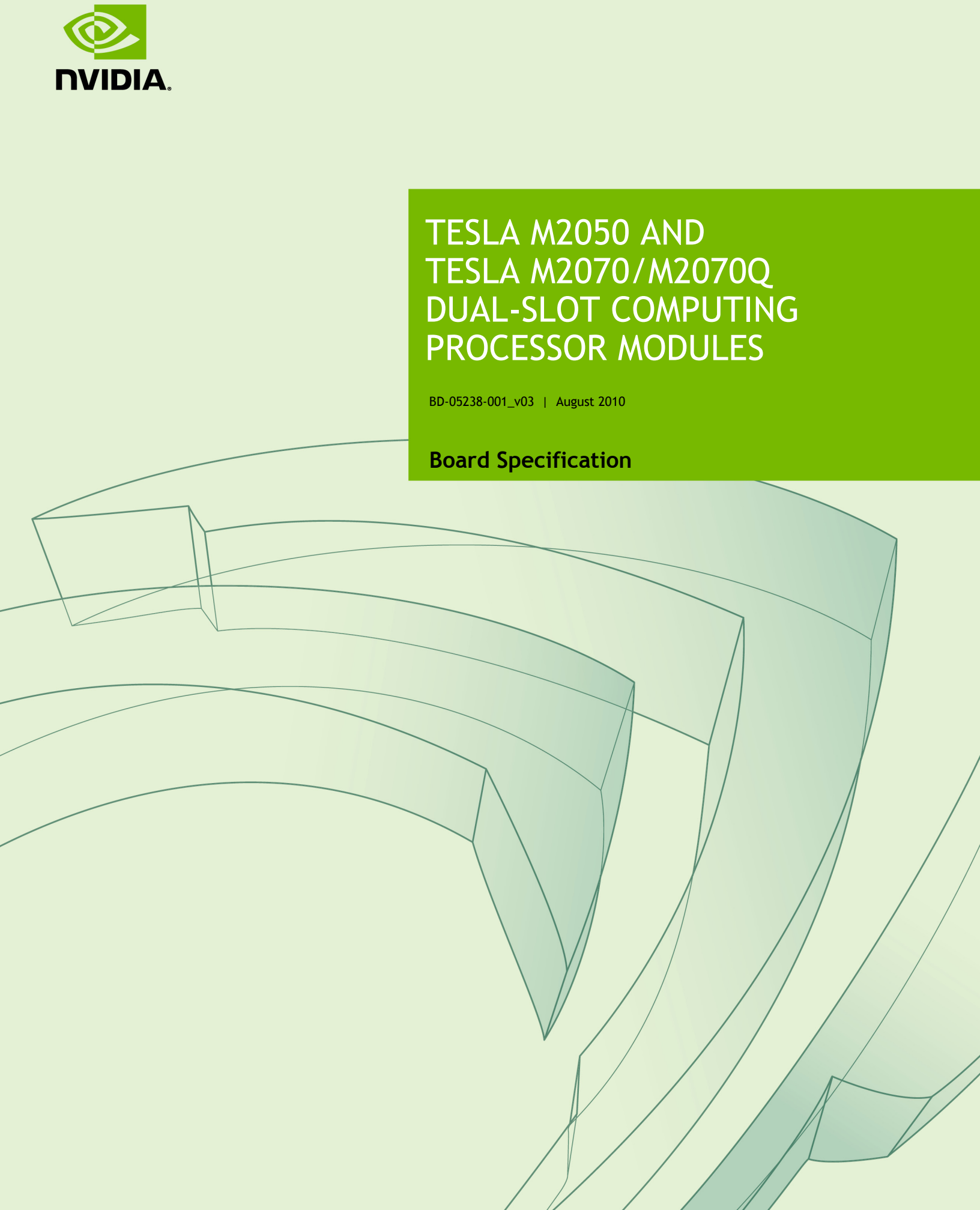

TESLA M2050 AND TESLA M2070/M2070Q DUAL-SLOT COMPUTING PROCESSOR MODULES

BD-05238-001_v03 | August 2010

Board Specification

DOCUMENT CHANGE HISTORY

BD-05238-001_v03

Version	Date	Authors	Description of Change
01	April 22. 2010	GB, SM	Initial Release (Preliminary information)
02	April 28, 2010	GB, DV	•Removed “Preliminary Information” text •Added Figure 3 •Memory clock changed from 1.6 GHz to 1.546 GHz
03	August 6, 2010	GG, SM	•Updated the memory clock for Tesla M2070 to 1.566 GHz •Added Tesla M2070Q

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OVERVIEW

The NVIDIA® Tesla™ M20-Series graphics processing unit (GPU) Computing Module is a PCI Express, double-wide, full-height (4.376 inches by 9.75 inches by 1.52 inches) form factor computing module based on the NVIDIA Fermi GPU. This module comprises a computing subsystem wit h a GPU and high speed memory.

This module is offered with two memory sizes:

- The Tesla M2050 module offers 3 GB of GDDR5 memory on board.
- The Tesla M2070 and Tesla M2070Q module offers 6 GB of GDDR5 memory on board.

Both of these products can be configured by the OEM or by the end user to enable or disable ECC or error correcting codes that can fix single-bit errors and report double-bit errors. Enabling ECC will cause some of the memory to be used for the ECC bits, so the user available memory will decrease to approximately 2.62 GB for a Tesla M2050 and approximately 5.25 GB for a Tesla M2070 and Tesla M2070Q.

The Tesla M2070Q GPU computing module uses the NVIDIA Fermi GPU that combines Tesla's high performance computing and the NVIDIA Quadro® professional-class advanced visualization in the same GPU. Tesla M2070Q is the ideal solution for customers, who want to deploy high performance computing, advanced and remote visualization in a datacenter.

KEY FEATURES

GPU

- Number of processor cores: 448
- Processor core clock: 1.15 GHz
- Package size: 42.5 mm × 42.5 mm 1981-pin ball grid array (BGA)

Board

- PCI Express Gen2 ×16 system interface
- Physical dimensions: 4.376 inches × 9.75 inches, dual slot
- Board power dissipation: < = 225 W

External Connectors

- None

Internal Connectors and Headers

- One 6-pin PCI Express power connector
- One 8-pin PCI Express power connector

Memory

- Memory clock
  - 1.546 GHz for Tesla M2050
  - 1.566 GHz for Tesla M2070 and Tesla M2070Q
- Interface: 384-bit
  - Tesla M2050
    - 3 GB
    - 24 pieces 64M × 16 GDDR5 136-pin BGA, SDRAM
  - Tesla M2070 and Tesla M2070Q
    - 6 GB
    - 24 pieces 128M × 16 GDDR5 136-pin BGA, SDRAM

BIOS

- 2Mbit Serial ROM

COMPUTING PROCESSOR DESCRIPTION

Figure 1 is a block diagram of the Tesla T20 GPU used on the Tesla M20-series products.

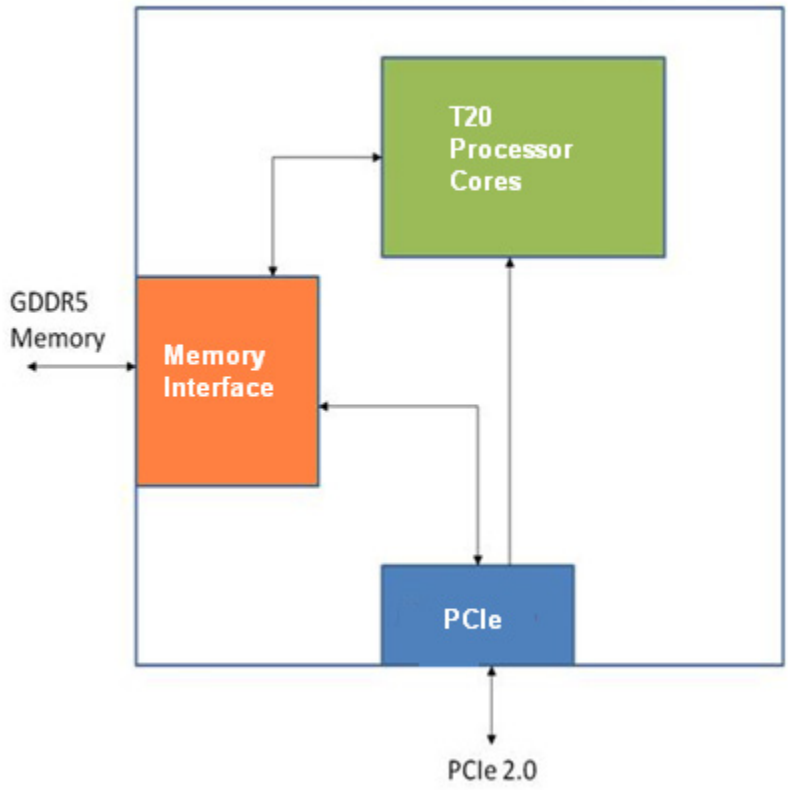

Figure 1. Tesla T20 GPU Block Diagram

CONFIGURATION

There is one configuration available (Table 1) for the Tesla M2050 and Tesla M2070.

Table 1. Board Configurations

Specification	Tesla M2050	Tesla M2070 and Tesla M2070Q
Generic SKU reference	900-21030-0050-000	•Tesla M2070: 900-21030-0070-000 •Tesla M2070Q: 900-21030-0080-000
Chip	Tesla T20 GPU	Tesla T20 GPU
Package size GPU	42.5 mm x 42.5 mm	42.5 mm x 42.5 mm
Processor clock	1.15 GHz	1.15 GHz
Memory clock	1.546 GHz	1.566 GHz
Memory size	•3 GB total •2.62 GB available with ECC enabled	•6 GB total •5.25 GB available with ECC enabled
Memory I/O	384-bit GDDR5	384-bit GDDR5
Memory configuration	24 pcs 64M × 16 GDDR5 SDRAM	24 pcs 128M × 16 GDDR5 SDRAM
External connectors	None	None
Internal connectors and headers	•8-pin PCI Express power connector •6-pin PCI Express power connector	•8-pin PCI Express power connector •6-pin PCI Express power connector
Board power	< = 225 W	< = 225 W
Thermal cooling solution	Passive heat sink	Passive heat sink

MECHANICAL SPECIFICATIONS

PCI EXPRESS SYSTEM

The Tesla M2050 and Tesla M2070/M2070Q computing processor boards (Figure 2) conform to the PCI Express full height (4.376 inches by 9.75 inches) form factor. Figure 2 is shown without the bracket.

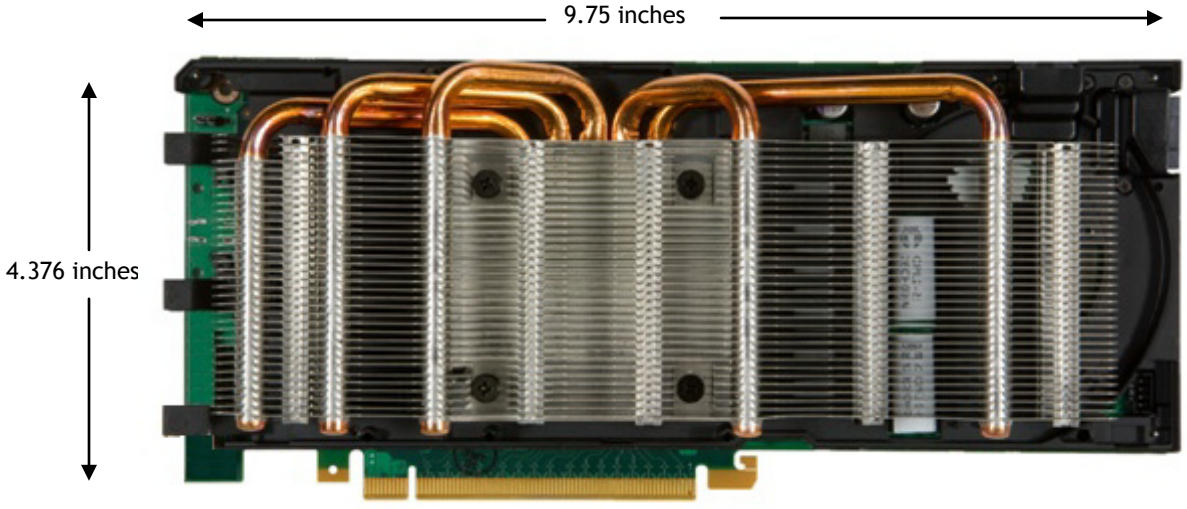

Figure 2. Tesla M2050 and Tesla M2070/M2070Q Computing Processor Module

STANDARD I/O CONNECTOR PLACEMENT

As shown in Figure 3, the Tesla M2050 and Tesla M2070/M2070Q include a vented bracket. If you are an OEM who qualifies for bracket modifications, you have the option of receiving your modules with no bracket installed.

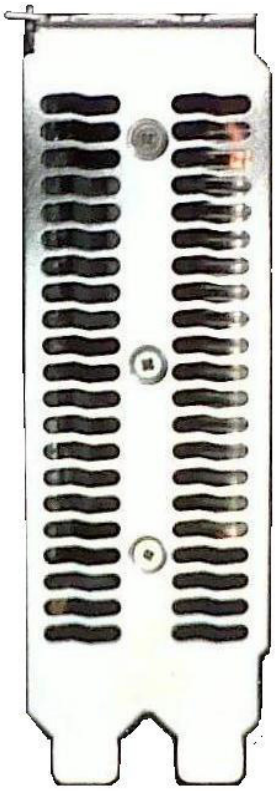

Figure 3. Tesla M2050 and Tesla M2070/M2070Q Bracket

INTERNAL CONNECTORS AND HEADERS

The Tesla M2050 and Tesla M2070/M2070Q modules support the following internal connectors and headers.

- 8-pin PCI Express power connector (can be used with a 6-pin power cable)
- 6-pin PCI Express power connector

External PCI Express Power Connectors

The Tesla M2050 and Tesla M2070/M2070Q modules are performance-optimized, high-end products and use power from the PCI Express connector as well as external power connectors. The boards can be used in two different ways.

- One 8-pin PCI Express power connector or
- Two 6-pin PCI Express power connectors

Figure 4 and Figure 5 show the specifications and Table 2 and Table 3 show the pinouts for the 6-pin and 8-pin PCI Express power connectors.

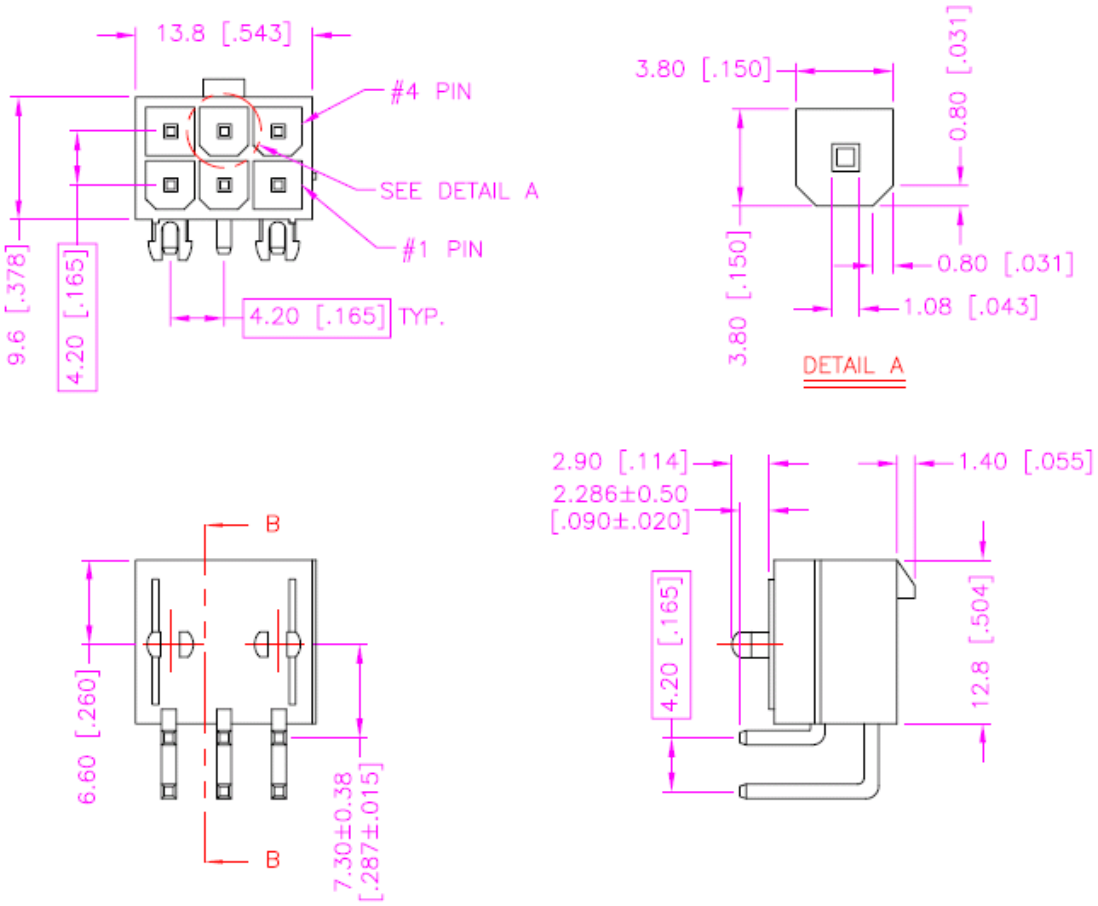

Figure 4. 6-Pin PCI Express Power Connector

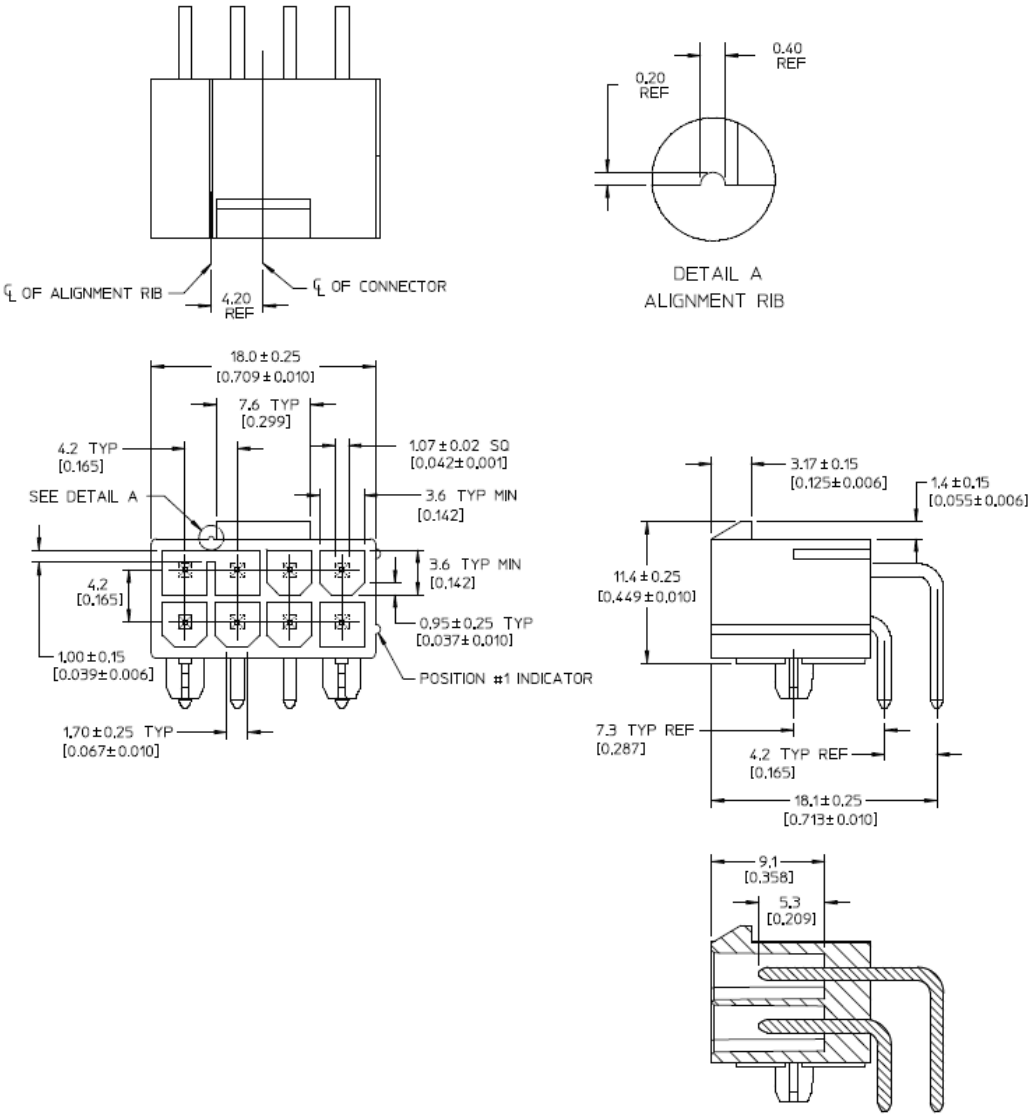

Figure 5. 8-Pin PCI Express Power Connector

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

Table 3. 8-Pin PCI Express Power Connector Pinout

Pin Number	Description
1	+12 V
2	+12 V
3	+12 V
4	Sense1
5	GND
6	Sense0
7	GND
8	GND

POWER SPECIFICATIONS

The Tesla M2050 and Tesla M2070/M2070Q require power from the PCIe connector as well as one or two auxiliary power connectors.

Table 4. Configuration with External PCI Express Connectors

8-Pin Power Connector	6-Pin Power Connector	Result
Connected (either 8-pin or 6-pin)	Connected	Valid configuration – board will operate to spec
8-pin connected	Not connected	Valid configuration – board will operate to spec
6-pin connected	Not connected	Insufficient power – board will not operate
Not connected	Connected	Insufficient power – board will not operate
Not connected	Not connected	Insufficient power – board will not operate

Note: Detailed information about power draw by rail is available to authorized system partners in the *Tesla M2050 System Design Guide* and the *Tesla M2070 and Tesla M2070QSystem Design Guide*.

SUPPORT INFORMATION

CERTIFICATES AND AGENCIES

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)
- Voluntary Control Council for Interference (VCCI)

LANGUAGES

Table 5. Languages Supported

	Windows Server 2008 and Windows Server 2008 R2	Linux
English (US)	X	X
English (UK)	X	
Arabic	X	
Chinese, Simplified	X	
Chinese, Traditional	X	
Danish	X	
Dutch	X	
Finnish	X	
French	X	
French (Canada)	X	
German	X	
Italian	X	
Japanese	X	
Korean	X	
Norwegian	x	
Portuguese (Brazil)	X	
Russian	X	
Spanish	X	
Spanish (Latin America)	X	
Swedish	X	
Thai	X	

NOTE: NVIDIA's CUDA software is only supported in English (U.S.)

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