Specification

Tesla S1070
GPU Computing System

October 9, 2008 | SP-04154-001_v02

Document Change History

Version	Date	Responsible	Description of Change
0.9	July 14, 2008	GB	Initial version, preliminary
01	July 28, 2008	GB, SM	Initial release
02	October 9, 2008	GB, SM	Production-release update

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Tesla S1070 Overview

The NVIDIA® Tesla™ S1070 Computing System is a 1U rack-mount system with four Tesla T10 computing processors. This system connects to one or two host systems via one or two PCI Express cables. A Host Interface Card (HIC) is used to connect each PCI Express cable to a host. The host interface cards are compatible with both PCI Express 1x and PCI Express 2x systems.

Key Specifications

Computing Processors

- Four Tesla T10 graphics processing units (GPUs)
- 16.0 GB of high speed memory, configured as 4.0 GB for each GPU

Mechanical Overview

- Physical Dimensions
  - System: 1.71 inches high × 17.425 inches wide × 28.5 inches deep
  - System weight without external accessories: 34 lbs
  - Shipping box: 9.5 inches high x 24 inches wide x 37.5 inches deep
  - System shipping weight with standard accessories: 61 lbs
- PCI Express Cable
  - Standard: 0.5 meters in length
  - Optional: 2.0 meters in length
- Host interface Cards
  - PCI Express low profile form factor
  - Standard card requires a ×16 PCI Express slot
  - An optional card is available for ×8 PCI Express slots
- Rack Compatibility
  - Fits 4-post, 19” EIA compatible racks
  - Rack depth between posts: 28.7 to 36.3 inches
- External Connectors
  - Two cable connectors for ×16 PCI Express

- C19 format female connector for power cord

Operating Environment

- Temperature: 10 °C to 35 °C
- Relative humidity: 10 % to 80 % non-condensing
- Maximum Airflow: 143 cfm

System Architecture

The Tesla S1070 GPU computing system is based on the T10 GPU from NVIDIA. It can be connected to a single host system via two PCI Express connections to that host, or connected to two separate host systems via one PCI Express connection to each host.

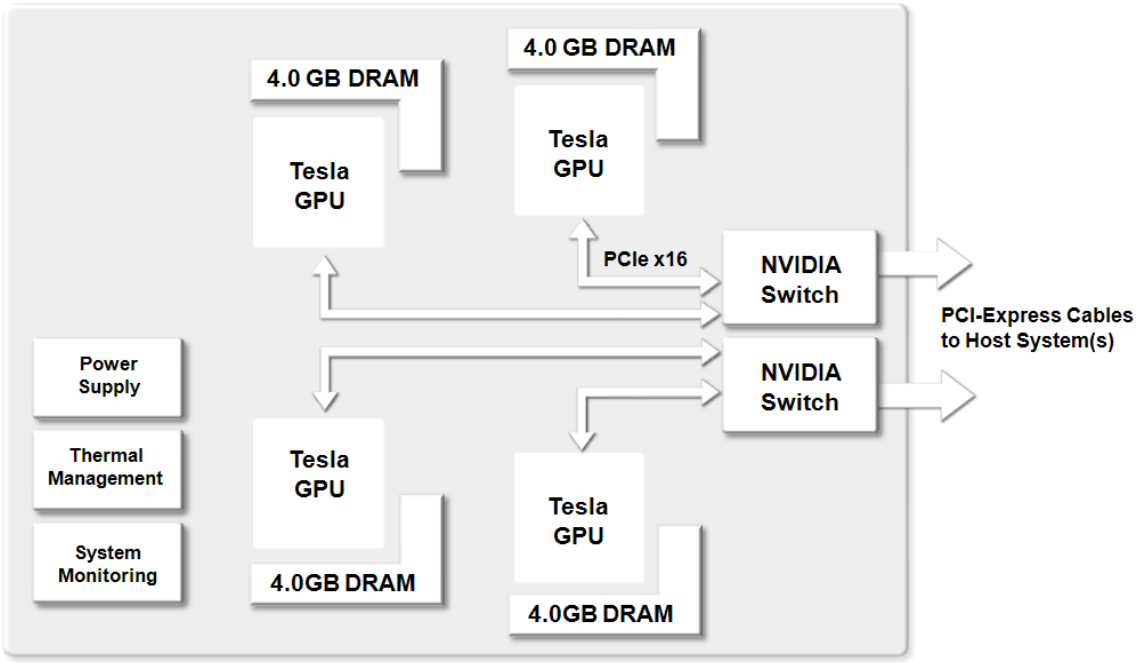


Figure 1. Tesla S1070 System Architecture

Each NVIDIA switch and corresponding PCI Express cable connects to two of the four GPUs in the Tesla S1070. If only one PCI Express cable is connected to the Tesla S1070, only two of the GPUs will be used. To connect all four GPUs in a Tesla S1070 to a single host system, the host must have two available PCI Express slots and be configured with two cables as shown in Figure 2.

Figure 2. Tesla S1070 Connection to a Single Host System

The Tesla S1070 can also be used with hosts that have only one available PCI Express slot. However, two host systems are required and should be connected as shown in Figure 3. Each host system will access two of the four GPUs.

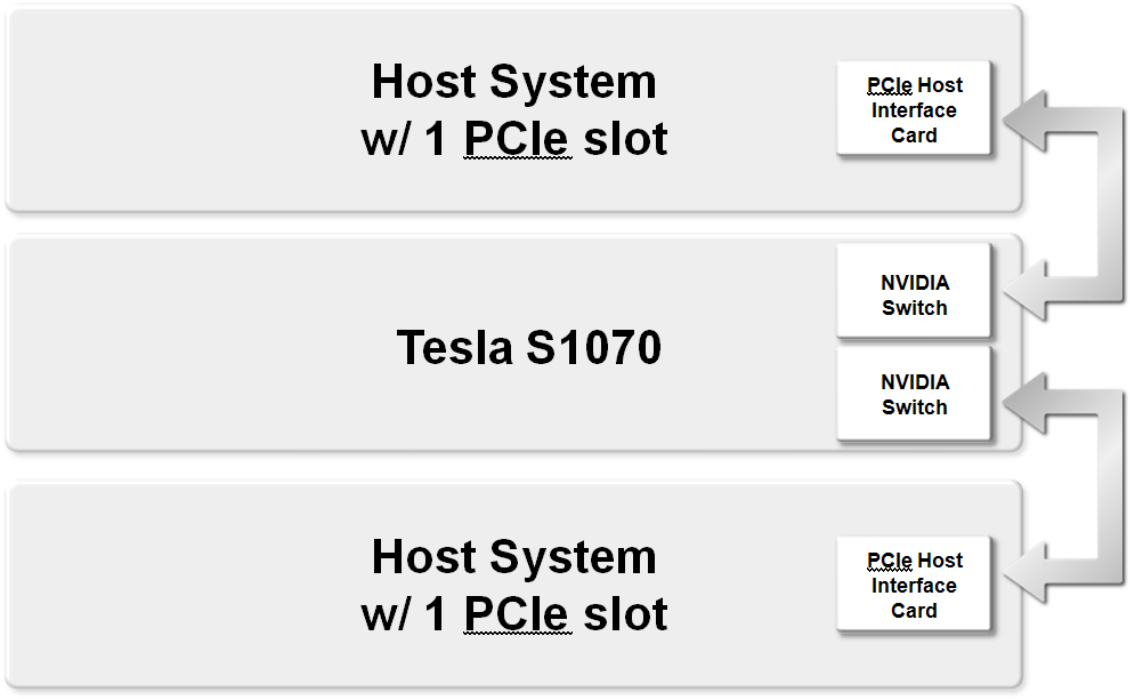


Figure 3. Tesla S1070 Connection to Two Host Systems

Configuration

There are two configurations available (Table 1) for the Tesla S1070 computing system.

Table 1. System Configuration

Specification	Description
Ordering Part Numbers	**920-20804-0001-000** (-500 configuration, Turnkey, with standard HICs and external cables included) **920-20804-0002-000** (-500 configuration, A La Carte, with no HICs and no cables so user can specify accessories) **920-20804-0006-000** (-400 configuration, Turnkey, with standard HICs and external cables included) **920-20804-0005-000** (-400 configuration, A La Carte, 1.296 GHz peak clock with no HICs and no cables so user can specify accessories)
GPU	T10 GPU
GPU Processor clock	-500 configuration: 1.44 GHz peak clock -400 configuration: 1.296 GHz peak clock
GPU Memory clock	792 MHz
Memory configuration	16.0 GB total configured as 4.0 GB per GPU
Memory I/O	512-bit per GPU
System I/O	Two PCIe connections. Each connection leads to two of the four GPUs.
PCI Express cables	→ A 0.5-meter cable is included in the "turnkey" kit → A 2.0-meter cable is available but must be ordered separately

Mechanical Specification

System Chassis

The Tesla S1070 (Figure 4) uses a 1U form factor chassis and conforms to the EIA 310E specification for 19-inch 4-post racks with 900 mm to 1000 mm depth. The chassis dimensions are 1.73 inches high × 17.5 inches wide × 28.5 inches deep.

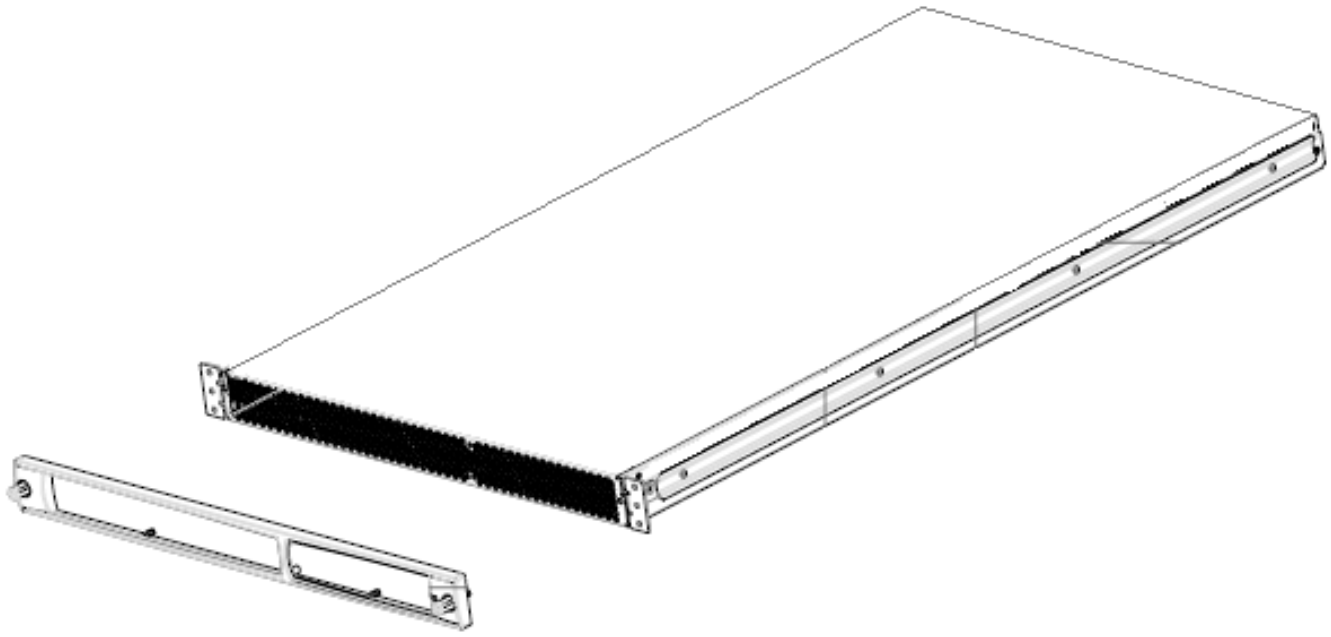


Figure 4. System Chassis Drawing

Host Interface Card (HIC)

The HIC conforms to the PCI Express low profile form factor. This card is compatible with both PCI Express 1× and PCI Express 2.0 systems. A ×8 version is also available for systems that do not have ×16 PCI Express slots. The HICs ship with a full-height bracket installed and includes a low-profile bracket.

Figure 5 shows the ×16 version of the card with the full-height bracket.

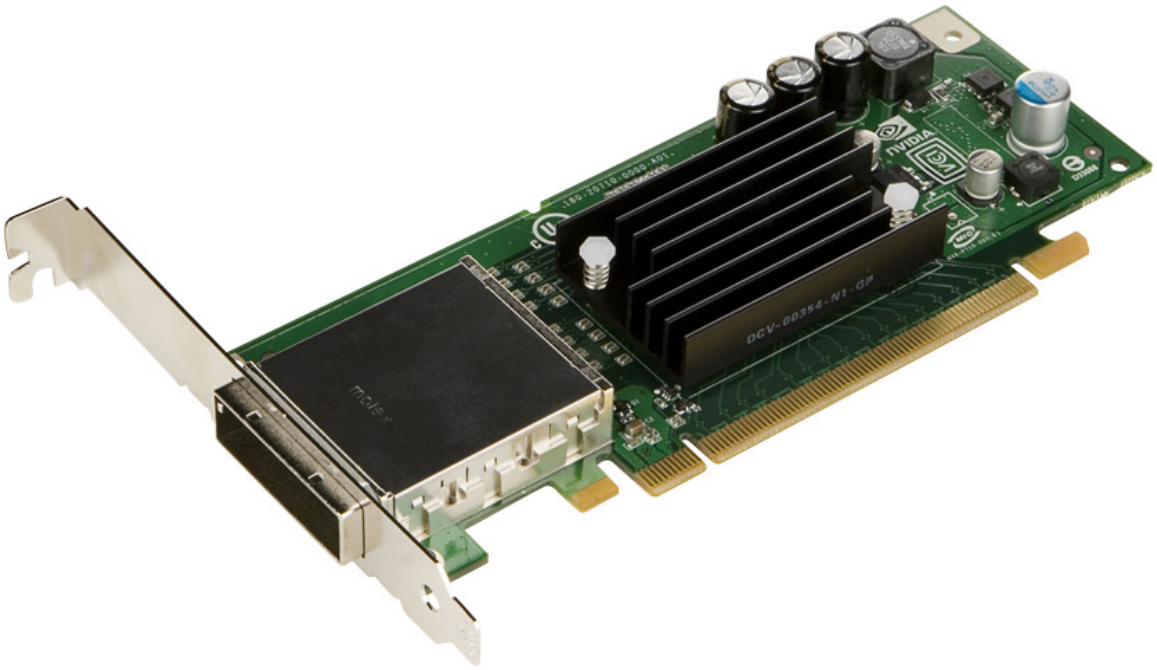


Figure 5. Host Interface Card (x16 Version)

PCI Express Cable

The Tesla S1070 uses 0.5-meter PCI Express cables as the standard connection to the host system(s). Figure 6 shows the dimensions of this cable and its connectors. A 2.0-meter version of the cable is also available as a standalone accessory and uses the same connectors as the 0.5-meter cable.

Note: For Figure 6 the dimensions are in millimeters unless otherwise labeled.

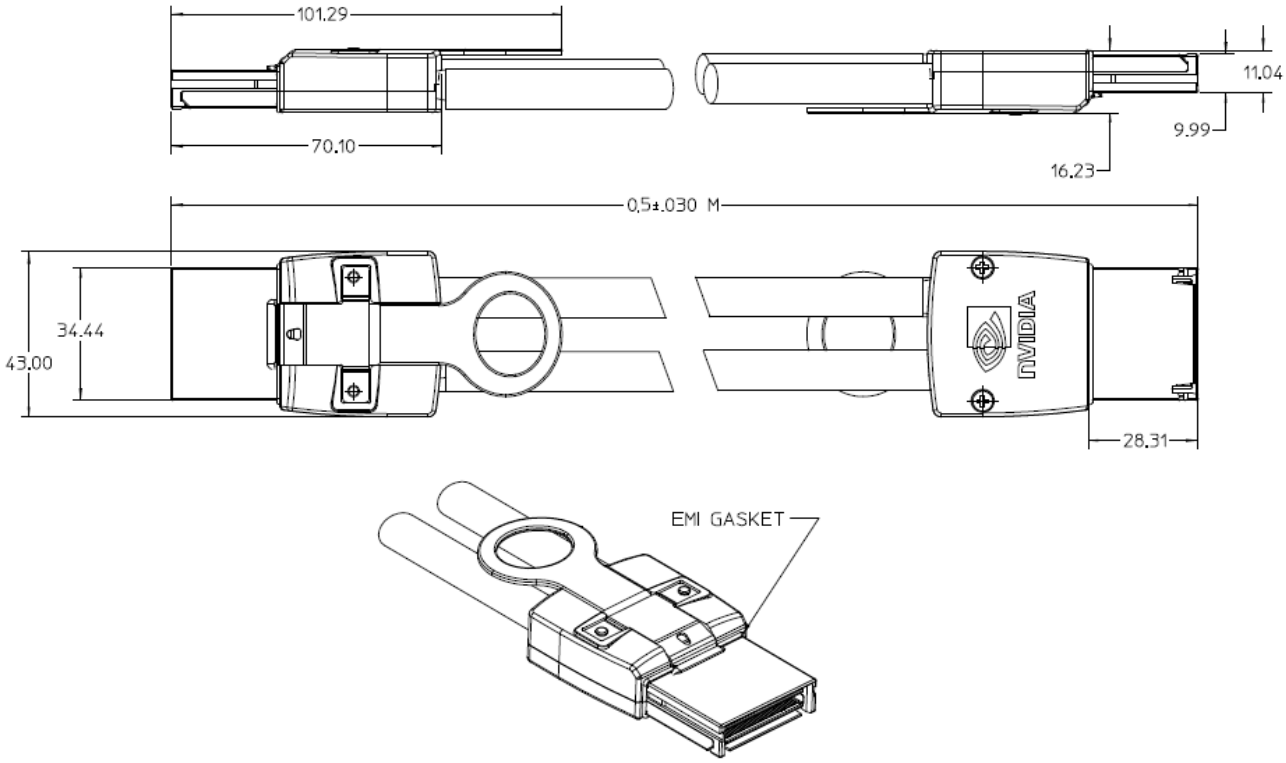
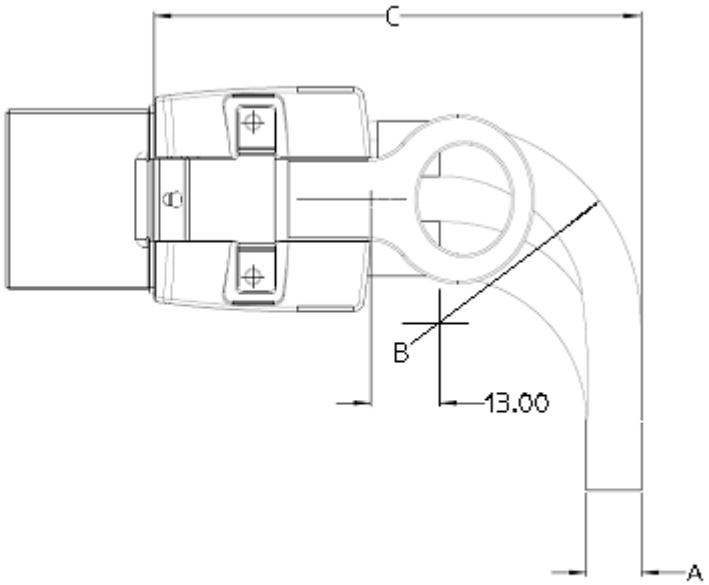


Figure 6. PCI Express Cable (0.5 Meter)

The minimum bend radius is 38.7 mm for the PCI Express cable. Figure 7 shows details of how this is measured relative to the I/O plate on the host interface card and relative to the cable/connector interface.



	CABLE GAGE	30
A.	CABLE DIAMETER	8.6
B.	MINIMUM OUTER RADIUS	38.7
C.	FACEPLATE TO OUTER RADIUS	94

Figure 7. PCI Express Cable Minimum Bend Radius

Rails for Rack Mounting

The Tesla S1070 uses a pair of rails for mounting to a 4-post, EIA rack. The rails can expand to fit a distance from 730 mm (28.74 inches) to 922 mm (36.3 inches) for the inside dimension between the front and rear posts. See Figure 8 for the exact dimension details.

Note: For Figure 8 the dimensions are in millimeters unless noted in square brackets [xx.yy +/- zz] that indicate dimensions in inches.

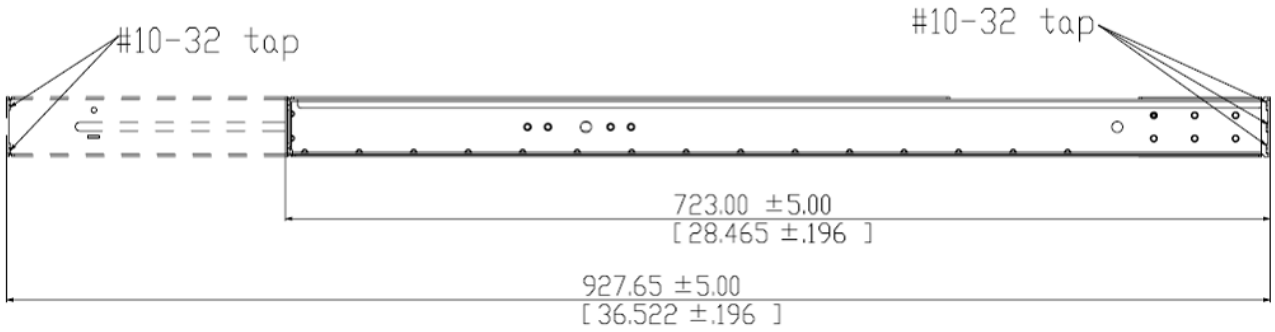


Figure 8. Rail for Rack Mounting

Environmental Specifications

Table 2. Environmental Specifications and Conditions

Specifications		**Conditions**
Operating	Input Power	90 to 274 VAC 50 to 60 Hz
	Temperature	10 °C to 35 °C (50 °F to 95 °F) at sea level with an altitude derating of 1.0 °C per every 1000 ft.
	Humidity	10 % to 80 % RH, 28 °C (82.4 °F) maximum wet bulb temperature, non-condensing
	Altitude	0 to 5000 feet mean sea level (MSL)
	Shock	Half sine 40g, 2 ms duration
	Vibration	Sinusoidal 0.25g, 10 to 500 Hz, 3 axis. Random 1.0 Grms, 10 to 500 Hz
	Acoustics	TBD dBa at 1 meter in front of system
	Airflow	143 cfm maximum
Non-Operating	Temperature	-40 °C to 60 °C (-40 °F to 140 °F)
	Humidity	10 % to 80 % RH, 38.7 °C (101.7 °F) maximum wet bulb temperature, non-condensing
	Altitude	0 to 10,000 feet mean sea level (MSL) with maximum allowable rate of altitude change of 2000 ft/min.
	Shock	Half-sine: 80G, 2ms Trapezoidal: 40G, 150 in/sec
	Vibration (random)	0.015-0.008G/Hz, 5-500 Hz, 10 minutes

Support Information

Languages

Language support for the Tesla 1U systems is English (U.S.) only at this time.

Certificates and Agencies

Certificates

- CISPR 22
- EN55022
- EN55024
- FCC CFR 47, Part 15;
- ICES-0003
- CNS13438
- GB9254
- K22
- K234
- EN 61000-3-2
- EN 61000-3-3
- EN 60950-1
- IEC 60950-1
- VCCI
- MIC (in process)
- GOST-R (in process)

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