Selling AMD FirePro™ Professional GPUs for Workstations and Data Center applications

2. WHAT IS A GPU (GRAPHICS PROCESSING UNIT)?

A GPU (Graphics Processing Unit) is a powerful processor designed to deliver static and moving images to a display. This could be a web page, a video, a 3D game or a 3D Computer Aided Design (CAD) model of a building or a car.

◢ A modern GPU, also known as a graphics card, typically features **hundreds of individual processing cores** and **dedicated memory**. The processor is the 'brain' and performs all of the calculations. The memory is important so data can be stored close to the processor so it can be accessed quickly.

◢ In addition to traditional graphics tasks, the highly parallel architecture of a GPU means it is very good at performing **compute-intensive calculations** in areas such as engineering simulation, visual effects, video editing, science and research.

◢ In a desktop computer or laptop, the **GPU works alongside the CPU** (Central Processing Unit), which is used for general processing operations. Some GPUs are built into the CPU but these tend to be for office or consumer PCs.

◢ GPUs that are designed for professional use in areas such as 3D CAD (Computer Aided Design) or Digital Content Creation (DCC) tend to be **discrete PCI® Express (PCIe®)** add-in boards that slot into the motherboard of a workstation or server.

3. WHAT IS A PROFESSIONAL GPU?

AMD FirePro™ professional GPUs have been designed, manufactured and optimized specifically for professional users. They offer outstanding graphics performance in 2D and 3D applications; ultra high-resolution multi display capabilities and the ability to perform compute intensive operations that have traditionally been carried out by CPUs.

Reliability

Reliability is of paramount importance and AMD FirePro professional GPUs are designed for extremely demanding workloads. Some run 24/7. Every FirePro GPU is designed exclusively by AMD, delivering consistent quality. Drivers are tested for stability and undergo a minimum of 16 consecutive weeks of testing.
For customer peace of mind, AMD FirePro professional GPUs are backed up with a three-year warranty and 24/7 support. Cards are given extended product life cycles to help support customers that are working on long term projects.

Performance

Performance is a key tenet of AMD FirePro professional GPUs, including support for the latest APIs (OpenGL® 4.4, Microsoft® DirectX® 12 and OpenCL™ 2.0) and the high-speed PCIe 3.0 interface. In addition to offering exceptional performance and smooth handling of complex 3D designs and visual effects in general, AMD optimizes its drivers for individual applications. Several new FirePro professional graphics drivers are released each year which include performance and feature improvements that are not supported by consumer GPUs.

Innovation

AMD FirePro GPUs innovate in several areas including the ability to perform simultaneous render and compute on a single card, support for up to six 4K displays[1] on a single card and intelligent power technologies.

FIREPRO FOR PROFESSIONALS

AMD FirePro™ is a professional GPU. It is available for desktop workstations, mobile workstations and servers (data centers).

- **Desktop workstations:** AMD FirePro W-Series ▶**(page 7)**
- **Mobile workstations:** AMD FirePro M-Series ▶**(page 11)**
- **Data center servers:** AMD FirePro S-Series ▶**(page 13)**

GRAPHICS CORE NEXT (GCN)

Increasingly, applications can use the GPU not only to accelerate graphics but also for computationally-intensive tasks, such as rendering and simulation, using OpenCL™.
The latest generation of AMD FirePro GPUs with Graphics Core Next (GCN) architecture have been specifically designed to efficiently balance compute tasks with 3D workloads, enabling multi-tasking that is designed to optimize utilization and maximize performance, from a single card.

[1] AMD Eyefinity technology supports up to six DisplayPort monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design. Mixed monitors of different resolutions are supported by select AMD FirePro™ professional graphics cards. Confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort™-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See **www.amd.com/eyefinityfaq** for full details.

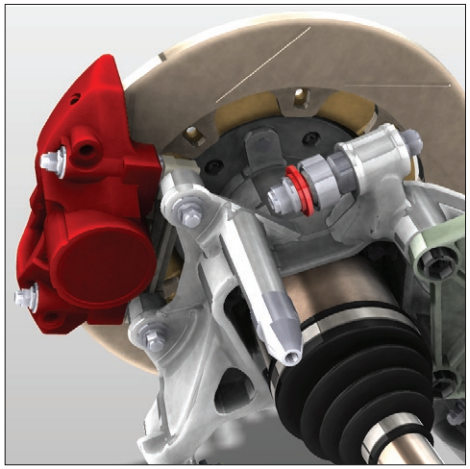
4. WHERE ARE PROFESSIONAL GPUs NEEDED?

DESIGN

Product designers and industrial designers visualize and interact with 3D models in Computer Aided Design (CAD) software.

ENGINEERING

Engineers interact with complex 3D engineering models in Computer Aided Design (CAD) software and solve simulations with GPU compute.

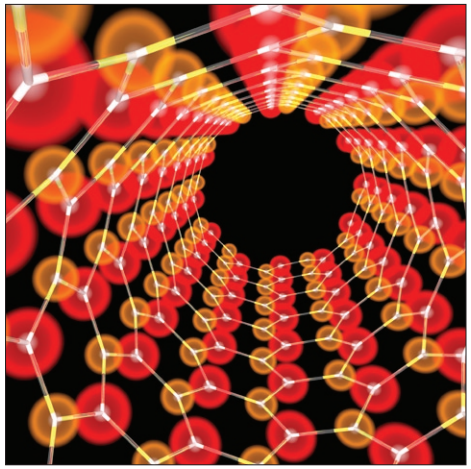


ARCHITECTURE

Architects design and visualize complex building designs in 3D Computer Aided Design (CAD) and Building Information Modeling (BIM) software.

SCIENCE

Scientists visualize and simulate complex models in areas of research such as molecular biology, theoretical physics and molecular engineering.

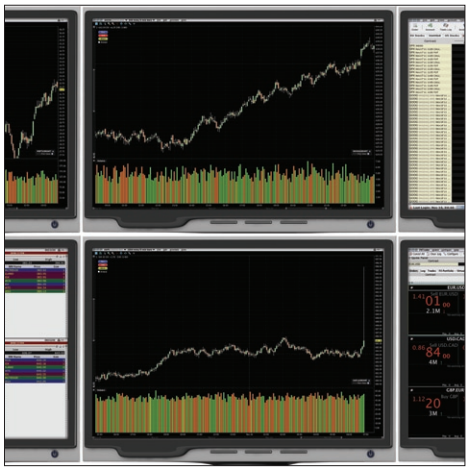


MEDIA & ENTERTAINMENT

CGI artists visualize and animate hyper-realistic 3D models for film, TV and games. Broadcast professionals edit 4K footage in real time.

FINANCE

Financial and enterprise users need high-quality, high-resolution, multi-display environments to keep track of data from multiple data.



MEDICAL

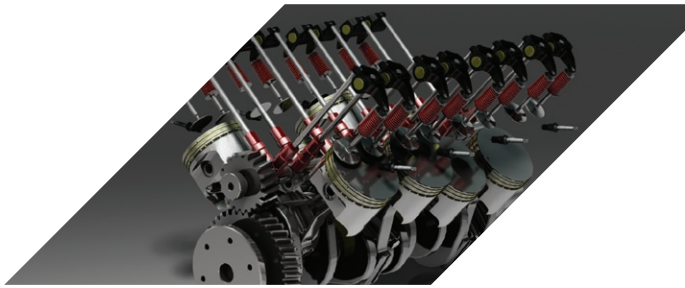
Medical imaging demands high resolution and color critical displays in areas such as radiology, pathology, and dentistry.

OIL AND GAS

Petrochemical firms need high-resolution, color critical displays for seismic imaging to help locate underground oil and gas reservoirs.

Design and Architecture Images courtesy of DEVELOP3D

5. CONSUMER GPU vs PROFESSIONAL GPU



FEATURE	CONSUMER GPU (e.g. AMD Radeon™, Nvidia® GeForce®, Intel® HD Graphics 4600)	DISCRETE PROFESSIONAL GPU (AMD FirePro)
Certified for professional applications	No	Certified for more than 100 professional applications. Tested against a battery of simulations and real-world scenarios using rigorous certification processes to ensure readiness for demanding professional use
Optimized drivers for professional CAD/CAM/CAE/DCC software	No	Drivers are tuned to deliver optimum performance in professional 2D and 3D applications
Professional image quality	Professional image quality features not supported	Support for professional visualization features including realistic effects in 3D applications such as enhanced materials, lighting, shadows and transparency*
Number of supported displays	Up to 6	Up to 6
Discrete graphics card that can be upgraded	Yes (Intel integrated GPU not upgradable on its own)	Yes
Board Design	Various	AMD
Warranty	Typical 12-36 month warranty	Standard three year warranty and 24/7 support
Life Cycle	Not guaranteed	Extended product life cycles for long term projects
Compute	Support for single precision operations (not optimized for double precision) ▶	Optimized for single- and double-precision operations with ½-rate for AMD FirePro W8100 and W9100 ▶ and ECC memory ▶
Memory	Up to 8GB / 12GB of non-ECC memory	Up to 16GB of ECC memory for complex models and compute

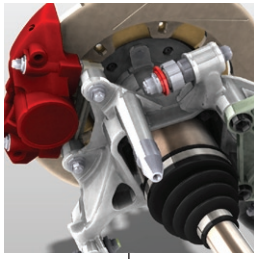
*Examples include SolidWorks RealView, Ambient Occlusion and Order Independent Transparency (OIT)

6. CHOOSING THE RIGHT GPU FOR YOUR CUSTOMER

Q WHAT DOES YOUR CUSTOMER DO?

• *Click buttons to navigate to the relevant page*

DESIGN / ENGINEERING (CAD/CAM/CAE)

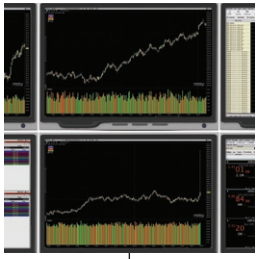


MEDIA AND ENTERTAINMENT

MEDICAL IMAGING AND SCIENCE

DISPLAY WALLS (SIGNAGE, VIDEO)

FINANCE (TRADING FLOORS)



HIGH PERFORMANCE COMPUTING (HPC)

VIRTUAL DESKTOP INFRASTRUCTURE (VDI)

For 3D visualization

For 2D multi display

RECOMMEND SELECT AMD FIREPRO™ W-SERIES GPUs FOR DESKTOPS page 7

RECOMMEND SELECT AMD FIREPRO™ M-SERIES GPUs FOR LAPTOPS page 11

RECOMMEND SELECT AMD FIREPRO™ 2*XXX* & W-SERIES GPUS FOR DESKTOPS page 12

RECOMMEND AMD FIREPRO™ S- AND R-SERIES GPUS FOR SERVERS page 13

AMD FirePro W-Series professional GPUs are used in design, engineering, architecture, animation, special effects, games development and video editing.

◢ GPUs are optimized for **3D workflows** to ensure ultra high geometry performance and smooth handling of complex, visually rich models. This helps support a much more fluent design process in a realistic environment.

◢ **AMD FirePro drivers are optimized** for individual applications to boost performance and tuned to support professional features such as SolidWorks RealView for realistic models, Ambient Occlusion for realistic shadows and Order Independent Transparency (OIT) for faster and more realistic transparency effects.

◢ The **Graphics Core Next (GCN) architecture** efficiently balances compute and 3D workloads, so one GPU can perform two roles at the same time.

◢ **GPU compute** ▶ uses the GPU (or multiple GPUs) as a processor to perform advanced calculations that help scientists and engineers get results faster. Application areas include engineering simulation (structural analysis (FEA) and computational fluid dynamics (CFD)), ray trace rendering, video editing and scientific research.[1] An AMD FirePro Ultra Workstation can support up to four AMD FirePro W9100 GPUs.

◢ **AMD Eyefinity technology**[2] ▶ enables one graphics card to output high-quality visuals on 3, 4 and even 6 displays from a single workstation. This supports multi-tasking, where each dataset or application (CAD, rendering, simulation, for example) has a dedicated display, or large scale visualization for immersive presentations or collaborative design delivered on a powerwall (an array of displays or projectors).

FEATURES AT A GLANCE

◢ **Memory capacity** is important so 3D datasets or 4K video files can be loaded into GPU memory for fast access. The latest generation AMD FirePro W-series graphics cards features twice the GPU memory compared to their predecessors, with a minimum of 2GB in the AMD FirePro W2100 and a maximum of 16GB in the AMD FirePro W9100.

◢ **Memory bandwidth** is important so data can be loaded in and out of GPU memory quickly so the processor is not left waiting. It becomes even more important as datasets grow in size.

◢ **PCIe 3.0** supports CPU to GPU data transfer rates of up to 16GB/sec. Standard on AMD FirePro W-Series GPUs. Particularly beneficial for large datasets.

◢ **ECC (Error Correcting Code)** support is important for high-precision compute operations, used in areas such as such as engineering simulation, as it helps correct errors that are the result of naturally occurring background radiation.

◢ **Stereo** delivers interactive 3D images to dedicated 3D glasses. FirePro provides support via DisplayPort 1.2 or dedicated stereoscopic 3-pin mini DIN.

◢ **Framelock / Genlock** helps ensure accurate and consistent video synchronisation to external sources or multiple GPUs in different systems.

◢ **DirectGMA** is an AMD FirePro graphics technology that offers low latency data transfer directly between multiple GPUs, instead of going via the CPU.

[1] Applications must support OpenCL [2] AMD Eyefinity technology supports up to six DisplayPort monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design. Mixed monitors of different resolutions are supported by select AMD FirePro™ professional graphics cards. Confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort™-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See **www.amd.com/eyefinityfaq** for full details.

8. AMD FIREPRO W-SERIES FOR CAD + MEDIA AND ENTERTAINMENT

Q WHAT SOFTWARE DOES YOUR CUSTOMER USE? • *Recommend a specific AMD FirePro GPU*

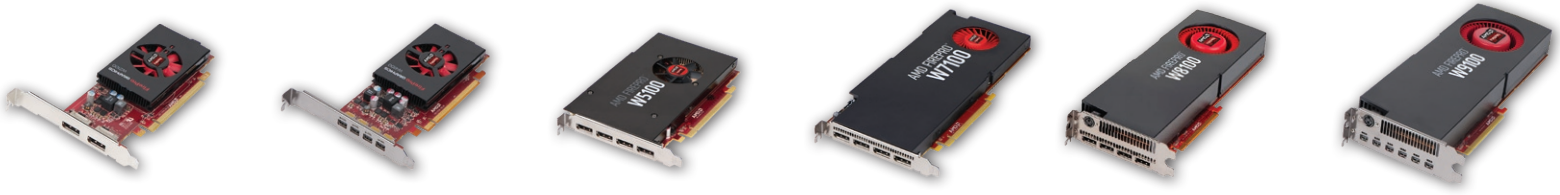
Software developer	Application	Entry-level (about 10% of users)	Mid-range (about 80% of users)	High-end (about 10% of users)
The following information is based on average application use and is intended as a guideline. Individual workflows and application usage must be taken into consideration when selecting a professional graphics card.		2D/Motion Media Design 3D Modeling & Animation	High-end 2D & VFX Design Complex 3D Design Hardware (GPU) Rendering	High-end VFX Design, Real-time 3D Design-Viz, High-end 3D Animation and FX Computational Design
Adobe	After Effects	AMD FirePro™ W5100	AMD FirePro™ W7100	AMD FirePro™ W8100
	Photoshop CC	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro™ W9100
	Premiere Pro CC	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W9100
Altair Engineering	HyperWorks	AMD FirePro™ W4100	AMD FirePro W5100	AMD FirePro W8100
ANSYS	ANSYS Mechanical	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W8100
	FLUENT	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W8100
	Workbench	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W8100
Graphisoft	ArchiCAD	AMD FirePro™ W2100	AMD FirePro W4100	AMD FirePro W5100
Assimilate	Scratch	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W9100
Autodesk	3ds Max	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W9100
	AutoCAD	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W8100
	Inventor	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W9100
	Maya	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W9100
	Moldflow	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W9100
	Revit	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W7100
	Vred	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W9100
Bentley Systems	MicroStation	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W7100
Beta CAE Systems	ANSA	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W9100
Blackmagic Design eyeon	Fusion	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W9100
CEI Inc.	EnSight	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W8100
CGTech	Vericut	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
Chaos Group	V-Ray	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W9100
COMSOL	COMSOL Multiphysics	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W8100
Dassault Systèmes	3DVIA Composer	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
	CATIA	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W7100
	DELMIA	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W7100

9. AMD FIREPRO W-SERIES FOR CAD + MEDIA AND ENTERTAINMENT

Q WHAT SOFTWARE DOES YOUR CUSTOMER USE? • *Recommend a specific FirePro GPU*

Software developer	Application	Entry-level (about 10% of users)	Mid-range (about 80% of users)	High-end (about 10% of users)
The following information is based on average application use and is intended as a guideline. Individual workflows and application usage must be taken into consideration when selecting a professional graphics card.		2D/Motion Media Design 3D Modeling & Animation	High-end 2D & VFX Design Complex 3D Design Hardware (GPU) Rendering	High-end VFX Design, Real-time 3D Design-Vis, High-end 3D Animation and FX Computational Design
Dassault Systèmes	SIMULIA Abaqus	AMD FirePro™ W5100	AMD FirePro™ W7100	AMD FirePro™ W9100
	SolidWorks	AMD FirePro™ W4100	AMD FirePro W5100	AMD FirePro W7100
Esri	ArcGIS	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
IMSI/Design	TurboCAD V19	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
IronCAD	IronCAD	AMD FirePro™ W2100	AMD FirePro W4100	AMD FirePro W7100
Missler Software	TopSolid	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
MSC.Software	Patran	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro™ W8100
	SimXpert	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W8100
Nemetschek	Allplan	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
	Maxon Cinema 4D	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W9100
OPTIS	THEIA-RT	AMD FirePro W5100	AMD FirePro W7100	AMD FirePro W9100
PTC	Creo	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
Robert McNeel & Assoc.	Rhinoceros	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W7100
Side Effects	Houdini	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W9100
SIEMENS PLM Software	Femap	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W9100
	NX	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W9100
	Solid Edge	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
	Teamcenter (Visualization)	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W7100
	Tecnomatix	AMD FirePro W2100	AMD FirePro W5100	AMD FirePro W7100
SpaceClaim	SpaceClaim	AMD FirePro W2100	AMD FirePro W4100	AMD FirePro W7100
The Foundry	Mari	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W9100
	modo	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
	Nuke	AMD FirePro W7100	AMD FirePro W8100	AMD FirePro W9100
Vero Software	Edgecam	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100
	VISI	AMD FirePro W4100	AMD FirePro W5100	AMD FirePro W7100

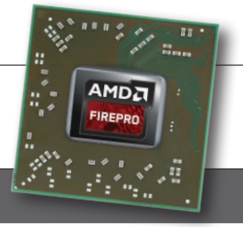
10. AMD FIREPRO W-SERIES (WORKSTATION) SPECIFICATIONS



	Entry-level CAD	Entry-level CAD	Mid-range CAD	Mid-range CAD. Entry level CGI and compute	High-end (CAD, design viz, CGI and compute)	Ultra high-end (design viz, CGI, compute and powerwalls)
	AMD FirePro W2100 ▶	AMD FirePro W4100 ▶	AMD FirePro W5100 ▶	AMD FirePro W7100 ▶	AMD FirePro W8100 ▶	AMD FirePro W9100 ▶
GCN Stream Processors	320	512	768	1,792	2,560	2,816
Memory	2GB GDDR3	2GB GDDR5	4GB GDDR5	8GB GDDR5	8GB GDDR5	16GB GDDR5
Memory bus	128-bit	128-bit	128-bit	256-bit	512-bit	512-bit
Memory Bandwidth (GB/sec)	28.8	72	96	160	320	320
ECC	No	No	No	No	Yes	Yes
Max resolution per display output	4K (4,096 x 2,160)	4K (4,096 x 2,160)	4K (4,096 x 2,160)	4K (4,096 x 2,160)	4K (4,096 x 2,160)	4K (4,096 x 2,160)
Max # of displays (outputs)	2 (DisplayPort) [1]	4 (Mini DisplayPort) [1]	4 (DisplayPort) [1]	4 (DisplayPort) [1]	4 (DisplayPort) [1]	6 (Mini DisplayPort) [1]
Single Precision Compute Performance	0.40 TFLOPS	0.65 TFLOPS	1.43 TFLOPS	3.30 TFLOPS	4.20 TFLOPS	5.24 TFLOPS
Double Precision Compute Performance	0.025 TFLOPS	0.040 TFLOPS	0.089 TFLOPS	0.21 TFLOPS	2.10 TFLOPS	2.62 TFLOPS
OpenGL®	4.4	4.4	4.4	4.4	4.4	4.4
Microsoft® DirectX®	12	12	12	12	12	12
OpenCL™	1.2	1.2	2.0	2.0	2.0	2.0
Operating System (32-bit & 64-bit)	Windows 8.1, Windows 7, Linux	Windows 8.1, Windows 7, Linux	Windows 8.1, Windows 7, Linux	Windows 8.1, Windows 7, Linux	Windows 8.1, Windows 7, Linux	Windows 8.1, Windows 7, Linux
3D Stereo	No	Yes (via DisplayPort)	Yes (requires additional 3D Stereo Connector Bracket)	Yes (requires additional 3D Stereo Connector Bracket)	Yes (via dedicated port)	Yes (via dedicated port)
Framelock / Genlock	No	No	No	Yes (requires FirePro S400 module)	Yes (requires FirePro S400 module)	Yes (requires FirePro S400 module)
System interface	PCIe 3.0, single slot	PCIe 3.0, single slot	PCIe 3.0, single slot	PCIe 3.0, single slot	PCIe 3.0, dual slot	PCIe 3.0, dual slot
Aux power	No	No	No	1 x 6-pin connector	(2 x 6-pin connector)	(1 x 6-pin & 1 x 8-pin connector)
Maximum Power	26w	50w	<75w	<150w	220w	275w
Warranty / lifecycle	3 year / planned five-year life cycle	3 year / planned five-year life cycle	3 year / planned three-year life cycle	3 year / planned three-year life cycle	3 year / planned three-year lifecycle	3 year / planned three-year lifecycle
Typical workstation	HP Z440, Dell Precision Tower 5810	HP Z440, Dell Precision Tower 5810	HP Z440, Dell Precision Tower 5810	HP Z440, Dell Precision Tower 5810	HP Z640	HP Z840, BOXX Ultra Workstation

[1] DVI-D supported via adapter. HDMI and VGA supported by via additional adapters.
[2] Requires Mini-DP to DP Adapter (sold separately).
[3] Requires two physical connections and SLS mode enabled in Catalyst

11. AMD FIREPRO M-SERIES (MOBILE) SPECIFICATIONS



	Entry-level CAD	Entry-level CAD	Mid-range CAD	Mid-range CAD and entry-level compute
	AMD FirePro™ M4150 ▶	AMD FirePro™ M4170[1] / W4170M[2] ▶	AMD FirePro™ M5100 ▶	AMD FirePro™ M6100 ▶
Memory	1GB GDDR5	Up to 2GB GDDR5	2GB GDDR5	2GB GDDR5
Memory bus	128-bit	128-bit	128-bit	128-bit
Memory Bandwidth (GB/sec)	Up to 64 GB/s	Up to 72 GB/s	Up to 72 GB/s	Up to 96 GB/s
Single Precision Compute Performance	Up to 549 GFLOPS	Up to 691 GFLOPS	Up to 992 GFLOPS	Up to 1971 GFLOPS
Double Precision Compute Performance	Up to 34 GFLOPS	Up to 43 GFLOPS	Up to 62 GFLOPS	Up to 123.2 GFLOPS
OpenGL®	4.4	4.4	4.4	4.4
Microsoft® DirectX® [4]	12	12	12	12
OpenCL™ [3]	2.0	2.0	2.0	2.0
	HP ZBOOK 14 G2 WORKSTATION ULTRABOOK 14" DIAGONAL DISPLAY	**HP ZBOOK 15u G2** WORKSTATION ULTRABOOK 15.6" DIAGONAL DISPLAY	**HP ZBOOK 15 G2** PRODUCTIVITY ON THE GO 15.6" DIAGONAL DISPLAY	**HP ZBOOK 17 G2** EXPAND YOUR CREATIVE CAPABILITIES - 17.3" DISPLAY
		DELL PRECISION M2800 AFFORDABLE 15" MOBILE WORKSTATION	**DELL PRECISION M4800** 'WORLD'S MOST POWERFUL' 15" WORKSTATION	**DELL PRECISION M6800** 'WORLD'S MOST POWERFUL' 17" WORKSTATION
			PANASONIC TOUGHBOOK 54 'THINNEST AND LIGHTEST' SEMI-RUGGED LAPTOP	

[1] AMD FirePro M4170 with 1GB GDDR5 memory, featured in the HP ZBook 15U G2.
[2] AMD FirePro W4170M with 2GB GDDR5 memory, featured in the Dell Precision M2800
[3] Support for OpenCL 1.2 enabled today; conformance expected. AMD plans to release OpenCL 2.0 drivers for enabled AMD FirePro W2100, W4100, W5100, W7100, W8100, and W9100 graphics cards in Q1 2015; conformance testing is planned at that time. Previous-generation AMD FirePro products may not support OpenCL 2.0.
[4] Based on our review of the Microsoft DirectX(r) 12 specification dated July 23, 2014, we are confident that devices based on our GCN architecture will be able to support DirectX(r) 12 graphics when available. We recommend that you check AMD.com prior to purchase to confirm that a particular device will support DirectX(r) 12 graphics. Note however, any changes to the DirectX(r) 12 specification after this date could impact or completely eliminate this ability – and AMD disclaims all liability resulting therefrom.

12. AMD FIREPRO W-SERIES FOR FINANCE AND DISPLAY WALLS

AMD FirePro multi display solutions deliver graphics and video on up to six displays with a single card. Multiple cards can also be combined in a single system to create large display walls.

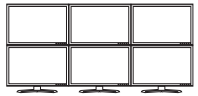
◢ **Target industries** include Financial Services (trading), Healthcare (medical imaging), Transportation (air traffic control), Digital Signage, Government (control centers), Education and Hospitality (events).

◢ Select models are available in a space-efficient, **low-profile design** so GPUs can be deployed in a variety of form factors, from small form factor desktops to towers and mobile docking stations.

◢ Select models draw extremely **low power and are passively cooled** for silent operation.

◢ Select models support **multiple display connectors** such as DisplayPort, DVI and VGA to make best use of existing display technology investments. Adapters are available for all other GPUs.

Q NUMBER OF DISPLAYS vs CUSTOMER REQUIREMENTS

	 2	 4	 6	 12
Multiple 2D applications	Recommend AMD FirePro™ 2270	Recommend AMD FirePro™ 2460	Recommend AMD FirePro W600 or 2 x AMD FirePro 2460	Recommend 2 x AMD FirePro™ W600
Multimedia display wall	Recommend AMD FirePro W600	Recommend AMD FirePro W600	Recommend AMD FirePro W4100	Recommend 2 x AMD FirePro W600
Display wall with support for 3D applications	Recommend AMD FirePro W4100*	Recommend AMD FirePro W4100*	Recommend AMD FirePro W9100	Recommend 2 x AMD FirePro W9100

* For 3D applications that demand more performance, recommend a FirePro W5100, W7100, W8100 or W9100 (see page 10)

	AMD FirePro 2270 ▶	AMD FirePro 2460 ▶	AMD FirePro W4100 ▶	AMD FirePro W600 ▶	AMD FirePro W9100 ▶
	Dual output GPU with support for all types of monitors	**Quad output GPU for display walls**	**Quad output GPU with performance for 3D applications**	**Six output GPU with multimedia performance for display walls**	**Six output GPU with high-end 3D performance for display walls**
No of displays	2	4	4	6	6
Display connectors	DMS-59 connector with breakout cables for dual DisplayPort, DVI and VGA output	Four Mini DisplayPort outputs (DVI adapter included, DisplayPort adapter sold separately)	Four Mini DisplayPort outputs	Six Mini DisplayPort outputs	Six Mini DisplayPort outputs
Max resolution (per display)	2,560 x 1,600	2,560 x 1,600	4,096 x 2,160 (4k)	4,096 x 2,160 (4k)	4,096 x 2,160 (4k)
Max Power / cooling type	17W / passive	20W / passive	50W / active	75W / active	275w / active
Low profile form factor	Yes	Yes	Yes	No	No
Warranty	3 year warranty	3 year warranty	3 year warranty	3 year warranty	3 year warranty

[1] AMD Eyefinity technology supports up to six DisplayPort monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design. Mixed monitors of different resolutions are supported by select AMD FirePro™ professional graphics cards. Confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort™-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See **www.amd.com/eyefinityfaq** for full details.

13. AMD FIREPRO S-SERIES FOR DATA CENTER (SERVERS)

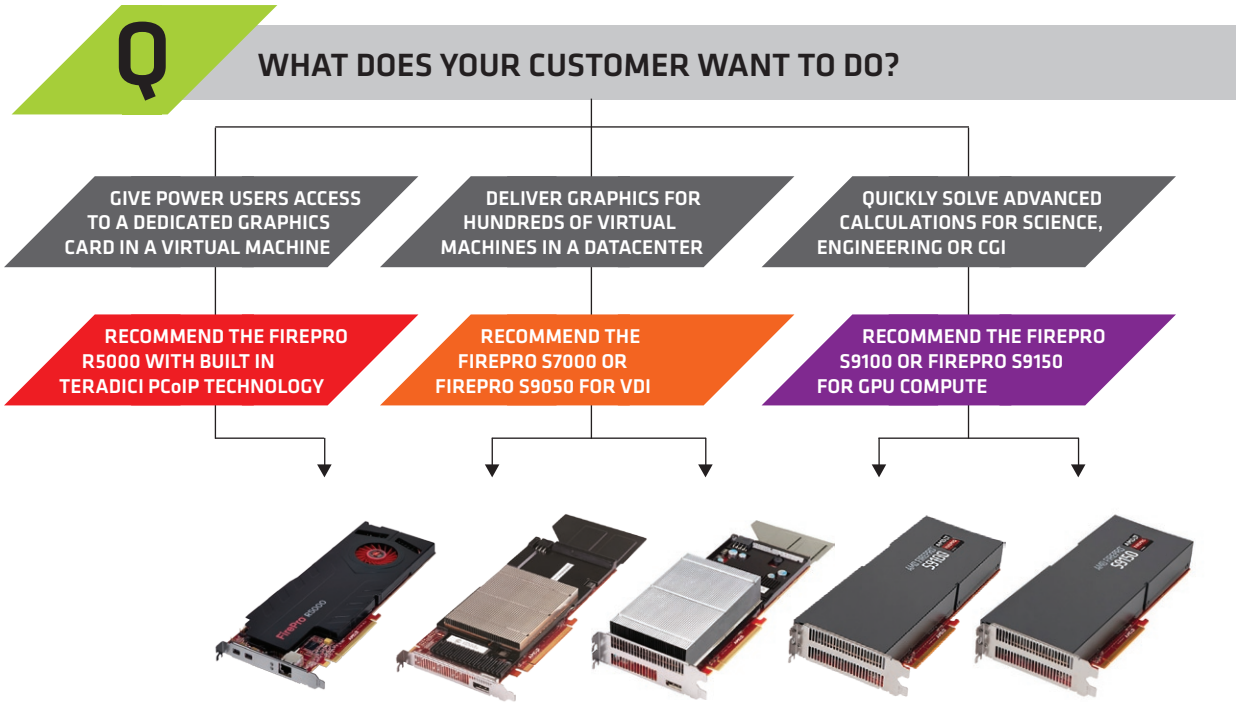
The AMD FirePro S-Series GPUs are specifically designed to be used inside a data center environment. The GPUs are placed inside rack mounted servers to give cloud, research and engineering firms powerful, scaleable central processing resources for Virtual Desktop Infrastructure (VDI) or compute deployments.

◢ **Virtual Desktop Infrastructure (VDI)** ▶ allows a single server to run dozens of "virtual" desktops simultaneously. AMD FirePro S-Series GPUs provide the graphics for these virtual desktops, supporting virtualization technologies from Citrix®, Microsoft®, VMware® and Teradici®.

◢ **PCoIP®** ▶ is a remoting protocol from Teradici®. A data center solution typically uses a PCIe Teradici host card and GPU for each user. The AMD FirePro R5000 combines both Teradici technology and GPU on a single card so only one PCIe slot is used, increasing user density in a rack server.

◢ **OpenCL** ▶ is the enabling technology that allows AMD FirePro GPUs to perform compute operations. It is an open standard and runs on many different processors (cross-platform).

◢ **Single and Double Precision** support is important for compute performance. Single Precision is needed when accuracy is not of paramount importance (e.g. for ray trace rendering or processing video). Double precision is important when accuracy is critical (e.g. for engineering or physics-based simulations).



	AMD FirePro™ R5000 ▶	AMD FirePro™ S7000 ▶	AMD FirePro™ S9050 ▶	AMD FirePro™ S9100 ▶	AMD FirePro™ S9150 ▶
	Dedicated GPU for each user. Up to four users supported in a 1U server	Single-slot server card for high density VDI and compute deployments	Powerful, multifunctional card for compute and VDI	High-performance HPC for budget conscious projects	Very high-performance HPC and exceptional performance per watt
GCN Stream Processors	N/A	1,280 Stream Processors	1,792 Stream Processors (28 GCN compute units)	2,560 Stream Processors (40 compute units)	2,816 Stream Processors (44 GCN compute units)
Memory (interface / bandwidth)	2GB GDDR5 (256-bit / up to 102GB/s)	4GB GDDR5 (256-bit / up to 154GB/s)	12GB GDDR5 (ECC) (384-bit / up to 264GB/s)	12GB GDDR5 (ECC) (512-bit / up to 320GB/s)	16GB GDDR5 (ECC) (512-bit / up to 320GB/s)
Floating point compute performance (TFLOPS)	N/A	2.4 peak single-precision 0.152 peak double-precision	3.23 peak single-precision 0.81 peak double-precision	4.22 peak single-precision 2.11 peak double-precision	5.07 peak single-precision 2.53 peak double-precision
Max Power	150W	150W	225W	225W	235W
Interface / cooling	PCIe 3.0 x16, Single Slot Active heat sink	PCIe 3.0 x16, Single Slot Passive heat sink	PCIe 3.0 x16, Dual Slot Passive heat sink	PCIe 3.0 x16, Dual Slot Passive heat sink	PCIe 3.0 x16, Dual Slot Passive heat sink
Typical server	BOXX XDI V4	TYAN FT77A-B7059 (4U) Asus ESC4000 G3/G3S (2U) Supermicro SYS-2027GR (2U)	TYAN FT77A-B7059 (4U) Asus ESC4000 G2 (2U) Gigabyte GS-R22PHL (2U)	TYAN FT77A-B7059 (4U) Asus ESC4000 G2 (2U) Gigabyte GS-R22PHL (2U)	TYAN FT77A-B7059 (4U) Asus ESC4000 G2 (2U) Gigabyte GS-R22PHL (2U)

14. AMD EYEFINITY FOR MULTIPLE DISPLAYS

AMD FirePro professional graphics features AMD Eyefinity[1], a multi-display technology which enables one graphics card to output high-quality visuals on 3, 4 and even 6 displays from a single workstation or PC. Multiple graphics cards also can be combined to create massive display walls.

◢ Configure various combinations of landscape and portrait orientations, with independent display resolutions and refresh rates.

◢ Multi display AMD Eyefinity 'groups' can be easily managed from the AMD Catalyst™ Control Center, which is installed alongside the AMD FirePro driver.

◢ Support for four or more displays is available on almost all FirePro GPUs, apart from the entry-level AMD FirePro 2270 and AMD FirePro W2100, both of which support two displays. For six displays an AMD FirePro W600 or AMD FirePro W9100 is recommended.

Q HOW CAN MY CUSTOMER USE AMD EYEFINITY?

1. Single-user Workstations

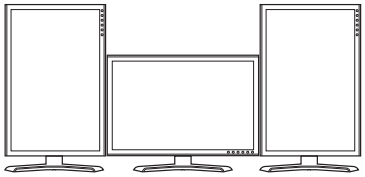
Gives more visual real estate to view large scale models and multiple applications at the same time in a single, large workspace. 3, 4 and even 6 high-res displays can be operated simultaneously and configured independently in landscape and portrait orientations.

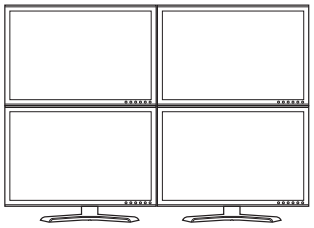
2. Small Workgroups

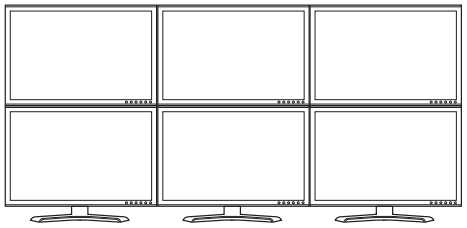
With a 4 or 6 display array, teams can view documents in their entirety, giving a holistic view of project data for effective collaboration. The use of thin bezel monitors and bezel correction in the AMD Catalyst Control Center can help give the appearance of one continuous display.

3. Large Scale Display Walls

Digital signage solutions with 6 or more displays can be found in airports and retail stores displaying compelling multimedia content. AMD FirePro graphics can also power large-scale 3D presentations with interactive controls or projection mapping.







1 Three monitors: landscape (3 x 1)
One extended desktop to support multi application workflows.
Up to 12,228 x 2,160 resolution.
Supported on AMD FirePro W4100 and above.

2 Three monitors: one landscape, two portrait (3 x 1)
One landscape display flanked by two portrait displays to support multi application workflows.
Supported on AMD FirePro W4100 and above.

3 Four monitor array (2 x 2)
One extended desktop up to 8,192 x 4,320 resolution for multi-application workflows or presentations.
Supported on AMD FirePro W4100 and above.

4 Six monitor array (3 x 2)
One big display wall up to 12,228 x 4,320 resolution for presentations or collaborative meetings.
Supported on AMD FirePro W600 (2D) and W9100 (3D)

[1] AMD Eyefinity technology supports up to six DisplayPort monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design. Mixed monitors of different resolutions are supported by select AMD FirePro™ professional graphics cards. Confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort™-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See **www.amd.com/eyefinityfaq** for full details.

15. HOW TO CONNECT AN AMD FIREPRO GPU TO A MONITOR

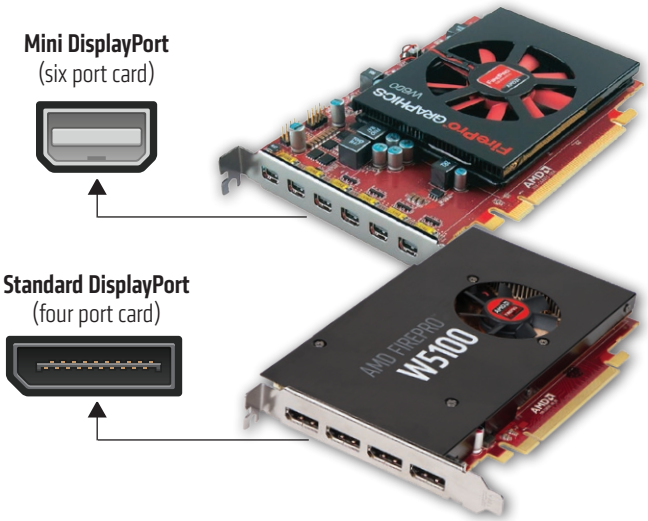
All new generation AMD FirePro GPUs use the very latest DisplayPort 1.2 ▶ standard to connect the GPU to a monitor or monitors. The digital display interface can support resolutions up to 4K (4,096 x 2,160) per display.

◢ DisplayPort connectors come in two different sizes: standard DisplayPort (a rectangular port with the bottom left corner cut off) and Mini DisplayPort (a smaller rectangular port with the bottom two corners cut off).

◢ Standard DisplayPort connectors are found on most AMD FirePro GPUs with four outputs.

◢ Mini DisplayPort connectors are found on AMD FirePro GPUs with six outputs and low profile four output GPUs. A Mini DisplayPort to DisplayPort adapter is usually included.

◢ DisplayPort can also support monitors with older display standards (VGA, DVI and HDMI) through the use of active or passive adapters. Some are included with the GPU.



Q WHICH MONITOR PORTS DOES YOUR CUSTOMER HAVE?

Dell UltraSharp U2711 | port illustrations © istockphoto

USE STANDARD DISPLAYPORT CABLE (WITH OPTIONAL MINI DISPLAYPORT ADAPTER)

USE STANDARD DVI CABLE WITH (MINI) DISPLAYPORT TO DVI ADAPTER

USE STANDARD VGA CABLE WITH ACTIVE (MINI) DISPLAYPORT TO VGA ADAPTER

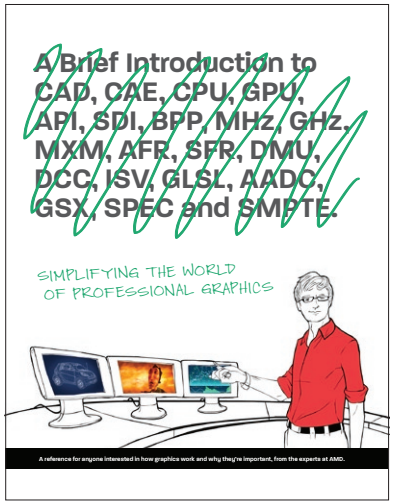
USE STANDARD HDMI CABLE WITH (MINI) DISPLAYPORT TO HDMI ADAPTER

16. FURTHER READING - WHITE PAPERS

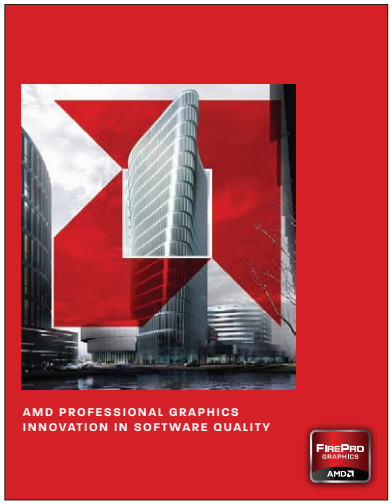
CLICK TO DOWNLOAD

AMD FIREPRO PROFESSIONAL GRAPHICS FAMILY BROCHURE

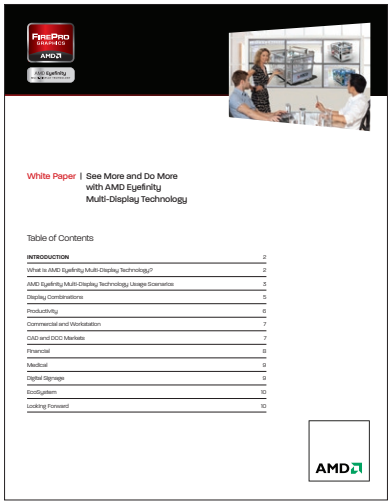
GRAPHICS 101 – SIMPLIFYING THE WORLD OF PROFESSIONAL GRAPHICS



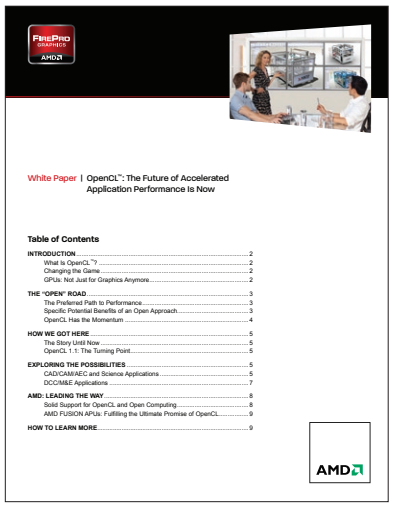
AMD CATALYST™ PRO DRIVER ENGINEERED FOR RELIABILITY & PERFORMANCE



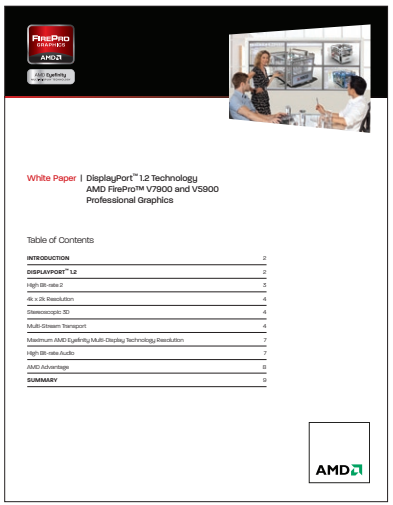
AMD EYEFINITY MULTI-DISPLAY TECHNOLOGY WHITE PAPER



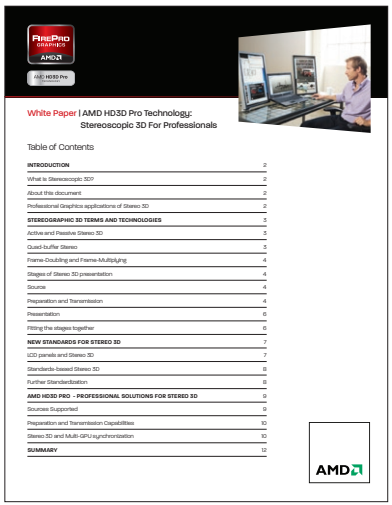
OPENCL™ - THE FUTURE OF ACCELERATED APPLICATION PERFORMANCE



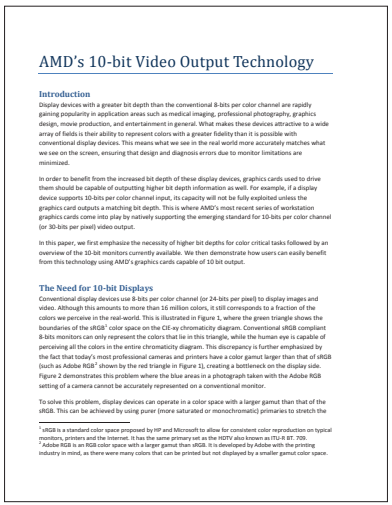
DISPLAYPORT 1.2 TECHNOLOGY WHITE PAPER



AMD HD3D PRO TECHNOLOGY: STEREO 3D FOR PROFESSIONALS



10-BIT VIDEO OUTPUT TECHNOLOGY WHITE PAPER



GPUs FOR DESKTOP WORKSTATIONS






AMD FirePro W2100 ▶ | AMD FirePro W4100 ▶ | AMD FirePro W5100 ▶ | AMD FirePro W7100 ▶ | AMD FirePro W8100 ▶ | AMD FirePro W9100 ▶

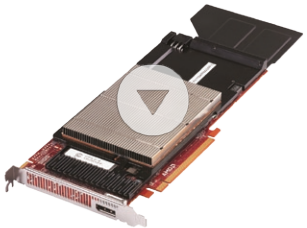
GPUs FOR MULTIPLE DISPLAYS





AMD FirePro 2270 ▶ | AMD FirePro 2460 ▶ | AMD FirePro W4100 ▶ | AMD FirePro W600 ▶ | AMD FirePro W9100 ▶

GPUs FOR SERVERS (DATA CENTERS)


AMD FirePro R5000 ▶ | AMD FirePro S7000 ▶ | AMD FirePro S9050 ▶ | AMD FirePro S9100 ▶ | AMD FirePro S9150 ▶

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