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Simply connecting the (IP) world

*AT-8412/SC FX*  
*AT-8412/MT FX*

*Line Card*

*Installation Guide*

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# ***Electrical Safety and Emission Compliance Statement***

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**Standards:** This product meets the following standards when installed in compliant host equipment.

## **U.S. Federal Communications Commission**

### **Radiated Energy**

Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of 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 this 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.


Note: Modifications or changes not expressly approved by the manufacturer or the FCC can void your right to operate this equipment.

## **Industry Canada**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### **RFI Emission**

FCC Class A  
EN55022 Class A  
VCCI Class A  
C-TICK  1



**Warning:** In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

⌘ 2

**Immunity** EN55024 ⌘ 3

**Electrical Safety** UL60950 (cUL<sub>us</sub>)  
EN60950 (TUV)  
EN60825

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### **Note**

For language translations of this safety information, see the Electrical Safety and Emission Compliance Statement in the **AT-8400 Series Switch Reference Guide**.

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# ***Table of Contents***

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<b>Electrical Safety and Emission Compliance Statement</b> .....	iii
<b>Welcome to Allied Telesyn</b> .....	vii
Related Documents .....	viii
Document Conventions .....	viii
Contacting Allied Telesyn .....	ix
Online Support .....	ix
E-mail and Telephone Support.....	x
Returning Products .....	x
For Sales or Corporate Information .....	x
<b>Chapter 1</b>	
<b>Overview</b> .....	1
Status LEDs .....	3
<b>Chapter 2</b>	
<b>Installation and Removal</b> .....	5
Verifying the Package Contents .....	5
Installing an AT-8412 Line Card .....	5
Removing an AT-8412 Line Card .....	16
Warranty Registration .....	21

### **Chapter 3**

<b>Troubleshooting</b> .....	23
<b>Technical Specifications</b> .....	25
Agency Certifications .....	25
<b>Port Specifications and Cabling</b> .....	27
Port Specifications .....	27
Cable Specifications.....	28

# ***Welcome to Allied Telesyn***

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This guide provides a comprehensive description of the AT-8412/SC FX and AT-8412/MT FX line cards.

The following topics are covered:

- ❑ “Overview” on page 1
- ❑ “Installation and Removal” on page 5
- ❑ “Troubleshooting” on page 23
- ❑ “Technical Specifications” on page 25
- ❑ “Port Specifications and Cabling” on page 27

## Related Documents

The Allied Telesyn web site at [www.alliedtelesyn.com](http://www.alliedtelesyn.com) offers you an easy way to access the most recent documentation, software, and technical information for all of our products. For details on the features and functions of your Allied Telesyn AT-8400 chassis and for instructions on how to manage the chassis and line cards, refer to the following manuals from our web site:

- ❑ **AT-8400 Series Switch Reference Guide**  
PN 613-50399-00
- ❑ **AT-S60 Management Software User's Guide**  
PN 613-50400-00
- ❑ **AT-S60 Management Software Command Line User's Guide**  
PN 613-50401-00

## Document Conventions

This guide uses the following conventions:

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### Note

A note provides additional information.

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**Caution**

Caution informs you that performing or omitting a specific action may result in equipment damage or loss of data.

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**Warning**

Warnings informs you that performing or omitting a specific action may result in bodily injury.

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## Contacting Allied Telesyn

This section provides Allied Telesyn contact information for technical support as well as sales or corporate information.

### Online Support

You can request technical support online by accessing the Allied Telesyn Knowledge Base from the following web site:

**<http://kb.alliedtelesyn.com>.**

You can use the Knowledge Base to submit questions to our technical support staff and review answers to previously asked questions.

Welcome to Allied Telesyn

## **E-mail and Telephone Support**

For Technical Support via e-mail or telephone, refer to the Support & Services section of the Allied Telesyn web site:

**<http://www.alliedtelesyn.com>**.

## **Returning Products**

Products for return or repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to Allied Telesyn without a RMA number will be returned to the sender at the sender's expense.

To obtain a RMA number, contact Allied Telesyn's Technical Support at our web site: **<http://www.alliedtelesyn.com>**.

## **For Sales or Corporate Information**

You can contact Allied Telesyn for sales or corporate information at our web site:

**<http://www.alliedtelesyn.com>**.

To find the contact information for your country, select **Contact Us** then **Worldwide Contacts**.

# ***Chapter 1***

## ***Overview***

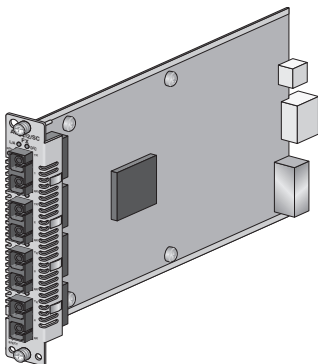
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The AT-8412/SC FX and AT-8412/MT FX line cards are

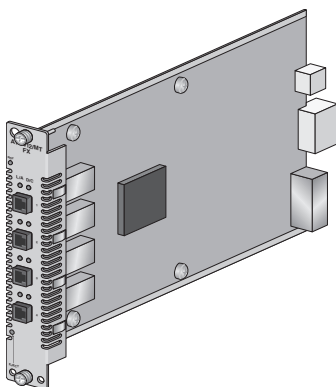
Ethernet line cards designed for the AT-8400 chassis. Both line cards have four fiber optic 100Base-FX ports which can operate in either half- or full-duplex mode.

The line cards can be installed in slots 1 through 12 on the front of the chassis. Both AT-8412 line cards can be installed without having to power down the chassis. You can install a maximum of 12 AT-8412 line cards in an AT-8400 chassis.

The AT-8412/SC has four dual SC connectors. See Figure 1 on page 2. The AT-8412/MT has four MT-RJ connectors. See Figure 2 on page 2.



**Figure 1.** AT-8412/SC FX Line Card



**Figure 2.** AT-8412/MT FX Line Card

## Status LEDs

The AT-8412 line cards have port LEDs which display link and activity status about each fiber port. See Table 1 for LED information.

**Table 1:** AT-8412/ST and AT-8412/SC LEDs

LED	State	Description
RDY	Steady Green	Indicates line card is receiving power and is ready to forward traffic.
L/A	Steady Green	The port has established a valid link with the end node.
	Flashing Green	The port is transmitting and/or receiving data.
	Off	The port has not established a valid link with the end node.

<b>LED</b>	<b>State</b>	<b>Description</b>
D/C	Steady Green	The port is operating at 100 Mbps in full duplex.
	Flashing Green	The port is operating at 100 Mbps in half duplex and experiencing data collisions.
	Off	The port is operating at 100 Mbps in half duplex without data collisions.

## ***Chapter 2***

# ***Installation and Removal***

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This chapter contains the procedures for installing and removing AT-8412/SC FX and AT-8412/MT FX line cards.

### **Verifying the Package Contents**

Make sure the following items are included in your line card package. If any item is missing or damaged, contact your Allied Telesyn sales representative for assistance.

- One AT-8412/SC FX or AT-8412/MT FX line card
- Installation Guide
- Warranty Card

### **Installing an AT-8412 Line Card**

This section describes how to install either an AT-8412/SC FX or an AT-8412/MT EX line card into an AT-8400 chassis. If you are replacing a line card, refer to the “Removing an AT-8412 Line Card” on page 16 for instructions on how to remove the line card.

You can install an AT-8412 line card whether the chassis is powered on or powered off. The following procedure assumes that the chassis is powered on and that you are removing an attached faceplate.



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**Caution**

Before installing an AT-8412 line card, refer to the *AT-8400 Series Switch Reference Guide* for electrical safety information.

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To install an AT-8412 line card, perform the following procedure:

1. Select a slot in the AT-8400 chassis where you will install the Ethernet line card. You can install the line card in any slot marked 1 through 12.



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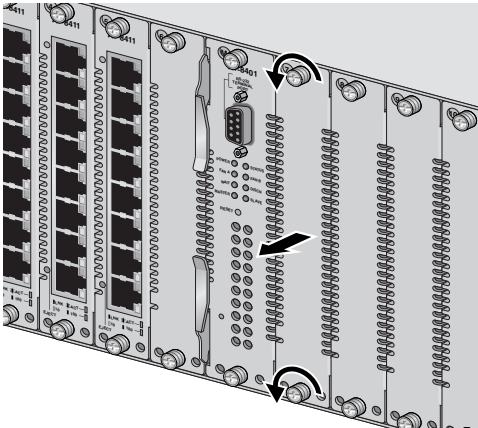
**Caution**

Do not install a line card in Slot M. Slot M is reserved for the AT-8401 Management Fabric Card.

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2. Use a Phillips screwdriver to loosen the two installation screws on the faceplate. See Figure 3 below.



**Figure 3.** Removing a Blank Faceplate

3. Remove the faceplate from the slot.

Keep the faceplate in a safe area in case you need to cover the slot. The faceplate keeps dust from getting into the switch and maintains proper airflow.

4. Examine the WAIT/REMOVE LED on the AT-8401 management card. See Figure 4 below. If the LED is a steady amber, you cannot safely install a line card. Wait approximately 20 seconds and the WAIT/REMOVE LED will turn a steady green. When the WAIT/REMOVE LED is a steady green, it is safe to install a line card.

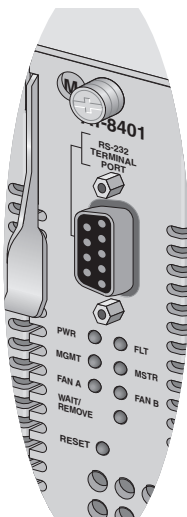


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### Caution

If the WAIT/REMOVE LED is a steady amber, it is not safe to install a line card.

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**Figure 4.** AT-8401 Management Card LEDs

5. Unpack the line card from its shipping container, and store all packaging material in a safe location.



**Caution**

Observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the chassis device. Line cards can be damaged by static electricity.

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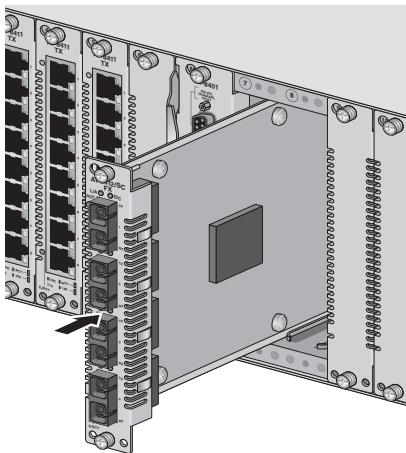
**Note**

Keep all shipping material. You must use the original shipping material if you need to return the line card to Allied Telesyn.

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6. Verify that the line card package includes all the items previously listed in “Verifying the Package Contents” on page 5. If any item is missing or damaged, contact your Allied Telesyn sales representative for assistance.

7. Align the edge of the line card with the top and bottom guide rails before carefully sliding the line card into the slot. See Figure 5 below. Keep sliding the line card forward into the slot until the faceplate is flush with the front of the chassis. Avoid touching the line card components.



**Figure 5.** Installing an AT-8412 Line Card

- Secure the Ethernet line card to the chassis by using a Phillips screwdriver to tighten the two installation screws on the line card faceplate.

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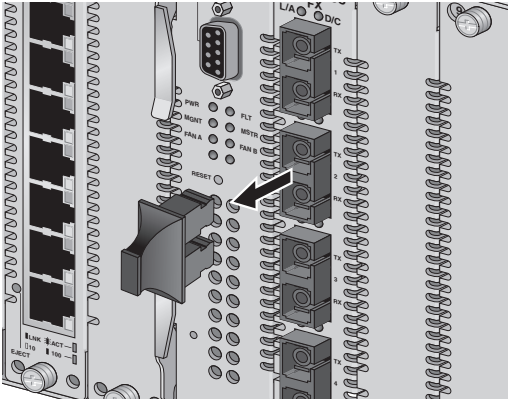
**Note**

Always use the installation screws to secure the line card to the switch. Leaving a line card partially seated may cause the system to halt and subsequently crash.

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- Remove the dust caps from the AT-8412 line card. Perform this step if you purchased an AT-8412/SC FX line card. (See Figure 6 on page 12.) Or, see step 10 to remove a dust cap from an AT-8412/MT FX line card.

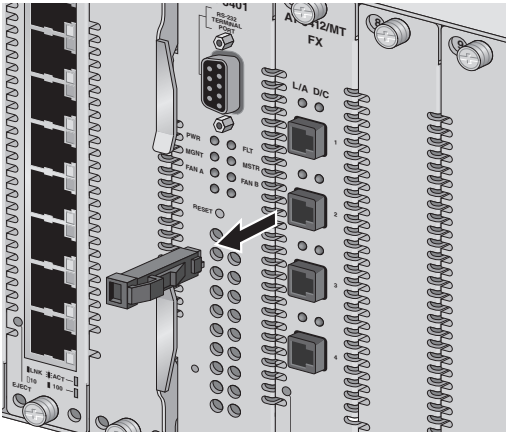
Store the dust caps with your line card shipping material in case the line card is removed from the chassis in the future.



**Figure 6.** Removing an SC Port Dust Cap

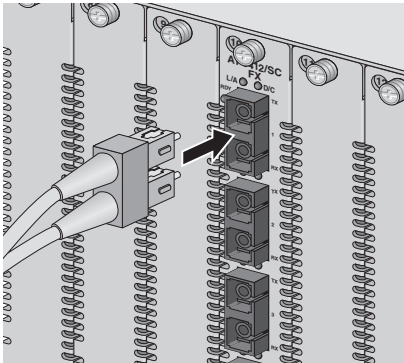
10. Remove the dust caps from the AT-8412/MT FX ports. See Figure 7 on page 13.

Store the dust caps with your line card shipping material in case the line card is removed from the chassis in the future.



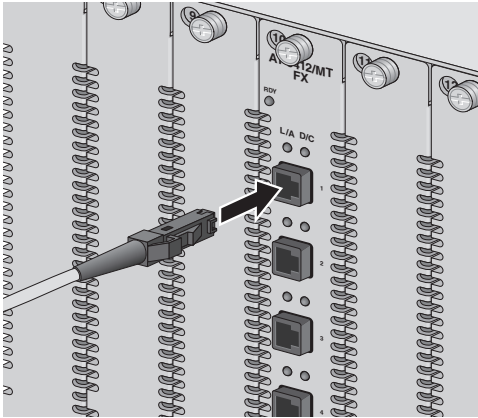
**Figure 7.** Removing an MT Port Dust Cap

11. Connect a fiber optic cable to your AT-8412 line card. See Figure 8 below for an illustration of how to connect a fiber optic cable to the AT-8412/SC FX. Or, see Figure 9 on page 15 for an illustration of how to connect a fiber optic cable to an AT-8412/MT FX.



**Figure 8.** Connecting Fiber Optic Cable to an AT-8412/SC FX Line Card





**Figure 9.** Connecting Fiber Optic Cable to an AT-8412/MT FX Line Card

12. Power on the end node.
13. Make sure the appropriate LEDs on the front of the line card are lit.

See "Status LEDs on pages 2 - 4 for complete LED information.

## Removing an AT-8412 Line Card

This section explains how to remove an AT-8412 line card from the AT-8400 chassis. You can remove an AT-8412 line card when the AT-8400 is powered on.

An AT-8412 line card can be removed and replaced, or hotswapped, with another AT-8412 line card while the AT-8400 chassis is powered on. When you replace an AT-8412 line card, the software configuration for the line card is retained on the AT-8401 management card. For further information on the effects of hot swapping AT-8412 line cards, see the **AT-8400 Series Switch Reference Guide**.

Allied Telesyn recommends you cover the optic ports after you remove the fiber optic cables. As a result, you need the appropriate ST or SC dust caps to perform this procedure.



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### Caution

Replace line cards one at a time to avoid system malfunction.

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To remove an AT-8412 line card, perform the following procedure:

1. Select a line card to remove.

Use this procedure to remove a line card from slots 1 through 12.

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**Note**

Do not use this procedure to remove the AT-8401 management card from Slot M.

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2. Remove the fiber optic cable from the ports on the line card.
3. Replace the dust caps over the fiber optic ports.
4. Examine the LEDs on the AT-8401 management fabric card. See Figure 10 on page 18.

If the WAIT/REMOVE LED is a steady green, you can safely remove a line card from the chassis.

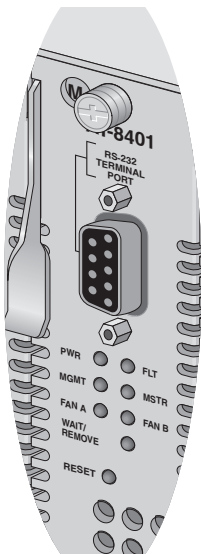


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**Caution**

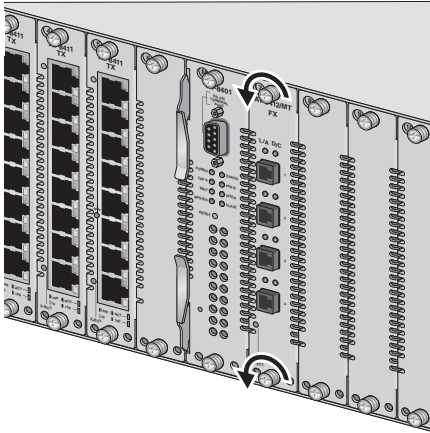
If the WAIT/REMOVE LED is a steady amber, it is not safe to remove a line card. You must wait approximately 20 seconds until the WAIT/REMOVE LED turns a steady green before you can safely remove a line card.

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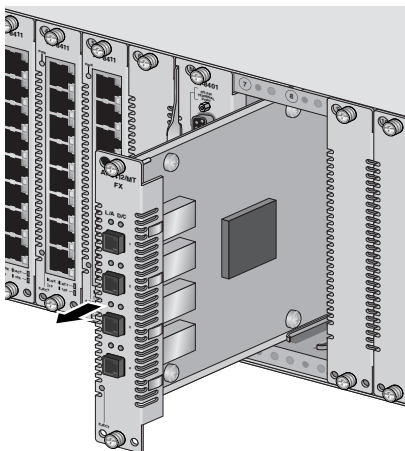
**Figure 10.** AT-8401 Management Card LEDs

- Using a Phillips screwdriver, loosen the two installation screws on the faceplate of the linecard. See Figure 11 below.



**Figure 11.** Loosening the Installation Screws

6. Pull the line card forward and remove it from the chassis. See Figure 12 below.



**Figure 12.** Removing an AT-8412 Line Card

Once you have removed the line card from the chassis, the WAIT/REMOVE LED on the AT-8401 management card turns a steady amber. Approximately 20 seconds later, the WAIT/REMOVE LED turns a steady green.



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**Caution**

Observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the chassis device. Store the removed line card in an antistatic bag, or immediately install the card in another slot. Line cards can be damaged by static electricity.

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7. When the WAIT/REMOVE LED is a steady green, you must install either a blank faceplate or another line card into the empty slot.

The faceplate keeps dust from getting into the chassis and maintains proper airflow.

To install a line card, see “Installing an AT-8412 Line Card” on page 5.

## Warranty Registration

When you have finished installing the product, register your product by completing the enclosed warranty card and sending it in. You can also fill out the registration online by selecting “Warranties” under “Support & Services” from **[www.alliedtelesyn.com](http://www.alliedtelesyn.com)**.





## ***Chapter 3***

# ***Troubleshooting***

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Follow the guidelines below to test and troubleshoot your AT-8412 line card in the event a problem occurs.

If the LINK/ACT (L/A) LED is off, do the following:

- Check that the line card is securely seated in the chassis.
- Check that the chassis is receiving power.
- Try installing the line card in another slot. You can install an AT-8412 line card in slots 1 through 12.
- Check that there is power to the end node.
- Check that the cable is securely connected to the ports on the line card and on the end node.
- Check that the appropriate type of fiber optic cable is connected to the port. See “Installing an AT-8412 Line Card” on page 5.
- Check that the maximum allowable loss budget has not been exceeded.

## Troubleshooting

The AT-8412/SC and AT-8412/MT line cards contain a D/C LED. Under normal operating conditions, the D/C LED is OFF when the port is operating in half-duplex mode. If this LED is OFF and there is a communication problem with the end nodes, it may be that the two sides are working in half-duplex mode and data collisions are not occurring. Check that the end nodes are operating in the same duplex mode.

If you are still experiencing problems after using the troubleshooting information in this chapter, refer to “Contacting Allied Telesyn” on page ix.

# ***Appendix A***

## ***Technical Specifications***

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### **Maximum Operating Temperature:**

0° C to 40° C (32° F to 104° F)

### **Maximum Storage Temperature:**

-20° C to 80° C (-4° F to 176° F)

### **Operating and Storage Altitude:**

Up to 3,048 meters (10,000 feet)

### **Relative Humidity Operating and Storage:**

5% to 80% (non-condensing)

## **Agency Certifications**

### **RFI Emission**

FCC Class A,  
EN55022 Class A,  
VCCI Class A,  
C-TICK

### **Immunity**

EN55024

### **Electrical Safety**

EN60825  
EN60950 (TUV)  
UL60950 (UL/cUL)



## ***Appendix B***

# ***Port Specifications and Cabling***

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This appendix provides port specifications and cabling information for the AT-8412/SC FX and AT-8412/MT FX line cards.

### **Port Specifications**

The following table lists the fiber optic port specifications for the AT-8412 line cards.

**Table 2:** Port Specifications

<b>Pin</b>	<b>Signal</b>
Standard	100Base-FX
Transmitter Output Power	50/125 m cabling Minimum: -22.5 dBm average Maximum: -14 dBm average  62.5/125 m cabling Minimum: -19 dBm average Maximum: -14 dBm average

<b>Pin</b>	<b>Signal</b>
Receiver Sensitivity	Minimum: -31dBm average Maximum: -14 dBm average

### **Cable Specifications**

The following table contains the cabling specifications for the AT-8412 ports. The ports can use either 50/125 or 62.5/125 micron multimode fiber optic cable. The operating wavelength is 1310 nm.

**Table 3:** Cable Specifications

<b>Speed</b>	<b>Type of Cable</b>	<b>Maximum Distance</b>
100 Mbps	62.5/125, fiber optic in full-duplex mode	2 km (1.25 mi.)
100 Mbps	62.5/125, fiber optic in half-duplex mode	300 m (984 ft.)

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#### **Note**

Do not use single-mode fiber optic cable with these ports.

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