CPCI Rear Transmission Remote Controller

PCIE101A / PCIE100A

User's Manual

Revision History

Version:	Notification of Change	Date
1.0		16.12.2019
1.1	Add PCIE101A PC Card; correct the wording	03.02.2020
1.2	Add PCIe 2m Kabel to ordering Information	

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Contents

1. Safety

Intended Application

The PCI series remote controller kit is not designed for stand-alone use -- in order to enable stand-alone functionality, additional elements are required. An operational system is achieved only by way of appropriate CPCI Cards.

The completion and final testing of the units have been carried out by qualified technicians. These instructions are intended to assist those who are qualified to operate this equipment.

Make sure that the finished system complies with the safety regulations currently applicable in the country it is going to be used.

Safety Symbols

	Hazardous voltage!
	Familiarize yourself with the danger of electrical voltages and the safety precautions before starting to work with parts that carry dangerous voltages

	Caution!
	This symbol indicates a condition where damage of the equipment or injury of the service personnel could occur. To reduce the risk of damage or injury, follow all steps or procedures as instructed.

	Danger of electrostatic discharge!
	Static electricity can damage sensitive components in a system. To avoid damage, wear ESD wrist straps or at regular intervals touch blank enclosure parts.

General Safety Precautions

	Warning!
	Voltages over 60 VDC can be present in this equipment. This equipment is intended to be accessed, to be installed and maintained by qualified and trained service personnel only.
	This equipment is designed in accordance with protection class 1!
	It must therefore be operated only with protective GND/earth connection!

Safety Instructions

This user's manual is intended for system Integrators and hardware/software engineers.

This product has been designed to meet the relevant standard industrial safety requirements. It is not intended to be used in applications other than that of its specific area of the office telecommunication industry and industrial control. It is not designed nor intended for use in safety-critical applications, life-sustaining appliances or in aircraft.

Only trained personnel or persons qualified in electronics or electrical engineering are authorized to install, operate or maintain the product.

This section provides safety information about the following:

- Protection against electromagnetic interference (EMI)
- Electrostatic discharge precautions
- System installation

Protection Against Electromagnetic Interference (EMI)

The product has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules, EN 55022 Class A.

To ensure proper EMC shielding, operate the chassis only with all free slots populated with filler panels.

Ensure that all EMI gaskets make correct contact.

Electrostatic Discharge Precautions

Electronic components can easily be destroyed by electrostatic discharge which can occur between chassis components and a person.

- Before working on the chassis make sure that you are working in an ESD-safe environment.

Installation

To avoid chassis damage verify that the system environment meets the environmental and power requirements given in this guide before installation consider these guidelines:

Location

Locate the system in a stable area free of excessive movement or jarring, dust, smoke, and electrostatic discharge (ESD). Make sure that the temperature does not exceed the operating temperature given in the environmental requirements in this guide and allow room for proper air flow for cooling.

Voltage Hazards

The system is powered with a power supply the mains voltage is 115/230VAC.
(Voltage range 90VAC to 264VAC)

This voltage is considered hazardous.

System Overheating

Ensure a clearance of at least 10 cm on both sides of the chassis to allow the needed air flow for proper system cooling.
Shelf ambient temperature may not exceed 50°C.

Mounting Considerations

Assure that all components, structural or otherwise, were not loosened nor damaged during shipment prior to use.
Do not operate under loose or damaged conditions as it may damage other parts of the system at large.

Electrical Hazards

The caution label on the system's rear, near the grounding studs, indicates a needed earth connection due to the potential for high-leakage current which is considered hazardous.

High leakage current can cause injuries.
Ensure that the system is properly grounded at all times. Please account for the following condition:

- This equipment shall be connected directly to the AC supply system earthing

Board Installation

Electrostatic discharge and incorrect board installation or removal can damage circuits or shorten their life.

- Before touching the boards or electronic components, make sure that you are working in an ESD-safe environment

Boards should be inserted and removed using their handles, do not force the board by applying pressure to the front panel.

2. Product Description

The PCIE100A CPCI Remote Controller is designed to operate in a CPCI System Slot. The controller complies with the 19" Rear Transmission module form factor. With its use, a conventional Desktop PC is used ,to control a CPCI Chassis.
With the use of a Hartmann Electronic PCIE101A PC adapter, the Remote Controller is connected with a standard PCIe X4 cable to the desktop PC. The interface of the PXE100A, as well as the interface of the PCIE101A, are fully compliant with the *PCI Express External Cable Specification, Revision 2.0.*
That Downstream Port can be linked to another Remote Controller's upstream port.

Related Documentation

- *PCI Express® External Cabling Specification Revision 2.0*
- CompactPCI PICMG 2.0 R. 3.0
- *PCI Express® Card Electromechanical Specification Revision 2.0*
- *PCI Local Bus Specification Revision 3.0*

Chassis Description

The CPCI Remote controller requires Rear I/O connectors on the CPCI Backplane's System Slot. The Space-saving 4 TE design allows ample space for additional system components as well as further CPCI Modules, conveniently placed directly next to the controller.

Block Diagram

PCIE101A PCIe Gen. 3 X4 PC Card

Figure 2-2 illustrates the hardware implementation of the PCIE101A PC Card.
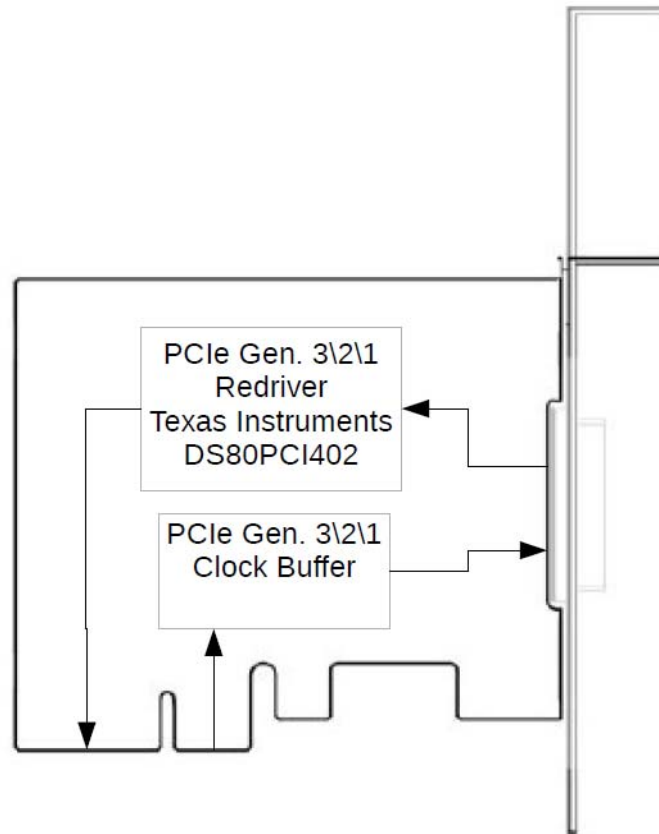
Figure 2-1 PCI Express X4 host card

The Block Diagram above outlines the Hardware implementation of the PCIe PC Card PCIE101A. As shown in Figure 2-1, the PC-Card is available in both high and low profile versions of the front panel. This allows the PC card to be plugged into any Desktop PC Chassis.
The PC Card can be plugged into a PCIe X4, PCIe X8 or PCIe X16 slot. The card re-drives a PCIe X4 link to the standard PCIe X4 Cable Connector.
PCIe Gen. 3 data rates are supported with the card by utilizing a PCIe X4 Link.

PXE100A PCIe Gen. 2 Uplink to CPCI

Figure 2-1 illustrates the hardware implementation of the CPCI Rear Transmission Remote Controller.
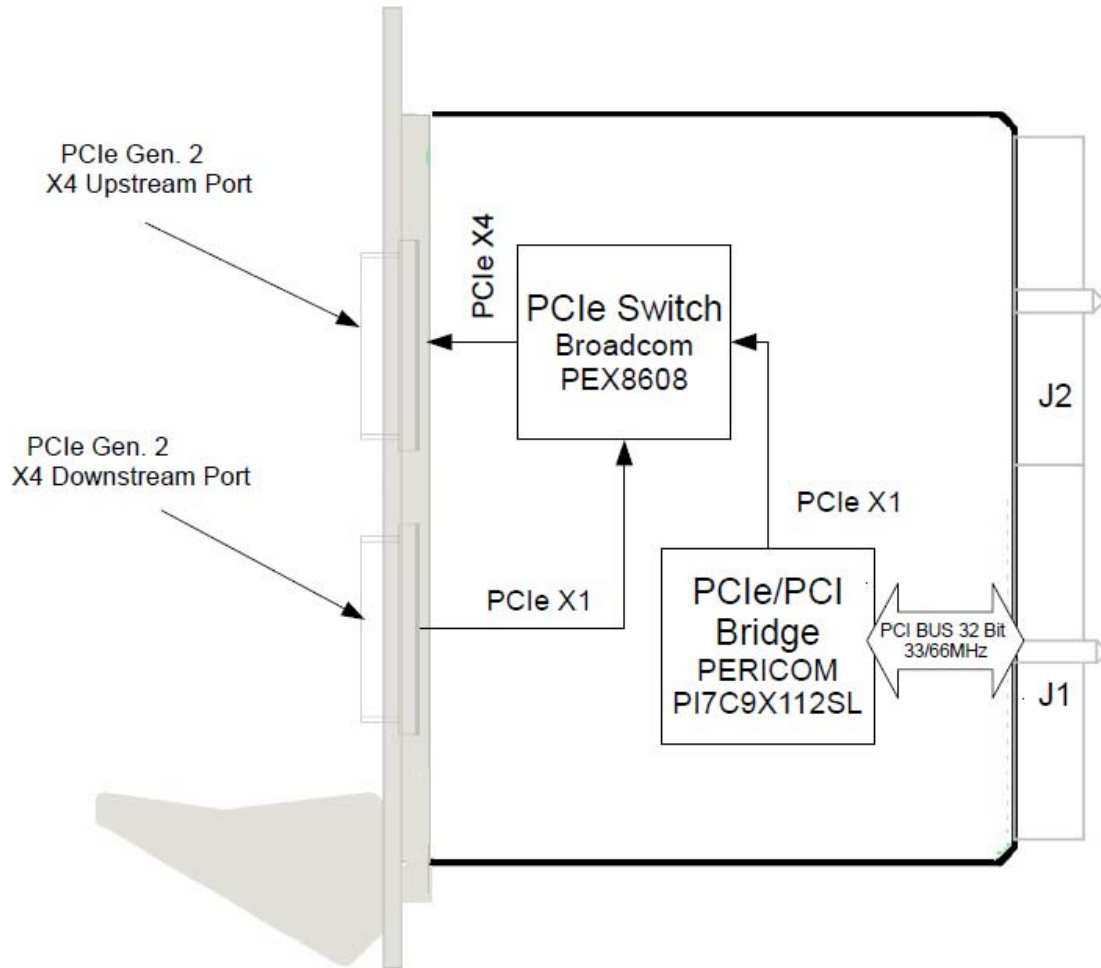
Figure 2-1 CPCI Remote Controller Block Diagram

The Block Diagram above outlines the Hardware implementation of the CPCI Remote Controller. The Controller's Downstream Port is mechanically implemented through a standard PCIe X4 Cable connector. A PCIe Gen. 2 X1 Link is supported, electrically, at the downstream side.
The PCIe/PCI Bridge supports both, 33Mhz and 66 MHz operation. The extended implementation of the PERICOM, PI7C9X112SL PCIe/PCI Bridge allows arbitration support for up to 7 CPCI Modules. In order to cascade a 2nd hierarchy chassis, the Downstream Port of the 1st hierarchy chassis is connected, through a PCIe X4 cable, to the upstream Port of the 2nd hierarchy chassis.

The controller can be plugged into any CPCI chassis' rear system controller slot, which is compliant with the necessary specifications. These specifications are listed in the "related document" section.

Front Panel LEDs

Figure 2-2 shows the location of the front panel LEDs.
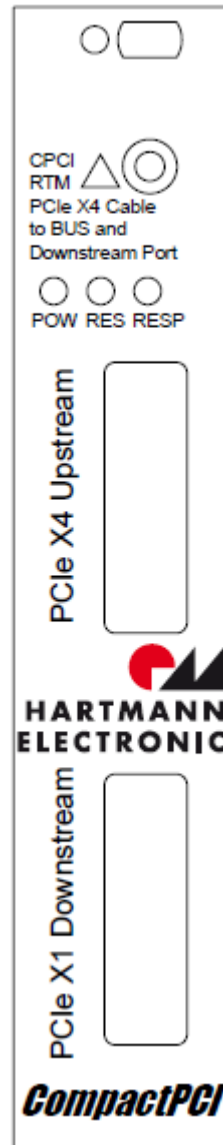
Table 2-1 describes the front panel LED states

LED	State	Description
POW	Green	Chassis Power OK
	Red	One or more Power Rails of the chassis are not within the specified range
RES	Green	Function OK. PCI Express Reset is not asserted
	Red	PCI Express Interface is hold in Reset
RESP	Green	Function OK. PCI Reset is not asserted
	Red	PCI Interface is hold in Reset

3. Installation

Installing Hardware

Installing the PCIE101A PC Card

Complete the following steps to install the PCIE100A in your computer.

1) Power off your computer.

	Danger of electrostatic discharge!
	To protect both yourself and the computer from electrical hazards, your computer should remain off until you finish installing all hardware as instructed.

2) Remove the top cover or access port to the PCI Express expansion slots.

3) Touch the metal part of the power supply case inside the computer to discharge any static electricity that might be on your clothes or body.

4) Unplug the computer and wait 30 seconds to allow the energy stored in the computer's power supply to fully dissipate.

5) Select any available PCI Express expansion slot (X4, X8 or X16).

6) Locate the metal bracket that covers the cut-out in the back panel of the computer for the slot you have selected. Remove and save the bracket-retaining screw and the bracket cover.

7) Line up the PCIE101A with the slot on the back panel. Slowly lower the PCIE101A until its card-edge connector is resting on the expansion slot receptacle. Using slow, evenly distributed pressure, press the PCIE101A straight down until it seats in the expansion slot.

8) Secure the PCIE101A to the back-panel rail using a bracket retaining screw.

9) Replace the computer cover.

10) Plug in the computer.

Connecting a single CPCI System to the Desktop PC

1) Install the Controller into the appropriate system slot.

	Danger of electrostatic discharge!
	To protect both yourself and the computer from electrical hazards, The CPCI system should remain off until you finish installing all hardware as instructed.

2) Power down your host system and the external CPCI system.

3) Insert the CPCI board into the system slot of the CPCI system. Make sure that the front handle of the CPCI board is locked.

4) Connect your host system through a PCIe X4 Cable to the upstream port of the CPCI board.

5) Before applying power to the external CPCI system, make sure that all other CPCI boards are installed correctly. You may follow the instruction of your CPCI board supplier to install the board correctly.

6) Power up your external CPCI system.

7) Power up your host system.

8) The CPCI Remote controller should be enumerated automatically. There are no additional software drivers required.

	WARNING: Boards should slide easily when installing or removing them from the shelf. Forcing the boards may cause damage to the interface connector pins.

Install filler panels in unused or empty slots.

Filler panels consists of a front panel (with or w/o air baffles), EMC gasket and mounting screws.

	WARNING: Close all empty chassis slots with filler panels. The filler panel prevents fan air from escaping out of open slots.

Installing a further CPCI Remote Controller at the PCIe X4 Downstream Port

1) Power down the host system and your first and second party CPCI system.
   First party system: System that is connected directly to the host system.
   Second party system: System that is connected to the host through the second party system.

2) Insert the CPCI Board into the system slot of the first party CPCI system.
   Make sure that the front handle of the CPCI board is locked.

3) Connect your host system through a PCIe X4 Cable to the upstream port of the board, that is plugged into your first party system.

4) Insert the CPCI Board into the system slot of your second party CPCI system.
   Make sure that the front handle of the CPCI board is locked.

5) Connect the downstream port of the first party Remote Controller with the upstream port of the second party Remote controller via a PCIe X4 Cable.

6) Power up your second party CPCI system

8) Power up your first party CPCI system

9) Power up your host system

10) Both of your CPCI systems should be enumerated automatically

Note: The system that is at the lowest level of the hierarchical PCIe structure should be powered up first.

<table>
<tr><td>⚠</td><td>WARNING: Boards should slide easily when installing or removing them from the shelf. Forcing the boards may cause damage to the interface connector pins.</td></tr>
</table>

  1.) Install filler panels in unused or empty slots.

      Filler panels consists of a front panel (with or w/o air baffles), EMC gasket and mounting screws.

<table>
<tr><td>⚠</td><td>WARNING:
Close all empty chassis slots with filler panels. The filler panel prevents fan air from escaping out open slots.</td></tr>
</table>

Installing Software

The Remote Controller does not require any additional software drivers. The Controller is enumerated fully with the use of conventional standard PCI-to-PCI bridge drivers.

4. Specification

Electrical

DC Input

Applied through CPCI Backplane

Operating Voltage Range   +3,3V and +VI/O. The +VI/O-Voltage can be either +3,3V or +5V.

Operating Environment

Operating temperature range: -10… +85 °C
Storage temperature range: -40 °C… + 125 °C

Electromagnetic Compatibility

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Backplanes
Aufbausysteme MPS
Layoutservice

HARTMANN ELECTRONIC
A Phoenix Mecano Company

EU-Konformitätserklärung:

CE

Zertifikat Nummer.: 2019 - 11 - 22

Hiermit wird bescheinigt, dass folgende Gerätetypen:

Gerätetyp	Materialnummer	Benennung
PCIE100A	1H00007120	CPCI Rear Board - PCIeX1 to 8CPCI-Slot
PCIE101A	1H00005304/ 1H00005305	PC PCieX4 to PCIeX4_Cable Buffered (Low/High Profile)

mit den Bestimmungen des Rates der Europäischen Union zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten
- betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen
- über die Elektromagnetische Verträglichkeit
übereinstimmt.
Die Übereinstimmung wird nachgewiesen durch die Einhaltung folgender Normen:

EN 55022 Rad	EMV, Funkstörung für: Einrichtung der Informationstechnik
EN 55022 Cond	EMV, Funkstörung für: Einrichtung der Informationstechnik
EN 61000-4-2	EMV, Störfestigkeit gegen ESD
EN 61000-4-3	EMV, Störfestigkeit elektromagnetische Felder
EN 61000-4-4	EMV, Störfestigkeit gegen schnelle elektrische Störgrößen/Bursts
EN 61000-4-5	EMV, Störfestigkeit benachbarter Blitzeinschlag
EN 61000-4-6	EMV, Störfestigkeit gegen leitungsgeführte Störgrößen
EN 61000-4-8	EMV, Störfestigkeit gegen Magnetfelder mit energietechnischen Frequenzen

Bei der Beurteilung der elektromagnetischen Verträglichkeit wurden die Störaussendungsgrenzwerte für Geräte der Klasse B sowie die Störfestigkeit für Betrieb in industriellen Bereichen zugrunde gelegt.

Für ein CE-Konformes System müssen die verwendeten Netzteile der Norm *EN 61000-4-29* genügen. Andere Normen ergeben sich ggf. aus den einzelnen Systemkomponenten.

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Stuttgart, den 16.12.2019

Mechanical

Form Factor:

Eurocard (80x100mm): suitable for 19"-Racks. Front panel width 4HP (20.32mm).

Slot Requirement:

Single rear CPCI system controller slot

5. Pin Assignment

The Pin assignment applies with the *CompactPCI PICMG 2.0 R. 3.0* specification.

- System Controller Slot

	Z	A	B	C	D	E	F	
22	GND	GA4	GA3	GA2	GA1	GA0	GND	
21	GND	CLK6	GND	BP(I/O)	BP(I/O)	BP(I/O)	GND	
20	GND	CLK5	GND	BP(I/O)	BP(I/O)	BP(I/O)	GND	
19	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**P2**
18	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**/**
17	GND	BP(I/O)	BP(I/O)	BP(I/O)	REQ6#	GNT6#	GND	**J2**
16	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	
15	GND	BP(I/O)	BP(I/O)	BP(I/O)	REQ5#	GNT5#	GND	
14	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	
13	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	
12	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	
11	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	
10	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**C**
9	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**O**
8	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**N**
7	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**N**
6	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**E**
5	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**C**
4	GND	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	BP(I/O)	GND	**T**
3	GND	CLK4	GND	GNT3#	REQ4#	GNT4#	GND	**O**
2	GND	CLK2	CLK3	SYSEN#	GNT2#	REQ3#	GND	**R**
1	GND	CLK1	GND	REQ1#	GNT1#	REQ2#	GND	
25	GND	5V	REQ64#	ENUM#	3.3V	5V	GND	
24	GND	AD[1]	5V	V(I/O)	AD[0]	ACK64#	GND	
23	GND	3.3V	AD[4]	AD[3]	5V	AD[2]	GND	
22	GND	AD[7]	GND	3.3V	AD[6]	AD[5]	GND	**P1**
21	GND	3.3V	AD[9]	AD[8]	M66EN	C/BE[0]#	GND	**/**
20	GND	AD[12]	GND	V(I/O)	AD[11]	AD[10]	GND	**J1**
19	GND	3.3V	AD[15]	AD[14]	GND	AD[13]	GND	
18	GND	SERR#	GND	3.3V	PAR	C/BE[1]#	GND	
17	GND	3.3V	IPMB SCL	IPMB SDA	GND	PERR#	GND	
16	GND	DEVSEL#	GND	V(I/O)	STOP#	LOCK#	GND	**C**
15	GND	3.3V	FRAME#	IRDY#	GND	TRDY#	GND	**O**
12-14				KEY AREA				**N**
11	GND	AD[18]	AD[17]	AD[16]	GND	C/BE[2]#	GND	**N**
10	GND	AD[21]	GND	3.3V	AD[20]	AD[19]	GND	**E**
9	GND	C/BE[3]#	GND	AD[23]	GND	AD[22]	GND	**C**
8	GND	AD[26]	GND	V(I/O)	AD[25]	AD[24]	GND	**T**
7	GND	AD[30]	AD[29]	AD[28]	GND	AD[27]	GND	**O**
6	GND	REQ0#	GND	3.3V	CLK0	AD[31]	GND	**R**
5	GND	BRSVP1A5	BRSVP1B5	RST#	GND	GNT0#	GND	
4	GND	IPMB PWR	HEALTHY#	V(I/O)	INTP	INTS	GND	
3	GND	INTA#	INTB#	INTC#	5V	INTD#	GND	
2	GND	TCK	5V	TMS	TDO	TDI	GND	
1	GND	5V	-12V	TRST#	12V	5V	GND	
Pin	Z	A	B	C	D	E	F	

length of pins (front view)

short	medium	long
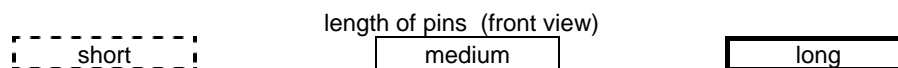
6. Ordering Information

Ordering Number	Description	PCI V(I/O)
1H00007120	CPCI Rear Board – PCIeX4 to 8CPCI-Slots	+5 V / +3V3
1H00005304	PC Card PCie X4 to PCIe X4_Cable (Low Profile)	-
1H00005305	PC Card PCie X4 to PCIe X4_Cable (High Profile)	-
F006.02170	PCIe X4 Gen. 2 Cable (1m)	-
F006.02180	PCIe X4 Gen. 2 Cable (3m)	-
F006.02190	PCIe X4 Gen. 2 Cable (2m)	