

# Rayforge Core Library

## Documentation v1.0

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### Overview

Core library package providing essential utilities, rendering extensions, and math helpers for Rayforge Unity assets. This package serves as a shared dependency and should not be modified directly.

**Package Type:** Shared Dependency Library

**Target Audience:** Users of Rayforge Unity Assets

**Installation:** Automatic via dependency resolution

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### Installation

- Install via Unity Package Manager
  - **Minimum Unity Version:** [Specify Version]
  - This package is automatically installed as a dependency for Rayforge assets
  - No manual setup required
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## Main Modules

### Editor Utilities

- **VolumeComponents:** Custom volume component helpers
- **Abstractions & Attributes:** Base classes for editor tooling

### Runtime

- **Caching:** Performance optimization utilities
- **ManagedResources:** Resource pooling and memory management
- **Maths:** Extended math operations (Spaces, Transforms, noise functions)
- **Rendering:** Shader utilities, collections, filtering, and passes

### Shader Extensions

- **ShaderLibrary:** Common shader functions (Blitter, Color, Filter, Lighting, Math)
  - **TemporalReprojection:** TAA and temporal effects support
  - **BlueNoise:** Optimized noise textures and sampling
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## Key Features

**Modular Architecture:** Use only what you need

**Performance Focused:** Optimized caching and pooling systems

**Shader Library:** Reusable HLSL functions across projects

**Threading Support:** Multi-threaded operations via Jobs system

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## Module Details

### Caching System

Provides efficient caching mechanisms for frequently accessed data, reducing memory allocations and improving runtime performance.

### Managed Resources

Handles resource pooling, allocation strategies, and memory management to optimize asset usage across your projects.

### Math Utilities

Extended mathematical operations including space transformations, noise functions (Blue Noise), and specialized transform helpers.

### Rendering Pipeline

Core rendering utilities for shader management, pass organization, filtering operations, and collection handling.

### Shader Library

Comprehensive HLSL function library covering:

- Color space conversions and manipulation
  - Lighting calculations
  - Mathematical operations optimized for shaders
  - Blitter utilities for efficient rendering
  - Temporal reprojection for anti-aliasing and effects
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## Usage Notes

### Important:

- Designed as a dependency package - install once, use across multiple Rayforge assets
  - All namespaces start with `RayforgeUnity.Library.Core`
  - See individual asset documentation for specific integration examples
  - Do not modify package contents directly - changes may be overwritten on updates
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## Integration

This library is automatically referenced by Rayforge assets. No manual integration steps are required. Simply install your desired Rayforge asset, and this package will be included as a dependency.

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## Support & Resources

- **Documentation:** Included with each Rayforge asset
  - **Support:** [info@rayforge.eu](mailto:info@rayforge.eu)
  - **Updates:** Automatically managed via Unity Package Manager
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## Component Overview

### Core Components

#### Caching & Memory Management

- Concurrent caching systems for thread-safe operations
- Resource pooling and allocation strategies
- Transform and data caching utilities

#### Mathematics

- Space transformations and coordinate conversions
- Blue Noise generation and sampling
- Optimized math helpers for graphics operations

#### Rendering Pipeline

- Shader pass management and organization
- Color space utilities and filtering operations
- Blitter system for efficient full-screen effects
- Temporal reprojection for anti-aliasing and motion

## **Editor Integration**

- Custom volume components for URP/HDRP
  - Editor utilities and inspector extensions
  - Debug visualization tools
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