NVIDIA Quadro K5000 Sync
PNY Part Number: VCQK5000SYNC-PB

User Guide
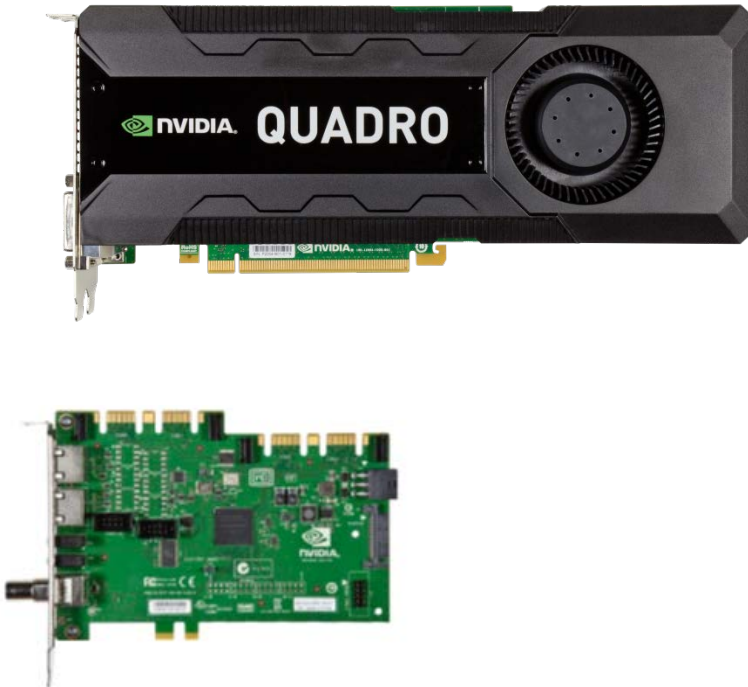
NVIDIA Quadro K5000 Sync Hardware Components

The NVIDIA Quadro K5000 with NVIDIA Quadro Sync consists of the following hardware components:

- NVIDIA Quadro K5000 graphics board
- NVIDIA Quadro Sync board
- 6-pin auxiliary power cable
- Stereo connector bracket
- Two DisplayPort to DVI-D SL adapters
- DVI to VGA adapter
- Three ribbon cable retention clips
- Four ribbon connector cables
- Software installation disc with PDF documentation
- Printed NVIDIA Quadro Sync Quick Start Guide

NVIDIA Quadro K5000 Sync Overview

The NVIDA Quadro K5000 with NVIDIA Quadro Sync delivers Frame Lock/Genlock and advanced programmable graphics for industrial, visualization and collaborative applications, by providing features for advanced multi-system visualization and multi-device film and video environments. This sophisticated professional visualization solution is GPU-driven by the NVIDIA Quadro K5000, while features such Frame Lock, Genlock, and synchronized Frame Buffer Swap and refresh rate are supported by a companion NVIDIA Quadro Sync board.

The Quadro K5000 requires an open x16 PCIe interface slot with an adjacent open slot (double-width board). The NVIDIA Quadro Sync board is designed to fit into any available expansion slot within 6 to 24 inches of the NVIDIA Quadro K5000. The Quadro Sync requires power via a 6-pin power connector or SATA power connector. The Quadro Sync card can host up to four (4) NVIDIA Quadro K5000 boards.

Frame Lock allows the display channels from multiple workstations to be synchronized, creating one large "virtual display" that can be driven by a multi-system cluster for performance scalability.

Genlock allows the graphics output to be synchronized to an external source, typically for film and broadcast video applications.

The NVIDIA Quadro K5000 and NVIDIA Quadro Sync will synchronize up to four displays simultaneously (2 DVI-DL and 2 DisplayPort), provided they are all in same display mode, which means the same resolution and refresh rate on all four displays.
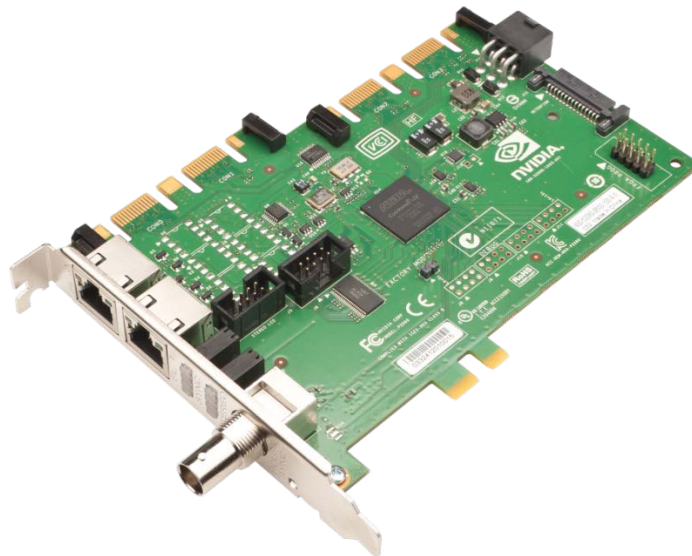
NVIDIA Quadro K5000 Overview

The NVIDIA Quadro K5000 graphics board is a PCI Express full-height form factor (4.376 inches by 10.5 inches) graphics add-in card based on the NVIDIA Quadro K5000 graphics processing unit (GPU). It is targeted as a high-performance desktop graphics solution for PCI Express

systems. The NVIDIA Quadro K5000 graphics board offers 4GB of GDDR5 GPU memory and supports display types ranging from analog CRTs to the latest digital flat panels.

NVIDIA Quadro K5000 Photo

NVIDIA Quadro Sync Photo

Refer to the NVIDIA Quadro Sync Quick Start Guide which covers the various connectors available and how to connect the Quadro Sync board to the Quadro K5000.

NVIDIA Quadro K5000 Specifications and Features

- GPU: NVIDIA Quadro K5000
- Maximum core clock: 706 MHz
- CUDA cores: 1536
- GPU memory: 4GB GDDR5
- Memory clock: 2700 MHz
- Memory interface: 256-bit
- Memory bandwidth: 173GB/s
- GPU memory: 4GB GDDR5
- PCI Express: PCIe Gen 2.0 x16
- Auxiliary power: 6-pin connector
- Maximum power consumption: 122 W
- Physical dimensions 4.376 x 10.5 inches, dual slot

Display Connectors
- One Dual Link DVI-I connector
- One Dual Link DVI-D connector
- Two DisplayPort 1.2 connectors
- Stereo connector (via supplied stereo connector bracket)

Internal Connectors and Headers
- 6-pin auxiliary power connector
- SDI/Sync connector
- SLI connector
- Stereo header

Display Support
- Maximum VGA resolution: 2048 x 1536 x 32 bpp at 85Hz
- Maximum DVI Dual Link resolution: 2560 x 1600 x 32 bpp at 60Hz
- Maximum DisplayPort 1.2 resolution: 3840 x 2160 x 36 bpp at 60Hz
- High-bandwidth digital content protection (HDCP) support

NVIDIA Quadro Sync Specifications and Features

Quadro Sync Board
- Six layer printed circuit board (PCB)
- Physical dimensions: 6.15" inches x 4.37" inches
- Power: 6-pin PCI or SATA power connector
- Maximum power consumption: 12 W

Connectors and Status Indicators
- 4 SLI-style edge fingers for connection to compatible GPUs
- BNC house sync
- RJ45 1st Frame Lock sync (using CAT5 straight-through cable)
- RJ45 2nd Frame Lock sync (using CAT5 straight-through cable)

- Frame Lock and Stereo Sync Status LEDs

NVIDIA Quadro Sync Key Features

- Synchronization of up to four Kepler GPU's and up to 16 display or projector per system.
  - Increasing the density of GPU and displays per system reduce the total number of system in a visualization cluster and minimizes operation complexity.

- Enable Mosaic technologies on up to 16 displays or projectors in any system
  - Scale any application across synchronized displays or projectors from any system. Future like Projector Overlap and an integrated geometry and intensity adjustment give you pixel-accurate display surface

- A research lab can create a stereoscopic 3D 3x3 or 4x4 display wall with just one system, instead of three or four.

- A flight simulator can move from HD resolution to four-input 4K projectors with the same size visualization cluster.

- A broadcaster can power 16HD –display video wall for on air display with just one system.

BNC House Sync Connector Video Format Support
- 720 x 486_59.94i NTSC
- 720 x 576_50i PAL
- 1280 x 720_59.94p
- 1280 x 720_60i
- 1920 x 1035_59.54i
- 1920 x 1080_60i
- 1920 x 1080_59.94i (same as 1929 x 1080_29.97 psf)
- 1920 x 1080_50i (same as 1920 x 1080_25 psf)
- 1920 x 1080_24psf
- 1920 x 1080_23.976psf
- TTL level sync pulse

NVIDIA Quadro K5000 Auxiliary Power Requirements

| 6-Pin Auxiliary Power Connector	Results
6-pin cable connected	Full Power
Not connected	Message on display will alert user to connect AUX power.

Driver Support:

- Windows 8.1, 8, 7, Vista, and Linux (32- and 64-bit)
- Windows XP SP3 32- and 64-bit driver supports only two GPUs, and only the Frame Lock and Swap Lock features are available

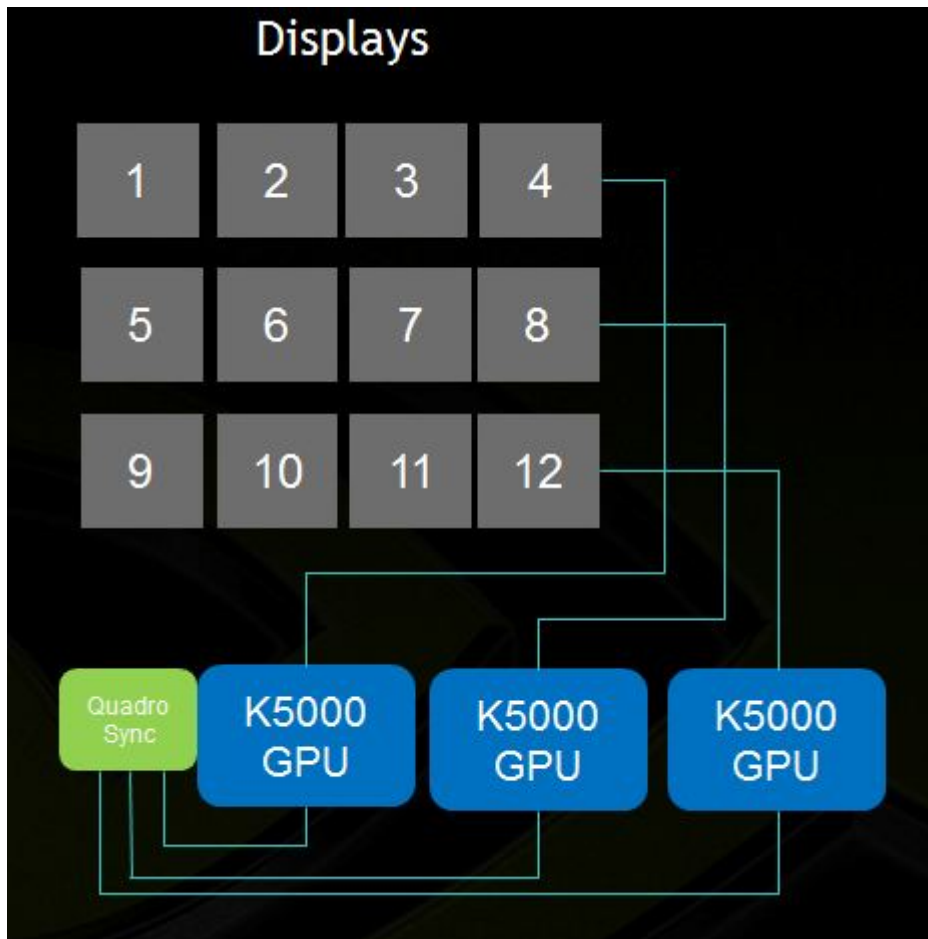**Quadro K5000, Quadro Sync and Mosaic Configuration Options**

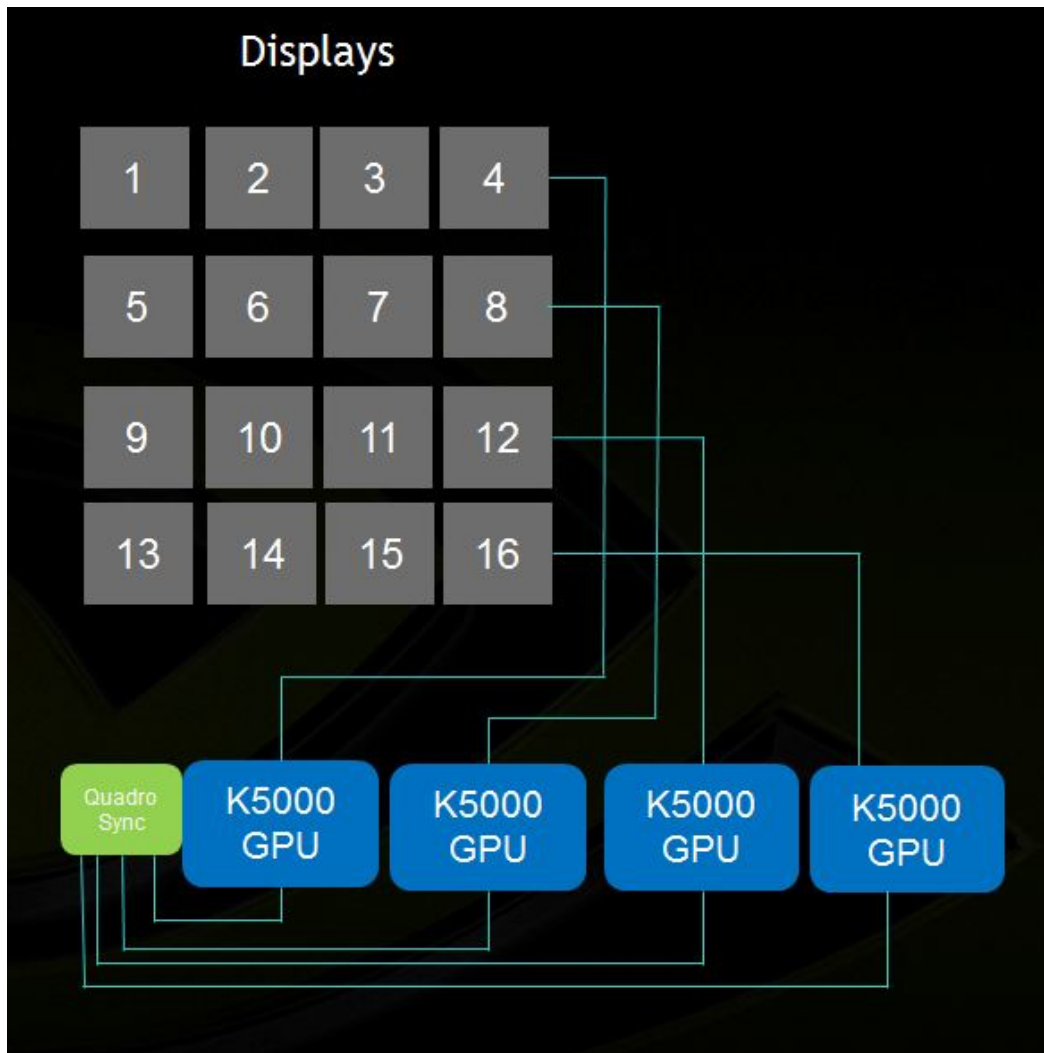1) Four display configuration with Quadro K5000 and Quadro Sync
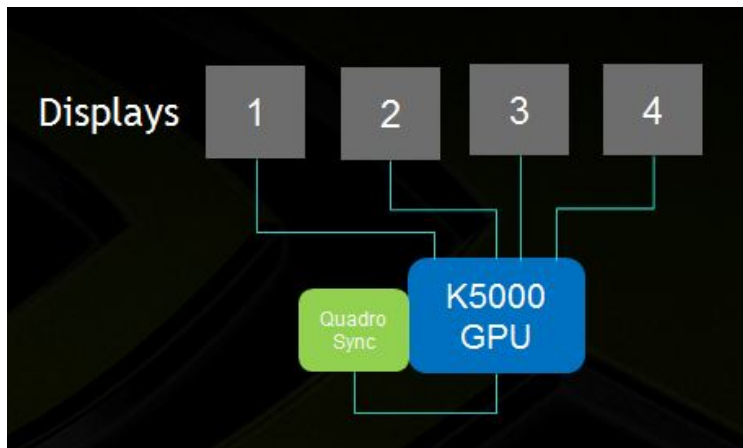
2) Eight (1 x 8 or 2 x 4) display configuration with two Quadro K5000s and Quadro Sync.
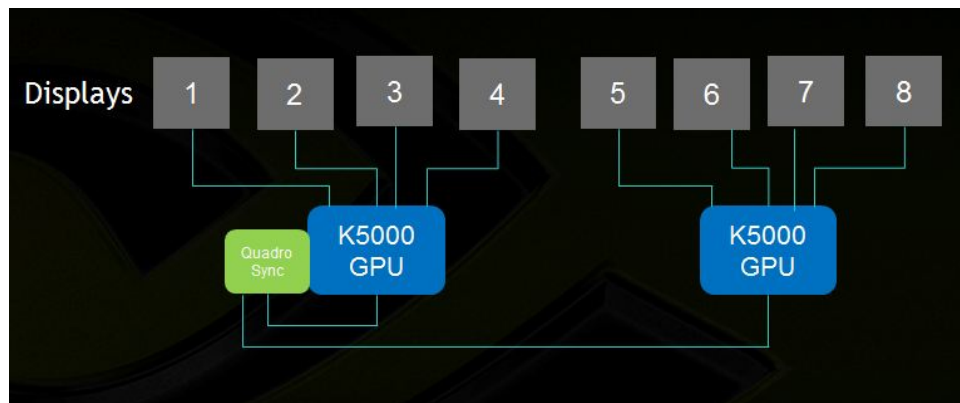
3) Twelve (4 x 3) display configuration with three Quadro K5000s and Quadro Sync.

4) Sixteen (4 x 4) display configuration with four Quadro K5000s and Quadro Sync.

Motherboard, Power Supply, and System Enclosure Selection

The Quadro Sync card supports up to four Quadro K5000 boards. The number of K5000's that can be installed will vary by motherboard, system enclosure, and power supply capacity. When configuring a multi-K5000 system choose all of these components accordingly. Also pay attention to thermal capacity since multiple ultra-high-performance K5000 boards, even based on the reasonable individual wattage utilized, generate heat load that must be accounted for.