NVIDIA GRID K1 GRAPHICS BOARD

BD-06633-001_v02 | January 2013

Board Specification

DOCUMENT CHANGE HISTORY

BD-06633-001_v02

Version	Date	Authors	Description of Change
01	November 27, 2012	AP, SM	Preliminary Information (Information contained within this board specification is subject to change)
02	January 31, 2013	MV, SM	•Removed “Preliminary Information” and “NVIDIA Confidential” •Added “Reliability” section (MTBF data) •Updated product name to NVIDIA GRID

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OVERVIEW

The NVIDIA GRID™ K1 is a dual-slot 10.5 inch PCI Express Gen3 graphics board with four NVIDIA Kepler ™ graphics processing units (GPUs). The NVIDIA GRID K1 has 16 GB of DDR3 memory (4 GB per GPU), and a 130 W maximum power limit. The NVIDIA GRID K1 graphics board uses a passive heat sink that requires system airflow to properly operate the card within thermal limits. It is designed to accelerate graphics in virtual desktop environments, making it the ideal graphics processor for Microsoft RemoteFX and VMware vSGA.

Figure 1. NVIDIA GRID K1 Graphics Board (GK107 / P2401 SKU 502)

KEY FEATURES

GPU

- Four GK107 GPUs
- Core clock: 850 MHz
- Number of processor cores: 768 (192 per GPU)
- Full Microsoft DirectX 11, Shader Model 5.0 support
- Full OpenGL 4.3 support

Board

- PCI Express 3.0 ×16 system interface
- Physical dimensions: 4.376 inches × 10.5 inches × 1.52 inches (dual-slot)
- Board power: 130 W (maximum)

Power Connector

- One 6-pin PCI Express power connector

Memory

- Memory clock: 891 MHz
- Interface: 128-bit
- Total board memory: 16 GB (4 GB per GPU)
  - 32 pieces of 256M × 16 DDR3

BIOS

- Four 2Mbit serial ROMs (one per GPU)

Virtualization Solutions

- Citrix XenServer with NVIDIA GRID Hypervisor + XenDesktop with HDX
- Microsoft Windows Server 2012 + RemoteFX
- Microsoft Windows Server 2008 R2 + RemoteFX
- VMware ESXi + View with vSGA

CONFIGURATION

Table 1 lists the configuration for the NVIDIA GRID K1 graphics board.

Table 1. Board Configuration

Specification	SKU 502 Description
Generic SKU reference	699-52401-0502-xxx
Chip	4× GK107
Core clock	850 MHz
Memory clock	891 MHz
NVIDIA CUDA® cores	768 (192 per GPU)
Frame buffer	16 GB (4 GB per GPU)
Memory I/O	128-bit
Memory configuration	32 pcs 256M × 16 DDR3
Display connectors	None
Power connector	One 6-pin PCI Express auxiliary power connector
Total board power	130 W

MECHANICAL SPECIFICATIONS

BOARD DIMENSIONS

The NVIDIA GRID K1 graphics board conforms to the PCI Express Gen3 ×16 (4.376 inches by 10.5 inches) form factor. Figure 2 shows the NVIDIA GRID K1 graphics board without the top cover installed.

Figure 2. NVIDIA GRID K1 Graphics Board Dimensions

BRACKET

The NVIDIA GRID K1 board features a vented bracket, as shown in Figure 3. OEMs who qualify for bracket modifications have the option of receiving modules with no bracket installed.

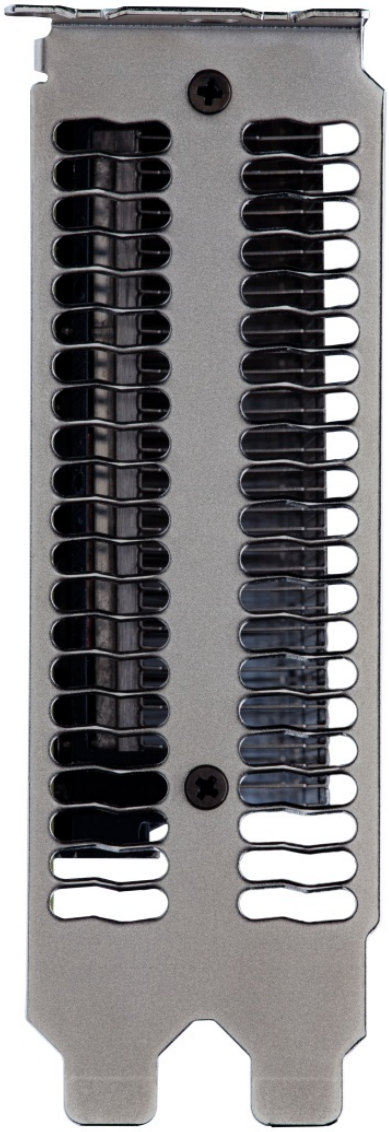

Figure 3. NVIDIA GRID K1 Bracket

Bracket Removal

The following steps will show you how to remove the standard bracket if necessary.

1. Remove the shoulder screw on the back side of the PCB.
2. Remove the two flat head screws on the bracket exhaust face.
3. Removed the bracket.

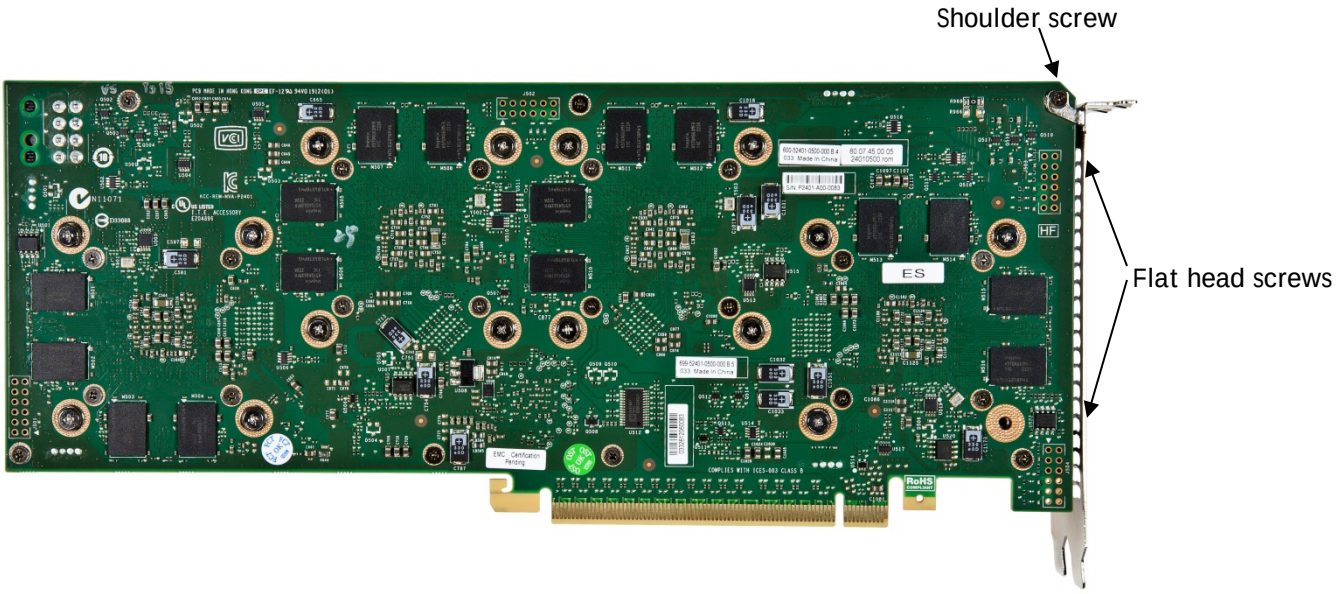

Figure 4. Shoulder Screw and Flat Head Screws Location

POWER CONNECTOR

The NVIDIA GRID K1 graphics board utilizes power from the 6-pin PCI Express power connector. Figure 5 shows the 6-pin PCI Express power connector specifications and Table 2 shows the connector's pinout.

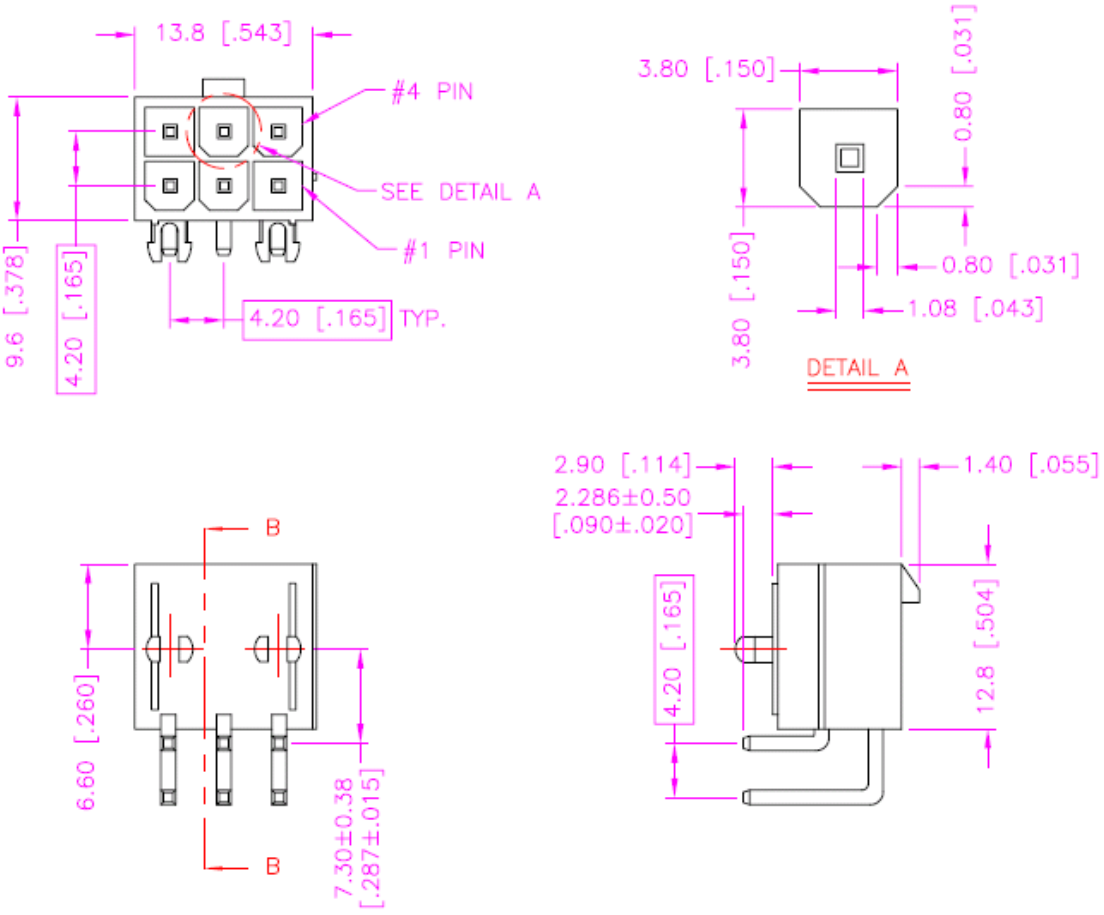

Figure 5. 6-Pin PCI Express Power Connector

Table 2. 6-Pin PCI Express Power Connector Pinout

Pin Number	Description
1	+12 V
2	+12 V
3	+12 V
4	GND
5	Sense
6	GND

THERMAL SPECIFICATIONS

The NVIDIA GRID K1 graphics board uses passive heat sinks that require system airflow to properly operate the card within thermal limits. Table 3 provides thermal information necessary to deliver reliable operation of the NVIDIA GRID K1 GPU. This information is not intended to provide a specific thermal management solution.

For more detailed information regarding thermal specifications for the NVIDIA GRID K1 graphics board, refer to the *NVIDIA GRID K1 System Design Guide* (DG-06428-001).

Table 3. Thermal Results and Specification

Test Application	Temperature (°C)*
GPU Junction temperature (T_j) at TDP**	96 °C
GPU slowdown temperature (maximum T_j)	96 °C
GPU shutdown temperature (T_j)	101 °C
Maximum fan inlet temperature	45 °C (at 17 CFM)

Notes:
* Junction temperature is reported by NVIDIA thermal sensor
** TDP = thermal design power

RELIABILITY

The meant time between failure (MTBF) ratings for the NVIDIA GRID K1 are tabulated in Table 4. The calculation of these values uses the Bellcore's Parts Count method in controlled environments.

Table 4. Mean Time Between Failure (MTBF)

Condition (Bellcore Code)	MTBF
Ground Benign (GB) environment, 35 °C *	242,324 hours
Ground Fixed (GF) environment, 35 °C **	121,991 hours

Notes:
*Bellcore Code GB relates to non-mobile equipment used in ideal environment (lab, medical, and test equipment).
**Bellcore Code GF relates to non-mobile equipment used in less than ideal environments (rack mount or other instrumentation or equipment used in buildings without controlled temperatures).

SUPPORT INFORMATION

AGENCIES

- Australian Communications Authority and Radio Spectrum Management Group of New Zealand (C-Tick)
- Bureau of Standards, Metrology, and Inspection (BSMI)
- Conformité Européenne (CE)
- Federal Communications Commission (FCC)
- Industry Canada - Interference-Causing Equipment Standard (ICES)
- Korean Communications Commission (KCC)
- Underwriters Laboratories (cUL, UL)
- Voluntary Control Council for Interference (VCCI)

LANGUAGES

Table 5. Languages Supported

	Windows 7
English (US)	X
English (UK)	X
Arabic	X
Chinese, Simplified	X
Chinese, Traditional	X
Czech	X
Danish	X
Dutch	X
Finnish	X
French	X
French (Canada)	X
German	X
Greek	X
Hebrew	X
Hungarian	X
Italian	X
Japanese	X
Korean	X
Norwegian	x
Portuguese (Brazil)	X
Portuguese (European/Iberian)	X
Russian	X
Slovak	X
Slovenian	X
Spanish	X
Swedish	X
Thai	X
Turkish	X

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