OpenGL hardware matrix

Extensions exposed by OpenGL implementations

Iuly 2016. G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GK110 / Kepler 110: GeForce 780 GM200 / Maxwell: GeForce 900 series

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

N.I. / Northern Islands: Radeon HD 6900 series

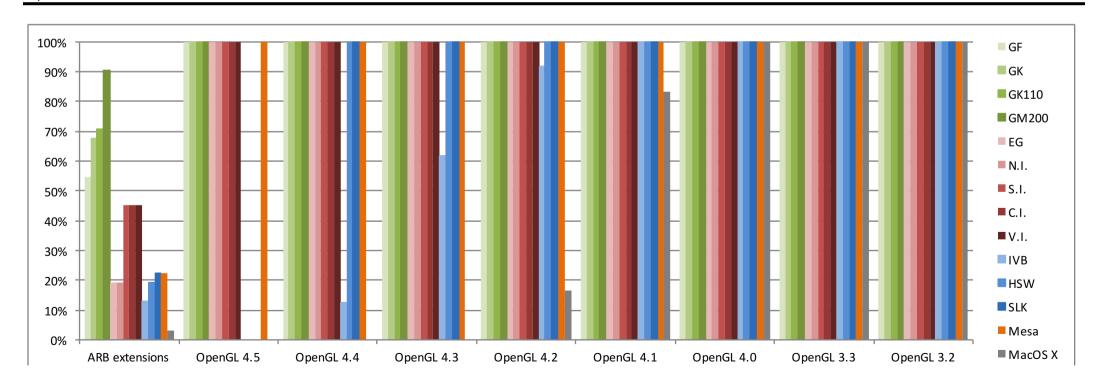
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 285 / 290 / Fury

SNB / Sandy Bridge: HD, HD 2000 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5X00 series, HD 4X00 series BSW / Broadwell: Iris 6X00 series, HD 5X00 series

Vendor		N	IVIDIA				AMD				Int	:el		Mesa	Apple
Drivers version		3	64.72				16.4.1			4229	4332	4331	4352	git-12.1	10.11.3
Release date		28/	03/2016			04	/04/201	16			ecemb	er 2015	;	26/072016	22/03/2016
Platforms	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB extensions	55%	68%	71%	90%	19%	19%	45%	45%	45%	13%	19%	19%	23%	23%	3%
OpenGL 4.5	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	100%	0%
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	100%	100%	100%	100%	0%
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	0%
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	100%	17%
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	83%
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
KHR texture compression astc ldr	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Х	Χ
KHR texture compression astc hdr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Х	Χ
KHR no error	V	V	V	V	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Х	Χ
KHR blend equation advanced	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ
KHR blend equation advanced coherent	X	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB transform feedback overflow query	V	V	V	V	V	V	V	V	V	V	V	V	V	X	Χ
ARB texture filter minmax	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	V	V	V	V	X	Χ
ARB sparse texture clamp	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB sparse texture2	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB sparse texture	V	V	V	V	Χ	Χ	V	V	V	X	Χ	Χ	Χ	Χ	X
ARB sparse buffer	V	V	V	V	Χ	Χ	V	V	V	X	Χ	Χ	Χ	Χ	X
ARB shader viewport layer array	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB shading language include	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V
ARB shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	V	V	X
ARB shader group vote	V	V	V	V	Χ	X	V	V	V	X	Χ	Χ	Χ	V	X
ARB shader draw parameters	V	V	V	V	Χ	X	V	V	V	X	Χ	Χ	Χ	V	X
ARB shader clock	X	V	V	V	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB shader ballot	X	V	V	V	X	X	V	V	V	X	Χ	Χ	Χ	X	Х
ARB shader atomic counter ops	X	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	Χ	V	X
ARB seamless cubemap per texture	X	V	V	V	V	V	V	V	V	X	V	V	V	X	X
ARB sample locations	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robustness isolation	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_post_depth_coverage	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	X

ARB pipeline statistics query	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB_parallel_shader_compile	V	V	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB gpu shader int64	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB_fragment_shader_interlock	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB ES3 2 compability	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB debug output	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB indirect parameters	V	V	V	V	X	Χ	V	V	V	Χ	V	V	V	V	X
ARB compute variable group size	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ
ARB cl event	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB bindless texture	X	V	V	V	X	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ
ARB gl spirv	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
									400/	440/	200/	200		200	
Support	54%	66%	69%	6 86%	17%	17%	40%	40%	40%	11%	20%	20%	29%	20%	3%
Support	54%	66%	69%	% 86%	17%	17%	40%	40%	40%	11%	20%	20%	29%	20%	3%
Support OpenGL Extensions	549 GF	66% GK		6 86% GM200	5 17% EG	17% N.I.	40% S.I.	40% C.I.	40% V.I.	IVB	HSW	BDW		Mesa	MacOS X
OpenGL Extensions	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
OpenGL Extensions EXT texture compression dxt1	GF V	GK V	GM100 V	GM200 V	EG X	N.I. X	S.I.	C.I.	V.I.	IVB X	HSW X	BDW X	SLK X	Mesa V	MacOS X V
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc	GF V	GK V V	GM100 V V	GM200 V V	EG X V	N.I. X V	S.I. X V	C.I. X V	V.I. X V	IVB X V	HSW X V	BDW X V	SLK X V	Mesa V X	MacOS X V V
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc EXT texture sRGB decode	GF V	GK V V	GM100 V V V	GM200 V V V	EG X V	N.I. X V	S.I. X V	C.I. X V	V.I. X V	IVB X V	HSW X V	BDW X V	SLK X V	Mesa V X V	MacOS X V V
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc EXT texture sRGB decode EXT texture mirror clamp	GF V	GK V V V	GM100 V V V V	GM200 V V V	EG X V V	N.I. X V V	S.I. X V V	C.I. X V V	V.I. X V V	IVB X V V	HSW X V V	BDW X V V	SLK X V V	Mesa V X V	MacOS X V V V
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc EXT texture sRGB decode EXT texture mirror clamp EXT texture filter minmax	GF V V V V	GK V V V	GM100 V V V V	GM200 V V V V	EG X V V V	N.I. X V V V	S.I. X V V V	C.I. X V V X	V.I. X V V X	IVB X V V X	HSW X V V X	BDW X V V X	SLK X V V X X	Mesa V X V X	MacOS X V V V X
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc EXT texture sRGB decode EXT texture mirror clamp EXT texture filter minmax EXT shader integer mix	GF V V V V	GK V V V V	GM100 V V V V X V	GM200 V V V V	EG X V V V X	N.I. X V V V X	S.I. X V V V X V V	C.I. X V V V X	V.I. X V V V X	IVB X V V X X X	HSW X V V X X	BDW X V V X X	SLK X V V X X	Mesa V X V X V	MacOS X V V V X X
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc EXT texture sRGB decode EXT texture mirror clamp EXT texture filter minmax EXT shader integer mix EXT shader image load formatted	GF V V V V	GK V V V X X	GM100 V V V V X V	GM200 V V V V V	EG X V V V X V	N.I. X V V X X X	S.I. X V V X V X	C.I. X V V V X X V X	V.I. X V V X X X	IVB X V V X X X	HSW X V X X X X	BDW X V X X X X	SLK X V V X X X	Mesa V X V X X X	MacOS X V V V X X
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc EXT texture sRGB decode EXT texture mirror clamp EXT texture filter minmax EXT shader integer mix EXT shader image load formatted EXT_shader_framebuffer_fetch	GF V V V V	GK V V V X X X	GM100 V V V V X V	GM200 V V V V V V V X	EG X V V V X V X	N.I. X V V V X X X X	S.I. X V V V X X X X	C.I. X V V V X X X X	V.I. X V V X X X X	IVB X V V X X X X X	HSW X V V X X X X X	BDW X V V X X X X X	SLK X V V X X X V V	Mesa V X V X X X X X X	MacOS X V V V X X X
OpenGL Extensions EXT texture compression dxt1 EXT texture compression s3tc EXT texture sRGB decode EXT texture mirror clamp EXT texture filter minmax EXT shader integer mix EXT shader image load formatted EXT_shader_framebuffer_fetch EXT sparse texture2	GF V V V V	GK V V V X X X X	GM100 V V V V X V X	GM200 V V V V V V V	EG X V V X X X X	N.I. X V V V X X X X	S.I. X V V V X X X X X	C.1. X V V X V X X	V.I. X V V X X X X X	IVB X V V X X X X X	HSW X V X X X X X X	BDW X V X X X X X X	SLK X V X X X X X X X X X	Mesa V X V X X X X X X	MacOS X V V V V X X X X

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EXT framebuffer multisample blit scaled

EXT direct state access

EXT depth bounds test

EXT clip_control

NV viewport array2

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V

X

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Χ

NV vertex buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV uniform buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture multisample	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV texture barrier	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	V
NV shader thread shuffle	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader thread group	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader buffer store	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader buffer load	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader atomic fp16 vector	X	Χ	Х	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader atomic float	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic int64	X	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample mask override coverage	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample locations	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering shared edge	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV multisample coverage	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV internalformat sample query	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV geometry shader passthrough	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV framebuffer mixed samples	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fragment shader interlock	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fragment coverage to color	Χ	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fill rectangle	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV explicit multisample	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	X
NV draw vulkan image	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV depth buffer float	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	X
NV copy image	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	X
NV_command_list	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV conservative raster dilate	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV conservative raster	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless texture	X	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect count	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X

NV blend equation advanced	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
INTEL multi rate fragment shader	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
INTEL map texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	X	X
INTEL fragment shader ordering	Χ	Χ	Χ	Χ	Х	Χ	V	V	V	X	V	V	V	X	Χ
INTEL conservative rasterization	Χ	Χ	Χ	Χ	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
ANGLE texture compression dxt5	X	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
ANGLE texture compression dxt3	X	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
AMD vertex shader viewport index	X	Χ	Χ	Χ	V	V	V	V	V	X	V	V	V	X	X
AMD vertex shader layer	X	Χ	Χ	Χ	V	V	V	V	V	Χ	V	V	V	V	X
AMD transform feedback4	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	Χ	X	X
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	Χ	X	X
AMD stencil operation extended	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	Χ	X	X
AMD_sparse_texture_pool	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	X	X
AMD sparse texture	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	Χ	X	X
AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	V	X
AMD shader stencil value export	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	Χ	X	X
AMD shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	X	X
AMD seamless cubemap per texture	X	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	V	X
AMD sample positions	X	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	X	X
AMD query buffer object	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	Χ	X	X
AMD pinned memory	X	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	X	X
AMD performance monitor	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	Χ	V	X
AMD occlusion query event	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	Χ	Χ	Χ	X	X
AMD interleaved elements	X	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	Χ	X	X
AMD_gpu_shader_half_float	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	X
AMD_gpu_shader_half_float2	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ	Χ	Χ	X	X
AMD gpu shader int64	X	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	Χ	Χ	X
AMD gcn shader	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	Χ	X	X
AMD_framebuffer_sample_positions	Χ	Χ	Χ	Χ	Х	Χ	V	V	V	X	Χ	Χ	Χ	Х	X
AMD depth clamp separate	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	V	X	X
AMD blend minmax factor	X	Χ	Χ	Χ	Χ	V	V	V	V	X	Χ	Χ	Χ	X	X
ATI texture mirror once	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X	V

Support	40%	⁶ 46%	49%	71%	22% 2	24% 41%	42%	44%	7%	15%	15%	21%	15%	% 8%
OpenGL 4.5	GF	GK	GM100	GM200	EG N.I	. S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
KHR context flush control	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	Χ
KHR robust buffer access behavior	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	Х
KHR robustness	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB ES3 1 compatibility	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB clip control	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB conditional render inverted	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB cull distance	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB derivative control	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB direct state access	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB get texture sub image	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB shader texture image samples	V	V	V	V	V V	V	V	V	Χ	Χ	Χ	Χ	V	X
488 · · · · · · · · · · · · · · · · · ·	M	V	V	V	V V	V	V	V	Х	Χ	Χ	Χ	V	X
ARB texture barrier	V	V	V	-										
ARB texture barrier Support	100%	•	100%	100%	100% 10	00% 100%	6 100%	100%	0%	0%	0%	0%	1009	% 0%
	100%	•	100%	100%	100% 10	00% 100%	6 100%	6 100%	5 0%	0%	0%	0%	1009	% 0%
Support	100% _GF	•	100% GM100	100% GM200	100% 10		6 100% C.I.	5 100% V.I.	5 0% IVB	0% HSW	0% BDW	0% SLK	Mesa	% 0% MacOS X
Support		6 100%												
Support OpenGL 4.4	GF	6 100% GK	GM100	GM200	EG N.	. S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
OpenGL 4.4 ARB buffer storage	GF V	6 100% GK V	GM100 V	GM200 V	EG N.	. S.I.	C.I.	V.I.	IVB V	HSW V	BDW V	SLK V	Mesa V	MacOS X
OpenGL 4.4 ARB buffer storage ARB clear texture	GF V V	6 100% GK V	GM100 V V	GM200 V V	EG N.I V V V V	. S.I. V	C.I. V	V.I. V	IVB V X	HSW V V	BDW V V	SLK V V	Mesa V V	MacOS X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts	GF V V	6 100% GK V V	GM100 V V V	GM200 V V V	EG N. V V V V	. S.I. V V	C.I. V V	V.I. V V	IVB V X	HSW V V	BDW V V	SLK V V	Mesa V V	MacOS X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object	GF V V V	6 100% GK V V V	GM100 V V V V	GM200 V V V V	EG N.I V V V V V V	S.I. V V V	C.I. V V V	V.I. V V V	IVB V X X	HSW V V V	BDW V V V	SLK V V V	Mesa V V V	MacOS X X X X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind	GF V V V V	GK V V V V V	GM100 V V V V	GM200 V V V V	EG N. V V V V V V V V	. S.I. V V V V V V	C.I. V V V	V.I. V V V	IVB V X X X	HSW V V V V V	BDW V V V V V	SLK V V V V	Mesa V V V V	MacOS X X X X X X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge	GF V V V V	GK V V V V	GM100 V V V V V	GM200 V V V V V	EG N.I V V V V V V V V V V	S.I. V V V V V	C.I. V V V V	V.I. V V V V	IVB V X X X X	HSW V V V V V V V	BDW V V V V V V	SLK V V V V	Mesa V V V V	MacOS X X X X X X X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8	GF V V V V	GK V V V V V V V V V V V V V V V V V V V	GM100 V V V V V V	GM200 V V V V V V	EG N. V V V V V V V V V V V V V V V	. S.I. V V V V V V V V V	C.I. V V V V V	V.I. V V V V V V V	IVB V X X X X X X	HSW V V V V V V V V V V	BDW V V V V V V V V V V V	SLK V V V V V V V V V V	Mesa V V V V V V V V V	MacOS X X X X X X X X X X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8 ARB vertex type 10f 11f 11f rev	GF V V V V V	GK V V V V V V V V V V V V V V V V V V V	GM100 V V V V V V	GM200 V V V V V V	EG N. V V V V V V V V V V V V V V V	. S.I. V V V V V V V V V	C.I. V V V V V	V.I. V V V V V V V	IVB V X X X X X X	HSW V V V V V V V V V V	BDW V V V V V V V V V V V	SLK V V V V V V V V V V	Mesa V V V V V V V V V	MacOS X X X X X X X X X X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8 ARB vertex type 10f 11f 11f rev Support	GF V V V V V	GK V V V V V V V V V V V V V V V V V V V	GM100 V V V V V V	GM200 V V V V V V	EG N. V V V V V V V V V V V V V V V	S.I. V V V V V V V O0% 100%	C.I. V V V V V	V.I. V V V V V V V	IVB V X X X X X X	HSW V V V V V V V V V V	BDW V V V V V V V V V V V	SLK V V V V V V V V V V	Mesa V V V V V V V V V	MacOS X X X X X X X X X X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8 ARB vertex type 10f 11f 11f rev Support	GF V V V V V V V	GK V V V V V V V V V V V V V V V V V V V	GM100 V V V V V V	GM200 V V V V V V	EG N. V	S.I. V V V V V V V O0% 100%	C.I. V V V V V V V V	V.I. V V V V V V V V C 100%	IVB V X X X X X X X X X X	HSW V V V V V V V 100%	BDW V V V V V V V 100%	SLK V V V V V V	Mesa V V V V V V V V V V V V V V V V V V V	MacOS X X X X X X X X X X X X X X X
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8 ARB vertex type 10f 11f 11f rev	GF V V V V V V V T009	GK V V V V V GK	GM100 V V V V V V T100%	GM200 V V V V V V T100%	EG N. V V V V V V V V V V V V V V V V V T 100% 10	. S.I. V V V V V V V V V V V V V V S.I. S.I.	C.I. V V V V V V V C.I.	V.I. V V V V V V V V V V.I.	IVB V X X X X X IVB	HSW V V V V V V HSW	BDW V V V V V V S BDW	SLK V V V V V V V SLK	Mesa V V V V V V V Mesa	MacOS X X X X X X X X X M MacOS X

ARB texture query levels	V	V	V	V	V	V	V	V	V	Χ	V	V	٧	V	Х
ARB texture buffer range	V	٧	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB stencil texturing	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB shader storage buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB shader image size	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB program interface query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB multi draw indirect	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB invalidate subdata	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB internalformat query2	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB framebuffer no attachments	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB fragment layer viewport	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB explicit uniform location	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB ES3 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Х
KHR debug	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB copy image	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB compute shader	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB clear buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB arrays of arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	100%	1009	6 0%

OpenGL 4.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB transform feedback instanced	٧	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB texture compression bptc	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB shader image load store	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X

ARB base instance	V	V	V	٧	٧	٧	٧	V	V	V	V	V	V	V	X	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	1	.00%	17%
OpenGL 4.1	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacC	S X
ARB viewport array	V	V	V	V	V	V	٧	V	٧	V	V	V	V	V	V	
ARB vertex attrib 64bit	V	V	V	V	V	V	V	V	٧	V	V	V	V	V	V	
ARB shader precision	V	V	V	V	V	V	V	V	٧	V	V	V	V	V	V	
ARB separate shader objects	V	٧	V	V	V	٧	V	V	٧	V	V	V	V	V	V	
ARB get program binary	V	٧	V	V	V	٧	V	V	V	V	V	V	V	V	X	
ARB ES2 compatibility	V	٧	V	V	٧	٧	V	V	٧	٧	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	5 1	.00%	83%
OpenGL 4.0	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacC	S X
ARB transform feedback3	V	V	٧	V	٧	٧	٧	V	٧	٧	V	V	V	V	V	
ARB transform feedback2	V	V	V	V	V	٧	V	V	٧	V	V	V	V	V	V	
ARB texture query lod	V	٧	V	V	٧	٧	٧	V	V	V	V	V	V	V	V	
ARB texture gather	V	٧	V	V	V	٧	٧	V	٧	V	V	V	V	V	V	
ARB texture cube map array	V	٧	V	V	V	V	٧	V	V	V	V	V	V	V	V	
ARB texture buffer object rgb32	V	V	V	V	V	V	V	V	٧	V	V	V	V	V	V	
ARB tessellation shader	V	٧	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB shader subroutine	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB sample shading	V	V	V	V	V	٧	V	V	V	V	V	V	V	V	V	
ARB gpu shader5	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB gpu shader fp64	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw indirect	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw buffers blend	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	5 1	.00%	100%
OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacC	S X
ARB vertex type 2 10 10 10 rev	V	٧	V	V	V	٧	V	V	V	V	V	V	V	V	V	
ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	

ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	٧	V	V	V	V	V	V
ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB explicit attrib location	V	V	V	V	V	V	٧	٧	٧	٧	V	V	V	V	V
ARB blend func extended	V	V	V	V	V	V	٧	٧	٧	٧	V	V	V	V	V
Support	100%	6 100	% 100%	100%	6 100%	100%	100%	100%	100%	100%	100%	100%	100%	6	100% 100
OpenGL 3.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
OpenGL 3.2 ARB vertex array bgra	GF V	GK V	GM100 V	GM200 V	EG V	N.I. V	S.I.	C.I.	V.I.	IVB V	HSW V	BDW V	SLK V	Mesa V	MacOS X V
·	GF V V										HSW V V		SLK V V		
ARB vertex array bgra	GF V V	V	V	V	V	V	V	V	V	V	V	V	٧	V	V
ARB vertex array bgra ARB texture multisample	GF V V V	V V													
ARB vertex array bgra ARB texture multisample ARB sync	GF V V V V	V V V													
ARB vertex array bgra ARB texture multisample ARB sync ARB seamless cube map	GF V V V V	V V V													
ARB vertex array bgra ARB texture multisample ARB sync ARB seamless cube map ARB provoking vertex	GF V V V V V	V V V V													

٧

100%

100%

100% 100%

ARB draw elements base vertex

Support

OpenGL hardware matrix

Extensions exposed by OpenGL implementations

April 2016. G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GK110 / Kepler 110: GeForce 780 GM200 / Maxwell: GeForce 900 series

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

N.I. / Northern Islands: Radeon HD 6900 series

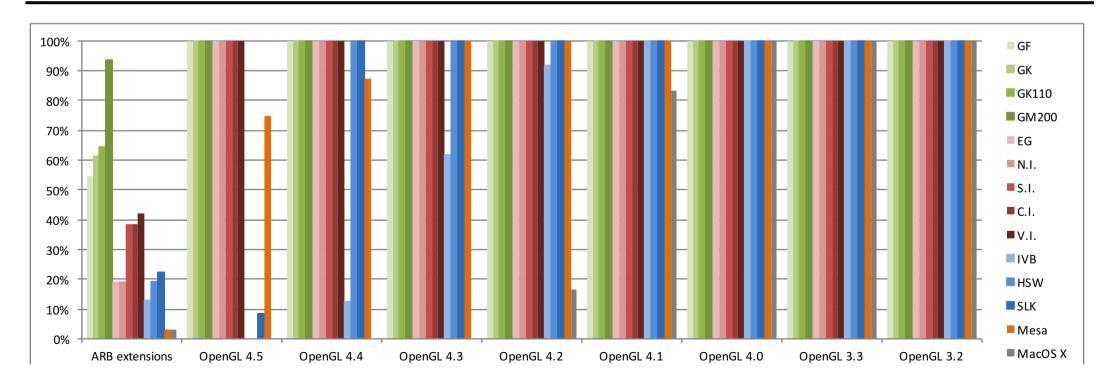
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 285 / 290 / Fury

SNB / Sandy Bridge: HD, HD 2000 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5X00 series, HD 4X00 series BSW / Broadwell: Iris 6X00 series, HD 5X00 series

Vendor		Ν	IVIDIA				AMD				Int	:el		Mesa	Apple
Drivers version		3	64.72				16.4.1			4229	4332	4331	4352	git-11.0	10.11.3
Release date		28/	03/2016			04	/04/202	16			ecemb	er 2015	5	02/08/2015	22/03/2016
Platforms	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB extensions	55%	61%	65%	94%	19%	19%	39%	39%	42%	13%	19%	19%	23%	3%	3%
OpenGL 4.5	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	8%	75%	0%
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	100%	100%	100%	88%	0%
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	100%	100%	0%
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	100%	17%
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	83%
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
KHR texture compression astc ldr	Χ	Χ	Х	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	Х
KHR texture compression astc hdr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	V	X	X
KHR no error	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	X
KHR blend equation advanced	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X
KHR blend equation advanced coherent	X	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB transform feedback overflow query	V	V	V	V	V	V	V	V	V	V	V	V	V	X	X
ARB texture filter minmax	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	V	V	V	V	X	X
ARB sparse texture clamp	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB sparse texture2	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB sparse texture	V	V	V	V	Χ	Χ	V	V	V	X	Χ	Χ	Χ	Χ	X
ARB sparse buffer	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	X
ARB shader viewport layer array	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB shading language include	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V
ARB shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	V	X	X
ARB shader group vote	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	X
ARB shader draw parameters	V	V	V	V	Χ	Χ	V	V	V	X	Χ	Χ	Χ	Χ	X
ARB shader clock	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB shader ballot	X	Χ	Χ	V	Χ	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	X
ARB shader atomic counter ops	Χ	Х	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Х	Χ	Χ	Χ	X
ARB seamless cubemap per texture	X	V	V	V	V	V	V	V	V	X	V	V	V	X	X
ARB sample locations	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB robustness isolation	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_post_depth_coverage	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X

ARB pipeline statistics query	V	V	٧	V	١	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	X	
ARB_parallel_shader_compile	V	V	V	V	2	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB gpu shader int64	V	V	V	V	2	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB_fragment_shader_interlock	X	Χ	Χ	V		X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB ES3 2 compability	V	V	V	V	,	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB debug output	V	V	V	V	'	V	V	V	V	V	V	V	V	V	V	X	
ARB indirect parameters	V	V	V	V		X	Χ	V	V	V	Χ	V	V	V	Χ	X	
ARB compute variable group size	V	V	V	V		X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB compatibility	V	V	V	V	١	V	V	V	V	V	V	V	V	V	Χ	X	
ARB cl event	X	Χ	Χ	Х)	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB bindless texture	X	V	V	V		X	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	X	
Support	54%	60%	0	63%	89%	17%	17%	6 34%	34%	37%	11%	20%	20%	29%)	3%	3%

OpenGL Extensions	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
EXT texture compression dxt1	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V
EXT texture compression s3tc	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ	V
EXT texture sRGB decode	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	V
EXT_texture_filter_minmax	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT_shader_integer_mix	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
EXT_shader_image_load_formatted	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT_shader_framebuffer_fetch	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ
EXT_sparse_texture2	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT_raster_multisample	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT_post_depth_coverage	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	X
EXT_polygon_offset_clamp	V	V	V	V	V	V	V	V	V	X	V	V	V	X	Χ
EXT framebuffer multisample blit scaled	V	V	V	V	Χ	X	Χ	Χ	Χ	Χ	X	Χ	Χ	V	V
EXT_direct_state_access	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	X
EXT_depth_bounds_test	V	V	V	V	X	Χ	V	V	V	X	Χ	Χ	Χ	Χ	V
EXT clip_control	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ
NV_viewport_array2	X	Χ	Χ	V	X	Χ	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ
NV vertex buffer unified memory	V	V	V	V	Χ	Χ	Χ	Χ	Χ	X	X	X	Χ	Χ	Χ

NV uniform buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture multisample	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV texture barrier	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X	V
NV shader thread shuffle	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV shader thread group	V	V	V	V	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV shader buffer store	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader buffer load	V	V	V	V	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV shader atomic fp16 vector	Χ	X	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV shader atomic float	V	V	V	V	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV shader atomic int64	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV sample mask override coverage	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV sample locations	Χ	X	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV path rendering shared edge	Χ	Χ	Χ	V	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV path rendering	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV multisample coverage	V	V	V	V	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV internalformat sample query	Χ	X	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV geometry shader passthrough	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV framebuffer mixed samples	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV fragment shader interlock	Χ	X	Χ	V	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV fragment coverage to color	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV fill rectangle	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV explicit multisample	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	X
NV draw vulkan image	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV depth buffer float	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	X
NV copy image	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	X
NV_command_list	Χ	X	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV conservative raster dilate	Χ	X	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV conservative raster	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV bindless texture	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV bindless multi draw indirect count	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV bindless multi draw indirect	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV blend equation advanced	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X

INTEL multi rate fragment shader	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ	
INTEL map texture	X	Χ	Χ	Х	Х	Х	Χ	Χ	Х	V	V	V	V	Χ	Х	
INTEL fragment shader ordering	X	Χ	Χ	Х	Χ	Χ	V	V	V	Х	V	V	V	Χ	Х	
INTEL conservative rasterization	X	Χ	Χ	Х	Х	Х	Χ	Χ	Х	Χ	Х	Х	V	Χ	Х	
ANGLE texture compression dxt5	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Х	Х	Χ	V	Х	
ANGLE texture compression dxt3	X	Χ	Χ	Χ	Χ	Х	Χ	Χ	Χ	Χ	Х	Χ	Χ	V	X	
AMD vertex shader viewport index	X	Χ	Χ	Χ	V	V	V	V	V	Х	V	V	V	X	Х	
AMD vertex shader layer	X	Χ	Χ	Χ	V	V	V	V	V	Х	V	V	V	V	X	
AMD transform feedback4	Χ	Χ	Χ	X	X	Х	V	V	V	Х	Х	Х	Χ	Χ	Х	
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	Χ	V	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD stencil operation extended	Χ	Χ	Χ	X	Χ	X	V	V	V	Х	X	X	Χ	Χ	X	
AMD_sparse_texture_pool	Χ	Χ	Χ	Χ	Χ	X	Χ	V	V	Х	X	Χ	Χ	Χ	X	
AMD sparse texture	Χ	Χ	Χ	X	Χ	X	V	V	V	Х	X	X	Χ	Χ	X	
AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	Χ	V	V	V	Х	X	Χ	Χ	V	X	
AMD shader stencil value export	X	Χ	Χ	Χ	X	Χ	V	V	V	Х	X	Χ	Χ	Χ	X	
AMD shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD seamless cubemap per texture	X	V	V	V	V	V	V	V	V	Х	Χ	Χ	Χ	V	X	
AMD sample positions	X	Χ	Χ	Χ	V	V	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD query buffer object	X	Χ	Χ	Χ	V	V	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD pinned memory	X	Χ	Χ	Χ	V	V	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD performance monitor	X	Χ	Χ	Χ	V	V	V	V	V	Х	Χ	Χ	Χ	V	X	
AMD occlusion query event	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD interleaved elements	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Х	X	Χ	Χ	Χ	X	
AMD_gpu_shader_half_float	X	Χ	Χ	X	Χ	Χ	Χ	Χ	V	Х	Χ	Χ	Χ	Χ	X	
AMD_gpu_shader_half_float2	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Х	Χ	Χ	Χ	Χ	X	
AMD gpu shader int64	X	Χ	Χ	X	Χ	Χ	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD gcn shader	X	Χ	Χ	Χ	Χ	Χ	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD_framebuffer_sample_positions	X	Χ	Χ	Χ	Х	Χ	V	V	V	Х	Χ	Χ	Χ	Χ	X	
AMD depth clamp separate	Χ	Χ	Χ	Χ	V	V	V	V	V	X	X	Χ	V	X	X	
AMD blend minmax factor	Χ	Χ	Χ	Χ	Х	V	V	V	V	Х	X	Χ	Χ	Χ	Х	
ATI texture mirror once	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	Χ	V	
Support	40%	45%	479	7	3% 239	% 24%	6 39 ⁹	% 41%	% 43%	5	7% 159	% 15%	219	%	9%	8%

OpenGL 4.5	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
KHR context flush control	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
KHR robust buffer access behavior	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
KHR robustness	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	X
ARB ES3 1 compatibility	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	X
ARB clip control	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	V	V	X
ARB conditional render inverted	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB cull distance	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	X
ARB derivative control	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB direct state access	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB get texture sub image	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB shader texture image samples	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
ARB texture barrier	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	X
Support	100%	100%	100%	6 100%	100%	100%	100%	100%	100%	0%	0%	0%	89	6	75%
OpenGL 4.4	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB_buffer_storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB_clear_texture	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB enhanced layouts	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	X
ARB multi bind	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB query buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB texture mirror clamp to edge	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB texture stencil8	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
ARB vertex type 10f 11f 11f rev	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X
Support	100%	6 100%	100%	6 100%	100%	100%	100%	100%	100%	13%	100%	100%	100%	6 8	88%
Support	100%	6 100%	5 100%	6 100%	100%	100%	100%	100%	100%	13%	100%	100%	100%	6 8	38%
OpenGL 4.3	100% GF	6 100% GK	5 100% GM100		5 100% EG	100% N.I.	100% S.I.	100% C.I.	100% V.I.	13% IVB	100% HSW	100% BDW	5 100% SLK	% 8 Mesa	MacOS X
OpenGL 4.3		GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	
OpenGL 4.3 ARB vertex attrib binding		GK V	GM100 V	GM200 V	EG V	N.I. V	S.I. V	C.I.	V.I.	IVB V	HSW V	BDW V	SLK V	Mesa V	MacOS X

ARB texture buffer range	V	٧	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB stencil texturing	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB shader storage buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X	
ARB shader image size	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB program interface query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB multi draw indirect	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB invalidate subdata	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X	
ARB internalformat query2	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB framebuffer no attachments	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB fragment layer viewport	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X	
ARB explicit uniform location	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X	
ARB ES3 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
KHR debug	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB copy image	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB compute shader	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X	
ARB clear buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	X	
ARB arrays of arrays	٧	V	V	V	٧	V	V	٧	٧	V	V	V	V	V	X	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	100%	10	0%	0%

OpenGL 4.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB transform feedback instanced	V	V	V	V	V	V	V	V	V	V	V	٧	V	V	X
ARB texture compression bptc	V	V	V	V	V	V	V	V	V	V	V	٧	V	V	X
ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	٧	V	V	V
ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ
ARB shader image load store	V	V	V	V	V	V	V	V	V	Χ	V	V	V	٧	X
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Х
ARB base instance	V	V	V	V	V	V	V	V	V	V	V	٧	V	٧	Х

Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	-	100% 1
OpenGL 4.1	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB viewport array	V	٧	V	V	٧	٧	٧	٧	٧	V	٧	٧	٧	V	V
ARB vertex attrib 64bit	V	٧	V	V	٧	٧	٧	٧	٧	V	٧	٧	٧	V	V
ARB shader precision	V	V	V	V	V	٧	V	V	٧	V	٧	V	V	V	V
ARB separate shader objects	V	V	V	V	٧	V	V	٧	V	V	V	V	V	V	V
ARB get program binary	V	٧	V	V	V	V	٧	٧	V	V	V	V	٧	V	X
ARB ES2 compatibility	V	٧	V	V	٧	٧	٧	٧	٧	V	٧	٧	٧	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100% 8
OpenGL 4.0	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB transform feedback3	V	V	V	V	٧	V	٧	٧	٧	V	V	٧	٧	V	V
ARB transform feedback2	V	٧	V	V	V	V	٧	٧	V	V	V	V	٧	V	V
ARB texture query lod	V	٧	V	V	٧	٧	٧	٧	٧	V	٧	٧	٧	V	V
ARB texture gather	V	V	V	V	V	٧	V	V	٧	V	٧	V	V	V	V
ARB texture cube map array	V	V	V	V	٧	٧	٧	٧	٧	V	V	٧	٧	V	V
ARB texture buffer object rgb32	V	V	V	V	V	V	V	V	V	V	٧	V	V	V	V
ARB tessellation shader	V	V	V	V	V	V	V	V	V	V	٧	V	V	V	V
ARB shader subroutine	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB sample shading	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB gpu shader5	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB gpu shader fp64	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB draw indirect	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB draw buffers blend	V	٧	V	V	V	V	٧	٧	V	V	V	٧	٧	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	-	100% 10
OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacOS X
ARB vertex type 2 10 10 10 rev	V	٧	V	V	V	٧	V	٧	٧	V	٧	٧	V	V	V
ARB timer query	V	V	V	V	V	٧	V	V	٧	V	V	V	V	V	V
ARB texture swizzle	V	V	V	V	V	٧	V	V	٧	V	٧	V	V	V	V
ARB texture rgb10 a2ui	V	٧	V	V	V	V	٧	٧	V	V	٧	٧	V	V	V

ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB sampler objects	V	V	V	V	V	V	V	٧	٧	V	V	V	V	V	V	
ARB occlusion query2	V	V	V	V	V	V	V	٧	٧	V	V	V	٧	V	V	
ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB blend func extended	V	V	V	V	V	٧	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
OpenGL 3.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	MacO	S X
ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_sync	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw elements base vertex	V	V	V	V	V	٧	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%

OpenGL hardware matrix

Extensions exposed by OpenGL implementations

October 2015. G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GK110 / Kepler 110: GeForce 780 GM200 / Maxwell: GeForce 900 series

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

N.I. / Northern Islands: Radeon HD 6900 series

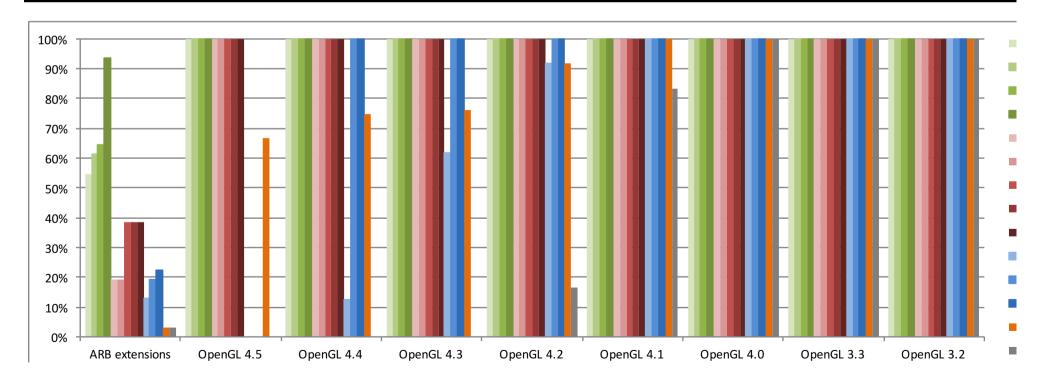
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 285 / 290 / Fury

SNB / Sandy Bridge: HD, HD 2000 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5X00 series, HD 4X00 series BSW / Broadwell: Iris 6X00 series, HD 5X00 series

Vendor		N	IVIDIA				AMD				Int	tel		Mesa
Drivers version		3	53.62				15.7.1			4229	4226	4212	4212	git-11.0
Release date		29/	07/2015			29	/07/20	15			Oct	2015		02/08/2015
Platforms	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa
ARB extensions	55%	61%	65%	94%	19%	19%	39%	39%	39%	13%	19%	19%	23%	3%
OpenGL 4.5	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%	67%
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	100%	100%	100%	75%
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	100%	76%
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	100%	92%
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa
KHR texture compression astc ldr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
KHR texture compression astc hdr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
KHR no error	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ
KHR blend equation advanced	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X
KHR blend equation advanced coherent	X	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB transform feedback overflow query	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB texture filter minmax	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	V	V	V	V	X
ARB sparse texture clamp	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB sparse texture2	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB sparse texture	V	V	V	V	Χ	Χ	V	V	V	X	Χ	Χ	Χ	Χ
ARB sparse buffer	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB shader viewport layer array	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shading language include	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	V	X
ARB shader group vote	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB shader draw parameters	V	V	V	V	Χ	Χ	V	V	V	X	X	Χ	Χ	Χ
ARB shader clock	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shader ballot	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ
ARB shader atomic counter ops	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ
ARB seamless cubemap per texture	X	V	V	V	V	V	V	V	V	X	V	V	V	X
ARB sample locations	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robustness isolation	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB_post_depth_coverage	V	V	V	V	Χ	Χ	Χ	Х	Χ	Χ	Χ	Χ	Χ	Χ

ARB pipeline statistics query	V	V	V	V		V	V	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB_parallel_shader_compile	V	V	V	V		X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB gpu shader int64	V	V	V	V		Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_fragment_shader_interlock	Χ	Χ	Χ	V		Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB ES3 2 compability	V	V	V	V		X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB debug output	V	V	V	V		V	V	V	V	V	V	V	V	V	V
ARB indirect parameters	V	V	V	V		X	Χ	V	V	V	Χ	V	V	V	X
ARB compute variable group size	V	V	V	V		X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB compatibility	V	V	V	V		V	V	V	V	V	V	V	V	V	X
ARB cl event	Χ	Χ	Χ	Χ		X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB bindless texture	Χ	V	V	V		Χ	Χ	V	٧	V	Χ	Χ	Χ	Χ	Χ
Support	54%	609	%	63%	89%	17%	17%	34%	34%	34%	11%	20%	20%	29%	3%

OpenGL Extensions	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa
EXT texture compression dxt1	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V
EXT texture compression s3tc	V	V	V	V	V	V	V	V	V	V	V	V	V	X
EXT_texture_sRGB_decode	V	V	V	V	V	V	V	V	V	V	V	V	V	V
EXT_texture_mirror_clamp	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ
EXT_texture_filter_minmax	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT shader integer mix	V	V	V	V	V	V	V	V	V	V	V	V	V	V
EXT shader image load formatted	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT_shader_framebuffer_fetch	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
EXT sparse texture2	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT_raster_multisample	X	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT_post_depth_coverage	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT_polygon_offset_clamp	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X
EXT framebuffer multisample blit scaled	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V
EXT_direct_state_access	V	V	V	V	V	V	V	V	V	Χ	V	V	V	Χ
EXT_depth_bounds_test	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ
EXT clip_control	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ
NV_viewport_array2	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV vertex buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X

NV uniform buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV texture multisample	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture barrier	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X
NV shader thread shuffle	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader thread group	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer store	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer load	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic fp16 vector	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic float	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic int64	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample mask override coverage	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample locations	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering shared edge	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV multisample coverage	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV internalformat sample query	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV geometry shader passthrough	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV framebuffer mixed samples	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fragment shader interlock	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fragment coverage to color	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fill rectangle	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV explicit multisample	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X
NV depth buffer float	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X
NV copy image	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X
NV_command_list	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV conservative raster dilate	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV conservative raster	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless texture	X	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect count	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV blend equation advanced	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
INTEL multi rate fragment shader	X	Χ	Χ	X	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	V	X

INTEL map texture	Χ	Χ	Χ	Х	Χ	Χ	Х	Χ	Χ	V	V	V	V	X	
INTEL fragment shader ordering	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	V	V	V	X	
INTEL conservative rasterization	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	
ANGLE texture compression dxt5	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X	Χ	V	
ANGLE texture compression dxt3	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	Х	Χ	Χ	V	
AMD vertex shader viewport index	X	Χ	Χ	Χ	V	V	V	V	V	X	V	V	V	X	
AMD vertex shader layer	Χ	Χ	Χ	Χ	V	V	V	V	V	X	V	V	V	V	
AMD transform feedback4	X	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X	Χ	Χ	Χ	
AMD transform feedback3 lines triangles	Χ	Χ	Χ	Χ	Χ	V	V	V	V	X	X	X	Χ	Χ	
AMD stencil operation extended	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X	Χ	Χ	Χ	
AMD_sparse_texture_pool	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	X	X	Χ	Χ	
AMD sparse texture	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X	Χ	Χ	Χ	
AMD shader trinary minmax	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X	X	Χ	V	
AMD shader stencil value export	X	Χ	Χ	Χ	Х	Χ	V	V	V	X	X	Χ	Χ	Χ	
AMD shader stencil export	Χ	Χ	Χ	Х	V	V	V	V	V	Х	Х	Χ	Χ	Χ	
AMD seamless cubemap per texture	Χ	V	V	V	V	V	V	V	V	X	X	Χ	Χ	V	
AMD sample positions	Χ	Χ	Χ	Χ	V	V	V	V	V	X	X	X	Χ	Χ	
AMD query buffer object	X	Χ	Χ	Χ	V	V	V	V	V	X	X	Χ	Χ	Χ	
AMD pinned memory	Χ	Χ	Χ	Χ	V	V	V	V	V	X	X	X	Χ	Χ	
AMD performance monitor	Χ	Χ	Χ	Χ	V	V	V	V	V	X	X	Χ	Χ	V	
AMD occlusion query event	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	X	X	Χ	Χ	
AMD interleaved elements	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X	Χ	Χ	Χ	
AMD_gpu_shader_half_float	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X	X	Χ	Χ	
AMD_gpu_shader_half_float2	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X	X	Χ	Χ	
AMD gpu shader int64	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X	X	Χ	Χ	
AMD gcn shader	X	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X	Χ	Χ	Χ	
AMD_framebuffer_sample_positions	Χ	Χ	Χ	Χ	Х	Χ	V	V	V	X	X	X	Χ	Χ	
AMD depth clamp separate	X	Χ	Χ	Х	V	V	V	V	V	X	X	Χ	V	X	
AMD blend minmax factor	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Х	Х	Χ	Χ	Χ	
ATI texture mirror once	V	V	V	V	V	V	V	V	V	X	Х	Χ	Χ	Χ	
Support	40%	45%	ó	47%	73% 23%	6 25%	% 39 ⁹	% 41	% 43	%	7% 15	% 159	% 22	%	10%

OpenGL 4.5	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	
KHR context flush control	V	V	V	V	٧	٧	٧	٧	V	Χ	Χ	Χ	Χ	V	
KHR robust buffer access behavior	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
KHR robustness	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB ES3 1 compatibility	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB clip control	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
ARB conditional render inverted	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
ARB cull distance	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X	
ARB derivative control	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
ARB direct state access	V	V	V	V	V	V	V	V	V	Χ	X	Χ	Χ	V	
ARB get texture sub image	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
ARB shader texture image samples	V	V	V	V	V	V	V	V	V	Х	X	Χ	Χ	X	
ARB texture barrier	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	0%		67%
OpenGL 4.4	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	
ARB buffer storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB clear texture	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB enhanced layouts	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB multi bind	V	V	V	V	V	V	V	V	V	Х	V	V	V	V	
ARB query buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB texture mirror clamp to edge	V	V	V	V	V	V	V	V	V	Х	V	V	V	V	
ARB texture stencil8	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB vertex type 10f 11f 11f rev	V	V	V	V	V	V	V	V	V	X	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	100%	100%	100%		75%
OpenGL 4.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	
OpenGL 4.3 ARB_vertex_attrib_binding	GF V	V	GM100 V	GM200 V	EG V	N.I. V	S.I. V	C.I. V	V.I. V	V	V	BDW V	SLK V	Mesa V	
·															
ARB vertex attrib binding	V	V	V	V	V	V	V	V	V	V X V	V V V	V	V	V	
ARB vertex attrib binding ARB texture view	V V	V V	V V	V V	V V	V V	V V	V V	V V	V X	V V	V V	V V	V V	

ARB stencil texturing	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB shader storage buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	Χ
ARB shader image size	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ
ARB program interface query	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB multi draw indirect	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB invalidate subdata	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V
ARB internalformat query2	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ
ARB framebuffer no attachments	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB fragment layer viewport	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V
ARB explicit uniform location	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V
ARB ES3 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	V
KHR debug	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB copy image	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB compute shader	V	V	V	V	V	V	V	V	V	Χ	V	V	V	Χ
ARB clear buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V
ARB arrays of arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	100%	769
OpenGL 4.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa
ARB transform feedback instanced	V	V	V	V	V	V	V	V	٧	V	V	٧	V	V
ARB texture compression bptc	V	V	V	V	V	V	V	V	٧	V	V	V	V	V
ARB texture storage	V	V	V	V	V	V	V	V	٧	V	V	٧	V	V
ARB shading language packing	V	V	V	V	V	V	V	V	٧	V	V	V	V	V
ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB shader image load store	V	V	V	V	V	V	V	V	V	Χ	V	V	V	Χ
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ADD	1/	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	<u> </u>
ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	V

V

100% 100%

V

V

100%

V

100% 100% 100% 100% 100% 100% 92% 100% 100% 100%

V

92%

ARB conservative depth

ARB base instance

Support

ARB compressed texture pixel storage

OpenGL 4.1	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa
ARB viewport array	V	V	V	V	V	V.I.	V.	V	V.I.	V	V	V	V	V
ARB vertex attrib 64bit	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB shader precision	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB separate shader objects ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	V	V	V
	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB ES2 compatibility	1000/	100%	•	•	•	100%	•	•	•	•	•	•	•	•
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 4.0	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa
ARB transform feedback3	V	V	V	V	٧	٧	٧	٧	V	V	V	V	V	V
ARB transform feedback2	V	V	V	V	V	٧	V	V	V	V	V	V	V	V
ARB texture query lod	V	V	V	V	٧	٧	٧	V	V	V	٧	٧	V	V
ARB texture gather	V	V	V	V	٧	٧	٧	٧	٧	٧	٧	٧	٧	V
ARB texture cube map array	V	V	V	V	٧	٧	٧	٧	V	V	٧	٧	V	V
ARB texture buffer object rgb32	V	V	٧	V	٧	٧	V	V	V	V	٧	٧	V	V
ARB tessellation shader	V	V	V	V	٧	٧	٧	٧	٧	٧	٧	٧	٧	V
ARB shader subroutine	V	V	V	V	٧	٧	V	٧	٧	٧	٧	٧	٧	V
ARB sample shading	V	V	V	V	٧	V	V	V	V	V	٧	V	V	V
ARB gpu shader5	V	V	V	V	٧	٧	V	٧	٧	٧	٧	٧	٧	V
ARB gpu shader fp64	V	V	V	V	٧	٧	V	٧	٧	٧	٧	V	٧	V
ARB draw indirect	V	V	V	V	٧	٧	V	٧	٧	٧	V	V	٧	V
ARB draw buffers blend	V	V	V	V	٧	V	V	V	V	V	٧	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa
ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	٧	V	V	V
ARB timer query	V	V	V	V	٧	V	V	V	V	V	V	V	V	V
ARB texture swizzle	V	V	V	V	٧	V	V	V	V	V	V	V	V	V
ARB texture rgb10 a2ui	٧	V	V	V	٧	V	V	V	V	V	V	V	V	V
ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	V

ARB sampler objects	٧	V	V	V	٧	٧	٧	V	V	V	V	V	V	V	
ARB occlusion query2	٧	V	V	V	V	V	V	٧	V	V	V	٧	V	V	
ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB blend func extended	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 3.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	SLK	Mesa	
ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_sync	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_provoking_vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw elements base vertex	٧	V	V	V	V	V	V	V	V	V	V	٧	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%

Apple

10.10.1

17/11/2014

MacOS X

3%

0%

0%

0%

17%

83%

100% 100%

100%

I GF

I GK

GK110

IGM200

I EG

I N.1.

IS.I.

IC.I.

IV.I.

IVB

IHSW

ISLK

I Mesa

I MacOS X

MacOS X

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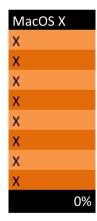
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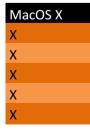
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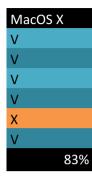
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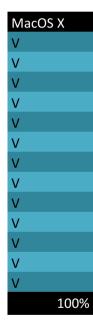
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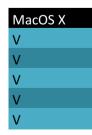




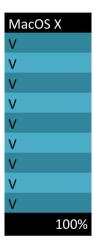
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OpenGL hardware matrix

Extensions exposed by OpenGL implementations

August 2015, G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GK110 / Kepler 110: GeForce 780 GM200 / Maxwell: GeForce 900 series

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

N.I. / Northern Islands: Radeon HD 6900 series

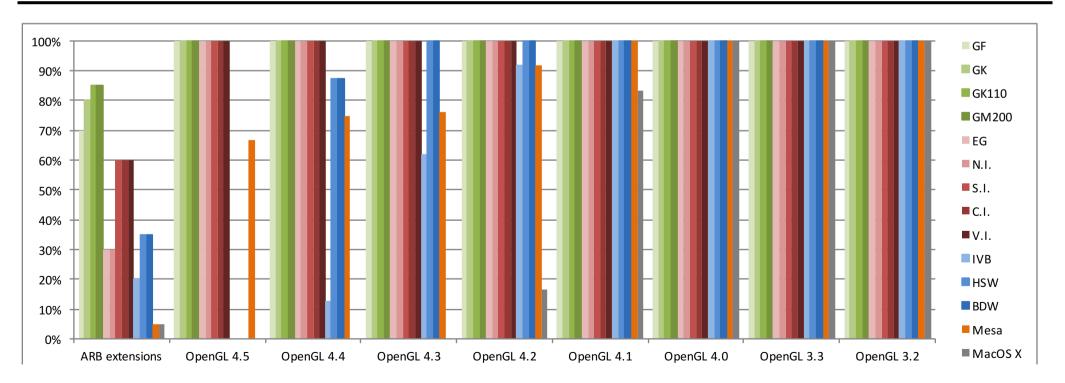
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 285 / 290 / Fury

SNB / Sandy Bridge: HD, HD 2000 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5X00 series, HD 4X00 series BSW / Broadwell: Iris 6X00 series, HD 5X00 series

Vendor		N	VIDIA				AMD				Intel		Mesa	Apple
Drivers version		3	53.62				15.7.1			4229	4226	4212	git-11.0	10.10.1
Release date		29/0	07/2015			29	/07/20	15		J	une 201	L5	02/08/2015	17/11/2014
Platforms	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS X
ARB extensions	70%	80%	85%	85%	30%	30%	60%	60%	60%	20%	35%	35%	5%	5%
OpenGL 4.5	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	67%	0%
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	88%	88%	75%	0%
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	76%	0%
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	92%	17%
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	83%
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS	S X
KHR blend equation advanced coherent	X	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
KHR blend equation advanced	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	
KHR texture compression astc ldr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB transform feedback overflow query	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	
ARB robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	V	V	٧	Χ	Χ	
ARB sparse texture	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB sparse buffer	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB shading language include	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	
ARB shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB shader group vote	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	X	Χ	
ARB shader draw parameters	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB seamless cubemap per texture	X	V	V	V	V	V	V	V	V	Χ	V	V	Χ	Χ	
ARB robustness isolation	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB pipeline statistics query	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X	
ARB debug output	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB indirect parameters	V	V	V	V	X	Χ	V	V	V	Χ	V	V	Χ	Χ	
ARB compute variable group size	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB compatibility	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	
ARB cl event	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB bindless texture	X	V	V	V	Χ	Χ	V	V	٧	Χ	Χ	Χ	Χ	Χ	
Support	72%	83%	6 839	6 83%	33%	33%	67%	67%	67%	22%	33%	33%		6%	6

OpenGL Extensions	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS X
EXT_texture_compression_dxt1	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V

EXT texture compression s3tc	V	V	V	V	V	V	V	V	V	V	V	V	X	V
EXT texture sRGB decode	V	V	V	V	V	V	V	V	V	V	V	V	V	V
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V
EXT texture filter minmax	X	Χ	Χ	V	X	X	X	Χ	Χ	Χ	Χ	Χ	X	X
EXT shader integer mix	V	V	V	V	V	V	V	V	V	V	V	V	V	X
EXT shader image load formatted	Χ	Χ	Х	V	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT sparse texture2	X	Χ	Χ	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT raster multisample	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT post depth coverage	X	Χ	Χ	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT polygon offset clamp	V	V	V	V	V	V	V	V	V	X	V	V	X	Χ
EXT framebuffer multisample blit scaled	V	V	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	V	V
EXT direct state access	V	V	V	V	V	V	V	V	V	X	V	V	X	Χ
EXT depth bounds test	V	V	V	V	X	Χ	V	V	V	X	Χ	Χ	Χ	V
EXT clip control	X	Χ	X	Χ	X	Χ	X	Χ	Χ	Χ	V	V	X	X
NV viewport array2	X	Χ	Χ	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV vertex buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV uniform buffer unified memory	V	V	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture multisample	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture barrier	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	V
NV shader thread shuffle	X	V	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader thread group	V	V	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer store	V	V	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer load	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic fp16 vector	X	Χ	Χ	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic float	V	V	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic int64	X	Χ	V	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample mask override coverage	Χ	Χ	Χ	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample locations	X	Χ	X	V	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering shared edge	X	Χ	Х	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV multisample coverage	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV internalformat sample query	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X

NV geometry shader passthrough	Χ	Χ	Х	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV framebuffer mixed samples	Χ	Χ	Χ	V	X	Х	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV fragment shader interlock	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Х	X
NV fragment coverage to color	X	Χ	Χ	V	X	Х	Χ	Χ	Χ	Χ	Χ	Χ	Х	X
NV fill rectangle	Χ	Х	Χ	V	Х	Х	Χ	Х	Χ	Χ	Χ	Χ	Х	X
NV explicit multisample	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X
NV depth buffer float	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Х	X
NV copy image	V	V	V	V	V	V	V	V	V	X	Χ	Χ	X	X
NV_command_list	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV conservative raster dilate	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV conservative raster	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV bindless texture	X	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV bindless multi draw indirect count	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV bindless multi draw indirect	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV blend equation advanced	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
INTEL map texture	X	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ
INTEL fragment shader ordering	Χ	Χ	Χ	Χ	X	Χ	V	V	V	Χ	V	V	X	Χ
INTEL conservative rasterization	X	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	V	V	X	X
ANGLE texture compression dxt5	X	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
ANGLE texture compression dxt3	X	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
AMD vertex shader viewport index	X	Χ	Χ	Χ	V	V	V	V	V	Χ	V	V	Χ	X
AMD vertex shader layer	X	Χ	Χ	Χ	V	V	V	V	V	X	V	V	V	X
AMD transform feedback4	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	Χ	X
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	X	V	V	V	V	X	Χ	Χ	Χ	X
AMD stencil operation extended	Χ	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	Χ	X
AMD_sparse_texture_pool	X	Χ	Χ	Χ	X	Χ	Χ	V	V	X	Χ	Χ	Χ	X
AMD sparse texture	Χ	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	Χ	X
AMD shader trinary minmax	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	V	X
AMD shader stencil value export	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	Χ	X	X
AMD shader stencil export	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	Χ	X
AMD seamless cubemap per texture	X	V	V	V	V	V	V	V	V	X	Χ	Χ	V	X
AMD sample positions	X	Χ	Χ	X	V	V	V	V	V	X	Χ	Χ	Χ	X

AMD query buffer object	X	X	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	X	
AMD pinned memory	X	X	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	X	
AMD performance monitor	X	X	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	V	X	
AMD occlusion query event	X	X	Χ	Χ	Χ	Χ	Χ	V	V	Χ	X	Χ	Χ	X	
AMD interleaved elements	X	X	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X	
AMD_gpu_shader_half_float	X	X	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	X	
AMD_gpu_shader_half_float2	X	X	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	X	
AMD gpu shader int64	X	X	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X	
AMD gcn shader	X	X	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X	
AMD_framebuffer_sample_positions	X	X	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X	
AMD blend minmax factor	X	X	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	Χ	X	
ATI texture mirror once	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
Support	41	% 47%	6 48%	68%	27%	29%	47%	49%	51%	99	% 18%	18%		12%	9%
OpenGL 4.5	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS	Χ
KHR context flush control	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	V	X	
KHR robust buffer access behavior	V	V	V	V	V	٧	V	V	V	Х	Χ	Χ	V	Х	
KHR robustness	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	Χ	X	
ARB ES3 1 compatibility	V	V	V	V	V	٧	V	V	V	Х	Χ	Χ	Χ	X	
ARB clip control	V	V	V	V	٧	٧	V	V	V	Χ	Χ	Χ	V	X	
ARB conditional render inverted	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	V	X	
ARB cull distance	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	Χ	X	
ARB derivative control	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	V	X	
ARB direct state access	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	V	X	
ARB get texture sub image	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	V	X	
ARB shader texture image samples	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X	
ARB texture barrier	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	V	X	
Support	100	% 1009	% 100 ₉	6 100%	100%	100%	100%	100%	100%	09	% 0%	0%		67%	0%
OpenGL 4.4	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS	Х
ARB buffer storage	V	V	V	V	V	V	V	V	V	V	V	V	V	Х	
ARB clear texture	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	

ARB enhanced layouts	V	V	V	V	V	V	V	V	V	Χ	V	٧	X	X	
ARB multi bind	V	٧	٧	٧	٧	V	٧	٧	V	Χ	V	V	V	X	
ARB query buffer object	V	٧	V	V	V	V	٧	٧	V	Χ	Х	Χ	Х	X	
ARB texture mirror clamp to edge	V	٧	V	V	V	V	٧	٧	V	Χ	٧	V	V	X	
ARB texture stencil8	V	٧	V	V	V	٧	٧	٧	V	Χ	V	٧	V	X	
ARB vertex type 10f 11f 11f rev	V	V	V	V	V	٧	V	V	V	Χ	V	٧	V	X	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	88%	88%		75%	0%
OpenGL 4.3	GF	GK	GM100	GM200	EG		S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS X	
ARB vertex attrib binding	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB texture view	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB texture storage multisample	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB texture query levels	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB texture buffer range	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB stencil texturing	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB shader storage buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	X	X	
ARB shader image size	V	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
ARB program interface query	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB multi draw indirect	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB_invalidate_subdata	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB internalformat query2	V	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
ARB framebuffer no attachments	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB fragment layer viewport	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB explicit uniform location	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB ES3 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
KHR debug	V	V	V	V	V	V	V	V	V	V	٧	V	V	X	
ARB copy image	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB compute shader	V	V	V	V	٧	V	V	٧	V	Χ	V	V	Х	X	
ARB clear buffer object	V	V	V	V	٧	V	V	V	V	Χ	V	V	V	X	
ARB arrays of arrays	V	٧	V	V	٧	V	٧	٧	V	V	٧	V	X	Χ	

100% 100% 100% 100% 100% 100% 62% 100% 100%

76%

0%

100% 100%

100%

Support

OpenGL 4.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS	Χ
ARB transform feedback instanced	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB texture compression bptc	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB shader image load store	V	V	V	V	V	V	V	V	V	Χ	V	V	Χ	X	
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB base instance	V	V	V	V	٧	٧	V	V	V	V	V	V	V	X	
Support	100%	100%	5 100%	100%	100%	100%	100%	100%	100%	92%	100%	100%		92%	17%
OpenGL 4.1	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS	X
ARB viewport array	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_vertex_attrib_64bit	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB vertex attrib 64bit ARB shader precision	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
	V V V				_							_			
ARB shader precision	V V V	V	V	V	V	V	V	V	V	٧	V	V	V	V	
ARB shader precision ARB separate shader objects	V V V V	V	V	V	V V	V V	V V	V	V V	V V	V V	V V	V V	V V	
ARB shader precision ARB separate shader objects ARB get program binary	V V V V 100%	V V V	V V V	V V V V	V V V V	V V V V	V V V	V V V	V V V	V V V V	V V V	V V V	V V V	V V X	83%
ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility	V V V V 100%	V V V	V V V	V V V V	V V V V	V V V V	V V V	V V V	V V V	V V V V	V V V	V V V	V V V	V V X V	83%
ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility	V V V V 100%	V V V	V V V	V V V V	V V V V	V V V V	V V V	V V V	V V V	V V V V	V V V	V V V	V V V	V V X V	
ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support		V V V V 5 100%	V V V V S 100%	V V V V	V V V V	V V V V	V V V V 100%	V V V V 100%	V V V V	V V V V	V V V V 100%	V V V V 100%	V V V	V V X V	
ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0	GF	V V V V S 100%	V V V V 5 100%	V V V V 5 100%	V V V V 100%	V V V V 100%	V V V V 100%	V V V V 5 100%	V V V 100%	V V V V 100%	V V V V 5 100%	V V V V 100%	V V V V	V V X V 100% MacOS	
ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3	GF	V V V V S 100%	V V V V S 100% GM100 V	V V V V 5 100% GM200 V	V V V V 100%	V V V V 100%	V V V V 100% S.I.	V V V V 100%	V V V 100% V.I.	V V V V 100%	V V V V 100% HSW V	V V V V 100%	V V V V Mesa V	V V X V 100% MacOS	
ARB shader precision ARB separate shader objects ARB get program binary ARB ES2 compatibility Support OpenGL 4.0 ARB transform feedback3 ARB transform feedback2	GF	V V V V S 100%	V V V V 3 100% GM100 V	V V V V 100% GM200 V	V V V V 100% EG V	V V V V 100% N.I. V	V V V V 100% S.I. V V	V V V V 5 100%	V V V 100% V.I. V	V V V V 100%	V V V V 100% HSW V	V V V V 100% BDW V	V V V V Mesa V	V V X V 100% MacOS V V	
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	GF	V V V V S 100%	V V V V V S 100% GM100 V V V V	V V V V T 100% GM200 V V V V	V V V V 100% EG V V	V V V V 100% N.I. V V	V V V V 100% S.I. V V V	V V V V V T 100% C.I. V V V V	V V V V 100% V.I. V V V	V V V V 100% IVB V V	V V V V 100% HSW V V	V V V V 100% BDW V V	V V V V Mesa V V	V V X V 100% MacOS V V V	
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	GF	V V V V S 100% GK V V V V V	V V V V V S 100% GM100 V V V V V V V	V V V V 100% GM200 V V V V V	V V V V 100% EG V V V	V V V V 100% N.I. V V V	V V V V 100% S.I. V V V V	V V V V V T T T T T T T T T T T T T T T	V V V 100% V.I. V V	V V V V 100% IVB V V V V V V	V V V V 100% HSW V V V	V V V V 100% BDW V V V	V V V V Mesa V V V	V V X V 100% MacOS V V V V	

ARB shader subroutine	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB sample shading	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB gpu shader5	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB gpu shader fp64	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw indirect	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw buffers blend	V	V	V	V	V	٧	٧	٧	٧	٧	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacO	S X
ARB vertex type 2 10 10 10 rev	V	٧	V	V	V	V	٧	٧	V	٧	٧	V	V	V	
ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB blend func extended	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
OpenGL 3.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacO	S X
ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_texture_multisample	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_sync	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw elements base vertex	٧	٧	V	V	٧	V	V	٧	V	٧	٧	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%

OpenGL hardware matrix

Extensions exposed by OpenGL implementations

Iune 2015. G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GK110 / Kepler 110: GeForce 780 GM200 / Maxwell: GeForce 900 series

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

N.I. / Northern Islands: Radeon HD 6900 series

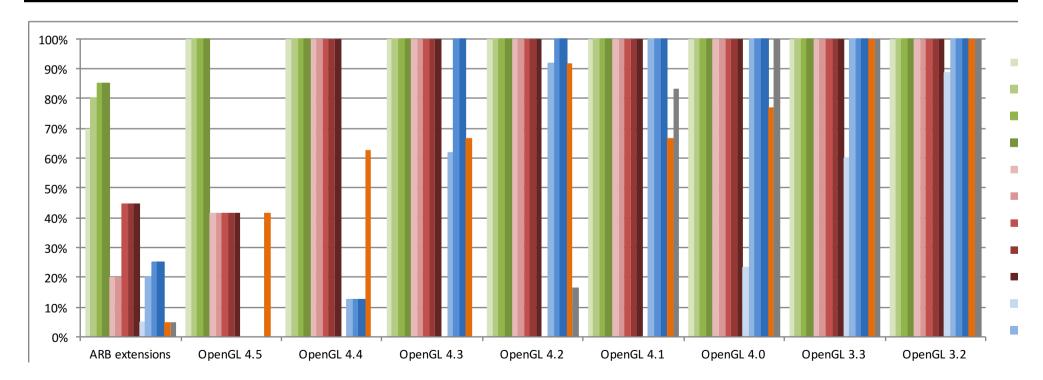
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 285 / 290 / Fury

SNB / Sandy Bridge: HD, HD 2000 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5X00 series, HD 4X00 series BSW / Broadwell: Iris 6X00 series, HD 5X00 series

Vendor		N	VIDIA				AMD					Intel		Mesa
Drivers version		3	47.09				14.12			4101	3958	3977	4124	git
Release date		18/	12/2014			12,	/09/20	14			26	/10/20	14	04/01/2015
Platforms	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa
ARB extensions	70%	80%	85%	85%	20%	20%	45%	45%	45%	5%	20%	25%	25%	5%
OpenGL 4.5	100%	100%	100%	100%	42%	42%	42%	42%	42%	0%	0%	0%	0%	42%
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	13%	13%	13%	63%
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	62%	100%	100%	67%
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	92%	100%	100%	92%
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	67%
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	23%	100%	100%	100%	77%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	60%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

OpenGL Extensions

EXT texture compression dxt1

Support added from previous report

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa
KHR blend equation advanced coherent	X	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
KHR blend equation advanced	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ
KHR texture compression astc ldr	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB transform feedback overflow query	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ
ARB robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ
ARB sparse texture	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB sparse buffer	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB shading language include	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shader stencil export	Χ	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB shader group vote	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB shader draw parameters	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X
ARB seamless cubemap per texture	X	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB robustness isolation	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB pipeline statistics query	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ
ARB debug output	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V
ARB indirect parameters	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ
ARB compute variable group size	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ
ARB cl event	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB bindless texture	Χ	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ
Support	72%	83%	83%	83%	22%	22%	50%	50%	50%	6%	22%	22%	22%	69

GM100 GM200 EG

GF

GK V N.I. S.I.

C.I.

Χ

V.I.

Χ

SNB

IVB

Χ

Χ

HSW BSW Mesa

٧

EXT texture compression s3tc	V	V	V	V	V	V	V	V	V	V	V	V	V	X
EXT texture sRGB decode	V	V	V	V	V	V	V	V	V	Х	V	V	V	V
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X
EXT texture filter minmax	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT shader integer mix	٧	V	V	V	V	V	V	V	V	Χ	V	V	V	V
EXT shader image load formatted	Χ	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT sparse texture2	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT raster multisample	Χ	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT post depth coverage	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT polygon offset clamp	V	V	V	V	V	V	V	V	V	X	Χ	V	V	X
EXT framebuffer multisample blit scaled	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V
EXT direct state access	V	V	V	V	V	V	V	V	V	X	Χ	V	V	X
EXT depth bounds test	V	V	V	V	X	Χ	V	V	V	X	Χ	Χ	Χ	X
EXT clip control	Χ	Χ	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X
NV viewport array2	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV vertex buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV uniform buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture multisample	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture barrier	٧	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X
NV shader thread shuffle	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader thread group	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer store	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer load	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic fp16 vector	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic float	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic int64	X	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample mask override coverage	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample locations	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering shared edge	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV multisample coverage	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV internalformat sample query	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X

NV geometry shader passthrough	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV framebuffer mixed samples	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fragment shader interlock	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fragment coverage to color	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV fill rectangle	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV explicit multisample	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X
NV depth buffer float	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X
NV copy image	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	X
NV conservative raster	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless texture	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect count	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV blend equation advanced	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
INTEL map texture	X	Χ	Χ	X	X	Χ	Χ	Χ	Χ	V	V	V	V	X
INTEL fragment shader ordering	X	Χ	Χ	X	Χ	Χ	V	V	V	Χ	Χ	V	V	X
INTEL conservative rasterization	X	Χ	Χ	X	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X
ANGLE texture compression dxt5	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V
ANGLE texture compression dxt3	X	Χ	Χ	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V
AMD vertex shader viewport index	Χ	Χ	Χ	X	V	V	V	V	V	Χ	Χ	V	V	X
AMD vertex shader layer	X	Χ	Χ	X	V	V	V	V	V	X	Χ	V	V	V
AMD transform feedback4	Χ	Χ	Χ	X	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X
AMD transform feedback3 lines triangles	X	Χ	Χ	X	X	V	V	V	V	X	Χ	Χ	Χ	X
AMD stencil operation extended	Χ	Χ	Χ	X	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X
AMD_sparse_texture_pool	X	Χ	Χ	X	X	Χ	Χ	V	V	X	Χ	Χ	Χ	X
AMD sparse texture	Χ	Χ	Χ	X	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X
AMD shader trinary minmax	X	Χ	Χ	X	X	Χ	V	V	V	X	Χ	Χ	Χ	V
AMD shader stencil value export	Χ	Χ	Χ	X	X	Χ	V	V	V	Χ	Χ	Χ	Χ	X
AMD shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	Χ	X
AMD seamless cubemap per texture	Χ	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V
AMD sample positions	X	Χ	Χ	X	V	V	V	V	V	X	Χ	Χ	Χ	X
AMD query buffer object	Χ	Χ	Χ	X	V	V	V	V	V	Χ	Χ	Χ	Χ	X
AMD pinned memory	X	Χ	Χ	X	V	V	V	V	V	X	Χ	Χ	Χ	X

AMD performance monitor	X	Χ	Χ	Χ	V	٧	V	V	V	Χ	Χ	Χ	Χ	٧	
AMD occlusion query event	Χ	Χ	Х	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Х	
AMD interleaved elements	X	Χ	Χ	Х	Χ	Χ	V	٧	V	Χ	Χ	Χ	Χ	Χ	
AMD gpu shader int64	X	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	Χ	
AMD gcn shader	X	Χ	Χ	Χ	Χ	Χ	٧	٧	V	Χ	Χ	Χ	Χ	Χ	
AMD_framebuffer_sample_positions	X	Χ	Χ	Χ	X	Χ	V	٧	٧	Χ	Χ	Χ	Χ	Χ	
AMD blend minmax factor	X	Χ	Χ	Χ	Χ	V	V	٧	٧	Χ	Χ	Χ	Χ	Χ	
ATI texture mirror once	V	V	V	V	V	٧	٧	٧	٧	Χ	Χ	Χ	Χ	Χ	
Support	43%	49%	6 50%	69%	25%	27%	45%	47%	47%	3%	9%	17%	17%		12%
OpenGL 4.5	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	
KHR context flush control	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
KHR robust buffer access behavior	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	
KHR robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Х	
ARB ES3 1 compatibility	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB clip control	V	V	V	V	V	٧	٧	٧	٧	Χ	Χ	Χ	Χ	V	
ARB conditional render inverted	V	V	V	V	V	V	V	٧	V	Χ	Χ	Χ	Χ	V	
ARB cull distance	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB derivative control	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
ARB direct state access	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB get texture sub image	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB shader texture image samples	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB texture barrier	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	V	
Support	100%	1009	% 100%	100%	42%	42%	42%	42%	42%	0%	0%	0%	0%		42%
OpenGL 4.4	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	
ARB buffer storage	V	V	V	V	V	٧	V	٧	V	Χ	V	V	٧	V	
ARB clear texture	V	V	V	V	V	٧	٧	٧	V	Χ	Χ	Χ	Χ	V	
ARB enhanced layouts	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB multi bind	V	V	V	V	V	٧	V	٧	٧	Χ	Χ	Χ	Χ	V	
ARB query buffer object	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB texture mirror clamp to edge	V	V	V	V	V	V	V	V	V	Х	Χ	Χ	Х	V	

ARB texture stencil8	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	
ARB vertex type 10f 11f 11f rev	V	V	V	V	V	V	V	V	V	X	X	X	X	V	
Support	100%	100%	100%		100%	100%	100%	100%		* *		13%			63%
OpenGL 4.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	
ARB vertex attrib binding	V	٧	V	V	٧	٧	٧	٧	٧	Χ	٧	٧	٧	V	
ARB texture view	V	V	V	V	V	V	٧	٧	٧	Χ	Χ	V	٧	V	
ARB texture storage multisample	V	V	V	V	V	V	٧	٧	٧	Χ	V	٧	٧	V	
ARB texture query levels	V	V	V	V	V	٧	٧	٧	٧	Χ	Χ	V	٧	V	
ARB texture buffer range	V	V	V	V	V	V	V	٧	V	Χ	V	٧	V	V	
ARB stencil texturing	V	V	V	V	V	V	V	٧	٧	Χ	٧	٧	V	V	
ARB shader storage buffer object	V	V	V	V	V	٧	٧	٧	٧	Χ	Χ	V	٧	Χ	
ARB shader image size	V	V	V	V	V	V	V	٧	٧	Χ	V	٧	V	Χ	
ARB program interface query	V	V	V	V	V	V	V	٧	V	Χ	V	٧	V	Χ	
ARB multi draw indirect	V	V	V	V	V	V	V	٧	٧	Χ	٧	٧	V	V	
ARB invalidate subdata	V	V	V	V	V	V	V	٧	V	Χ	Χ	V	V	V	
ARB internalformat query2	V	V	V	V	V	V	V	٧	٧	Χ	V	٧	V	Χ	
ARB framebuffer no attachments	V	V	V	V	V	V	V	٧	V	Χ	V	V	V	Χ	
ARB fragment layer viewport	V	V	V	V	V	V	٧	٧	٧	Χ	Χ	V	٧	V	
ARB explicit uniform location	V	V	V	V	V	V	٧	٧	٧	Χ	Χ	V	٧	V	
ARB ES3 compatibility	V	V	V	V	V	V	٧	٧	٧	Χ	٧	٧	٧	V	
KHR debug	V	V	V	V	V	V	٧	٧	٧	Χ	V	٧	٧	V	
ARB copy image	V	V	V	V	V	V	٧	٧	٧	Χ	٧	٧	٧	V	
ARB compute shader	V	V	V	V	V	V	٧	٧	٧	Χ	Χ	V	٧	Χ	
ARB clear buffer object	V	V	V	V	V	V	٧	٧	٧	Χ	Χ	V	٧	V	
ARB arrays of arrays	V	V	V	V	V	٧	٧	٧	٧	Χ	V	٧	٧	Χ	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	62%	100%	100%		67%
OpenGL 4.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	
ARB transform feedback instanced	V	V	V	V	٧	٧	V	٧	V	Χ	V	V	V	V	
ARB texture compression bptc	V	V	V	V	٧	V	V	V	V	Χ	V	V	V	V	
ARB texture storage	V	V	V	V	٧	V	V	٧	V	Χ	V	V	V	V	

ARB shading language packing	V	٧	V	V	٧	V	٧	V	V	Χ	٧	V	V	V	
ARB shading language 420pack	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB shader image load store	V	V	V	V	V	V	V	V	V	Χ	Χ	V	V	Χ	
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB map buffer alignment	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB internalformat query	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB conservative depth	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB base instance	V	V	V	V	V	V	V	V	V	X	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	92%	100%	100%	929	6
OpenGL 4.1	GF	GK			EG					SNB	IVB	HSW	BSW	Mesa	
ARB viewport array	V	V	V	V	V	V	V	V	V		V	V	V	V	
ARB vertex attrib 64bit	V	V	V	V	V	V	V	V	V	X	V	V	V	Χ	
ARB shader precision	V	V	V	V	V	V	V	V	V	X	V	V	V	Χ	
ARB separate shader objects	V	V	V	V	V	V	V	V	V	X	V	V	V	V	
ARB get program binary	V	V	V	V	V	V	V	V	V	X	V	V	V	V	
ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	679	6
OpenGL 4.0	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	
ARB transform feedback3	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB_transform_feedback2	V	V	V	V	V	V	V	V	V	X	V	V	V	V	
ARB texture query lod	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture gather	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB texture cube map array	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB texture buffer object rgb32	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_tessellation_shader	V	V	V	V	V	V	V	V	V	X	V	V	V	Χ	
ARB shader subroutine	V	V	V	V	V	V	V	V	V	Χ	V	V	V	Χ	
ARB sample shading	V	V	V	V	V	V	V	V	V	X	V	V	V	V	
ARB gpu shader5	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB gpu shader fp64	V	V	V	V	V	V	V	V	V	X	V	V	V	Χ	

ARB draw indirect	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB draw buffers blend	V	V	V	V	V	V	V	V	٧	V	٧	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	23%	100%	100%	100%		77%
OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	
ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_timer_query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture swizzle	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB sampler objects	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_instanced_arrays	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB blend func extended	V	V	V	V	V	٧	V	V	V	Χ	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	60%	100%	100%	100%		100%
OpenGL 3.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	SNB	IVB	HSW	BSW	Mesa	
ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture multisample	V	V	V	V	V	V	V	V	V	Χ	V	V	V	V	
ARB_sync	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_depth_clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw elements base vertex	V	V	V	V	V	٧	V	V	V	V	٧	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%	100%	100%	100%		100%

Apple

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17/11/2014

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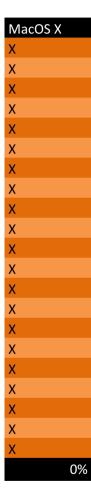
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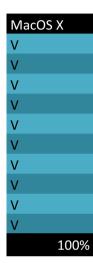


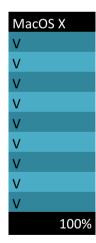
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OpenGL hardware matrix

Extensions exposed by OpenGL implementations

January 2015, G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GK110 / Kepler 110: GeForce 780 GM200 / Maxwell: GeForce 900 series

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

N.I. / Northern Islands: Radeon HD 6900 series

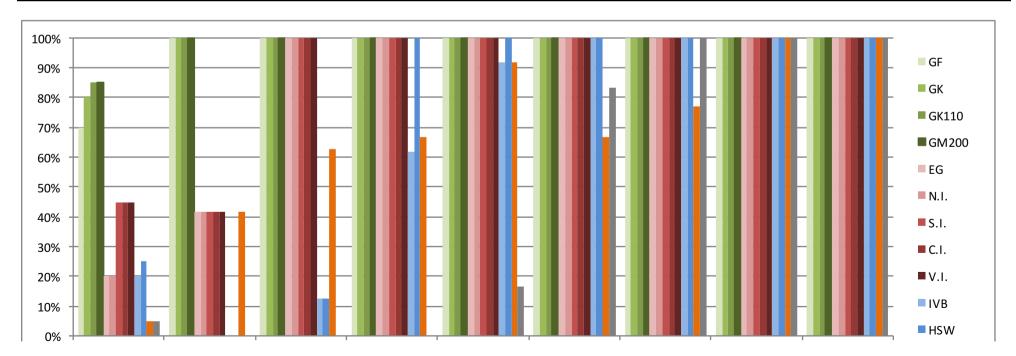
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280

C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 290 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5000 series, HD 4X00 series

Vendor		Ν	IVIDIA		AMD					Int	tel	Mesa	Apple	
Drivers version		3	47.09				14.12			3958	3977	git	10.10.1	
Release date		18/	12/2014			12,	/09/202	14		26/10	/2014	04/01/2015	17/11/2014	
Platforms	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X	
ARB extensions	70%	80%	85%	85%	20%	20%	45%	45%	45%	20%	25%	5%	5%	
OpenGL 4.5	100%	100%	100%	100%	42%	42%	42%	42%	42%	0%	0%	42%	0%	
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	13%	63%	0%	
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	67%	0%	
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	92%	17%	
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	67%	83%	
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	77%	100%	
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	



ARB extensions OpenGL 4.5 OpenGL 4.4 OpenGL 4.3 OpenGL 4.2 OpenGL 4.1 OpenGL 4.0 OpenGL 3.3 OpenGL 3.2

Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS	Χ
KHR blend equation advanced coherent	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
KHR blend equation advanced	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	X	
KHR texture compression astc ldr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB transform feedback overflow query	V	V	V	V	Χ	X	Χ	Χ	Χ	V	V	Χ	Χ	
ARB_robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	V	V	Х	Χ	
ARB sparse texture	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB sparse buffer	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	
ARB shading language include	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	
ARB shader stencil export	X	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	
ARB shader group vote	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	
ARB shader draw parameters	V	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	
ARB seamless cubemap per texture	X	V	V	V	V	V	V	V	V	Χ	Χ	Χ	X	
ARB_robustness_isolation	V	V	V	V	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB pipeline statistics query	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Х	
ARB debug output	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB_indirect_parameters	V	V	V	V	Χ	X	V	V	V	Χ	Χ	X	X	
ARB compute variable group size	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
ARB_compatibility	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
<u>ARB_cl_event</u>	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
<u>ARB bindless texture</u>	X	V	V	V	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	
Support	72%	839	6 83%	83%	22%	22%	50%	50%	50%	22%	22%		6%	
OpenGL Extensions	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS	Χ

EXT texture compression dxt1	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V
EXT texture compression s3tc	V	V	V	V	V	V	V	V	V	V	V	Χ	V
EXT texture sRGB decode	V	V	V	V	V	V	V	V	V	V	V	V	V
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	X	Χ	Χ	V
EXT texture filter minmax	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT shader integer mix	V	V	V	V	V	V	V	V	V	V	V	V	X
EXT shader image load formatted	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT sparse texture2	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT raster multisample	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT post depth coverage	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT polygon offset clamp	V	V	V	V	V	V	V	V	V	X	V	X	X
EXT framebuffer multisample blit scaled	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V
EXT direct state access	V	V	V	V	V	V	V	V	V	X	V	X	X
EXT depth bounds test	V	V	V	V	X	Χ	V	V	V	Χ	Χ	Χ	V
EXT clip control	Χ	Χ	Χ	Х	X	Χ	Χ	Χ	Χ	V	V	Χ	X
NV viewport array2	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV vertex buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV uniform buffer unified memory	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture multisample	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture barrier	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	V
NV shader thread shuffle	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader thread group	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer store	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader buffer load	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic fp16 vector	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic float	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic int64	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample mask override coverage	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample locations	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering shared edge	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV multisample coverage	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X

NV internalformat sample query	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV geometry shader passthrough	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV framebuffer mixed samples	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV fragment shader interlock	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV fragment coverage to color	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV fill rectangle	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV explicit multisample	V	V	V	V	V	V	V	V	V	X	Χ	X	X
NV depth buffer float	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	X
NV copy image	V	V	V	V	V	V	V	V	V	X	Χ	X	X
NV conservative raster	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV bindless texture	Χ	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV bindless multi draw indirect count	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV bindless multi draw indirect	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV blend equation advanced	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Х	X
INTEL map texture	Χ	Χ	Χ	X	X	Χ	Χ	Χ	Χ	Χ	V	X	X
INTEL fragment shader ordering	Χ	Χ	Χ	X	X	Χ	V	V	V	V	V	X	X
INTEL conservative rasterization	Χ	Χ	Χ	X	X	Χ	Χ	Χ	Χ	Χ	V	X	X
ANGLE texture compression dxt5	Χ	Χ	Χ	X	X	Χ	Χ	Χ	Χ	Χ	Χ	V	X
ANGLE texture compression dxt3	Χ	Χ	Χ	X	X	Χ	Χ	Χ	Χ	Χ	Χ	V	X
AMD vertex shader viewport index	Χ	Χ	Χ	Х	V	V	V	V	V	Χ	V	X	X
AMD vertex shader layer	Χ	Χ	Χ	X	V	V	V	V	V	X	V	V	X
AMD transform feedback4	Χ	Χ	Χ	Х	X	Χ	V	V	V	Χ	Χ	X	X
AMD transform feedback3 lines triangles	Χ	Χ	Χ	X	X	V	V	V	V	X	Χ	X	X
AMD stencil operation extended	Χ	Χ	Χ	Χ	Х	Χ	V	V	V	Х	Χ	Χ	X
AMD_sparse_texture_pool	X	Χ	Χ	Χ	X	Χ	X	V	V	X	Χ	X	X
AMD sparse texture	Χ	Χ	Χ	X	X	Χ	V	V	V	Х	Χ	Х	Х
AMD shader trinary minmax	X	Χ	Χ	Χ	X	Χ	V	V	V	X	Χ	V	X
AMD shader stencil value export	Χ	Χ	Χ	X	Х	Χ	V	V	V	Х	Χ	X	X
AMD shader stencil export	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	X
AMD seamless cubemap per texture	Χ	V	V	V	V	V	V	V	V	Х	Χ	V	X
AMD sample positions	X	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	X
AMD query buffer object	Χ	Χ	Χ	X	V	V	V	V	V	X	Χ	Χ	X

AMD pinned memory	Χ	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	X
AMD performance monitor	Χ	Χ	Χ	Χ	V	٧	V	V	V	Χ	Χ	V	X
AMD occlusion query event	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ	X
AMD interleaved elements	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	X
AMD gpu shader int64	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	X
AMD gcn shader	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	X
AMD_framebuffer_sample_positions	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	X
AMD blend minmax factor	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	X
ATI texture mirror once	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	V
Support	43%	49%	50%	69%	25%	27%	45%	47%	47%	10%	17%	129	% 10%
OpenGL 4.5	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
KHR context flush control	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
KHR robust buffer access behavior	٧	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
KHR robustness	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB ES3 1 compatibility	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_clip_control	V	V	V	V	V	٧	V	V	V	Χ	Χ	V	X
ARB conditional render inverted	V	V	V	V	V	٧	V	V	V	Χ	Χ	V	X
ARB_cull_distance	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_derivative_control	V	V	V	V	V	٧	V	V	V	Χ	Χ	V	X
ARB_direct_state_access	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB get texture sub image	V	V	V	V	V	٧	V	V	V	Χ	Χ	Χ	X
ARB shader texture image samples	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB texture barrier	V	٧	V	V	V	٧	V	V	V	Χ	Χ	V	X
Support	100%	100%	100%	100%	42%	42%	42%	42%	42%	0%	0%	42%	% 0%
OpenGL 4.4	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB_buffer_storage	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB_clear_texture	V	V	V	V	V	V	V	V	V	Χ	Χ	V	X
ARB enhanced layouts	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	X
ARB multi_bind	V	V	V	V	V	V	V	V	V	Χ	Χ	V	X
ARB guery buffer object	\ /	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ

ARB texture mirror clamp to edge	V	V	V	V	V	V	V	V	V	Χ	Χ	V	X
ARB texture stencil8	V	٧	V	V	٧	٧	٧	V	V	Χ	Χ	X	X
ARB vertex type 10f 11f 11f rev	V	٧	V	V	V	V	V	V	٧	Χ	Χ	V	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	13%	13%	63%	0%
OpenGL 4.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB vertex attrib binding	V	٧	V	V	٧	٧	٧	٧	V	٧	V	V	Χ
ARB texture view	V	V	V	V	V	٧	٧	V	٧	Χ	V	V	X
ARB texture storage multisample	V	V	V	V	٧	V	V	V	٧	V	V	V	X
ARB texture query levels	V	V	V	V	V	٧	٧	V	٧	Χ	V	V	X
ARB texture buffer range	V	V	V	V	٧	V	V	V	٧	٧	٧	V	X
ARB stencil texturing	V	V	V	V	٧	V	V	V	٧	٧	V	V	X
ARB shader storage buffer object	V	V	V	V	٧	V	V	V	٧	Χ	V	X	X
ARB shader image size	V	V	V	V	٧	V	٧	٧	٧	٧	٧	X	X
ARB program interface query	V	٧	V	V	V	٧	٧	V	٧	٧	٧	X	X
ARB multi draw indirect	V	V	V	V	٧	V	٧	٧	٧	٧	٧	V	X
ARB invalidate subdata	V	V	V	V	٧	V	٧	٧	٧	Χ	V	V	X
ARB internalformat query2	V	V	V	V	V	V	V	V	٧	V	V	X	X
ARB framebuffer no attachments	V	V	V	V	٧	٧	٧	٧	٧	٧	V	Χ	X
ARB fragment layer viewport	V	V	V	V	٧	V	٧	٧	٧	Χ	V	V	X
ARB explicit uniform location	V	V	V	V	٧	V	٧	٧	٧	Χ	V	V	X
ARB ES3 compatibility	V	V	V	V	٧	V	٧	٧	٧	٧	٧	V	X
KHR debug	V	V	V	V	٧	V	٧	٧	٧	٧	٧	V	X
ARB copy image	V	V	V	V	٧	V	٧	٧	٧	٧	٧	V	X
ARB compute shader	V	V	V	V	٧	V	٧	٧	٧	Χ	V	Χ	X
ARB clear buffer object	V	V	V	V	٧	V	٧	٧	٧	Χ	V	V	X
ARB arrays of arrays	V	٧	V	V	٧	٧	٧	٧	٧	٧	٧	Χ	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	67%	0%
OpenGL 4.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB transform feedback instanced	V	٧	V	V	٧	٧	٧	٧	٧	٧	٧	V	Χ
ARB texture compression bptc	V	V	V	V	V	V	٧	٧	V	V	V	V	X

ARB texture storage	V	V	V	V	٧	٧	V	V	V	V	V	V	V
ARB shading language packing	V	V	V	V	V	٧	٧	V	V	٧	V	V	X
ARB shading language 420pack	V	V	V	V	٧	٧	V	V	V	V	V	V	X
ARB shader image load store	V	V	V	V	V	V	V	V	V	Χ	V	Χ	X
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB base instance	V	V	V	V	٧	٧	V	V	V	V	V	V	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	929	% 17%
OpenGL 4.1	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB viewport array	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB vertex attrib 64bit	V	V	V	V	V	V	V	V	V	V	V	Χ	V
ARB shader precision	V	V	V	V	V	V	V	V	V	V	V	Χ	V
ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB ES2 compatibility	V	V	V	V	V	٧	٧	V	V	٧	٧	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	679	% 83%
OpenGL 4.0	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB_transform_feedback3	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB_transform_feedback2	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture query lod	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture gather	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture cube map array	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture buffer object rgb32	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB tessellation shader	V	V	V	V	V	V	V	V	V	V	V	X	V
ARB shader subroutine	V	V	V	V	V	V	V	V	V	V	V	X	V
ARB sample shading	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB gpu_shader5	V	V	V	V	V	V	V	V	V	V	V	V	V

ARB gpu shader fp64	V	V	V	V	٧	V	V	V	V	V	V	X	V	
ARB draw indirect	V	V	V	V	V	٧	٧	٧	V	V	V	V	V	
ARB draw buffers blend	V	V	V	V	٧	٧	٧	٧	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		77%	100%
OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	Ma	acOS X
ARB vertex type 2 10 10 10 rev	V	V	V	V	٧	V	٧	٧	V	V	V	V	V	
ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB blend func extended	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
OpenGL 3.2	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	Ma	acOS X
ARB vertex array bgra	V	V	V	V	٧	V	V	٧	V	V	V	V	V	
ARB texture multisample	V	V	V	V	٧	V	V	V	V	V	V	V	V	
ARB sync	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB_depth_clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB draw elements base vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%

OpenGL hardware matrix

Extensions exposed by OpenGL implementations

July 2014, G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GM / Maxwell: GeForce 750

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

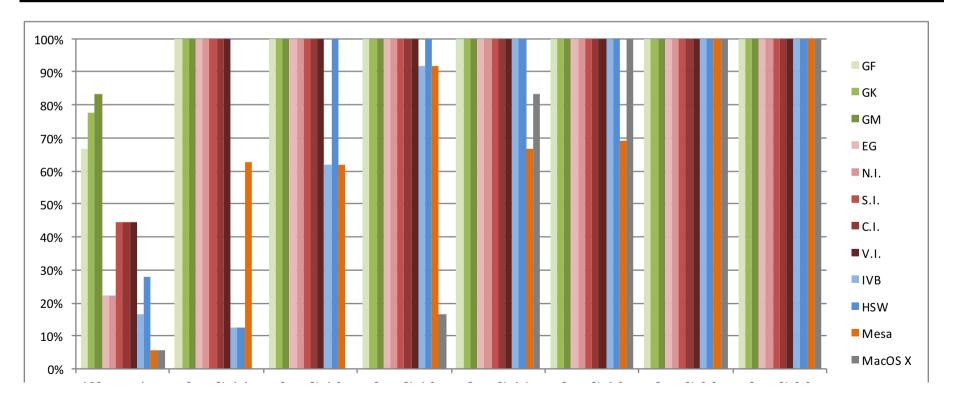
N.I. / Northern Islands: Radeon HD 6900 series

S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 290 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5000 series, HD 4X00 series

Vendor		NVIDIA				AMD			ln ⁻	tel	Mesa	Apple
Drivers version		340.43				14.7 rc1	l		3621	3652	git	10.9.4
Release date	1	7/06/20	14		09	/07/20	14		24/06	/2014	25/07/2014	30/06/2014
Platforms	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB extensions	67%	78%	83%	22%	22%	44%	44%	44%	17%	28%	6%	6%
OpenGL 4.4	100%	100%	100%	100%	100%	100%	100%	100%	13%	13%	63%	0%
OpenGL 4.3	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	62%	0%
OpenGL 4.2	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	92%	17%
OpenGL 4.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	67%	83%
OpenGL 4.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	69%	100%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



ARB extensions OpenGL 4.4 OpenGL 4.3 OpenGL 4.2 OpenGL 4.1 OpenGL 4.0 OpenGL 3.3 OpenGL 3.2

Nomenclature:

Supported

Not supported

Support added from previous report

EXT texture compression s3tc

EXT texture sRGB decode

GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X	
Χ	Χ	V	X	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	
V	V	V	X	Χ	Χ	Χ	Χ	Χ	V	Χ	X	
Χ	X	X	X	Χ	X	X	Χ	Χ	Χ	Χ	X	
V	٧	٧	X	Χ	Χ	Χ	Χ	V	٧	Χ	X	
V	٧	٧	Х	Χ	V	٧	٧	Χ	Χ	Χ	X	
V	V	٧	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	
Χ	Χ	Χ	V	V	V	V	٧	Χ	Χ	Χ	Χ	
V	٧	٧	X	Χ	V	٧	٧	Χ	Χ	Χ	X	
V	V	٧	Χ	Χ	V	٧	V	Χ	Χ	Χ	Χ	
Χ	V	٧	V	٧	٧	٧	٧	Χ	Χ	Χ	X	
V	٧	٧	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
V	٧	٧	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	Χ	
V	٧	٧	V	V	٧	V	V	V	٧	V	Χ	
V	٧	٧	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
V	٧	٧	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	
V	٧	٧	V	٧	٧	٧	٧	V	٧	Χ	X	
Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
Χ	V	٧	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	
69%	81%	81%	25%	25%	50%	50%	50%	19%	25%	6	% 6	6%
GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X	
V	V	V	Χ	Х	Х	Х	Х	Х		V		
	X V X V V V X V V V V V V V V V V V V	X X X V V V V V V V V V V V V V V V V V	X X V V V X X X X X V V V V V V V V V V	X	X	X X	X	X	X	X	X X	X

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EXT texture mirror clamp	V	V	V	V	V	V	V	V	X	Χ	Χ	V
EXT shader integer mix	V	V	V	V	V	V	V	V	V	V	V	X
EXT shader image load formatted	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT framebuffer multisample blit scaled	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V
EXT direct state access	V	V	V	V	V	V	V	V	X	V	X	Χ
EXT depth bounds test	V	V	V	X	Χ	V	V	V	X	Χ	X	V
EXT clip control	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	Χ
NV vertex buffer unified memory	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV texture multisample	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV texture barrier	V	V	V	V	V	V	V	V	X	Χ	Χ	V
NV shader thread shuffle	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader thread group	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader buffer store	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader buffer load	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader atomic float	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader atomic int64	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV multisample coverage	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV explicit multisample	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ
NV depth buffer float	V	V	V	V	V	V	V	V	X	Χ	Χ	X
NV copy image	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ
NV bindless texture	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect count	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV bindless multi draw indirect	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV blend equation advanced	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
INTEL map texture	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
INTEL fragment shader ordering	Χ	Χ	Χ	Χ	Χ	V	V	V	V	V	X	X
INTEL conservative rasterization	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
ANGLE texture compression dxt5	Χ	Χ	Χ	Χ	Χ	Х	Χ	Χ	Χ	Χ	V	X
ANGLE texture compression dxt3	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
AMD vertex shader viewport index	Χ	Χ	Χ	V	V	V	V	V	X	V	X	X
AMD vertex shader layer	X	Χ	Χ	V	V	V	V	V	X	V	V	X
AMD transform feedback4	X	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	X

AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	V	V	V	٧	Χ	Χ	X	X
AMD stencil operation extended	X	Χ	Χ	Χ	Χ	V	٧	٧	Χ	Χ	X	X
AMD sparse texture pool	X	Χ	Χ	Χ	Χ	Χ	V	٧	Χ	Χ	X	Χ
AMD sparse texture	X	Χ	Χ	Χ	Χ	V	٧	٧	Χ	Χ	X	X
AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	V	٧	٧	Χ	Χ	V	X
AMD shader stencil value export	X	Χ	Χ	Χ	Χ	V	٧	٧	Χ	Χ	X	X
AMD shader stencil export	X	Χ	Χ	V	V	٧	٧	٧	Χ	Χ	X	Χ
AMD seamless cubemap per texture	X	٧	٧	٧	V	٧	٧	٧	Χ	Χ	V	Х
AMD sample positions	X	Χ	Χ	V	٧	V	٧	٧	Χ	Χ	Χ	X
AMD query buffer object	X	Χ	Χ	V	V	V	٧	٧	Χ	Χ	X	X
AMD pinned memory	X	Χ	Χ	V	V	V	V	٧	Χ	Χ	X	X
AMD performance monitor	X	Χ	Χ	V	V	٧	V	٧	Χ	Χ	V	X
AMD occlusion query event	X	Χ	Χ	Χ	Χ	Χ	V	٧	Χ	Χ	X	X
AMD interleaved elements	X	Χ	Χ	Χ	Χ	V	V	٧	Χ	Χ	X	X
AMD gpu shader int64	X	Χ	Χ	Χ	Χ	V	٧	٧	Χ	Χ	X	Χ
AMD gcn shader	X	Χ	Χ	Χ	Χ	V	٧	٧	Χ	Χ	X	X
AMD framebuffer sample positions	X	Χ	Χ	Χ	Χ	V	٧	٧	Χ	Χ	X	Χ
AMD blend minmax factor	X	Χ	Χ	Χ	V	V	٧	٧	Χ	Χ	Χ	X
ATI texture mirror once	V	V	V	V	V	V	٧	٧	Χ	Χ	Χ	V
Support	49%	56%	59%	31%	34%	56%	59%	59%	11%	20%	16%	13%

OpenGL 4.4	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB buffer storage	V	٧	٧	V	V	٧	V	V	V	V	V	X
ARB clear texture	V	٧	٧	V	٧	٧	V	V	Χ	Χ	V	X
ARB enhanced layouts	V	٧	V	V	V	٧	V	V	Χ	Χ	X	X
ARB multi bind	V	٧	٧	V	٧	٧	V	V	Χ	Χ	V	X
ARB query buffer object	V	٧	V	V	V	٧	V	V	Χ	Χ	X	X
ARB texture mirror clamp to edge	V	٧	٧	V	٧	٧	V	V	Χ	Χ	V	X
ARB texture stencil8	V	٧	V	V	V	٧	V	V	Χ	Χ	X	X
ARB vertex type 10f 11f 11f rev	V	٧	٧	V	٧	٧	٧	V	Χ	Χ	V	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	13%	13%	63%	0%

OpenGL 4.3	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB vertex attrib binding	V	V	V	V	V	V	V	V	V	V	V	Х
ARB texture view	V	V	V	V	V	V	V	V	Χ	V	V	X
ARB texture storage multisample	V	V	V	V	V	V	V	V	V	V	V	Х
ARB texture query levels	V	V	V	V	V	V	V	V	Χ	V	V	X
ARB texture buffer range	V	V	V	V	V	V	V	V	V	V	V	Х
ARB stencil texturing	V	V	V	V	V	V	V	V	V	V	V	Χ
ARB shader storage buffer object	V	V	V	V	V	V	V	V	Χ	V	X	Χ
ARB shader image size	V	V	V	V	V	V	V	V	V	V	Χ	Χ
ARB program interface query	V	V	V	V	V	٧	V	V	V	V	X	X
ARB multi draw indirect	V	V	V	V	V	V	V	V	V	V	V	X
ARB invalidate subdata	V	V	V	V	V	٧	V	V	Χ	V	V	X
ARB internalformat query2	V	٧	V	V	V	٧	V	V	V	V	X	Χ
ARB framebuffer no attachments	V	V	V	V	V	٧	V	V	V	V	X	X
ARB fragment layer viewport	V	V	V	V	V	V	V	V	Χ	V	V	X
ARB explicit uniform location	V	V	V	V	V	V	V	V	Χ	V	V	X
ARB ES3 compatibility	V	٧	V	V	V	٧	V	V	V	V	V	X
KHR debug	V	V	V	V	V	٧	V	V	V	V	V	X
ARB copy image	V	٧	V	V	V	٧	V	٧	V	V	X	Χ
ARB compute shader	V	V	V	V	V	٧	V	V	Χ	V	X	X
ARB clear buffer object	V	٧	V	V	V	٧	V	٧	Χ	V	V	X
ARB arrays of arrays	V	V	V	V	V	V	V	V	V	V	Χ	Χ
Support	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	62%	0%

OpenGL 4.2	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB transform feedback instanced	V	V	V	V	V	V	V	V	V	V	V	Х
ARB texture compression bptc	V	V	V	V	V	V	V	V	V	V	V	X
ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V
ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	Х
ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	Х
ARB shader image load store	V	V	V	V	V	V	V	V	Χ	V	X	Χ
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	V	V	X

ARB map buffer alignment	V	٧	V	V	V	٧	V	V	٧	٧	٧	X	
ARB internalformat query	V	V	V	V	V	V	٧	V	٧	V	V	V	
ARB conservative depth	V	V	V	V	٧	٧	V	V	٧	٧	V	X	
ARB compressed texture pixel storage	V	V	V	٧	٧	V	٧	V	٧	٧	V	X	
ARB base instance	V	V	V	٧	٧	V	٧	٧	٧	٧	V	X	
Support	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%		92%	17%
•													
OpenGL 4.1	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	Ν	/lacOS X
ARB viewport array	V	V	V	V	V	V	V	V	V	V	V	V	
ARB vertex attrib 64bit	V	V	V	V	V	V	V	V	V	V	Χ	V	
ARB shader precision	V	V	V	V	V	V	V	V	V	V	Χ	V	
ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	V	•
ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	X	
ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		67%	83%
OpenGL 4.0	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	Ν	/lacOS X
ARB transform feedback3	V	V	V	V	V	V	V	V	V	V	V	V	
ARB transform feedback2	V	V	V	V	V	V	V	V	V	V	V	V	
ARB texture query lod	V	V	V	V	V	V	V	V	V	V			
ARB texture gather			V	V	V		V	V	V	V	V	V	
AND texture gather	V	٧	V	V	V	V	V	V	V	V	V	V	
ARB texture cube map array	V	V	_										,
		V	V	V	V	V	V	V	V	٧	V	V	,
ARB texture cube map array	V	V	V V	V V	V V	V V	V V	V V	V V	V V	V	V	, ,
ARB texture cube map array ARB texture buffer object rgb32	V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V	
ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader	V V	V V V	V V V V	V V V V	V V V	V V V	V V V V	V V V	V V V V	V V V V	V V V X	V V V	
ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine	V V V	V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V X X	V V V	
ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB sample shading	V V V V	V V V V	V V V V V	V V V V V	V V V V V	V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V X X V	V V V V	
ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB sample shading ARB gpu shader5	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V X X V X	V V V V V	
ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB sample shading ARB gpu shader5 ARB gpu shader fp64	V V V V V V V V	V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V X X V X X X X	V V V V V	

OpenGL 3.3	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB vertex type 2 10 10 10 rev	V	٧	٧	V	٧	٧	٧	V	٧	٧	٧	V
ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V
ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V
ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V
ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V
ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V
ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V
ARB blend func extended	٧	V	٧	V	V	V	٧	٧	V	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1009	% 100%

OpenGL 3.2	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V
ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V
ARB sync	V	٧	٧	٧	٧	V	V	٧	V	V	V	V
ARB seamless cube map	V	V	V	V	V	V	V	٧	V	V	V	V
ARB provoking vertex	V	V	V	٧	V	V	V	٧	V	V	V	V
ARB geometry shader4	V	V	V	٧	V	V	V	V	V	V	V	V
ARB fragment coord conventions	V	V	V	٧	٧	V	V	٧	V	V	V	V
ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V
ARB draw elements base vertex	V	٧	٧	٧	٧	V	V	٧	٧	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1009	% 100%

OpenGL hardware matrix

Extensions exposed by OpenGL implementations

May 2014, G-Truc Creation

GF / Fermi: GeForce 400 series, GeForce 500 series GK / Kepler: GeForce 600 series, GeForce 700 series

GM / Maxwell: GeForce 750

EG / Evergreen: Radeon HD 5000 series, Radeon HD 6000 series

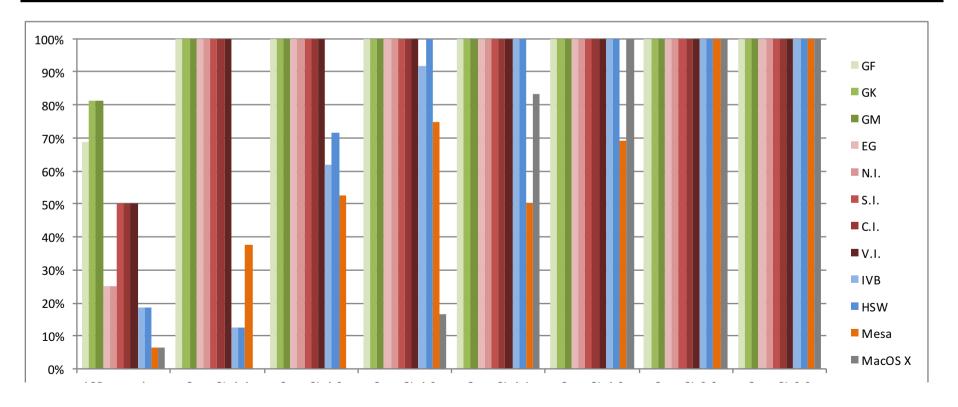
N.I. / Northern Islands: Radeon HD 6900 series

S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

V.I. / Volcanic Islands: Radeon R9 290 IVB / Ivy Bridge: HD4000, HD2500

HSW / Haswell: Iris 5000 series, HD 4X00 series

Vendor	NVIDIA	4		AMD			Int	tel	Mesa	Apple
Drivers version	337.61 b	eta	•	14.4 rc			35	74	10.3 git	10.9.2
Release date	17/04/20)14	15	5/04/202	14		30/04	/2014	18/04/2014	25/02/2014
Platforms	GF GK	GM EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB extensions	69% 81%	81%	25% 25%	50%	50%	50%	19%	19%	6%	6%
OpenGL 4.4	100% 100%	100% 1	00% 100%	100%	100%	100%	13%	13%	38%	0%
OpenGL 4.3	100% 100%	100% 1	00% 100%	100%	100%	100%	62%	71%	52%	0%
OpenGL 4.2	100% 100%	100% 1	00% 100%	100%	100%	100%	92%	100%	75%	17%
OpenGL 4.1	100% 100%	100% 1	00% 100%	100%	100%	100%	100%	100%	50%	83%
OpenGL 4.0	100% 100%	100% 1	00% 100%	100%	100%	100%	100%	100%	69%	100%
OpenGL 3.3	100% 100%	100% 1	00% 100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100% 100%	100% 1	00% 100%	100%	100%	100%	100%	100%	100%	100%



ARB extensions OpenGL 4.4 OpenGL 4.3 OpenGL 4.2 OpenGL 4.1 OpenGL 4.0 OpenGL 3.3 OpenGL 3.2

Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
KHR blend equation advanced	٧	٧	٧	Χ	Χ	Χ	Χ	Χ	Χ	٧	Х	Х
KHR texture compression astc ldr	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
ARB robustness	V	V	V	Χ	Χ	Χ	Χ	Χ	V	V	X	Χ
ARB sparse texture	V	V	V	Χ	Χ	V	V	V	Χ	Χ	X	Х
ARB shading language include	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	V
ARB shader stencil export	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	X	X
ARB shader group vote	V	V	V	Χ	Χ	V	V	V	Χ	Χ	X	X
ARB shader draw parameters	V	V	V	Χ	Χ	V	V	V	Χ	Χ	X	X
ARB seamless cubemap per texture	Χ	V	V	V	V	V	V	V	Χ	Χ	X	X
ARB_robustness_isolation	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
ARB robust buffer access behavior	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
ARB_debug_output	V	V	V	V	V	V	V	V	V	V	V	X
ARB_indirect_parameters	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
ARB compute variable group size	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
ARB_compatibility	V	V	V	V	V	V	V	V	V	V	Χ	X
ARB cl_event	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
ARB bindless texture	Χ	V	V	Χ	Χ	V	V	٧	Χ	Χ	Χ	Χ
Support	69%	81%	81%	25%	25%	50%	50%	50%	19%	19%	6%	6%

OpenGL Extensions	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
EXT texture compression dxt1	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V
EXT texture compression s3tc	V	V	V	V	V	V	V	V	V	V	X	V
EXT texture sRGB decode	V	V	V	V	V	V	V	V	V	V	V	V
EXT texture mirror clamp	V	V	V	V	V	V	V	V	X	X	X	V

EXT shader integer mix	V	V	V	V	V	V	V	V	V	V	V	X
EXT shader image load formatted	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT framebuffer multisample blit scaled	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V
EXT direct state access	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ
EXT depth bounds test	V	V	V	X	Χ	V	V	V	X	Χ	Χ	V
EXT clip control	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	Χ
NV vertex buffer unified memory	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV texture multisample	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV texture barrier	V	V	V	V	V	V	V	V	X	Χ	X	V
NV shader thread shuffle	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV shader thread group	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader buffer store	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV shader buffer load	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader atomic float	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV multisample coverage	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV explicit multisample	V	V	V	V	V	V	V	V	X	Χ	X	Χ
NV depth buffer float	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ
NV copy image	V	V	V	V	V	V	V	V	X	Χ	X	Χ
NV bindless texture	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV bindless multi draw indirect	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV blend equation advanced	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Х	Χ
INTEL map texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ
INTEL fragment shader ordering	Χ	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ
INTEL conservative rasterization	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
ANGLE texture compression dxt5	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
ANGLE texture compression dxt3	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
AMD vertex shader viewport index	Χ	Χ	Χ	V	V	V	V	V	X	Χ	X	X
AMD vertex shader layer	X	Χ	Χ	V	V	V	V	V	X	Χ	V	X
AMD transform feedback4	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	X	Χ
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	V	V	V	V	X	Χ	Χ	Χ
AMD stencil operation extended	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	X	Χ
AMD sparse texture pool	X	Χ	Χ	Χ	Χ	Χ	V	V	X	Χ	X	X

AMD sparse texture	X	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Х	
AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	V	V	٧	Χ	Χ	V	X	
AMD shader stencil value export	X	Χ	Χ	Χ	Χ	٧	V	٧	Χ	Χ	Χ	Χ	
AMD shader stencil export	X	Χ	Χ	V	V	٧	V	V	Χ	Χ	Χ	Χ	
AMD seamless cubemap per texture	X	V	٧	V	V	V	V	V	Χ	Χ	V	X	
AMD sample positions	Χ	Χ	Χ	٧	V	V	V	V	Χ	Χ	Χ	X	
AMD query buffer object	Χ	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	Χ	
AMD pinned memory	X	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	X	
AMD performance monitor	X	Χ	Χ	V	V	V	V	V	Χ	Χ	V	X	
AMD occlusion query event	X	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	
AMD interleaved elements	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Х	
AMD gpu shader int64	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	
AMD gcn shader	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Х	
AMD framebuffer sample positions	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	
AMD blend minmax factor	X	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	Х	
ATI texture mirror once	V	V	V	V	V	V	V	٧	Χ	Χ	Χ	V	
Support	49%	56%	57%	32%	35%	57%	60%	60%	12%	15%		16%	13%
Support	49%	56%	57%	32%	35%	57%	60%	60%	12%	15%		16%	13%
Support OpenGL 4.4	49% GF	56% GK	57% GM	32% EG	35% N.I.	57% S.I.	60% C.I.	60% V.I.	12% IVB	15% HSW	Mesa	16% MacO	
				EG									
OpenGL 4.4	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacO	
OpenGL 4.4 ARB_buffer_storage	GF V	GK V	GM V	EG V	N.I.	S.I. V	C.I.	V.I.	IVB V	HSW V	Mesa V	MacO X	
OpenGL 4.4 ARB buffer storage ARB clear texture	GF V V	GK V V	GM V V	EG V V	N.I. V V	S.I. V V	C.I. V V	V.I. V	IVB V X	HSW V X	Mesa V X	MacO X X	
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts	GF V V	GK V V	GM V V	EG V V	N.I. V V	S.I. V V	C.I. V V	V.I. V V	IVB V X X X	HSW V X X X	Mesa V X X X	MacO X X X	
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind	GF V V V	GK V V V	GM V V V	EG V V V	N.I. V V V	S.I. V V V	C.I. V V V	V.I. V V V	IVB V X X	HSW V X X X	Mesa V X X	MacO X X X	
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object	GF V V V	GK V V V	GM V V V	EG V V V V	N.I. V V V	S.I. V V V	C.I. V V V	V.I. V V V	IVB V X X X	HSW V X X X X X	Mesa V X X X V X	MacO X X X X	
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge	GF V V V V	GK V V V V	GM V V V V	EG V V V V	N.I. V V V V	S.I. V V V V	C.I. V V V V	V.I. V V V V	IVB V X X X X	HSW V X X X X X	Mesa V X X X X	MacO X X X X X	
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8	GF V V V V V V	GK V V V V V	GM V V V V V V	EG V V V V V	N.I. V V V V V	S.I. V V V V V	C.I. V V V V V	V.I. V V V V V	IVB V X X X X X X X	HSW V X X X X X	Mesa V X X X V V V	MacO X X X X X X X X	
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8 ARB vertex type 10f 11f 11f rev	GF V V V V V V	GK V V V V V V V V	GM V V V V V V	EG V V V V V V	N.I. V V V V V	S.I. V V V V V	C.I. V V V V V	V.I. V V V V V	IVB V X X X X X X X	HSW V X X X X X X X	Mesa V X X X V V V	MacO X X X X X X	SX
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8 ARB vertex type 10f 11f 11f rev	GF V V V V V V	GK V V V V V V V V	GM V V V V V V	EG V V V V V V	N.I. V V V V V	S.I. V V V V V	C.I. V V V V V V V	V.I. V V V V V	IVB V X X X X X IVB	HSW V X X X X X X X	Mesa V X X X V V V	MacO X X X X X X	S X 0%
OpenGL 4.4 ARB buffer storage ARB clear texture ARB enhanced layouts ARB multi bind ARB query buffer object ARB texture mirror clamp to edge ARB texture stencil8 ARB vertex type 10f 11f 11f rev Support	GF V V V V V V V 100%	GK V V V V V V V	GM V V V V V V V	EG V V V V V V V	N.I. V V V V V V V	S.I. V V V V V V V	C.I. V V V V V V V	V.I. V V V V V V V	IVB V X X X X X X X X X	HSW V X X X X X X X X X	Mesa V X X X V V	MacO X X X X X X X X X X X	S X 0%

ARB texture storage multisample	V	٧	٧	٧	V	٧	٧	V	V	V	V	Х
ARB texture query levels	V	٧	V	V	V	V	٧	٧	Χ	Χ	V	X
ARB texture buffer range	V	٧	V	V	V	V	٧	٧	V	V	V	X
ARB stencil texturing	V	V	V	V	V	V	V	V	V	V	V	X
ARB shader storage buffer object	V	V	V	V	V	V	V	V	Χ	V	Х	X
ARB shader image size	V	V	V	V	V	V	V	V	V	V	Х	X
ARB program interface query	V	V	V	V	V	V	V	V	V	V	Χ	X
ARB multi draw indirect	V	V	V	V	V	V	V	V	V	V	V	Χ
ARB invalidate subdata	V	V	V	V	V	V	V	V	Χ	Χ	V	X
ARB internalformat query2	V	V	V	V	V	V	V	V	V	V	X	X
ARB framebuffer no attachments	V	V	V	V	V	V	V	V	V	V	Χ	X
ARB fragment layer viewport	V	V	V	V	V	V	V	V	Χ	Χ	X	X
ARB explicit uniform location	V	V	V	V	V	V	V	V	Χ	Χ	X	X
ARB ES3 compatibility	V	V	V	V	V	V	V	V	V	V	V	X
KHR debug	V	V	V	V	V	V	V	V	V	V	V	X
ARB copy image	V	V	V	V	V	V	V	V	V	V	X	X
ARB compute shader	V	V	V	V	V	V	V	V	Χ	V	Χ	X
ARB clear buffer object	V	V	V	V	V	V	V	V	Χ	Χ	V	X
ARB arrays of arrays	V	V	V	٧	V	V	V	V	V	V	X	X
Support	100%	100%	100%	100%	100%	100%	100%	100%	62%	71%	52%	0%

OpenGL 4.2	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB transform feedback instanced	V	V	V	V	V	V	V	V	V	V	V	Х
ARB texture compression bptc	V	V	V	V	V	V	V	V	V	V	Χ	Χ
ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V
ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	X
ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	X
ARB shader image load store	V	V	V	V	V	V	V	V	X	V	Χ	X
ARB shader atomic counters	V	V	V	V	V	V	V	V	V	V	V	X
ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	X
ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V
ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	X

ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	Χ		Χ
ARB base instance	٧	٧	٧	V	V	٧	٧	V	V	V	V		X
Support	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%		75%	17%
													•
OpenGL 4.1	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa		MacOS X
ARB viewport array	٧	٧	٧	V	٧	٧	٧	V	V	٧	V		V
ARB vertex attrib 64bit	V	V	V	V	V	V	V	V	V	V	Χ		V
ARB shader precision	V	V	V	V	V	V	V	V	V	V	Χ		V
ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	Χ		V
ARB get program binary	V	V	V	V	V	V	V	V	V	V	V		X
ARB ES2 compatibility	٧	V	V	٧	V	V	V	V	V	V	V		V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		50%	83%
OpenGL 4.0	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa		MacOS X
ARB transform feedback3	V	٧	٧	V	٧	٧	٧	V	V	٧	V		V
ARB transform feedback2	٧	V	V	٧	٧	V	V	V	V	V	V		V
ARB texture query lod	٧	V	V	V	V	V	V	V	V	V	V		V
ARB texture gather	٧	V	V	V	V	V	V	V	V	V	V		V
ARB texture cube map array	V	V	V	V	V	V	V	V	V	V	V		V
ARB texture buffer object rgb32	V	V	V	V	V	V	V	V	V	V	V		V
ARB tessellation shader	V	V	V	V	V	V	V	V	V	V	Χ		V
ARB shader subroutine	V	V	V	V	V	V	V	V	V	V	Χ		V
ARB sample shading	V	V	V	V	V	V	V	V	V	V	V		V
ARB gpu shader5	V	V	V	V	V	V	V	V	V	V	Χ		V
ARB gpu shader fp64	V	V	V	V	V	V	V	V	V	V	Χ		V
ARB_draw_indirect	V	V	V	V	V	V	V	V	V	V	V		V
ARB draw buffers blend	V	٧	V	V	V	V	V	V	V	V	V		V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		69%	100%
OpenGL 3.3	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa		MacOS X
ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V		V
ARB timer query	V	V	V	V	V	V	V	V	V	V	V		V

ARB texture swizzle	V	V	٧	٧	V	V	٧	V	V	٧	V	V	
ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V	
ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	
ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V	
ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	
ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	
ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	
ARB blend func extended	V	V	V	٧	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
			•				•				<u> </u>		

OpenGL 3.2	GF	GK	GM	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	Mesa	MacOS X
ARB vertex array bgra	V	٧	٧	٧	٧	V	٧	٧	٧	٧	V	V
ARB texture multisample	V	V	٧	V	V	V	٧	٧	V	V	V	V
ARB sync	V	V	٧	V	V	V	٧	٧	V	V	V	V
ARB seamless cube map	V	V	٧	V	V	V	٧	٧	V	V	V	V
ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V
ARB geometry shader4	V	V	V	V	V	V	٧	٧	V	V	V	V
ARB fragment coord conventions	V	V	٧	V	V	V	٧	٧	V	V	V	V
ARB depth clamp	V	V	V	V	V	V	٧	٧	V	V	V	V
ARB draw elements base vertex	V	٧	٧	٧	٧	٧	٧	٧	٧	٧	٧	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	6 100%

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	4/2014		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

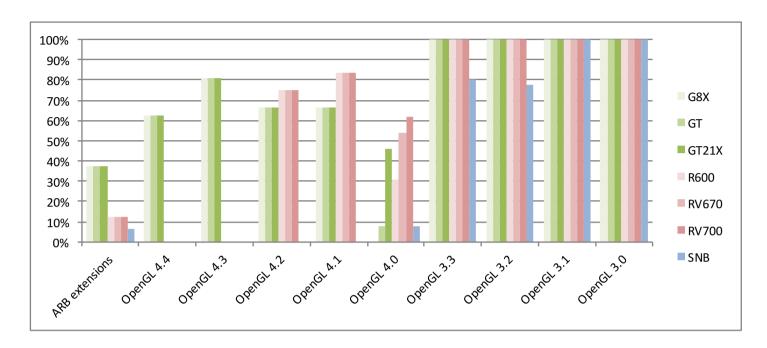
G8X: GeForce 8600, 8400, 9XXX, GTS 1XX

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	X	X	Χ	Χ	Χ	Χ	Χ	Χ
ARB robustness	V	V	V	V	Χ	Χ	Χ	Χ
ARB sparse texture	X	X	Χ	Χ	Χ	Х	Χ	Χ
ARB shading language include	V	V	V	V	Χ	Χ	Χ	Χ
ARB shader stencil export	X	X	Χ	Χ	Χ	Х	Χ	Χ
ARB shader group vote	X	X	Χ	Χ	Χ	Χ	Χ	Χ
ARB shader draw parameters	X	Х	Χ	Χ	Χ	Х	Χ	Χ
ARB seamless cubemap per texture	X	Х	Χ	Х	Χ	Χ	Χ	Χ

ARB robustness isolation	V	V	V	V	X	X	Χ	X
ARB robust buffer access behavior	V	V	V	V	Χ	X	Χ	Χ
ARB debug output	V	V	V	V	V	V	V	Χ
ARB indirect parameters	X	Χ	X	Χ	Χ	X	Χ	Χ
ARB compute variable group size	X	Χ	Χ	Χ	Χ	Х	Χ	Χ
ARB compatibility	V	V	V	V	V	V	V	V
ARB cl event	X	Χ	Χ	Χ	Χ	X	Χ	Χ
ARB bindless texture	X	Χ	Χ	Χ	Χ	X	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	Χ	Χ	Χ
EXT shader image load formatted	X	X	Χ	Χ	Χ	Χ	Χ	Χ
EXT framebuffer multisample blit scaled	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT direct state access	V	V	V	V	V	V	V	Χ
EXT depth bounds test	V	V	V	V	Χ	Χ	Χ	Χ
EXT clip control	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV vertex buffer unified memory	V	V	V	V	Χ	Χ	Χ	Χ
NV texture multisample	V	V	V	V	Χ	Χ	Χ	Χ
NV texture barrier	V	V	V	V	V	V	V	Χ
NV shader thread shuffle	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader thread group	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader buffer store	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV shader buffer load	V	V	V	V	Χ	Χ	Χ	Χ
NV shader atomic float	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV multisample coverage	V	V	V	V	Χ	Χ	Χ	Χ
NV explicit multisample	V	V	V	V	V	V	V	Χ
NV depth buffer float	V	V	V	V	V	V	V	Χ
NV copy image	V	V	V	V	V	V	V	Χ
NV bindless texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ

NV bindless multi draw indirect	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV blend equation advanced	Χ	Χ	Χ	Х	Х	Х	Х	Χ
INTEL map texture	X	Χ	Χ	Х	Х	Х	Χ	Χ
INTEL fragment shader ordering	X	Χ	Χ	X	Χ	X	Χ	Χ
INTEL conservative rasterization	X	Χ	Χ	X	X	X	Χ	Χ
AMD vertex shader viewport index	X	Χ	Χ	Χ	X	X	X	Χ
AMD vertex shader layer	X	Χ	Χ	X	X	X	Χ	Χ
AMD transform feedback4	X	Χ	Χ	X	X	X	X	Χ
AMD transform feedback3 lines triangles	X	Χ	Χ	X	X	X	Χ	Χ
AMD stencil operation extended	X	Χ	Χ	X	X	X	X	Χ
AMD sparse texture pool	X	Χ	X	X	Χ	X	Χ	Χ
AMD sparse texture	X	Χ	Χ	Х	X	X	Χ	Χ
AMD shader trinary minmax	X	Χ	Χ	X	X	X	X	Χ
AMD shader stencil value export	X	Χ	Χ	Х	X	Х	Х	Χ
AMD shader stencil export	X	Χ	X	X	Χ	Х	V	Χ
AMD seamless cubemap per texture	X	Χ	X	Х	X	X	V	Χ
AMD sample positions	X	Χ	X	Х	V	V	V	Χ
AMD query buffer object	X	Χ	X	Х	X	X	X	Χ
AMD pinned memory	X	Χ	X	Х	V	V	V	Χ
AMD occlusion query event	X	Χ	X	Х	X	X	X	Χ
AMD interleaved elements	X	Χ	Χ	X	Χ	Χ	Χ	Χ
AMD gpu shader int64	X	Χ	Χ	Χ	X	X	Χ	Χ
AMD gcn shader	X	Χ	Χ	X	Χ	Χ	Χ	Χ
AMD framebuffer sample positions	Χ	Χ	Χ	X	X	X	Χ	Χ
AMD blend minmax factor	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ATI texture mirror once	V	V	V	V	V	V	V	Χ
Support	32%	32%	32%	32%	17%	17%	21%	2%

OpenGL 4.4	G80	G8X	GT	GT21X	R600	RV670	RV700	SNB
ARB buffer storage	Χ	Χ	Χ	X	Χ	Χ	Χ	X
ARB clear texture	Х	X	Χ	X	Χ	Χ	Χ	X
ARB enhanced layouts	V	V	V	V	Χ	Χ	Χ	X

ARB multi bind	V	V	V	V	Χ	Χ	Χ	X
ARB query buffer object	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB texture mirror clamp to edge	V	V	V	V	Χ	Χ	Χ	Χ
ARB texture stencil8	V	V	V	V	Χ	Χ	Χ	Χ
ARB vertex type 10f 11f 11f rev	V	V	V	V	Χ	Χ	Χ	Χ
Support	63%	63%	63%	63%	0%	0%	0%	0%
OpenGL 4.3	G80	G8X	GT	GT21X	R600	RV670	RV700	SNB
ARB vertex attrib binding	V	V	V	V	Χ	X	X	X
ARB texture view	X	V	V	V	Χ	X	X	X
ARB texture storage multisample	V	V	V	V	Χ	X	X	X
ARB texture query levels	V	V	V	V	Χ	X	X	X
ARB texture buffer range	V	V	V	V	Χ	Χ	Χ	X
ARB stencil texturing	V	V	V	V	Χ	Χ	Χ	X
ARB shader storage buffer object	X	X	Χ	Χ	Χ	Χ	Χ	X
ARB shader image size	X	Х	Χ	Χ	Χ	Χ	Χ	X
ARB program interface query	V	V	V	V	Χ	Χ	Χ	Χ
ARB multi draw indirect	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Х
ARB invalidate subdata	V	V	V	V	Χ	Χ	Χ	X
ARB internalformat query2	V	V	V	V	Χ	Χ	Χ	Х
ARB framebuffer no attachments	V	V	V	V	Χ	Χ	Χ	X
ARB fragment layer viewport	V	V	V	V	Χ	Χ	Χ	Х
ARB explicit uniform location	V	V	V	V	Χ	Χ	Χ	X
ARB ES3 compatibility	V	V	V	V	Χ	Χ	Χ	Х
KHR debug	V	V	V	V	Χ	Χ	Χ	X
ARB copy image	V	V	V	V	Χ	Χ	Χ	Х
ARB compute shader	X	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB clear buffer object	V	V	V	V	Χ	Χ	Χ	Х
ARB arrays of arrays	V	V	V	V	Χ	Χ	Χ	Χ
Support	76%	81%	81%	81%	0%	0%	0%	0%

ARB transform feedback instanced	X	Χ	Χ	Х	V	V	V	Х
ARB texture compression bptc	Х	Х	Χ	Х	Х	Χ	Х	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	Х	Χ	Χ	Х	Χ	Х	Х	Х
ARB shader atomic counters	Х	Х	Χ	Χ	Χ	Χ	Χ	Х
ARB map buffer alignment	V	V	V	V	V	V	V	X
ARB internalformat query	V	V	V	V	V	V	V	Х
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
Support	67%	67%	67%	67%	75%	75%	75%	0%
OpenGL 4.1	G80	G8X	GT	GT21X	R600	RV670	RV700	SNB
ARB viewport array	V	V	V	V	V	V	V	X
ARB vertex attrib 64bit	X	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB shader precision	X	Χ	Χ	Χ	V	V	V	X
ARB separate shader objects	V	V	V	V	V	V	V	X
ARB get program binary	V	V	V	V	V	V	V	X
ARB ES2 compatibility	V	V	V	V	V	V	V	X
Support	67%	67%	67%	67%	83%	83%	83%	0%
OpenGL 4.0	G80	G8X	GT	GT21X	R600	RV670	RV700	SNB
ARB transform feedback3	X	X	Χ	Χ	V	V	V	X
ARB transform feedback2	X	Х	V	V	V	V	V	Х
ARB texture query lod	X	X	Χ	V	Χ	X	V	V
ARB texture gather	X	Х	Χ	V	X	V	V	X
ARB texture cube map array	X	Χ	Χ	V	Χ	V	V	X
ARB texture buffer object rgb32	X	Χ	Χ	Χ	V	V	V	X
ARB tessellation shader	X	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB shader subroutine	X	X	Χ	Χ	Χ	Χ	Χ	X

ARB sample shading	X	Χ	Χ	V	Х	V	V	Χ
ARB gpu shader5	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB gpu shader fp64	X	Χ	Χ	X	Χ	Χ	Χ	Χ
ARB draw indirect	X	Χ	Χ	Χ	Χ	Χ	Х	Χ
ARB draw buffers blend	X	Χ	Χ	V	V	V	V	Χ
Support	0%	0%	8%	46%	31%	54%	62%	8%

OpenGL 3.3	G80	G8X	GT	GT21X	R600	RV670	RV700	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	X
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	X
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	X
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	X
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	V	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
EXT gpu shader4	V	V	V	V	V	V	V	V
ARB framebuffer sRGB	V	V	V	V	V	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	V	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

V

V

EXT blend equation separate

Support

V

V

٧

100%

V

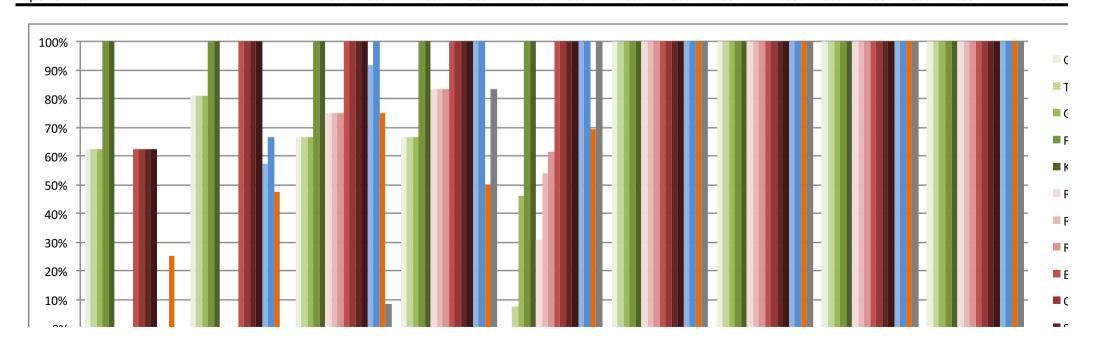
100% 100% 100% 100% 100% 100% 100%

OpenGL hardware matrix

Extensions exposed by OpenGL implementations

February 2014, G-Truc Creation

Vendor			NVIDIA	4					AMD				Int	tel	Mesa	
Drivers version			334.89)					14.1 be	ta			34	12	git-1	10.1
Release date			18/02/20	014				0:	1/02/20	14			29/01	/2014	20/02	/2013
Platforms	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
OpenGL 4.4	63%	63%	63%	100%	100%	0%	0%	0%	63%	63%	63%	63%	0%	0%		25%
OpenGL 4.3	81%	81%	81%	100%	100%	0%	0%	0%	100%	100%	100%	100%	57%	67%		48%
OpenGL 4.2	67%	67%	67%	100%	100%	75%	75%	75%	100%	100%	100%	100%	92%	100%		75%
OpenGL 4.1	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	100%	100%	100%		50%
OpenGL 4.0	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	100%	100%		69%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 3.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 3.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%



Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
KHR texture compression astc ldr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robustness	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ
ARB sparse texture	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
ARB shading language include	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shader stencil export	X	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ
ARB shader group vote	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ
ARB shader draw parameters	X	X	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB seamless cubemap per texture	X	Χ	Χ	Χ	V	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ
ARB robustness isolation	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robust buffer access behavior	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB_debug_output	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB indirect parameters	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB compute variable group size	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ
ARB_cl_event	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB bindless texture	X	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT texture sRGB decode	V	V	V	V	V	X	Χ	Χ	V	V	V	V	V	V	Χ
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ
EXT framebuffer multisample blit scaled	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
EXT direct state access	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ
EXT depth bounds test	V	V	V	V	V	X	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ
EXT clip control	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ
OES_compressed_ETC1_RGB8_texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ
NV vertex buffer unified memory	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ

NV texture multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture barrier	V	V	V	V	V	V	V	V	V	V	V	V	Х	Χ	Х
NV shader buffer store	X	Х	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Х	Χ	Х	Χ	Χ
NV shader buffer load	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV shader atomic float	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV multisample coverage	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV explicit multisample	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	X
NV copy image	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	X
NV bindless texture	X	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV blend equation advanced	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
INTEL map texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ
INTEL fragment shader ordering	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X
INTEL conservative rasterization	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ
AMD vertex shader viewport index	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	X
AMD vertex shader layer	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	X
AMD stencil operation extended	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ
AMD sparse texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	X
AMD shader trinary minmax	X	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ
AMD seamless cubemap per texture	X	Χ	Χ	Χ	V	Χ	Χ	V	V	V	V	V	Χ	Χ	X
AMD sample positions	X	Χ	Χ	Χ	Χ	V	V	V	V	V	V	V	Χ	Χ	Χ
AMD query buffer object	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	X
AMD pinned memory	X	Χ	Χ	Χ	Χ	V	V	V	V	V	V	V	Χ	Χ	Χ
AMD_occlusion_query_event	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	Χ	X
AMD blend minmax factor	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ
ATI texture mirror once	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ
Support	36%	6 36%	36%	54%	62%	18%	18%	20%	32%	36%	46%	48%	14%	18%	2%
On an CL A A	C00	Toolo	CT21V	Гокраі	Vanlar	DCOO	DV670	D\/700	ГС	Cauman	C I	C I	IV/D	LICVA	Mass

OpenGL 4.4	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
ARB buffer storage	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB clear texture	Χ	Χ	Χ	V	V	Х	Χ	Χ	٧	V	V	V	Χ	Χ	Χ

ARB enhanced layouts	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB multi bind	V	V	V	V	V	Χ	Χ	X	V	V	V	V	Χ	Χ	X	
ARB query buffer object	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	Х	Χ	Χ	
ARB texture mirror clamp to edge	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	Χ	Χ	V	
ARB texture stencil8	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
ARB vertex type 10f 11f 11f rev	V	V	V	V	V	Χ	Χ	Χ	V	V	٧	V	Χ	Χ	V	
Support	63%	63%	63%	100%	100%	0%	0%	6 0%	63%	63%	63%	63%	0%	0%		25%
OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex attrib binding	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	V	
GL ARB texture view	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	Χ	Χ	V	
GL ARB texture storage multisample	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	V	
GL ARB texture query levels	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	Χ	Χ	V	
GL ARB texture buffer range	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	V	
GL ARB stencil texturing	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	Χ	
GL ARB shader storage buffer object	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	Χ	V	Χ	
GL ARB shader image size	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	
GL ARB program interface query	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	Χ	
GL ARB multi draw indirect	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	V	V	
GL ARB invalidate subdata	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	Χ	Χ	V	
GL ARB internalformat query2	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	Х	
GL ARB framebuffer no attachments	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	Χ	
GL ARB fragment layer viewport	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	
GL ARB explicit uniform location	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	X	Χ	Χ	
GL ARB ES3 compatibility	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	V	
GL KHR debug	V	V	V	V	V	Χ	Χ	Χ	V	V	٧	V	V	V	V	
GL ARB copy image	V	V	V	V	V	Χ	Χ	X	V	V	V	V	V	V	Χ	
GL ARB compute shader	X	X	Χ	V	V	Χ	Χ	Χ	V	V	V	V	Χ	V	Χ	
GL ARB clear buffer object	V	V	V	V	V	Χ	Χ	X	V	V	V	V	Χ	Χ	V	

0%

0% 100%

100% 100% 100% 57% 67%

48%

81% 100%

100%

0%

81% 81%

GL ARB arrays of arrays

Support

OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
GL ARB transform feedback instanced	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture compression bptc	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	V	X
GL ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shader image load store	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	Χ	V	X
GL ARB shader atomic counters	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	V	V
GL ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB base instance	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Support	67%	67%	67%	100%	100%	75%	75%	75%	100%	100%	100%	100%	92%	100%	75%
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
GL ARB viewport array	V	V	V	V	V	V	V	V	V	V	٧	٧	V	V	V
GL ARB vertex attrib 64bit	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	V	Χ
GL ARB shader precision	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V	V	Χ
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	V	V	V	Χ
GL ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	100%	100%	100%	50%
OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
GL ARB transform feedback3	X	Χ	Χ	V	V	V	V	V	V	V	٧	٧	V	V	V
GL ARB transform feedback2	X	V	V	V	V	V	V	V	V	V	V	٧	V	٧	V
GL ARB texture query lod	X	Х	V	V	V	Χ	Χ	V	V	V	٧	V	V	V	V
GL ARB texture gather	X	Х	V	V	V	Χ	V	V	V	V	V	V	V	V	V
GL ARB texture cube map array	X	Χ	V	V	V	Χ	V	V	V	V	V	V	V	V	V
GL ARB texture buffer object rgb32	X	Χ	Х	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB tessellation shader	X	Χ	Χ	V	V	Х	Χ	Χ	V	V	V	V	V	V	Х

GL ARB shader subroutine	X		Х	V	V	Χ	Χ	X	V	V	V	V	V	V	Х	
GL ARB sample shading	X		V	V	V	X	V	V	V	V	V	V	V	V	V	
GL ARB gpu shader5	X	Χ	Χ	V	V	Χ	X	X	V	V	V	V	V	V	Χ	
GL ARB gpu shader fp64	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	V	X	
GL ARB draw indirect	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	V	V	V	
GL ARB draw buffers blend	X	Χ	V	V	V	V	V	V	V	V	V	V	V	٧	V	
Support	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	100%	100%		69%
OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	٧	V	V	V	V	٧	V	V	٧	V	
GL ARB timer query	V	V	V	V	V	V	V	V	٧	V	V	V	V	٧	V	
GL ARB texture swizzle	V	V	V	V	V	V	V	V	٧	V	V	V	V	٧	V	
GL ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	٧	V	V	V	V	٧	V	
GL ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB instanced arrays	V	V	V	V	V	٧	V	V	V	V	٧	V	V	٧	V	
GL ARB explicit attrib location	V	V	V	V	V	٧	V	V	V	V	٧	V	V	٧	V	
GL ARB blend func extended	V	V	V	V	V	٧	V	V	V	V	٧	V	V	٧	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 3.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex array bgra	V	V	V	V	V	٧	V	V	٧	V	V	V	V	٧	V	
GL ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB sync	V	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw elements base vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%

OpenGL 3.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
GL ARB uniform buffer object	V	V	V	V	V	٧	V	V	V	V	V	٧	٧	٧	V
GL EXT texture snorm	V	V	V	V	V	V	V	V	V	V	V	٧	V	٧	V
GL ARB texture rectangle	V	V	V	V	٧	V	V	V	V	V	V	V	V	٧	V
GL ARB texture buffer object	V	V	V	V	٧	V	V	V	V	V	V	٧	V	V	V
GL NV primitive restart	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	V
GL ARB draw instanced	V	V	V	V	V	V	V	V	V	V	V	٧	V	V	V
GL ARB copy buffer	V	V	V	V	V	V	V	V	V	V	V	٧	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1009
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergr	· Cayman	S.I.	C.I.	IVB	HSW	Mesa
GL ARB vertex array object	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL EXT transform feedback	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture rg	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL EXT texture shared exponent	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL EXT texture integer	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture float	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture compression rgtc	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL EXT texture array	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL EXT packed float	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL EXT packed depth stencil	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB map buffer range	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB half float vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB half float pixel	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL EXT gpu shader4	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB framebuffer sRGB	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB framebuffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB depth buffer float	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL NV conditional render	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB color buffer float	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1009

OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL_EXT_texture_sRGB	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB pixel buffer object	V	V	V	V	V	V	V	V	V	V	٧	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex shader	٧	V	V	V	V	V	V	V	٧	V	٧	٧	٧	٧	٧	
GL ARB texture non power of two	V	V	V	V	V	V	V	V	V	V	٧	٧	V	٧	V	
GL EXT stencil two side	V	V	V	V	V	V	V	V	V	V	٧	٧	V	٧	V	
GL ARB shading language 100	V	٧	V	V	V	٧	V	V	٧	V	٧	V	V	٧	٧	
GL ARB shader objects	V	V	V	V	V	٧	V	V	٧	V	٧	V	V	V	V	
GL ARB point sprite	V	V	V	V	V	V	V	V	V	V	٧	٧	V	٧	V	
GL ARB fragment shader	V	V	V	V	V	V	V	V	V	V	٧	٧	V	٧	V	
GL ARB draw buffers	V	V	V	V	V	٧	V	V	٧	V	٧	٧	V	٧	V	
GL EXT blend equation separate	V	٧	V	V	V	٧	V	V	V	V	٧	V	V	٧	٧	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%

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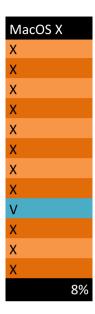
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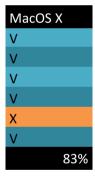
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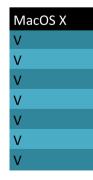
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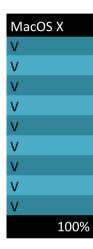
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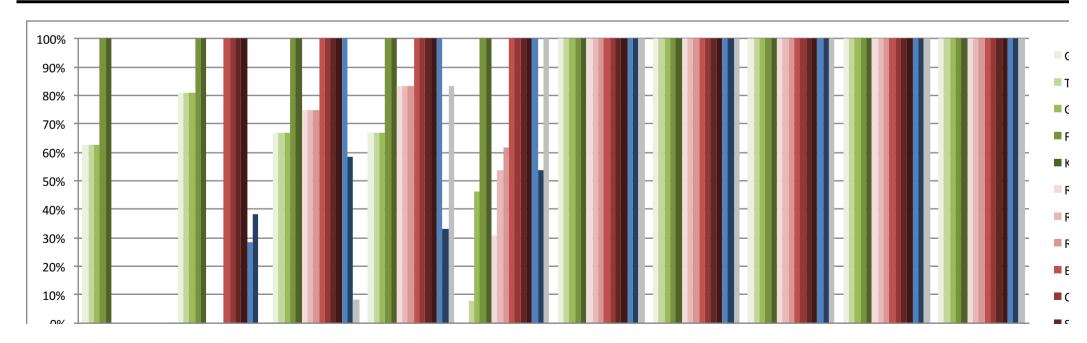


OpenGL hardware matrix

Extensions exposed by OpenGL implementations

November 2013. G-Truc Creation

Vendor			NVIDIA	A					AMD				Int	el	Mesa	
Drivers version			331.10 b	eta				13	.11 beta	a 9.2			33	25	git-10.0	
Release date			02/10/20	013				0	8/11/20)13			30/08	/2013	06/11/2013	3
Platforms	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
OpenGL 4.4	63%	63%	63%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	%
OpenGL 4.3	81%	81%	81%	100%	100%	0%	0%	0%	100%	100%	100%	100%	19%	29%	38%	%
OpenGL 4.2	67%	67%	67%	100%	100%	75%	75%	75%	100%	100%	100%	100%	92%	100%	58%	%
OpenGL 4.1	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	100%	100%	100%	33%	%
OpenGL 4.0	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	100%	100%	54%	%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	%
OpenGL 3.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	%
OpenGL 3.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	%
OpenGL 2.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	%
OpenGL 2.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%	%



Nomenclature:

Supported

Not supported

∪% ⊤

Support added from previous report

OpenGL 4.4

OpenGL 4.3

OpenGL 4.2

OpenGL 4.1

OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
KHR texture compression astc ldr	Χ	Χ	Χ	Χ	Χ	Χ	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB_robustness	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB sparse texture	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shading language include	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB shader stencil export	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ
ARB shader group vote	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_shader_draw_parameters	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB seamless cubemap per texture	Χ	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_robustness_isolation	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB robust buffer access behavior	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB debug output	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
ARB_indirect_parameters	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB compute variable group size	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB_cl_event	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB_bindless_texture	Χ	Χ	Χ	Χ	V	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT texture sRGB decode	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	X
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	V	V	V	Χ	X	X
EXT framebuffer multisample blit scaled	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT direct state access	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ
EXT depth bounds test	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	X
NV vertex buffer unified memory	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV texture barrier	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	X

OpenGL 3.3

OpenGL 4.0

OpenGL 3.2

OpenGL 3.1

NV shader buffer store	X	Χ	Χ	V	V	Χ	X	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
NV shader buffer load	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	
NV shader atomic float	X	Х	Х	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Х	Χ	Χ	Х	
NV multisample coverage	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	
NV explicit multisample	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	
NV copy image	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	
NV bindless texture	X	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
NV bindless multi draw indirect	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Х	Χ	Χ	Χ	
NV blend equation advanced	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
INTEL map texture	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ	V	Х	
INTEL fragment shader ordering	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Х	
ATI texture mirror once	V	V	V	V	V	٧	V	V	V	V	V	V	Χ	Χ	Χ	
AMD vertex shader viewport index	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	
AMD vertex shader layer	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	
AMD stencil operation extended	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ	
AMD sparse texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ	
AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	Χ	Χ	Χ	
AMD seamless cubemap per texture	X	Χ	Χ	Χ	V	Χ	Χ	V	V	V	V	V	Χ	Χ	Χ	
AMD sample positions	X	Χ	Χ	Χ	Χ	٧	V	V	V	V	V	V	Χ	Χ	Χ	
AMD query buffer object	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	V	Χ	Χ	Χ	
AMD pinned memory	X	Χ	Χ	Χ	Χ	٧	V	V	V	V	V	V	Χ	Χ	Χ	
AMD_occlusion_query_event	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	Χ	Χ	
AMD blend minmax factor	X	Χ	X	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	
Support	40%	40%	40%	58%	67%	21%	21%	23%	33%	38%	46%	48%	8%	10%)	2%
OpenGL 4.4	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	

OpenGL 4.4	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
ARB buffer storage	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB clear texture	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB enhanced layouts	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB multi bind	V	V	V	V	V	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB query buffer object	Χ	Χ	X	V	V	Χ	X	X	Χ	X	Χ	Χ	Χ	X	X

ARB texture mirror clamp to edge	V	V	V	V	V	Χ	X	Χ	X	X	X	X	X	Χ	X	
ARB texture stencil8	V	V	V	V	V	Χ	X	Х	Χ	X	X	Χ	Х	Χ	Х	
ARB vertex type 10f 11f 11f rev	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	
Support	63%	63%	63%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%
OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex attrib binding	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	X	Χ	V	
GL ARB texture view	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	X	Χ	V	
GL ARB texture storage multisample	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	X	Χ	V	
GL ARB texture query levels	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	Х	Χ	V	
GL ARB texture buffer range	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	X	Χ	V	
GL ARB stencil texturing	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	Х	Χ	X	
GL ARB shader storage buffer object	X	Х	Х	V	V	Χ	Χ	Χ	V	V	V	V	Х	V	Χ	
GL ARB shader image size	X	Х	Х	V	V	Χ	Х	Χ	V	V	V	٧	Х	Χ	Х	
GL ARB program interface query	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	V	Χ	
GL ARB multi draw indirect	Χ	Х	Х	V	V	Χ	Χ	Χ	V	V	V	V	V	٧	Χ	
GL ARB invalidate subdata	V	V	V	V	V	Χ	Χ	Χ	٧	V	V	٧	Х	Χ	V	
GL ARB internalformat query2	V	V	V	V	V	Χ	Х	Χ	٧	V	V	٧	Х	Χ	Х	
GL ARB framebuffer no attachments	V	V	V	V	V	Χ	Χ	Χ	٧	V	V	٧	Х	Χ	Х	
GL ARB fragment layer viewport	V	V	V	V	V	Χ	Х	Χ	٧	V	V	٧	Х	Χ	Х	
GL ARB explicit uniform location	V	V	V	V	V	Χ	Χ	Χ	٧	V	V	٧	Х	Χ	Х	
GL ARB ES3 compatibility	V	V	V	V	V	Χ	Х	Χ	٧	V	V	٧	Х	Χ	V	
GL KHR debug	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	٧	V	
GL ARB copy image	V	V	V	V	V	Χ	Х	Χ	٧	V	V	٧	Х	Χ	Х	
GL ARB compute shader	X	Х	Х	V	V	Χ	Χ	Χ	٧	V	V	٧	Х	٧	Х	
GL ARB clear buffer object	V	V	V	V	V	Χ	Х	Χ	V	V	V	V	Х	Χ	Х	
GL ARB arrays of arrays	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	V	٧	Χ	
Support	81%	81%	81%	100%	100%	0%	0%	0%	100%	100%	100%	100%	19%	29%		38%
OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB transform feedback instanced	Χ	Χ	Х	V	٧	V	V	V	V	V	V	٧	V	V	V	
GL ARB texture compression bptc	X	Χ	Χ	V	V	Х	Х	Χ	V	V	V	V	٧	V	X	

CL ARR															
GL ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB shader image load store	X	X	X	V	V	Χ	Χ	X	V	V	V	V	X	V	X
GL ARB shader atomic counters	X	X	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	V	X
GL ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB base instance	V	V	V	V	V	V	V	V	٧	V	٧	V	V	V	V
Support	67%	67%	67%	100%	100%	75%	75%	75%	100%	6 100%	100%	5 100%	92%	100%	58%
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
GL ARB viewport array	V	V	V	V	V	V	V	V	٧	V	V	V	V	V	Х
GL ARB vertex attrib 64bit	X	Χ	Χ	V	V	Х	Χ	Χ	V	V	V	V	V	V	Χ
GL ARB shader precision	X	Х	Χ	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB get program binary	V	V	V	V	V	V	V	V	٧	V	V	V	V	V	V
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	6 100%	100%	100%	100%	100%	33%
OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa
GL ARB transform feedback3	Χ	Χ	Χ	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB transform feedback2	X	V	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture query lod	X	Х	V	V	V	Χ	Х	V	V	V	٧	V	V	V	V
GL ARB texture gather	X	Χ	V	V	V	Χ	V	V	V	V	V	V	V	V	V
GL ARB texture cube map array	X	X	V	V	V	Χ	V	V	V	V	V	V	V	V	V
GL ARB texture buffer object rgb32	X	X	X	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB tessellation shader	X	X	X	V	V	X	X	X	V	V	V	V	V	V	X
GL ARB shader subroutine	X	X	X	V	V	X	X	X	V	V	V	V	V	V	X
GL ARB sample shading	×	X	V	V	V	X	V	V	V	V	V	V	V	V	Y
GL ARB gpu shader5	V	X	X	V	V	X	X	X	V	V	V	V	V	V	X
OL AND Khn Sligners	^	٨	٨	V	V	٨	٨	٨	V	V	V	V	V	V	^

CL ADD and abode for A	V	V	V	V	M	V	V	V	M	V	V	M	M	M	V	
GL ARB gpu shader fp64	X	X	X	V	V	X	X	X	V V	V	V	V	V	V	X	
GL ARB draw indirect GL ARB draw buffers blend	×		V	V	V	V	V	\ \	V	V	V	V	V	V	V	
	0%	,,	46%	•	100%	31%	•	•	•	•	•	•	•	•	V	54%
Support	0%	٥%	40%	100%	100%	31%	54%	62%	100%	100%	100%	100%	100%	100%		54%
OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture rgb10 a2ui	V	٧	V	V	V	V	V	V	V	V	V	٧	٧	V	V	
GL ARB shader bit encoding	V	٧	V	V	V	V	V	V	V	V	V	٧	٧	V	V	
GL ARB sampler objects	V	٧	V	V	V	V	V	V	V	V	٧	٧	٧	V	V	
GL ARB occlusion query2	V	٧	V	V	V	V	V	٧	V	V	٧	٧	٧	V	V	
GL ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB explicit attrib location	V	٧	V	V	V	V	V	V	V	V	٧	٧	٧	V	V	
GL ARB blend func extended	V	٧	V	V	V	V	V	V	٧	V	٧	٧	٧	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
Support OpenGL 3.2	100% G80	100% Tesla	100% GT21X	100% Fermi	100% Kepler	100% R600	100% RV670	100% RV700	100% EG		100% S.I.	100% C.I.	100% IVB	100% HSW	Mesa	100%
																100%
OpenGL 3.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	100%
OpenGL 3.2 GL ARB vertex array bgra	G80	Tesla V	GT21X V	Fermi V	Kepler V	R600 V	RV670 V	RV700 V	EG V	Cayman V	S.I.	C.I.	IVB V	HSW V	Mesa V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample	G80	Tesla V V	GT21X V V	Fermi V V	Kepler V V	R600 V V	RV670 V V	RV700 V V	EG V V	Cayman V V	S.I. V V	C.I. V V	IVB V V	HSW V V	Mesa V V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync	G80	Tesla V V	GT21X V V	Fermi V V	Kepler V V	R600 V V V	RV670 V V	RV700 V V	EG V V	Cayman V V	S.I. V V	C.I. V V	IVB V V	HSW V V	Mesa V V V V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync GL ARB seamless cube map	G80	Tesla V V V V	GT21X V V V	Fermi V V V	Kepler V V V	R600 V V V	RV670 V V V	RV700 V V V	EG V V V	Cayman V V V	S.I. V V V	C.I. V V V	IVB V V V	HSW V V V	Mesa V V V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync GL ARB seamless cube map GL ARB provoking vertex	G80	Tesla V V V V V	GT21X V V V V V	Fermi V V V V	Kepler V V V V V	R600 V V V V	RV670 V V V V	RV700 V V V V	EG V V V V	Cayman V V V V	S.I. V V V V	C.I. V V V	IVB V V V V	HSW V V V	Mesa V V V V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync GL ARB seamless cube map GL ARB provoking vertex GL ARB geometry shader4	G80	Tesla V V V V V V	GT21X V V V V V V V	Fermi V V V V V V	Kepler V V V V V V	R600 V V V V V	RV670 V V V V V	RV700 V V V V V	EG V V V V	Cayman V V V V V V	S.I. V V V V	C.I. V V V V	IVB V V V V V	HSW V V V V	Mesa V V V V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync GL ARB seamless cube map GL ARB provoking vertex GL ARB geometry shader4 GL ARB fragment coord conventions	G80	Tesla V V V V V V V V V V V V	GT21X V V V V V V V V V V V V	Fermi V V V V V V V V V V V V V	Kepler V V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V	RV700 V V V V V V	EG V V V V V	Cayman V V V V V V V V V V	S.I. V V V V V V	C.I. V V V V V V V V V V V V	IVB V V V V V V V V V V V	HSW V V V V V V V V V V V V	Mesa V V V V V V V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync GL ARB seamless cube map GL ARB provoking vertex GL ARB geometry shader4 GL ARB fragment coord conventions GL ARB depth clamp	G80	Tesla V V V V V V V V V V V	GT21X V V V V V V V V V V V	Fermi V V V V V V V V V V V V V	Kepler V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V	RV700 V V V V V V	EG V V V V V V V V V V V	Cayman V V V V V V V V V	S.I. V V V V V V	C.I. V V V V V V V V V V V V	IVB V V V V V V V V V V	HSW V V V V V V V V V V V V	Mesa V V V V V V V V V V V	100%
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync GL ARB seamless cube map GL ARB provoking vertex GL ARB geometry shader4 GL ARB fragment coord conventions GL ARB depth clamp GL ARB draw elements base vertex	G80 V V V V V V V V V V	Tesla V V V V V V V V V V V V	GT21X V V V V V V V V V V V V	Fermi V V V V V V V V V V V V V	Kepler V V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V	RV700 V V V V V V V	EG V V V V V V V V V V V	Cayman V V V V V V V V V V	S.I. V V V V V V	C.I. V V V V V V V V V V V V	IVB V V V V V V V V V V V	HSW V V V V V V V V V V V V	Mesa V V V V V V V V V V V	
OpenGL 3.2 GL ARB vertex array bgra GL ARB texture multisample GL ARB sync GL ARB seamless cube map GL ARB provoking vertex GL ARB geometry shader4 GL ARB fragment coord conventions GL ARB depth clamp GL ARB draw elements base vertex	G80 V V V V V V V V V V	Tesla V V V V V V V V V V V V	GT21X V V V V V V V V V V V V	Fermi V V V V V V V V V V V V V	Kepler V V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V	RV700 V V V V V V V	EG V V V V V V V V V V V	Cayman V V V V V V V V V V V V V	S.I. V V V V V V	C.I. V V V V V V V V V V V V	IVB V V V V V V V V V V V	HSW V V V V V V V V V V V V	Mesa V V V V V V V V V V V	

GL EXT texture snorm	V	V	V	V	V	V	V	V	V	V	V	V	V	V	٧	
GL ARB texture rectangle	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL NV primitive restart	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw instanced	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB copy buffer	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	•	100%	100%	100%	100%	•	100%
																_00,0
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergr	«Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex array object	٧	V	٧	V	٧	٧	V	V	٧	٧	٧	٧	٧	٧	V	
GL EXT transform feedback	V	V	V	V	V	٧	V	V	٧	٧	V	٧	V	V	V	
GL ARB texture rg	V	V	V	V	٧	٧	V	V	٧	٧	٧	V	V	V	V	
GL EXT texture shared exponent	V	V	V	V	V	V	V	V	V	V	٧	٧	V	٧	V	
GL EXT texture integer	V	V	V	V	V	V	V	V	٧	V	٧	٧	٧	٧	V	
GL ARB texture float	V	V	V	V	V	V	V	V	٧	V	٧	٧	٧	٧	V	
GL ARB texture compression rgtc	V	V	V	V	V	V	V	V	٧	V	٧	٧	٧	٧	V	
GL EXT texture array	V	V	V	V	V	٧	V	V	٧	٧	٧	V	V	٧	V	
GL EXT packed float	V	V	V	V	V	V	V	V	V	V	٧	V	V	V	V	
GL EXT packed depth stencil	V	V	V	V	V	V	V	V	٧	V	٧	٧	٧	V	V	
GL ARB map buffer range	٧	V	V	V	V	٧	V	V	٧	V	٧	V	٧	V	V	
GL ARB half float vertex	V	V	V	V	V	٧	V	V	٧	V	٧	V	٧	V	V	
GL ARB half float pixel	٧	V	V	V	V	٧	V	V	٧	V	٧	V	٧	V	V	
GL EXT gpu shader4	V	V	V	V	V	٧	V	V	٧	V	٧	V	٧	V	V	
GL ARB framebuffer sRGB	V	V	V	V	V	٧	V	V	٧	V	٧	٧	٧	V	V	
GL ARB framebuffer object	V	V	V	V	V	٧	V	V	٧	V	٧	٧	٧	V	V	
GL ARB depth buffer float	V	V	V	V	V	٧	V	V	٧	V	٧	V	V	V	V	
GL NV conditional render	V	V	V	V	V	٧	V	V	٧	V	V	V	V	V	V	
GL ARB color buffer float	V	V	V	V	V	٧	V	V	٧	٧	٧	٧	٧	٧	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL EXT texture sRGB	٧	V	V	V	V	V	V	V	V	٧	V	V	V	V	V	

GL ARB pixel buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	EG	Cayman	S.I.	C.I.	IVB	HSW	Mesa	
GL ARB vertex shader	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture non power of two	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT stencil two side	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shading language 100	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shader objects	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB point sprite	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB fragment shader	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw buffers	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT blend equation separate	V	V	V	V	V	V	V	V	V	V	V	V	٧	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%

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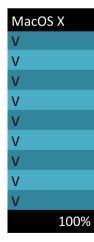
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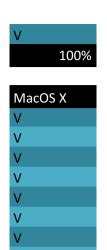
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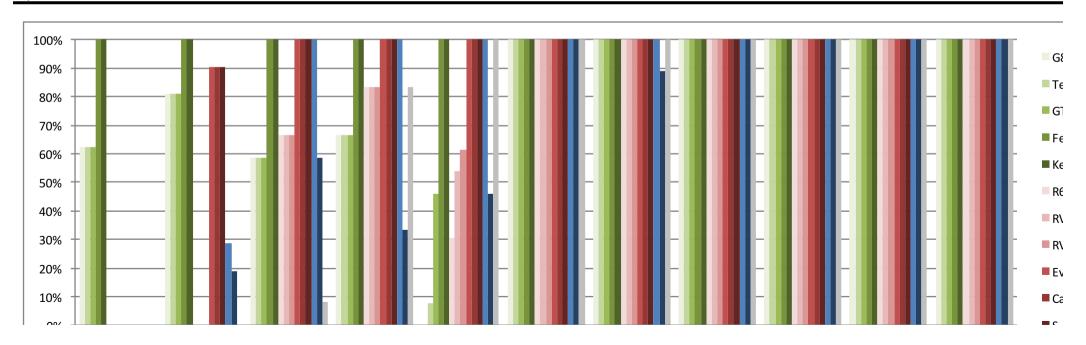
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OpenGL hardware matrix

Extensions exposed by OpenGL implementations

September 2013, G-Truc Creation

Vendor	NVIDIA								AMD		Intel	Mesa	
Drivers version	326.98 beta								13.4		10.18.10.3277	git-9.2	
Release date		28/08/2013						24	/04/2013		30/08/2013	30/03/2013	
Platforms	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
OpenGL 4.4	63%	63%	63%	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%
OpenGL 4.3	81%	81%	81%	100%	100%	0%	0%	0%	90%	90%	90%	29%	19%
OpenGL 4.2	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	100%	58%
OpenGL 4.1	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	100%	33%
OpenGL 4.0	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	46%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%
OpenGL 3.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

Support added from previous report

OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
KHR texture compression astc ldr	Χ	Χ	Χ	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Х	Χ
ARB_robustness	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
ARB sparse texture	Χ	Χ	Χ	V	V	Х	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shading language include	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shader stencil export	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ
ARB shader group vote	Χ	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB shader draw parameters	Χ	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB seamless cubemap per texture	Χ	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robustness isolation	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB robust buffer access behavior	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB debug output	V	V	V	V	V	V	V	V	V	V	V	Χ	V
ARB indirect parameters	X	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB compute variable group size	Χ	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB compatibility	V	V	V	V	V	V	V	V	V	V	V	V	X
ARB cl event	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
ARB bindless texture	X	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT texture sRGB decode	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	X
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	V	V	X	Χ
EXT framebuffer multisample blit scaled	Χ	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	X	Χ
EXT direct state access	V	V	V	V	V	٧	V	V	V	V	V	X	Χ
EXT depth bounds test	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	V	X	Χ
NV vertex buffer unified memory	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV texture multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
NV texture barrier	V	V	V	V	V	V	V	V	V	V	V	Х	Χ

NV shader buffer store	X	X	()	/ \	/	X >	X	Χ	X	Χ	Χ	X	
NV shader buffer load	V	٧ ١	/ \	/ \	/	X >	X	Х	X	Χ	X	X	
NV shader atomic float	X	X	()	/ \	/	X >	X	Χ	X	Χ	Χ	X	
NV multisample coverage	V	٧ ١	/ \	/ \	/	X >	X	Х	X	Χ	X	X	
NV explicit multisample	V	٧ ١	/ \	/ \	<i>/</i>	V	′ V	V	V	V	X	X	
NV copy image	V	٧ ١	/ \	/ \	<i>!</i>	V	′ V	V	V	V	X	X	
NV bindless texture	X	X	()	()	/	X >	X	X	X	Χ	Χ	X	
NV bindless multi draw indirect	X	X	(/ \	/	X >	X	X	X	Χ	Χ	X	
NV blend equation advanced	X	X	(/ \	1	X >	X	X	X	Χ	Χ	X	
INTEL map texture	X	X	〈	()	(X >	X	X	X	Χ	V	X	
ATI texture mirror once	V	٧ ١	/ \	/ \	<i>1</i>	V ١	′ V	V	V	V	X	X	
AMD vertex shader viewport index	X	X	〈	()	(X >	X	V	V	V	X	X	
AMD vertex shader layer	X	X	()	()	(X >	X	V	V	V	X	X	
AMD transform feedback3 lines triangles	X	X	〈	()	(X >	X	X	V	V	X	X	
AMD stencil operation extended	X	X	()	()	(X >	X	X	X	V	X	X	
AMD sparse texture	X	X	〈	()	(X >	X	X	X	V	X	X	
AMD shader trinary minmax	X	X	()	()	(X >	X	Χ	X	V	X	X	
AMD seamless cubemap per texture	X	X	〈	()	/	X >	V	V	V	V	X	X	
AMD sample positions	X	X	()	()	(V ١	′ V	V	V	V	X	X	
AMD query buffer object	X	X	〈	()	(X >	X	V	V	V	X	X	
AMD pinned memory	X	X	()	()	(V ١	′ V	V	V	V	X	X	
AMD blend minmax factor	X	X	()	()	(X >	X	Χ	V	V	X	X	
Support	37%	37%	37%	61%	70%	22%	22%	24%	35%	39% 4	8%	7%	2%

OpenGL 4.4	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
ARB buffer storage	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
ARB clear texture	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB enhanced layouts	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB multi bind	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB query buffer object	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB texture mirror clamp to edge	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
ARB texture stencil8	٧	V	V	V	V	Χ	Χ	Χ	X	Χ	Χ	X	X

ARB vertex type 10f 11f 11f rev	V	V	V	V	٧	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
Support	81%	81%	81%	100%	100%	0%	0%	0%	90%	90%	90%	29%	19
OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
GL ARB vertex attrib binding	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
GL ARB texture view	V	V	V	V	V	Х	Χ	Χ	Х	Χ	Χ	Χ	Χ
GL ARB texture storage multisample	V	V	V	V	V	X	X	X	V	V	V	Х	Χ
GL ARB texture query levels	V	V	V	V	V	Х	Χ	Χ	V	V	V	Х	Χ
GL ARB texture buffer range	V	V	V	V	V	Х	Χ	Χ	V	V	V	Х	V
GL ARB stencil texturing	V	V	V	V	V	Х	Χ	Χ	V	V	V	Х	Χ
GL ARB shader storage buffer object	X	X	Χ	V	V	Х	Χ	Χ	V	V	V	V	Χ
GL ARB shader image size	X	X	Χ	V	V	Х	Χ	Χ	V	V	V	Х	Χ
GL ARB program interface query	V	V	V	V	V	Х	Χ	Χ	V	V	V	V	X
GL ARB multi draw indirect	X	X	Χ	V	V	X	Χ	Χ	V	V	V	V	Χ
GL ARB invalidate subdata	V	V	V	V	V	Х	Χ	Χ	V	V	V	Х	V
GL ARB internalformat query2	V	V	V	V	V	X	Χ	Χ	V	V	V	X	Χ
GL ARB framebuffer no attachments	V	V	V	V	V	X	Χ	Χ	V	V	V	Χ	Χ
GL ARB fragment layer viewport	V	V	V	V	V	Х	Χ	Χ	V	V	V	Χ	Χ
GL ARB explicit uniform location	V	V	V	V	V	X	Χ	Χ	V	V	V	Χ	Χ
GL ARB ES3 compatibility	V	V	V	V	V	Х	Χ	Χ	V	V	V	X	V
GL KHR debug	V	V	V	V	V	X	Χ	Χ	V	V	V	V	V
GL ARB copy image	V	V	V	V	V	Х	Χ	Χ	V	V	V	Χ	Χ
GL ARB compute shader	X	Χ	Χ	V	V	Х	Χ	Χ	V	V	V	V	X
GL ARB clear buffer object	V	V	V	V	V	Х	Χ	Χ	V	V	V	Χ	Χ
GL ARB arrays of arrays	V	V	V	V	V	Χ	Χ	Χ	V	V	V	V	X
Support	81%	81%	81%	100%	100%	0%	0%	0%	90%	90%	90%	29%	5 19
OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
GL ARB transform feedback instanced	Χ	Χ	Χ	V	V	٧	V	V	V	V	V	V	V
GL ARB texture compression bptc	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	Х
GL ARB texture storage	V	V	V	٧	V	V	V	V	V	V	V	V	V
GL ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	V	V

GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	V	X	
GL ARB shader image load store	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	X	
GL ARB shader atomic counters	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	X	
GL ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	V	X	
GL ARB base instance	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	
Support	58%	6 58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	1009	%	58%
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB viewport array	V	V	V	V	V	V	V	V	V	V	V	V	X	
GL ARB vertex attrib 64bit	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	X	
GL ARB shader precision	X	Χ	Χ	V	V	V	V	V	V	V	V	V	X	
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	V	X	
GL ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	1009	%	33%
OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB transform feedback3	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V	
GL ARB transform feedback2	X	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture query lod	X	Χ	V	V	V	Χ	Χ	V	V	V	V	V	V	
GL ARB texture gather	X	Χ	V	V	V	Χ	V	V	V	V	V	V	Χ	
GL ARB texture cube map array	X	Χ	V	V	V	Χ	V	V	V	V	V	V	V	
GL ARB texture buffer object rgb32	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V	
GL ARB tessellation shader	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	X	
	N	V	Χ	V	V	V	Χ	Χ	V	V	V	V	Χ	
<u>GL_ARB_shader_subroutine</u>	Х	Χ		V	V	Χ		Χ	V	V	V	V	^	
GL ARB shader subroutine GL ARB sample shading	X	X X	V X	V V	V	X	V X	V X	V V	V	V	V	X	

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Χ

GL ARB gpu shader fp64

GL ARB draw indirect

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Χ

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V

V V

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Χ

GL ARB draw buffers blend	X	Χ	V	٧	V	V	V	٧	V	V	V	V	V	
Support	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%		100%	46%
OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler			RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture swizzle	V	V	V	٧	V	V	V	V	V	V	V	V	V	
GL ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB blend func extended	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
OpenGL 3.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB sync	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	٧	V	X	
GL ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw elements base vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	89%
OpenGL 3.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB uniform buffer object	V	V	V	V	٧	٧	V	V	٧	V	V	V	V	
GL EXT texture snorm	V	V	V	V	V	V	V	V	٧	V	V	V	V	
GL ARB texture rectangle	V	V	V	V	V	V	V	V	V	V	V	V	V	

		.,				.,								
GL ARB texture buffer object	V		V	V	V	V	V	V	V	V	V	V	V	
GL NV primitive restart	V	_	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw instanced	V		V	V	V	V	V	V	V	V	V	V	V	
GL ARB copy buffer	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB vertex array object	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT transform feedback	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture rg	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT texture shared exponent	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT texture integer	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture float	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture compression rgtc	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT texture array	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT packed float	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT packed depth stencil	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB map buffer range	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB half float vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB half float pixel	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL EXT gpu shader4	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB framebuffer sRGB	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB framebuffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB depth buffer float	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL NV conditional render	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB color buffer float	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL EXT texture sRGB	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB pixel buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%

OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB vertex shader	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture non power of two	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL EXT stencil two side	٧	٧	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shading language 100	٧	٧	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shader objects	V	٧	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB point sprite	٧	٧	V	V	V	V	V	V	V	V	V	V	V	
GL ARB fragment shader	V	٧	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB draw buffers	٧	٧	V	V	V	V	V	V	V	V	V	V	V	
GL EXT blend equation separate	٧	٧	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	6	100%	100%

Apple
10.9.pre
14/03/2013
MacOS X

0%
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8%
83%
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80

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T21X

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V700

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MacOS X

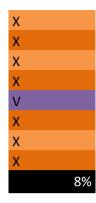
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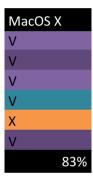
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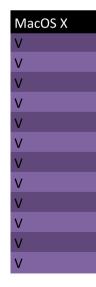


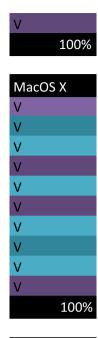
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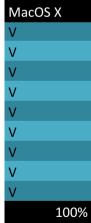
MacOS X X X X



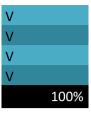


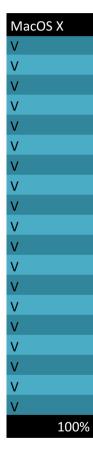




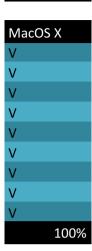










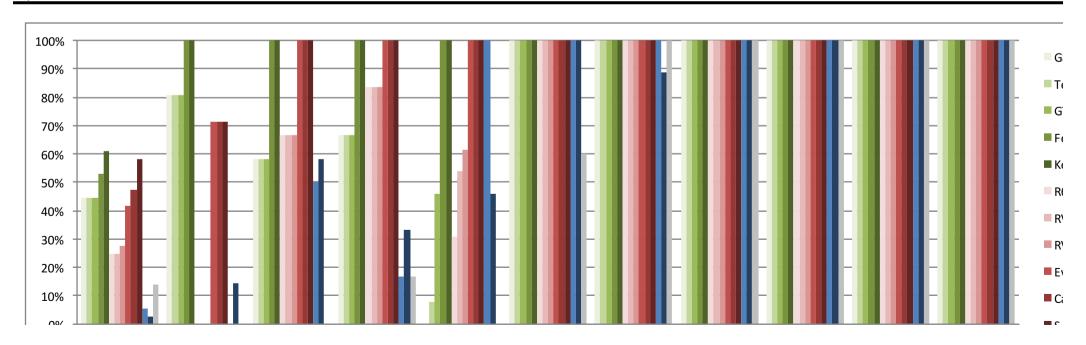


OpenGL hardware matrix

Extensions exposed by OpenGL implementations

Avril 2013, G-Truc Creation

Vendor			NVIDIA	4					AMD			Intel	Mesa
Drivers version			320.00 b	eta					13.4			9.18.10.3006	git-9.2
Release date			23/04/20	013				24	/04/2013			23/02/2013	30/03/2013
Platforms	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
Extensions	44%	44%	44%	53%	61%	25%	25%	28%	42%	47%	58%	6%	3%
OpenGL 4.3	81%	81%	81%	100%	100%	0%	0%	0%	71%	71%	71%	0%	14%
OpenGL 4.2	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	50%	58%
OpenGL 4.1	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	17%	33%
OpenGL 4.0	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	46%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	89%
OpenGL 3.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



U% + Extensions OpenGL 4.3 OpenGL 4.2 OpenGL 4.1 OpenGL 4.0 OpenGL 3.3 OpenGL 3.2 OpenGL 3.1 OpenGL 3.0 OpenGL 2.1 OpenGL 2.0

Nomenclature:

Supported

Not supported

OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
AMD vertex shader viewport index	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ
AMD vertex shader layer	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ
NV vertex buffer unified memory	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X	Χ
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	Χ
EXT texture sRGB decode	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	X	Χ
KHR texture compression astc ldr	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
NV_texture_multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
EXT_texture_mirror_clamp	V	V	V	V	V	V	V	V	V	V	V	X	Χ
ARB_robustness	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X	Χ
AMD stencil operation extended	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ
AMD_sparse_texture	X	Χ	Χ	Χ	Χ	X	Χ	Χ	X	Χ	V	X	Χ
ARB shading language include	V	V	V	V	V	X	Χ	Χ	X	Χ	Χ	X	Χ
AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ
ARB shader stencil export	X	Χ	Χ	Χ	Χ	X	Χ	Χ	V	V	V	X	Χ
ARB_robustness_isolation	V	V	V	V	V	X	Χ	Χ	X	Χ	Χ	X	Χ
ARB robust buffer access behavior	V	V	V	V	V	X	Χ	Χ	X	Χ	Χ	X	Χ
NV shader buffer store	X	Χ	Χ	V	V	X	Χ	Χ	X	Χ	Χ	X	Χ
NV shader buffer load	V	V	V	V	V	X	Χ	Χ	X	Χ	Χ	X	Χ
NV shader atomic float	X	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	X	Χ
AMD seamless cubemap per texture	X	Χ	Χ	Χ	V	Χ	Χ	V	V	V	V	X	Χ
AMD sample positions	X	Χ	Χ	Χ	Χ	V	V	V	V	V	V	X	Χ
AMD query buffer object	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X
AMD pinned memory	Χ	Χ	Χ	Χ	Χ	V	V	V	V	V	V	X	Х
NV multisample coverage	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
ATI texture mirror once	V	V	V	V	V	V	V	V	V	V	V	X	Χ

INTEL map texture	X	X	X	X	X	>	(X	Χ	X	X	X	V	X	
EXT framebuffer multisample blit scaled	X	Χ	Χ	Х	V	>	(X	X	X	X	Χ	X	X	
NV explicit multisample	V	V	V	V	V	\	/ V	V	V	V	V	X	X	
EXT direct state access	V	V	V	V	V	_\	/ V	V	V	V	V	X	X	
EXT depth bounds test	V	V	V	V	V	>	(X	Χ	Χ	X	V	X	X	
ARB debug output	V	V	V	V	V	\	/ V	V	V	V	V	X	V	
NV copy image	V	V	V	V	V	\	/ V	V	V	V	V	X	X	
ARB compatibility	V	V	V	V	V	\	/ V	V	V	V	V	V	X	
ARB cl event	X	X	X	X	X	>	(X	X	X	X	X	X	X	
AMD blend minmax factor	X	X	X	X	X	>	(X	X	X	V	V	X	X	
NV bindless texture	X	X	X	X	V	>	(X	Х	Х	X	X	Х	X	
Support	44	1%	44%	44%	53%	61%	25%	25%	28%	42%	47%	58%	6%	3%

OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
GL ARB vertex attrib binding	V	V	V	V	V	Χ	Χ	Х	Χ	Χ	Χ	Χ	Χ
GL ARB texture view	V	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	Χ	X
GL ARB texture storage multisample	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB texture query levels	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB texture buffer range	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	V
GL ARB stencil texturing	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB shader storage buffer object	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	X	X
GL ARB shader image size	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	X	X
GL ARB program interface query	V	V	V	V	V	Χ	Χ	Χ	V	V	V	X	X
GL ARB multi draw indirect	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	X	X
GL_ARB_invalidate_subdata	V	V	V	V	V	Χ	Χ	Χ	V	V	V	Χ	V
GL ARB internalformat query2	V	V	V	V	V	Χ	Χ	Χ	X	Χ	Χ	X	X
GL ARB framebuffer no attachments	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB fragment layer viewport	V	V	V	V	V	Χ	Χ	Χ	V	V	V	X	X
GL ARB explicit uniform location	V	V	V	V	V	Χ	Χ	Χ	V	V	V	X	X
GL ARB ES3 compatibility	V	V	V	V	V	Χ	Χ	Χ	V	V	V	Χ	V
GL KHR debug	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB copy image	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X

GL ARB compute shader	X	Χ	Χ	V	V	Χ	Χ	X	V	V	V	X	X	
GL ARB clear buffer object	V	V	V	V	V	X	Χ	Χ	V	V	V	Х	X	
GL ARB arrays of arrays	V	V	V	V	V	Χ	Χ	Χ	V	V	V	Χ	X	
Support	81%	81%	81%	100%	100%	0%	0%	0%	71%	71%	71%		0%	14%
OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB transform feedback instanced	X	X	Χ	V	V	V	V	V	V	V	V	V	V	
GL ARB texture compression bptc	Χ	Χ	Χ	V	V	X	Χ	Χ	V	V	V	Χ	X	
GL ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	Χ	V	
GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
GL ARB shader image load store	X	X	Χ	V	V	Χ	Χ	X	V	V	V	Χ	Χ	
GL ARB shader atomic counters	X	X	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	X	
GL ARB map buffer alignment	V	V	V	V	V	٧	V	V	V	V	V	V	V	
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
GL ARB base instance	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	
Support	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%		50%	58%
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB viewport array	V	V	V	V	V	٧	V	V	V	V	V	Χ	Х	
GL ARB vertex attrib 64bit	X	X	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	Χ	
GL ARB shader precision	X	Χ	Χ	V	V	V	V	V	V	V	V	Χ	Χ	
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
GL ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	Χ	V	
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%		17%	33%
OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB transform feedback3	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V	
GL ARB transform feedback2	X	V	V	V	V	V	V	V	٧	V	V	V	V	

GL ARB texture query lod	X	Х	V		V	V	Х	X	V	V	V	V	V	V	
GL ARB texture gather	X	Х	V		V	V	X	V	V	V	V	V	V	X	
GL ARB texture cube map array	X	X	V		V	V	Χ	V	V	V	V	V	V	V	
GL ARB texture buffer object rgb32	X	X	X		V	V	V	V	V	V	V	V	V	V	
GL ARB tessellation shader	X	X	X		V	V	X	Χ	X	V	V	V	V	X	
GL ARB shader subroutine	X	X	X		V	V	X	Χ	Χ	V	V	V	V	X	
GL ARB sample shading	X	X	V		V	V	X	V	V	V	V	V	V	X	
GL ARB gpu shader5	X	X	X		V	V	X	Χ	X	V	V	V	V	X	
GL ARB gpu shader fp64	X	X	X		V	V	X	Χ	X	V	V	V	V	X	
GL ARB draw indirect	X	X	X		V	V	Χ	Χ	Χ	V	V	V	V	X	
GL ARB draw buffers blend	X	Х	V		V	V	V	V	V	V	V	V	V	V	
Support		0%	8%	46%	100%	1009	6 3	1%	54%	62%	100%	100% 100	0%	100%	46%

OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB blend func extended	٧	٧	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	6 100%	6	100%	100%

OpenGL 3.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
GL ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB sync	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB provoking vertex	٧	V	V	V	V	٧	V	V	V	V	V	V	V

GL ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	X	
GL ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw elements base vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100	%	89%
OpenGL 3.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB uniform buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT texture snorm	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture rectangle	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL NV primitive restart	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw instanced	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB copy buffer	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	6 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100	0/ 1	100%
Support	100/	100/0	100/0	100/0	100/0	100/0	100/0	100/0	100/0	100/0	100/0	100	/0 1	10070
Support	1007	3 100/0	10070	10070	100%	10070	10070	10070	100%	10070	10070	100	/0 <u>1</u>	10070
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	10070
														10070
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	10070
OpenGL 3.0 GL ARB vertex array object	G80	Tesla V	GT21X V	Fermi V	Kepler V	R600 V	RV670 V	RV700 V	Evergreen V	Cayman V	S.I.	HD 4000 V	Mesa V	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback	G80	Tesla V V	GT21X V V	Fermi V V	Kepler V V	R600 V V	RV670 V V	RV700 V V	Evergreen V V	Cayman V V	S.I. V V	HD 4000 V V	Mesa V V	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg	G80	Tesla V V	GT21X V V V	Fermi V V	Kepler V V	R600 V V V	RV670 V V	RV700 V V	Evergreen V V	Cayman V V V	S.I. V V	HD 4000 V V	Mesa V V	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent	G80	Tesla V V V V	GT21X V V V V	Fermi V V V	Kepler V V V V	R600 V V V V	RV670 V V V	RV700 V V V	Evergreen V V V V	Cayman V V V	S.I. V V V	HD 4000 V V V	Mesa V V	100/0
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer	G80	Tesla V V V V V	GT21X V V V V V	Fermi V V V V V	Kepler V V V V V	R600 V V V V	RV670 V V V V	RV700 V V V V	Evergreen V V V V V	Cayman V V V V V	S.I. V V V V	HD 4000 V V V V	Mesa V V	100/0
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float	G80	Tesla V V V V V V	GT21X V V V V V V V	Fermi V V V V V V	Kepler V V V V V V	R600 V V V V V	RV670 V V V V V	RV700 V V V V V	Evergreen V V V V V V	Cayman V V V V V V	S.I. V V V V	HD 4000 V V V V V	Mesa V V	100/0
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc	G80	Tesla V V V V V V V V	GT21X V V V V V V V V	Fermi V V V V V V V V V	Kepler V V V V V V V	R600 V V V V V V	RV670 V V V V V	RV700 V V V V V V	Evergreen V V V V V V V	Cayman V V V V V V V V	S.I. V V V V V	HD 4000 V V V V V	Mesa V V	100/0
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array	G80	Tesla V V V V V V V V V	GT21X V V V V V V V V V V V	Fermi V V V V V V V V V	Kepler V V V V V V V V V	R600 V V V V V V	RV670 V V V V V V	RV700 V V V V V V	Evergreen V V V V V V V V	Cayman V V V V V V V V	S.I. V V V V V V V V V V V V V V V V V V	HD 4000 V V V V V V	Mesa V V	100/0
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float	G80	Tesla V V V V V V V V V V V V	GT21X V V V V V V V V V V V V V	Fermi V V V V V V V V V V V V	Kepler V V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V	RV700 V V V V V V V V	Evergreen V V V V V V V V V	Cayman V V V V V V V V V V V	S.I. V V V V V V V V V	HD 4000 V V V V V V	Mesa V V	100/0
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float GL EXT packed depth stencil	G80	Tesla V V V V V V V V V V V V V	GT21X V V V V V V V V V V V V V	Fermi V V V V V V V V V V V V V V V V V V V	Kepler V V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V V V V V	RV700 V V V V V V V V V	Evergreen V V V V V V V V V V V V V V V	Cayman V V V V V V V V V V V	S.I. V V V V V V V V V V V V V V V V V V	HD 4000 V V V V V V V V V V V V V	Mesa V V	

GL EXT gpu shader4
GL ARB framebuffer sRGB

GL ARB framebuffer object	V	V	V	٧	V	٧	V	V	V	V	V	V	V	
GL ARB depth buffer float	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL NV conditional render	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB color buffer float	V	V	V	V	V	V	V	V	V	V	٧	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1	.00%	100%
OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL EXT texture sRGB	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB pixel buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1	.00%	100%
													•	
OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
OpenGL 2.0 GL ARB vertex shader	G80 V	Tesla V	GT21X V	Fermi V	Kepler V	R600 V	RV670 V	RV700 V	Evergreen V	Cayman V	S.I.	HD 4000 V	Mesa V	
·	G80 V V				Kepler V V			RV700 V V	Evergreen V V	Cayman V V	S.I. V V			
GL ARB vertex shader	G80 V V V	V	V	٧	Kepler V V	V	V	V	Evergreen V V	V	S.I. V V	V		
GL ARB vertex shader GL ARB texture non power of two	G80 V V V	V V	V V	V V	V V	V V	V V	V	Evergreen V V V V	V	S.I. V V V	V		
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side	G80 V V V V	V V V	V V V	V V V	V V V	V V V	V V V	V	Evergreen V V V V V	V	S.I. V V V V	V		
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100	G80 V V V V V	V V V	V V V	V V V	V V V	V V V	V V V	V	Evergreen V V V V V V V	V	S.I. V V V V	V V V		
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects	G80 V V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V	Evergreen V V V V V V V V	V	S.I. V V V V V	V V V		
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects GL ARB point sprite	G80 V V V V V V	V V V V V	V V V V	V V V V V	V V V V	V V V V V	V V V V V	V	Evergreen V V V V V V V V V V	V	S.I. V V V V V V	V V V		
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects GL ARB point sprite GL ARB fragment shader	G80 V V V V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V	Evergreen V V V V V V V V V V V V V	V	S.I. V V V V V V V V V V V V V V V V V V	V V V		

Apple
10.8.3
14/03/2013
MacOS X

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V670

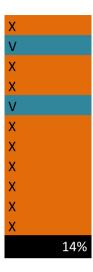
V700

vergreen

ayman

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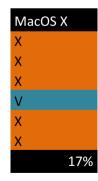
MacOS X



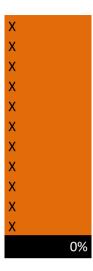


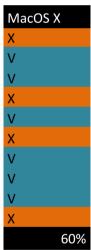


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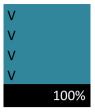




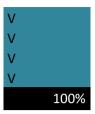








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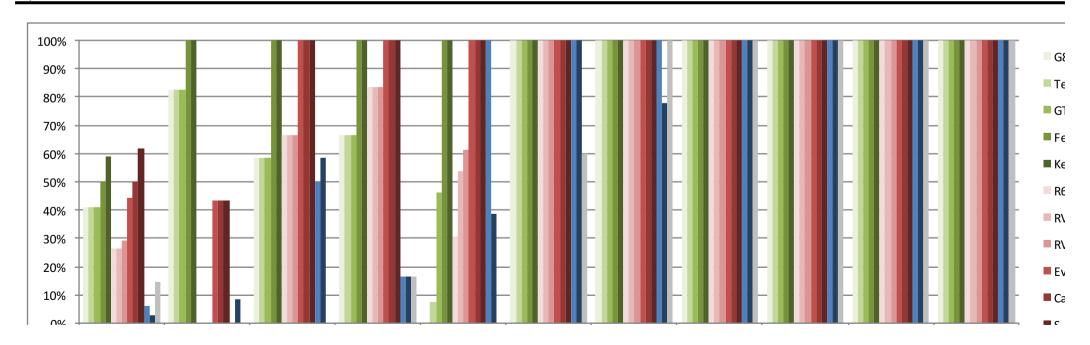


OpenGL hardware matrix

Extensions exposed by OpenGL implementations

March 2013, G-Truc Creation

Vendor			NVIDIA	١					AMD			Intel	Intel Mesa
Drivers version			314.21 b	eta				13	3.3 beta 3			9.18.10.3006	9.1.1
Release date			16/03/20)13				18	3/03/2013			23/02/2013	20/03/2013
Platforms	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
Extensions	41%	41%	41%	50%	59%	26%	26%	29%	44%	50%	62%	6%	3%
OpenGL 4.3	83%	83%	83%	100%	100%	0%	0%	0%	43%	43%	43%	0%	9%
OpenGL 4.2	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	50%	58%
OpenGL 4.1	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	17%	17%
OpenGL 4.0	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	38%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	78%
OpenGL 3.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Extensions OpenGL 4.3 OpenGL 4.2 OpenGL 4.1 OpenGL 4.0 OpenGL 3.3 OpenGL 3.2 OpenGL 3.1 OpenGL 3.0 OpenGL 2.1 OpenGL 2.0

Nomenclature:

Supported

Not supported

Changes with previous report

OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
AMD vertex shader viewport index	Χ	Χ	Х	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ
AMD vertex shader layer	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ
NV vertex buffer unified memory	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	Χ
AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	X
EXT texture sRGB decode	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	X	X
KHR texture compression astc ldr	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV texture multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	V	V	X	X
ARB robustness	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
AMD stencil operation extended	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
AMD sparse texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
ARB shading language include	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
ARB shader stencil export	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X
NV shader buffer store	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader buffer load	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader_atomic_float	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
AMD seamless cubemap per texture	X	Χ	Χ	Χ	V	Χ	Χ	V	V	V	V	X	X
AMD sample positions	X	Χ	Χ	Χ	Χ	V	V	V	V	V	V	X	X
AMD query buffer object	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X
AMD pinned memory	X	Χ	Χ	Χ	Χ	V	V	V	V	V	V	X	X
NV multisample coverage	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
ATI texture mirror once	V	V	V	V	V	V	V	V	V	V	V	Χ	X
INTEL map texture	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X

EXT framebuffer multisample blit scaled	Χ	Х	Χ	X	V	>	(X	Χ	X	X	X	Χ	X	
NV explicit multisample	V	V	V	V	V	١	/ V	V	V	V	V	X	X	
EXT direct state access	V	V	V	V	V	_\	/ V	V	V	V	V	X	X	
EXT depth bounds test	V	V	V	V	V)	(X	Χ	X	X	V	X	X	
ARB debug output	V	V	V	V	V	١	/ V	V	V	V	V	X	V	
NV copy image	V	V	V	V	V	١	/ V	V	V	V	V	X	X	
ARB compatibility	V	V	V	V	V	١	/ V	V	V	V	V	V	X	
ARB cl event	Χ	Х	X	X	X	>	X	X	X	X	X	X	X	
AMD blend minmax factor	Χ	Х	X	X	X	\	X	X	X	V	V	X	X	
NV bindless texture	X	Χ	X	X	V	>	X	X	X	X	Х	Χ	X	
Support	41	%	41%	41%	50%	59%	26%	26%	29%	44%	50% 62	2%	6%	3%

OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB vertex attrib binding	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Х	X
GL ARB texture view	V	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	X	X
GL ARB texture storage multisample	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB texture query levels	V	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	Χ	X
GL ARB texture buffer range	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB stencil texturing	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB shader storage buffer object	X	Χ	Χ	V	V	Χ	Χ	X	Χ	Χ	Χ	X	X
GL ARB shader image size	Χ	Χ	Χ	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB robustness isolation	V	V	V	V	V	Χ	Χ	X	Χ	Χ	X	X	X
GL ARB robust buffer access behavior	V	V	V	V	V	Χ	Χ	X	Χ	Χ	X	X	X
GL ARB program interface query	V	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	Χ	X
GL ARB multi draw indirect	Χ	Χ	Χ	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB invalidate subdata	V	V	V	V	V	Χ	Χ	X	Χ	Χ	X	X	V
GL ARB internalformat query2	V	V	V	V	V	Χ	Χ	X	Χ	Χ	X	X	X
GL ARB framebuffer no attachments	V	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	Χ	X
GL ARB fragment layer viewport	V	V	V	V	V	Χ	Χ	X	V	V	V	Χ	X
GL ARB explicit uniform location	V	V	V	V	V	Χ	Χ	X	V	V	V	X	X
GL ARB ES3 compatibility	V	V	V	V	V	Χ	X	X	V	V	V	X	V
GL KHR debug	V	V	V	V	V	Χ	X	X	Χ	Χ	Χ	X	X

GL ARB copy image	V	V	V	V	V	X	X	X	X	X	X	X	X
GL ARB compute shader	X	X	Χ	V	V	X	X	X	X	X	X	X	X
GL ARB clear buffer object	V	V	V	V	V	X	X	X	V	V	V	X	X
GL ARB arrays of arrays	V	V	V	V	V	Χ	Χ	Χ	V	V	V	X	Χ
Support	83%	83%	83%	100%	100%	0%	0%	0%	43%	43%	43%	0	9%
OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB transform feedback instanced	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V
GL ARB texture compression bptc	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	Χ
GL ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	X	V
GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	Χ	X
GL ARB shader image load store	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	٧	X	X
GL ARB shader atomic counters	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	٧	X	X
GL ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	٧	V	V
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	٧	V	V
GL ARB conservative depth	V	٧	V	V	V	V	V	V	V	V	V	V	V
GL ARB compressed texture pixel storage	V	٧	V	V	V	V	V	V	V	V	٧	X	Χ
GL ARB base instance	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	٧	V	V
Support	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	50	58%
•													
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB viewport array	V	٧	V	V	V	V	V	V	V	V	V	Х	Х
GL ARB vertex attrib 64bit	X	Χ	Χ	V	V	Χ	Χ	Х	V	V	V	X	Χ
GL ARB shader precision	X	Χ	Χ	V	V	V	V	V	V	V	٧	X	X
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	X	Χ
GL ARB get program binary	V	٧	V	V	V	V	V	V	V	V	V	X	Χ
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	17	'% 17%
OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB transform feedback3	Χ	Χ	Х	V	V	V	V	V	٧	٧	٧	V	V

		N /	N /	\ /		\ /		N/			N/	17	\ /
GL ARB transform feedback2	X	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture query lod	X	X	V	V	V	X	X	•	V	V	V	V	X
GL ARB texture gather	X	X	V	V	V	X	V	V	V	V	V	V	X
GL ARB texture cube map array	X	X	V	V	V	X	V	V	V	V	V	V	V
GL ARB texture buffer object rgb32	X	X	X	V	V	V	V	V	V	V	V	V	V
GL ARB tessellation shader	X	X	X	V	V	Х	X	X	V	V	V	V	X
GL ARB shader subroutine	X	X	X	V	V	X	Χ	X	V	V	V	V	X
GL ARB sample shading	X	X	V	V	V	X	V	V	V	V	V	V	X
GL ARB gpu shader5	X	X	X	V	V	Χ	X	X	V	V	V	V	X
GL ARB gpu shader fp64	X	Χ	X	V	V	Χ	X	X	V	V	V	V	Х
GL ARB draw indirect	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	X
GL ARB draw buffers blend	X	Χ	V	V	V	V	V	V	V	V	V	V	V
Support	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	38%
OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB timer query	V	V	V	V	V	V	V	V	V	N /	\ /		
	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V
	V		•	•	•			•	•	•	•		V V V
GL ARB texture swizzle	V V V	V	V	V	V	V	V	V	V	•	V	V	V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui	V V V	V V	V V	V V	V V	V V	V V	V V	V V	•	V V	V V	V V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding	V V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	•	V V V	V V V	V V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects	V V V V V	V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	•	V V V V	V V V V	V V V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2	V V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	•	V V V V	V V V V	V V V V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays	V V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	•	V V V V V	V V V V V	V V V V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location	V V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V	V V V V V V	V V V V V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended	V V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V V
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended	V V V V V V 100%	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V V Intel Mesa
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended Support		V V V V V V V T	V V V V V V V	V V V V V V V V T 100%	V V V V V V V V 100%	V V V V V V V	V V V V V V V	V V V V V V V	V V V V V V V	V V V V V V V	V V V V V V V	V V V V V V V V 100%	
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended Support OpenGL 3.2		V V V V V V Tesla	V V V V V V T100%	V V V V V V V T T T T T T T T T T T T T	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	V V V V V V V R600	V V V V V V T100%	V V V V V V T100%	V V V V V V T100%	V V V V V V Cayman	V V V V V V V S.I.	V V V V V V T100%	Intel Mesa
GL ARB texture swizzle GL ARB texture rgb10 a2ui GL ARB shader bit encoding GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended Support OpenGL 3.2 GL ARB vertex array bgra		V V V V V V V Tesla V	V V V V V V V T 100%	V V V V V V V V V V V V V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V V R600 V	V V V V V V V V RV670	V V V V V V T100%	V V V V V V V V V V V V V V V V V V V	V V V V V V V Cayman V	V V V V V V V T 100%	V V V V V V V V V V V V V V V V V V V	Intel Mesa

GL ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	X	
GL ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw elements base vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	10	00%	78%
OpenGL 3.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Me	sa
GL ARB uniform buffer object	V	V	V	V	V	V	V	V	٧	V	٧	٧	V	
GL EXT texture snorm	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture rectangle	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL ARB texture buffer object	V	V	V	V	V	V	V	V	V	V	٧	V	V	
GL NV primitive restart	V	V	V	V	V	V	V	V	٧	V	٧	٧	V	
GL ARB draw instanced	V	V	V	V	V	V	V	V	٧	V	V	٧	V	
GL ARB copy buffer	V	V	V	V	V	V	V	V	V	V	٧	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	10	00% 1	100%
Support	100%	5 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	10	100%	100%
OpenGL 3.0	100% G80	5 100% Tesla	100% GT21X	100% Fermi	100% Kepler	100% R600	100% RV670	100% RV700				10 HD 4000	00% 1 Intel Me	
									100% Evergreen	Cayman				
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Me	
OpenGL 3.0 GL ARB vertex array object	G80	Tesla V	GT21X V	Fermi V	Kepler V	R600 V	RV670 V	RV700 V	Evergreen V	Cayman V	S.I.	HD 4000 V	Intel Me	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback	G80	Tesla V V	GT21X V V	Fermi V V	Kepler V V	R600 V V	RV670 V V	RV700 V V	Evergreen V V	Cayman V V	S.I. V V	HD 4000 V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg	G80	Tesla V V V	GT21X V V	Fermi V V	Kepler V V	R600 V V V	RV670 V V	RV700 V V V	Evergreen V V	Cayman V V	S.I. V V	HD 4000 V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent	G80	Tesla V V V V	GT21X V V V	Fermi V V V	Kepler V V V	R600 V V V V	RV670 V V V	RV700 V V V	Evergreen V V V V	Cayman V V V	S.I. V V V	HD 4000 V V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer	G80	Tesla V V V V V	GT21X V V V V V	Fermi V V V V V	Kepler V V V V V	R600 V V V V	RV670 V V V V	RV700 V V V V	Evergreen V V V V V	Cayman V V V V V	S.I. V V V V	HD 4000 V V V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float	G80	Tesla V V V V V V	GT21X V V V V V V V	Fermi V V V V V V	Kepler V V V V V V	R600 V V V V V	RV670 V V V V V	RV700 V V V V V	Evergreen V V V V V V	Cayman V V V V V V	S.I. V V V V V	HD 4000 V V V V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc	G80	Tesla V V V V V V V	GT21X V V V V V V V V V	Fermi V V V V V V V V V	Kepler V V V V V V V V	R600 V V V V V V	RV670 V V V V V V	RV700 V V V V V V	Evergreen V V V V V V V V	Cayman V V V V V V V V	S.I. V V V V V	HD 4000 V V V V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array	G80	Tesla V V V V V V V V V	GT21X V V V V V V V V V V V	Fermi V V V V V V V V V	Kepler V V V V V V V V V	R600 V V V V V V	RV670 V V V V V V	RV700 V V V V V V	Evergreen V V V V V V V V V V	Cayman V V V V V V V V	S.I. V V V V V V	HD 4000 V V V V V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float	G80	Tesla V V V V V V V V V V V V	GT21X V V V V V V V V V V V V V V V V V V	Fermi V V V V V V V V V V V V V	Kepler V V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V	RV700 V V V V V V V V V	Evergreen V V V V V V V V V V V V V	Cayman V V V V V V V V V V V V	S.I. V V V V V V	HD 4000 V V V V V V V V V V V	Intel Me V V	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float GL EXT packed depth stencil	G80	Tesla V V V V V V V V V V V V V	GT21X V V V V V V V V V V V V V V V V V V V	Fermi V V V V V V V V V V V V V V V V V V V	Kepler V V V V V V V V V V V	R600 V V V V V V V	RV670 V V V V V V V	RV700 V V V V V V V V V	Evergreen V V V V V V V V V V V V V V V V V V	Cayman V V V V V V V V V V V V V V V	S.I. V V V V V V V V V V V V V V V V V V	HD 4000 V V V V V V V V V V V V V	Intel Me	
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float GL EXT packed depth stencil GL ARB map buffer range	G80	Tesla V V V V V V V V V V V V V V V V V V V	GT21X V V V V V V V V V V V V V V V V V V V	Fermi V V V V V V V V V V V V V V V V V V V	Kepler V V V V V V V V V V V V V V V V V V V	R600 V V V V V V V V	RV670 V V V V V V V V V V V V	RV700 V V V V V V V V V V	Evergreen V V V V V V V V V V V V V V V V V V	Cayman V V V V V V V V V V V V V V V V V V V	S.I. V V V V V V V	HD 4000 V V V V V V V V V V V V V V	Intel Me	

GL ARB framebuffer sRGB	V	V	V	V	V	٧	V	V	V	٧	V	٧	V	
GL ARB framebuffer object	V	٧	V	V	V	V	V	V	V	٧	V	٧	V	
GL ARB depth buffer float	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL NV conditional render	V	٧	V	V	V	٧	V	V	V	V	٧	V	V	
GL ARB color buffer float	V	٧	V	V	V	٧	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	10	0%	100%
OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergroop	Cayman	S.I.	HD 4000	Intel M	052
GL EXT texture sRGB	V	V	V	V	V	V	W 070	V	Evergreen	Cayman	٥.I. ٧	ПD 4000 V	V	esa
GL ARB pixel buffer object	V	V	V	V	V	V V	V	V	V	V	V V	V	V	
Support	100%	100%	100%	100%	100%	V	100%	V	100%	V	100%	V	0%	100%
зарроге	10070	100/0	10070	10070	100/0	100/0	10070	10070	10070	100/0	100/0	10	070	10070
OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel M	esa
OpenGL 2.0 GL ARB vertex shader	G80 V	Tesla V	GT21X V	Fermi V	Kepler V	R600 V	RV670 V	RV700 V	Evergreen V	Cayman V	S.I.	HD 4000 V	Intel M V	esa
· ·	G80 V V	Tesla V V	GT21X V V		Kepler V V						S.I. V V			esa
GL ARB vertex shader	G80 V V	V	٧	V	٧	٧	V	V			S.I. V V	V		esa
GL ARB vertex shader GL ARB texture non power of two	G80 V V V	V V	V V		S.I. V V V	V V		esa						
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side	G80 V V V V	V V V	V V	V V V	V V V	V V V	V V V	V V V	V V		S.I. V V V V	V V V		esa
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100	G80 V V V V	V V V	V V		S.I. V V V V	V V V		esa						
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects	G80 V V V V V	V V V V	V V V	V V V	V V V	V V V V	V V V V	V V V	V V		S.I. V V V V V	V V V		esa
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects GL ARB point sprite	G80 V V V V V	V V V V V	V V V V V	V V V V	V V V V	V V V V	V V V V V	V V V V	V V		S.I. V V V V V V	V V V V V		esa
GL ARB vertex shader GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects GL ARB point sprite GL ARB fragment shader	G80 V V V V V V V V	V V V V V	V V		S.I. V V V V V V V V V	V V V V V		esa						

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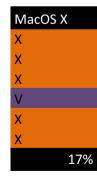
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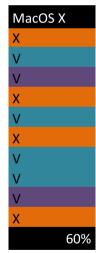




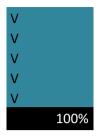




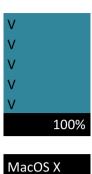








MacOS X
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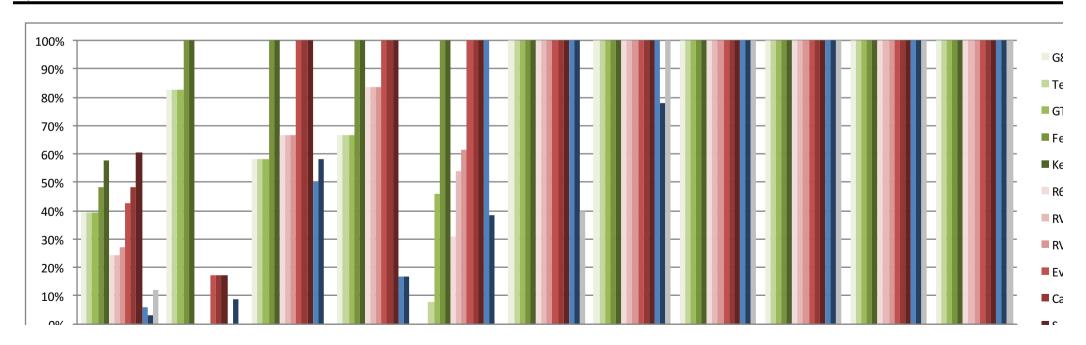


OpenGL hardware matrix

Extensions exposed by OpenGL implementations

February 2013, G-Truc Creation

Vendor			NVIDIA	A					AMD			Intel	Intel Mesa
Drivers version			314.07	7				13	3.2 beta 6			9.18.10.2973	9.1 branch
Release date			18/02/20)12				19	/02/2013			22/01/2013	22/01/2013
Platforms	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
Extensions	39%	39%	39%	48%	58%	24%	24%	27%	42%	48%	61%	6%	3%
OpenGL 4.3	83%	83%	83%	100%	100%	0%	0%	0%	17%	17%	17%	0%	9%
OpenGL 4.2	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	50%	58%
OpenGL 4.1	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	17%	17%
OpenGL 4.0	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	38%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	78%
OpenGL 3.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
AMD vertex shader viewport index	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	Х	Х
AMD vertex shader layer	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X
NV vertex buffer unified memory	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X	X
AMD transform feedback3 lines triangles	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	V	V	X	X
EXT texture sRGB decode	Χ	Χ	Χ	V	V	X	Χ	Χ	V	V	V	X	X
KHR texture compression astc ldr	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	Χ	X	X
NV texture multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	V	V	X	X
ARB robustness	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X	X
AMD stencil operation extended	Χ	Χ	Χ	X	Χ	X	Χ	Χ	Χ	Χ	V	X	X
AMD sparse texture	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	٧	X	X
ARB shading language include	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X	X
AMD shader trinary minmax	Χ	Χ	Χ	X	Χ	X	Χ	Χ	Χ	Χ	V	X	X
ARB shader stencil export	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	V	V	V	X	X
NV shader buffer store	X	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	X	X
NV shader buffer load	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X	X
NV shader atomic float	Χ	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	X	X
AMD seamless cubemap per texture	Χ	Χ	Χ	X	V	X	Χ	V	V	V	V	X	X
AMD sample positions	Χ	Χ	Χ	X	Χ	V	V	V	V	V	V	X	X
AMD query buffer object	Χ	Χ	Χ	X	Χ	X	Χ	Χ	V	V	V	X	X
AMD pinned memory	Χ	Χ	Χ	Χ	Χ	V	V	V	V	V	V	X	X
NV multisample coverage	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X	X
INTEL map texture	Χ	Χ	Χ	X	Χ	X	Χ	Χ	Χ	Χ	Χ	V	X
EXT framebuffer multisample blit scaled	Χ	Χ	Χ	X	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV_explicit_multisample	V	V	V	V	V	V	V	V	V	V	V	X	X

EXT direct state access	V	V	V	V	V	_	v v	' V	′ V	V	V	X	X	
EXT depth bounds test	V	V	V	V	V	,	X X	X	X	X	V	X	X	
ARB debug output	V	V	V	V	V	,	√ V	' V	′ V	V	V	X	V	
NV copy image	V	V	V	V	V	,	√ V	' V	′ V	V	V	X	X	
ARB compatibility	V	V	V	V	V	,	√ V	′ V	′ V	V	V	V	X	
ARB cl event	X	X	X	X	X		X X	X	X	X	Χ	X	X	
AMD blend minmax factor	X	X	X	X	X	:	X X	X	X	V	V	X	X	
NV bindless texture	X	Χ	Х	Х	V		X X	X	X	X	X	Х	X	
Support	399	%	39%	39%	48%	58%	24%	24%	27%	42%	48%	61%	6%	3%

OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB vertex attrib binding	V	V	V	V	V	Χ	Х	Х	Χ	Χ	Χ	Χ	Χ
GL ARB texture view	V	V	V	V	V	Χ	X	Χ	X	Χ	X	Χ	X
GL ARB texture storage multisample	V	V	V	V	V	Χ	Χ	Χ	V	V	V	Χ	X
GL ARB texture query levels	V	V	V	V	V	Χ	X	Χ	X	Χ	X	Χ	X
GL ARB texture buffer range	V	V	V	V	V	Χ	X	Χ	V	V	V	Χ	X
GL ARB stencil texturing	V	V	V	V	V	Χ	Χ	Χ	X	Χ	X	X	X
GL ARB shader storage buffer object	X	Χ	Χ	V	V	Χ	Χ	Χ	X	Χ	X	X	X
GL ARB shader image size	X	Χ	Χ	V	V	Χ	Χ	Χ	X	Χ	X	X	X
GL ARB robustness isolation	V	V	V	V	V	Χ	Χ	Χ	X	Χ	X	X	X
GL ARB robust buffer access behavior	V	V	V	V	V	Χ	Χ	Χ	X	Χ	X	X	X
GL ARB program interface query	V	V	V	V	V	Χ	Χ	Χ	X	Χ	Χ	X	X
GL ARB multi draw indirect	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	X
GL ARB invalidate subdata	V	V	V	V	V	Χ	Χ	Χ	X	Χ	X	X	V
GL ARB internalformat query2	V	V	V	V	V	Χ	Χ	Χ	X	Χ	X	X	X
GL ARB framebuffer no attachments	V	V	V	V	V	Χ	Χ	Χ	X	Χ	Χ	X	X
GL ARB fragment layer viewport	V	V	V	V	V	Χ	X	Χ	V	V	V	Χ	X
GL ARB explicit uniform location	V	V	V	V	V	Χ	Χ	Χ	X	Χ	X	X	X
GL ARB ES3 compatibility	V	V	V	V	V	Χ	Χ	Χ	X	Χ	X	X	V
GL KHR debug	V	V	V	V	V	Χ	X	Χ	Χ	Χ	Χ	Χ	X
GL ARB copy image	V	V	V	V	V	Χ	X	Χ	Χ	Χ	Χ	Χ	X
GL ARB compute shader	X	Χ	Χ	V	V	X	X	X	Χ	X	Χ	Χ	X

GL ARB clear buffer object	V	V	V	V	V	Χ	X	X	X	Χ	Χ	Χ	Χ	
GL ARB arrays of arrays	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	
Support	83%	83%	83%	100%	100%	0%	0%	0%	17%	17%	17%		0%	9%
OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mo	esa
GL ARB transform feedback instanced	X	Χ	Χ	V	V	V	V	V	V	V	٧	٧	V	
GL ARB texture compression bptc	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	Χ	
GL ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	Χ	V	
GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	
GL ARB shader image load store	X	Χ	Χ	V	V	Χ	X	Χ	V	V	V	Χ	Χ	
GL ARB shader atomic counters	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	X	Χ	
GL ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	X	Χ	
GL ARB base instance	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	
Support	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	5	0%	58%
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel M	esa
GL ARB viewport array	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	
GL ARB vertex attrib 64bit	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	Χ	
GL ARB shader precision	X	Χ	Χ	V	V	V	V	V	V	V	V	Χ	Χ	
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	X	X	
GL ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	X	Χ	
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	1	7%	17%
OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel M	esa
GL ARB transform feedback3	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V	
GL ARB transform feedback2	X	V	V	V	V	V	V	V	V	V	V	V	V	

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GL ARB texture gather	X	X	V	V	V	X	V	V	V	V	V	V	X
GL ARB texture cube map array	X	X	V	V	V	Χ	V	V	V	V	V	V	V
GL ARB texture buffer object rgb32	X	Χ	Χ	V	V	V	V	V	V	V	V	V	V
GL ARB tessellation shader	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	X
GL ARB shader subroutine	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	X
GL ARB sample shading	X	Χ	V	V	V	X	V	V	V	V	V	V	X
GL ARB gpu shader5	X	Χ	X	V	V	X	X	Χ	V	V	V	V	X
GL ARB gpu shader fp64	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	X
GL ARB draw indirect	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	X
GL ARB draw buffers blend	X	Χ	V	V	V	V	V	V	V	V	V	V	V
Support	0%	6 8%	46%	100%	100%	31%	54%	62%	100%	6 100%	100%	1009	% 38%
OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB timer query	V	٧	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shader bit encoding	7												
	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB sampler objects	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V
	V V		_	•	•		•	•	•	•	•	•	V V V
GL ARB sampler objects	V V V	V	V	V	V	V	V	V	V	V	V	V	V V V
GL ARB sampler objects GL ARB occlusion query2	V V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V V V
GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays	V V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V V
GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location	V V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V
GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended	V V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V
GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended	V V V V 1009	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V
GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended Support		V V V V 6 100%	V V V V V S 100%	V V V V V S 100%	V V V V V S 100%	V V V V V 5 100%	V V V V V	V V V V V	V V V V V	V V V V V V	V V V V V 5 100%	V V V V V	% 100%
GL ARB sampler objects GL ARB occlusion query2 GL ARB instanced arrays GL ARB explicit attrib location GL ARB blend func extended Support OpenGL 3.2		V V V V 6 100%	V V V V V GT21X	V V V V V 5 100%	V V V V V S 100%	V V V V V 5 100%	V V V V 100%	V V V V V T T T T T T T T T T T T T T T	V V V V V 100%	V V V V 6 100%	V V V V V 5 100%	V V V V V HD 4000	% 100% Intel Mesa

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V

GL ARB seamless cube map GL ARB provoking vertex

GL ARB geometry shader4

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V

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V

V

GL ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB draw elements base vertex	V	V	V	V	V	V	V	V	V	٧	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	78%
OpenGL 3.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
GL ARB uniform buffer object	V	V	V	V	V	٧	V	V	V	٧	V	V	V
GL EXT texture snorm	V	V	V	V	V	٧	V	V	V	V	V	V	V
GL ARB texture rectangle	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V
GL NV primitive restart	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB draw instanced	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB copy buffer	V	V	V	V	V	V	V	V	V	٧	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	6 100%
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel Mesa
OpenGL 3.0 GL ARB vertex array object	G80 V	Tesla V	GT21X V	Fermi V	Kepler V	R600 V	RV670 V	RV700 V	Evergreen V	Cayman V	S.I.	HD 4000 V	Intel Mesa V
·													
GL ARB vertex array object		V	٧	V	٧	V	V	V	V	V	V	V	V
GL ARB vertex array object GL EXT transform feedback		V V	V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg		V V V	V V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent		V V V	V V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer		V V V V	V V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float		V V V V V	V V V V	V V V V	V V V V	V V V V V	V V V V V	V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc		V V V V V	V V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array		V V V V V V	V V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float		V V V V V V	V V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float GL EXT packed depth stencil		V V V V V V V	V V V										
GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array GL EXT packed float GL EXT packed depth stencil GL ARB map buffer range		V V V V V V V	V V V										

GL ARB framebuffer sRGB
GL ARB framebuffer object

GL ARB depth buffer float	V	V	V	V	٧	V	٧	٧	V	V	V	V	V	
GL NV conditional render	V	V	V	V	V	٧	V	V	V	V	V	V	V	
GL ARB color buffer float	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1	100%	100%
OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel M	lesa
GL EXT texture sRGB	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB pixel buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	6 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1	L00%	100%
OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Intel M	lesa
GL ARB vertex shader	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture non power of two	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT stencil two side	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shading language 100	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shader objects	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB point sprite	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB fragment shader	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw buffers	V	V	V	V	V	٧	V	V	V	V	V	V	V	
GL EXT blend equation separate	V	V	V	V	V	٧	V	V	V	V	V	V	V	
Support	100%	6 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	1	100%	100%

Apple
10.8.2
04/10/2012
MacOS X

12%
0%
0%
0%
40%
100%
100%
100%
100%

80

esla

T21X

ermi

epler

500

√670

V700

∕ergreen

ayman

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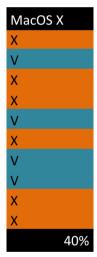
X V X X X X X X X







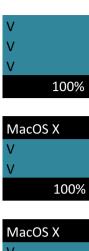








MacOS X
V
V
V
V
V
V
100%



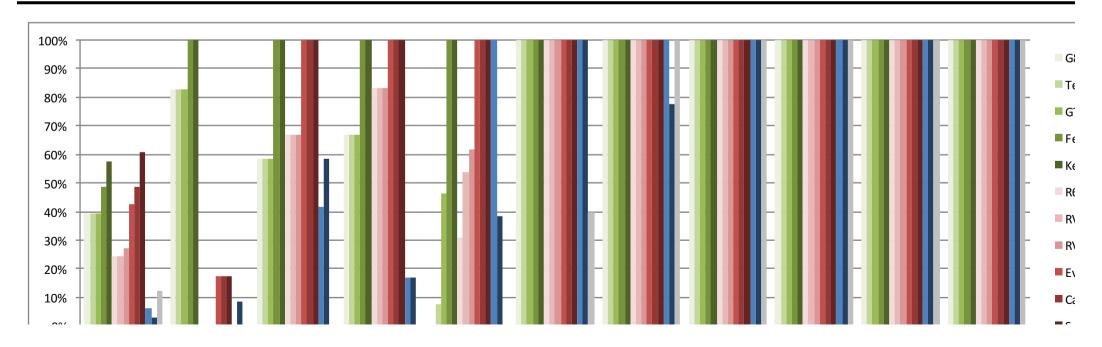


OpenGL hardware matrix

Extensions exposed by OpenGL implementations

January 2013, G-Truc Creation

Vendor			NVIDIA	4					AMD			Intel	Intel Mesa
Drivers version			313.95 b	eta				1	3.02 beta			15.31.64.2885	9.1 branch
Release date			28/01/20	013				18	/01/2013			16/12/2012	22/01/2013
Platforms	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
Extensions	39%	39%	39%	48%	58%	24%	24%	27%	42%	48%	61%	6%	3%
OpenGL 4.3	83%	83%	83%	100%	100%	0%	0%	0%	17%	17%	17%	0%	9%
OpenGL 4.2	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%	42%	58%
OpenGL 4.1	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%	17%	17%
OpenGL 4.0	0%	8%	46%	100%	100%	31%	54%	62%	100%	100%	100%	100%	38%
OpenGL 3.3	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	78%
OpenGL 3.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 2.0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



0% + Extensions OpenGL 4.3 OpenGL 4.2 OpenGL 4.1 OpenGL 4.0 OpenGL 3.3 OpenGL 3.2 OpenGL 3.1 OpenGL 3.0 OpenGL 2.1 OpenGL 2.0

Nomenclature:

Supported

Not supported

OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
AMD vertex shader viewport index	Χ	Χ	Χ	Χ	Х	Χ	Χ	Χ	V	V	V	Х	Х
AMD vertex shader layer	Χ	X	Χ	Χ	Χ	Χ	Χ	X	V	V	V	X	X
NV vertex buffer unified memory	٧	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	X	X
AMD transform feedback3 lines triangles	X	X	Χ	Χ	Χ	Χ	Χ	X	Χ	V	V	X	X
EXT texture sRGB decode	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	X	X
KHR texture compression astc ldr	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV texture multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	V	V	X	X
ARB robustness	V	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	X	X
AMD stencil operation extended	X	X	Χ	Χ	X	Χ	Χ	X	Χ	Χ	V	X	X
AMD sparse texture	Χ	X	Χ	Χ	Χ	Χ	Χ	X	Χ	Χ	V	X	X
ARB shading language include	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
AMD shader trinary minmax	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	X
ARB shader stencil export	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X
NV shader buffer store	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader buffer load	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV shader atomic float	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
AMD seamless cubemap per texture	Χ	Χ	Χ	Χ	V	Χ	Χ	V	V	V	V	X	X
AMD sample positions	Χ	Χ	Χ	Χ	Χ	V	V	V	V	V	V	X	X
AMD query buffer object	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	X
AMD pinned memory	Χ	X	Χ	Χ	Χ	V	V	V	V	V	V	X	X
NV multisample coverage	٧	V	V	V	V	Χ	Χ	X	Χ	Χ	Χ	Χ	X
INTEL map texture	Χ	Χ	Χ	X	Χ	Χ	Χ	X	Χ	Χ	Χ	V	X
EXT framebuffer multisample blit scaled	Χ	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
NV explicit multisample	V	V	V	V	V	V	V	V	V	V	V	X	X

EXT direct state access	V	V	V	V	V	V	V	V	V	V	V	X	X	
EXT depth bounds test	V	V	V	V	V	X	X	X	X	X	V	X	X	
ARB debug output	V	V	V	V	V	V	V	V	V	V	V	X	V	
NV copy image	V	V	V	V	V	V	V	V	V	V	V	X	X	
ARB compatibility	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB cl event	X	Χ	Χ	Χ	Χ	X	X	X	Χ	X	Χ	Χ	X	
AMD blend minmax factor	X	Χ	Χ	Χ	Χ	X	X	X	Χ	V	V	X	X	
NV bindless texture	Χ	Χ	Χ	Χ	V	X	X	X	Х	X	Χ	Χ	X	
Support	39%	39%	39	% 48	% 5	58%	24%	24%	27%	42%	48% 619	%	6%	3%

OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa
GL ARB vertex attrib binding	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB texture view	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB texture storage multisample	V	V	V	V	V	Χ	Χ	Χ	V	V	V	Χ	X
GL ARB texture query levels	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB texture buffer range	V	V	V	V	V	Χ	Χ	Χ	V	V	V	Χ	X
GL ARB stencil texturing	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB shader storage buffer object	X	X	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB shader image size	Χ	Χ	Χ	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB robustness isolation	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB robust buffer access behavior	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB program interface query	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB multi draw indirect	Χ	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	X
GL ARB invalidate subdata	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	V
GL ARB internalformat query2	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB framebuffer no attachments	V	V	V	V	V	X	Χ	Χ	X	Χ	Χ	Χ	X
GL ARB fragment layer viewport	V	V	V	V	V	Χ	Χ	Χ	V	V	V	Χ	X
GL ARB explicit uniform location	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X	X
GL ARB ES3 compatibility	V	V	V	V	V	Χ	X	Χ	Χ	Χ	Χ	X	V
GL KHR debug	V	V	V	V	V	Χ	X	Χ	Χ	Χ	Χ	X	X
GL ARB copy image	V	V	V	V	V	Χ	Χ	Χ	X	Χ	Χ	X	X
GL ARB compute shader	X	Χ	Χ	V	V	Χ	X	X	Χ	Χ	Χ	X	Χ

GL ARB clear buffer object	V	V	V	V	V	X	X	X	X	X	X	X	X	
GL ARB arrays of arrays Support	83%	V	V	•	•	7.	X 0%	X 0%	X 17%	X 17%	X 17%	X	0%	9%
Support	65%	03%	0370	100%	100%	U%	U70	0%	1/70	1/70	1/70		U%	9%
OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB transform feedback instanced	X	Χ	Χ	V	V	٧	V	V	V	V	٧	Χ	V	
GL ARB texture compression bptc	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	X	
GL ARB texture storage	V	٧	V	V	V	٧	V	V	V	V	V	V	V	
GL ARB shading language packing	V	٧	V	V	V	٧	V	V	V	V	V	Χ	V	
GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
GL ARB shader image load store	X	Χ	X	V	V	Χ	X	X	V	V	V	Χ	X	
GL ARB shader atomic counters	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ	X	
GL ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
GL ARB base instance	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V	V	
Support	58%	58%	58%	100%	100%	67%	67%	67%	100%	100%	100%)	42%	58%
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB viewport array	V	V	V	V	V	V	V	V	V	V	V	X	X	
GL ARB vertex attrib 64bit	X	Χ	X	V	V	Χ	Χ	Χ	V	V	V	Χ	X	
GL ARB shader precision	X	Χ	Χ	V	V	V	V	V	V	V	V	Χ	X	
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
GL ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	Χ	X	
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	100%	100%)	17%	17%
OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB transform feedback3	Χ	X	X	V	V	V	V	V	V	V	V	V	V	
GL ARB transform feedback2	X	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture query lod	X	X	ľv	V	V	X	X	v	V	V	V	V	X	
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GL ARB texture gather	X	Χ	V	V	V	Χ	V	V	V	V	V	V	X	
GL ARB texture cube map array	X	Χ	V	V	V	Χ	V	V	V	V	V	V	V	
GL ARB texture buffer object rgb32	X	Χ	X	V	V	V	V	V	٧	V	٧	V	V	
GL ARB tessellation shader	X	Χ	Χ	V	V	X	Χ	Х	V	V	٧	V	X	
GL ARB shader subroutine	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	X	
GL ARB sample shading	X	Χ	V	V	V	X	V	V	V	V	V	V	X	
GL ARB gpu shader5	X	Χ	X	V	V	X	X	Χ	V	V	V	V	X	
GL ARB gpu shader fp64	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	X	
GL ARB draw indirect	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	V	X	
GL ARB draw buffers blend	X	Χ	V	V	V	V	V	V	V	V	V	V	V	
Support	0%	8%	46%	100%	100%	31%	54%	62%	100%	6 100%	6 100%	6	100%	38%
													•	
OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	٧	V	V	V	V	
GL ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	٧	V	٧	V	V	
GL ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB sampler objects	V	V	V	V	V	V	V	V	٧	V	٧	V	V	
GL ARB occlusion query2	V	V	V	V	V	V	V	V	٧	V	٧	V	V	
GL ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB explicit attrib location	V	V	V	V	V	V	V	V	٧	V	٧	V	V	
GL ARB blend func extended	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	6 100%	6 100%	6 100%	6	100%	1009
OpenGL 3.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.L.	HD 4000	Mesa	
GL ARB vertex array bgra	V	V	V	V	V	\/	V	V	V	V	V.	V	V	
GL ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V	v	

OpenGL 3.2	G8U	resia	GIZIX	Fermi	Kepier	KbUU	KV6/U	KV/00	Evergreen	Cayman	5.I.	HD 4000	iviesa
GL ARB vertex array bgra	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB sync	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V	Χ

GL ARB fragment coord conventions	V	٧	V	٧	V	V	V	V	V	V	V	V	V	
GL ARB depth clamp	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw elements base vertex	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	6 100%	6	100%	78%
OpenGL 3.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB uniform buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT texture snorm	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture rectangle	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL NV primitive restart	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB draw instanced	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB copy buffer	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	6 100%	6	100%	100%
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	6 100%	6	100%	100%
Support OpenGL 3.0	100% G80	100% Tesla	100% GT21X	100% Fermi	100% Kepler	100% R600	100% RV670	100% RV700	5 100% Evergreen	5 100% Cayman	5.I.	6 HD 4000	100% Mesa	100%
														100%
OpenGL 3.0		Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	100%
OpenGL 3.0 GL ARB vertex array object		Tesla V	GT21X V	Fermi V	Kepler V	R600 V	RV670 V	RV700 V	Evergreen V	Cayman V	S.I. V	HD 4000 V	Mesa	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback		Tesla V V	GT21X V V	Fermi V V	Kepler V V	R600 V V	RV670 V V	RV700 V V	Evergreen V V	Cayman V V	S.I. V V	HD 4000 V V	Mesa	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg		Tesla V V V	GT21X V V	Fermi V V	Kepler V V	R600 V V V	RV670 V V	RV700 V V	Evergreen V V	Cayman V V V	S.I. V V	HD 4000 V V V	Mesa	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent		Tesla V V V V	GT21X V V V	Fermi V V V	Kepler V V V	R600 V V V V	RV670 V V V	RV700 V V V V	Evergreen V V V V	Cayman V V V	S.I. V V V	HD 4000 V V V V	Mesa	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer		Tesla V V V V V	GT21X V V V V V	Fermi V V V V	Kepler V V V V V	R600 V V V V	RV670 V V V V	RV700 V V V V	Evergreen V V V V V	Cayman V V V V V	S.I. V V V V	HD 4000 V V V V	Mesa	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float		Tesla V V V V V V	GT21X V V V V V V	Fermi V V V V V V V	Kepler V V V V V V	R600 V V V V V	RV670 V V V V V	RV700 V V V V V	Evergreen V V V V V V	Cayman V V V V V V	S.I. V V V V	HD 4000 V V V V V	Mesa	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc		Tesla V V V V V V V V	GT21X V V V V V V V V V	Fermi V V V V V V V V	Kepler V V V V V V V	R600 V V V V V V	RV670 V V V V V	RV700 V V V V V V	Evergreen V V V V V V V V	Cayman V V V V V V V V	S.I. V V V V V	HD 4000 V V V V V V	Mesa	100%
OpenGL 3.0 GL ARB vertex array object GL EXT transform feedback GL ARB texture rg GL EXT texture shared exponent GL EXT texture integer GL ARB texture float GL ARB texture compression rgtc GL EXT texture array		Tesla V V V V V V V V	GT21X V V V V V V V V V V V V	Fermi V V V V V V V V V V V	Kepler V V V V V V V V V V	R600 V V V V V V	RV670 V V V V V V	RV700 V V V V V V V V V V	Evergreen V V V V V V V V V V	Cayman V V V V V V V V	S.I. V V V V V V	HD 4000 V V V V V V	Mesa	100%

GL ARB half float vertex

GL ARB framebuffer sRGB

GL ARB framebuffer object

GL ARB half float pixel

GL EXT gpu shader4

GL ARB depth buffer float	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL NV conditional render	V	٧	V	V	V	V	V	V	V	V	V	V	V	
GL ARB color buffer float	V	٧	V	V	V	٧	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL EXT texture sRGB	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB pixel buffer object	V	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%
OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	Cayman	S.I.	HD 4000	Mesa	
GL ARB vertex shader	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB texture non power of two	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL EXT stencil two side	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shading language 100	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB shader objects	V	٧	V	V	V	٧	V	V	V	V	V	V	V	
GL ARB point sprite	V	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB fragment shader	V	٧	V	V	V	٧	V	V	V	V	V	V	V	
GL ARB draw buffers	V	٧	V	V	V	٧	V	V	V	V	V	V	V	
GL EXT blend equation separate	٧	٧	V	V	V	٧	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%	100%

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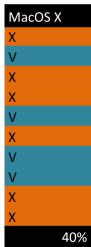
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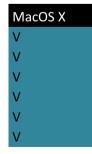






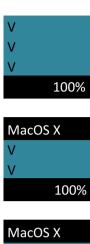








MacOS X
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OpenGL hardware matrix

Extensions exposed by OpenGL implementations

December 2012, G-Truc Creation

Nomenclature:

Supported

Not supported

Vendor			NVIDI	A					AMD			Intel
Drivers version			310.7	0					12.11 beta 11			15.31.64.2885
Release date			18/12/2	012					07/12/2012			16/12/2012
OpenGL Extensions	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL AMD vertex shader viewport index	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X
GL AMD vertex shader layer	X	Χ	Χ	Χ	Χ	X	Χ	Χ	V	V	V	X
GL NV vertex buffer unified memory	V	V	V	V	V	X	Χ	Χ	Χ	X	Χ	X
GL AMD transform feedback3 lines triangles	X	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	V	V	X
GL EXT texture sRGB decode	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	X
GL KHR texture compression astc ldr	X	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	X	Χ	Χ
GL NV texture multisample	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X
GL EXT texture mirror clamp	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB robustness	V	V	V	V	V	X	Χ	Χ	Χ	X	Χ	X
GL AMD stencil operation extended	X	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	X	V	X
GL AMD sparse texture	X	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	X	V	X
GL ARB shading language include	V	V	V	V	V	X	Χ	Χ	Χ	X	Χ	X
GL AMD shader trinary minmax	X	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	V	X
GL ARB shader stencil export	X	Χ	Χ	Χ	Χ	X	Χ	Χ	V	V	V	X
GL NV shader buffer store	X	Χ	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	X
GL NV shader buffer load	V	V	V	V	V	X	Χ	Χ	Χ	X	Χ	X
GL NV shader atomic float	X	X	Χ	V	V	X	Χ	Χ	Χ	Χ	Χ	X
GL AMD seamless cubemap per texture	X	Χ	Χ	Χ	V	X	Χ	V	V	V	V	X

GL AMD sample positions	X	Χ	Χ	Χ	Χ	٧	V	V	V	V	V	X
GL AMD query buffer object	X	Χ	Χ	Χ	Χ	Χ	X	Χ	V	V	V	X
GL AMD pinned memory	X	Χ	Χ	Χ	Χ	V	V	V	V	V	V	X
GL NV multisample coverage	V	V	V	V	V	Χ	Χ	Χ	X	X	X	X
GL INTEL map texture	X	Χ	Χ	Χ	Χ	Χ	X	Χ	X	X	X	V
GL EXT framebuffer multisample blit scaled	X	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	X	Χ	X
GL NV explicit multisample	V	V	V	V	V	V	V	V	V	V	V	X
GL EXT direct state access	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB debug output	V	V	V	V	V	V	V	V	V	V	V	X
GL NV copy image	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB cl event	X	Χ	Χ	Χ	Χ	Χ	X	Χ	X	X	X	X
GL AMD blend minmax factor	X	Χ	Χ	Χ	X	Χ	X	Χ	X	V	V	X
GL NV bindless texture	Χ	Χ	Χ	Χ	V	X	Χ	X	X	X	X	X
Support	35%	35%	35%	45%	6 55%	23%	239	% 2	26%	42%	48% 589	% 3%

OpenGL 4.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB vertex attrib binding	٧	V	V	V	V	Χ	Χ	Χ	X	X	Χ	Χ
GL ARB texture view	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB texture storage multisample	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB texture query levels	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB texture buffer range	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB stencil texturing	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X
GL ARB shader storage buffer object	X	X	Χ	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB shader image size	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB robustness isolation	V	V	V	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB robust buffer access behavior	V	V	V	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB program interface query	V	V	V	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB multi draw indirect	X	Χ	Χ	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB invalidate subdata	V	V	V	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB internalformat query2	V	V	V	V	V	Χ	Χ	Χ	Χ	X	Χ	X
GL ARB framebuffer no attachments	V	V	V	V	V	Χ	Χ	Χ	Χ	X	Χ	Χ
GL ARB fragment layer viewport	V	V	V	V	V	Χ	Χ	Χ	Χ	Χ	Χ	X

							.,	.,				
GL ARB explicit uniform location	V	V	V	V	V	X	X	X	X	X	X	X
GL ARB ES3 compatibility	V	V	V	V	V	Х	X	X	X	X	Χ	X
GL KHR debug	V	V	V	V	V	X	X	Χ	X	X	X	X
GL ARB copy image	V	V	V	V	V	Х	X	X	X	X	X	X
GL ARB compute shader	X	Χ	X	V	V	Х	X	Χ	X	X	Χ	X
GL ARB clear buffer object	V	V	V	V	V	X	X	Χ	X	X	Χ	X
GL ARB arrays of arrays	V	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	X
Support	83%	83%		100%	100%	0%	0%	0%	0%	6 09	% 0%	6 0%
OpenGL 4.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB transform feedback instanced	X	Χ	Χ	V	V	V	V	V	V	V	V	X
GL ARB texture compression bptc	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	Χ
GL ARB texture storage	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shading language packing	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB shading language 420pack	V	V	V	V	V	V	V	V	V	V	V	Х
GL ARB shader image load store	X	Χ	Χ	V	V	X	Χ	Χ	V	V	V	Х
GL ARB shader atomic counters	X	Χ	Χ	V	V	Х	Χ	Χ	V	V	V	X
GL ARB map buffer alignment	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB internalformat query	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB compressed texture pixel storage	V	V	V	V	V	V	V	V	V	V	V	Х
GL ARB base instance	X	Х	Χ	V	V	Х	Χ	Χ	V	V	V	V
Support	58%	58%	58%	100%	100%	67%	67%	67%	100%	6 1009	% 100%	42%
OpenGL 4.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB viewport array	V	V	V	V	V	V	V	V	V	V	V	Х
GL ARB vertex attrib 64bit	X	Х	Х	V	V	Х	Χ	Χ	V	V	V	Χ
GL ARB shader precision	X	Χ	Χ	V	V	V	V	V	V	V	V	Χ
GL ARB separate shader objects	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB get program binary	V	V	V	V	V	V	V	V	V	V	V	X
GL ARB ES2 compatibility	V	V	V	V	V	V	V	V	V	V	V	V
Support	67%	67%	67%	100%	100%	83%	83%	83%	100%	6 1009	% 100%	17%

OpenGL 4.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB transform feedback3	Χ	Χ	Х	V	V	V	V	V	V	V	V	V
GL ARB transform feedback2	X	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture query lod	X	X	V	V	V	Χ	Х	V	V	V	V	V
GL ARB texture gather	X	Χ	V	V	V	Χ	V	V	V	V	V	V
GL ARB texture cube map array	X	Χ	V	V	V	Χ	V	V	V	V	V	V
GL ARB texture buffer object rgb32	X	Χ	X	V	V	V	V	V	V	V	V	V
GL ARB tessellation shader	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V
GL ARB shader subroutine	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V
GL ARB sample shading	X	Χ	V	V	V	Χ	V	V	V	V	V	V
GL ARB gpu shader5	X	Χ	X	V	V	Χ	Χ	Χ	V	V	V	V
GL ARB gpu shader fp64	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V
GL ARB draw indirect	X	Χ	Χ	V	V	Χ	Χ	Χ	V	V	V	V
GL ARB draw buffers blend	X	Χ	V	V	V	V	V	V	V	V	V	V
Support	0%	6 8%	46%	100%	100%	31%	54%	62%	100%	6 100%	6 1009	% 10
OpenGL 3.3	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB vertex type 2 10 10 10 rev	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB timer query	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture swizzle	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB texture rgb10 a2ui	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB shader bit encoding	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB sampler objects	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB occlusion query2	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB instanced arrays	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB explicit attrib location	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB blend func extended	V	V	V	V	V	V	V	V	V	V	V	V
Support	100%	6 100%	100%	100%	100%	100%	100%	100%	100%	6 1009	6 100%	% 10

OpenGL 3.2	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB vertex array bgra	٧	V	V	V	V	V	V	V	V	V	V	V

GL ARB texture multisample	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB sync	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB provoking vertex	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB geometry shader4	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB fragment coord conventions	V	V	V	V	V	V	V	V	V	V	V	V
GL ARB depth clamp	V	V	V	V	V	V	V	V	٧	V	V	V
GL ARB draw elements base vertex	V	V	V	V	V	V	V	V	٧	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB uniform buffer object	V	٧	V	V	V	٧	V	V	V	V	٧	V
GL EXT texture snorm	V	٧	V	V	V	V	V	V	V	V	V	V
GL ARB texture rectangle	V	V	V	V	V	V	V	V	٧	V	V	V
GL ARB texture buffer object	V	V	V	V	V	V	V	V	٧	V	V	V
GL NV primitive restart	V	V	V	V	V	V	V	V	٧	V	V	V
GL ARB draw instanced	V	V	V	V	V	٧	V	V	V	V	V	V
GL ARB copy buffer	V	V	V	V	V	٧	V	V	V	V	V	V
GL ARB compatibility	V	V	V	V	V	V	V	V	٧	V	V	V
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000
GL ARB vertex array object	V	V	V	V	V	V	V	V	V	V	٧	V
GL EXT transform feedback	V	V	V	V	V	V	V	V	V	V	٧	V
GL ARB texture rg	V	V	V	V	V	٧	V	V	٧	V	V	V
GL EXT texture shared exponent	V	V	V	V	V	٧	V	V	٧	V	V	V
GL EXT texture integer	V	V	V	V	V	V	V	V	٧	V	V	V
GL ARB texture float	V	٧	V	V	V	V	V	V	٧	V	V	V
GL ARB texture compression rgtc	V	٧	V	V	V	V	V	V	٧	V	V	V
GL EXT texture array	V	٧	V	V	V	V	V	V	٧	V	V	V
GL EXT packed float	V	V	V	V	V	٧	V	V	٧	V	V	V
GL EXT packed depth stencil	V	V	V	V	V	V	V	V	V	V	V	V

GL ARB map buffer range	V	٧	V	V	V	V	V	V	V	V	V	V	
GL ARB half float vertex	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB half float pixel	V	V	V	V	V	V	V	V	V	V	٧	V	
GL EXT gpu shader4	V	V	V	V	V	V	V	V	V	V	٧	V	
GL ARB framebuffer sRGB	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB framebuffer object	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB depth buffer float	V	V	V	V	V	V	V	V	V	V	V	V	
GL NV conditional render	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB color buffer float	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.1	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cayman	S.I.	HD 4000	
GL EXT texture sRGB	V	V	V	V	V	V	V	V	V	V	V	V	
GL ARB pixel buffer object	V	V	V	V	V	V	V	V	V	V	V	V	
Support	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		100%
OpenGL 2.0	G80	Tesla	GT21X	Fermi	Kepler	R600	RV670	RV700	Evergreen	N.I. Cavanaan	٠.	HD 4000	
GL ARB vertex shader	V			T CITIII	•	11000	111070	117700	LVCIGICCII	N.I. Cayman	S.I.	110 4000	
	V	V	V	V	V	V	V	V	V	V.I. Cayman	V.	V	
GL ARB texture non power of two	V	V V	V	V						•			
<u> </u>	V V	•	V	V V	V	V	V	V	V	•	V	V	
GL ARB texture non power of two	V V V	V	V V V	V V V	V V	V V	V V	V V	V V	•	V	V V	
GL ARB texture non power of two GL EXT stencil two side	V V V V	V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	•	V	V V V	
GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100	V V V V	V V V	V V V V	V V V V	V V V	V V V	V V V	V V V	V V V	•	V	V V V	
GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects	V V V V V	V V V V	V V V V V	V V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	•	V	V V V V	
GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects GL ARB point sprite	V V V V V	V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	•	V V V V V	V V V V V	
GL ARB texture non power of two GL EXT stencil two side GL ARB shading language 100 GL ARB shader objects GL ARB point sprite GL ARB fragment shader	V V V V V V	V V V V V	V V V V V	V V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	•	V V V V V	V V V V V	