AMD

# SUPPORTING CLINICAL OUTCOMES FOR 11 YEARS

## Display Controllers for Medical and Health Care Industries

AMD FIREPRO

# 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 Eyefinity technology, spread content across multiple screens via a single display controller*

***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. **Five monitor array (5 x 1)**
   One landscape display of any resolution plus four 2560x1600 portrait displays
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

## 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™ workstation graphics are 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 card[1]. 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™ graphics enables high quality, high resolution 10-bit grayscale 2D 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.

***Investment protection.*** Extending prior DVI display investments, AMD FirePro™ W5000 DVI professional graphics can drive two large dual-DVI, 5 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.

8-bit Support

10-bit Support

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

## 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 AMD FirePro™ R5000 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.

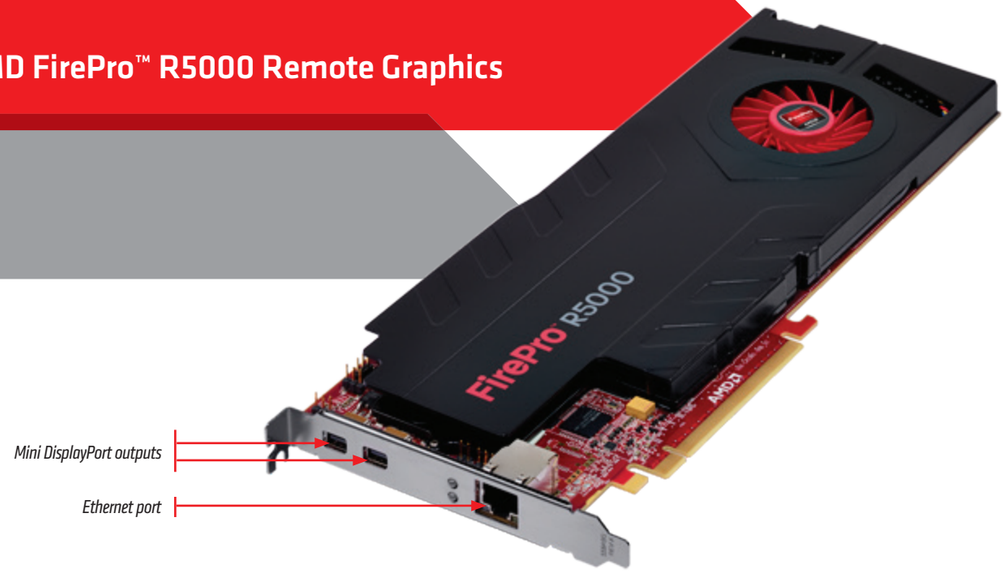
***Multi-display support.*** The AMD FirePro™ R5000 remote graphics provides support for two remote displays (max resolution of 2560x1600) or up to four remote displays (max resolution of 1920x1200). To remote displays, a zero client featuring PCoIP technology from Teradici is required.

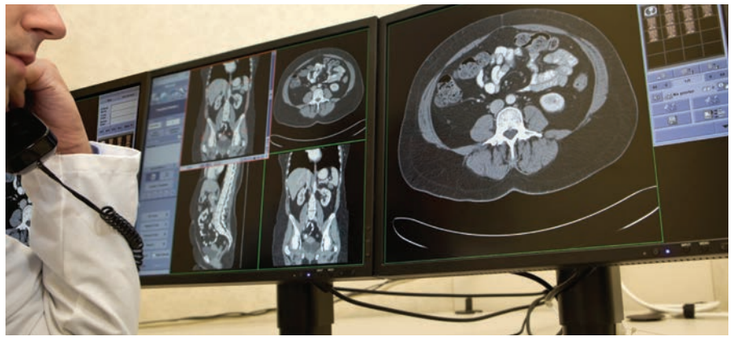
***Improved security, minimal costs.*** With an integrated graphics card that includes lossless display compression and IP transmission, AMD FirePro™ R5000 sends data through a regular IP network to a remote thin client device. This helps improve network security and minimize power and capital costs.

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

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

## AMD FirePro™ R5000 Remote Graphics



- *ATI FirePro™ 2460 supports up to four displays*
- *AMD FirePro™ 2270 professional graphics supports all major display standards - DisplayPort*, DVI and VGA*

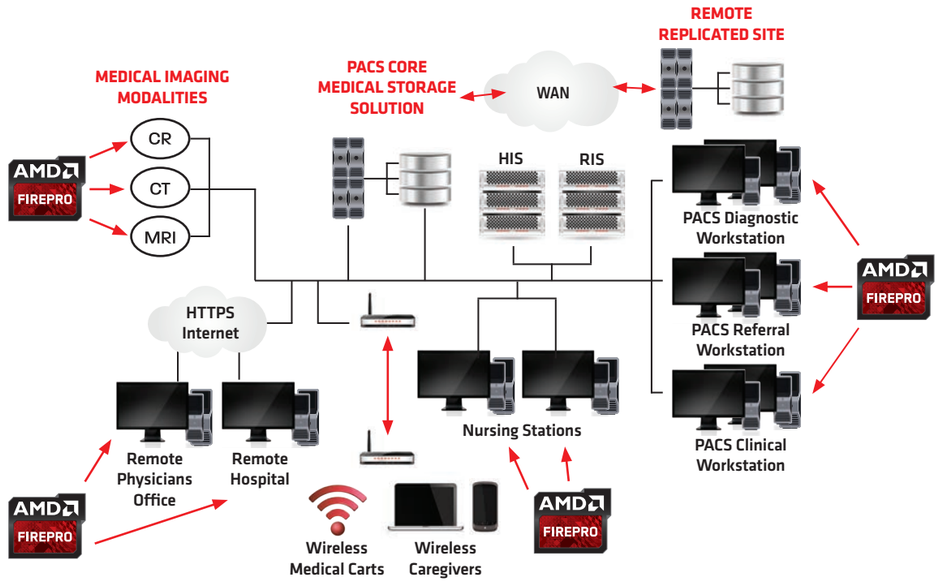
***Multi-display support.*** Multi-display solutions give medical professionals the ability to review a patient's information and images simultaneously, or to view several large scans at once, helping medical staff to diagnose efficiency and accurately.

***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 FIREPRO™ V3900

**A dual output, professional 3D graphics card in a small form factor for maximum flexibility in system installation.**

***ENTRY LEVEL***

- Scalable ultra parallel processing architecture with 480 stream processors
- 1GB DDR3 graphics memory
- Supports up to three independent displays with AMD Eyefinity multi-display technology[1]
- Officially certified and optimized for many CAD and M&E applications
- AMD AutoDetect Technology
- Full 30-bit display pipeline[2]
- Half-height/half-length design perfect for small form factor PCs
- Supports OpenCL™, OpenGL and DirectX®

## AMD FIREPRO™ V4900

**A professional 3D graphics card with 1GB of blazing-fast GDDR5 memory and multi-display capabilities to aid in improved workflow productivity.**

***ENTRY LEVEL***

- Supports up to three independent displays with AMD Eyefinity multi-display technology[1]
- 1GB GDDR5 memory
- 64 GB/s memory bandwidth
- Parallel processing architecture featuring 480 stream processors
- DirectX®, OpenGL and OpenCL™ support
- Full 30-bit precision display pipeline[2]
- Efficient design delivers outstanding performance at low-profile power usage

## AMD FIREPRO™ W5000

**For medical professionals who work on complex 3D models and need expansive visual desktop work space, all from a single-slot graphics solution.**

***MID RANGE***

- 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 technology[1]
- Capable of driving up to six independent displays (16.4 million pixels) utilizing DisplayPort 1.2 multi-streaming technology[1]
- 2GB of high speed GDDR5 memory with total memory bandwidth of 102.4 GB/s
- Full support for and hardware acceleration of OpenGL, DirectX® and OpenCL™
- PCI Express® 3.0 compliant

## AMD FIREPRO™ W7000

**A high performing professional 3D graphics card with superb visual quality and power.**

***HIGH END***

*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.*

- 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
- 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 154 GB/s
- Full support for and hardware acceleration of OpenGL, DirectX® and OpenCL™
- PCI Express® 3.0 compliant

## AMD FIREPRO™ W9000

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

***ULTRA HIGH END***

*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, DirectX® and OpenCL™
- 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™ W600

**Purpose built to drive up to six high resolution displays or projectors.**

***HIGH DISPLAY DENSITY***

*Ideal for powering multi-display configurations used in surgical theaters.*

- Six Mini DisplayPort outputs
- Projector overlap support
- 2GB GDDR5 memory
- DirectX®, OpenGL and OpenCL™ support
- Variable speed active cooling
- PCI Express 3.0 support
- 75W maximum power consumption
- No additional PCIe power connectors required
- Full height / half length form factor

## AMD FIREPRO™ W5000 DVI

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

***MEDICAL IMAGING***

*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 AMD FirePro™ W5000 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 pipeline[2]
- 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
- 2GB GDDR5 memory
- PCI Express® 3.0 compliant (x16)
- DirectX® and OpenGL support
- Variable speed active cooling
- <75W maximum power consumption

## AMD FIREPRO™ R5000

**For organizations that want to remote the compute and graphics experience for their workstation and desktop users.**

***REMOTE WORKSTATION***

*Delivering uncompromised quality of graphics and a user experience on par with physical desktop workstations.*

- Maximum power 150W
- 2GB GDDR5 graphics memory
- Max resolution support: 1920 x 1200 (4x remote displays) and 2560x1600 (2x remote displays)
- DirectX® and OpenGL support
- Sensitive data and IP stay in the data center - only pixels transmitted
- TERA2240 PCoIP host processor
- Dual and quad display remote and/or local output through
- PCoIP remoting technology[3]
- Support for a direct 1-1 local to remote link
- Connect to either a PC or a Virtual Machine

## AMD FIREPRO™ 2270

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

***LOW PROFILE, DUAL DISPLAY***

*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 or 1GB graphics memory
- PCI Express® 2.1 compliant
- PCI Express® x16 and x1 options
- DirectX® and OpenGL support
- Low profile, half length design
- 15W maximum power consumption for 512 MB; 17W for 1GB option
- Passive cooling

## ATI FIREPRO™ 2460

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

***LOW PROFILE, QUAD DISPLAY***

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

- 512MB graphics memory
- DirectX® & OpenGL support
- Maximum power <20W
- Quad DisplayPort and DVI output
- Low profile half length form factor

*DisplayPort adapter sold separately

# amd.com/firepro

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; 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.
2. 30-bit monitor required for full 30-bit display (10-bit per RBG component). AMD FirePro™ 3D graphics cards can display over one billion colors when attached to 30-bit displays.
3. PCoIP portal required, sold separately.