

ADAM-6541

**10/100Base-TX Ethernet to
100Base-FX Multi-Mode
Fiber Optic Converter**

User Manual

Copyright

The documentation and the software included with this product are copyrighted 2006 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. Information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties, which may result from its use.

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

This manual covers the following models:

- ADAM-6541
- ADAM-6541/ST

Part No. 2003654101

2nd Edition

Printed in Taiwan

March 2006

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.

Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Technical Support and Assistance

Step 1. Visit the Advantech web site at **www.advantech.com/support** where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Contents

Chapter 1	Overview	2
1.1	Introduction	2
1.2	Features	3
1.3	Specifications	3
1.4	Ordering Information	4
Chapter 2	Installation	6
2.1	LED Indicators	6
	Table 2.1:ADAM-6541 LED Definition	6
2.2	Dimensions (units:mm).....	7
	Figure 2.1:ADAM-6541-Front Panel	7
	Figure 2.2:ADAM-6541-Bottom	7
2.3	Full / Half-Duplex Selection	8
2.4	Connecting the Hardware	9
2.4.1	Choosing a Location	9
	Figure 2.3:Figure 2-3 Panel Mounting	9
	Figure 2.4:Din Rail Mounting	10
	Figure 2.5:Figure2-5 Piggyback Stack	11
2.5	Network Connection	11
2.5.1	Connection to the devices	11
2.5.2	Connection to other Hubs or Switch	12
2.5.3	Connection to fiber network	12
2.5.4	Power Connection	12
Appendix A	Pin Assignments & Wiring.....	14
	Figure A.1:RJ-45 Pin Assignment	14
	Figure A.2:EIA/TIA-568B	14

Overview

This chapter gives an overview of ADAM-6541 modules.

Sections include:

- Introduction
- Features
- Specifications
- Ordering Information

Chapter 1 Overview

1.1 Introduction

The ADAM-6541 is an industrial grade converter designed to convert Ethernet network (10/100Base-TX) to fiber network (100Base-FX). It transparently converts Ethernet signals into optic signals. The advantages of Fiber optic are wide bandwidth, anti-EMI and suitable for long-distance transmission. Therefore, ADAM-6541 is an ideal solution for “fiber to building” application in central offices or local sites.

The ADAM-6541 can be mounted in the following three ways: DIN Rail, panel, piggyback mounting. $+10\sim 30 V_{DC}$ operating voltages are also supplied over the terminal block. In addition, the operating temperature ranges from $-10\sim 65^{\circ}C$. The above functions make the ADAM-6541 a stable and reliable industrial grade converter.

High-Speed Transmissions

The ADAM-6541 supports MDI/MDI-X of auto detection. You will not need to crossover. A switch controller that can automatically sense transmission speed (10/100 Mbps) will be included. Both Ethernet and fiber ports have memory buffers that support store-and-forward mechanism; it assures proper data transmission.

Flexible Mounting

The ADAM-6541 is extremely compact and can be mounted in three different ways: DIN rail, panel and piggyback mounting.

Easy Troubleshooting

The ADAM-6541 provides three LED indicators: Power, Full/Link, 10/100Mbps, which easily let you troubleshoot.

Robust Enough for Industrial Environments

The ADAM-6541 can normally work from $-10^{\circ}C$ to $65^{\circ}C$ and accepts wide unregulated voltage range from $+10\sim 30 VDC$. Besides, it also provides 3,000 VDC surge protection (EFT) to protect it from over-voltage damages. It is suitable for any harsh operating environment.

1.2 Features

- Compact size economizes space
- Direct plug and play
- Easy to mount on a DIN-rail, panel or piggyback
- Supports full/half-duplex flow control
- Supports MDI/MDI-X auto crossover
- Embedded switch controller, supports auto-negotiation
- Embedded memory buffer, supports store and forward transmission
- Supports +10 ~ 30 V_{DC} voltage
- Supports operating temperature from -10 ~ 65° C

1.3 Specifications

ADAM-6541	Ethernet to Multi-Mode Fiber Optic Converter
Communications	
Standard	IEEE 802.3, 802.3u, 802.3x
LAN	10/100Base-TX, 100Base-FX
Transmission Distance	Ethernet : 100m Fiber : 2,000m
Transmission Speed	Ethernet : up to 100 Mbps Fiber : 100 Mbps
Interface	
Connectors	1 x RJ-45 1 x SC type fiber connector(ADAM-6541) 1 x ST type fiber connector(ADAM-6541/ST)
LED Indicators	Power, Full/Link(100BASE-FX), 100/10M (Ethernet)
Power	
Power Connectors	2-pin removable screw terminal
Power Consumption	Max. 3W
Power Input	Unregulated +10 ~ 30 V _{DC}

Mechanism	
Dimensions (W x H x D)	70 x 112 x 27 mm
Enclosure	IP30, ABS+PC with solid mounting kits
Mounting	DIN 35 rail, Wall, Stack
Protection	
Isolation Protection	1,500 Vrms (Ethernet Port)
Surge Protection (EFT)	3,000V _{DC} (Power)
Environment	
Operating Temperature	"-10 ~ 65 °C (14 ~ 149) Stack: -10 ~ 60 °C (14 ~ 140)
Storage Temperature	"-20~80 °C (- 4 ~ 176)
Operating Humidity	20 ~ 95% (non-condensing)
Storage Humidity	0 ~ 95% (non-condensing)
MTBF	550,000hrs
Certifications	
Safety	UL 60950-1, CAN/CSA-C22.2 No.60950
EMC	USA: FCC Part 15 CISPR 22 EU : EN55011 EN55022 Class A EN61000-3-2/3 EN55024 IEC61000-4-2/3/4/5/6/8/11

1.4 Ordering Information

ADAM-6541:	10/100 Base-TX Ethernet to 100 Base-FX Multi-Mode SC Type Fiber Optic Converter
ADAM-6541/ST:	10/100 Base-TX Ethernet to 100 Base-FX Multi-Mode ST Type Fiber Optic Converter

Installation

In this chapter, you will be given an overview of the ADAM-6541 hardware installation procedures.

Sections include:

- LED Indicators
- Dimensions
- Full/Half-Duplex Connections
- Connecting the Hardware
- Network Connection

Chapter 2 Installation

2.1 LED Indicators

There are six network LEDs located on the top panel of the ADAM-6541, each with its own specific function.

Table 2.1: ADAM-6541 LED Definition

Power	Green	On	Power is on
	Green	Off	Power is off
Full/Link(100Base-FX)	Green/ Orange	On	Connected to network
	Green/ Orange	Flashing	Networking is active
	Green/ Orange	Off	Not connected to network
100/10M (Ethernet)	Green	On	Connected to network
	Green	Flashing	Networking is active
	Green	Off	Not connected to network
	Orange	On	Link to 100 Mbps network
	Orange	Off	Link to 10 Mbps network

2.2 Dimensions (units:mm)

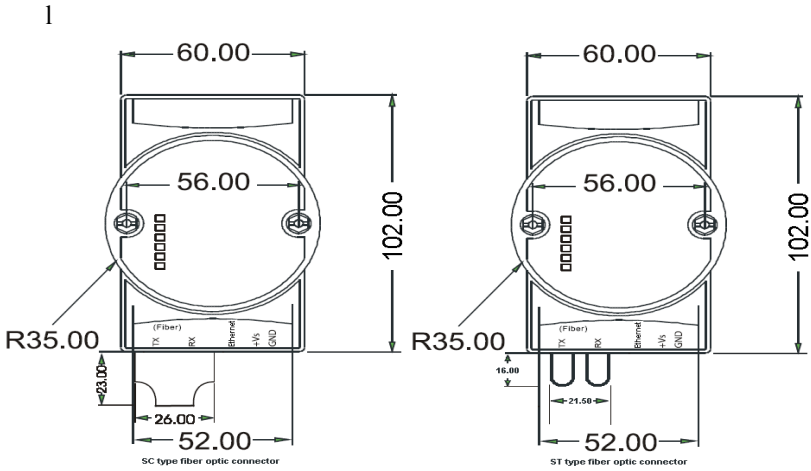


Figure 2.1: ADAM-6541-Front Panel

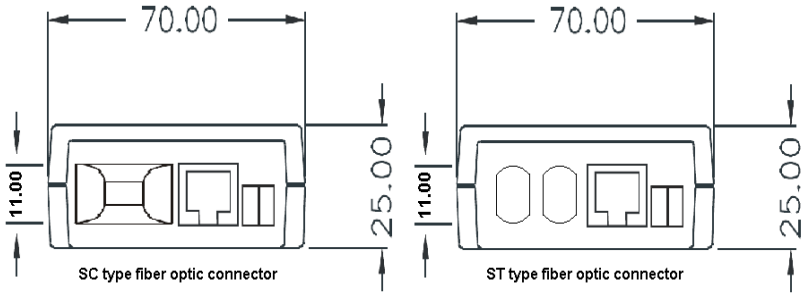
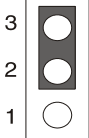
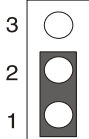


Figure 2.2: ADAM-6541-Bottom

2.3 Full / Half-Duplex Selection

There are two modes of data transmissions, full-duplex and half-duplex transmission. The data can be transmitted in both directions on a single carrier at the same time when you select Full-duplex mode. But the data can only be transmitted in one direction on a single carrier at the same time when you select Half-duplex mode. You may select Full or half-duplex mode according to your equipment requirements.

You can configure full or half-duplex ADAM-6541 via JP1 (located on the top-left PCB.)

JP1	Description
	Half-Duplex
	Full-Duplex (Default)

NOTE:

Fiber Transmission Distance

(1) Half duplex: 412 m

(2) Full duplex: 2 km

2.4 Connecting the Hardware

Next, we will explain how to find a proper location for your ADAM-6541, connect to the network, hook up the power cable, and connect to the ADAM-6541 Ethernet port.

2.4.1 Choosing a Location

Due to its versatility and innovative design, the ADAM-6541 can be:

- fixed to a panel mount
- fixed to a DIN Rail.
- Piggyback Stack

Panel Mounting

The ADAM-6541 can be attached to a wall using the included metal brackets. Each bracket comes with four screws. First attach the brackets to the bottom of the ADAM-6541, then screw each bracket to a wall.

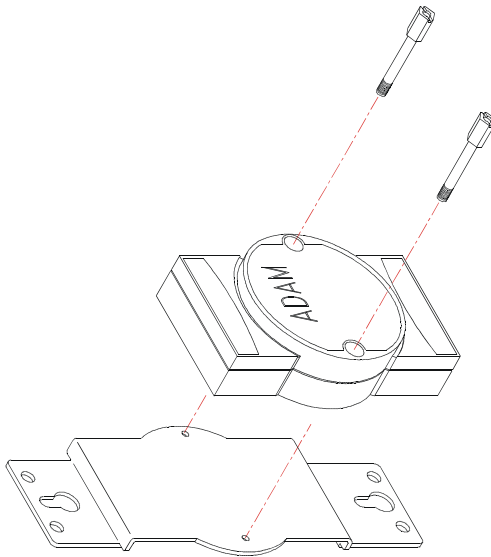


Figure 2.3: Figure 2-3 Panel Mounting

DIN-rail Mounting

You can mount the ADAM-6541 on a standard DIN-rail. First, using two screws, attach the metal plate to the DIN-rail bracket. Because the screw heads are beveled, the tops of the screws will be flush with the metal plate. Din-rail Mounting Brackets-Orientation of Metal Plates: A more convenient way is to screw the metal plate with the DIN-rail bracket assembly to the bottom of the server. Next, use the remaining screws to put the metal plate on the bottom of the ADAM-6541.

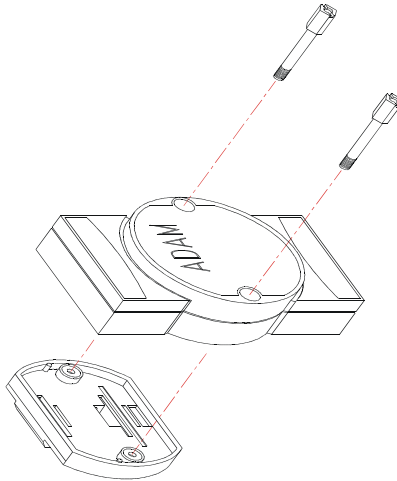


Figure 2.4: Din Rail Mounting

Piggyback Stack

ADAM-6541 can be stacked as seen in the figure below.

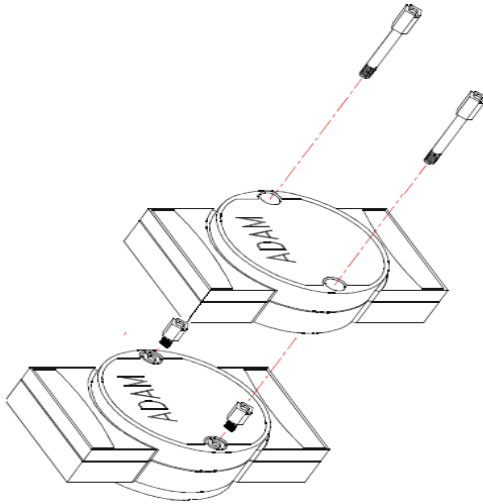


Figure 2.5: Figure2-5 Piggyback Stack

2.5 Network Connection

2.5.1 Connection to the devices

The ADAM-6541 consists of one fiber and one RJ-45 port.

Each of the converter's twisted-pair ports can be used to connect a station or other device. Use a straight-through twisted-pair cable with RJ-45 connectors on both ends. The twisted-pair cable extended from a twisted-pair port is called a "twisted-pair segment," that can be up to 100 meters long. You can connect any RJ-45 (MDI-X) station port on the switch to any device that uses a standard network interface such as a workstation or server.

2.5.2 Connection to other Hubs or Switch

ADAM-6541 has an RJ-45 port that supports the connection to 10Mbps Ethernet or 100Mbps Fast Ethernet, and half or full duplex operation. ADAM-6541 can be connected to other hub or switch via a two-pair straight through cable or crossover cable. The connection can be made from ADAM-6541's ports to other Hub or Switch, such as MDI-X port or uplink MDI port.

ADAM-6541 supports auto crossover to easily and flexibly network users' connections. You can connect any RJ-45 (MDI-X) station port on the switch to any device such as a switch or a bridge or router.

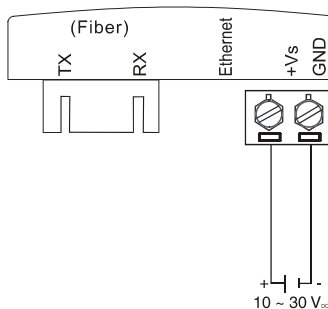
2.5.3 Connection to fiber network

Connecting to the fiber network segment with three-bud fiber. You can use fiber standards via 50/125, 62.5/125 μm (Core/Clad). With fiber optic, it transmits speed up to 100 Mbps and you can prevent noise interference from the system and transmission distance up to 2 km.

2.5.4 Power Connection

You should take the following steps to connect ADAM-6541 power.

1. Connect the power cable to 2-pin connector
2. Connect power cable to power adapter



Note: Please attach a dust cover to the unused fiber port for protection.

APPENDIX
A

**Pin Assignments &
Wiring**

Appendix A Pin Assignments & Wiring

It is suggested to adopt ELA/TIA as the wiring of the RJ45.

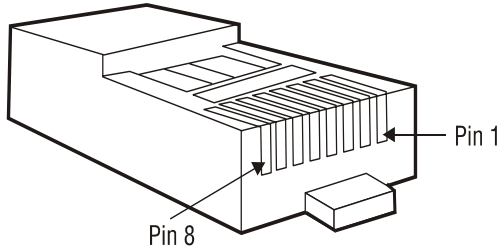


Figure A.1: RJ-45 Pin Assignment

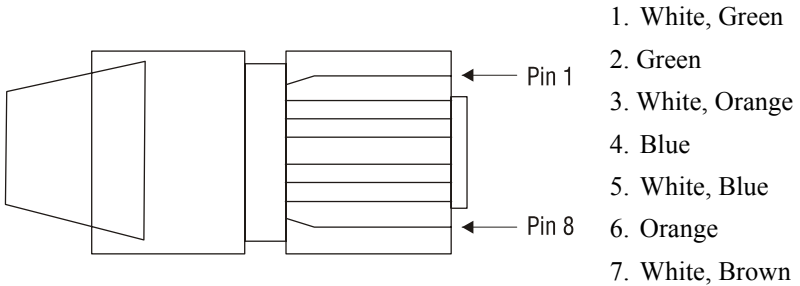


Figure A.2: EIA/TIA-568B