PCIe-PXIe-8565

PCIe to PXIe Extension Kit

User's Manual

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Leading **EDGE COMPUTING**

Revision History

Revision	Release Date	Description of Changes
1.0	2020-12-23	Initial release

Preface

Disclaimer

The information in this document is subject to change without prior notice in order to improve reliability, design, and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Environmental Responsibility

ADLINK is committed to fulfill its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.

Trademarks

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.


NOTE:

Additional information, aids, and tips that help users perform tasks.


CAUTION:

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.
ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche.


WARNING:

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.
AVERTISSEMENT: Informations destinées à prévenir les blessures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.

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1 Introduction

The PCIe-PXIe-8565 PCI Express to PXI Express extension kit provides control of PXI Express modules installed in a PXIe chassis using high bandwidth PCI Express technology. The extension kit consists of a PCIe-8560 peripheral card, PXIe-8565 3U system module, and an ACL-EXPRESS cable (available in 1, 3, and 7 meter lengths) that provides up to 250MB/s bandwidth via PCIe Gen 1 x1 signaling. With comprehensive hardware and software transparency, the extension kit enables fast and convenient detection of any PXI cards installed in the system, requiring no additional drivers or software.

The host PC can be separated from the PXI Express chassis by up to seven meters using high-quality shielded twisted copper cables. The robust and reliable PCIe to PXIe Extension Kit is suited for remote test and measurement applications with high-density I/O requirements and in hazardous industrial control and automation environments.

Controlling PXI with PCI Express

Based on PCI Express technology, the PCIe to PXIe Extension Kit provides bus extension capability through its high-speed differential signal interface.

The PCIe-PXIe-8565 PCI Express-to-PXI Express expansion kit provides connections from PXI instrument slots on the PXIe chassis to the host computer. The system consists of a PCIe-8560 host adapter installed in the host computer, a PCIe x1 cable, and a PXIe-8565 remote controller (a 3U expansion module) installed in the system slot of a PXIe chassis. The PCIe-8560 adapter comes in a PCI Express x1 footprint with a PCIe x1 cable connector.

1.1 Specifications

1.1.1 PCIe-8560 PCI Express Host Adapter

- PCI Express Base Specifications Rev. 1.0a compliant
- PCI Express Gen 1 x1 link, up to 250MB/s data throughput
- Extended distance of up to 7 meters
- Low-profile PCI Express card, 87(W) x 69(H) mm

1.1.2 PXIe-8565 3U PXIe System Module Controller

- PXI-5 PXI Express Hardware Specification Rev. 2.0 compliant
- PCIe Gen 1 x1 cable connector with 250 MB/s data throughput
- PXI Express link capability:
  - Four-link configuration: x1 x1 x1 x1
  - Two-link configuration: x1 x1
- 175 (W) x 107 (H) mm

1.1.3 Power Requirements

- **PCIe-8560**

Typical Power	4.0 W
Maximum Power	8.0 W

Table 1-1: PCIe-8560 Power Requirements

- **PXIe-8565**

Power Rail	12 V	3.3 V
Typical Current	0.85 A	1.3 A
Maximum Current	1.7 A	2.6 A

Table 1-2: PXIe-8565 Power Requirements

1.1.4 Operating and Storage Environment

- Operating temperature: 0°C to 55°C
- Storage temperature: -20°C to 70°C
- Relative humidity: 10% to 90%, non-condensing

Insertion loss in sockets and accessory cable connectors may increase after frequent/multiple insertions/removals, degrading the signal integrity of high speed PCI Express transmission. For each PCIe-PXIe-8565 socket or accessory cable connector, more than 200 connections/disconnections can impede functionality and performance.

1.2 Features

- PXI-5 PXI Express hardware specification Rev. 2.0 compliant
- PCI Express Base Specifications Rev. 1.0a compliant
- Maximum system throughput: 250MB/s
- PXI Express link capability:
  - Four-link configuration: x1 x1 x1 x1
  - Two-link configuration: x1 x1
- Expansion up to 7m (expansion cables of 1m, 3m, or 7m)
- Comprehensive hardware and software transparency

1.3 Applications

- Electronics manufacturing testing
- High-density I/O systems
- Industrial automation and control
- Military and aerospace
- Testing systems for remote and/or harsh environments
- Video capture

1.4 Available Models

Model	Description
PCIe-PXIe-8565/1M	PXIe remote controller kit: PCIe-8560, PXIe-8565, and 1m cable
PCIe-PXIe-8565/3M	PXIe remote controller kit: PCIe-8560, PXIe-8565, and 3m cable
PCIe-PXIe-8565/7M	PXIe remote controller kit: PCIe-8560, PXIe-8565, and 7m cable

Table 1-3: Available Models

1.5 Platform Services Installation

We recommend installing ADLINK Platform Services prior to installation. For details, see ADLINK's **PXI Platform Services User's Manual**.

2 Getting Started


NOTE:

Diagrams and images of equipment mentioned are used for reference only. Actual system appearance may vary.

2.1 Package Contents

- PCIe-8560 (PCI Express x1 host adapter for extension kit)
- PXIe-8565 (3U PXI Express system module controller)
- PCI Express x1 cable assembly (1m, 3m, or 7m)
- Quick Start Guide


NOTE:

If any of the items in the package are missing or damaged, contact your ADLINK dealer.

2.2 Installation Environment

Whenever unpacking and preparing to install any equipment described in this manual, please refer to the ***Important Safety Instructions*** chapter of this manual.

Only install equipment in well lit areas on flat, sturdy surfaces with access to basic tools such as flat and cross head screwdrivers.

The PCIe to PXIe Extension Kit contains several electrostatic-sensitive components that can be easily damaged by static electricity. For this reason, the cards and chassis should be handled on a grounded, anti-static mat, and the operator should wear an anti-static wristband during the unpacking and installation procedure.

Ensure that you inspect all components for apparent damage. Shipping and handling may cause damage to components.

Ensure that there is no shipping and handling-related damage to components before installation or modification.

Do not apply power to any equipment if it has been damaged.

2.3 Installing the PCIe-8560 on a Host Computer

1. Power off your host computer.
2. Remove the screws from the housing of your host computer using a cross-head or flat-head screwdriver and then open the chassis.
3. Remove the PCI Express extension card (PCIe-8560) from its packaging.

   Note: Wear anti-static gloves and use an anti-static surface when handling the card.
4. Install the PCIe-8560 in an available slot that supports a PCI Express x1 card in your host computer. Ensure that you firmly attach the PCIe-8560's bracket to the backplane of the host PC.
5. Close the chassis and reattach the housing screws.

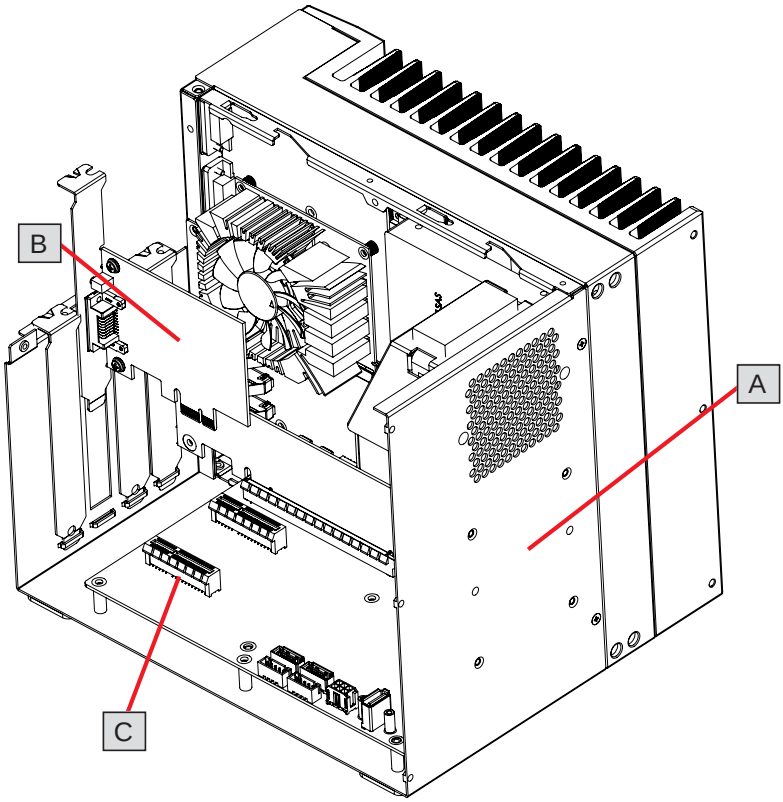

Figure 2-1: PCIe-8560 to Host PC Installation

Item	Description
A	Industrial/desktop PC with PCI Express x1 slot
B	PCIe-8560 (PCI Express host card)
C	PCI Express x1 slot

Table 2-1: PCIe-8560 to Host PC Installation Legend

2.4 Installing the PXIe-8565 in a PXIe Chassis

1. Remove the cover panel of the system slot.
2. Remove the PXIe-8565 from the packaging.

   Note: Wear anti-static gloves and use an anti-static surface when handling the card.
3. Insert the PXIe-8565 into the PXI system slot and attach the bracket-retaining screws to the top and bottom sides of the panel.

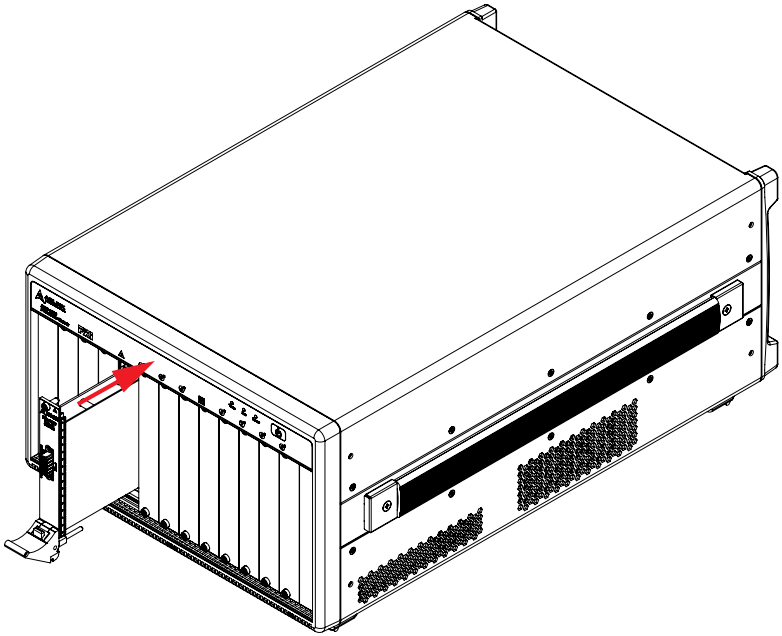

Figure 2-2: PXIe-8565 to PXI Chassis Installation Diagram

NOTE:

The PXIe-8565 must be installed in the PXI system slot. Peripheral slots cannot be used.

2.5 Connecting the Host Computer and PXI Chassis

This section illustrates how to connect a PCIe cable assembly between the the PCIe-8560 on your host computer and the PXIe-8565 on the PXI chassis.

CAUTION:

Removing the PCIe cable assembly after the system is powered on may cause system errors or data loss. If the cable is accidentally disconnected, reconnect it and reboot the host PC and PXI chassis (Section 2.6 Power On/Power Off Sequence)..

Figure 2-3: PCIe x1 Cable Assembly

1. Connect the cable assembly to the PCIe connector on the bracket of the PCIe-8560 card installed on the host PC.
2. Connect the other end of the cable assembly to the connector of the PXIe-8565 module installed in the PXIe chassis.

2.6 Power On/Power Off Sequence

To power on the PCIe to PXIe Extension Kit:

1. Ensure that the extension cable is properly connected to the host PC and PXIe chassis.
2. Power on the PXIe chassis.
3. When the status LEDs of the PXI Express chassis and all installed modules indicate ready, power on the host PC.

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

Because the PCIe to PXIe Extension Kit is equipped with a standard PCIe switch, the BIOS will identify each device behind the switch and assign resources to each during startup. Therefore, the PXI chassis must be powered on in order to obtain the appropriate resources from the BIOS.

To power off the PCIe to PXIe Extension Kit:

1. Power off the host PC.
2. Power off the PXIe chassis.

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

In some cases, it may be necessary to change the BIOS settings to support a PCI Express x1 card, depending on the specifications and functions of the host PC.

3 Hardware Information

3.1 Functional Block Diagram

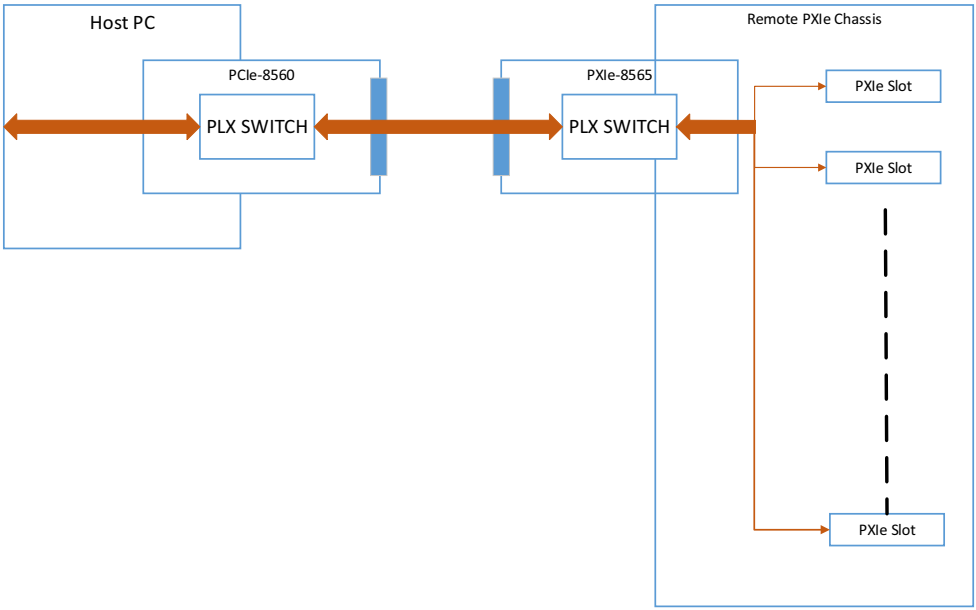

Figure 3-1: PCIe to PXIe Extension Kit Functional Block Diagram

3.2 PCIe-8560 Mechanical Layout

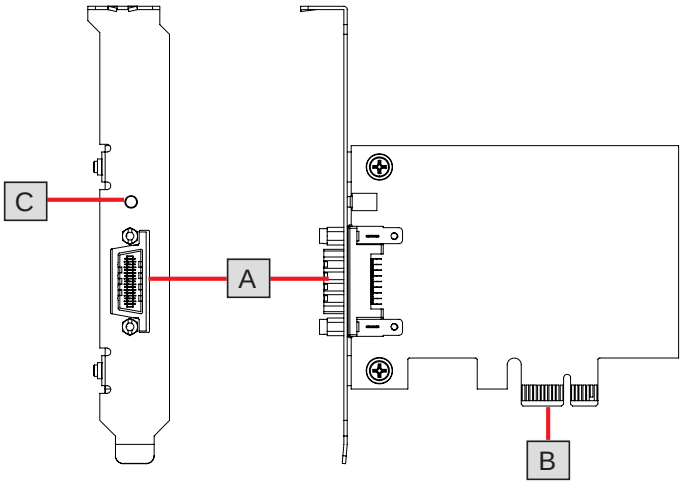

Figure 3-2: PCIe-8560 Mechanical Layout

A	PCIe x1 external cabling
B	PCIe x1 edge connector
C	Status LED

Table 3-1: PCIe-8560 Mechanical Layout Legend

LED	Description
STATUS	Off: No power
	On: PCIe Gen 1 link active

Table 3-2: PCIe-8560 LED Behavior

3.3 PXIe-8565 Mechanical Layout

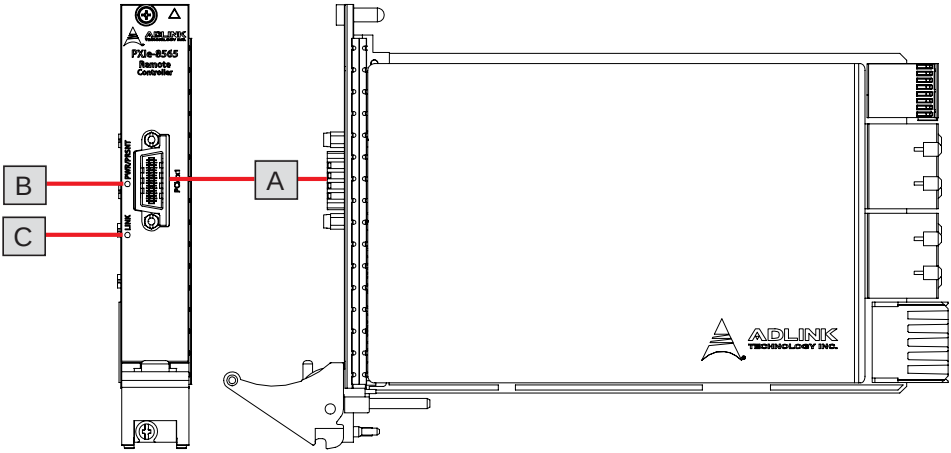

Figure 3-3: PXIe-8565 Mechanical Layout

A	PCIe x1 external cabling
B	PWR/PRSNT LED
C	LINK LED

Table 3-3: PXIe-8560 Mechanical Layout Legend

LED	Description
PWR/PRSNT	Off: No power
	Orange: Power on; no module detected
	Green: PCIe-8560 detected
LINK (Link status between PCIe-8560 and PXIe-8565)	Off: No link
	0.5Hz blinking: PCIe Gen 1 link active

Table 3-4: PXIe-8565 LED Behavior

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Appendix A Troubleshooting (FAQ)

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

Question: What is the maximum extension length of the PCIe-PXIe-8565?

Answer: ADLINK provides cable accessories for the PCIe-PXIe-8565 in 1, 3, and 7-meter lengths, with a maximum cable length of up to 7 meters.

Question: When using the PCIe-PXIe-8565, do I need to install any additional software or drivers?

Answer: Yes, ADLINK PXI Platform Services support PCIe-PXIe-8565, including PCIe-PXIe-8565 SMBus controller drivers and the PXI software framework.

ADLINK PXI Platform Services can be downloaded from the PCIe-PXIe-8565 product page on the ADLINK website.

Question: Which link configuration of the PXI Express system slot does the PCIe-PXIe-8565 support? 4-link or 2-link? How are the associated settings configured?

Answer: The PCIe-PXIe-8565 acts as a generic PXI Express system controller that supports both 4-link and 2-link PXI Express system slots. It detects the backplane and configures automatically without any additional settings.

Question: Are there any compatibility issues with the PCIe-PXIe-8565? How can I select the most suitable host PC for the PCIe-PXIe-8565?

Answer: Limited PCI bus availability is the primary concern in terms of compatibility. Available PCI bus numbers assigned by the system BIOS may exceed PCI bus numbers required by the PCIe-PXIe-8565 and PXI Express chassis. If PCI bus

numbers are occupied, the system may not boot correctly or devices may not be detected.

Theoretically, PC systems implementing PCI Express can support up to 256 bus numbers. However, maximum PCI bus numbers of many PC systems are frequently limited by the system BIOS due to system design or architecture. Conversely, the PXI Express chassis consumes many PCI bus numbers. Each PXI Express peripheral slot reserves a PCI bus number, and PCI Express switches on the PXI Express chassis also occupy several PCI bus numbers. Some peripheral modules may also consume PCI bus numbers. PCI bus number requirements for ADLINK PXI Express chassis are as shown as follows:

Model	PCI Bus Number Requirement
PCIe-PXIe-8565 + PXES-2590	27
PCIe-PXIe-8565 + PXES-2780	44

Table A-1: PCI Bus Number Requirements

Third-party utilities like System Information Viewer (http://rh-software.com/) can check the number of available PCI bus numbers in the system BIOS (Run SIV>>PCI Bus>>ACPI Buses):

Figure A-1: Bus Number Information

Question: One or more modules in the PXI Express chassis connected via the PCIe-PXIe-8565 are missing from Windows Device Manager. What's the best way to solve this or other compatibility problems (like no-boot)?

Answer: Due to the flexibility and variety of systems with PCI Express expansion, most compatibility issues are related to abnormal device detection or resource assignment performed by the system BIOS. The following suggestions may help solve frequently encountered issues.

- Check that the PCIe-PXIe-8565 and cable are properly installed.
- Check for any abnormal LED status on the PCIe-PXIe-8565. (See “PCIe-8560 Mechanical Layout” on page 12.)
- Check that the PCIe-PXIe-8565 cable is not broken or bent, and that the connector is not dirty or broken.
- Make sure sufficient PXI Express bus numbers are available.
- Regularly update the BIOS system to fix resource limitation issues.
- Try different installation sequences for modules installed in the PXI Express chassis.
- Try a different PCI Express slot or a different host PC (different system BIOS).
- Remove one or more modules to free up system resources.

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
- A Lithium-type battery may be provided for uninterrupted, backup or emergency power.

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THEIR INSTRUCTIONS.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

Getting Service

Ask an Expert: http://askanexpert.adlinktech.com

ADLINK Technology, Inc.
9F, No.166 Jian Yi Road, Zhonghe District
New Taipei City 235, Taiwan
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
5215 Hellyer Avenue, #110
San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
300 Fang Chun Rd., Zhangjiang Hi-Tech Park
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH
Hans-Thoma-Straße 11
D-68163 Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: emea@adlinktech.com

Please visit the Contact page at www.adlinktech.com for information on how to contact the ADLINK regional office nearest you: