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

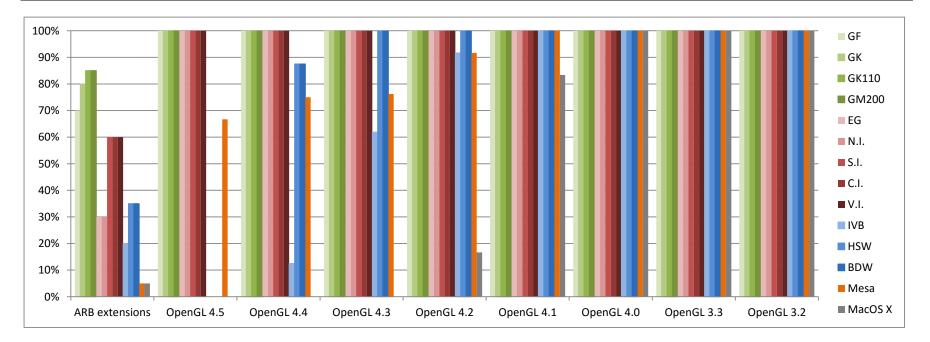
S.I. / Southern Islands: Radeon HD 7000 series, Radeon R7 250X, Radeon R7 265, Radeon R9 280 C.I. / Sea Islands: Radeon HD 7790, Radeon R7 240, Radeon R7 250, Radeon R7 260, Radeon R9 270

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		NVIDIA				AMD					Intel		Mesa	Apple
Drivers version		353.62					15.7.1					4212	git-11.0	10.10.1
Release date		29/07/2015				29,	/07/20	15		Ju	une 20:	15	02/08/2015	17/11/2014
Platforms	GF G	3K	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% 1	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%	0%	67%	0%
OpenGL 4.4	100% 1	100%	100%	100%	100%	100%	100%	100%	100%	13%	88%	88%	75%	0%
OpenGL 4.3	100% 1	100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%	76%	0%
OpenGL 4.2	100% 1	100%	100%	100%	100%	100%	100%	100%	100%	92%	100%	100%	92%	17%
OpenGL 4.1	100% 1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	83%
OpenGL 4.0	100% 1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.3	100% 1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
OpenGL 3.2	100% 1	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%



Nomenclature:

Supported

Not supported

Support added from previous report

EXT texture compression s3tc

EXT texture sRGB decode

EXT texture mirror clamp

OpenGL Extensions	GF	GK	GK110	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS	5 X
KHR blend equation advanced coherent	X	Χ	V	V	X	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	X	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	X	Χ	
ARB robustness	V	V	V	V	Χ	Χ	X	Χ	Χ	V	V	V	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	X	Χ	V	V	V	X	Χ	Χ	Χ	Χ	
ARB shader draw parameters	V	V	V	V	Χ	Χ	V	V	V	X	Χ	Χ	Χ	Χ	
ARB seamless cubemap per texture	X	V	V	V	V	V	V	V	V	X	V	V	X	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	X	Χ	Χ	Χ	Χ	
ARB debug output	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
ARB indirect parameters	V	V	V	V	Χ	Χ	V	V	V	Χ	V	V	X	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	X	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	V	Χ	Χ	Χ	Χ	Χ	
Support	729	% 83%	% 83%	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	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	

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EXT texture filter minmax	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT shader integer mix	V	V	V	V	V	V	V	V	V	V	V	V	V	X
EXT shader image load formatted	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT sparse texture2	Χ	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT raster multisample	X	Χ	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
EXT post depth coverage	Χ	Χ	X	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	V	V	X	X
EXT framebuffer multisample blit scaled	V	V	V	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V
EXT direct state access	V	V	V	V	V	V	V	V	V	X	V	V	X	X
EXT depth bounds test	V	V	V	V	X	Χ	V	V	V	X	Χ	Χ	Χ	V
EXT clip control	Χ	Χ	Χ	X	X	Χ	Χ	Χ	Χ	Χ	V	V	X	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	V	V	V	V	V	V	V	V	V	X	Χ	Χ	Χ	V
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	X	Χ	X	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	X	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV sample locations	X	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV path rendering shared edge	Χ	Χ	X	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	X	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	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ
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	Χ
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	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV conservative raster dilate	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV conservative raster	Χ	Χ	Χ	V	X	X	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	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV bindless multi draw indirect	V	V	V	V	X	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	X
NV blend equation advanced	V	V	V	V	X	Χ	Χ	Χ	Χ	X	Χ	Χ	X	X
INTEL map texture	X	Χ	Χ	X	Χ	X	Χ	Χ	Χ	V	V	V	X	X
INTEL fragment shader ordering	X	Χ	Χ	Χ	Χ	X	V	V	V	X	V	V	X	X
INTEL conservative rasterization	X	Χ	Χ	Χ	Χ	X	Χ	Χ	Χ	Χ	V	V	X	X
ANGLE texture compression dxt5	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X
ANGLE texture compression dxt3	X	Χ	Χ	Χ	Χ	X	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	X	X
AMD vertex shader layer	Χ	Χ	Χ	Χ	V	V	V	V	V	X	V	V	V	X
AMD transform feedback4	X	Χ	Χ	Χ	Χ	X	V	V	V	X	Χ	Χ	Χ	X
AMD transform feedback3 lines triangles	X	Χ	Χ	X	Χ	V	V	V	V	X	Χ	Χ	Χ	X
AMD stencil operation extended	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	Χ	X
AMD_sparse_texture_pool	X	Χ	Χ	X	Χ	X	Χ	V	V	X	Χ	Χ	Χ	X
AMD sparse texture	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	Х	X
AMD shader trinary minmax	X	Χ	Χ	X	Χ	X	V	V	V	X	Χ	Χ	V	X
AMD shader stencil value export	X	Χ	Χ	Χ	Χ	Х	V	V	V	X	Χ	Χ	Χ	X
AMD shader stencil export	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	X	X
AMD seamless cubemap per texture	Χ	V	V	V	V	V	V	V	V	X	Χ	Χ	V	X
AMD sample positions	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	Χ	X
AMD query buffer object	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	X	X
AMD pinned memory	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	Χ	X
AMD performance monitor	Χ	Χ	Χ	Χ	V	V	V	V	V	X	Χ	Χ	V	X
AMD occlusion query event	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	V	X	Χ	Χ	Χ	X
AMD interleaved elements	Χ	Χ	Χ	Χ	Χ	Χ	V	V	V	X	Χ	Χ	Χ	X

AMD_gpu_shader_half_float	Χ	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	X	Χ	Χ	Χ	Χ	
AMD_gpu_shader_half_float2	X	Χ	Χ	Χ	Χ	Χ	Χ	Χ	V	Χ	Χ	Χ	Χ	X	
AMD gpu shader int64	X	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	X	X	
AMD gcn shader	X	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X	
AMD_framebuffer_sample_positions	X	Χ	Χ	Χ	Χ	Χ	V	V	V	Χ	Χ	Χ	Χ	X	
AMD blend minmax factor	X	Χ	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%	48%	68%	27%	29%	47%	49%	51%	9%	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 >	K
KHR context flush control	V	V	V	V	٧	٧	٧	٧	٧	Χ	Χ	Χ	V	X	
KHR robust buffer access behavior	V	V	V	V	٧	٧	٧	٧	٧	Χ	Χ	Χ	V	X	
KHR robustness	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	X	X	
ARB ES3 1 compatibility	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	Χ	X	
ARB clip control	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	V	X	
ARB conditional render inverted	V	V	V	V	V	V	V	V	V	Χ	Χ	Χ	V	X	
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	V	X	
ARB direct state access	V	V	V	V	V	V	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%	100%	100%	100%	100%	100%	100%	100%	100%	0%	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 >	K
ARB buffer storage	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	X	
ARB enhanced layouts	V	V	V	V	V	V	V	V	V	Χ	V	V	X	X	
ARB multi bind	V	V	V	V	٧	٧	٧	٧	V	Χ	V	٧	V	X	
ARB query buffer object	V	V	V	V	٧	٧	٧	V	V	Χ	Χ	Χ	X	X	
ARB texture mirror clamp to edge	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB texture stencil8	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB vertex type 10f 11f 11f rev	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	

Support	100%	% 100%	5 100%	100%	100%	100%	100%	100%	100%	13%	88%	88%)	75%	0%
OpenGL 4.3	GF	GK	GM100	GM200	EG	N.I.	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	Χ	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	V	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	V	V	V	V	V	Χ	V	V	Χ	X	
ARB clear buffer object	V	V	V	V	V	V	V	V	V	Χ	V	V	V	X	
ARB arrays of arrays	V	V	V	V	V	V	V	V	V	V	V	V	Χ	Χ	
Support	100%	% 100%	100%	100%	100%	100%	100%	100%	100%	62%	100%	100%		76%	0%
OpenGL 4.2	GF	GK		GM200		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	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	X	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	٧	V	X	
ARB internalformat query	V	V	V	V	V	٧	V	V	V	V	V	٧	V	V	
ARB conservative depth	V	V	V	V	V	V	V	V	V	V	V	٧	V	X	
ARB compressed texture pixel storage	V	V	V	V	V	٧	V	V	V	V	V	٧	V	X	
ARB base instance	V	V	V	V	V	V	V	V	V	V	V	V	V	X	
Support	100%	100%	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	MacO	S 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 shader precision	V	V	V	V	V	V	V	V	V	V	V	V	V	V	
ARB separate shader objects	V	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	V	X	
ARB ES2 compatibility	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%	1	00%	83%
OpenGL 4.0	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacO	S X
OpenGL 4.0 ARB transform feedback3	GF V	GK V	GM100 V	GM200 V	EG V	N.I. V	S.I. V	C.I.	V.I.	IVB V	HSW V	BDW V	Mesa V	MacO V	S X
•															S X
ARB transform feedback3		٧	V	V	V	V	V	V	V	V	V	V	V	V	S X
ARB transform feedback3 ARB transform feedback2		V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	V V	SX
ARB transform feedback2 ARB texture query lod		V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	V V V	SX
ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather 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 V V	V V V	SX
ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather 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	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V	V V V V V	SX
ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather 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 V	V V V V	V V V V V	V V V V	V V V V	V V V V V	SX
ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader		V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	V V V V V	SX
ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine		V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V	V V V V V V V	V V V V V V	SX
ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB sample shading		V V V V V V	V V V V V V V V	V V V V V V V V	V V V V V V	V V V V V V V V V	V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V V V	V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V	V V V V V V V V	SX
ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB sample shading 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 V	V V V V V V V V V V V V V V V V V V V	V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V	V V V V V V V	SX
ARB transform feedback3 ARB transform feedback2 ARB texture query lod ARB texture gather ARB texture cube map array ARB texture buffer object rgb32 ARB tessellation shader ARB shader subroutine ARB sample shading 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 V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V V V V V V V V V V V V V	V V V V V V V V	V V V V V V V V	SX

OpenGL 3.3	GF	GK	GM100	GM200	EG	N.I.	S.I.	C.I.	V.I.	IVB	HSW	BDW	Mesa	MacOS X
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	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%	6 100%	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	MacOS X
ARB vertex array bgra	V	V	V	V	V	V	V	V	V	٧	V	V	V	V
ARB texture multisample	V	V	V	V	٧	V	٧	٧	٧	٧	٧	V	V	V
ARB sync	V	٧	V	V	٧	V	٧	٧	٧	٧	٧	V	V	V
ARB seamless cube map	V	V	V	V	V	V	V	V	V	V	٧	V	V	V
ARB provoking vertex	V	V	V	V	V	V	V	V	٧	V	V	V	V	V

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V

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V

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V

ARB geometry shader4

ARB depth clamp

Support

ARB fragment coord conventions

ARB draw elements base vertex