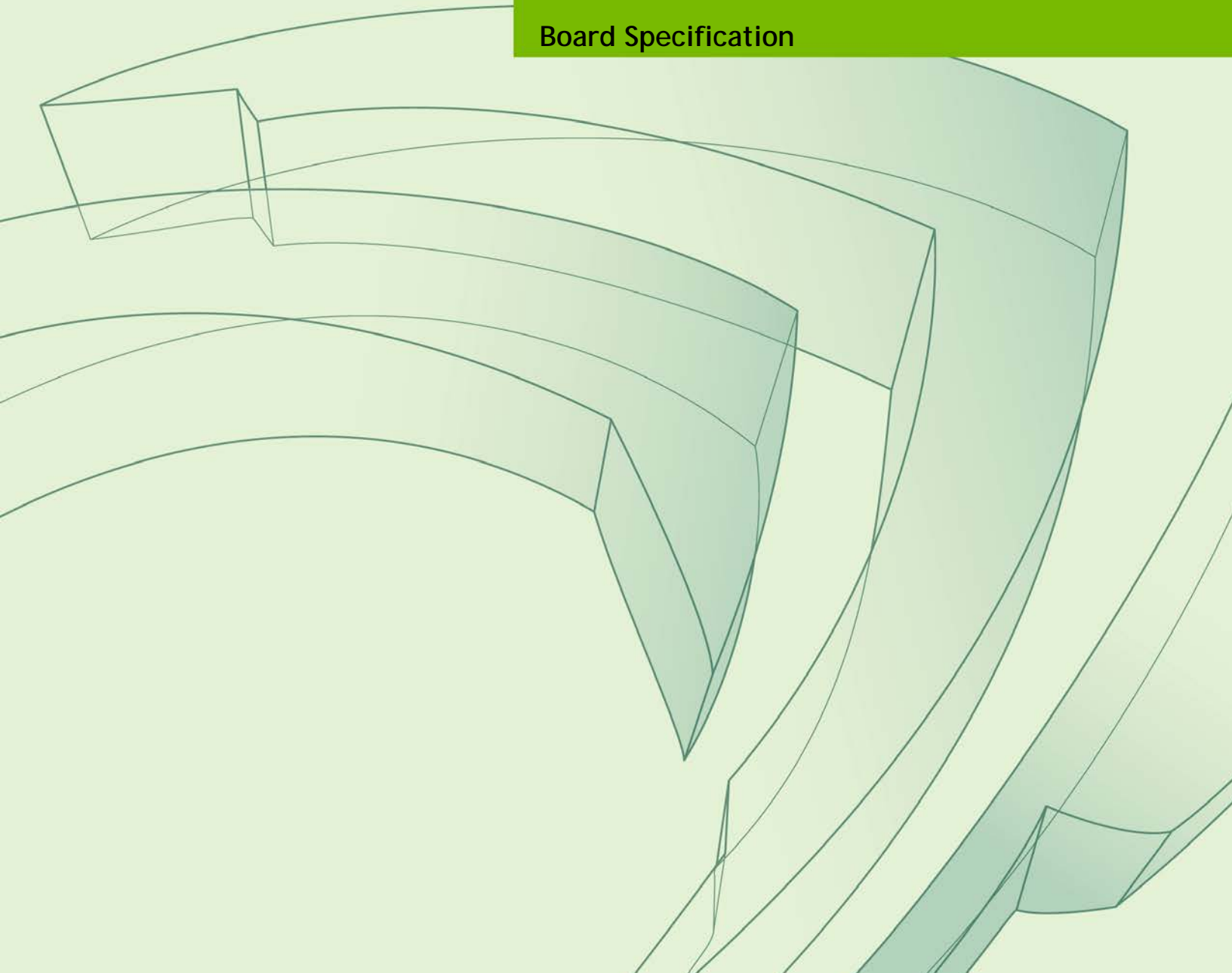




TESLA M2090 DUAL-SLOT COMPUTING PROCESSOR MODULE

BD-05766-001_v02 | June 2011

Board Specification



DOCUMENT CHANGE HISTORY

BD-05766-001_v02

| Version | Date | Authors | Description of Change |
|---------|----------------|---------|---|
| 01 | March 21, 2011 | GG, SM | Initial Release |
| 02 | June 16, 2011 | GG, SM | Updated memory configuration in Table 1 |
| | | | |

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OVERVIEW

The NVIDIA® Tesla™ M2090 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 with a GPU and high speed memory. The Tesla M2090 module offers 6 GB of GDDR5 on-board memory.

The Tesla M2090 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 5.25 GB for a Tesla M2090.

KEY FEATURES

GPU

- ▶ Number of processor cores: 512
- ▶ Processor core clock: 1.3 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: 1.85 GHz
- ▶ Interface: 384-bit
 - 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 T20A GPU used on the Tesla M2090 dual-slot computing processor module.

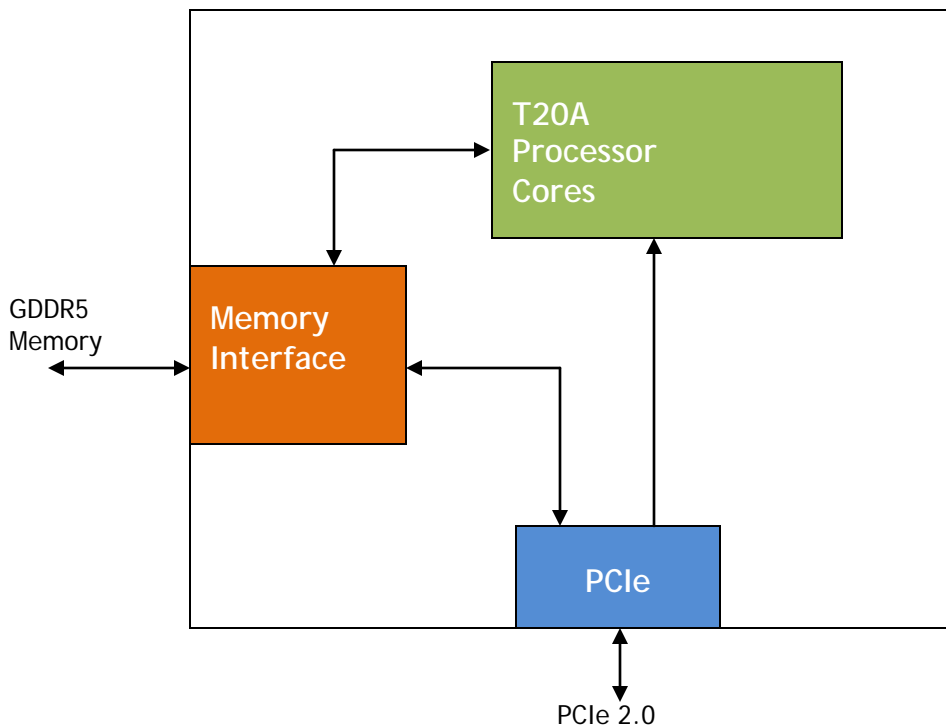


Figure 1. Tesla T20A GPU Block Diagram

CONFIGURATION

There is one configuration available (Table 1) for the Tesla M2090 dual-slot computing processor module.

Table 1. Tesla M2090 Board Configuration

| Specification | Description |
|---------------------------------|--|
| Generic SKU reference | 900-21030-0040-100 |
| Chip | T20A GPU |
| Package size | 42.5 mm × 42.5 mm |
| Processor clock | 1.3 GHz |
| Memory clock | 1.85 GHz |
| Memory I/O | 384-bit GDDR5 |
| Memory configuration | 24 pcs 128M × 16 GDDR5 SDRAM |
| External connectors | None |
| Internal connectors and headers | <ul style="list-style-type: none"> • 8-pin PCI Express power connector • 6-pin PCI Express power connector |
| Board power | <= 225 W |
| Thermal cooling solution | Passive heat sink |

MECHANICAL SPECIFICATIONS

PCI EXPRESS SYSTEM

The Tesla M2090 computing processor board (Figure 2) conforms to the PCI Express full height (4.376 inches by 9.75 inches) form factor. Figure 2 is shown without the bracket.

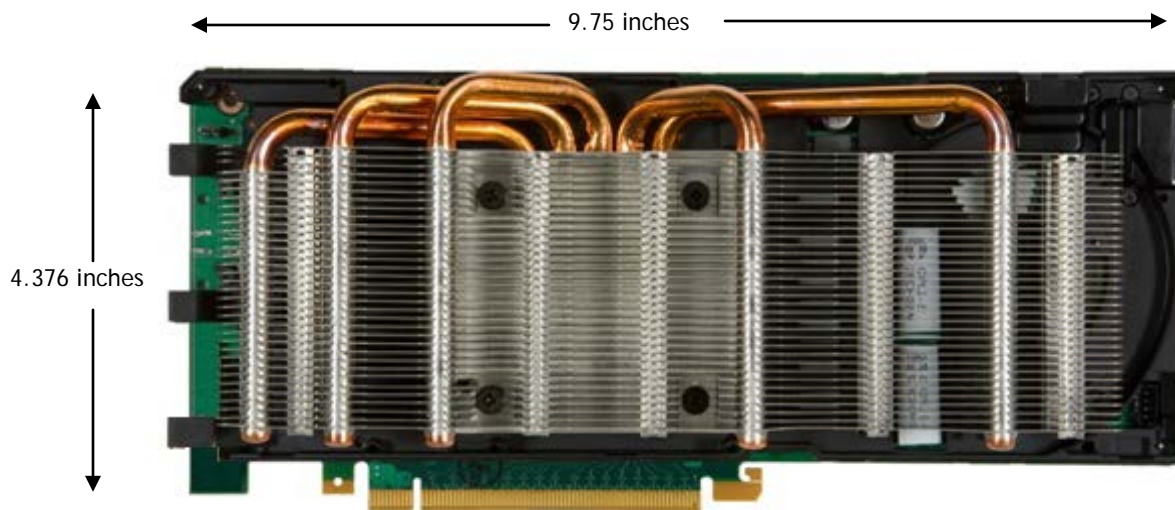


Figure 2. Tesla M2090 Computing Processor Module

STANDARD I/O CONNECTOR PLACEMENT

As shown in Figure 3, the Tesla M2090 includes a vented bracket. If you are an OEM who qualifies for bracket modifications, you have the option of receiving your module with no bracket installed.

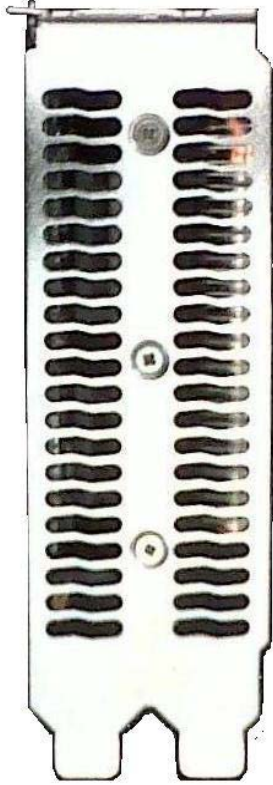


Figure 3. Tesla M2090 Bracket

INTERNAL CONNECTORS AND HEADERS

The Tesla M2090 module supports 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 M2090 module is a performance-optimized, high-end product and uses power from the PCI Express connector as well as external power connectors. The board 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.

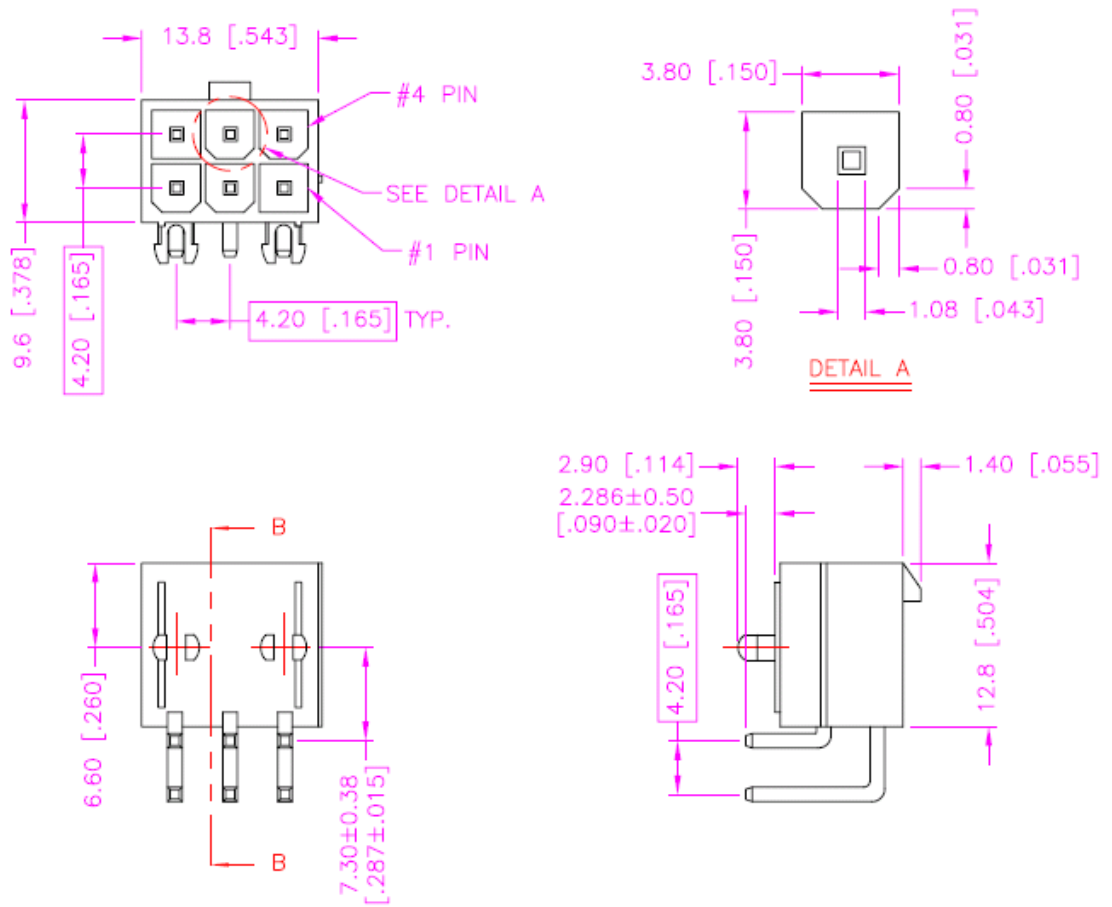


Figure 4. 6-Pin PCI Express Power Connector

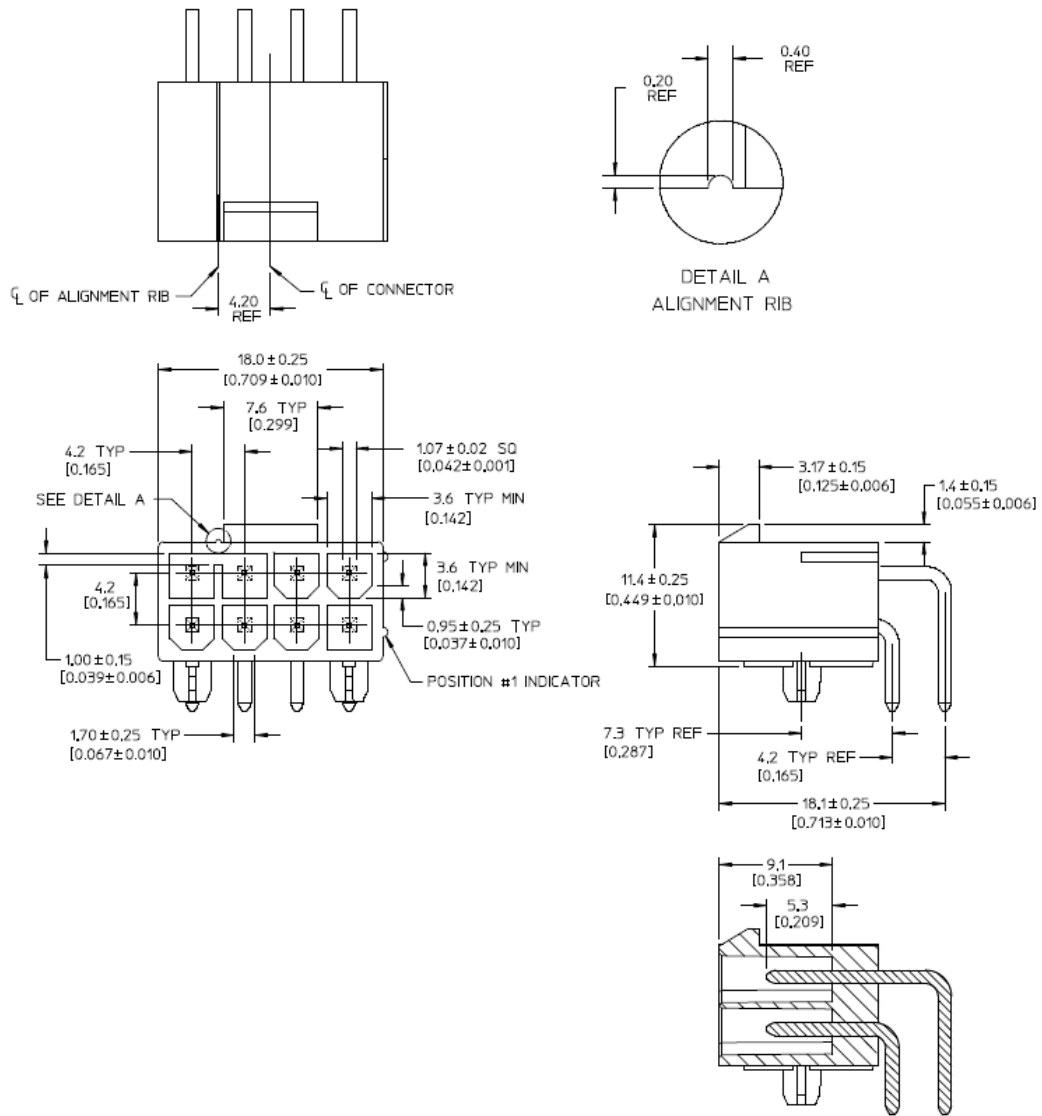


Figure 5. 8-Pin PCI Express Power Connector

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 M2090 requires 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 specification |
| 8-pin connected | Not connected | Valid configuration - board will operate to specification |
| 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 M2090 System 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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