pickering 41-924 PCIe and PXI Remote Control Interface User Manual

pickering 41-924 PCIe and PXI Remote Control Interface

Contents

Technical Support

For Technical Support please contact Pickering Interfaces either by phone, the website or via e-mail.

Warranty
All products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years, excluding programmable power supplies, from the date of delivery to the original purchaser. Any product found to be defective within this period will, at the discretion of Pickering Interfaces be

repaired or replaced.
Products serviced and repaired outside of the warranty period are warranted for ninety days.
Extended warranty and service are available. Please contact Pickering Interfaces by phone, the website or via e-mail.

Environmental Policy
Pickering Interfaces operates under an environmental management system similar to ISO 14001.
Pickering Interfaces strives to fulfil all relevant environmental laws and regulations and reduce wastes and releases to the environment. Pickering Interfaces aims to design and operate products in a way that protects the environment and the health and safety of its employees, customers and the public. Pickering Interfaces endeavours to develop and manufacture products that can be produced, distributed, used and recycled, or disposed of, in a safe and environmentally friendly manner.

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Product Safety

Safety Symbols
The following safety symbols may be used on the product and throughout the product documentation.

Meaning/Description	Symbol
PROTECTIVE EARTH (GROUND) To identify any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.	
DANGEROUS VOLTAGE To indicate hazards arising from dangerous voltages.	
WARNING/CAUTION An appropriate safety instruction should be followed or caution to a potential hazard e xists. Refer to the relevant instructions detailed within the product manual.	
HEAVY If this product is heavy reference should be made to the safety instructions for provisions of lifting and moving.	
STATIC SENSITIVE To indicate that static sensitive devices are present and handling precautions should be followed.	

Warnings & Cautions

WARNING – Hazardous Environments	Symbol
This product is not specifically designed for use in hazardous environments, for example in e xplosive atmospheres. If the product is to be used in hazardous environments we recommen d that the user ensures suitable protective measures are taken.	

WARNING – Danger of Electric Shock	Symbol
This module may contain hazardous voltages. Before removing the module from the rack rem ove all supplies and disconnect user I/O signals. Unused slots in the PXI/PXIe/LXI chassis are populated with blanking plates to prevent access to user I/O signals that may be present. Blanking panels are available to order from Pickering i n a variety of slot widths. If the product is not used in this manner for example by using an ext ender card then additional care must be taken to avoid contact with exposed signals.	

CAUTION – Handling of Electrostatic-Sensitive Devices	Symbol
Certain semiconductor devices used in this equipment are liable to damage due to static voltage. Observe the following precautions when handling these devices in their unterminated state, or sub-assemblies containing these devices: • Persons removing sub-assemblies from equipment using these devices must be earthed by a wrist strap and a resistor at the point provided on the equipment. • Soldering irons used during the repair operations must be low voltage types with earthed tips and isolated from the mains voltage by a double insulated transformer. • Outer clothing worn must be unable to generate static charges. • Printed Circuit Boards (PCBs) fitted with these devices must be stored and transported in anti-static bags.	

CAUTION – Product Documentation	Symbol
Suitably qualified & trained users should ensure that the accompanying documentation is fully read and understood before attempting to install or operate the product.	

Safety Instructions

Safety Instructions
All cleaning and servicing requires the equipment to be isolated and disconnected from the power source and user I/O signals (refer to the Maintenance Section). • Appropriate manual handling procedures should be followed as dictated by the weight of the individual module or the combined weight of the modules & chassis. • Should a fault occur with the module or chassis, immediately isolate and disconnect the incoming power to the chassis and the user I/O signals. • Ensure the equipment is installed, operated and maintained by trained and authorised personnel. • For suitably equipped products in the event of an emergency press the red “emergency stop” button situated on the front of the unit.

Section 1 – Technical Specification

- Provides Seamless Interface Between PC Controller PCIe and PXI Chassis
- Fast PCI Express Interface
- Supports 32 bit 33MHz PXI Bus
- Supplied Complete with Interface Cable
- Low Power Consumption
- Occupies Single PXI and PCIe Slot
- 3 Year Warranty

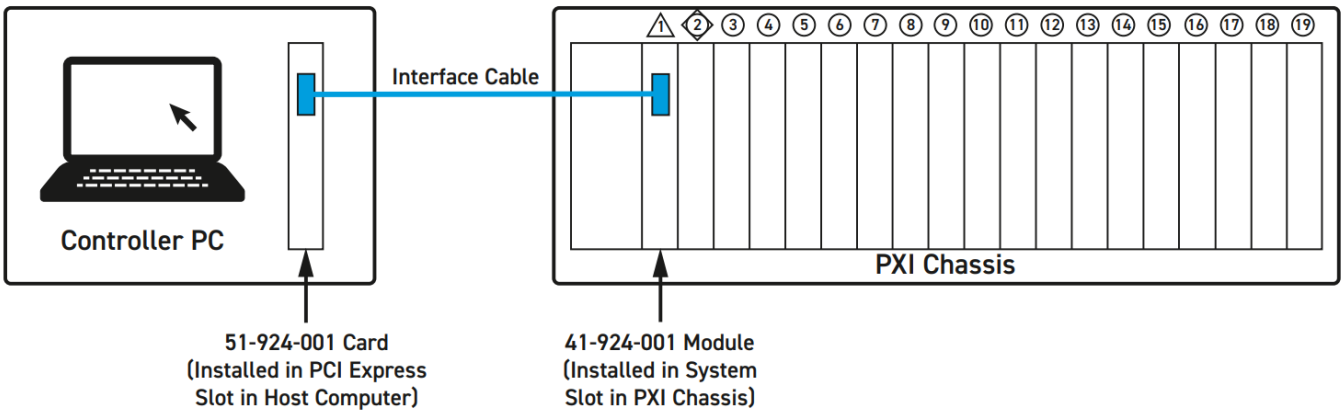
Harnessing the bandwidth potential of PCI Express, the 41-924 Extension Kit enables computers with a PCIe slot to remotely control a PXI chassis via a high-speed interface. The extension system operates in 32-bit/33 MHz configuration and has complete end-to-end hardware and software transparency for the host system. Hardware installed in the PXI chassis operates as if it is installed in the host system, requiring no additional drivers or software.
The host system can be separated from the PXI chassis by up to 7 meters using a high-quality shielded twisted pair cable.

Controlling PXI™ with PCI Express®
Based on PCI Express technology, the PCIe-to-PXI Extension Kit provides bus expansion capability through its high-speed differential signal interface. With the 41-924 Extension Kit, users can use a PCIe slot to control an external PXI chassis.
Because the PCIe bridge is transparent, there is no need to install any additional software on the external chassis.

The Extension Kit consists of a 50-924-001 card installed in the host computer, a shielded interface cable, and a 40-924-001 module installed in the remote PXI chassis. The 50-924-001 has a PCIe x1 footprint and communicates with the 40-924-001 via the interface cable. The 40-924-001 converts the PCIe interface into a PCI interface for the PXI slots in the extension system.
The link between host PC and the external chassis is a PCI Express X1 link that consists of a dual-simplex communications channel with two, low-voltage differentially driven signal pairs. The signaling rate can be up to 2.5 Gbps in each direction. With a shielded twisted pair cable, the maximum extension distance is up to 7 m without decreasing signal rate.

Diagram Showing Remote Control Interface Kit Fitted in a Controlling PC and a PXI Chassis, Linked With the

Interface Cable



Specification

The system is supplied as kit containing an interface cable, a 41-924-001 PXI module and a 51-924-001 PCIe c ard and ordered as a complete kit. Provides a single lane PCIe connection from PCIe to PXI.
51-924-001 Specification: Compliant with PCI Express Base Specifications Rev. 1.0a. PCI Express x1 link providing an effective signaling rate of up to 2.5 Gigabits/sec.
41-924-001 Specification: Compliant with PCI-to-PCI Bridge Architecture Specification Rev. 1.2. Supports 5 V and 3.3 V PCI bus 32-bit/33 MHz full data throughput.
Chassis Compatibility: 51-924-001 is suitable for insertion in any PCIe slot of a PC. 41-924-001 is suitable for insertion in any PXI chassis controller slot (Slot 1), not suitable for PXIe controller slot s.
Connection Distance: Supplied with a 3 m interface cable, maximum connection distance of 7 m.

Power Requirements

	+3.3 V	+5 V	+12 V	-12 V
51-924-001	210 mA	0	0	0
41-924-001	720 mA	0	0	0

Mechanical Characteristics

51-924-001: Single slot PCIe Card (height 68.90mm, width 86.65mm)
41-924-001: Single slot 3 U PXI (CompactPCI card).
3D models for all versions in a variety of popular file formats are available on request.

Product Order Codes

PCIe to PXI Remote Control Kit 41-924-001-KIT
(Complete kit 51-924-001, 41-924-001, 3m Interface cable)

PCIe Remote Control Interface Card 51-924-00
PXI Remote Control Interface Module 41-924-001

Safety & CE Compliance
All modules are fully CE compliant and meet applicable EU directives:
Low-voltage safety EN61010-1:2010,
EMC Immunity EN61326-1:2013,
Emissions EN55011:2009+A1:2010.

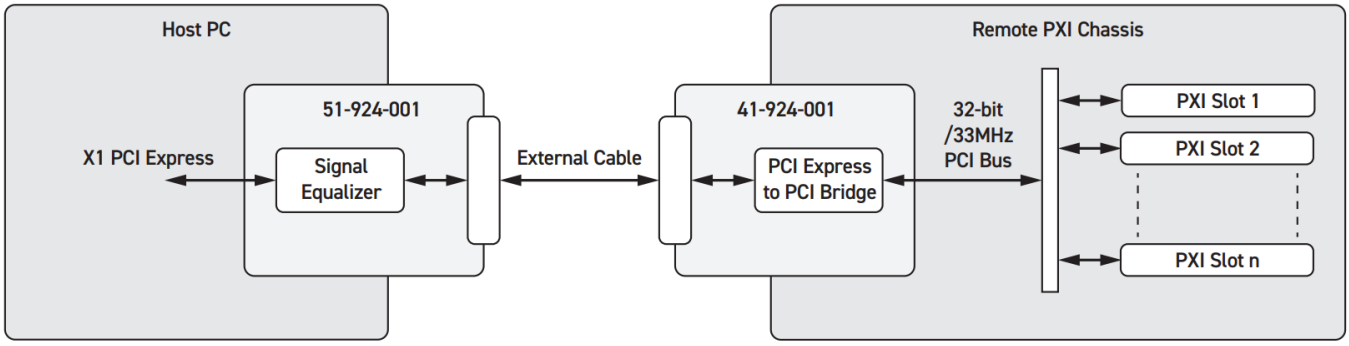
Operating/Storage Conditions

Operating Temperature: 0 °C to +50 °C
Humidity: Up to 90 % non-condensing
Altitude: 5000 m
Storage Temperature: -20 °C to +80 °C
Humidity: Up to 90 % non-condensing
Altitude: 15000 m

Section 2 – Technical Description

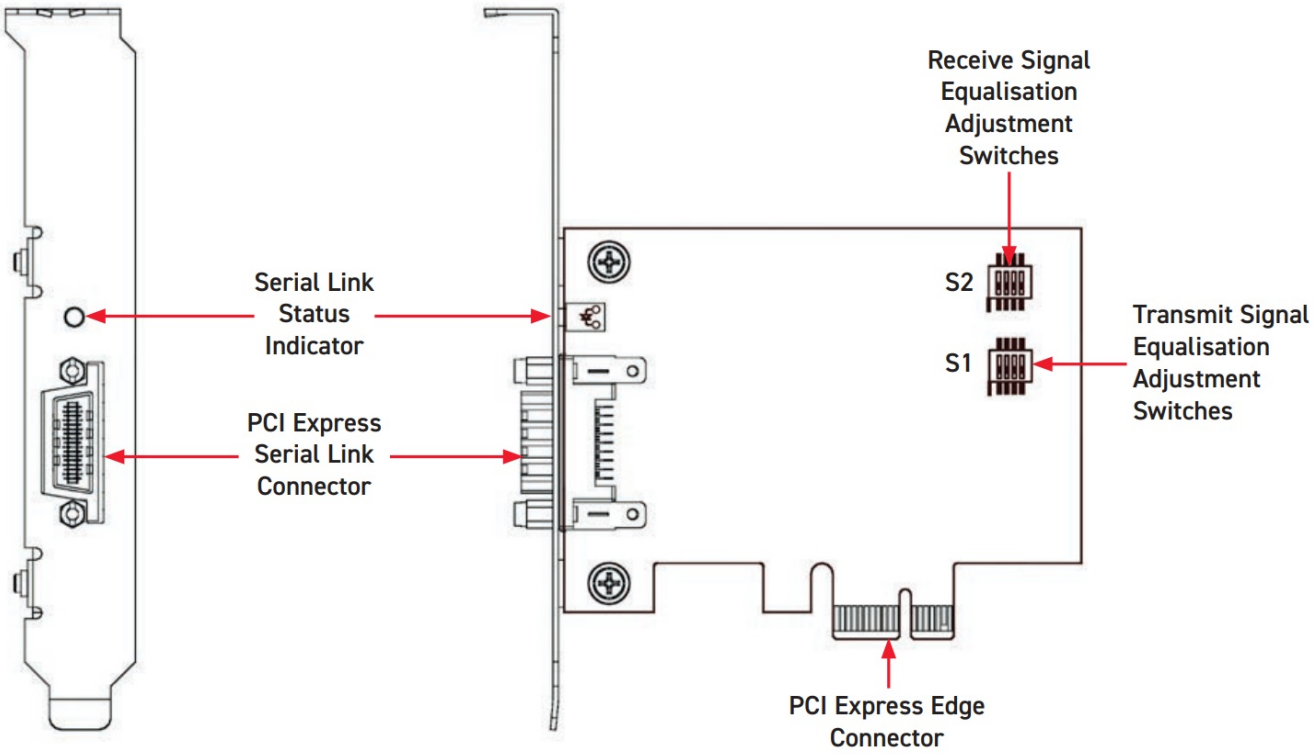
Hardware Description

Functional Block Diagram
Figure 2.1 – PCI Express-to-PXI Extension Kit Functional Block Diagram



51-924 Layout Connectors & Indicators

Figure 2.2 – 51-924 PCIe Remote Control Interface Card Mechanical Layout



51-924-001 S1/S2 Signal Equalizer Adjustments

51-924-001 provides equalization, amplification and de-emphasis circuits to optimize signal integrity performance. With this design, 51-924-001 allows signal transmission over long distances and reduces signal distortion.

Note: The following adjustment should be applied to both S1 and S2 simultaneously. S1 adjusts transmits signals and S2 adjusts receive signals.

Table 2.1 – S1/S2 51-924-001 Equalization Selection

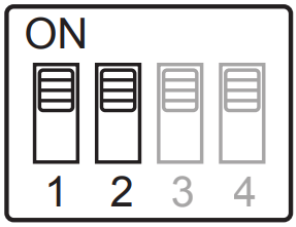
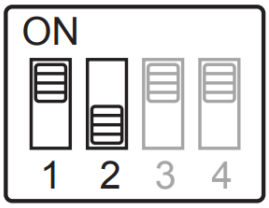
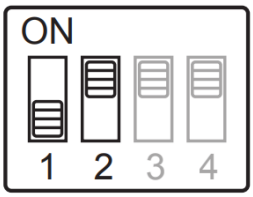
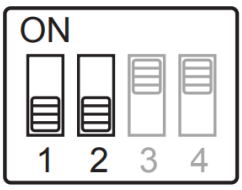
Setting	Description
	Strongest equalizer levels (default)
	Moderate equalizer level
	Weakest equalizer level
	No equalizer

Table 2.2 – S1/S2 51-924-001 Output Swing Control

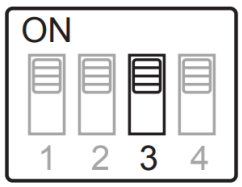
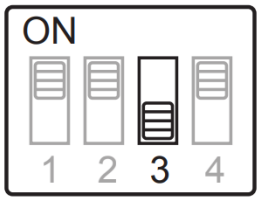
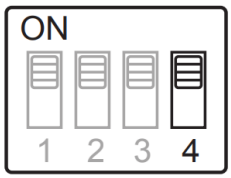
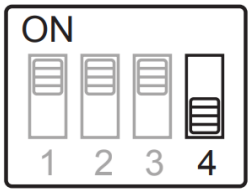
Setting	Description
	High level output signal swing (default)
	Normal level output signal swing

Table 2.3 – S1/S2 51-924-001 Output De-Emphasis Control

Setting	Description
	High level (default)
	Normal level

41-924 Layout Connectors & Indicators

Figure 2.3 – 41-924 PXIe Remote Control Interface Module Mechanical Layout

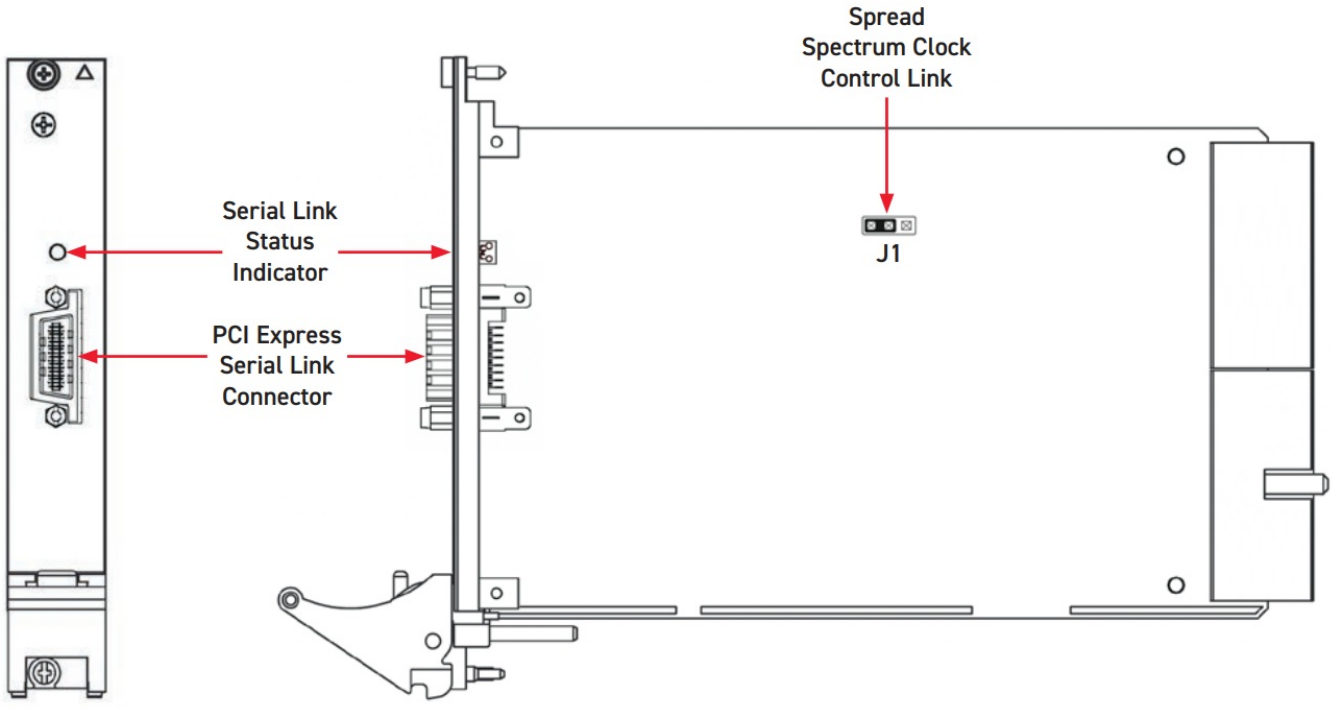
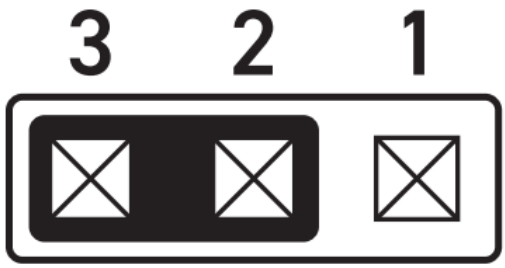
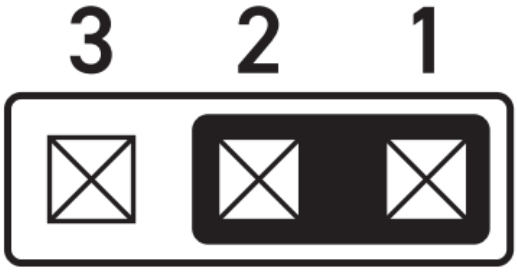


Table 2.4 – J1 41-924-001 Spread Spectrum Clock Control

Setting	Description
	Enables spread spectrum control. When enabling spread spectrum control, the PCI clock will be modulated with a low freq uency carrier, the peak EMI can be greatly reduced in the system (Default).
	Disables spread spectrum control.

Section 3 – Installation

 Refer to the Warnings and Cautions at the front of this manual !
These products require installation in a suitable PXIe chassis/host PC. They are designed for indoor use only.

 Pre-operation Checks (Unpacking)

1. Check the module for transport damage and report any damage immediately to Pickering Interfaces.
   Do not attempt to install the product if any damage is evident.
2. Position the chassis relative to any other equipment the module(s) will connect with. Ensure the chassis is not connected to the electrical supply.
3. Ensure that the designated area for the chassis containing the module is of flat and solid construction to withstand and support the combined weight of the module(s) and chassis.

 Installation of 51-924-001 in Host PC

The host PC must be electrically installed in accordance with local regional electrical codes by a qualified engineer.

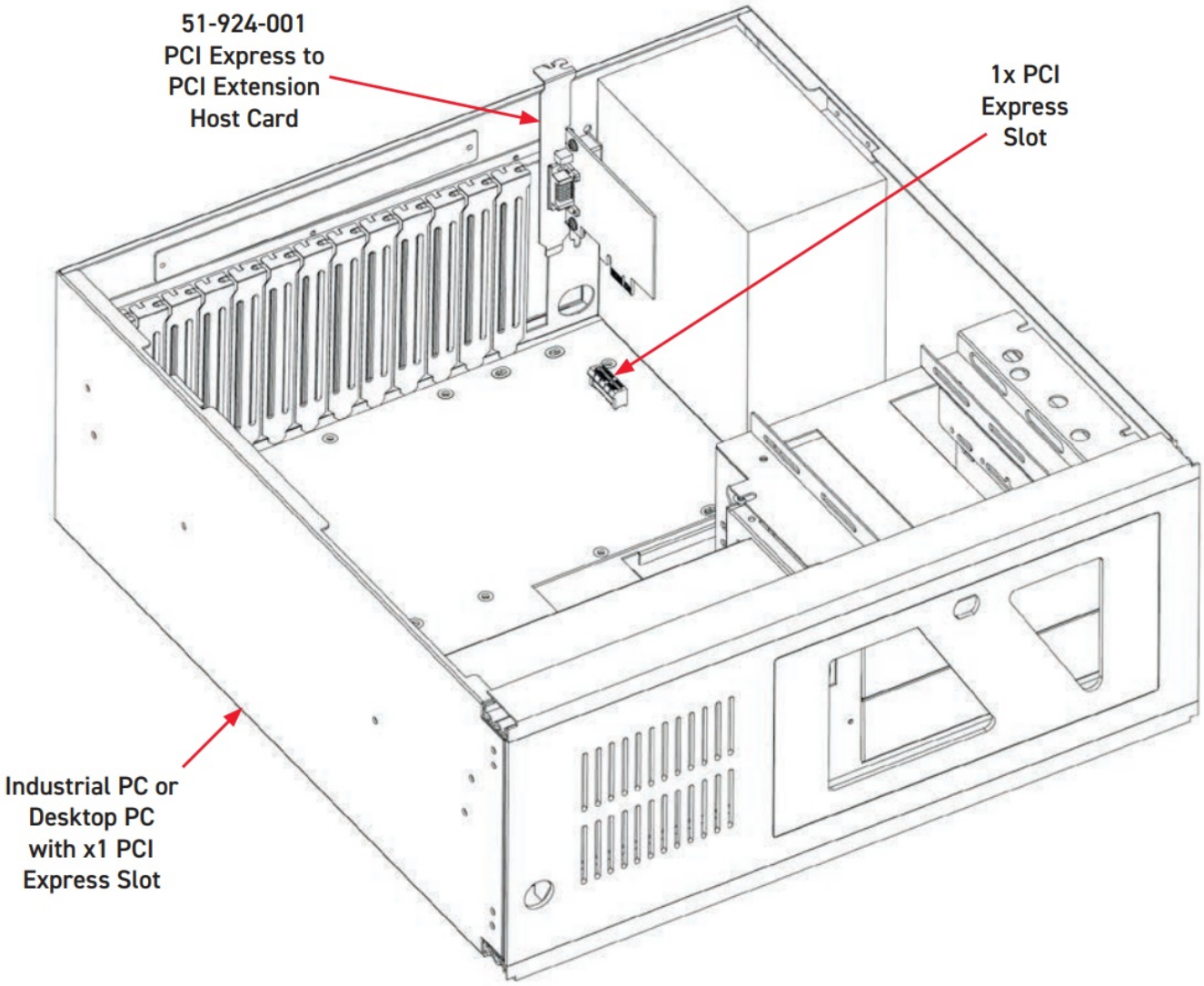
 The PC must be grounded.

 Electrostatic discharge can damage the components on the card.
To avoid such damage in handling the board refer to page vi.
Ensure that there is adequate ventilation.

 The card should be installed in accordance with the following procedure:

1. Ensure that the PC is turned OFF but still connected to mains so that it remains grounded.
2. Unscrew the fixing screws and remove the cover of you host PC to gain access to the backplane
3. Choose an available x1 PCI Express slot in the PC backplane.
4. Remove the blanking panel for the chosen slot and retain the fixing screw.
5. Carefully remove the 51-924-001 card from its anti-static bag and insert the card's edge connector into the chosen slot on the backplane (refer to Figure 3.1).
6. Make sure the card is fully inserted into the edge connector and its front panel is fully in contact with the back of the card aperture of the host PC's chassis.
7. Use the fixing screw to secure the front panel of the card to the chassis mounting rail.
8. Replace the cover of the host PC and secure with the appropriate fixing screws

Figure 3.1 – Installing the 51-924-001 PCIe Remote Control Interface Card in a Host PC




Installation of 41-924-001 in PXI Chassis

The chassis must be electrically installed in accordance with local regional electrical codes by a qualified engineer.


The chassis must be grounded.


Electrostatic discharge can damage the components on the module.
To avoid such damage in handling the board refer to page vi.
Ensure that there is adequate ventilation.

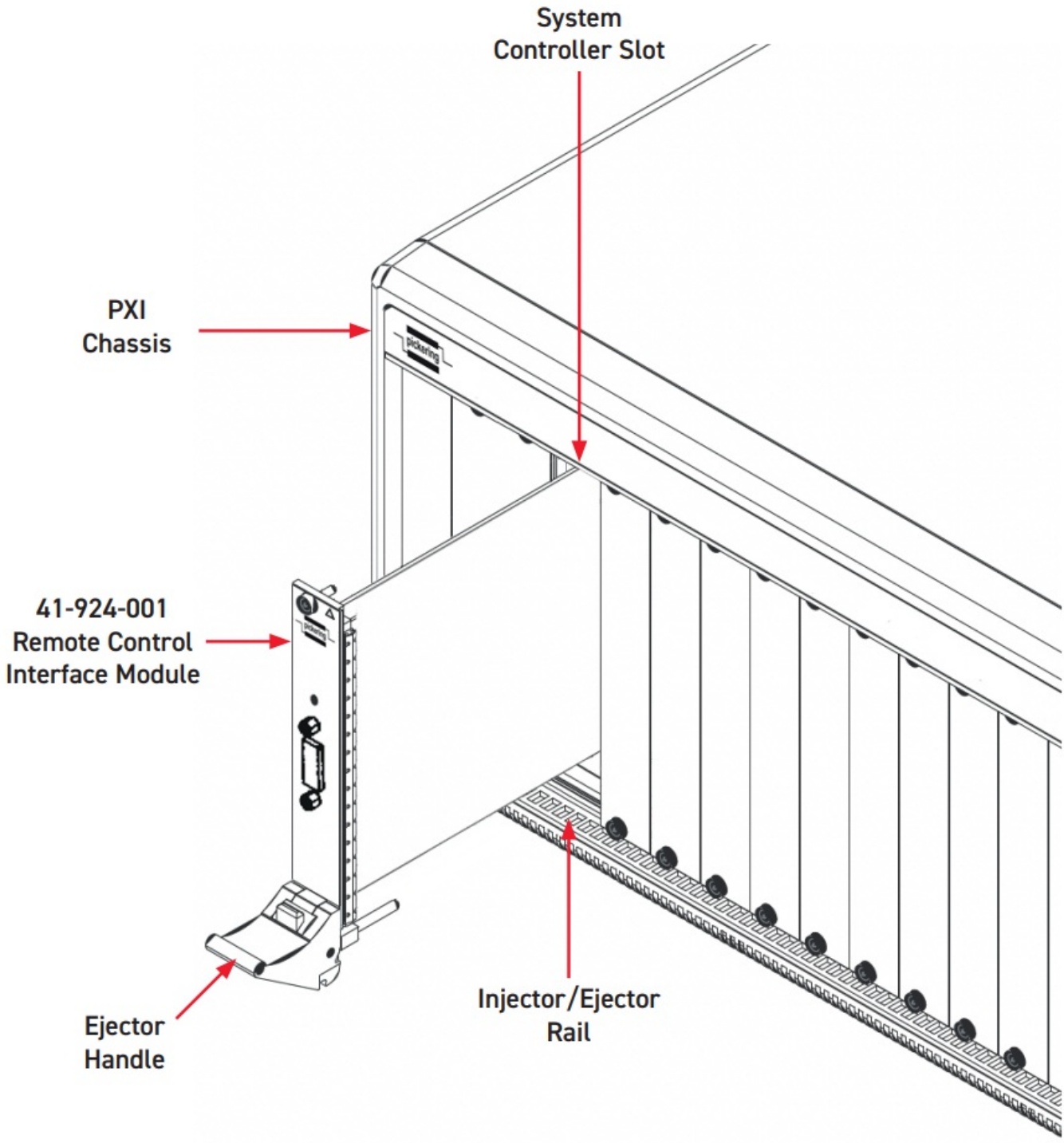

The module should be installed in accordance with the following procedure:

1. Ensure that the chassis is turned OFF but still connected to mains so that it remains grounded.
2. Locate the system slot in the PXI chassis (the 41-924-001 module must be installed in a system controller slot).

3. Remove the blanking plate for the system slot.
4. Ensure that the injector/ejector handle is in its downward position. Align the module with the card guides on the top and bottom of the slot.

   Do not raise the injector/ejector handle whilst inserting the module as the module will not insert properly.
5. Hold the handle whilst slowly sliding the module into the card guides until the handle catches on the injector/ejector rail (refer to Figure 3.2).
6. Raise the injector/ejector handle until the module firmly seats into the backplane. The front panel of the module should be flush with the front panel of the chassis.
7. Secure the module to the chassis mounting rails using the fixing screws on the top and bottom of the module's front panel.

Figure 3.2 – Installing the 41-924-001 PXIe Remote Control Interface Module into a PXIe Chassis
Note: The 41-924-001 module must be installed in the PXIe System Controller Slot of the chassis – peripheral slots cannot be used



Cabling Host Computer to a PXI Chassis

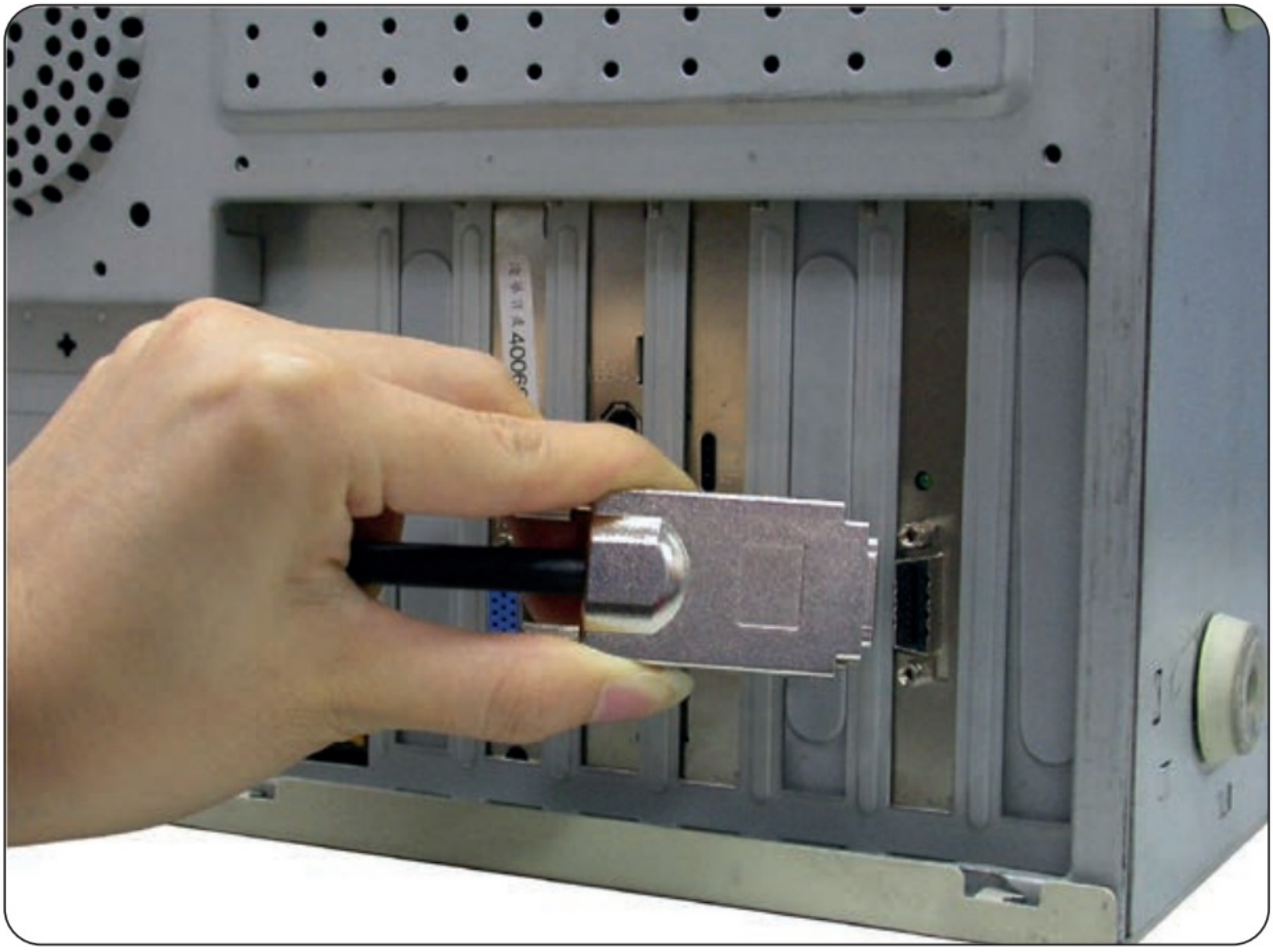
Now that you have successfully installed the 51-924-001 into the Host computer and installed the 41-924-001 in the PXI chassis, you may connect the host PC and PXI chassis with the interface cable assembly.

Caution: DO NOT remove the interface cable assembly after the system is powered on may cause system errors or data loss. If the cable is unplugged improperly, reconnect it and reboot the host PC and PXI chassis.

Figure 3.3 – 3m Interface Cable Assembly

1. Locate your 3m interface cable assembly
2. Connect the cable assembly to the PCIe connector on the bracket of the 51-924-001 located in the host PC.
3. Firmly attach the 3m interface cable by tightening its retention screws.

Connecting the 3m Interface Cable Assembly to the 51-924-001 Installed in the Host PC



4. Connect the other end of the cable assembly to the connector of the 41-924-001 installed into the system slot of the PXI chassis.

   Figure 3.5 – Connecting the 3m Interface Cable Assembly to the 41-924-001 Installed in the PXI Chassis

Figure 3.6 – Host PC Connected to the PXI Chassis

Power ON/OFF Sequence
To power-on the PCIe to PXI Extension Kit:

1. Ensure that the interface cable is properly connected to the host PC and PXI chassis.
2. Power on the PXI chassis first.
3. Power on the host PC

   Caution: DO NOT remove the cable after the system and PXI chassis are powered on. Disconnecting the cable while the system is running may cause unpredictable system errors and/or system crash.

   As the PCIe to PXI Extension Kit is a standard PCIe-to-PCI bridge interface, the BIOS will identify each device behind the PCI bridge and assign resource to each one during start up. Thus users have to power-on the PXI™ chassis first in order to get appropriate resources from the BIOS.

   To power down the PCIe to PXIe Extension Kit:
4. Power down the host PC.
5. Power down the PXI chassis.

Caution: DO NOT power down the PXI chassis until the host PC is powered off. If the PXIe chassis is powered off while the host PC is on, the host PC may hang or crash.

Status LED Indicators
The LEDs on the front panel of the 51-924-001 and 41-924-001 give power status information. The LEDs light up only when the following conditions are met:

- The extension cable between the 51-924-001 (Host PC) and 41-924-001 (Extension Chassis) is properly

connected.

- The extension chassis is powered on.
- The host PC is entering its Power-On Self Test (POST).

Section 4 – Troubleshooting

This section describes frequently asked questions that may assist in solving minor problems that may be encountered.

Question: What is the maximum extension length of the 41-924-001-KIT?
Answer: Pickering provides an interface cable in a 3 meter length, maximum cable length is 7 meters.
Question: When using the 41-924-001-KIT, are there any additional drivers or software required to install?
Answer: It is designed to be a standard PCI Express®-to-PCI bridge. It is not necessary to install additional drivers or software for support.
Question: How many extension chassis can I connect to a host PC by using the 41-924-001-KIT?
Answer: Due to the point-to-point architecture of PCI Express®, only one PCI Express® Bus Extension Product can be supported by one chassis. However, users can select multiple extension chassis for different purposes. For example, a
4-slot extension chassis provides small and compact form factor while an 18-slot extension chassis provides more PCI slots. Theoretically, PCI specification allows up to 255 PCI bus segments. PCI Express® Bus Extension Products do not limit the bus segment number. The maximum PCI bus segments may limited by your BIOS or operating system.
Question: Are there any compatibility problems with the 41-924-001-KIT?
Answer: The 41-924-001-KIT is designed as a standard PCI Express®-to-PCI Bridge. During PC boot up, your PC BIOS will search devices and assign resources such as, I/O, memory space and IRQ number, to each device according to its algorithm. Although PCI specification allows up to 255 bus segments in a PC system, the BIOS may not assign the correct and/or proper resource to each device in some complex PCI systems.
Because the PCI Express® specification was released in 2002, most hardware and circuit board designers as of yet do not offer multiple PCI-to-PCI bridges. Most BIOS work for simple applications but may not work for multiple PCI bus segments and a variety of resource requests. We suggest customers choose PC equipment with Intel 945, 965 or later chipsets to
adjust for these issues.
Question: If I encounter compatibility problems, what should I do?
Answer: Because most compatibility problems come from PCI resource assignments, customers should consult their PC vendors or BIOS vendors for help. Updating to the most current BIOS version may also resolve PCI resources problems.
The following list are some indications that may help customers to deal with compatibility issues:

- Disable the onboard device functions of your host PC to release IO resources.
- Remove PCI devices plugged/installed in your host PC.
- Connect an extension chassis which is single bus segment to the host PC. Plug a PCI device to an extension chassis one by one and boot each in sequence to check if your host PC can accommodate the PCI device or not.
- You may try to plug the PCI Express® extension host card to a different PCI Express® slot.

Section 5 – Maintenance Information

 Refer to the Warnings and Cautions at the front of this manual.

Periodic Maintenance
This product and its corresponding chassis do not require any periodic maintenance.

General Cleaning
• Isolate the electrical power from the chassis and ensure that no user I/O signals are being applied. • Wipe the product & chassis surfaces with a clean dry anti-static cloth only.

Software Update
For PXI/PXIe modules operating in a PXI/PXIe chassis, no module software updates are required. For the latest version of the driver please refer to our web site **pickeringtest.com** where links to our Software Download page will provide the latest version of the driver software for the various programming environments encountered. For PXI modules which are supported in one of Pickering Interfaces' Modular LXI Chassis (such as the 60-102B and 60-103B) no module software update is required. If the module was introduced after the LXI chassis was manufactured the module may not be recognized, in this case the chassis firmware may need upgrading. This is a simple process which is described in the manual for the Modular LXI Chassis.

Documents / Resources

	pickering 41-924 PCIe and PXI Remote Control Interface [pdf] User Manual 41-924-001, 41-924M, 41-924, 41-924 PCIe and PXI Remote Control Interface, PCIe and PXI Remote Control Interface, PXI Remote Control Interface, Remote Control Interface, Control Interface, Interface

References

- User Manual