PXI Express
Desktop PC Expansion

PCIE101A \ PXE100A

User's Manual

Revision History

Version:	Notification of Change	Date
1.0		10.01.2020
1.1		04.02.2020

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Contents

1. Safety

Intended Application

The PXE100A 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 PXI Express 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, 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)

This 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 filler panels covering all unpopulated slots.

Ensure that all EMI gaskets make correct contact.

Electrostatic Discharge Precautions

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

Before working on the chassis, be sure that you are working in an ESD-safe environment or have taken the necessary ESD precautions (ESD wrist strap, lab coat, etc.)

Installation

To avoid chassis damage, verify that the system environment meets or exceeds the environmental and power requirements given in this guide before installation. In doing so, 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 with the following voltage to the mains: 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/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 PXE100A series PXI Express Remote Controller is designed to operate in a PXI Express System Slot. The controller complies with the PXI Express module form factor. With its use, a conventional Desktop PC is used to control a PXI Express 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.*

Related Documentation

- *PXI-5 PXI Express Hardware Specification*
- *CompactPCI PICMG 2.0 R. 3.0*
- *CompactPCI Express Specification PICMG EXP.0 Revision 2.0*
- *PCI Express External Cable Specification, Revision 2.0*

Chassis Description

The PXI Express Remote Controller is plugged into the PXI Express Backplane's System Slot. The Space-saving 4 TE design allows ample space for additional system components as well as further PXI Express Modules, conveniently placed directly next to the controller.
The Controller is suitable for PXI Express Chassis that implement a PXI Express System Slot 4-Link configuration.

Block Diagram

PCIE101A PCIe Gen. 3 X4 PC Card

Figure 2-2 illustrates the hardware implementation of the PCIE101A PC Card.
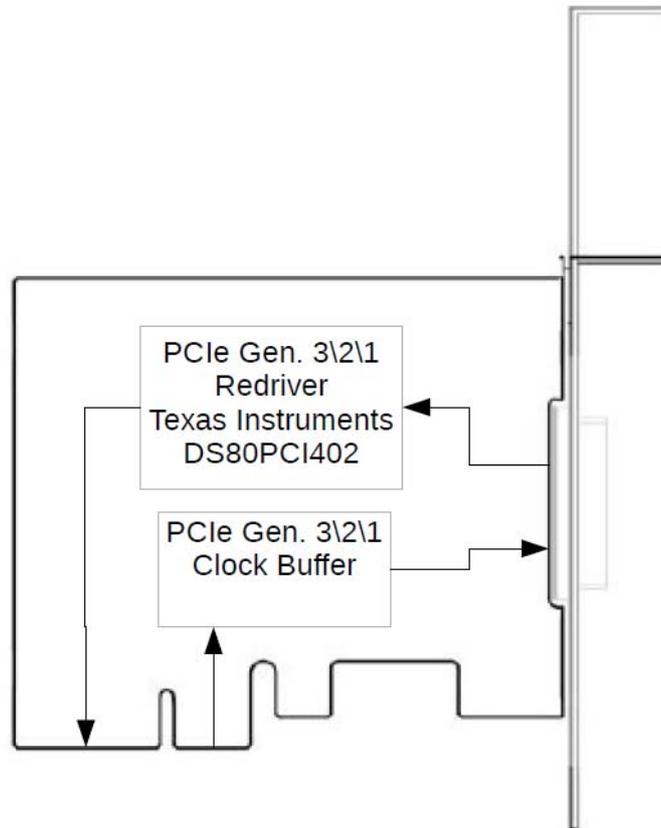
Figure 2-1 PXI Express Remote Controller Block Diagram

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 PXI Express

Figure 2-2 illustrates the hardware implementation of the PXI Express Remote Controller.
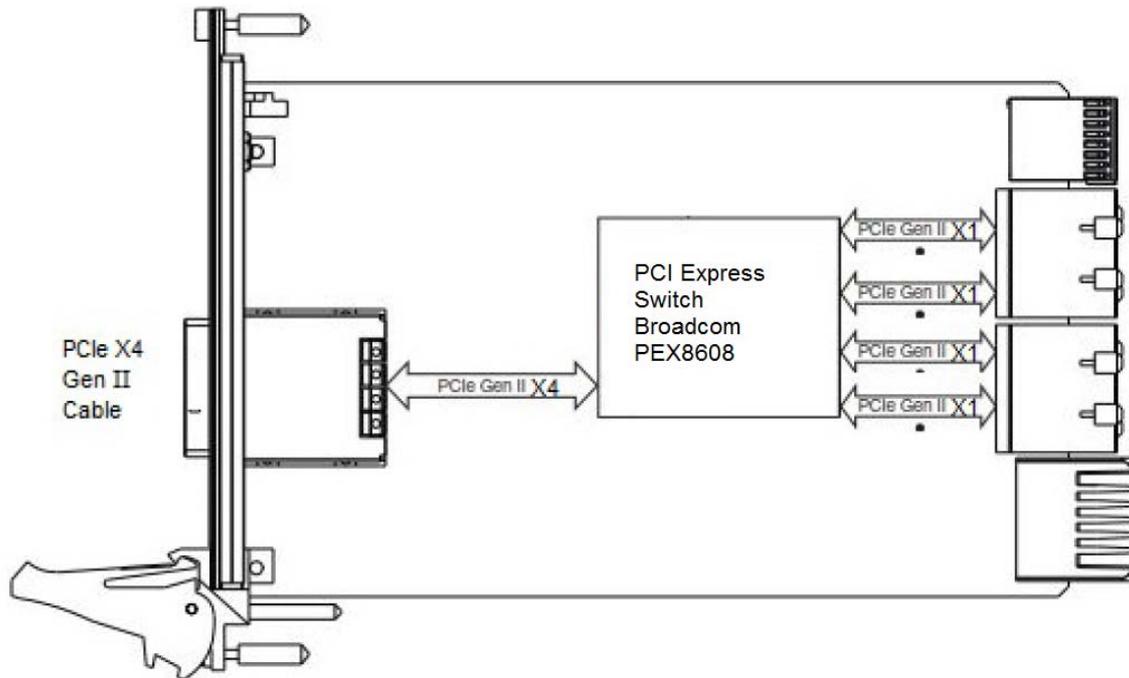
Figure 2-2 PXI Express Remote Controller Block Diagram

The Block Diagram above outlines the PXI Express Controller's Hardware implementation. The controller's upstream port is implemented through a standard PCIe X4 Cable connector. A PCIe Gen. 2 X4 Link is supported for connection with a desktop PC.

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

Front Panel LEDs

The PXE100A provides a Power LED that as status indicator for the function of the PXI Express systems' power supply.

Figure 2-3 shows the location of the front panel LED.
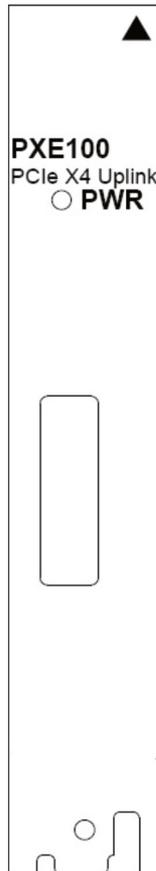
Table 2-1 describes the front panel LED states

LED	State	Description
PWR	Green	Chassis Power OK
	OFF	One or more Power Rails of the chassis are not within the specified range

Cabling

Recommended copper cable Length.

The PCIE101A PC Card is implemented to support PCIe Gen. 3 signaling. To also support PCIe Gen. 3 signaling at the Remote Controller side, the PCIe X4 cable should not exceed a length of 3m. The PXE100A Remote controller supports PCIe Gen. 2 signaling.

The cable length should not exceed 7m in order to support PCIe Gen. 2 signaling.

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 PXI Express 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 PXIe system should remain off until you finish installing all hardware as instructed.

2) Power down your host system and the external PXI Express system.

3) Insert the PXI Express board into the system slot of the PXI Express 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 PXI Express board.

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

6) Power up your external PXI Express system.

7) Power up your host system.

8) The PXI Express 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 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.

Note: The Controller does not implement a SMBus Interface. Therefore, the chassis can't be enumerated with the PXI Express Resource Manager. As a result, the hcassis will not appear in any vendor specific PXI Express Explorer. However, all the PXI Express modules installed into the chassis will correctly appear in the PXI Express Explorer.

3. Specification

Electrical

DC Input

Applied through PXI Express Backplane

Operating Voltage Range	+5V and +5V_AUX and +3V3
Power Consumption	+5V: 0.8A ; total power consumption: 5W

Operating Environment

Operating temperature range:	-10… +85 °C
Storage temperature range:	-40 °C… + 125 °C
Relative humidity range:	10% to 90%, noncondensing

Electromagnetic Compatibility

This product meets or exceeds the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

• AS/NZS CISPR 11: Group 1, Class A emissions

• EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity

• EN 55011 (CISPR 11): Group 1, Class A emissions

• ICES-001: Class A emissions

• FCC 47 CFR Part 15B: Class A emissions

Environmental

Maximum Altitude:	2,000 m

CE Compliance

Declaration of Conformity

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Backplanes
Aufbausysteme MPS
Layoutservice

EU-Konformitätserklärung:

$$CE$$

Zertifikat Nummer.: 2019 - 11 - 22

Hiermit wird bescheinigt, dass folgende Gerätetypen:

Gerätetyp	Materialnummer	Benennung
PXE100A	1H00007140	PCIe X4 Uplink to PXI Express

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 Blitzeischlag
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.

Stuttgart, den 19.12.2019

Geschäftsleitung / Godulla
CE

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Mechanical

Form Factor:

Eurocard (160x100mm):   suitable for 19"-Racks. Front panel width 4HP (20.32mm).

Slot Requirement:

Single system controller slot

4. Pin Assignment

The Pin assignment applies with the *PXI-5 PXI Express Hardware Specification for a system slot 4 link configuration.*

PXI Express System Controller Slot (4 Link Configuration)

Pin	Z	A	B	C	D	E	F	
1	GND	GA4	GA3	GA2	GA1	GA0	GND	
2	GND	+5Vaux	GND	SYSEN#	WAKE#	ALERT#	GND	
3	GND	RSV	RSV	RSV	RSV	RSV	GND	
4	GND	RSV	RSV	RSV	RSV	RSV	GND	
5	GND	PXI_TRIG3	PXI_TRIG4	PXI_TRIG5	GND	PXI_TRIG6	GND	
6	GND	PXI_TRIG2	GND	RSV	NC	PXI_CLK10	GND	
7	GND	PXI_TRIG1	PXI_TRIG0	RSV	GND	PXI_TRIG7	GND	
8	GND	RSV	GND	RSV	RSV	PXI_LBR6	GND	XJ4 Connector

Pin	A	B	ab	C	D	cd	E	F	ef	
1	RSV	RSV	GND	RSV	RSV	GND	RSV	RSV	GND	
2	RSV	RSV	GND	PWR_OK	PS_ON#	GND	LINKCAP	PWRBTN#	GND	
3	SMBDAT	SMBCLK	GND	**4REFCLK+**	**4REFCLK-**	GND	**2REFCLK+**	**2REFCLK-**	GND	
4	RSV	PERST#	GND	**3REFCLK+**	**3REFCLK-**	GND	**1REFCLK+**	**1REFCLK-**	GND	
5	**1PETp0**	**1PETn0**	GND	**1PERp0**	**1PERn0**	GND	NC	NC	GND	
6	NC	NC	GND	NC	NC	GND	NC	NC	GND	
7	NC	NC	GND	NC	NC	GND	**2PETp0**	**2PETn0**	GND	
8	NC	NC	GND	NC	NC	GND	**2PERp0**	**2PERn0**	GND	
9	NC	NC	GND	NC	NC	GND	NC	NC	GND	
10	**3PETp0**	**3PETn0**	GND	**3PERp0**	**3PERn0**	GND	NC	NC	GND	XJ3 Connector

Pin	A	B	ab	C	D	cd	E	F	ef	
1	NC	NC	GND	NC	NC	GND	NC	NC	GND	
2	NC	NC	GND	NC	NC	GND	NC	NC	GND	
3	**4PETp0**	**4PETn0**	GND	**4PERp0**	**4PERn0**	GND	NC	NC	GND	
4	NC	NC	GND	NC	NC	GND	NC	NC	GND	
5	NC	NC	GND	NC	NC	GND	RSV	RSV	GND	
6	RSV	RSV	GND	RSV	RSV	GND	RSV	RSV	GND	
7	RSV	RSV	GND	RSV	RSV	GND	RSV	RSV	GND	
8	RSV	RSV	GND	RSV	RSV	GND	RSV	RSV	GND	
9	RSV	RSV	GND	RSV	RSV	GND	RSV	RSV	GND	
10	RSV	RSV	GND	RSV	RSV	GND	RSV	RSV	GND	XJ2 Connector

Pin	Signals	
G	GND	
F	NC	
E	NC	
D	GND	
C	5V	
B	3.3V	
A	GND	XJ1 Connector

5. Ordering Information

Ordering Number	Description
1H00007140	PCIe X4 Uplink to PXI Express
1H00005312	PC Card PCie X4 to PCIe X4_Cable (Low Profile)
1H00005304	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)