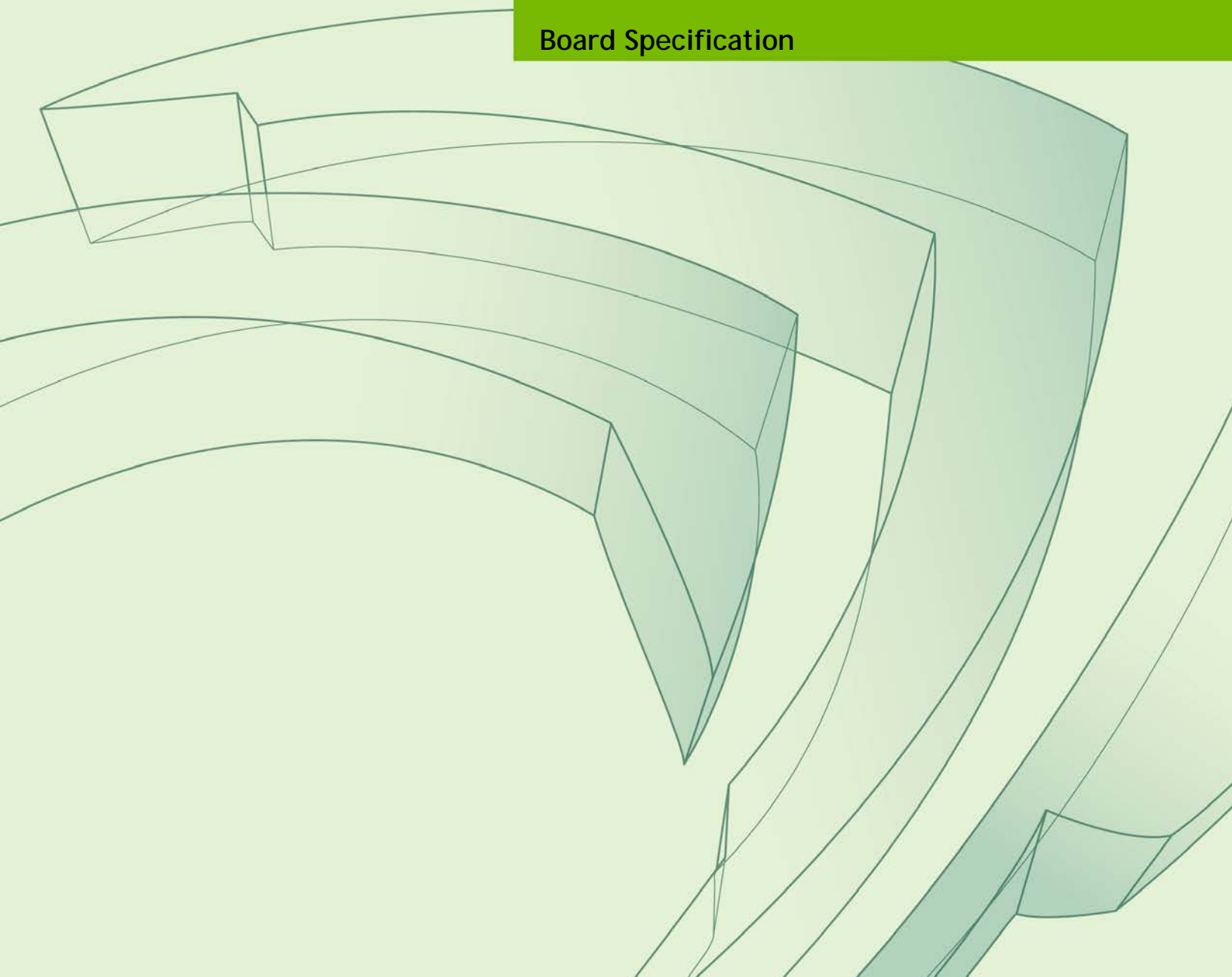




# TESLA M2090 DUAL-SLOT COMPUTING PROCESSOR MODULE

BD-05766-001\_v03 | June 2012

**Board Specification**



## DOCUMENT CHANGE HISTORY

BD-05766-001\_v03

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
03	June 27, 2012	GG, SM	Updated SKU reference 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.

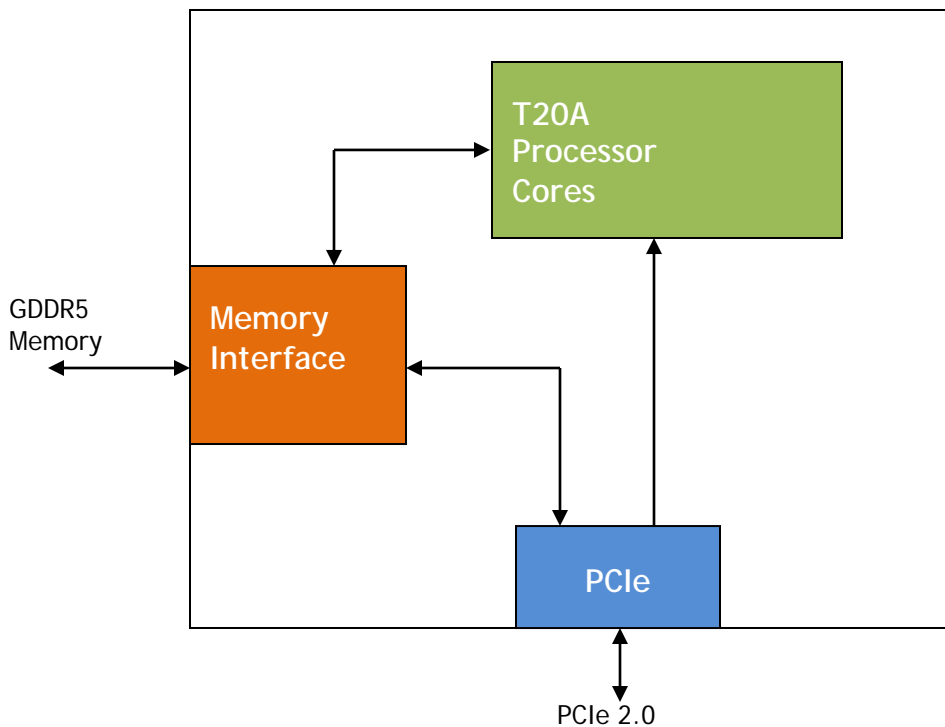


Figure 1. Tesla T20A GPU Block Diagram

## 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	<ul style="list-style-type: none"> <li>900-21030-0040-100 (ships without bracket)</li> <li>900-21030-0045-100 (ships with bracket)</li> </ul>
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"> <li>8-pin PCI Express power connector</li> <li>6-pin PCI Express power connector</li> </ul>
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.

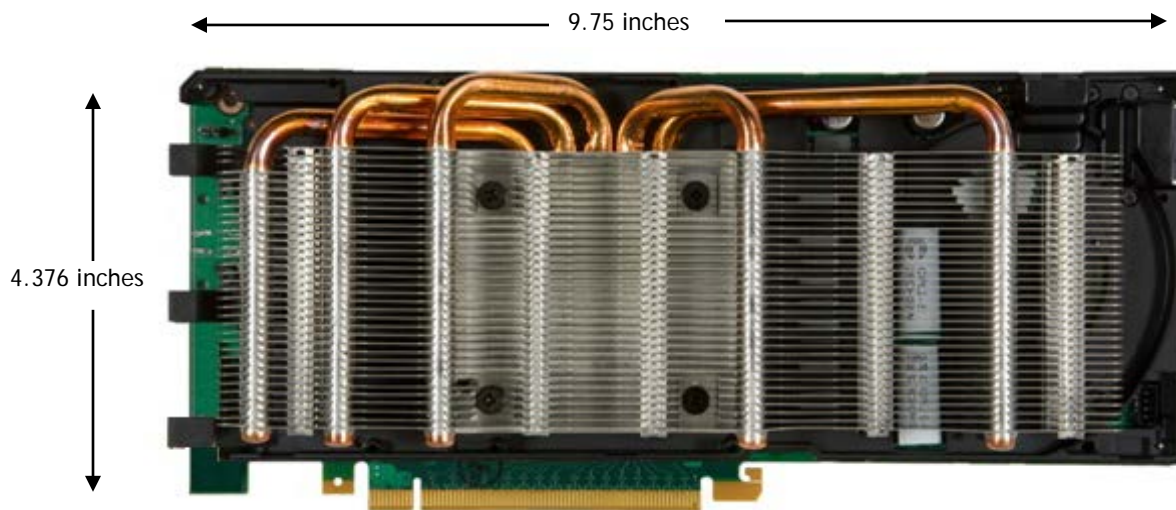


Figure 2. Tesla M2090 Computing Processor Module



## 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.

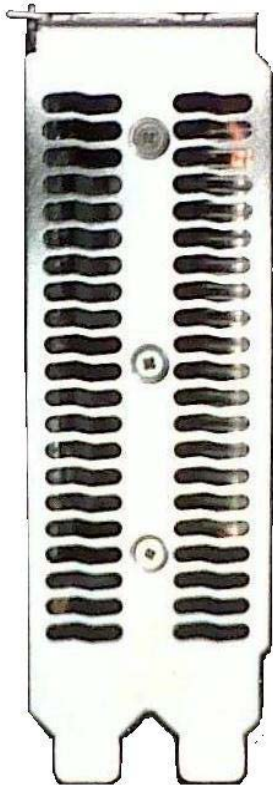


Figure 3. Tesla M2090 Bracket

## 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.

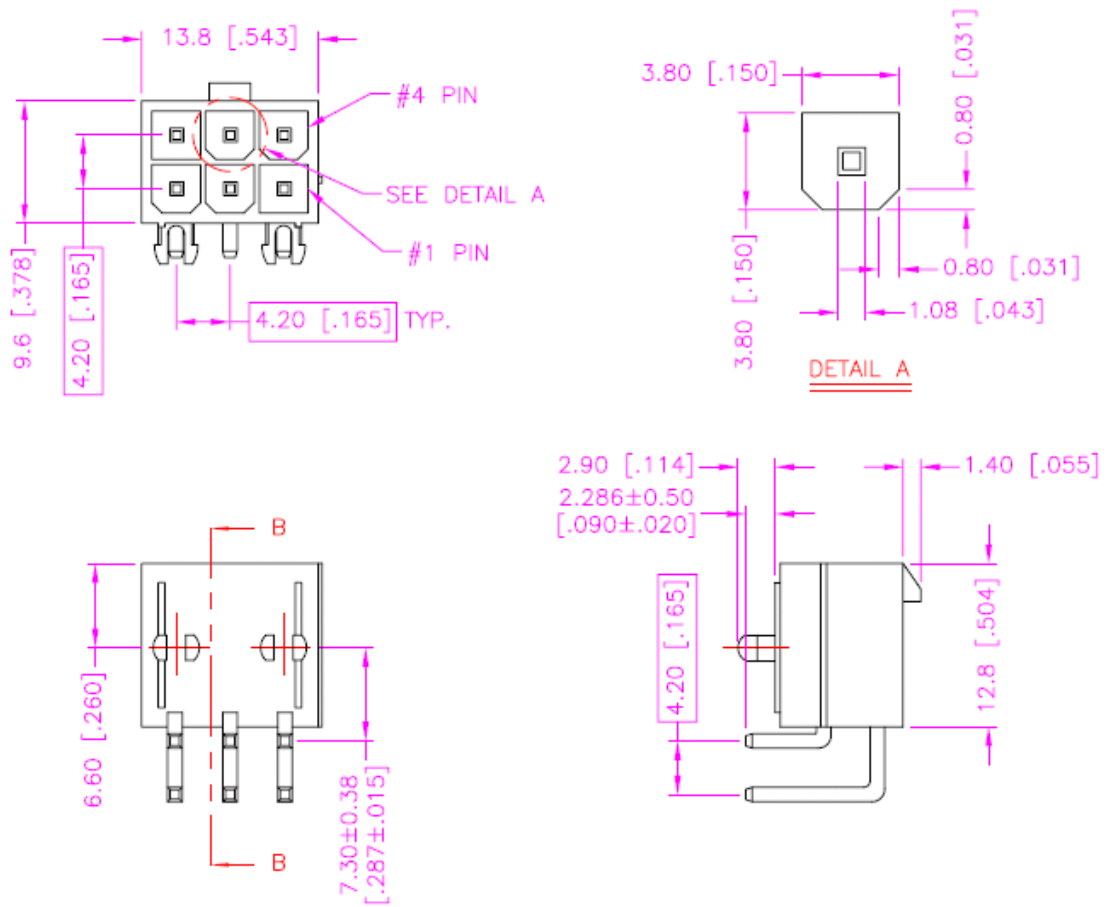


Figure 4. 6-Pin PCI Express Power Connector

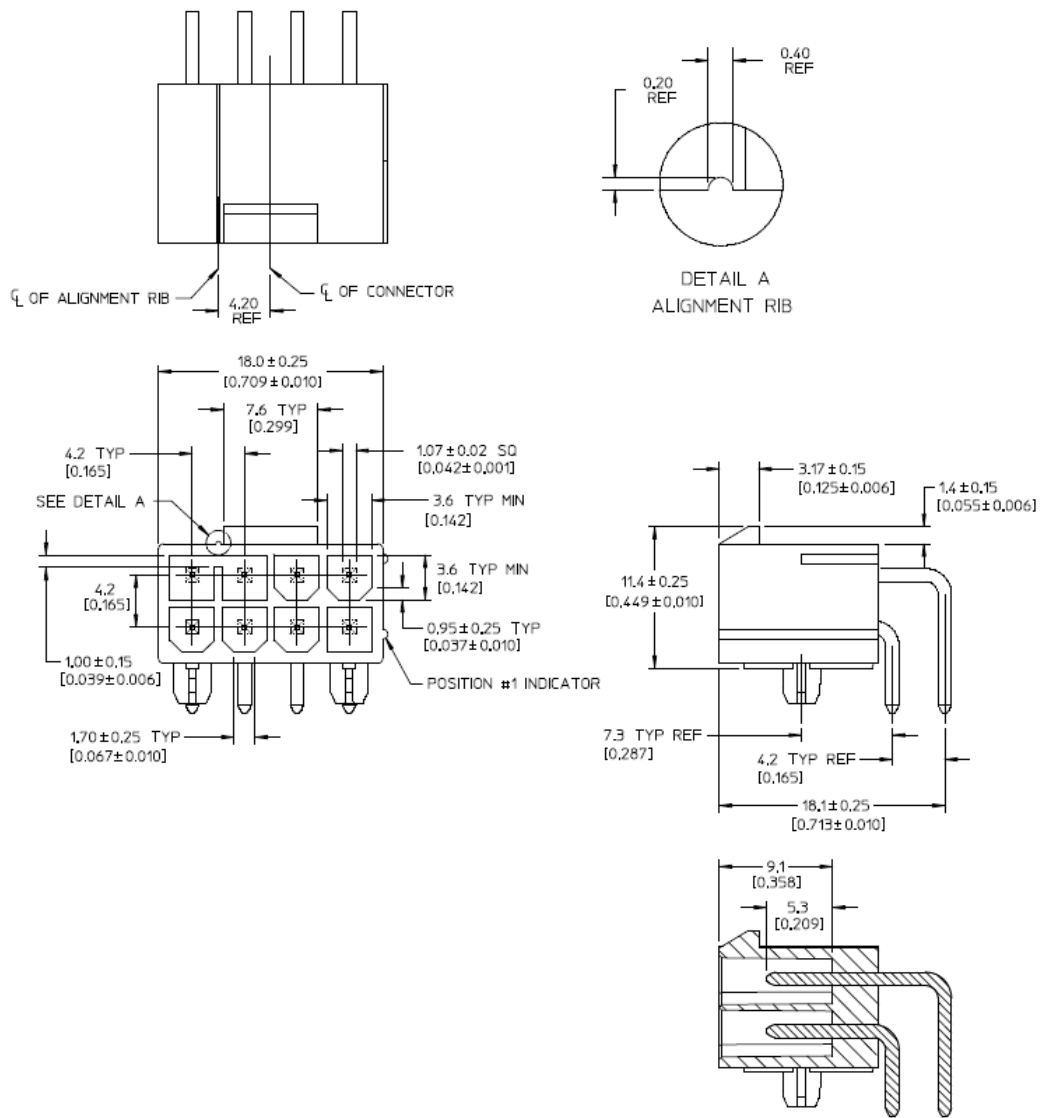


Figure 5. 8-Pin PCI Express Power Connector

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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