



**GET A SHARPER, CLEARER PICTURE.**

Upgrade to a Desktop Graphics Card for a more powerful visual experience.

**lenovo**

THERE'S **MORE THINKING** IN **ThinkPlus** Accessories



Get more out of your ThinkCentre® desktops. Pair them with Lenovo® accessories to make them perform even better. Lenovo offers a range of ThinkCentre multimedia and professional desktop Graphic Cards that bring you richer colors and sharper images. Ideal for desktop publishing, CAD/CAM and web design, these Graphic Cards boost productivity and power multiple display monitors be it VGA Analog, DVI Digital or DisplayPort monitors. They work best in application-intensive desktops giving them a longer lifecycle.



Color correction using desktop publishing application with NVIDIA® GeForce® 310 graphics.

**Multimedia Desktop  
NVIDIA® GeForce® Graphic Cards**

- Allow users to experience Windows® 7 better
- Enhances photos and helps you edit videos
- Ideal for desktop publishing and web design and those who want a faster, more efficient desktop

**Professional Desktop  
NVIDIA® Quadro® Graphic Cards**

These Graphic Cards are ideal for businesses that need: premium application-intensive desktops with a longer PC lifecycle. So if you're a stock market professional juggling multiple monitors or a CAD/CAM designer rendering designs or a web designer putting together a multimedia presentation, these powerful Graphic Cards are just for you.



**NVIDIA® Quadro® NVS offers NVIDIA® nView® Display Management Software that features:**

**VIRTUAL DESKTOPS**

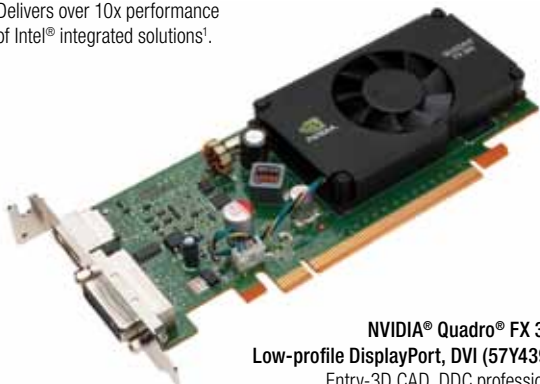
Eliminate application clutter by customizing, and switching between different desktops based on usage and grouping preferences.

**GRIDLINES**

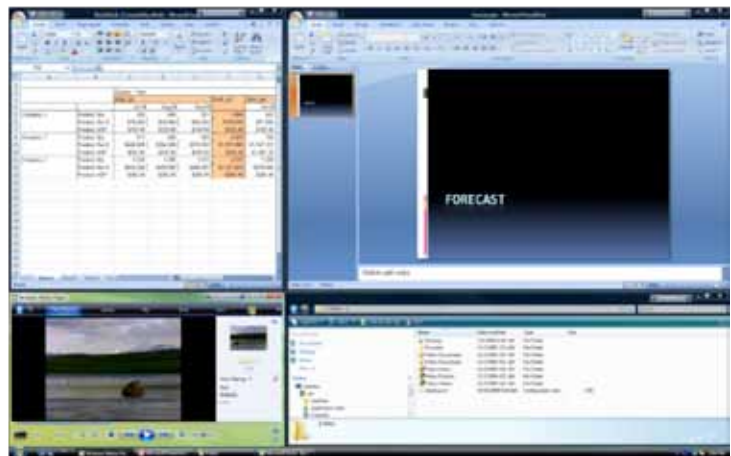
Divide your monitor into sub-regions to maximize your desktop space.

**NVIDIA® GeForce® 310 DMS59  
Dual-Digital, Dual-Analog (57Y4167)**

Delivers over 10x performance of Intel® integrated solutions!



**NVIDIA® Quadro® FX 380  
Low-profile DisplayPort, DVI (57Y4396)**  
Entry-3D CAD, DDC professional applications with ThinkCentre Small Form Factor (SFF) specialized configuration.



NVIDIA® nView® Gridlines divides the monitor into four sub-regions.







## MULTIMEDIA DESKTOP GRAPHIC CARDS



|   |   |  |
|---|---|--|
| <b>Graphic Card</b>   | NVIDIA® GeForce® 310 DisplayPort, VGA   | NVIDIA® GeForce® 310 DMS59 Dual-DVI, Dual-VGA  |
| <b>Part Number</b>  | 57Y4397   | 57Y4167  |
| <b>Attributes and Applications</b>  | <p>Delivers over 10x performance of Intel® integrated solutions<sup>1</sup></p> <p>Attach new ThinkVision® DisplayPort monitors</p> <p>Crystal-clear high-definition Blu-ray™ or an HD video file with NVIDIA® PureVideo® HD technology</p> | <p>Delivers over 10x performance of Intel® integrated solutions<sup>1</sup></p> <p>Dual-DVI Digital or Dual-VGA Analog</p> <p>Crystal-clear high-definition Blu-ray™ or an HD video file with NVIDIA® PureVideo® HD technology</p> |
| <b>Compatible Towers</b>  | A63, M90, M90p, A70, M70e, M75e, M80  | A58, A58e, A63, M58, M58p, M58e, M90, M90p, A70, M70e, M75e, M80, M57, M57p  |
| <b>Compatible Desktops</b>  | ----  | M57, M57p  |
| <b>Compatible Small Form Factors (SFFs)</b>   | M90, M90p, A70, M70e, M75e, M80   | A58, M58, M58p, M58e, M90, M90p, A70, M70e, M75e, M80, M57, M57p   |
| <b>Monitor Connectors</b>   | DisplayPort, VGA Analog   | Dual-DVI or Dual-VGA   |
| <b>Maximum Monitor Resolution</b>   | DisplayPort: 2560x1600<br>VGA Analog: 1920x1200   | Single-Link DVI Digital: 1920x1200<br>VGA Analog: 1920x1200  |
| <b>Adapters and Cables</b>  | -----   | DMS59-to-Dual DVI, DMS59-to-Dual VGA   |
| <b>Adding Optional DisplayPort to Single-Link DVI-D Digital Monitor Cable (45J7915)</b> | Single-Link DVI Digital <sup>2</sup> and VGA Analog   | ----   |
| <b>Adding Optional DisplayPort to VGA Analog Monitor Cable (57Y4393)</b>                | Dual VGA Analog <sup>2</sup>  | ----   |
| <b>Form Factor</b>  | PCI-e x16 low-profile with low-profile and full-height brackets   | PCI-e x16 low-profile with low-profile and full-height brackets  |
| <b>Cooling</b>  | Active Fansink  | Active Fansink   |
| <b>Memory Size (Frame Buffer)</b>   | 512MB DDR3  | 512MB DDR3   |
| <b>Memory Interface</b>   | 128-bit   | 128-bit  |
| <b>CUDA Cores</b>   | ----  | ----   |
| <b>Microsoft® DirectX®</b>  | 10.1  | 10.1   |
| <b>Shader Model</b>   | 4.1   | 4.1  |
| <b>OpenGL</b>   | 3.1   | 3.1  |
| <b>Power Consumption (typical)</b>  | 30W   | 30W  |



## PROFESSIONAL DESKTOP GRAPHIC CARDS

|   |   |   |   |  |
|---|---|---|---|--|
|   |  |                                    |                                      |   |
| <b>Graphic Card</b>   | NVIDIA® NVS 290 Dual-DVI, Dual-VGA  | NVS 295 Dual-DisplayPort  | NVS 450 Quad-DisplayPort, Quad DVI-D  | NVIDIA® Quadro® FX 380 Low-Profile DisplayPort, DVI  |
| <b>Part Number</b>  | 43R1765   | 45K1669   | 57Y4398   | 57Y4396  |
| <b>Attributes and Applications</b>  | Quiet desktop operation<br>nView® Display Management Software                     | Quiet desktop operation<br>nView® Display Management Software<br>Attach two 2560x1600 monitors<br>Long product life | Quiet desktop operation<br>nView® Display Management Software<br>Attach four 2560x1600 monitors<br>Long product life    | Built for professionals delivering up to 10x faster <sup>3</sup> graphics performance in AutoCAD for ThinkCentre SFF users<br>NVIDIA® Application Configuration Engine (ACE) |
| <b>Compatible Towers</b>  | M57, M57e, M58, M58p, M58e, M90, M90p   | M58, M58p, M90, M90p  | M90, M90p   | -----  |
| <b>Compatible Desktops</b>  | M57, M57e   | -----   | -----   | -----  |
| <b>Compatible Small Form Factors (SFFs)</b>   | M58, M58p, M58e, M90, M90p  | M90, M90p   | -----   | M90, M90p, A70, M70e, M75e, M80  |
| <b>Monitor Connectors</b>   | Dual-DVI or Dual-VGA  | Dual-DisplayPort  | Quad-DisplayPort  | DisplayPort, DVI-I Digital   |
| <b>Maximum Monitor Resolution</b>   | Single-Link DVI Digital: 1920x1200<br>VGA Analog: 1920x1200                       | Dual-DisplayPort: 2560x1600   | Quad-DisplayPort: 2560x1600<br>Quad-Single-Link DVI Digital: 1920x1200 (using four included DisplayPort monitor cables) | DisplayPort: 2560x1600<br>Dual-Link DVI Digital: 2560x1600   |
| <b>Adapters and Cables</b>  | DMS59-to-Dual DVI, DMS59-to-Dual VGA  | -----   | Four DisplayPort to Single-Link DVI-D Monitor Cables (45J7915)  | DVI-to-VGA Monitor Adapter   |
| <b>Adding optional DisplayPort to Single-Link DVI-D Digital Monitor Cable (45J7915)</b> | ----  | Recommended NVIDIA® NVS 290   | Four DisplayPort to Single-Link DVI-D Monitor Cables (45J7915) are included   | Dual Single-Link DVI Digital <sup>2</sup> or Single-Link DVI Digital <sup>2</sup> + VGA Analog <sup>2</sup>  |
| <b>Form Factor</b>  | PCI-e x16 low-profile with low-profile and full-height brackets                   | PCI-e x16 low-profile with full-height bracket  | PCI-e x16 full-height with full-height bracket  | PCI-e x16 low-profile with low-profile bracket   |
| <b>Cooling</b>  | Passive Heatsink  | Passive Heatsink  | Passive Heatsink  | Active Fansink   |
| <b>Memory Size (Frame Buffer)</b>   | 256MB DDR2  | 256MB GDDR3   | 512MB GDDR3 (256MB per GPU)   | 512MB DDR3   |
| <b>Memory Interface</b>   | 64-bit  | 64-bit  | 128-bit (64-bit per GPU)  | 64-bit   |
| <b>CUDA Cores</b>   | 8   | 8   | 16 (8 per GPU)  | 16   |
| <b>Shader Model</b>   | 4.0   | 4.0   | 4.0   | 4.1  |
| <b>Microsoft® DirectX®</b>  | 10.1  | 10.1  | 10.1  | 10.1   |
| <b>OpenGL</b>   | 3.2   | 3.2   | 3.2   | 3.2  |
| <b>Full-Screen Anti-Aliasing (FSAA)</b>   | -----   | -----   | -----   | 32x  |
| <b>Maximum Power Consumption</b>  | 21W   | 23W   | 35W   | 28W  |

## DisplayPort Monitor Cables

DisplayPort Monitor Cable<sup>4</sup> allows a DVI Digital or VGA Analog monitor to attach to graphic cards, ThinkPad<sup>®5</sup> notebooks and ThinkCentre<sup>5</sup> desktops offering DisplayPort 9" (330mm) cable.

- 9" (330mm) cable supports 1920x1200 monitor resolution



### DVI Digital Monitor

DisplayPort to Single-Link DVI Digital Monitor Cable (45J7915)



### VGA Analog Monitor

DisplayPort to VGA Analog Monitor Cable (57Y4393)



### ThinkVision L2251x, L2251p DisplayPort Monitors

ThinkVision monitors are both energy-efficient and environmentally responsible, optimizing Total Cost of Ownership.

#### ThinkVision L2251x Wide (2578HB6)

- 22" wide, 1680x1050 resolution
- DisplayPort and VGA Analog
- Lift, tilt, swivel, pivot stand adjustment
- 3 USB ports, integrated camera and microphone

#### ThinkVision L2251p Wide (2572HD6)

- 22" wide, 1680x1050 resolution
- DisplayPort and VGA Analog
- Lift, tilt, swivel, pivot stand adjustment



## Lenovo ADD2 DVI-D Monitor Connection Adapter

The ADD2 DVI-D Monitor Connection Adapter<sup>6</sup> (43R1985) is a low-cost method to attach a second monitor to select ThinkCentre desktops, for Dual Independent Display (DID)

- The first monitor, VGA Analog, attaches to the system's, VGA monitor port;
- the second monitor, DVI Digital, attaches to the ADD2 DVI-D Monitor Connection Adapter
- Supported on select Intel® chipsets. Compatible with the following:
  - ThinkCentre A57, A58, A58e, M57, M57p, M57e, A70, M70e Small Form Factor, Desktop, Tower
  - ThinkCentre M58, M58p Small Form Factor, Tower (disables the system's DisplayPort)



## Lenovo USB-to-DVI Monitor Adapter

- Lenovo USB-to-DVI Monitor Adapter (45K5296) allows attachment of a High-Definition (HD) monitor to a USB port. Flexibility to add as many as six monitors to a ThinkCentre desktop; one adapter is needed for each monitor
- Designed for 2D business graphic applications
- Can be used along with ThinkCentre system monitor ports or installed graphics card
- Supports 1920x1200 resolution, including 1920x1080 (1080p) for analog or digital monitors



USB-to-DVI Adapter



## Footnotes

- 1: Compared to Intel® G45 chipset. Measured using 3DMark Vantage, Performance Pre-set on an Intel® Pentium® Dual-Core E5200 system with 2GB RAM, Windows Vista® SP1 ([www.nvidia.com](http://www.nvidia.com)).
- 2: Attaching a DisplayPort Monitor Cable or the DVI-to-VGA Monitor Adapter reduces the resolution to 1920x1200.
- 3: AutoCAD 2009 running Cadalyst 2008 Benchmark, Windows Vista® 64, Quadro® FX 380 LP with Performance Driver vs. GeForce® GTS 250 ([www.nvidia.com](http://www.nvidia.com)).
- 4: DisplayPort monitor cables are designed to attach a DVI-D Windows Digital or VGA Analog monitor to a system or option that has DisplayPort. These cables does not support attachment of DisplayPort monitor to a DVI-D Digital or VGA Analog port.
- 5: For a list of compatible ThinkPad and ThinkCentre systems, go to [www.lenovo.com/support/monitoraccessories](http://www.lenovo.com/support/monitoraccessories)
- 6: The ADD2 is not a graphics card, with a GPU and memory. The ADD2 is a monitor connection adapter allowing connection of a monitor which uses the system's integrated graphics. No separate driver is required for this option. Use the most current Intel® video driver for the Intel® Integrated Graphics present on the ThinkCentre system's board.

## Monitor Connectors:

- DisplayPort:** Supports 2560x1600 resolution. DisplayPort monitor cables are available to attach 1920x1200 resolution DVI-D Digital or VGA Analog monitor.
- Dual-Link DVI-I Digital:** Supports 2560x1600 resolution. A DVI-to-VGA Monitor Adapter allows attachment of a 1920x1200 resolution VGA Analog monitor.
- Single-Link DVI-I Digital:** Supports 1920x1200 resolution. A DVI-to-VGA Monitor Adapter allows attachment of a 1920x1200 resolution VGA Analog monitor.
- VGA Analog:** Supports 1920x1200 resolution.

For more information:

[www.lenovo.com/accessoriesguide](http://www.lenovo.com/accessoriesguide)

[www.lenovo.com/support/graphiccards](http://www.lenovo.com/support/graphiccards)

[www.lenovo.com/support/monitoraccessories](http://www.lenovo.com/support/monitoraccessories)

**lenovo**

**THERE'S MORE THINKING IN ThinkPlus Accessories**

All products and offers are subject to availability. Lenovo reserves the right to alter product offerings and specifications at any time, without notice. Lenovo makes every effort to ensure accuracy of all information but is not liable or responsible for any editorial, photographic or typographic errors. All images are for illustration purposes only. For full Lenovo product, service and warranty specifications visit [www.lenovo.com](http://www.lenovo.com). The following are registered trademarks of Lenovo: Lenovo, the Lenovo logo, ThinkVision, ThinkPlus, ThinkCentre and ThinkPad. Other company, product and service names may be trademarks or service marks of others. ©2010 Lenovo. All rights reserved. Visit [www.lenovo.com/safecomputing](http://www.lenovo.com/safecomputing) periodically for the latest information on safe and effective computing.