OpenGL 3 hardware matrix

Extensions exposed by OpenGL implementations

April 2014, G-Truc Creation

| Vendor | | NV | IDIA | | | AMD | | Intel |
|-----------------|--------|-------|--------|-------|---------|---------|-------|------------|
| Drivers version | 337.50 | | | | 14.4 rc | | | 3517 |
| Release date | | 07/04 | 1/2014 | | 1 | 5/04/20 | 14 | 11/04/2014 |
| Platforms | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| ARB extensions | 38% | 38% | 38% | 38% | 13% | 13% | 13% | 6% |
| OpenGL 4.4 | 63% | 63% | 63% | 63% | 0% | 0% | 0% | 0% |
| OpenGL 4.3 | 76% | 81% | 81% | 81% | 0% | 0% | 0% | 0% |
| OpenGL 4.2 | 67% | 67% | 67% | 67% | 75% | 75% | 75% | 0% |
| OpenGL 4.1 | 67% | 67% | 67% | 67% | 83% | 83% | 83% | 0% |
| OpenGL 4.0 | 0% | 0% | 8% | 46% | 31% | 54% | 62% | 8% |
| OpenGL 3.3 | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 80% |
| OpenGL 3.2 | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 78% |
| OpenGL 3.1 | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| OpenGL 3.0 | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| OpenGL 2.1 | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| OpenGL 2.0 | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

G80: GeForce 8800

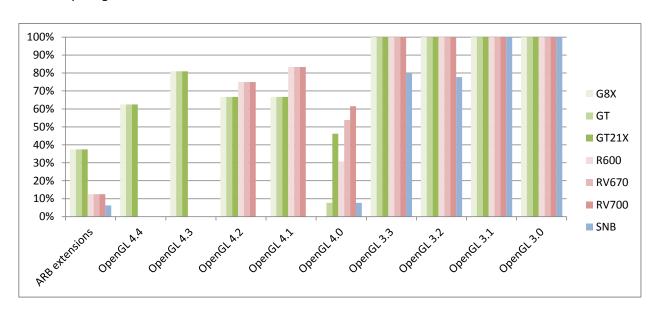
G8X: GeForce 8600, 8400, 9XXX, GTS 1XX

GT: Tesla, GeForce GTX 2XX

GT21X: GeForce GT 21X, GeForce GT 3XX

R600: Radeon HD 2000 series RV670: Radeon HD 3000 series RV700: Radeon HD 4000 series

SNB: Sandy Bridge



Nomenclature:

Supported

Not supported

| OpenGL Extensions | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
|-----------------------------------|-----|-----|-----|-------|------|-------|-------|-----|
| KHR texture compression astc ldr | Χ | Χ | Χ | Χ | Χ | Χ | Χ | Χ |
| ARB robustness | V | V | V | V | Χ | Χ | Χ | Χ |
| ARB sparse texture | Χ | Χ | Χ | Χ | Χ | Χ | Χ | Χ |
| ARB shading language include | V | V | V | V | Χ | Χ | Χ | Χ |
| ARB shader stencil export | X | Χ | Χ | Χ | Χ | Χ | Χ | X |
| ARB shader group vote | Χ | Χ | Χ | Χ | Χ | Χ | Χ | Χ |
| ARB shader draw parameters | Χ | Χ | Χ | Χ | Χ | Χ | Χ | Χ |
| ARB seamless cubemap per texture | X | X | Χ | Χ | Χ | Χ | Χ | X |
| ARB robustness isolation | V | V | V | V | Χ | Χ | Χ | Χ |
| ARB robust buffer access behavior | V | V | V | V | Χ | Χ | Χ | Χ |
| ARB debug output | V | V | V | V | V | V | V | X |
| ARB indirect parameters | X | X | Χ | Χ | Χ | Χ | Χ | X |
| ARB compute variable group size | Χ | X | Χ | Χ | Χ | Χ | Χ | X |
| ARB compatibility | V | V | V | V | V | V | V | V |
| ARB cl event | Χ | X | Χ | Χ | Χ | Χ | Χ | X |
| ARB bindless texture | Χ | Χ | Χ | Χ | Χ | Χ | Χ | Χ |
| Support | 38% | 38% | 38% | 38% | 13% | 13% | 13% | 6% |

| OpenGL Extensions | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
|---|-----|-----|----|-------|------|-------|-------|-----|
| EXT texture sRGB decode | V | V | V | V | Χ | Х | Χ | Χ |
| EXT texture mirror clamp | V | V | V | V | V | V | V | Χ |
| EXT shader integer mix | V | V | V | V | Χ | Х | Х | Х |
| EXT shader image load formatted | X | Х | Χ | Х | Χ | Х | Χ | Х |
| EXT framebuffer multisample blit scaled | X | X | Χ | X | Χ | Х | Х | Х |
| EXT direct state access | V | V | V | V | V | V | V | Х |
| EXT depth bounds test | V | V | V | V | Χ | Х | Χ | Χ |
| EXT clip control | X | X | Χ | Χ | Χ | X | Χ | Χ |
| NV vertex buffer unified memory | V | V | V | V | Χ | X | X | Χ |
| NV texture multisample | V | V | V | V | Χ | X | Χ | Χ |
| NV texture barrier | V | V | V | V | V | V | V | Χ |
| NV shader thread shuffle | X | X | Χ | Х | X | X | Χ | X |
| NV shader thread group | X | Χ | Χ | Χ | X | Χ | Χ | Χ |
| NV shader buffer store | X | X | Χ | Χ | Χ | X | Χ | X |
| NV shader buffer load | V | V | V | V | X | Χ | Χ | Χ |
| NV shader atomic float | X | X | Χ | Χ | Χ | X | Χ | X |
| NV multisample coverage | V | V | V | V | X | Χ | Χ | Χ |
| NV explicit multisample | V | V | V | V | V | V | V | X |
| NV depth buffer float | V | V | V | V | V | V | V | Χ |
| NV copy image | V | V | V | V | V | V | V | X |
| NV bindless texture | X | Χ | Χ | Χ | Χ | Х | Х | Χ |
| NV bindless multi draw indirect | Χ | Χ | Χ | X | Χ | X | X | Χ |
| NV blend equation advanced | X | Χ | Χ | X | Χ | Х | Х | Х |
| INTEL map texture | X | Χ | Χ | X | Χ | X | X | X |
| INTEL fragment shader ordering | X | Х | Χ | Х | Χ | Х | Х | Х |

| INTEL conservative rasterization | X | Χ | Χ | Χ | Χ | Χ | Χ | X |
|---|---|--|---|--|---|---|---|---------------------------------------|
| AMD vertex shader viewport index | Х | Х | Х | Х | Х | Х | Х | Х |
| AMD vertex shader layer | Х | Χ | Х | Х | Х | Х | Χ | X |
| AMD transform feedback4 | Х | Х | Х | Х | Х | Χ | Х | Х |
| AMD transform feedback3 lines triangles | X | Х | Х | X | X | X | X | X |
| AMD stencil operation extended | X | Х | Х | Х | X | Χ | X | X |
| AMD sparse texture pool | X | Х | Х | X | X | X | X | X |
| AMD sparse texture | X | X | X | X | X | X | X | X |
| AMD shader trinary minmax | X | X | Х | X | X | X | X | X |
| AMD shader stencil value export | X | X | X | X | X | X | X | X |
| AMD shader stencil export | X | X | X | X | X | X | V | X |
| AMD seamless cubemap per texture | X | X | X | X | X | Х | V | X |
| AMD sample positions | X | X | X | X | V | V | V | X |
| AMD query buffer object | X | X | X | X | X | X | X | X |
| AMD pinned memory | X | X | Х | X | V | V | V | X |
| AMD occlusion query event | X | X | X | X | X | X | X | X |
| AMD interleaved elements | Х | Х | Х | X | X | X | X | X |
| AMD gpu shader int64 | Χ | Χ | Χ | Х | X | Х | X | X |
| AMD gcn shader | Χ | Χ | Χ | Х | Χ | Х | Х | Χ |
| AMD framebuffer sample positions | Х | Х | Х | Х | Х | Х | Х | Х |
| AMD blend minmax factor | Х | Χ | Χ | Х | Χ | Х | Х | X |
| ATI texture mirror once | V | V | V | V | V | V | V | X |
| Support | 32% | 32% | 32% | 32% | 17% | 17% | 21% | 2% |
| | | | | | | | | |
| On an CL A A | 600 | 601/ | O.T. | CT24V | B.C.O.O. | DV/C70 | DV/700 | SNB |
| OpenGL 4.4 | G80 | G8X | GT | GT21X | R600 | RV670 | KV/UU | SIND |
| OpenGL 4.4 ARB buffer storage | G80 X | G8X X | X | G121X X | R600 X | X X | X X | X |
| ARB buffer storage ARB clear texture | | | | | | | | |
| ARB buffer storage | X | Χ | Χ | Χ | Χ | Χ | Χ | Х |
| ARB buffer storage ARB clear texture | X | X X | X X | X X | X X | X | X X | X X |
| ARB buffer storage ARB clear texture ARB enhanced layouts | X X V | X X V | X X V | X X V | X X X | X X X | X X X | X X X |
| ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind | X X V | X X V | X X V | X X V | X X X | X X X | X X X | X X X |
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| ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge | X V V X | X X V V X | X V V X | X V V X | X X X X X | X X X X X | X X X X X | X X X X X |
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| ARB explicit uniform location | V | V | V | V | Χ | Х | Χ | Χ |
|--|---|---|---|-------------------------------------|--|---|--|--|
| ARB ES3 compatibility | V | V | V | V | Х | Х | Х | Х |
| KHR debug | V | V | V | V | Х | Х | Х | Х |
| ARB copy image | V | V | V | V | Х | Х | Х | Х |
| ARB compute shader | X | Х | Χ | Х | Χ | Х | Х | Х |
| ARB clear buffer object | V | V | V | V | Х | Х | Х | Х |
| ARB arrays of arrays | V | V | V | V | Χ | Х | Х | Х |
| Support | 76% | 81% | 81% | 81% | 0% | 0% | 0% | 0% |
| OpenGL 4.2 | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| ARB transform feedback instanced | X | X | X | X | V | V | V | X |
| ARB texture compression bptc | X | X | X | X | X | X | X | X |
| ARB texture storage | V | V | V | V | V | V | V | X |
| ARB shading language packing | V | V | V | V | V | V | V | X |
| ARB shading language 420pack | V | V | V | V | V | V | V | X |
| ARB shader image load store | X | X | X | X | X | X | X | X |
| ARB shader atomic counters | X | X | X | X | X | X | X | X |
| ARB map buffer alignment | V | V | V | V | V | V | V | X |
| ARB internalformat query | V | V | V | V | V | V | V | X |
| ARB conservative depth | V | V | V | V | V | V | V | X |
| ARB compressed texture pixel storage | V | V | V | V | V | V | V | X |
| ARB base instance | V | V | V | V | V | V | V | X |
| AND Base instance | • | • | - | 67% | 75% | | 75% | 0% |
| Support | 67% | 67% | | | | | | |
| Support | 67% | 67% | 67% | 07/0 | 75% | 75% | 75% | 0,0 |
| Support OpenGL 4.1 | 67% G80 | 67% G8X | GT | GT21X | R600 | | RV700 | SNB |
| OpenGL 4.1 | | | | | | | | |
| | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| OpenGL 4.1 ARB viewport array | G80 V | G8X V | GT V | GT21X V | R600 V | RV670 V | RV700 V | SNB X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit | G80 V X | G8X V X | GT V X | GT21X V X | R600 V X | RV670 V X | RV700 V X | SNB X X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision | G80 V X X | G8X V X | GT V X | GT21X V X X | R600 V X V | RV670 V X V | RV700 V X V | SNB X X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary | G80 V X X V | G8X V X X | GT V X X V | GT21X V X X V | R600 V X V | RV670 V X V | RV700 V X V | SNB X X X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility | X X V V | G8X V X V V | GT V X X V | GT21X V X V V | R600 V X V V | RV670 V X V V | RV700 V X V V | SNB X X X X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support | G80 V X X V V | G8X V X V V V | GT V X X V V V | GT21X V X X V V V | R600 V X V V V V | RV670 V X V V V V 83% | RV700 V X V V V V 83% | SNB X X X X X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 | G80 V X X V V V 67% | G8X V X V V V | GT V X X V V V | GT21X V X X V V V | R600 V X V V V V | RV670 V X V V V | RV700 V X V V V V 83% | SNB X X X X X X O% |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 | G80 V X X V V V 67% | G8X V X V V V 67% | GT V X X V V V 67% | GT21X | R600 V X V V V V 83% | RV670 V X V V V V 83% | RV700 V X V V V V 83% | SNB X X X X X SNB |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 ARB transform feedback2 | G80 V X X V V V 67% | G8X V X V V V 67% | GT V X X V V V 67% | GT21X | R600 V X V V V V 83% | RV670 V X V V V V 83% | RV700 V X V V V V 83% | SNB X X X X X SNB X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 ARB transform feedback2 ARB texture query lod | G80 V X X V V 67% G80 X X | G8X V X V V V 67% | GT V X X V V V 67% GT X V | GT21X | R600 V X V V V V 83% R600 V | RV670 V X V V V 83% RV670 V | RV700 V X V V V V 83% RV700 V | SNB X X X X X SNB X X X |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather | G80 V X X V V 67% G80 X X | G8X V X V V V 67% G8X X | GT V X X V V V 67% | GT21X V X V V 67% GT21X X V | R600 V X V V V 83% R600 V | RV670 V V V V 83% RV670 V X | RV700 V X V V V 83% RV700 V | SNB X X X X X X SNB X X V |
| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array | G80 V X X V V 67% G80 X X X | G8X V X V V 67% G8X X X | GT V X X V V V 67% GT X V X X X | GT21X | R600 V X V V V 83% R600 V V | RV670 V X V V V 83% RV670 V V | RV700 V X V V V V 83% RV700 V V | SNB X X X X X X SNB X X X X X X X X X X X X X X X X X X X |
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| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB sample shading | G80 V X X V V 67% G80 X X X X X X X X X | G8X V X V V 67% G8X X X X X X | GT V X X V V V 67% GT X X X X X X X X X | GT21X | R600 V X V V V 83% R600 V V X X X | RV670 V V V V V 83% RV670 V V V V X | RV700 V X V V V S3% RV700 V V V V X X X | SNB X X X X X X O% SNB X X X X X X X X X X X X X X X X X X X |
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| OpenGL 4.1 ARB viewport array ARB vertex attrib 64bit ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB gpu shader5 ARB gpu shader fp64 | G80 V X X V V 67% G80 X X X X X X X X X X X X X X X X X X X | G8X V X V V 67% G8X X X X X X X X X X X | GT | GT21X | R600 V X V V V 83% R600 V V X X X X X X | RV670 V V V V V 83% RV670 V V V X V V X X X | RV700 V X V V V 83% RV700 V V V X X X X X | SNB |

| ARB vertex type 2 10 10 10 rev | V | V | V | V | V | V | V | V |
|---------------------------------------|------|--------|--------|--------|--------|--------|--------|--------|
| ARB timer query | V | V | V | V | V | V | V | V |
| ARB texture swizzle | V | V | V | V | V | V | V | Χ |
| ARB texture rgb10 a2ui | V | V | V | V | V | V | V | V |
| ARB shader bit encoding | V | V | V | V | V | V | V | V |
| ARB sampler objects | V | V | V | V | V | V | V | V |
| ARB occlusion query2 | V | V | V | V | V | V | V | V |
| ARB instanced arrays | V | V | V | V | V | V | V | V |
| ARB explicit attrib location | V | V | V | V | V | V | V | V |
| ARB blend func extended | V | V | V | V | V | V | V | Χ |
| Support | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 80% |
| | | | | | | | | |
| OpenGL 3.2 | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| ARB vertex array bgra | V | V | V | V | V | V | V | V |
| ARB texture multisample | V | V | V | V | V | V | V | Х |
| ARB sync | V | V | V | V | V | V | V | V |
| ARB seamless cube map | V | V | V | V | V | V | V | V |
| ARB provoking vertex | V | V | V | V | V | V | V | V |
| ARB geometry shader4 | V | V | V | V | V | V | V | Х |
| ARB fragment coord conventions | V | V | V | V | V | V | V | V |
| ARB depth clamp | V | V | V | V | V | V | V | V |
| ARB draw elements base vertex | V | V | V | V | V | V | V | V |
| Support | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 78% |
| | | | | | | | | |
| OpenGL 3.1 | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| ARB uniform buffer object | V | V | V | V | ٧ | V | V | V |
| EXT texture snorm | V | V | V | V | V | V | V | V |
| ARB texture rectangle | V | V | V | V | V | V | V | V |
| ARB texture buffer object | V | V | V | V | V | V | V | V |
| NV primitive restart | V | V | V | V | V | V | V | V |
| ARB draw instanced | V | V | V | V | V | V | V | V |
| ARB copy buffer | V | V | V | V | V | V | V | V |
| Support | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| • | | | | | | | | |
| OpenGL 3.0 | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| ARB vertex array object | V | V | V | V | V | V | V | V |
| EXT transform feedback | V | V | V | V | V | V | V | V |
| ARB texture rg | V | V | V | V | V | V | V | V |
| EXT texture shared exponent | V | V | V | V | V | V | V | V |
| EXT texture integer | V | V | V | V | V | V | V | V |
| ARB texture float | V | V | V | V | V | V | V | V |
| ARB texture compression rgtc | V | V | V | V | V | V | V | V |
| EXT texture array | V | V | V | V | V | V | V | V |
| EXT packed float | V | V | V | V | V | V | V | V |
| EXT packed depth stencil | V | V | V | V | V | V | V | V |
| ARB map buffer range | V | V | V | V | V | V | V | V |
| ARB half float vertex | V | V | V | V | V | V | V | V |
| ARB half float pixel | V | V | | | | | | |
| | | V | V | V | V | V | V | V |
| FXI gnu snader4 | | | V | V | | V | V | V |
| EXT gpu shader4 ARB framebuffer sRGB | V | V V |

| ARB framebuffer object | V | V | V | V | V | V | V | V |
|------------------------------|------|------|------|-------|------|-------|-------|------|
| ARB depth buffer float | V | V | V | V | V | V | V | V |
| NV conditional render | V | V | V | V | V | V | V | V |
| ARB color buffer float | V | V | V | V | V | V | V | V |
| Support | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | | | | | | | |
| OpenGL 2.1 | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| EXT texture sRGB | V | V | ٧ | V | V | V | V | V |
| ARB pixel buffer object | V | V | V | V | V | V | V | V |
| Support | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | | | | | | | | |
| OpenGL 2.0 | G80 | G8X | GT | GT21X | R600 | RV670 | RV700 | SNB |
| ARB vertex shader | V | V | V | V | V | V | V | V |
| ARB texture non power of two | V | V | V | V | V | V | V | V |
| EXT stencil two side | V | V | V | V | V | V | V | V |
| ARB shading language 100 | V | V | V | V | V | V | V | V |
| ARB shader objects | V | V | V | V | V | V | V | V |
| ARB point sprite | V | V | V | V | V | V | V | V |
| ARB fragment shader | V | V | V | V | V | V | V | V |
| ARB draw buffers | V | V | V | V | V | V | V | V |
| EXT blend equation separate | V | V | V | V | V | V | V | V |
| Support | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |