\_v2](https://cables.gl/op/Ops.WebAudio.AnalyzerTexture_v2)

---

### 13.91.2 AudioAnalyzer\_v2



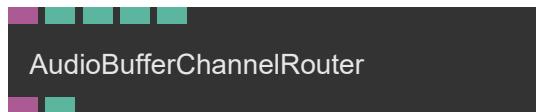
**Full Name:** Ops.WebAudio.AudioAnalyzer\_v2 **Description:** Full NameOps.WebAudio.AudioAnalyzer\_v2VisibilityOp - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlists-Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-niuse queryExample Patch AudioAnalyzer ExampleOpen In EditorINPUT PORTSInputsTrigger In (Trigger)trigger input

> **Input Ports:** - Visit [Ops.WebAudio.AudioAnalyzer\\_v2](#) documentation for input port details < **Output Ports:** - Visit [Ops.WebAudio.AudioAnalyzer\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl](#) patches for "AudioAnalyzer\_v2" **Docs:** [https://cables.gl/op/Ops.WebAudio.AudioAnalyzer\\_v2](https://cables.gl/op/Ops.WebAudio.AudioAnalyzer_v2)

---

### 13.91.3 AudioBufferChannelRouter



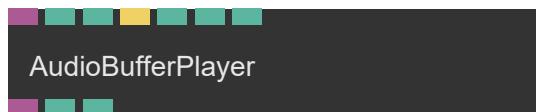
**Full Name:** Ops.WebAudio.AudioBufferChannelRouter **Description:** Routes audio input channels to different output channels by modifying the audiobuffer accordingly.

> **Input Ports:** - Visit [Ops.WebAudio.AudioBufferChannelRouter](#) documentation for input port details < **Output Ports:** - Visit [Ops.WebAudio.AudioBufferChannelRouter](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl](#) patches for "AudioBufferChannelRouter" **Docs:** <https://cables.gl/op/Ops.WebAudio.AudioBufferChannelRouter>

---

### 13.91.4 AudioBufferPlayer\_v2



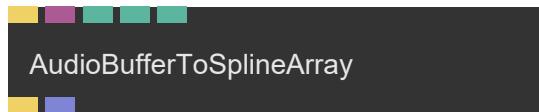
**Full Name:** Ops.WebAudio.AudioBufferPlayer\_v2 **Description:** Typically connected to a Ops.WebAudio.AudioBuffer which holds the sample / audio file.

> **Input Ports:** - Visit [Ops.WebAudio.AudioBufferPlayer\\_v2](#) documentation for input port details < **Output Ports:** - Visit [Ops.WebAudio.AudioBufferPlayer\\_v2](#) documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl](#) patches for "AudioBufferPlayer\_v2" **Docs:** [https://cables.gl/op/Ops.WebAudio.AudioBufferPlayer\\_v2](https://cables.gl/op/Ops.WebAudio.AudioBufferPlayer_v2)

---

### 13.91.5 AudioBufferToSplineArray



**Full Name:** Ops.WebAudio.AudioBufferToSplineArray **Description:** Full NameOps.WebAudio.AudioBufferToSplineOp - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatch-listsJavascript LibrariesWebaudio Peaks (extract peaks from audio samples or a webaudio AudioBuffer)Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch AudioBufferToSplineArray ExampleExample for AudioBuffer-ToSplineArray op.

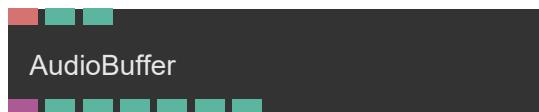
**> Input Ports:** - Visit *Ops.WebAudio.AudioBufferToSplineArray documentation for input port details* <

**Output Ports:** - Visit *Ops.WebAudio.AudioBufferToSplineArray documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "AudioBufferToSplineArray"* **Docs:** <https://cables.gl/op/Ops.WebAudio.AudioBufferToSplineArray>

---

### 13.91.6 AudioBuffer\_v3



**Full Name:** Ops.WebAudio.AudioBuffer\_v3 **Description:** Full NameOps.WebAudio.AudioBuffer\_v3VisibilityCoreOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatch-listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch AudioBuffer ExampleExample for AudioBufferPlayer\_v2 and AudioBuffer\_v2.

**> Input Ports:** - Visit *Ops.WebAudio.AudioBuffer\_v3 documentation for input port details* < **Output**

**Ports:** - Visit *Ops.WebAudio.AudioBuffer\_v3 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "AudioBuffer\_v3"* **Docs:** [https://cables.gl/op/Ops.WebAudio.AudioBuffer\\_v3](https://cables.gl/op/Ops.WebAudio.AudioBuffer_v3)

---

## 13.91.7 AudioPanner



**Full Name:** Ops.WebAudio.AudioPanner **Description:** Full NameOps.WebAudio.AudioPannerVisibilityCore  
Op - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatch-  
listsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op Li-  
cenceCaniuse queryExample Patch AudioPanner ExampleOpen In EditorINPUT PORTSaudio in  
(Object:audioNode)audio input

**> Input Ports:** - Visit *Ops.WebAudio.AudioPanner documentation for input port details* **< Output Ports:**  
- Visit *Ops.WebAudio.AudioPanner documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "AudioPanner"*  
**Docs:** <https://cables.gl/op/Ops.WebAudio.AudioPanner>

---

## 13.91.8 AudioRecorder



**Full Name:** Ops.WebAudio.AudioRecorder **Description:** This op let's you record any webaudio stream  
in your patch.

**> Input Ports:** - trigger to clear buffer (revert to “idling” state): Playback Gain (Number)volume  
of recorded audio playback **< Output Ports:** - Visit *Ops.WebAudio.AudioRecorder documentation for  
output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "AudioRecorder"*  
**Docs:** <https://cables.gl/op/Ops.WebAudio.AudioRecorder>

---

### 13.91.9 BiquadFilter\_v2



**Full Name:** Ops.WebAudio.BiquadFilter\_v2 **Description:** The BiquadFilterNode represents a simple low-order filter. It can represent different kinds of filters, tone control devices, and graphic equalizers.

**> Input Ports:** - Visit *Ops.WebAudio.BiquadFilter\_v2 documentation* for input port details **< Output Ports:** - Visit *Ops.WebAudio.BiquadFilter\_v2 documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "BiquadFilter\_v2"  
**Docs:** [https://cables.gl/op/Ops.WebAudio.BiquadFilter\\_v2](https://cables.gl/op/Ops.WebAudio.BiquadFilter_v2)

---

### 13.91.10 ClockSequencer



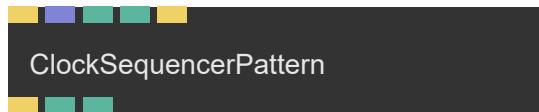
**Full Name:** Ops.WebAudio.ClockSequencer **Description:** Full NameOps.WebAudio.ClockSequencerVisibilityCore  
Op - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlists-  
Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa-  
niuse queryExample Patch ClockSequencer ExampleOpen In EditorINPUT PORTSBPM (Number:  
integer)beats per minute (tempo)

**> Input Ports:** - **beats per minute (tempo):** Start (Trigger)starts the sequencer **< Output Ports:** -  
**half note (3 half notes):** 1/2 Dotted Note Trigger (Trigger)triggers every half note + quarter note (3  
quarter notes) - **eighth note (3 eighth notes):** 1/8 Dotted Note Trigger (Trigger)triggers every eighth note  
+ sixteenth note (3 sixteenth notes) - **thirty-second note (3 thirty-second notes):** 1/32 Dotted Note  
Trigger (Trigger)triggers every thirty-second note + sixty-fourth note (3 sixty-fourth notes) - **notes  
(single tick):** Sequencer Running (booleanNumber)outputs true if the sequencer is currently running,  
falls else

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ClockSequencer"  
**Docs:** <https://cables.gl/op/Ops.WebAudio.ClockSequencer>

---

### 13.91.11 ClockSequencerPattern



**Full Name:** Ops.WebAudio.ClockSequencerPattern **Description:** This op allows you to create trigger patterns in conjunction with the ParseArray op.

**> Input Ports:** - Visit [Ops.WebAudio.ClockSequencerPattern documentation](#) for input port details **< Output Ports:** - Visit [Ops.WebAudio.ClockSequencerPattern documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ClockSequencerPattern" **Docs:** <https://cables.gl/op/Ops.WebAudio.ClockSequencerPattern>

---

### 13.91.12 Convolver\_v2



**Full Name:** Ops.WebAudio.Convolver\_v2 **Description:** The ConvolverNode interface is an AudioNode that performs a Linear Convolution on a given AudioBuffer, often used to achieve a reverb effect.

**> Input Ports:** - Visit [Ops.WebAudio.Convolver\\_v2 documentation](#) for input port details **< Output Ports:** - Visit [Ops.WebAudio.Convolver\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Convolver\_v2" **Docs:** [https://cables.gl/op/Ops.WebAudio.Convolver\\_v2](https://cables.gl/op/Ops.WebAudio.Convolver_v2)

---

### 13.91.13 CutFilter



**Full Name:** Ops.WebAudio.CutFilter **Description:** Full NameOps.WebAudio.CutFilterVisibilityCore Op - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlists-

Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch CutFilter ExampleExample patch for CutFilter op.

> **Input Ports:** - Visit *Ops.WebAudio.CutFilter documentation* for input port details < **Output Ports:** - Visit *Ops.WebAudio.CutFilter documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "CutFilter"* **Docs:** <https://cables.gl/op/Ops.WebAudio.CutFilter>

---

### 13.91.14 Delay



**Full Name:** Ops.WebAudio.Delay **Description:** Full NameOps.WebAudio.DelayVisibilityCore Op - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch Delay ExampleExample patch for the Delay op

> **Input Ports:** - Visit *Ops.WebAudio.Delay documentation* for input port details < **Output Ports:** - Visit *Ops.WebAudio.Delay documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl patches for "Delay"* **Docs:** <https://cables.gl/op/Ops.WebAudio.Delay>

---

### 13.91.15 FFTAreaAverage\_v3



**Full Name:** Ops.WebAudio.FFTAreaAverage\_v3 **Description:** Full NameOps.WebAudio.FFTAreaAverage\_v3VisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch FFTAreaAverage ExampleOpen In EditorINPUT PORTSRefresh (Trigger)trigger input

> **Input Ports:** - Visit [Ops.WebAudio.FFTAreaAverage\\_v3 documentation](#) for input port details < **Output Ports:** - Visit [Ops.WebAudio.FFTAreaAverage\\_v3 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "FFTAreaAverage\\_v3"](#) **Docs:** [https://cables.gl/op/Ops.WebAudio.FFTAreaAverage\\_v3](https://cables.gl/op/Ops.WebAudio.FFTAreaAverage_v3)

---

### 13.91.16 Gain



**Full Name:** Ops.WebAudio.Gain **Description:** The Gain-op can be used to make an audio signal more silent.

> **Input Ports:** - Visit [Ops.WebAudio.Gain documentation](#) for input port details < **Output Ports:** - Visit [Ops.WebAudio.Gain documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "Gain"](#) **Docs:** <https://cables.gl/op/Ops.WebAudio.Gain>

---

### 13.91.17 KeyPiano



**Full Name:** Ops.WebAudio.KeyPiano **Description:** Can be used to generate notes based on keyboard presses together with the KeyLearn-op. For every note the keyboard key can be defined in the corresponding KeyLearn-op, so e.g. you would add a KeyLearn-op, press its learn-button to store e.g. the key code for the key c and then you need to connect its on-press-port with the c note on-port of KeyPiano. Please note that key-presses are only detected in the preview window by default (click inside to set the focus). Currently only one key can be played simultaneously.

> **Input Ports:** - Visit [Ops.WebAudio.KeyPiano documentation](#) for input port details < **Output Ports:** - Visit [Ops.WebAudio.KeyPiano documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "KeyPiano" **Docs:** <https://cables.gl/op/Ops.WebAudio.KeyPiano>

---

### 13.91.18 MicrophoneIn\_v2



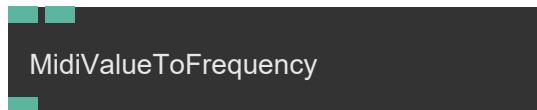
**Full Name:** Ops.WebAudio.MicrophoneIn\_v2 **Description:** Needs a user interaction to be enabled, check the example file

**> Input Ports:** - Visit *Ops.WebAudio.MicrophoneIn\_v2* documentation for input port details **< Output Ports:** - Visit *Ops.WebAudio.MicrophoneIn\_v2* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "MicrophoneIn\_v2" **Docs:** [https://cables.gl/op/Ops.WebAudio.MicrophoneIn\\_v2](https://cables.gl/op/Ops.WebAudio.MicrophoneIn_v2)

---

### 13.91.19 MidiValueToFrequency



**Full Name:** Ops.WebAudio.MidiValueToFrequency **Description:** Full NameOps.WebAudio.MidiValueToFrequencyVi  
Op - visible for everyoneLicenseMITAuthortimgithub sourceMaintained by Team cablesPatchlistsDoc-  
umentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse  
queryNo op example found on this serverINPUT PORTSMIDI Value (Number)Tuning (Number)OUTPUT  
PORTSFrequency (Number)SaveCancel ChangelogPatches using MidiValueToFrequencyExamples  
Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.WebAudio.MidiValueToFrequency* documentation for input port details **< Output Ports:** - Visit *Ops.WebAudio.MidiValueToFrequency* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search *cables.gl* patches for "MidiValueToFrequency" **Docs:** <https://cables.gl/op/Ops.WebAudio.MidiValueToFrequency>

---

## 13.91.20 Mixer



**Full Name:** Ops.WebAudio.Mixer **Description:** Connector-op, which makes it possible to combine multiple audio signals into one and change their volume.

**> Input Ports:** - Visit [Ops.WebAudio.Mixer documentation for input port details](#) < **Output Ports:** - Visit [Ops.WebAudio.Mixer documentation for output port details](#)

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "Mixer"](#) **Docs:** <https://cables.gl/op/Ops.WebAudio.Mixer>

---

## 13.91.21 MusicalScales



**Full Name:** Ops.WebAudio.MusicalScales **Description:** Full NameOps.WebAudio.MusicalScalesVisibilityCore Op - visible for everyoneLicenseMITAuthorsimodgithub sourceMaintained by Team cablesPatchlists- Documentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCa- niuse queryExample Patch MusicalScales ExampleExample for the MusicalNotes op

**> Input Ports:** - the octave of the scale (only for string & midi note outputs): Append Octave To Names (Number: boolean)if true, octave number is appended to output strings < **Output Ports:** - Visit [Ops.WebAudio.MusicalScales documentation for output port details](#)

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches for "MusicalScales"](#) **Docs:** <https://cables.gl/op/Ops.WebAudio.MusicalScales>

---

## 13.91.22 Output\_v2



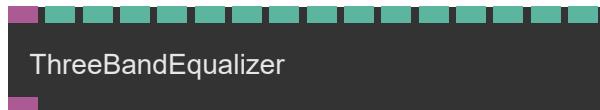
**Full Name:** Ops.WebAudio.Output\_v2 **Description:** This should be the end-op in your Web Audio patch. This is one of the most important ops when working with Web Audio – without it you don't hear anything.

➤ **Input Ports:** - Visit [Ops.WebAudio.Output\\_v2 documentation](#) for input port details < **Output Ports:** - Visit [Ops.WebAudio.Output\\_v2 documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "Output\_v2" **Docs:** [https://cables.gl/op/Ops.WebAudio.Output\\_v2](https://cables.gl/op/Ops.WebAudio.Output_v2)

---

## 13.91.23 ThreeBandEqualizer



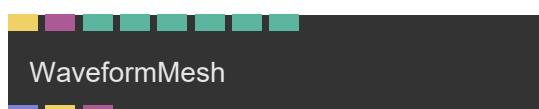
**Full Name:** Ops.WebAudio.ThreeBandEqualizer **Description:** This op is 3 biquad filters in one. It is heavily inspired by Ableton's EQ3.

➤ **Input Ports:** - Visit [Ops.WebAudio.ThreeBandEqualizer documentation](#) for input port details < **Output Ports:** - Visit [Ops.WebAudio.ThreeBandEqualizer documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search [cables.gl patches](#) for "ThreeBandEqualizer" **Docs:** <https://cables.gl/op/Ops.WebAudio.ThreeBandEqualizer>

---

## 13.91.24 WaveformMesh



**Full Name:** Ops.WebAudio.WaveformMesh **Description:** Full NameOps.WebAudio.WaveformMeshVisibilityCore  
Op - visible for everyone  
**License:** MIT  
**Authors:** simodgithub  
**source:** Maintained by Team  
**cablesPatch-**  
**lists:** Javascript Libraries  
**Webaudio Peaks** (extract peaks from audio samples or a webaudio AudioBuffer)  
**Documentation** (markdown)  
**Issues:** Example patch id  
**Youtube ids** (comma seperated)  
**Op Licence:** Can i use  
**Example query:** Patch WaveformMesh Example  
**Open In Editor:** INPUT PORTS Render  
**(Trigger):** Renders the waveform and triggers Next when done

**> Input Ports:** - Visit *Ops.WebAudio.WaveformMesh documentation* for input port details  
**< Output Ports:** - Visit *Ops.WebAudio.WaveformMesh documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "WaveformMesh"

**Docs:** <https://cables.gl/op/Ops.WebAudio.WaveformMesh>

---

## 13.91.25 Waveshaper



**Full Name:** Ops.WebAudio.Waveshaper **Description:** The default transfer function for the waveshaper is taken from <https://stackoverflow.com/a/22313408>

**> Input Ports:** - array input for the waveshaper (custom distortion transfer function): Output Gain (Number)  
**< Output Ports:** - distortion curve array output (one-dimensional): Curve Length (Number) length of the curve array

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Waveshaper"

**Docs:** <https://cables.gl/op/Ops.WebAudio.Waveshaper>

---

## 13.92 Ops.Website

### 13.92.1 Cookie



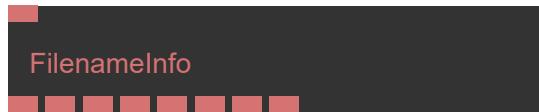
**Full Name:** Ops.Website.Cookie **Description:** Full NameOps.Website.CookieVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch cookie exampleOpen In EditorOUTPUT PORTSCookie (Object)Cookie String (String)SaveCancel ChangelogPatches using CookieExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Website.Cookie documentation* for input port details **< Output Ports:** - Visit *Ops.Website.Cookie documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "Cookie" **Docs:** <https://cables.gl/op/Ops.Website.Cookie>

---

### 13.92.2 FileInfo



**Full Name:** Ops.Website.FileInfo **Description:** Full NameOps.Website.FileInfoVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch FileInfo ExampleOpen In EditorINPUT PORTSURL (String)OUTPUT PORTSProtocol (String)Host (String)Full Path (String)Filename (String)basename (String)Suffix (String)Is URL (String)queryParams (String)SaveCancel ChangelogPatches using FileInfoExamples Team cables Public My Patches My Ops

**> Input Ports:** - Visit *Ops.Website.FileInfo documentation* for input port details **< Output Ports:** - Visit *Ops.Website.FileInfo documentation* for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "FileInfo" **Docs:** <https://cables.gl/op/Ops.Website.FileInfo>

---

### 13.92.3 ForceHttps



**Full Name:** Ops.Website.ForceHttps **Description:** if you open the patch on http://example.com it will redirect the url to https://example.com

> **Input Ports:** - Visit [Ops.Website.ForceHttps documentation](#) for input port details < **Output Ports:** - Visit [Ops.Website.ForceHttps documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "ForceHttps" **Docs:** <https://cables.gl/op/Ops.Website.ForceHttps>

---

#### 13.92.4 InIframe



**Full Name:** Ops.Website.InIframe **Description:** Full NameOps.Website.InIframeVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch inIframe exampleOpen In EditorOUTPUT PORTSIn Iframe (booleanNumber)SaveCancel ChangelogPatches using InIframeExamples Team cables Public My Patches My Ops

> **Input Ports:** - Visit [Ops.Website.InIframe documentation](#) for input port details < **Output Ports:** - Visit [Ops.Website.InIframe documentation](#) for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InIframe" **Docs:** <https://cables.gl/op/Ops.Website.InIframe>

---

#### 13.92.5 InfoURL



**Full Name:** Ops.Website.InfoURL **Description:** Full NameOps.Website.InfoURLVisibilityCore Op - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch URL info exampleOpen In EditorOUTPUT PORTSURL (String)Host (String)Hash

(String)Pathname (String)Protocol (String)Port (String)Hash Changed (Trigger)SaveCancel ChangeLogPatches using InfoURLExamples Team cables Public My Patches My Ops

➤ **Input Ports:** - Visit *Ops.Website.InfoURL* documentation for input port details < **Output Ports:** - Visit *Ops.Website.InfoURL* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "InfoURL" **Docs:** <https://cables.gl/op/Ops.Website.InfoURL>

---

### 13.92.6 LocalStorageNumber



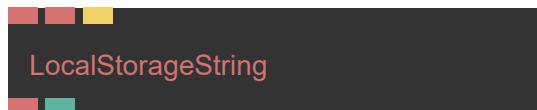
**Full Name:** Ops.Website.LocalStorageNumber **Description:** Full NameOps.Website.LocalStorageNumberVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma seperated)Op LicenceCaniuse queryExample Patch localstorageOpen In EditorINPUT PORTSKey (String)storage key

➤ **Input Ports:** - Visit *Ops.Website.LocalStorageNumber* documentation for input port details < **Output Ports:** - Visit *Ops.Website.LocalStorageNumber* documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "LocalStorageNumber" **Docs:** <https://cables.gl/op/Ops.Website.LocalStorageNumber>

---

### 13.92.7 LocalStorageString



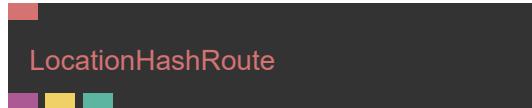
**Full Name:** Ops.Website.LocalStorageString **Description:** Full NameOps.Website.LocalStorageStringVisibilityOp - visible for everyoneLicenseMITAuthorpandurgithub sourceMaintained by Team cablesPatchlistsDocumentation (markdown)IssuesExample patch idYoutube ids (comma separated)Op LicenceCaniuse queryExample Patch localstorage stringOpen In EditorINPUT PORTSKey (String)storage key

> **Input Ports:** - Visit `Ops.Website.LocalStorageString` documentation for input port details < **Output Ports:** - Visit `Ops.Website.LocalStorageString` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "LocalStorageString" **Docs:** <https://cables.gl/op/Ops.Website.LocalStorageString>

---

### 13.92.8 LocationHashRoute



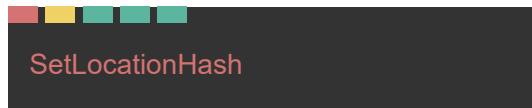
**Full Name:** `Ops.Website.LocationHashRoute` **Description:** this will return information about `window.location.hash` (the part after the #) in your url.

> **Input Ports:** - pattern for url and variables (i.e. `/scene/:id`): Check documentation < **Output Ports:** - Visit `Ops.Website.LocationHashRoute` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "LocationHashRoute" **Docs:** <https://cables.gl/op/Ops.Website.LocationHashRoute>

---

### 13.92.9 SetLocationHash



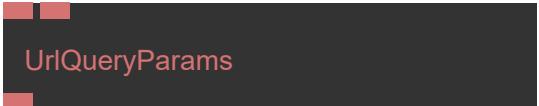
**Full Name:** `Ops.Website.SetLocationHash` **Description:** allows to manipulate `window.location.hash` to store data in the url without reloading the page.

> **Input Ports:** - hash (without the #): Update (Trigger)Active (Number: boolean)active/inactive < **Output Ports:** - Visit `Ops.Website.SetLocationHash` documentation for output port details

**Example Patch:** Open in Editor **Patches Using This Op:** Search `cables.gl` patches for "SetLocationHash" **Docs:** <https://cables.gl/op/Ops.Website.SetLocationHash>

---

## 13.92.10 UrlqueryParams\_v2



UrlqueryParams

**Full Name:** Ops.Website.UrlqueryParams\_v2 **Description:** You can append query parameters to your URLs, e.g.

> **Input Ports:** - Visit *Ops.Website.UrlqueryParams\_v2 documentation for input port details* < **Output Ports:** - Visit *Ops.Website.UrlqueryParams\_v2 documentation for output port details*

**Example Patch:** Open in Editor **Patches Using This Op:** Search cables.gl patches for "UrlqueryParams\_v2" **Docs:** [https://cables.gl/op/Ops.Website.UrlqueryParams\\_v2](https://cables.gl/op/Ops.Website.UrlqueryParams_v2)

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