

# PCI Express Expansion System

**PCI-E 401**

**PCI-E 411**

**600-2701**

**PCI-E Host Bus to PCI-E Expansion Cable Adapter**

**PCI Express Expansion Backplane**

**PCI Express Expansion Chassis**



Cyclone Microsystems' PCI Express Expansion System allows system developers to expand one host PCI Express slot to eight additional PCI Express Slots over an x8 (20 Gb/s) cable. This enables the coupling of cost-effective enterprise host PCs with high bandwidth, peer-to-peer capable I/O subsystems.

The PCI Express Expansion System includes a host bus adapter, an expansion cable, and an expansion backplane mounted in an industrial 19-inch chassis. The PCI-E 401 is a PCI Express x8 Host Bus Adapter that bridges from the host bus to an x8 expansion cable. A one or three meter cable connects to the PCI-E 411 Expansion Backplane. The PCI-E 411 provides an additional eight slots for PCI Express I/O and Embedded Computing boards. The eight slots are configured as two x8 (20Gbs/s) Slots, and six x4 (10 Gbs/s) Slots. The PCI Express Expansion Backplane supports a non-blocking switch fabric which features Quality of Service prioritization, end-to-end data integrity, and hot plug support.

The PCI-E 411 Expansion Backplane is mounted in the 600-2040 Expansion Chassis, a 19-inch rack mounted chassis that is specifically designed to support the maximum power and cooling loads of eight full-length PCI Express boards.

### Non-Blocking Switch Fabric

The PCI-E 411's two PCI Express Switches support a non-blocking switch fabric between the eight PCI Express slots and the host system. The non-blocking switch fabric supports complex peer-to-peer data flows.

### Quality of Service

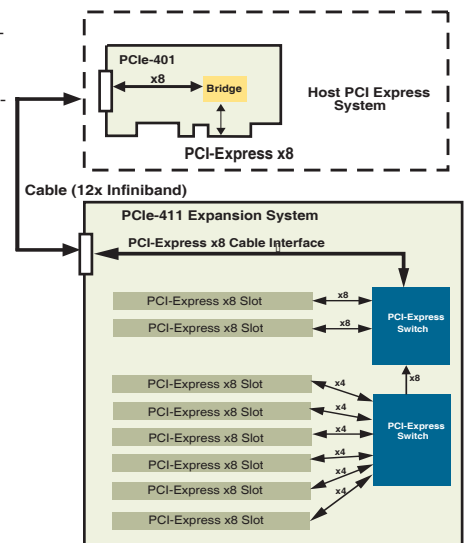
QoS features allow different applications to route packets through the fabric with differentiated priorities and bandwidths, and deterministic latencies. Two Virtual Channels per lane and eight traffic classes allows for different traffic priorities. Virtual Channel arbitration algorithms are user's selectable and allow the QoS to be optimized for different traffic requirements.

### End-to-End Packet Integrity

PCI Express Expansion Systems provide end-to-end CRC protection and Poison bit support to guarantee error free data transmission. Corrupted packets are automatically re-transmitted by the hardware with no software intervention.

### Hot Plug Support

Hot Plug support permits the insertion and extraction of PCI Express boards from a running system without affecting the power of the entire system. This capability allows boards to be isolated and removed for repair or reconfiguration.



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**PCI-E 411 PCI Express Expansion Backplane**

**600-2701 PCI Express Expansion Chassis**

## PCI-E Host Bus to PCI-E Expansion Cable Adapter Specifications

- PCI Express x8 Host Interface
- PCI Express Bridge to x8 Cable
- PCI Express Short Card Format
- Host Processor and Operating System Independent



## PCI-E 411 PCI Express Expansion Chassis

- x8 Upstream Port
  - PCI-Express Cable Interface from Host
  - Up to 10 feet of Cable from Host
  - Uses 12x Infiniband Cable to transmit x8 PCI Express Interface and Side Band Signals
- Eight PCI Express Downstream Ports
  - Two x8 PCI-Express Slots
  - Six x4 PCI-Express Slots using x8 Connectors
- Two 32 Lane PCI Express Switches supporting:
  - Non-Transparent Bridging for Peer-to-Peer Communications
  - Non-Blocking Switch Fabric
  - Data Integrity
  - Quality of Service
- Hot Plug support for all eight Expansion Slots
  - Attention Button
  - Attention LED
  - Power LED
- ATX Form Factor



## 600-2040 Expansion Chassis Specifications

<b>Physical</b>	19 Inch Rack Mount Enclosure 4U Height and 20 Inch Depth Black Color Rack Mount Handles	<b>Power</b>	460 Watt Power Supply 100-240 VAC, 47-63 Hz Power Input +5V 40 A -5V 0.8 A +12V 32 A -12V 1 A +3.3V 30 A +5VSB 2 A
<b>Board Slots</b>	Eight Full Length PCI Express Slots PCI Express Board Top Retaining Bar	<b>Regulatory Compliance</b>	RoHS Compliant EN60950-1 TUV
<b>Drive Bays</b>	Three 5.25 Inch External One 3.5 Inch Internal Locked Drive Bay Door	<b>Emissions</b>	FCC Part B Certification
<b>Cooling</b>	Fans Support 180 CFM Chassis Cooling Serviceable Fan Filter Thumbscrew Filter Replacement		

### Environmental

### PCI-E 401

### PCI-E 411

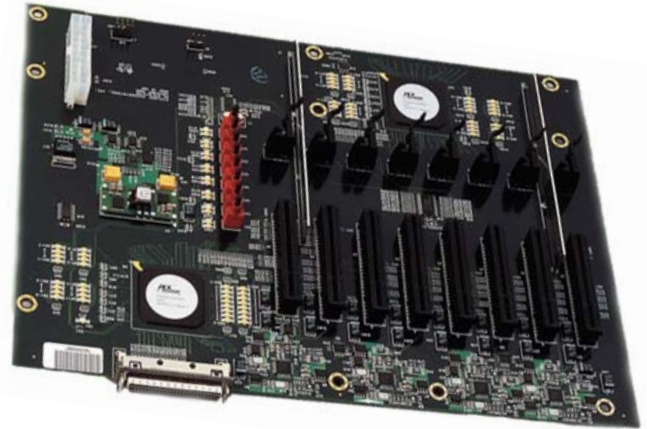
	PCI-E 401	PCI-E 411
<b>Physical Dimensions</b>	Half Length PCI-Express Card 6.66" x 4.2" (167.65mm x 106.65mm)	Mini ATX 11.2" x 8.2" (284mm x 208mm) ATX Power Supply Connector (Molex 39-29-9202 or equivalent)
<b>Operating Temperatures</b>	0 to 50 Degrees Celsius	0 to 50 Degrees Celsius
<b>Relative Humidity</b>	0 - 95%	0 - 95%
<b>Storage Temperatures</b>	-55 to 125 Degree Celsius	-55 to 125 Degree Celsius
<b>Power Requirements (Watts)</b>		
<b>+3.3V Typical</b>	0.77	2.73
<b>Maximum</b>	0.86	3.45
<b>+5V Typical</b>	-	13.55
<b>Maximum</b>	-	16.80
<b>+12V Typical</b>	3.53	0.12
<b>Maximum</b>	4.78	0.24
<b>-12V Typical</b>	-	-
<b>Maximum</b>	-	-

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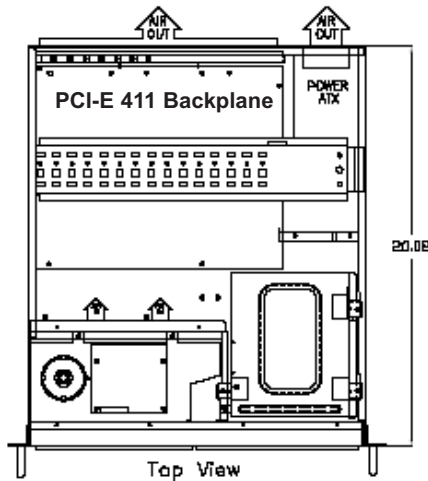
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### PCI Express Expansion Drawings



### PCI Express Expansion System Ordering Information

- 600-2701-A-B** PCI Express Host to PCI Express Expansion System
  - PCI-E 401 PCI Express Host Bus to Expansion Cable Adapter
  - PCI-E 411 PCI Express Expansion Backplane
  - 600-2040 Expansion Chassis

#### A - Cable Length

- (1) 1 Meter Expansion Cable
- (3) 3 Meter Expansion Cable

#### B - PCIe-401 Bracket Size

- (S) Standard Profile
- (L) Low Profile

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