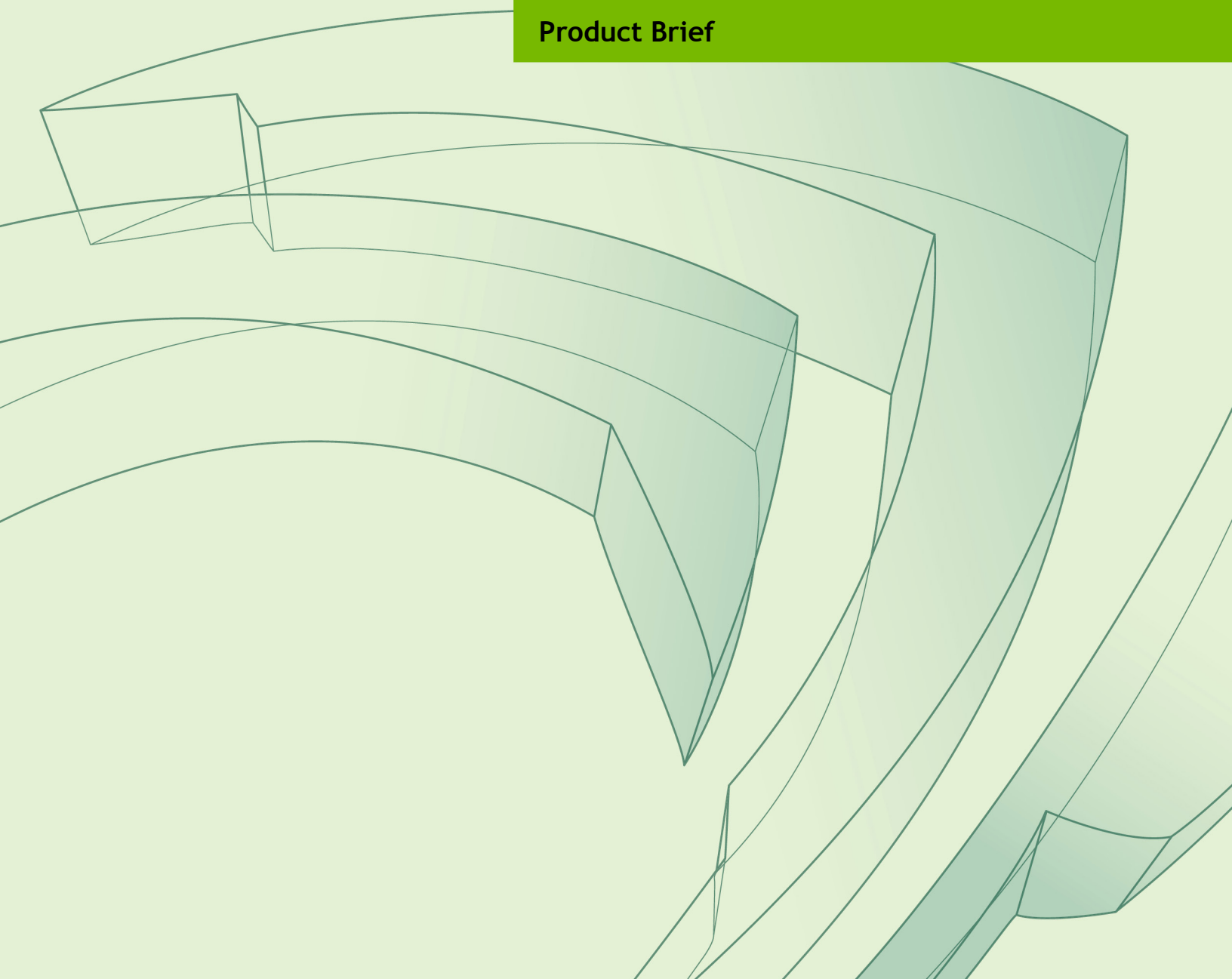
TESLA M60

PB-07864-001_v01 | November 2015

Product Brief



DOCUMENT CHANGE HISTORY

PB-07864-001_v01

Version	Date	Authors	Description of Change
01	November 13, 2015	MD, SM	Initial Release

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OVERVIEW

The NVIDIA® Tesla® M60 is a dual-slot 10.5 inch PCI Express Gen3 graphics card with two high-end NVIDIA Maxwell™ graphics processing units (GPUs). The Tesla M60 has 16 GB GDDR5 memory (8 GB per GPU) and a 300 W maximum power limit. The board is offered in a 300 W passively cooled variant that requires system airflow to properly operate the card within its thermal limits or in a 240 W actively cooled version. It is designed for single precision GPU compute tasks as well as to accelerate graphics in virtual remote workstation and virtual desktop environments.

A main feature of the Tesla M60 board is the support of the NVIDIA GRID™ software which includes NVIDIA GRID vGPU™. This technology enables the virtualization of physical GPUs into full-featured virtual GPUs providing maximum performance and scalability.

For performance optimization this board utilizes NVIDIA GPU Boost™. By adjusting the GPU clock dynamically, maximum performance is achieved within the power cap limit (300 W or 240 W).

In addition, Tesla M60 doubles the number of H.264 encoders over the NVIDIA® Kepler™ GPU architecture and also includes H.265 encoding ability. This improves encoding quality, which will enable richer colors, preserve more details after video encoding, and results in a high-quality user experience.

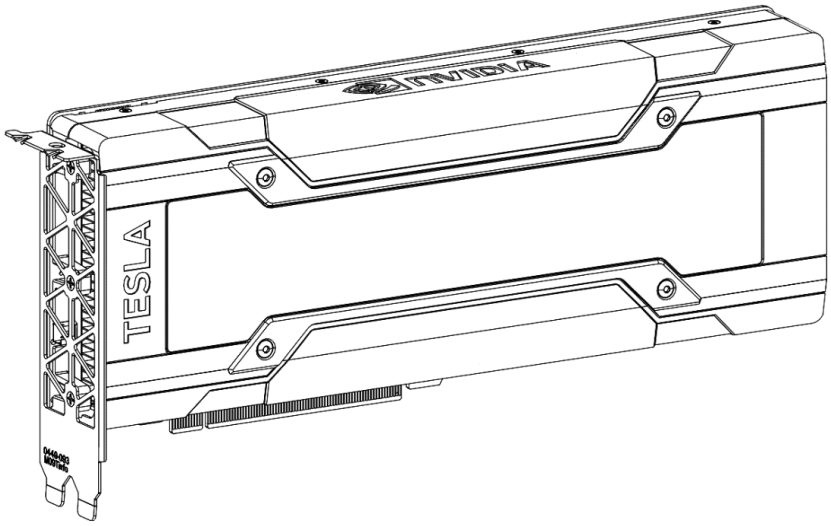

Figure 1. Tesla M60 Board (With Optional I/O Bracket)

AIRFLOW DIRECTION SUPPORT

The Tesla M60 board is available in four variants. Each version supports a single unidirectional airflow.

- PG402 SKU 40 supports passive cooling with left-to-right airflow (Figure 2)
- PG402 SKU 60 supports passive cooling with right-to-left airflow (Figure 3)
- PG402 SKU 80 supports active cooling with straight extender (Figure 4)
- PG402 SKU 80 supports active cooling with long offset extender (Figure 5)

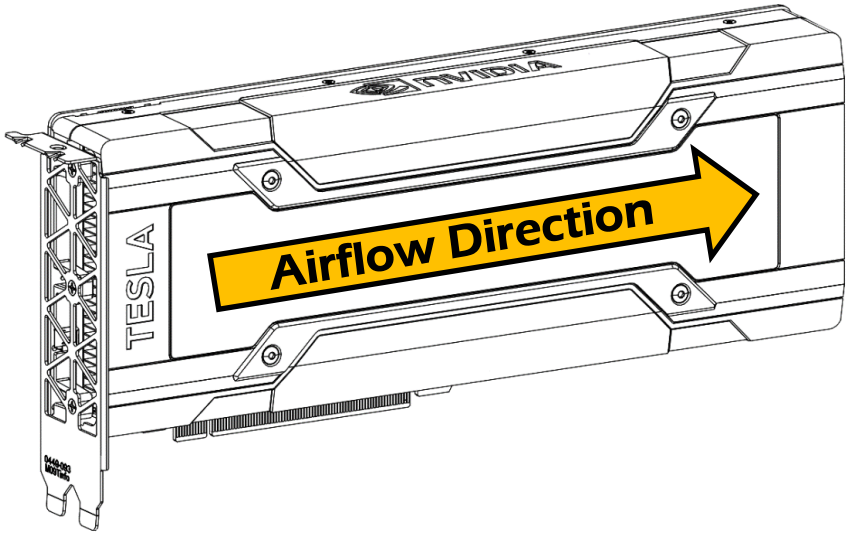

Figure 2. Tesla M60 (PG402 SKU 40): Left-to-Right Airflow

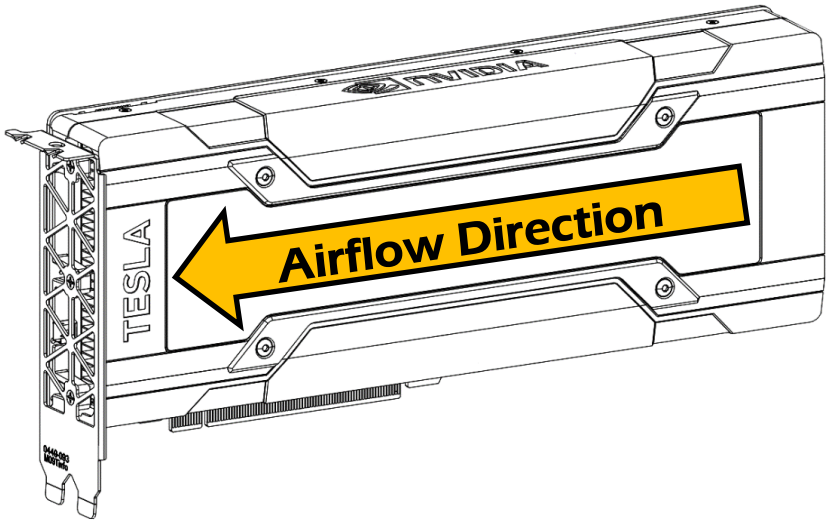

Figure 3. Tesla M60 (PG402 SKU 60): Right-to-Left Airflow

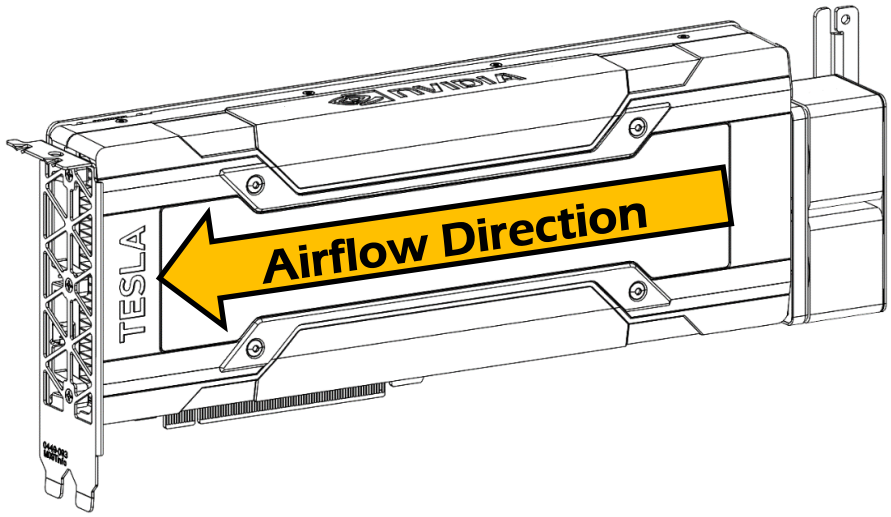

Figure 4. Tesla M60 (PG402 SKU 80): Right-to-Left Active Airflow with Straight Extender

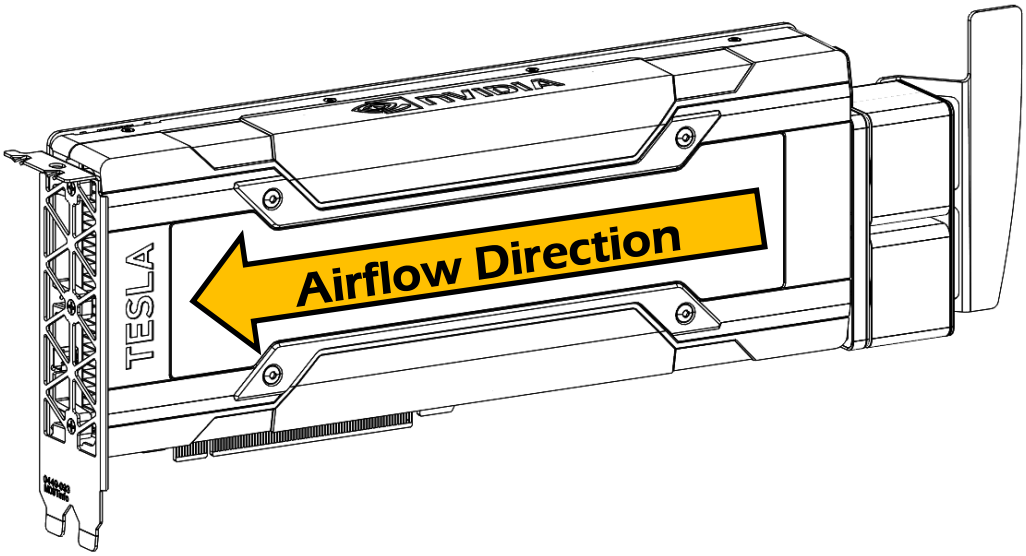

Figure 5. Tesla M60 (PG402 SKU 80): Right-to-Left Active Airflow with Long Offset Extender

SPECIFICATIONS

PRODUCT SPECIFICATION

Table 1 provides the product specifications for the Tesla M60 board.

Table 1. Product Specifications

Specification		Description
Product SKUs		PG402 SKU 40 (L2R passive airflow) PG402 SKU 60 (R2L passive airflow) PG402 SKU 80 (R2L active airflow)
Total board power		Passive: 300 W default (225 W configurable) Active: 240 W
GPU SKU		GM204-895-A1
NVIDIA® CUDA® cores		4096 (2048 per GPU)
GPU clocks	Base	899 MHz
	Maximum boost	1178 MHz
	Idle	405 MHz
VBIOS	EEPROM size	4 Mbit
	UEFI	Supported
PCI Express interface		PCI Express 3.0 ×16 Lane and polarity reversal supported
Power connectors and headers		One CPU 8-pin auxiliary power connector One 2-pin power brake header
Weight without extender and fans		1230 grams

Table 2 provides the memory specifications for the Tesla M60 board.

Table 2. Memory Specifications

Specification		Description
Memory clocks	Performance	2505 MHz
	Idle	324 MHz
Memory size		16 GB (8 GB per GPU)
Memory I/O		256-bit ×2
Memory configuration		32 pcs 256M × 16 GDDR5
Memory bandwidth		160 GB/s ×2

Table 3 provides the software specifications for the Tesla M60 board.

Table 3. Software Specifications

Specification	Description
Compatibility modes	Graphics and Compute
Base address	BAR0: 16 MB BAR1: 256 MB (Graphics) or 8 GB (Compute) BAR2: 32 MB I/O BAR: 4 KB (Graphics only)
PCI class code	0x03 - Display controller
PCI sub class codes	0x00 – VGA-compatible controller (Graphics) 0x02 - 3D controller (Compute)
ECC support	Supported (Enabled by default)

Table 4 provides the environment conditions specifications for the Tesla M60 graphics board.

Table 4. Board Environmental and Reliability Specifications

Specification	Condition
Operating temperature	0 °C to 45 °C
Storage temperature	-40 °C to 75 °C
Operating humidity	5% to 95% relative humidity
Storage humidity	5% to 95% relative humidity
Mean time between failures (MTBF)	Uncontrolled environment: 224,945 hours at 35 °C Controlled environment: 316,614 hours at 35 °C

THERMAL SPECIFICATIONS

Table 5 provides the thermal specifications for the Tesla M60 board.

Table 5. Thermal Specifications

Parameter	Value	Units
Total board power (Passive)	300	W
Total board power (Active)	240	W
GPU shutdown temperature	91	°C
GPU slowdown temperature	88	°C
GPU maximum operating temperature	86	°C
GPU hardware slowdown amount	50	%

DESIGN DISCUSSION

FORM FACTOR

The Tesla M60 board conforms to the NVIDIA Form Factor 2.0 specification. For details about the NVIDIA Form Factor 2.0 specification consult the *System Design Guide for NVIDIA Enterprise GPU Products* (DG-07562-001).

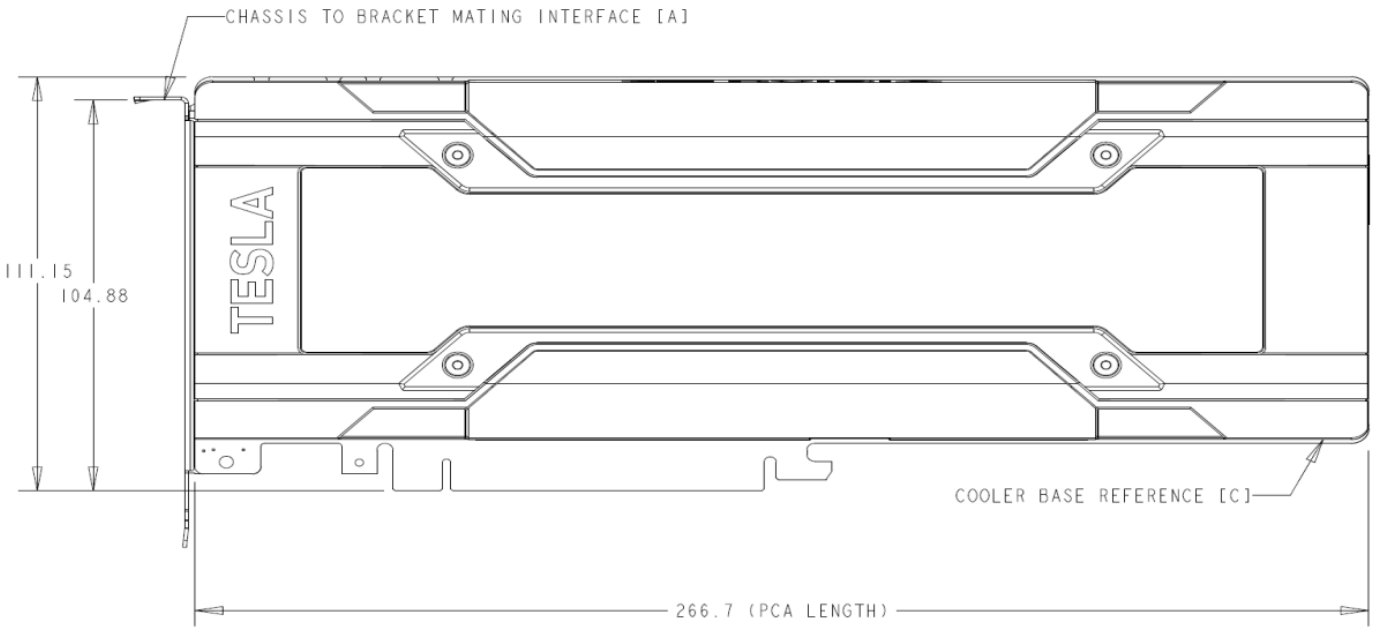

Figure 6. Tesla M60 Board Dimensions (With Optional I/O Bracket)

POWER BRAKE HEADER PLACEMENT

Figure 7 shows the placement of the power brake header connectors for the Tesla M60 board.

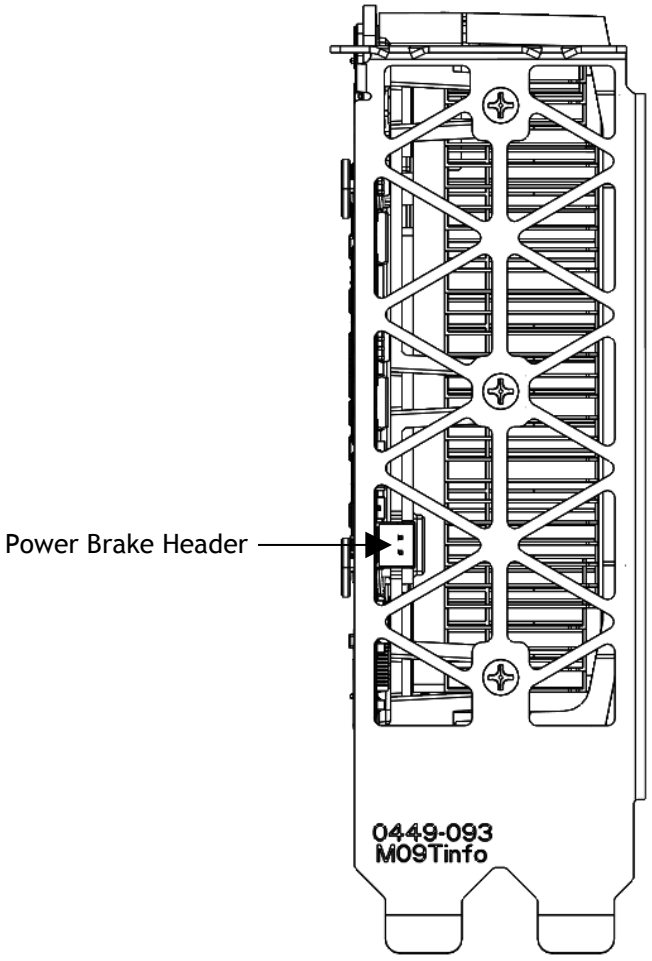

Figure 7. Power Brake Header

POWER CONNECTOR PLACEMENT

The board provides a CPU 8-pin power connector on the East edge of the board.

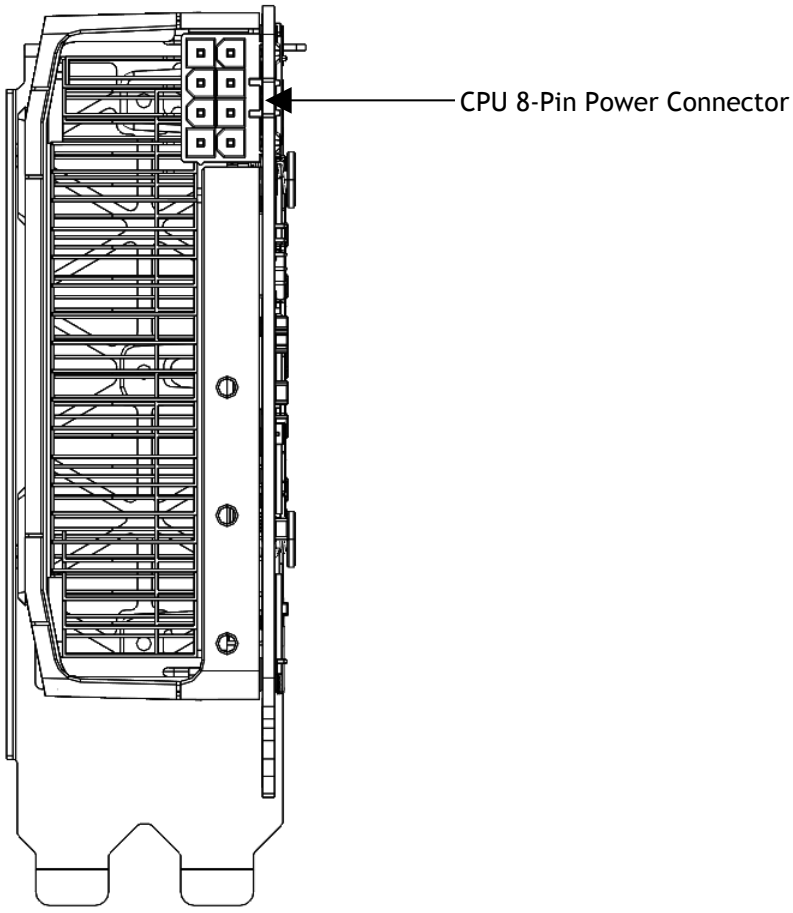

Figure 8. CPU 8-Pin Power Connector

CPU 8-Pin to PCIe 8-Pin Dongle

Figure 9 lists the pin assignments of the dongle (NVPN: 030-0571-000).

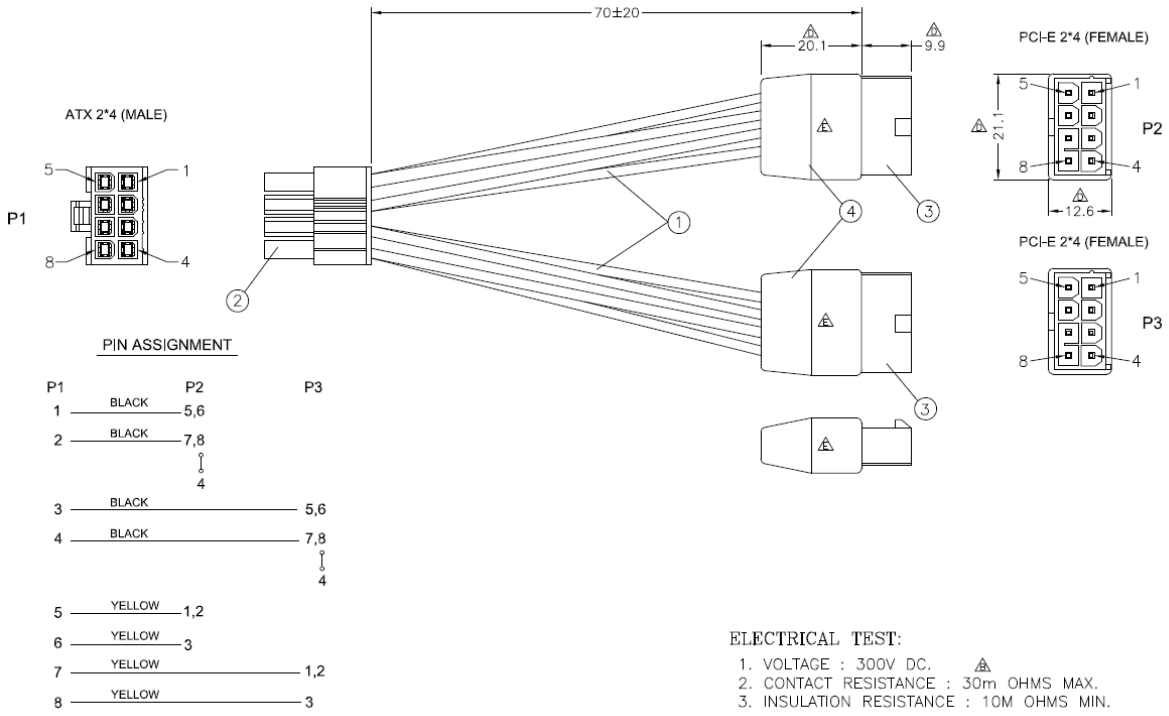

Figure 9. CPU 8-Pin to PCIe 8-Pin Dongle

Table 6. 12V External Power Configuration

Cable Attachment	Support	Notes
CPU-8-pin auxiliary power cable attached	Supported; required	CPU 8-pin cable must be attached. CPU 8-pin cable must carry up to 240 W.
PCIe 8-pin cable	Not supported	PCIe 8-pin cable is not compatible with CPU 8-pin board connector. Plugging in forcibly can cause permanent damage to the board and the system.
PCIe 6-pin cable	Not supported	PCIe 6-pin cable is not compatible with CPU 8-pin board connector. Plugging in forcibly can cause permanent damage to the board and the system.
No auxiliary power cable attached	Not supported	The auxiliary power cable must always be installed.

Note:
Customers can use a dual PCIe 8-pin to CPU 8-pin cable adapter in lieu of a CPU 8-pin auxiliary power cable.

EXTENDERS

The Tesla M60 board provides two extender options as shown in the following figures.

- NVPN: 320-0867-003 – Straight extender (Figure 10)
  - Card + extender = 312 mm
- NVPN: 320-0866-003 – Long offset extender (Figure 11)
  - Card + extender = 339 mm

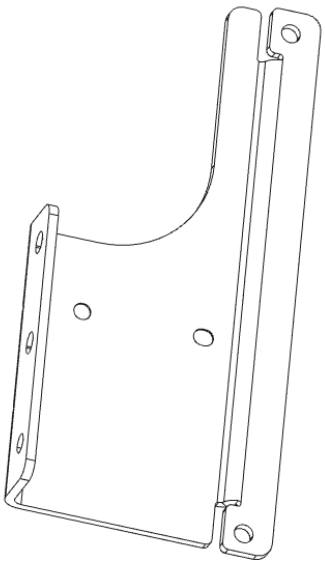

Figure 10. Straight Extender

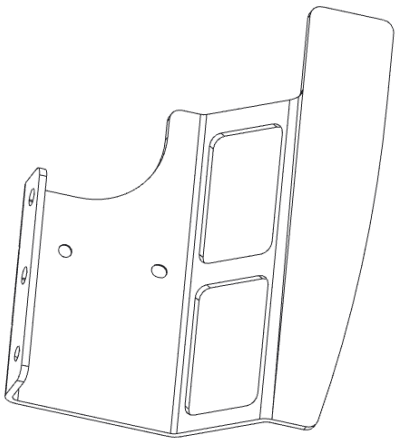

Figure 11. Long Offset Extender

- Using the standard NVIDIA extender ensures greatest forward compatibility with future NVIDIA product offerings.
- If the standard extender will not work, OEMs may design a custom attach method using the extender mounting holes on the heat sink baseplate. The extender mounting holes will vary among NVIDIA products, so designing for flexibility is recommended.

SUPPORT INFORMATION

CERTIFICATES AND AGENCIES

Certifications

- Windows Hardware Quality Lab (WHQL):
  - Certified Windows 7 and Windows 8
- Ergonomic requirements for office work W/VDTs (ISO 9241)
- EU Reduction of Hazardous Substances (EU RoHS)
- Joint Industry guide (J-STD) / Registration, Evaluation, Authorization, and Restriction of Chemical Substance (EU) – (JIG / REACH)
- Halogen Free (HF)
- EU Waste Electrical and Electronic Equipment (WEEE)

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 7. Languages Supported

Languages	Windows[1]	Linux
English (US)	Yes	Yes
English (UK)	Yes	Yes
Arabic	Yes	
Chinese, Simplified	Yes	
Chinese, Traditional	Yes	
Czech	Yes	
Danish	Yes	
Dutch	Yes	
Finnish	Yes	
French (European)	Yes	
German	Yes	
Greek	Yes	
Hebrew	Yes	
Hungarian	Yes	
Italian	Yes	
Japanese	Yes	
Korean	Yes	
Norwegian	Yes	
Polish	Yes	
Portuguese (Brazil)	Yes	
Portuguese (European/Iberian)	Yes	
Russian	Yes	
Slovak	Yes	
Slovenian	Yes	
Spanish (European)	Yes	
Spanish (Latin America)	Yes	
Swedish	Yes	
Thai	Yes	
Turkish	Yes	

Note:
[1]Windows 7, Windows 8, and Windows 8.1 are supported.