

SUPPORTING CLINICAL OUTCOMES FOR 10 YEARS



DISPLAY CONTROLLERS FOR MEDICAL
AND HEALTH CARE INDUSTRIES





Welcome

In today's medical and health care industry, new digital technologies such as digital radiography, 3D, PACS, and remote graphics are helping to improve patient care and save lives.

To enhance current systems, multi-display solutions can help medical professionals work more efficiently by quickly viewing large amounts of information. This enables them to diagnose patients accurately and prescribe treatment soon after an examination.

AMD has a full range of high resolution, high bit depth, multi-display solutions that are designed to help medical administrators streamline their work environments, adopt new, leading-edge technologies to improve patient treatment throughout and achieve a high standard of care.



→ With AMD FirePro™ technology, spread content across multiple screens via a single display controller

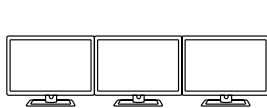
AMD FirePro™ 3D Workstation Graphics (MRI Review, Volumetric rendering and CT scans)

High performing graphics, optimised for 3D content. A continuing growing trend in medical imagery is the practice of 3D modeling; integrating several individual MRI or CT scans and combining them to create a 3D representation. This type of rendering, known as volumetric rendering, helps radiologists to spot anomalies within the patient's examination in a more natural view. Many of today's medical graphics solutions have little or no 3D accelerated graphical ability. AMD FirePro™ technology is designed specifically for 3D applications to improve the speed and clarity of a rendered image.

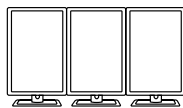
AMD Eyefinity technology. A powerful multi-display technology that supports up to six high definition displays from just a single graphics card¹. This technology enables medical professionals to efficiently diagnose patients by viewing several sets of information across multiple screens without application switching and window-sorting.

Grayscale. AMD FirePro™ technology enables high quality, high resolution 10-bit and 12-bit grayscale 2D

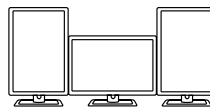
AMD Eyefinity Configurations



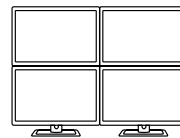
1. Three monitors landscape (3 x 1)
One extended desktop up to 7,680 x 1,600 resolution



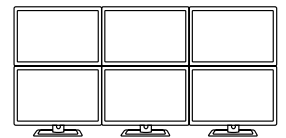
2. Three monitors portrait (3 x 1)
One extended desktop up to 4,800 x 2,560 resolution



3. Three monitors landscape and portrait (3 x 1)
One hi-res 2,560 x 1,600 resolution display flanked by two portrait monitors of any resolution



4. Four monitor array (2 x 2)*
One giant extended desktop or a setup for design /review with displays mounted on a wall - up to 5,120 x 3,200 resolution

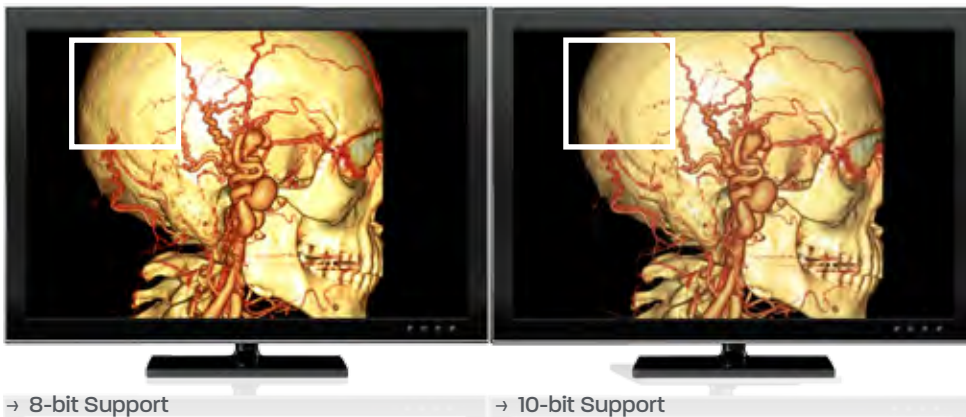


5. Six monitor array (3 x 2)**
A massive video wall, for digital signage and large presentation set ups – up to 7,680 x 3,200 resolution

output for medical imaging professionals, providing 1,024 shades of gray, while delivering high performance 3D acceleration. These enhanced visual capabilities are enabled by one AMD FirePro™ graphics card, minimizing cost and complexity while enabling radiology professionals and doctors to make highly accurate diagnoses.

High bit depth support (10-bit). In order to benefit from the increased bit depth of medical display devices, the graphics cards which are used to drive them should be capable of outputting higher bit depth information. Conventional display devices use 8-bits per colour channel (over 16 million colours). While this sounds substantial, this is but a fraction of the colours we actually perceive (Appendix A).

The most recent series of AMD FirePro™ workstation graphics cards support 10-bits per colour channel (or 30-bits per pixel) video output. They can transform and send 10-bit data to corresponding displays for an unprecedented level of colour support, representing images and data with incredible sharpness and clarity. Combined with a 10-bit display, the “real world” colours achieved can help medical professionals accurately analyse content.



→ Appendix A:
A visual
representation
of the
difference
between 8-bit
and 10-bit
support.

Investment protection. Extending prior DVI display investments, ATI FirePro™ V5800 DVI professional graphics can drive two large dual-DVI, five megapixel displays, enabling an amazing clarity when viewing images, scans and data. The broad, feature-rich range of AMD FirePro™ graphics cards in half and full-height configurations means there is no need to replace existing hardware. All AMD FirePro™ technology is designed and thoroughly tested by AMD for outstanding reliability and performance. This is why every AMD FirePro™ graphics card has a limited three year warranty and planned minimum four year lifecycle.

Finally, every AMD FirePro™ workstation graphics card comes with the highest levels of customer support. Customers have the ability to contact the AMD technical team directly to help in any matters regarding their graphics hardware.



AMD FirePro™ Remote Graphics

(Digital Radiography Review, PACS)

With the use of PACS (Picture Archiving and Communication System) many medical institutions are benefiting from access to central archived patient data. However, with concerns regarding security and access to patient data, one solution is to make the information provided by PACS available via remote graphics.

Improved access to patient data. The ATI FirePro™ RG220 remote graphics solution enables the user to access and view data from PACS, via an IP network, without the need to download it locally. The ability to view 2D, video and 3D content remotely has many advantages including reduced data storage costs and improved security.

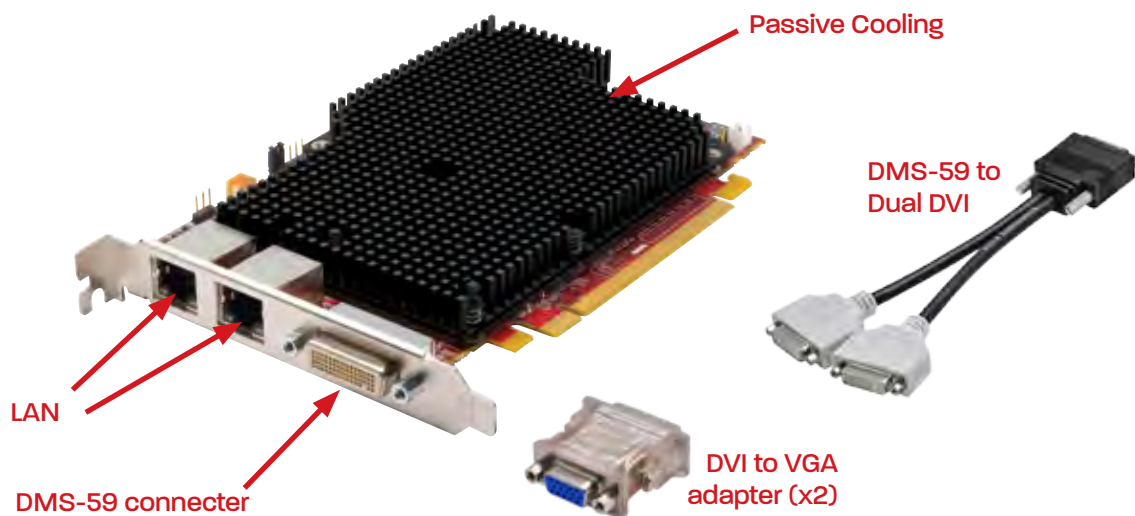
Multi-display support. The ATI FirePro™ RG220 remote graphics provides dual-display support or can be combined for quad-display support.

Improved security, minimal costs. With an integrated graphics card that includes lossless display compression and IP transmission, ATI FirePro™ RG220 sends data through a regular IP network to a remote thin client device. This helps improve network security and minimize power and capital costs.

This system can support a host of PC requirements, like:

- PACS Diagnostic workstations
- PACS Clinical workstations
- PACS Referral workstations
- PACS Remote Hospital workstations

ATI FirePro™ RG220 Remote Graphics



Mean Time Between Failure (MTBF). Passive cooling on AMD FirePro™ graphics cards uses heat displacement to cool the GPU, which means no fan, fewer moving parts and high MTBF.

AMD FirePro™ Multi-View Graphics

(Digital Radiography Review, Patient Diagnosis)



→ ATI FirePro™ 2460 supports up to four displays

→ AMD FirePro™ 2270 professional graphics supports all major display standards - DisplayPort***, DVI and VGA



Multi-display support. Multi-display solutions give medical professionals the ability to review a patient's information and images simultaneously, or to view several large scans at once, helping medical staff to diagnose efficiently and accurately.

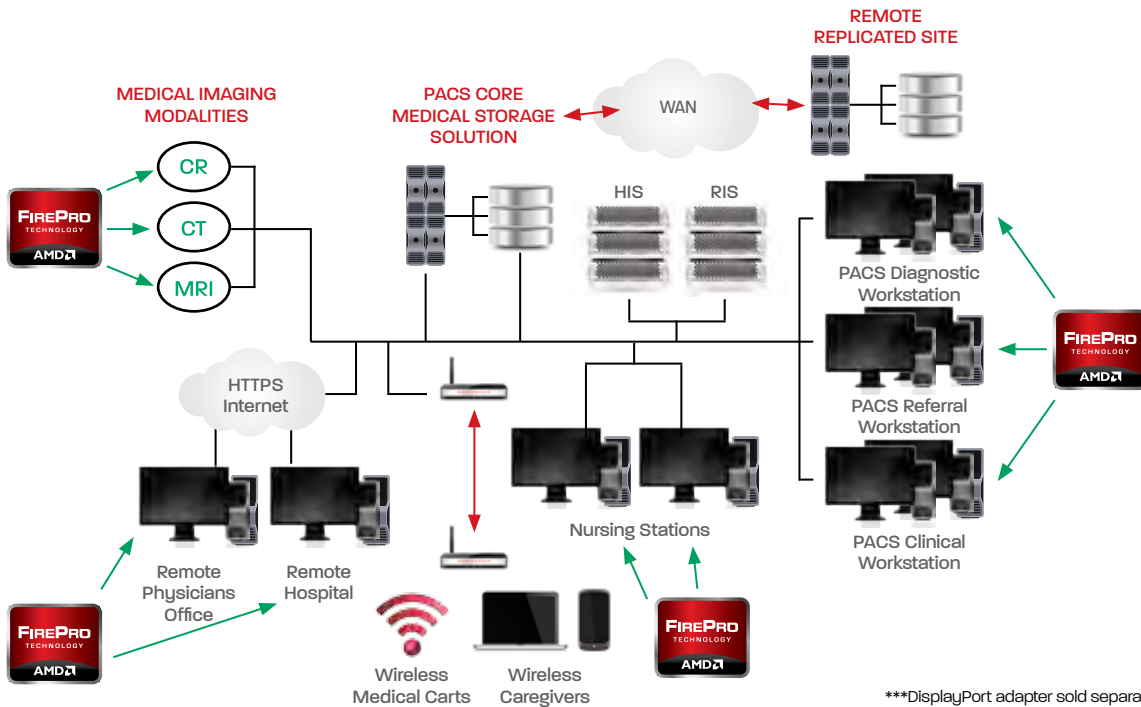
Easy integration. The low profile, half-height design means these graphics cards can easily be integrated into existing systems, for a cost effective way to make multi-display technology available to staff.

Energy efficient. Most AMD FirePro™ multi-view graphics cards utilize passive cooling, a very quiet and energy efficient system. As a result, the expected consumption rate of AMD's passively cooled graphics cards consume less power, minimizing heat and energy costs.

AMD FirePro™ Technology: Flexible Medical Solution

AMD FirePro™ graphics cards can be integrated into existing hardware and greatly improve productivity.

Below are just some examples of how a typical medical center can utilize AMD FirePro™ technology.



***DisplayPort adapter sold separately

amd.com/firepro



Product Portfolio

<p>AMD FIREPRO™ V3900</p>	<p>A dual output, professional 3D graphics card in a small form factor for maximum flexibility in system installation.</p>	
<p>ENTRY LEVEL</p> 	<ul style="list-style-type: none"> → Scalable ultra parallel processing architecture with 480 stream processors → 1GB DDR3 graphics memory → Supports up to three independent displays with AMD Eyefinity multi-display technology¹ → Officially certified and optimized for many CAD and M&E applications 	<ul style="list-style-type: none"> → AMD AutoDetect Technology → Full 30-bit display pipeline² → Half-height/half-length design perfect for small form factor PCs → Supports OpenCL™ 1.1, OpenGL 4.1 and DirectX® 11 → OS Support: Microsoft Windows® 7, Windows® XP, Windows Vista®, Linux® (32-bit or 64-bit)
<p>ATI FIREPRO™ V4900</p>	<p>A professional 3D graphics card with 1GB of blazing-fast GDDR5 memory and multi-display capabilities to aid in improved workflow productivity.</p>	
<p>ENTRY LEVEL</p> 	<ul style="list-style-type: none"> → Supports up to three independent displays with AMD Eyefinity multi-display technology¹ → 1GB GDDR5 memory → 64 GB/s memory bandwidth → Parallel processing architecture featuring 480 stream processors 	<ul style="list-style-type: none"> → DirectX® 11, OpenGL and OpenCL™ support (see amd.com/api for specific version support) → Full 30-bit precision display pipeline³ → Efficient design delivers outstanding performance at low-profile power usage
<p>ATI FIREPRO™ V5800</p>	<p>A high performing professional 3D graphics solution which gives the ability to process large data-sets and create advanced visual effects and 3D image reconstructions.</p>	
<p>MID RANGE</p> 	<ul style="list-style-type: none"> → Scalable ultra parallel processing architecture with 800 stream processors → 1GB GDDR5 graphics memory → AMD Eyefinity multi-display technology with support for up to 3 displays¹ → 64 GB/s memory bandwidth 	<ul style="list-style-type: none"> → Hardware tessellation support → OpenGL 4.1 and DirectX® 11 and OpenCL™ 1.1 support → Full 30-bit precision display pipeline³ → AMD CrossFire™ Pro support²
<p>AMD FIREPRO™ W5000</p>	<p>For medical professionals who work on complex 3D models and need expansive visual desktop work space, all from a single-slot graphics solution.</p>	
<p>MID RANGE</p> 	<ul style="list-style-type: none"> → Effortlessly balance compute and 3D workloads efficiently → Ultra-high geometry performance and smooth handling of complex models → Dynamic power management delivering improved performance → Drive up to three independent displays at once with AMD Eyefinity technology¹ 	<ul style="list-style-type: none"> → Capable of driving up to six independent displays (16.4 million pixels) utilizing DisplayPort 1.2 multi-streaming technology¹ → 2GB of high speed GDDR5 memory with total memory bandwidth of 102.4 GB/s → Full support for and hardware acceleration of OpenGL 4.2, DirectX® 11 and OpenCL™ 1.2 → PCI Express® 3.0 compliant
<p>ATI FIREPRO™ W7000</p>	<p>A high performing professional 3D graphics card with superb visual quality and power.</p>	
<p>HIGH END</p> 	<p>With the ability to meet the demands of highly complex data-sets and 3D model reconstruction, this GPU will significantly enhance the ability and performance of the system hardware it's assigned to.</p> <ul style="list-style-type: none"> → Class-leading compute performance, with 2.4 TFLOPs of single precision and 152 GFLOPs of double precision → Ultra-high geometry performance and smooth handling of complex models → Dynamic power management delivering improved performance and efficient power management 	<ul style="list-style-type: none"> → Capable of driving up to six independent displays (16.4 million pixels) utilizing DisplayPort 1.2 multi-streaming technology → 4GB of high speed GDDR5 memory with total memory bandwidth of 102.4 GB/s → Full support for and hardware acceleration of OpenGL 4.2, DirectX® 11 and OpenCL™ 1.2 → PCI Express® 3.0 compliant
<p>ATI FIREPRO™ W8000</p>	<p>This high performing, professional 3D graphics solution can process highly complex image processing and 3D construction.</p>	
<p>HIGH END</p> 	<p>With the ability to support up to four 10-bit monitors, this GPU enables highly efficient diagnoses by viewing multiple scans and 3D models all at once.</p> <ul style="list-style-type: none"> → Class-leading compute performance, with more than 3.23 TFLOPs of single precision and 806 GFLOPs of double precision → Unleash creativity with ultra-high geometry performance and smooth handling of complex models → Dynamic power management delivering improved performance and energy efficiency → Drive up to four independent displays at once with AMD Eyefinity technology¹ → Capable of driving up to six independent displays (16.4 million pixels) utilizing DisplayPort 1.2 multi-streaming technology 	<ul style="list-style-type: none"> → 4GB of high speed GDDR5 memory and 176 GB/s memory bandwidth → Full support for and hardware acceleration of OpenGL 4.2, DirectX® 11 and OpenCL™ 1.2 → PCI Express® 3.0 compliance → ECC Memory support ensures accuracy of computations by correcting any single or double bit error as a result of naturally occurring background radiation

AMD FIREPRO™ W9000

ULTRA HIGH END



A professional 3D graphics solution designed to process highly complex data-sets from superior image rendering to 3D image reconstruction.

This feature-rich, high performing GPU also supports six, 5M pixel displays for the ultimate expansive desktop workspace.

- Cutting-edge graphics and compute performance, delivering 1.95 billion triangles/second and 4.0 TFLOPs of single precision and 1.0 TFLOP double precision
- Enhance your creativity with ultra-high geometry performance and smooth handling of complex models
- Dynamic power management delivering improved performance
- 6GB of high speed GDDR5 memory with 264 GB/s memory bandwidth
- Full support for and hardware acceleration of OpenGL 4.2, DirectX® 11 and OpenCL™ 1.2
- PCI Express 3.0 compliance
- ECC Memory support ensures accuracy of computations by correcting any single or double bit error as a result of naturally occurring background radiation

ATI FIREPRO™ V5800 DVI

MEDICAL IMAGING



Purpose built to drive two dual link DVI high resolution medical imaging displays radiology professionals use to diagnose and patients.

It's commonplace for technicians to display patient information on one screen and CT, MRI or x-rays on another. With the latest advances in display technologies, these professionals can see more than ever before – many more shades of grey and vivid color. With the ATI FirePro™ 5800 DVI, professionals can view images in more detail on larger displays, helping to improve workflow efficiency and diagnostic accuracy.

- Drive up to two 5 MP displays
- Two independent Dual-link DVI outputs
- Full 30-bit precision display pipeline³
- High Dynamic Range (HDR) rendering with 8-bit, 10-bit and 16-bit per RGB colour component support
- Maximum digital resolution 2560x2048 at 60Hz with packed pixel mode
- 1GB GDDR5 memory
- PCI Express® 2.1 compliant (x16)
- DirectX® 11 and OpenGL 4.1 support
- Variable speed active cooling
- 75W maximum power consumption

ATI FIREPRO™ RG220

REMOTE GRAPHICS



Remote Graphics For enterprises who want to remote the compute and graphics experience of their workstation and desktop users.

For enterprises looking to remote the compute and graphics experience for traditional workstation and desktop users.

- Average Power <35W
- 512MB graphics memory
- Max resolution support: 1920 x 1200
- DirectX® 10.1 and OpenGL 4.1 support
- Dual screen remote and/or local output through PCoIP remoting technology⁴
- Support for a direct 1-1 local to remote link
- Connect to either a PC or a Virtual Machine

AMD FIREPRO™ 2270 MV

MULTI-VIEW (Dual-Display)



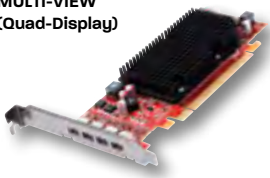
Designed to help IT more easily configure and deploy dual-displays for clinical, diagnostic and referral workstations within a health care institution.

The first low profile, passively cooled dual-output AMD graphics card supporting all three industry standard display technologies— DisplayPort***, DVI and VGA.

- Maximum digital resolution 2560 x 1600
- 512MB graphics memory
- PCI Express® 2.1 compliant
- PCI Express® x16 and x1 options
- DirectX® 11 and OpenGL 4.1 support
- Low profile, half length design
- 15W maximum power consumption
- Passive cooling

ATI FIREPRO™ 2460 MV

MULTI-VIEW (Quad-Display)



Designed for health care professionals to view large amounts of data and imagery across multiple displays.

The first low profile, quad mini-DisplayPort capable solution.

- 512MB graphics memory
- DirectX® 11 & OpenGL 4.1 support
- Average board power <13W
- Quad DisplayPort and DVI output
- Low profile half length form factor

amd.com/firepro



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1. AMD Eyefinity technology supports up to six DisplayPort displays using an enabled AMD graphics card and up to four using an enabled APU. Number and type of displays and resolution varies by model and board design; confirm specifications with manufacturer before purchase. Configurations with up to two active adapters supported. To enable more than two displays, DisplayPort™ displays are recommended. Additional hardware may be required. Up to four displays from each DisplayPort output are supported utilizing DisplayPort 1.2 Multi-Stream -enabled displays, connectors and/or hubs; total limit six displays per graphics card or four per APU. Microsoft® Windows® 7, Windows Vista®, or Linux® required to support more than two displays; Windows XP no longer supported. Applications must support non-standard aspect ratios to pan across multiple displays. SLS ("Single Large Surface") functionality requires identical display resolutions. See www.amd.com for full details.
2. AMD CrossFire™ Pro technology requires an AMD CrossFire™ Pro-ready motherboard, an AMD CrossFire™ Pro cable/connect and may require a specialized power supply. In addition, in order to take advantage of AMD CrossFire™ Pro technology, both AMD FirePro graphics cards must be of the identical product model (e.g. two ATI FirePro™ V8800 graphics cards).
3. 30-bit monitor required for full 30-bit display (10-bit per RGB component). AMD FirePro™ 3D graphics cards can display over one billion colors when attached to 30-bit displays.
4. PCoIP portal required, sold separately.