CONVERTEON™ Family

Media Converter Line Cards

AT-CM20x Series
AT-CM212x/1 Series
AT-CM2K0S
AT-CV10x Series
AT-CV1KSS
AT-CM70S

Reference Guide

613-50581-00 Rev. D

Allied Telesis

Electrical Safety and Emissions Standards

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 of 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 Emissions	FCC Class A, EN55022 Class A, VCCI Class A, C-TICK, CE
	Immunity	EN55024
	Electrical Safety	EN60950-1 (TUV), UL 60950-1 ($_{C}UL_{US}$), CAN/CSA C22.2 No. 60950-1
⚠	Laser Safety	EN60825

Translated Safety Statements

Important: Appendix C contains translated safety statements for installing this equipment. When you see the ✍, go to Appendix C for the translated safety statement in your language.

Wichtig: Anhang C enthält übersetzte Sicherheitshinweise für die Installation dieses Geräts. Wenn Sie ✍ sehen, schlagen Sie in Anhang C den übersetzten Sicherheitshinweis in Ihrer Sprache nach.

Importante: El Apéndice C contiene mensajes de seguridad traducidos para la instalación de este equipo. Cuando vea el símbolo ✍, vaya al Apéndice C para ver el mensaje de seguridad traducido a su idioma.

Important : L'annexe C contient les instructions de sécurité relatives à l'installation de cet équipement. Lorsque vous voyez le symbole ✍, reportez-vous à l'annexe C pour consulter la traduction de ces instructions dans votre langue.

Importante: l'Appendice C contiene avvisi di sicurezza tradotti per l'installazione di questa apparecchiatura. Il simbolo ✍, indica di consultare l'Appendice C per l'avviso di sicurezza nella propria lingua.

Важно: Приложение C содержит переведенную инструкцию по безопасности при установке данного устройства. Если Вы встретите ✍, перейдите к Приложению C для получения переведенной инструкции по безопасности.

Contents

Figures

Tables

Preface

This guide contains instructions on how to install and configure the Converteon™ Series line cards in an AT-CV5000 Media Converter.

How This Guide is Organized

This guide contains the following chapters and appendices:

This preface contains the following sections:

Document Conventions

This document uses the following conventions:

Note
Notes provide additional information.

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

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

Where to Find Web-based Guides

The installation and user guides for all Allied Telesis products are available in portable document format (PDF) from the Allied Telesis web site at **www.alliedtelesis.com**. You can view the documents online or download them onto a local workstation or server.

Refer to following manuals for instructions on how to install one of the Converteon™ chassis or for description of the MissingLink™ and Smart MissingLink features. The manuals come with the chassis and are also available from the Allied Telesis web site:

- AT-CV5000 Media Converter Chassis Installation Guide
  PN 613-50580-00
- AT-CV1000 Media Converter Chassis Installation Guide
  PN 613-50582-00
- AT-CV1200 Media Converter Chassis Installation Guide
  PN 613-50583-00
- AT-S70 Management Software User's Guide
  PN 613-50485-00

Contacting Allied Telesis

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

Online Support

You can request technical support online by accessing the Allied Telesis Knowledge Base from the following web site: **http://www.alliedtelesis.com/support/kb.aspx**. You can use the Knowledge Base to submit questions to our technical support staff and review answers to previously asked questions.

Email and Telephone Support

For Technical Support via email or telephone, refer to the Allied Telesis web site: **http://www.alliedtelesis.com**. Select your country from the list displayed on the website. Then select the appropriate menu tab.

Returning Products

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

To obtain a RMA number, contact Allied Telesis' Technical Support at our web site: **http://www.alliedtelesis.com**. Select your country from the list displayed on the website. Then select the appropriate menu tab.

For Sales or Corporate Information

You can contact Allied Telesis for sales or corporate information at our web site: **http://www.alliedtelesis.com**. Select your country from the list displayed on the website. Then select the appropriate menu tab.

Obtaining Management Software Updates

New releases of management software for our managed products are available for download from either of the following Internet sites:

- Allied Telesis web site: **www.alliedtelesis.com**
- Allied Telesis FTP server: **ftp://ftp.alliedtelesis.com**

If you prefer to download new software from the Allied Telesis FTP server using your workstation's command prompt, you will need FTP client software and you must log in to the server. Enter "anonymous" as the user name and your email address for the password.

Chapter 1

Converteon™ Fast Ethernet and Gigabit Ethernet Line Cards

This chapter contains the following sections:

Overview

Table 1 lists the configurations of the line cards that are currently available to be used with any Converteon™ Media Converter Chassis.

Table 1. Basic Line Card Configurations

Line Card	Type of Port/Slot	Connector	Cable	Speed	Maximum Distance
AT-CM201	Fiber Optic	Dual ST	50/125 or 62.5/125 micron Multi-Mode [1]	100 Mbps	2 kilometers (1.24 miles)
	Copper	RJ-45	Twisted-Pair	10 Mbps or 100 Mbps	100 meters (328 feet)
AT-CM202	Fiber Optic	Dual SC	50/125 or 62.5/125 micron Multi-Mode[1]	100 Mbps	2 kilometers (1.24 miles)
	Copper	RJ-45	Twisted-Pair	10 Mbps or 100 Mbps	100 meters (328 feet)
AT-CM202/1	Fiber Optic	Dual SC	9/125 micron Single-Mode[2]	100 Mbps	15 kilometers (9.4 miles)
	Copper	RJ-45	Twisted-Pair	10 Mbps or 100 Mbps	100 meters (328 feet)
AT-CM202/2	Fiber Optic	Dual SC	9/125 micron Single-Mode[2]	100 Mbps	40 kilometers (24.8 miles)
	Copper	RJ-45	Twisted-Pair	10 Mbps or 100 Mbps	100 meters (328 feet)
AT-CM2K0S	SFP	Varies by SFP transceiver	Varies by SFP transceiver[3]	1.25 Gbps	Varies by SFP transceiver
	Copper	RJ-45	Twisted-Pair	10 Mbps, 100 Mbps, or 1000 Mbps	100 meters (328 feet)
AT-CM212A/1 AT-CM212B/1	Fiber Optic	Simplex SC	9/125 micron Single-Mode[2]	100 Mbps	15 kilometers (9.4 miles)
	Copper	RJ-45	Twisted-pair	100 Mbps	100 meters (328 feet)

Table 1. Basic Line Card Configurations

Line Card	Type of Port/Slot	Connector	Cable	Speed	Maximum Distance
AT-CV101	Fiber Optic	Dual ST	50/125 or 62.5/125 micron Multi-Mode[1]	100 Mbps	2 kilometers (1.24 miles)
	Copper	RJ-45	Twisted-Pair	100 Mbps	100 meters (328 feet)
AT-CV102	Fiber Optic	Dual SC	50/125 or 62.5/125 micron Multi-Mode [1]	100 Mbps	2 kilometers (1.24 miles)
	Copper	RJ-45	Twisted-pair	100 Mbps	100 meters (328 feet)
AT-CV102/1	Fiber Optic	Dual SC	9/125 micron Single-Mode[2]	100 Mbps	40 kilometers (24.8 miles)
	Copper	RJ-45	Twisted-pair	100 Mbps	100 meters (328 feet)
AT-CV102/2	Fiber Optic	Dual SC	9/125 micron Single-Mode[2]	100 Mbps	15 kilometers (9.4 miles)
	Copper	RJ-45	Twisted-pair	100 Mbps	100 meters (328 feet)
AT-CV1KSS	SFP	Varies by SFP transceiver	Varies by SFP transceiver[2]	1.25 Gbps	Varies by SFP transceiver
	SFP	Varies by SFP transceiver	Varies by SFP transceiver[3]	1.25 Gbps	Varies by SFP transceiver
AT-CM70S	SFP	Varies by SFP transceiver	Varies by SFP transceiver[3]	1.25 Gbps	Varies by SFP transceiver
	Copper	RJ-45	Twisted-Pair	10 Mbps or 100 Mbps	100 meters (328 feet)
	T1/E1	RJ-48	Twisted-Pair	n/a	n/a
	RS-232 Console	Mini-DIN	RS-232 Serial	n/a	n/a

1. Do not use single-mode fiber optic cable with these ports.
2. SFP transceiver sold separately.

Line Card Descriptions

AT-CM20x Series

The AT-CM20x Series line cards are 10/100 Mbps copper-to-fiber media converter line cards. These line cards can be installed in any of the Converteon™ Media Converter chassis, including the AT-CV5000, AT-CV1000, and AT-CV1200. Each line card features one fiber optic port and one copper twisted pair port. The fiber optic port operates at a fixed operating speed of 100 megabits per second (Mbps) and the twisted pair port operates at 10 or 100 Mbps speed. The fiber optic port is IEEE 802.3ah-compliant and has either a dual ST or a dual SC connector with a maximum operating distance from 2 kilometers (1.24 miles) to 40 kilometers (24.8 miles), depending on the model. The twisted pair port has an RJ-45 connector and a maximum operating distance of 100 meters (328 feet). Both ports feature half- or full-duplex mode operation. The line card is hot-swappable into and out of the chassis.

Each AT-CM20x Series line cards feature the following:

- One 100Base-FX fiber optic port with a dual ST or SC connector
  Refer to “100Base-FX Fiber Optic Ports” on page 27
- One 10/100Base-TX twisted pair port with an RJ-45 connector
  Refer to “10/100Base-TX Twisted Pair Ports” on page 29
- Port and system status LEDs
  Refer to “Fiber Optic Port LEDs” on page 38
- DIP switches
  Refer to “DIP Switches” on page 44

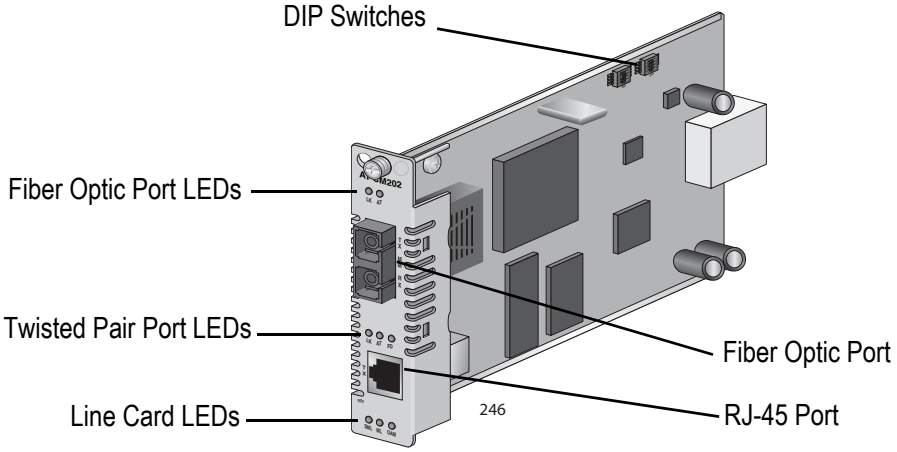

Figure 1. AT-CM202 Line Card

AT-CM212x/1 Series

The AT-CM212x/1 Series (AT-CM212A/1 and AT-CM212B/1) are 100 Mbps copper-to-fiber media converter line cards. The line card contains one fiber optic port and one copper twisted pair port. The fiber optic port operates at a fixed operating speed of 100 megabits per second (Mbps) and the twisted pair port operates at 10 or 100 Mbps speed. The fiber optic port is IEEE 802.3ah-compliant and has a simplex SC connector with a maximum operating distance of 15 kilometers (9.4 miles). The twisted pair port has an RJ-45 connection and a maximum operating distance of 100 meters (328 feet). Both ports feature half- or full-duplex mode operation. The line cards are hot-swappable into and out of the chassis.

Each AT-CM212x/1 Series line card features the following:

- One 100Base-FX fiber optic port with a simplex SC connector
  Refer to “100Base-FX Fiber Optic Ports” on page 27
- One 10/100Base-TX twisted pair port with an RJ-45 connector
  Refer to “10/100Base-TX Twisted Pair Ports” on page 29
- Port and system status LEDs
  Refer to “Fiber Optic Port LEDs” on page 38
- DIP switches
  Refer to “DIP Switches” on page 44

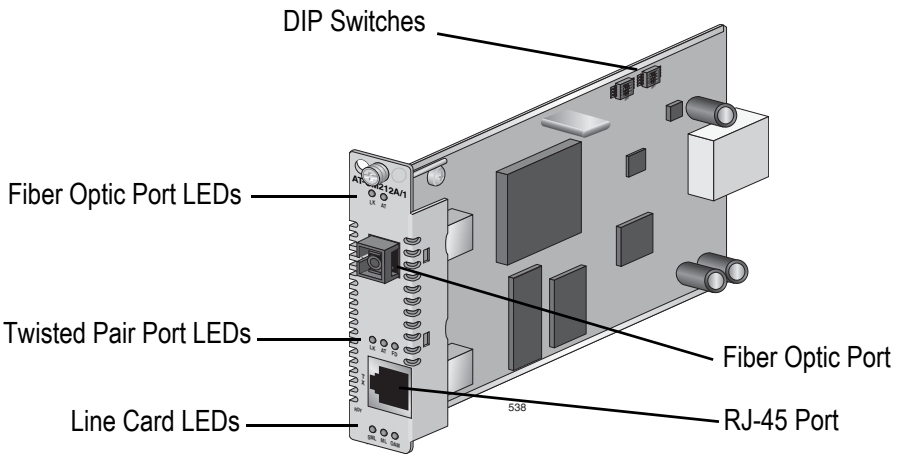

Figure 2. AT-CM212A/1 Line Card

AT-CM2K0S

The AT-CM2K0S is a Gigabit copper-to-fiber media converter line card. This line card can be installed in any of the Converteon™ Media Converter chassis, including the AT-CV5000, AT-CV1000, and AT-CV1200. The line card features one small form-factor pluggable (SFP) transceiver slot and one copper twisted pair port. The SFP slot can accommodate one SFP transceiver that operates at a fixed operating speed of one Gigabit. The twisted pair port has an RJ-45 connector with a maximum operating distance of 100 meters (328 feet) and operates at a speed of 10, 100, or 1000 megabits per second (Mbps). The line card is hot-swappable into and out of the chassis.

Each AT-CM2K0S line card features the following:

- One SFP slot (SFP transceiver sold separately)
  Refer to “SFP Expansion Slots” on page 35
- One 10/100/1000Base-T twisted pair port with an RJ-45 connector
  Refer to “10/100/1000Base-T Twisted Pair Ports” on page 31
- Port and system status LEDs
  Refer to “Fiber Optic Port LEDs” on page 38
- DIP switches
  Refer to “DIP Switches” on page 44

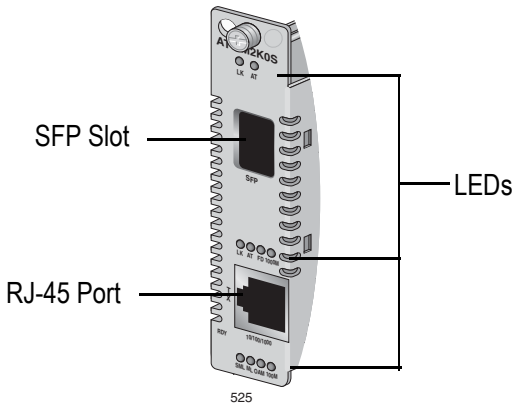

Figure 3. AT-CM2K0S Line Card

AT-CV10x Series

The AT-CV10x Series (AT-CV101, AT-CV102, AT-CV102/1, and AT-CV102/2) are 100 Mbps copper-to-fiber media converter line cards. The line card features one fiber optic port and one copper twisted pair port. Both ports operate at a fixed operating speed of 100 megabits per second (Mbps). The fiber optic port is IEEE 802.3ah-compliant and has either a dual ST or a dual SC connector with an operating distance of 2 kilometers (1.24 miles) to 40 kilometers (24.8 miles), depending on the model. The twisted pair port has an RJ-45 connection and a maximum operating distance of 100 meters (328 feet). Both ports feature half- or full-duplex mode operation. The line cards are hot-swappable into and out of the chassis.

Each AT-CV10x Series line card features the following:

- One 100Base-FX fiber optic port with a dual ST or a dual SC connector
  Refer to “100Base-FX Fiber Optic Ports” on page 27
- One 100Base-TX twisted pair port with an RJ-45 connector
  Refer to “100Base-FX Fiber Optic Ports” on page 27
- Port and system status LEDs
  Refer to “Fiber Optic Port LEDs” on page 38
- DIP switches
  Refer to “DIP Switches” on page 44

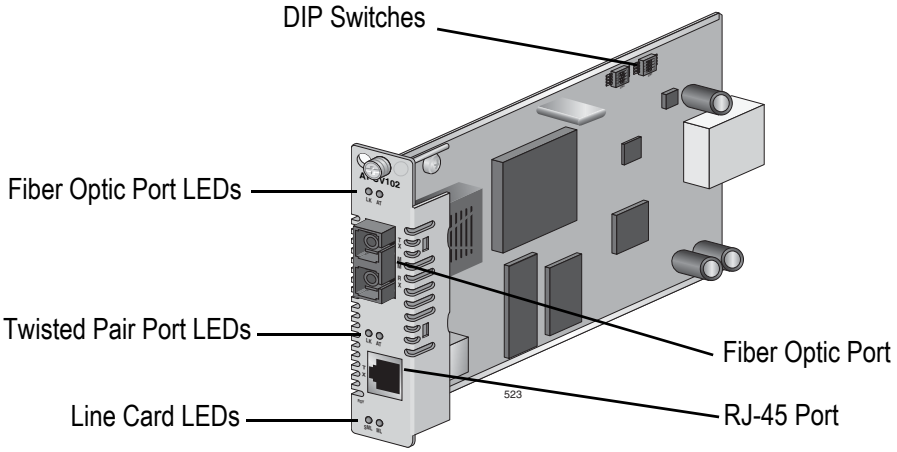

Figure 4. Sample of an AT-CV10x Series Line Card

Note

Restriction of Operation: While operating two AT-CV102 line cards back-to-back, where both cards are in SML mode, if the fiber connection between them is broken, remove the copper connection to one of the AT-CV102 cards before restoring the fiber link between them. Then wait at least 20 seconds before restoring the copper connection.

AT-CV1KSS

The AT-CV1KSS, shown in Figure 5, is a Gigabit fiber-to-fiber media converter line card used for Ethernet based networks. The line card features two small form-factor pluggable (SFP) transceiver slots. Each SFP slot can accommodate one SFP transceiver that operates at a fixed operating speed of one Gigabit. The line cards are hot-swappable into and out of the chassis.

Each AT-CV1KSS line card features the following:

- Two SFP expansion slots (SFP transceiver sold separately)
  Refer to “SFP Expansion Slots” on page 35
- Port and system status LEDs
  Refer to “Fiber Optic Port LEDs” on page 38
- DIP switches
  Refer to “DIP Switches” on page 44

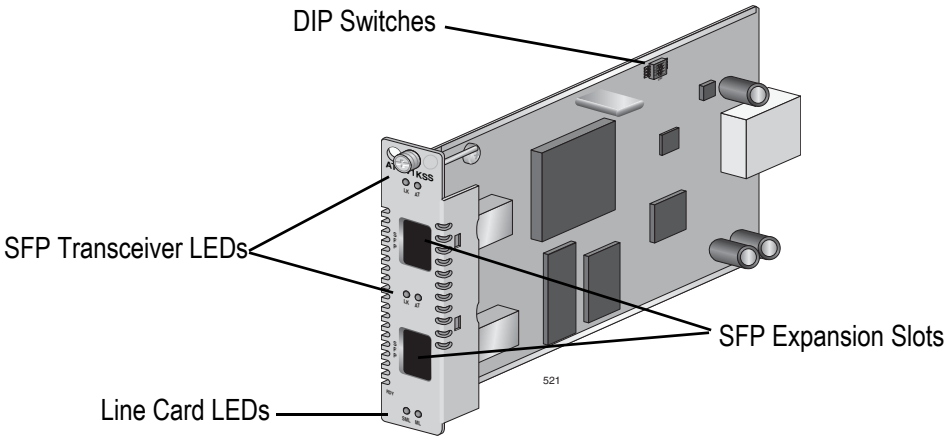

Figure 5. AT-CV1KSS Line Card

The AT-CV1KSS line card features two SFP slots. Each SFP slot can accommodate one fiber or one copper SFP transceiver that operates at a fixed operating speed of one Gigabit.

For proper operation in the MissingLink™ and Smart MissingLink mode configured with copper SFPs, the AT-CV1KSS requires to have copper SFP transceiver that supports LOS (RXLOS) signal.

(For a list of SFP transceivers that can be used with the AT-CV1KSS line card, refer to the Converteon™ Media Converter Line Cards Reference Guide.)

AT-CM70S

The AT-CM70S is a 10/100 Mbps Ethernet copper-to-fiber media converter line card with Time Division Multiplexing (TDM) (T1/E1) transport in addition to regular Ethernet traffic along with OAM link management capability. This line card offers support for 1.544 Mbps (T1) and 2.048 Mbps (E1) services - with complete synchronization for toll-quality transport of voice, video, and data. It also accommodates traditional testing equipment currently used on SONET/SDH equipment for testing T1/E1 services.

The AT-CM70S line card can be installed in the Converteon™ Media Converter chassis, either the AT-CV5000 or the AT-CV1200. The line card features one small form-factor pluggable (SFP) transceiver slot, one copper twisted pair port, four T1/E1 ports, and one console (Mini-DIN) port. The SFP slot can accommodate one SFP transceiver that operates at a fixed operating speed of 100 megabits per second (Mbps). The twisted pair port has an RJ-45 connector with a maximum operating distance of 100 meters (328 feet) and operates at a speed of 10 or 100 Mbps. The line card is hot-swappable into and out of the chassis.

Each AT-CM70S line card features the following:

- One RS-232 terminal port with an 8-pin Mini-DIN connector
  Refer to “8-Pin Mini-DIN Console Port Pinouts” on page 93
- One 10/100Base-TX twisted pair port with an RJ-45 connector
  Refer to “10/100Base-TX Twisted Pair Ports” on page 29
- One SFP expansion slots (SFP transceiver sold separately)
  Refer to “SFP Expansion Slots” on page 35
- Four T1/E1 ports with RJ-48 connectors
  Refer to “T1/E1 Port (AT-CM70S Line Cards Only)” on page 33
- Port and system status LEDs
  Refer to “Fiber Optic Port LEDs” on page 38
- DIP switches
  Refer to “DIP Switches” on page 44

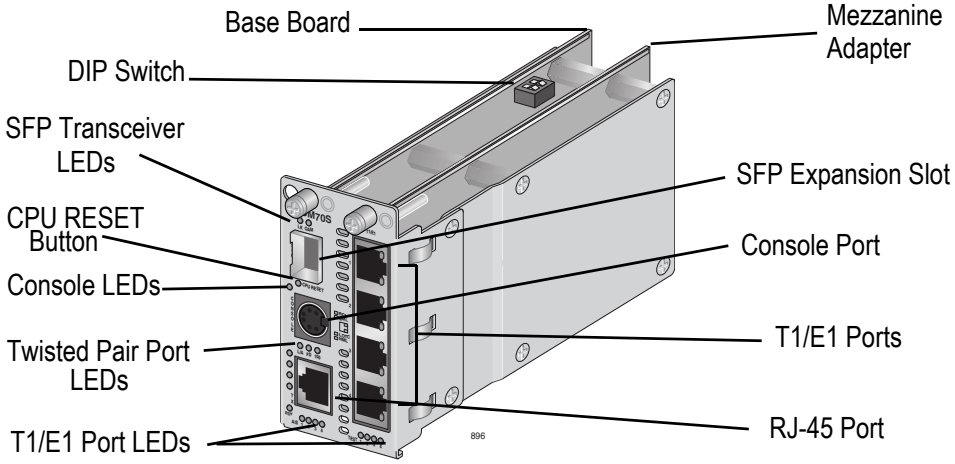

Figure 6. AT-CM70S Line Card

Hardware Features

The following sections describe these hardware features of the Converteon™ media converter line cards:

100Base-FX Fiber Optic Ports

The 100Base-FX fiber optic ports featured on the Converteon™ line cards are described below.

Type of Connector

The fiber optic ports on the Converteon™ line cards feature either a simplex SC, a dual SC, or a dual ST connector.

The connectors used on the line cards are listed as follows:

- Dual ST Connector – AT-CM201, AT-CV101
- Simplex SC Connector – AT-CM212x/1 Series
- Dual SC Connector – AT-CM202, AT-CV102, AT-CV102/x Series

Speed

The fiber optic ports are compliant with the 100Base-FX standard and have a fixed operating speed of 100 Mbps. The speed cannot be changed.

The ports can send and receive on the following wavelengths:

- AT-CM20x Series – TX/RX=1310 nm
- AT-CM212A/1 – TX=1310 nm and RX=1550 nm
- AT-CM212B/1 – TX=1550 nm and RX=1310 nm
- AT-CV10x Series –TX/RX=1310 nm

Duplex Mode

The fiber optic ports on the Converteon™ line cards can operate in either half- or full-duplex mode. You can set the duplex mode manually using the AT-S70 Management Software.

Maximum Distance

The maximum operating distances of the fiber optic ports are listed below:

- AT-CM202 – 2 kilometers (1.24 miles)
- AT-CM202/1 – 15 kilometers (9.4 miles)
- AT-CM202/2 – 40 kilometers (24.8 miles)
- AT-CM212x/1 – 15 kilometers (9.4 miles)
- AT-CV101 – 2 kilometers (1.24 miles)
- AT-CV102 – 2 kilometers (1.24 miles)
- AT-CV102/1 – 15 kilometers (9.4 miles)
- AT-CV102/2 – 40 kilometers (24.8 miles)

Type of Cable

The fiber optic ports on the Converteon™ line cards use either a single-mode (9/125 micron) or a multi-mode (50/125 or 62.5/125 micron) fiber optic cable.

- AT-CM202 – Multi-mode
- AT-CM202/1 – Single-mode
- AT-CM202/2 – Single-mode
- AT-CM212x/1 – Single-mode
- AT-CV101 – Multi-mode
- AT-CV102 – Multi-mode
- AT-CV102/1 – Multi-mode
- AT-CV102/2 – Multi-mode

10/100Base-TX Twisted Pair Ports

The 10/100Base-TX twisted pair ports featured on the Converteon™ line cards are described below.

Type of Connector

The 10/100Base-TX twisted pair ports feature 8-pin RJ-45 connectors. Only four of the pins are used when a port is operating at 10 or 100 Mbps. For the port pinouts, refer to “RJ-45 Twisted Pair Port Pinouts” on page 89.

Speed

The twisted pair ports are 10/100Base-TX compliant and are capable of both 10 megabits per second (Mbps) and 100 Mbps speeds. Since the ports are IEEE 802.3u Auto-Negotiation compliant, you can let the converter set the port’s speed automatically. With Auto-Negotiation, the converter automatically matches the highest possible common speed between the converter port and the end-node. For example, if an end-node is capable of only 10 Mbps, the converter sets the port connected to the end-node to 10 Mbps. Alternatively, you can set the port speed through the management software.

Note
Auto-Negotiation is activated as the default on the twisted pair port on the converter. To deactivate Auto-Negotiation and set the speeds manually, refer to the **AT-S70 Management Software User’s Guide**.

Duplex Mode

The10/100Base-TX twisted pair ports on a Converteon™ line cards can operate in either half- or full-duplex mode. The twisted pair ports are IEEE 802.3u-compliant and will Auto-Negotiate the duplex mode setting.

If desired, Auto-Negotiation on the converter ports can be disabled so that you can set the duplex mode manually through the converter’s AT-S70 management software.

Maximum Distance

The maximum operating distance of the 10/100Base-TX twisted pair ports is 100 meters (328 feet).

Type of Cable

For 10 Mbps, the port requires Category 3 or better (100 ohm shielded or unshielded) twisted pair cabling. For 100 or 1000 Mbps, the port requires Category 5 or Enhanced Category 5 (5E) (100 ohm shielded or unshielded) twisted pair cabling.

Auto MDI/ MDI-X

The 10/100Base-TX twisted pair ports are auto-MDI/MDI-X. They automatically configure themselves as either MDI or MDI-X, depending on the configuration of the port on the end node. This feature allows you to use either straight-through or crossover twisted pair cables to connect devices to the ports.

Note
The auto-MDI/MDI-X feature on a port is available only when the port is set to Auto-Negotiation. If you disable Auto-Negotiation and set a port's speed and duplex mode manually, the port defaults to MDI-X. For instructions on configuring a port, refer to the **AT-S70 Management Software User's Guide**.

Port Pinouts

For port pinouts when the port is operating at 10 or 100 Mbps in the MDI configuration, refer to Table 20 on page 89.

For port pinouts when the port is operating at 10 or 100 Mbps in the MDI-X configuration, refer to Table 21 on page 89.

10/100/1000Base-T Twisted Pair Ports

The 10/100/1000Base-T twisted pair ports featured on the Converteon™ line cards are described below.

Type of Connector

The ports have 8-pin RJ-45 connectors. The ports use four pins when operating at 10 or 100 Mbps and all eight pins when operating at 1000 Mbps.

Speed

The ports can operate at 10, 100, or 1000 Mbps. The speed is set automatically through Auto-Negotiation or you can set the speed to 10 or 100 Mbps manually through the management software.

> **Note**
> Auto-Negotiation is activated as the default on the twisted pair port on the converter. To deactivate Auto-Negotiation and set the speeds manually, refer to the **AT-S70 Management Software User's Guide**.

Duplex Mode

The10/100/1000Base-T twisted pair ports on a Converteon™ line cards can operate in either half- or full-duplex mode. The twisted pair ports are IEEE 802.3u-compliant and will Auto-Negotiate the duplex mode setting.

If desired, Auto-Negotiation on the converter ports can be disabled so that you can set the duplex mode manually through the converter's AT-S70 management software.

Maximum Distance

The10/100/1000Base-T twisted pair ports have a maximum operating distance of 100 meters (328 feet).

Type of Cable

For 10 Mbps, the port requires Category 3 or better 100 ohm shielded or unshielded twisted pair cabling. For 100 or 1000 Mbps operation, the ports require Category 5 or Enhanced Category 5 (5E) 100 ohm shielded or unshielded twisted pair cabling.

Auto-MDI/ MDI-X

The10/100/1000Base-T twisted pair ports are auto-MDI/MDI-X. They automatically configure themselves as either MDI or MDI-X. This feature allows you to use a straight-through twisted pair cable to connect any type of device to a port.

The auto-MDI/MDI-X feature on a 10/100/1000Base-T port is functional only when the port is set to Auto-Negotiation. If you disable Auto-Negotiation and set the port's speed and duplex mode manually, the port defaults to MDI-X. For instructions on configuring a port, refer to the AT-S70 Management Software User's Guides.

Port Pinouts

For the pinouts of these ports when operating at 10 or 100 Mbps, refer to Table 10 on page 82. For port pinouts when the ports are operating at 1000 Mbps, refer to Table 12 on page 84.

T1/E1 Port (AT-CM70S Line Cards Only)

The T1/E1 twisted pair ports featured on the AT-CM70S line cards are described below.

Type of Connector

The T1/E1 ports on the AT-CM70S line cards feature 8-pin RJ-48 connectors. For the port pinouts, refer to “RJ-48 T1/E1 Port Pinouts” on page 91.

Speed

The constant bit rate transport of full or fractional T1 frame is 1.544 Mbps. The constant bit rate transport of full or fractional E1 frame is 2.048 Mbps.

Type of Cable

The T1/E1 ports on the AT-CM70S line cards use the twisted pair cabling.

RS-232 Console Port (AT-CM70S Line Card Only)

You can use the console port on the AT-CM70S line card to establish a local (out-of-band) management session with the chassis to configure parameters and also view information about the operating of the system and line cards. You establish a local management session with the converter by connecting either a terminal, or a personal computer with a terminal emulation program, to the port.

Note
For more information how to start a management session, refer to the installation guide that comes with the chassis.

Note
If an AT-CM70S line card is used in an AT-CV5000 chassis, it can be managed either from its local console or from the console port on the AT-CV5M01 CPM module. However, if this line card is used in an AT-CV1200 chassis, it can only be managed from its local console, as there is no room for an AT-CV5M01 CPM module.

Type of Connector

The RS-232 console port on the AT-CM70S line card features 8-pin Mini-DIN connectors. For the port pinouts, refer to “8-Pin Mini-DIN Console Port Pinouts” on page 93.

Specifications

The console port has a Mini-DIN style connector and is set to the following specifications:

- Baud rate: 115200 bps
- Data bits: 8
- Parity: None
- Stop bits: 1

Type of Cable

The console port on the AT-CM70S line card use the RS-232 serial cable.

Note
You can use the AT-S70 management software to change the terminal port settings.

SFP Expansion Slots

The SFP expansion slots featured on the Converteon™ line cards are described below.

The SFP modules are a fast and easy way for you to add an 1000 Mbps fiber optic port. You can use the modules to extend the distance of your network, build a high-speed backbone network between devices, or connect additional end nodes to the network, such as high-speed servers.

Figure 7 shows an example of a fiber optic SFP transceiver module.

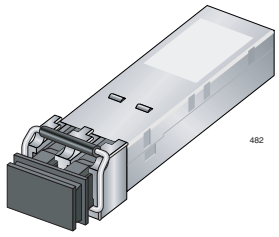

Figure 7. SFP Transceiver Module

Note
For a list of the SFP transceivers supported by the Converteon™ line cards, please refer to the Installation Guides shipped with the respective line cards.

SFP Transceivers Supported by AT-CV1KSS and AT-CM2K0S Line Cards

The AT-CV1KSS line card features two SFP slots. Each SFP slot can accommodate one fiber or one copper SFP transceiver that operates at a fixed operating speed of one Gigabit.

The AT-CM2K0S line card features one SFP slot that operates at a fixed operating speed of one Gigabit.

Line Card and Port Status LEDs

Line Card Status LEDs

The front panels of the Converteon™ line cards have different status LEDs, depending on the model. These LEDs display the status information of the line cards.

Table 2 lists the line card status LEDs, except for AT-CM70S line cards. For LEDs on the AT-CM70S line cards, refer to Table 3 on page 37.

For additional information on how the Link Test (LK), MissingLink (ML), and Smart MissingLink (SML) LEDs function on the Converteon™ line cards, refer to “Link Test, MissingLink™, and Smart MissingLink LED Functionalities” on page 98.

Table 2. Line Card Status LEDs

LED	State	Description
RDY	Green	The line card has passed diagnostics.
	OFF	The line card has failed diagnostics.
SML	Green	The Smart MissingLink mode on the line card is enabled.
	OFF	The Smart MissingLink mode on the line card is disabled.
ML	Green	The MissingLink™ mode on the line card is enabled.
	OFF	The MissingLink™ mode on the line card is disabled.
OAM[1]	Green	The OAM mode on the line card is enabled. The OAM mode setting is set by the DIP Switches. For more information, refer to Table 12, ”AT-CM20x Series and AT-CM212x/1 Series – Diagnostic Mode DIP Switch 1 Positions” on page 50.
	OFF	The OAM mode on the line card is disabled.

1. This LED does not display on the AT-CV Series line cards.

Table 3 lists the status LEDs on the AT-CM70S line card.

Table 3. AT-CM70S Line Card Status LEDs

LED	State	Description
RDY	Green	The line card has passed diagnostics.
	OFF	The line card has not passed diagnostics.
CONSOLE[1]	Green	The line card is managed from its local console.
	OFF	The line card is managed from the CPM module located on the chassis.

1. This LED only works when the AT-CM70S line card is used in the AT-CV5000 chasis.

Fiber Optic Port LEDs

Table 4 lists the fiber optic port LEDs, except for AT-CM70S line card. For LEDs on the AT-CM70S line card, refer to Table 5.

Table 4. Line Card Fiber Optic Port LEDs

LED	State	Description
LK	Green	Link established on the fiber optic port.
	Blinking Green	While in Smart MissingLink mode, a valid connection is established on the port while a link on the other port is lost.
	OFF	No link established on the fiber optic port.
AT	Blinking Green	TX/RX activity detected on the fiber optic port.
	OFF	No activity detected on the fiber optic port.

Table 5 lists the fiber optic port LEDs on the AT-CM70S line card.

Table 5. AT-CM70S - Fiber Optic Port LEDs

LED	State	Description
LK	Green	Link established on the fiber optic port.
	OFF	No link established on the fiber optic port.
OAM	Green	The OAM mode is enabled (visible or bypass) and can be set by the the DIP switches.
	OFF	The OAM mode is disabled.

Twisted Pair Port LEDs

Table 6 lists the twisted pair port LEDs, except for AT-CM70S line card. For LEDs on the AT-CM70S line card, refer to Table 7.

Table 6. Line Card Twisted Pair Port LEDs

LED	State	Description
LK	Green	Link established on the port.
	OFF	No link established on the port.
AT	Blinking Green	TX/RX activity detected on the port.
	OFF	No activity detected on the port.
FD[1]	Green	The TX port is operating in full-duplex mode.
	OFF	The TX port is operating in half-duplex mode.
100M[2]	Green	The port is operating at 100 Mbps.
	OFF[3]	The TX port is operating at 10 Mbps.
1000M[2]	Green	The TX port is operating at 1 Gigabit.
	OFF[3]	The TX port is operating at 10 Mbps.

1. This LED does not display on the AT-CV Series line cards.
2. These LEDs only display on the AT-CM2K0S line card.
3. When both 100M and 1000M LEDs are off, the port is operating at 10 Mbps.

Table 7 lists the twisted pair port LEDs on the AT-CM70S line card.

Table 7. AT-CM70S - Twisted Pair Port LEDs

LED	State	Description
L/A	Green	The TX port has established a valid link.
	Blinking Green	The TX port has detected TX/RX activity.
FD	Green	The TX port is operating in full-duplex mode.
	OFF	The TX port is operating in half-duplex mode (intermittently ON when there is collision).

Table 7. AT-CM70S - Twisted Pair Port LEDs

LED	State	Description
100	Green	The TX port is operating at 100 Mbps speed.
	OFF	The TX port is operating at 10 Mbps speed.

T1/E1 Port LEDs

Table 9 lists the T1/E1 surface-mount diagnostic LED's provisioned on the Mezzanine Adapter and are viewable through the line card front panel.

Table 8. T1/E1 Port LEDs

LED	State	Description
RCL [1 to 4]	Amber	Receive Carrier Loss occurred on the T1/E1 port.
	Green	The T1/E1 port is operating normally (NML) and has no Receive Carrier Loss.
LOTC [1 to 4]	Amber	Loss of Transmit Clock occurred on the T1/E1 port.
	Green	The T1/E1 port is operating normally (NML) and has no Loss of Transmit Clock.
AIS [1 to 4]	Amber	The T1/E1 has received Unframed All Ones.
	OFF	The T1/E1 port is operating normally (NML) and no AIS received.
TEST [1 to 4]	Green	T1/E1 port is synchronized to PRBS test stream: 2^{15}-1 (E1) or QRSS (T1).
	OFF	PRBS test stream not detected on the T1/E1 port.

Serial Port LEDs

Table 9 lists the serial port LED's provisioned on the Mezzanine Adapter and are viewable through the line card front panel.

LED	Color	Description
SER MODE [1 to 4]	Green	The serial port is operating in RS-232 mode.
	OFF	The serial port is operating in RS-422/485 mode.
SER ACT [1 to 4]	Green	The serial port has established a valid link.
	OFF	The serial port has detected TX/RX activity.

SFP Transceiver LEDs

Table 9 lists the SFP transceiver LEDs, except for AT-CM70S line cards. For LEDs on the AT-CM70S line cards, refer to Table 10.

Table 9. SFP Transceiver LEDs

LED	State	Description
LK	Green	Link established on the port.
	OFF	No link established on the port.
AT	Blinking Green	TX/RX activity detected on the port.
	OFF	No activity detected on the port.

Table 10 lists the SFP transceiver LEDs on the AT-CM70S line card.

Table 10. AT-CM70S - SFP Transceiver LEDs

LED	State	Description
LK	Green	Link established on the port.
	OFF	No link established on the port.
OAM	Green	The OAM mode is enabled (visible or bypass) and can be set by the the DIP switches.
	OFF	The OAM mode is disabled.

DIP Switches

Some of the Converteon™ line cards support the following features by configuring their DIP switches:

- Link Test
- MissingLink™ Mode
- Smart MissingLink Mode
- OAM Capability

> **Note**
> For additional information on how the Link Test (LK), MissingLink (ML), and Smart MissingLink (SML) LEDs function on the Converteon™ line cards, refer to “Link Test, MissingLink™, and Smart MissingLink LED Functionalities” on page 98.

Link Test

The link test is a fast and easy way for you to test the connections between the converter ports and the end-nodes that are connected to the ports. If a network problem occurs, you can perform a link test to determine which port is experiencing a problem, and so be able to focus your troubleshooting efforts on the cable and end-node where the problem resides.

The LK LED for the twisted pair port should be green, indicating that it was able to establish a link with its end-nodes. If the LK LED is off, the port could not establish a link. Refer to “Troubleshooting” on page 83 for suggestions on how to remedy the problem.

For more information on how the LK LED functions, refer to “Link Test, MissingLink™, and Smart MissingLink LED Functionalities” on page 98.

Performing a link test does not interfere with a converter’s ability to pass network traffic.

MissingLink™

The MissingLink™ feature enables the ports on the media converter to pass the “Link” status of their connections to each other. When the media converter detects a problem on one of the ports, such as the loss of connection to an end-node, the media converter shuts down the connection to the other port, thus notifying the end-node that the connection has been lost.

For more information on how the ML LED functions, refer to “Link Test, MissingLink™, and Smart MissingLink LED Functionalities” on page 98.

For example, if the twisted pair cable to the 10/100Base-TX port on the media converter were to fail, the unit would respond by dropping the link

on the 100Base-FX fiber optic port. In this way, the media converter notifies the end-node connected to the fiber optic port that the connection on the twisted pair port has been lost. If the failure had started with the fiber optic cabling, the unit would drop the link to the twisted pair port.

The value to this type of network monitoring and fault notification is that some devices can be configured to take a specific action in the event of the loss of connection on a port. In some cases, the unit can be configured to seek a redundant path to a disconnected end-node or send out a trap to a network management station, and so alert the network administrator of the problem.

Smart MissingLink

The Smart MissingLink feature performs exactly the same function as MissingLink™ with one additional feature. When a link is lost on a port, the LK LED of the port that still has a valid connection to its end-node starts to blink. This allows you to quickly determine which port still has a valid connection (LK LED blinking) and which port has lost its connection (LK LED Off).

For more information on how the SML LED functions, refer to “Link Test, MissingLink™, and Smart MissingLink LED Functionalities” on page 98.

For example, if the network twisted pair cable to the 10/100Base-TX port on the media converter fails, the LK LED on the 100Base-FX fiber optic port blinks, indicating a failed connection on the twisted pair port. If the failure starts with the fiber optic cabling, the LK LED on the twisted pair port blinks.

The value to this type of network monitoring and fault notification is so that you can quickly see which port has failed and troubleshoot your network accordingly.

OAM Overview

OAM refers to the tools and utilities to install, monitor, test, and trouble-shoot a network, helping carriers run their networks more efficiently. Without management features to monitor and troubleshoot the network, it is rather expensive and time consuming to have the problems diagnosed and resolved by having the technicians coming out to the location.

In the enterprise, Ethernet links and networks have been managed via SNMP. Although SNMP provides a very flexible management solution, it is not always efficient and is sometimes inadequate to the task. First, using SNMP assumes that the underlying network is operational because SNMP relies on IP connectivity; however, you need management functionality even more when the underlying network is non-operational. Second, SNMP assumes every station is IP accessible. This requires provisioning IP on every station and instituting an IP overlay network even if the ultimate end-user service is an Ethernet service. This is impractical in a carrier environment.

For these reasons, carriers look for management capabilities at every layer of the network. The Ethernet layer has not traditionally offered inherent management capabilities, so the 802.3ah OAM capabilities act as a first step at providing them. 802.3ah OAM is applicable to the following Ethernet in the First Mile (EFM) technologies:

- Ethernet in the First Mile over Copper (EFMC)
- Ethernet in the First Mile over Fiber (EFMF)
- Ethernet in the First Mile using Passive Optical Networks (EPON)

Note
Note that these capabilities are not intended to replace SNMP as a management utilities, but are there to enhance it.

Network operators have the freedom to choose and mix the three EFM topologies (copper, fiber, or passive optical networking) based on their business models, network architectures, and subscriber needs. They can configure and upgrade their access networks with multiple EFM topologies and manage them with a common set of tools and OAM procedures.

Additionally, EFM OAM is backwards compatible with any existing full-duplex Ethernet technology, and can be implemented on non-EFM Ethernet links. This compatibility was facilitated by the decision to use standard Ethernet frames as the transport mechanism for management information.

OAM Main Features

Although EFM OAM is compatible with any Ethernet technology and can be used on even small campus networks, it is geared towards reducing expenditures for first mile operators. The OAM work of the IEEE 802.3ah task force addresses three key operational issues when deploying Ethernet across geographically disparate locations: *link performance monitoring*, *fault detection and fault signaling*, and *loopback testing*.

- Link Performance Monitoring – Introduces some basic error definitions for Ethernet so entities can detect failed and degraded connections.
- Fault Detection and Fault Signaling – Provides mechanisms for one entity to signal another that it has detected an error.
- Loopback Testing – Is often used to troubleshoot networks, allows one station to put the other station into a state whereby all inbound traffic is immediately reflected back onto the link.

OAM Protocol

The operation of OAM on an Ethernet interface does not adversely affect data traffic as OAM is a slow protocol with very limited bandwidth potential, and it is not required for normal link operation. This slow protocol can be implemented in hardware or software, ensuring media independence. By utilizing the slow protocol MAC address, OAM frames are intercepted by the MAC sublayer and cannot propagate across multiple hops in an Ethernet network. This implementation assures that OAM Protocol Data Units (OAMPDUs) only affect the operation of the OAM protocol itself and not user data traffic.

OAMPDU Types

The architecture of the OAM protocol is based on OAMPDU, which are exchanged between two Ethernet ports. OAMPDUs are normal Ethernet frames that use a specific multicast destination address and EtherType.

Most of the OAMPDU types also define a set of standard type-length-value (TLV) encoding of attributes within the type.

- **Information OAMPDUs**
  Information OAMPDUs are used for discovery; they are variable-length OAMPDUs.

  The different TLVs for Information PDUs are Local Information, Remote Information, and Organizational Specific.

  Local and Remote Information is used in the discovery process. The Organizational Specific Information TLV is used for vendor extensions. It is encoded here because the source MAC address is not a simple indication of organization identification as many organizations have multiple OUIs assigned. The 32-bit vendor specific information is not defined and is used to encode the model or version of the platform. The platform identity held is intended to allow simple identification of the hardware device.
- **Event OAMPDUs**
  The data field in the Event OAMPDUs contains one or more link event TLVs. This variable-length PDU is used for link monitoring.
  The link event TLVs may be sent multiple times to increase the likelihood of reception (for example, in the case of high bit-errors). These TLVs may include a time reference when generated.
- **Loopback Control OAMPDUs**
  The Loopback Control OAMPDU provides the loopback command.
- Variable Request/Response OAMPDUs
  The variables accessible through OAM must be in the Ethernet branch of the MIB tree. The process of variable retrieval involves transferring Ethernet counters and statistics via Variable Containers/Descriptors.

- **Organizational Specific OAMPDUs**
  Organizations may define events that are of variable-length and are distinguish by the OUI. This is a variable-length TLV.
- **Unsupported OAMPDUs**
  Unknown/unsupported OAMPDUs are sent to the OAM Client. This is different from typical Ethernet (802.3x) behavior, which filtered unsupported opcodes.

OAM Discovery

Discovery is the first phase of the IEEE 802.3ah OAM protocol, and relies on what are termed information OAMPDUs. During discovery, information about OAM entities capabilities, configuration, and identity are exchanged.

The discovery process allows a local Data Terminating Entity (DTE) to detect OAM on a remote DTE. Once OAM support is detected, both ends of the link exchange state and configuration information (such as mode, PDU size, loopback support, etc.). If both DTEs are satisfied with the settings, OAM is enabled on the link. However, the loss of a link or a failure to receive OAMPDUs for five seconds may cause the discovery process to restart.

This is one important aspect of the IEEE 802.3ah OAM spec is that an OAM entity may be in either Active or Passive mode.

- **Active Mode** – Active-mode DTEs instigate OAM communications and can issue queries and commands to a remote station.
- **Passive Mode** – Passive-mode DTEs generally wait for the peer station to instigate OAM communications and respond to, but do not instigate, commands and queries.

By default, the card should come up in Passive mode for OAM discovery (as per the IEEE 802.3ah). In order to initiate OAM discovery, the card should change from Passive mode to Active mode by the CPM card within a chassis. Therefore, if a line card is in a chassis with no CPM card, it should come up in Passive mode.

The difference between the modes is that an active-mode station can exert more control on its peer than a passive-mode station. For example, an active-mode OAM entity can put a passive-mode OAM entity into loopback mode, but not vice versa.

Table 11 lists the OAM Active and OAM Passive mode behaviors.

Table 11. OAM Active and Passive Mode Behaviors

Capability	Active DTE	Passive DTE
Initiates OAM Discovery process	Yes	No
Reacts to OAM Discovery process initiation	Yes	Yes
Required to send Information OAMPDUs	Yes	Yes
Permitted to send Event Notification OAMPDUs	Yes	Yes
Permitted to send Variable Request OAMPDUs	Yes	No
Permitted to send Variable Response OAMPDUs	Yes*	Yes
Permitted to send Loopback Control OAMPDUs	Yes	No
Reacts to Loopback Control OAMPDUs	Yes*	Yes
Permitted to send Organization Specific OAMPDUs	Yes	Yes

* Requires the peer DTE to be in Active mode.

OAM Loopback

OAM provides a data link layer frame-level loopback mode, which is controlled remotely. Loopback is used to test the performance of a link. Statistics from both the local and remote station can be queried and compared at any time while the remote station is in OAM loopback mode. These queries can take place before, during, or after loopback frames have been sent to the remote station. In addition, an implementation may analyze loopback frames to determine additional information about the health of the link (in example, determine which frames are being dropped due to link errors).

The Converteon™ line cards feature one or two sets of DIP switches, depending on the model. The DIP switches are Diagnostic Mode and Port Configuration DIP switches.

- The Diagnostic Mode DIP switches are used to configure the diagnostic mode positions of the line card.
- The Port Configuration DIP switches are used to manually configure the operating characteristics of the twisted pair port.

AT-CM20x Series and AT-CM212x/1 Series Line Cards

The AT-CM20x Series line card, shown in Figure 8, and AT-CM2121x/1 Series line card, shown in Figure 9, feature both the Diagnostic Mode DIP Switch 1 and Port Configuration DIP Switch 2.

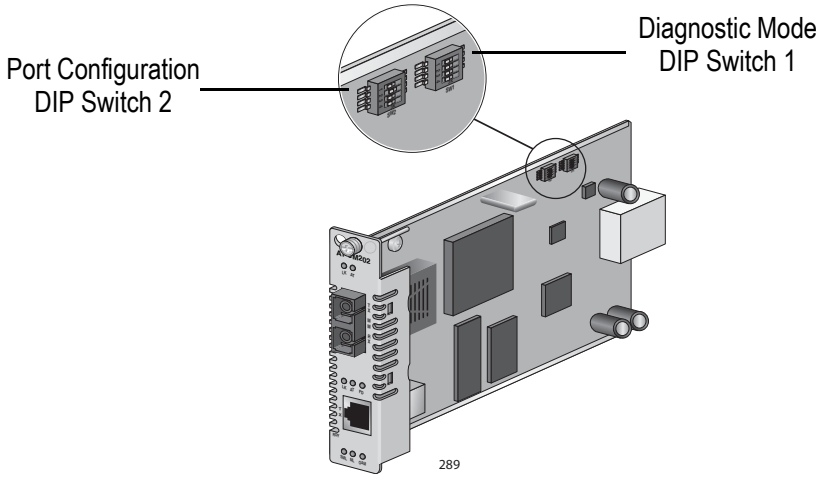

Figure 8. DIP Switches on an AT-CM20x Series Line Card (AT-CM202)

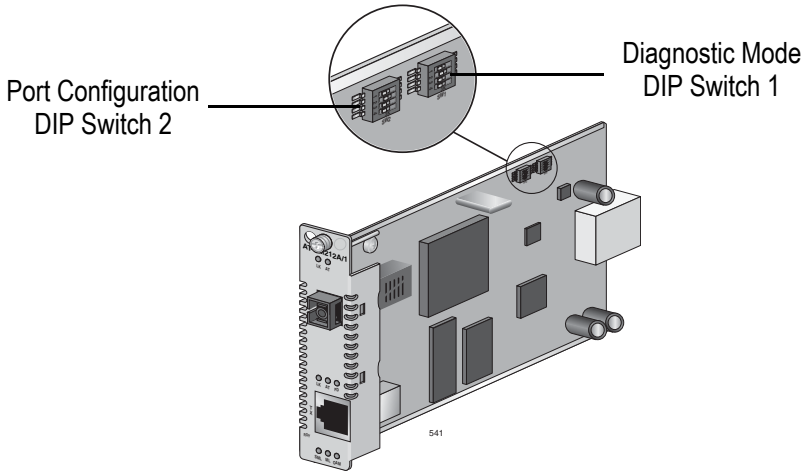

Figure 9. DIP Switches on an AT-CM212x/1 Series Line Card

Table 12 lists the positions of the Diagnostic Mode DIP Switch 1 on the AT-CM20x Series and AT-CM212x/1 Series line cards.

Table 12. AT-CM20x Series and AT-CM212x/1 Series – Diagnostic Mode DIP Switch 1 Positions

Operating Mode	DIP 1	DIP 2	DIP 3	DIP 4
Smart MissingLink (SML)	OFF	ON	ON	X
MissingLink™ (ML)	OFF	OFF	ON	X
OAM Bypass	ON	OFF	OFF	X

Table 12. AT-CM20x Series and AT-CM212x/1 Series – Diagnostic Mode DIP Switch 1 Positions

Operating Mode	DIP 1	DIP 2	DIP 3	DIP 4
OAM Visible	**ON**	ON	OFF	X
Link Test (default)	OFF	OFF	OFF	X
Manufacturing Default Settings	OFF	OFF	OFF	OFF

"X" means the DIP switch position could be either ON or OFF.

Table 13 lists the positions of the Port Configuration DIP Switch 2 for the twisted pair port on the AT-CM20x Series and AT-CM212x/1 Series line cards.

Table 13. AT-CM20x Series and AT-CM212x/1 Series – Port Configuration DIP Switch 2 Positions

Operating Mode	DIP 1	DIP 2	DIP 3	DIP 4
Auto MDI-X Enable (default)	X	OFF	X	X
Auto MDI-X Disable	X	ON	X	X
Manufacturing Default Settings	OFF	OFF	OFF	OFF

"X" means the DIP switch position could be either ON or OFF.

AT-CV10x Series Line Cards

The AT-CV10x series line cards, shown in Figure 11, feature both Diagnostic Mode DIP Switch 1 and Port Configuration DIP Switch 2.

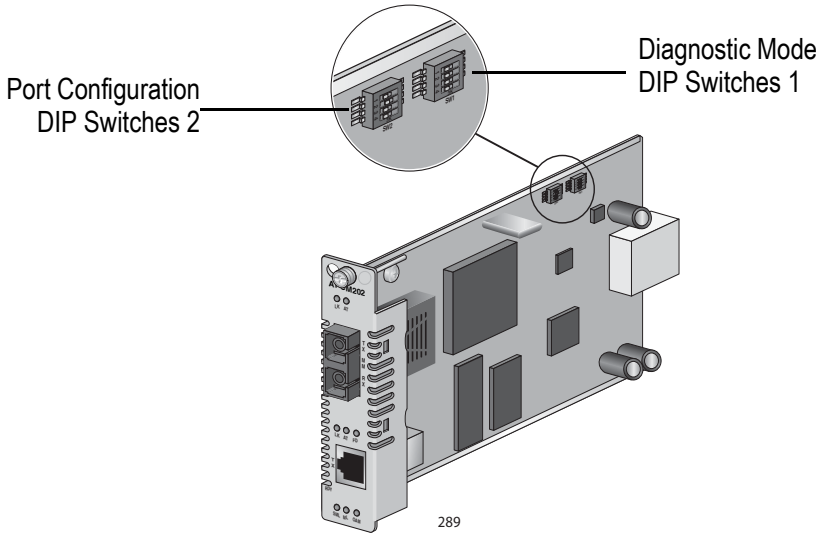

Figure 10. DIP Switches on an AT-CM20x Series Line Card

Table 16 lists the positions of the Diagnostic Mode DIP Switch 1 for the twisted pair port on the AT-CV10x Series line card.

Table 14. AT-CV10x Series – Diagnostic Mode DIP Switch 1 Positions

Operating Mode	DIP 1	DIP 2	DIP 3	DIP 4
Link Test (default)	OFF	OFF	X	X
Smart MissingLink (SML)	OFF	ON	X	X
MissingLink™ (ML)	ON	OFF	X	X
Manufacturing Default Settings	OFF	OFF	OFF	OFF

"X" means the DIP switch position could be either ON or OFF.

Table 15 lists the positions of the Port Configuration DIP Switch 2 for the twisted pair port on the AT-CV102 line card.

Table 15. AT-CV10x Series – Port Configuration DIP Switch 2 Positions

Operating Mode	DIP 1	DIP 2	DIP 3	DIP 4
Auto MDI-X Enabled (default)	X	OFF	X	X
Manufacturing Default Settings	OFF	OFF	OFF	OFF

"X" means the DIP switch position could be either ON or OFF.

AT-CM2K0S Line Card

The AT-CM2K0S line card, shown in Figure 11, feature only the Diagnostic Mode DIP Switch.

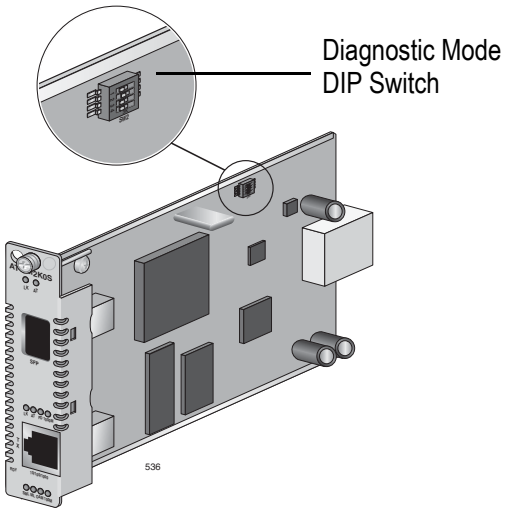

Figure 11. DIP Switch on an AT-CM2K0S Line Card

Table 16 lists the positions of the Diagnostic Mode DIP Switch for the twisted pair port on the AT-CM2K0S line card.

Table 16. AT-CM2K0S – Diagnostic Mode DIP Switch Positions

Operating Mode	DIP 1	DIP 2	DIP 3	DIP 4
Smart MissingLink (SML)	OFF	**ON**	**ON**	X
MissingLink (ML)	OFF	OFF	**ON**	X
OAM Bypass	**ON**	OFF	OFF	X
OAM Visible	**ON**	**ON**	OFF	X
Link Test (default)	OFF	OFF	OFF	OFF

"X" means the DIP switch position could be either ON or OFF.

AT-CV1KSS Line Card

The AT-CV1KSS line card, shown in Figure 12, features only the Diagnostic Mode DIP Switch.

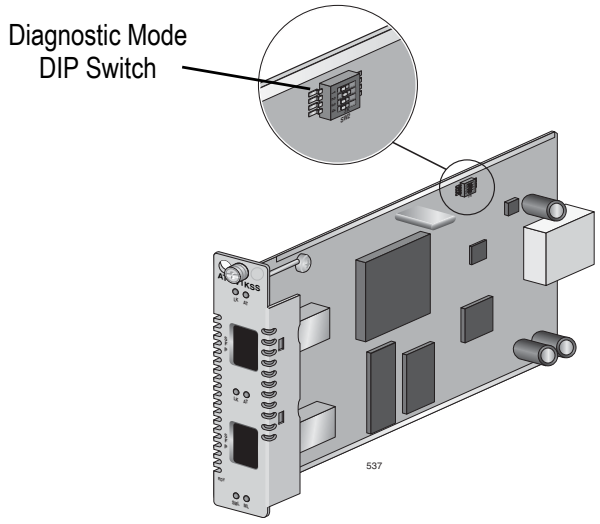

Figure 12. DIP Switches on an AT-CV1KSS Line Card

Table 17 lists the positions of the Diagnostic Mode DIP Switch on an AT-CM2K0S line card.

Table 17. AT-CV1KSS – Diagnostic Mode DIP Switch Positions

Operating Mode	DIP 1	DIP 2	DIP 3
Smart MissingLink (SML)	OFF	ON	X
MissingLink™ (ML)	ON	OFF	X
Link Test (default)	OFF	OFF	X
Manufacturing Default Settings	OFF	OFF	OFF

"X" means the DIP switch position could be either ON or OFF.

AT-CM70S Line Card

The AT-CM70S line card, shown in Figure 13, features only the Diagnostic Mode DIP Switch.

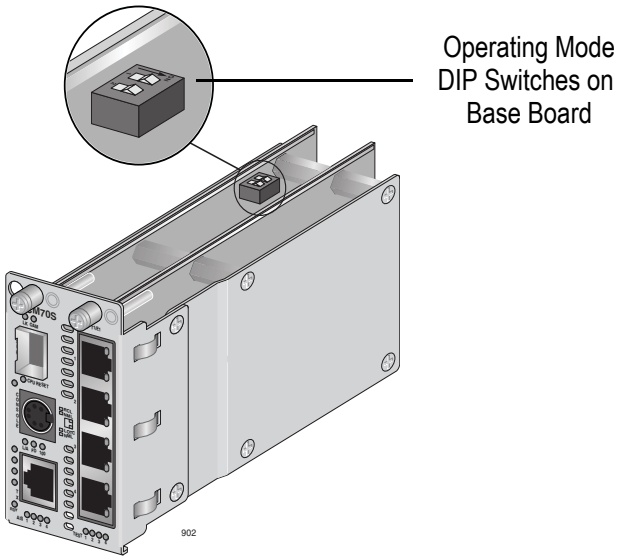

Figure 13. Diagnostic Mode DIP Switch on an AT-CM70S Line Card

Table 18 lists the positions of the Diagnostic Mode DIP Switch, located on the base board of the AT-CM70S line card.

Table 18. AT-CM70S Series – Diagnostic Mode DIP Switch Positions

Operating Mode	DIP 1	DIP 2
Link Test (non-OAM)	OFF	X
OAM Bypass	ON	OFF
OAM Visible	ON	ON
Manufacturing Default Settings	OFF	OFF

"X" means the DIP switch position could be either ON or OFF.

FCC Part 68 Customer Information

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. For additional information, refer to "FCC Part 68 Customer Information" on page 116.

CPU RESET Button (AT-CM70S Line Card Only)

The CPU RESET button on the AT-CM70S line card is used to reset the settings that are stored locally on its CPU. This feature can only be used when the AT-CM70S line card is installed in a managed AT-CV1200 or AT-CV5000 chassis. You may need to reset the system after upgrading the firmware or after you have made a configuration change that requires resetting the module to activate the change.

For additional information on how this button actually works, refer to the AT-CV1200 and AT-CV5000 Chassis Hardware Installation Guide.

Blank Slot Covers

The AT-CV5PNL1 blank slot cover is designed to maintain optimal, trouble-free environmental conditions for the Converteon™ chassis. An unoccupied line card slot on any Converteon™ chassis should be covered with a blank slot cover to keep dust from getting into the chassis and maintain proper airflow, cooling, and ventilation throughout the chassis.

Figure 14 illustrates the AT-CV5PNL1 blank slot cover.

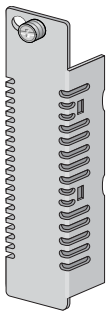

Figure 14. AT-CV5PNL1 Blank Slot Cover

Note
Allied Telesis strongly recommends that a blank slot cover be inserted in any slot that does not contain a functioning line card.

To install a blank slot cover, refer to “Installing a Line Card Blank Slot Cover” on page 80.

A Few Basics about Media Converters

An Ethernet media converter can interconnect network devices over large distances by transferring Ethernet traffic between twisted pair port and fiber optic cabling.

MAC Address Table

A Converteon™ media converter line card has a MAC address table that can store up to 2K to 32K MAC addresses, depending on the line card model, as listed below:

- AT-CM20x Series – 2K MAC Addresses
- AT-CM212x/1 Series – 2K MAC Addresses
- AT-CM70S – 2K MAC Addresses
- AT-CM2K0S – 8K MAC Addresses
- AT-CV10x Series – NO MAC Address Table (non-bridging card)
- AT-CV1KSS – NO MAC Address Table (non-bridging card)

The line card uses the table to store the MAC addresses of the network end nodes connected to the ports, along with the port number on which each address was learned.

A line card learns the MAC addresses of the end nodes by examining the source address of each packet received on a port. It adds the address and port on which the packet was received to the MAC table if the address had not already been entered in the table. The result is a table that contains all the MAC addresses of the devices that are connected to the line card's ports, and the port number where each address was learned.

When the line card receives a packet, it also examines the destination address and, by referring to its MAC address table, determines the port on which the destination end node is connected. It then forwards the packet to the appropriate port and on to the end node. This increases network bandwidth by limiting each packet to the appropriate port when the intended end node is located, freeing the other line card ports for receiving and transmitting data.

If the line card receives a packet with a destination address that is not in the MAC address table, it floods the packet to all the ports on the line card. If the ports have been grouped into virtual LANs, the line card floods the packet only to those ports which belong to the same VLAN as the port on which the packet was received. This prevents packets from being forwarded into inappropriate LAN segments, increasing network security. When the destination an end node responds, the line card adds its MAC address and port number to the table.

If the line card receives a packet with a destination address that is on the same port on which the packet was received, it discards the packet

without forwarding it on to any port. Because both the source end node and the destination end node for the packet are located on the same port on the line card, there is no reason for the line card to forward the packet.

Duplex Mode

Duplex mode refers to the manner in which an end node receives and transmits data. If an end node can receive or transmit data, but not both simultaneously, the end node is operating in what is referred to as half-duplex mode. If an end node can both receive and transmit data simultaneously, the end node is said to be operating in full-duplex mode. Naturally, an end node capable of operating in full-duplex can handle data much faster than an end node that can only operate in half-duplex mode.

The twisted pair ports on the Converteon™ line cards can operate in either half- or full-duplex mode. The twisted pair ports are IEEE 802.3u-compliant and will Auto-Negotiate the duplex mode setting for you.

By allowing the line card to configure the duplex mode for each port, you will not need to change the setting for a port on the line card should you replace an end node with an end node that has a different duplex mode capability. With Auto-Negotiation, the line card automatically resets the port to a new duplex mode setting.

If desired, you can disable Auto-Negotiation on the line card ports so that you can set the duplex mode manually through the management software.

In order for a line card port to successfully Auto-Negotiate its duplex mode with an end node, the end node should also be using Auto-Negotiation. Otherwise, a duplex mode mismatch can occur. A line card port, using Auto-Negotiation, defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This results in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

Consequently, when you connect an end node with a fixed duplex mode of full-duplex to a line card port, you should use the AT-S70 management software to disable Auto-Negotiation on the port and set the port speed and duplex mode manually.

Store-and-Forward

The bridging media converter line cards, for example the AT-CM20x Series, AT-CM2K0S, and CM212x/1 Series line cards, use store-and-forward as the method for receiving and transmitting frames. When an Ethernet frame is received on a line card port, the line card does not retransmit the frame out the destination port until it has received the entire frame and stored the frame in a port buffer. It then examines the frame to determine if it is a valid frame. Invalid frames, such as fragments or runts, are discarded by the line card. This ensures that only valid frames are transmitted out the line card ports and that damaged frames are not propagated on your network.

Network Topologies

This section discusses the network topologies you can create with the Converteon™ Fast and Gigabit Media Converter Line Cards.

Stand-Alone Topology

Figure 15 illustrates a stand-alone topology using one AT-CV1000 media converter with an AT-CM20x Series line card to interconnect two small networks.

- Network 1 has an AT-FS709FC switch connected to the 100Base-FX port on the AT-CM202 line card in the AT-CV1000 media converter.
- Network 2 has an AT-8524M switch connected to the 10/100Base-TX port on the AT-CM202 line card in the AT-CV1000 media converter.

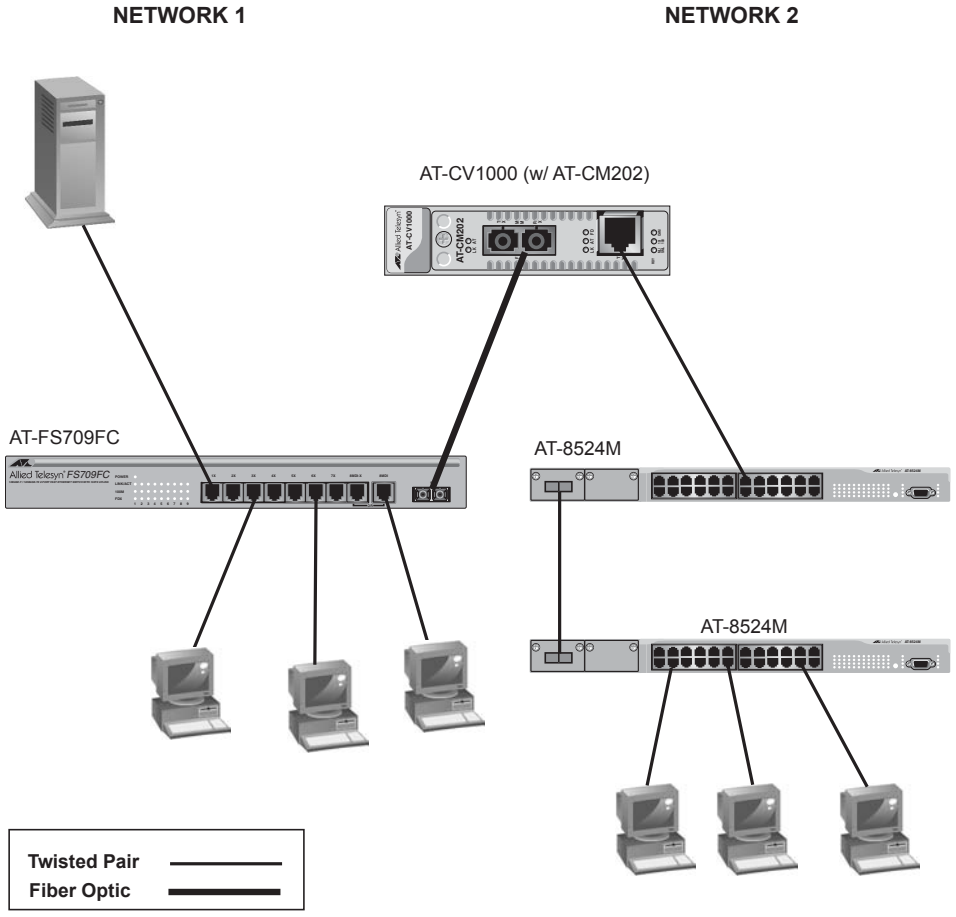

Figure 15. Stand-Alone Network Topology

Back-to-Back Topology

Figure 16 illustrates a back-to-back topology using two AT-CV1000 media converters with AT-CM20x Series line cards to interconnect two small networks.

- The media converters themselves are connected together through 100Base fiber optic ports on AT-CM202 line cards.
- Network 1 has an AT-8350GB switch connected to the 10/100Base-TX port on the AT-CM202 line card in the first AT-C1000 media converter.
- Network 2 has an AT-8524M switch connected to the 10/100Base-TX port on the AT-CM202 line card in the second AT-CV1000 media converter.

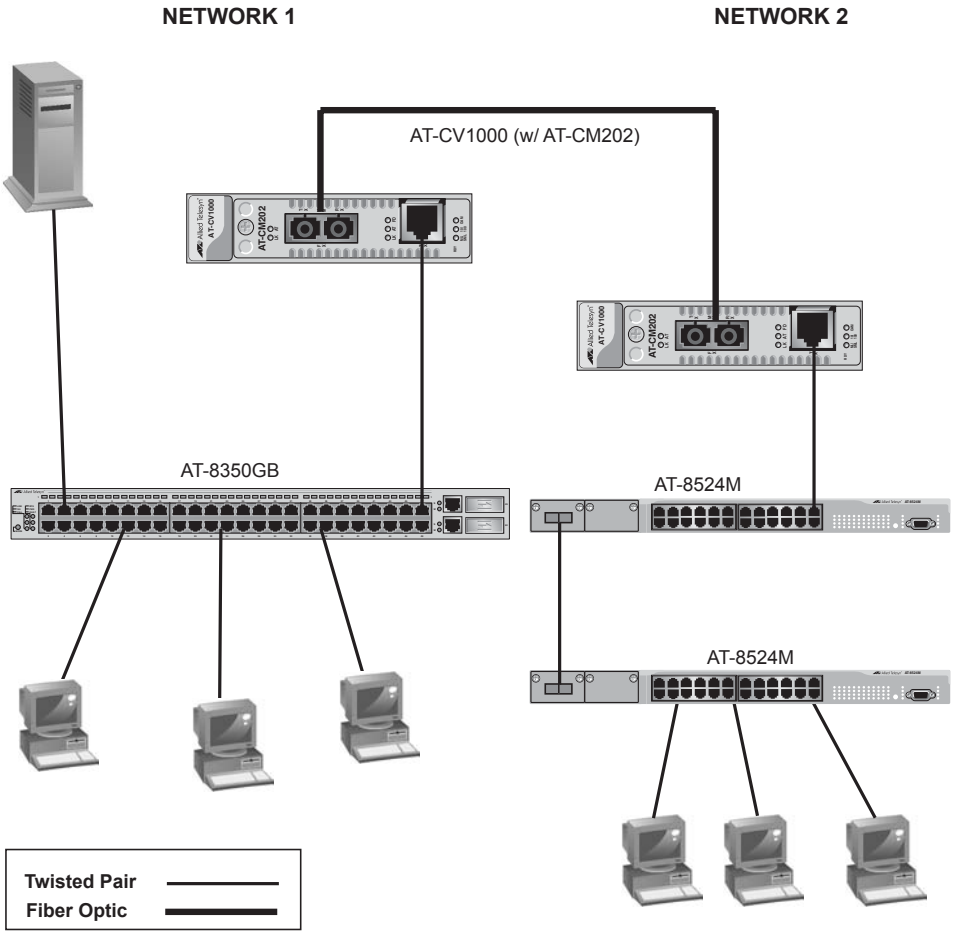

Figure 16. Back-to-Back Network Topology

Chapter 2

Installation

This chapter contains the following installation procedures for the Converteon™ media converter line cards:

Reviewing Safety Precautions

Please review the following safety precautions before you begin to install the line cards into any of the Converteon™ chassis.

Note
When you see the ✍, go to Appendix C, ”Translated Safety Statements” on page 111 for translated safety statements.

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

Warning
Class 1 laser product. ✍ 1

Warning
Do not stare into the laser beam. ✍ 2

Warning
Electric Shock Hazard. To prevent electric shock, do not remove the cover. No user-serviceable part inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables. ✍ 3

Warning
Lightning Danger. Do not work on this equipment or cables during periods of lightning activity. ✍ 4

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. ✍ 5

Warning
Class I Equipment. THIS EQUIPMENT MUST BE EARTHED. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts. 6

Warning
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. 7

Caution
Air vents must not be blocked and must have free access to the room ambient air for cooling. 8

Operating Temperature: This product is designed for a maximum ambient temperature of 40° C. 9

ALL COUNTRIES: Install product in accordance with local and National Electrical Codes. 10

Unpacking a Converteon™ Line Card

To unpack a line card, perform the following procedure:

1. Remove all components from the shipping package.

   Note
   Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

2. Make sure that the following components are included in the package. If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.

   - One Converteon™ media converter line card
   - Line card Installation Guide
   - Warranty card

Installing a Converteon™ Line Card into a Converteon™ Chassis

To install a Converteon™ line card into a Converteon™ chassis, perform the following procedure:

Note
The Converteon™ line cards can be installed in any of the line card slots located in the front panel of a Converteon™ chassis.

Note
For more information on the Converteon™ line cards, refer to “Converteon™ Fast Ethernet and Gigabit Ethernet Line Cards” on page 16.

Caution
Be sure to observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the device. A line card can be damaged by static electricity.

1. Remove the Converteon™ line card from its shipping package and store the package in a safe place.

   Note
   You must use the original package if you need to return the unit to Allied Telesis.

2. Select an empty line card slot in the chassis for the card.
3. Remove the AT-CV5PNL1 blank slot cover from the selected slot.

   Keep the blank slot cover in a safe area in case you remove the line card. The blank slot cover is used to keep dust from getting into the chassis and to maintain proper airflow, cooling, and ventilation throughout the chassis.

4. Locate the alignment guides inside the line card slots, as shown in Figure 17, Figure 18, and Figure 19.

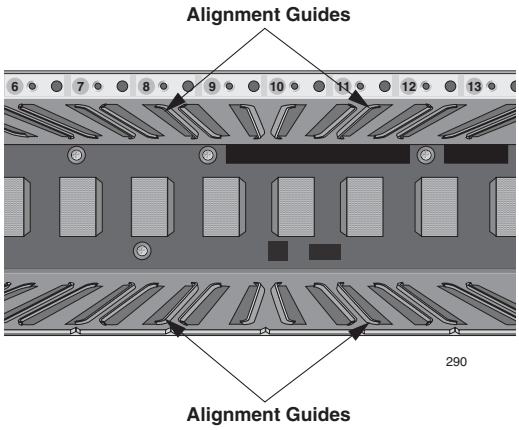

Figure 17. AT-CV5000 Chassis Alignment Guide Locations

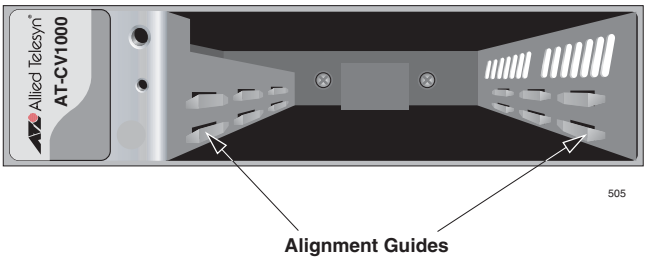

Figure 18. AT-CV1000 Chassis Alignment Guide Locations

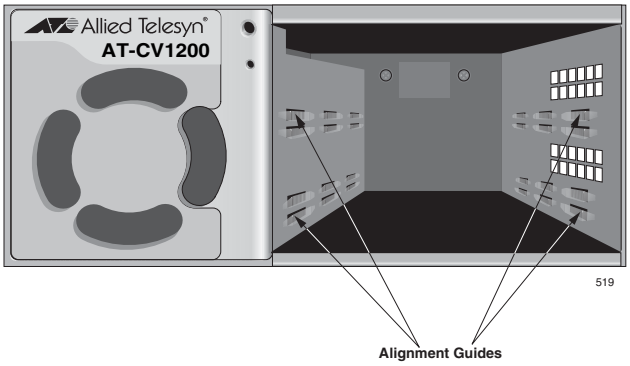

Figure 19. AT-CV1200 Chassis Alignment Guide Locations

5. Set the line card's DIP switches. For more information on the DIP switch settings, refer to the "DIP Switches" on page 44.

6. Align the line card with the alignment guides.

7. Slide the line card into the slot until the card's faceplate is flush with the front of the chassis, as shown in Figure 20, Figure 21, and Figure 22.

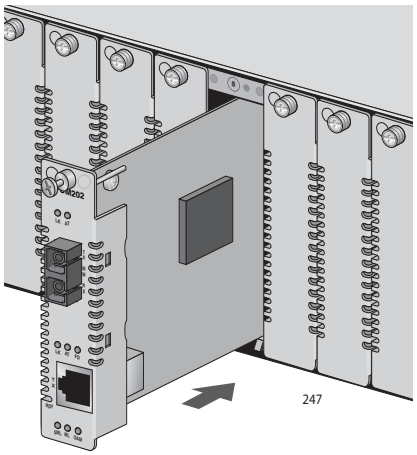

Figure 20. Inserting the Line Card in an AT-CV5000 Chassis

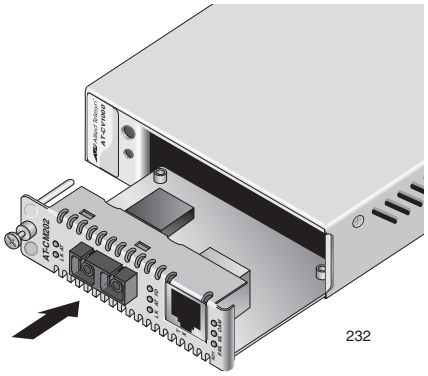

Figure 21. Inserting the Line Card in an AT-CV1000 Chassis

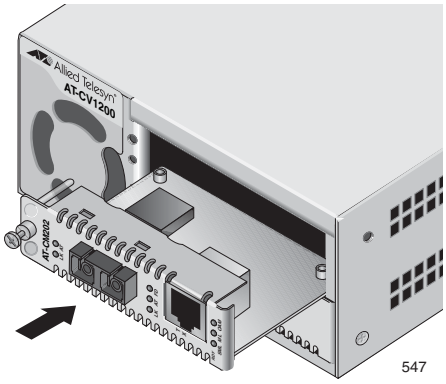

Figure 22. Inserting the Line Card in an AT-1200 Chassis

8. Use a Phillips screwdriver to tighten the captive screw on the line card, as shown in Figure 23.

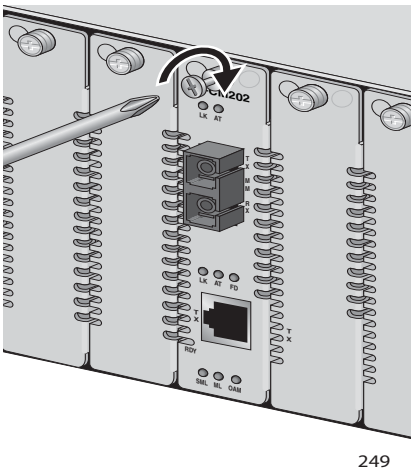

Figure 23. Tightening the Captive Screw

Note
Always tighten the captive screw to secure the line card to the chassis.

9. If you purchased an AT-CV5M01 CPM card for the chassis, go to the next procedure to install it. If you purchased additional line cards, repeat this procedure to install the cards. Otherwise, go to “Cabling a Converteon™ Line Card” on page 71.

Installing an SFP Transceiver in a Line Card

To install an SFP transceiver in a line card, perform the following procedure:

Note
The SFP transceiver can be hot swapped; you do not need to power off the chassis to install an SFP transceiver. However, always remove the cables before removing the SFP.

Note
You must install the SFP transceiver before you connect cables to it.

1. Remove the SFP transceiver from its shipping container and store the packaging material in a safe location.

Caution
An SFP transceiver can be damaged by static electricity. Be sure to observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the transceiver.

2. Slide the SFP transceiver into the slot in the line card, as shown in Figure 24.

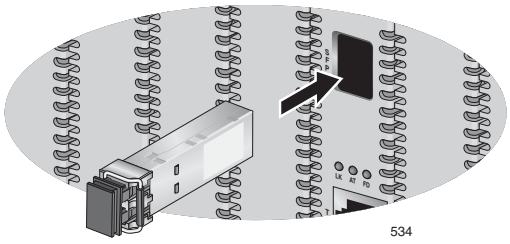

Figure 24. Installing an SFP Transceiver in a Line Card

For more information about cabling the SFP transceiver, refer to “Cabling an SFP Transceiver” on page 76.

Cabling a Converteon™ Line Card

Perform the following procedures to connect fiber optic and twisted pair cables to the ports on the line cards.

> **Note**
> For a current list of line cards for the Converteon™ Series Chassis, refer to the Allied Telesis web site or consult your authorized sales representative.

Cabling a Fiber Optic Port

When attaching a fiber optic cable, be sure to observe the following guidelines:

- Be sure that the cable connector is firmly locked into place in the port.
- You should verify that you are using the appropriate type of fiber optic cabling.
- You should verify that the operating specifications of the converter's fiber optic port are compatible with the fiber optic port on the remote end-node. For example, you cannot connect a fiber optic port with a maximum distance of 500 meters (1,640 feet) and an operating wavelength of 1310 nm to another fiber optic port that has a maximum distance of 20 kilometers (12.4 miles) and an operating wavelength of 1550 nm.
- Dual SC and ST ports consist of two separate connectors, as shown in Figure 25. Each connects to a separate fiber strand. One is for receiving data and the other is for transmitting data. When connecting a fiber optic cable to a SC or ST port, be sure that the receiver fiber connector is connected to the transmitter connector on the remote end-node, and the transmitter fiber connector is connected to the receiver connector on the remote node.

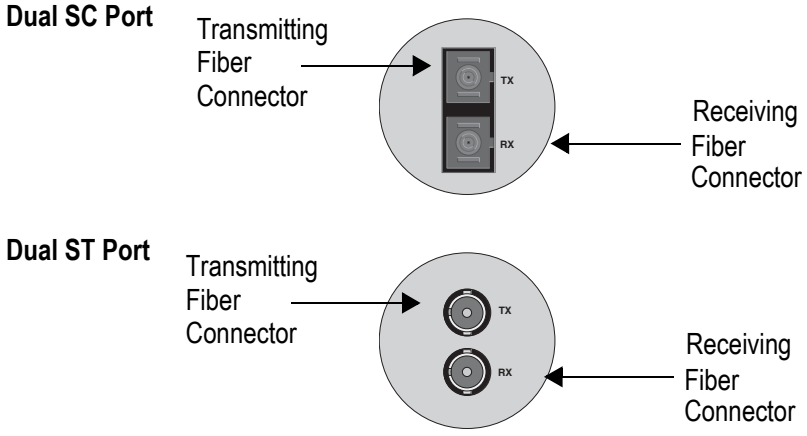

Figure 25. Dual ST and SC Port

Cabling a Dual SC Connector

To connect a fiber optic cable to a dual SC connector, perform the following procedure:

Warning
Class 1 laser product. 1

Warning
Do not stare into the laser beam. 2

1. Remove the dust cover from the fiber optic port, as shown in Figure 26.

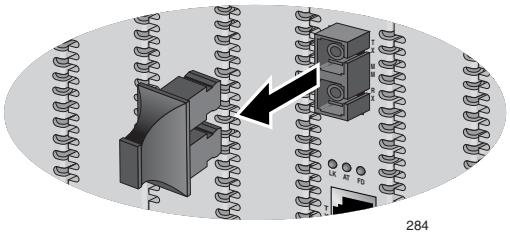

Figure 26. Removing the Dust Cover from a Dual SC Fiber Optic Port

2. Connect the appropriate optical cable to the port, as shown in Figure 27.

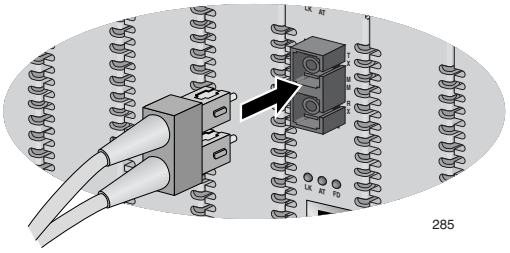

Figure 27. Connecting to the Dual SC Fiber Optic Port

3. Connect the other end of the optical cable to the link partner.
4. Power ON the end-nodes.
5. When the connection is established, the LK LED for the fiber optic port should show green. If the LED is OFF, refer to “Troubleshooting” on page 83 for instructions.

Cabling a Dual ST Connector

To connect a fiber optic cable to a dual ST connector, perform the following procedure:

Warning
Class 1 laser product. 1

Warning
Do not stare into the laser beam. 2

1. Connect the appropriate optical cable to the port, as shown in Figure 28.

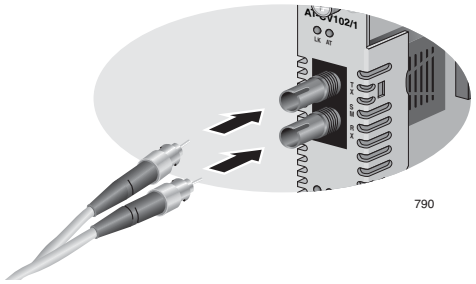

Figure 28. Connecting to the Dual SC Fiber Optic Port

2. Connect the other end of the optical cable to the link partner.
3. Power ON the end-nodes.
4. When the connection is established, the LK LED for the fiber optic port should show green. If the LED is OFF, refer to “Troubleshooting” on page 83 for instructions.

Cabling a Simplex SC Connector

To connect a fiber optic cable to a simplex SC connector, perform the following procedure:

Warning
Class 1 laser product. 1

Warning
Do not stare into the laser beam. 2

1. Remove the dust cover from the fiber optic port, as shown in Figure 29.

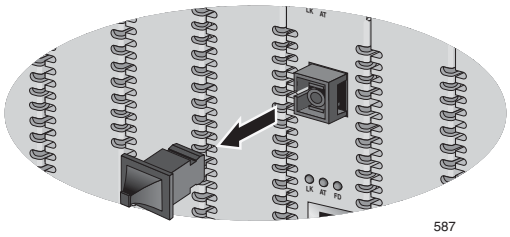

Figure 29. Removing the Dust Cover from a Simplex SC Fiber Optic Port

2. Connect the appropriate optical cable to the port, as shown in Figure 30.

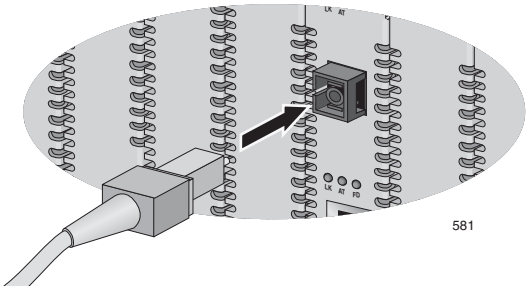

Figure 30. Connecting to the Simplex SC Fiber Optic Port

3. Connect the other end of the optical cable to the link partner.
4. Power ON the end-nodes.
5. When the connection is established, the LK LED for the fiber optic port should show green. If the LED is OFF, refer to “Troubleshooting” on page 83 for instructions.

Cabling a Twisted Pair Port

When connecting a twisted pair cable to an RJ-45 twisted pair port, observe the following guidelines:

- An RJ-45 connector should fit snugly into the port on the converter. The tab on the connector should lock the connector into place.
- You can use a straight-through or crossover twisted pair cable to connect any type of network device to a port on the converter.

To connect to the copper port, perform the following procedure:

1. Connect the twisted pair cable to the twisted pair port, as shown in Figure 31.

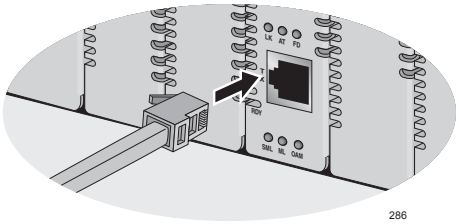

Figure 31. Connecting to the Twisted Pair Port

2. Connect the other end of the twisted pair cable to the link partner.
3. Power ON the end-nodes.
4. When the connection is established, the LK LED for the 10/100Base-TX port should show green. If the LED is OFF, refer to “Troubleshooting” on page 83 for instructions.

Cabling an SFP Transceiver

To connect a fiber optic cable to an SFP transceiver, perform the following procedure:

Warning
Class 1 laser product. 1

Warning
Do not stare into the laser beam. 2

1. Insert the SFP transceiver into the SFP slot on the line card, as shown in Figure 32.

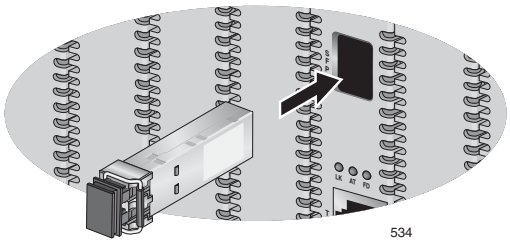

Figure 32. Inserting an SFP Transceiver into the SFP Slot

Note
For information about the proper cable type, refer to the SFP transceiver installation instructions.

Note
Before you install the cable in the SFP transceiver, verify that the optical power input to the transceiver is within its dynamic range.

2. Remove the dust cover from the SFP transceiver in the line card, as shown in Figure 33.

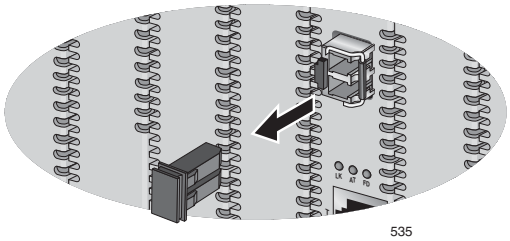

Figure 33. Removing the Dust Cover from the SFP Transceiver

3. Connect the fiber optic cable to the SFP transceiver, as shown in Figure 34.

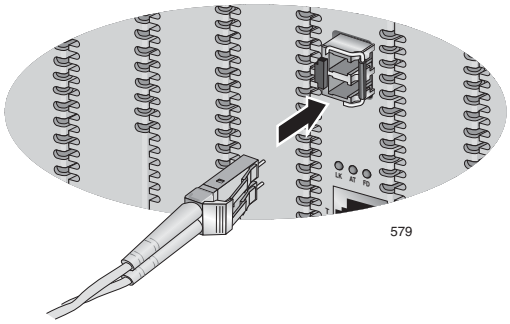

Figure 34. Connecting Fiber Optic Cables to the SFP Transceiver

Cabling a RS-232 Console Port (AT-CM70S Line Card Only)

When connecting to the RS-232 console port on the front of the AT-CM70S line card, observe the following guidelines:

- Once the connection is done, set the terminal or terminal emulation program to the following defaults:
  - Baud rate: 115200 bps
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow control: None

Note
The settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulation program.

To connect to the RS-232 console port on the AT-CM70S line card, perform the following procedure:

1. Connect the 8-pin Mini-DIN end of the RS-232 serial cable to the console port on the front of the AT-CM70S line card, as shown in Figure 31.

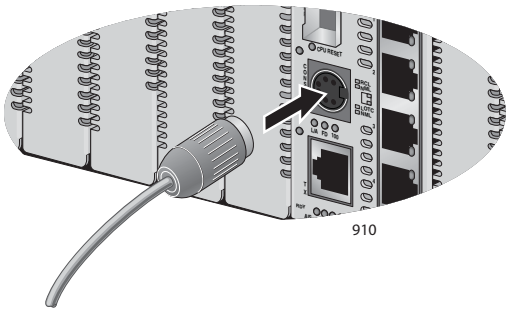

Figure 35. Connecting a Management Cable to the Console Port on an AT-CM70S Line Card

2. Connect the other end of the cable to an RS-232 port on a terminal or a personal computer with a terminal emulation program.

3. Power ON the end-nodes.

When the connection is established and the console port is operational, the CONSOLE LED for the console port should show green.

Resetting the AT-CM70S Line Card

To reset the CPU on the AT-CM70S line card, perform the following procedure.

1. Locate the CPU RESET button which is recessed in the front panel of the AT-CM70S line card.

> **Note**
> This CPU RESET button is used to reset the CPU on the AT-CM70S line card only, and is not for other line cards and/or the module installed in the expansion slot at the rear of the AT-CV5000 chassis. You may need to reset the CPU on the AT-CM70S line card after upgrading the firmware or after you have made a configuration change that requires resetting the module to activate the change.

2. Press the reset button with the tip of a pen or a non-conductive pointy object, as shown in Figure 36.

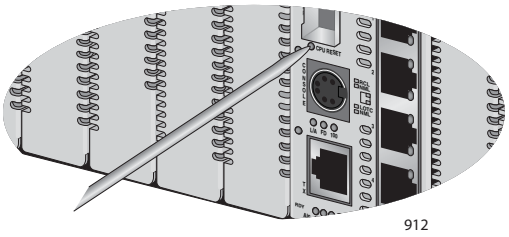

Figure 36. Resetting the CPU on the AT-CM70S Line Card

Installing a Line Card Blank Slot Cover

Each unoccupied slot on the Converteon™ chassis should be covered with a blank slot cover to keep dust from getting into the chassis and to maintain proper airflow, cooling, and ventilation throughout the chassis.

Note
Allied Telesis strongly recommends that a blank slot cover be inserted in any slot that does not contain a functioning line card or module.

Installing an AT-CV5PNL1 Blank Slot Cover

The Converteon™ chassis have different number of line card slots and are shipped with the line card slots covered by the AT-CV5PNL1 blank slot covers. When any of the line card slots is unoccupied, you should cover it with a blank slot cover, to keep dust from getting into the chassis and to maintains proper airflow, cooling, and ventilation throughout the chassis.

To install an AT-CV5PNL1 blank slot cover, perform the following procedure:

1. Select the line card you want to remove from the chassis.
2. Disconnect the cables from all the ports in the line card.
3. Cover the fiber optic port with the dust cap.
4. Remove the line card from the slot.
5. Insert the AT-CV5PNL1 slot cover into the slot you removed the line card from.
6. Align the back edge of the blank slot cover with the left and right alignment guides.

7. Slide the blank slot cover into the slot, as shown in Figure 37, until the slot cover is flush with the front of the chassis.

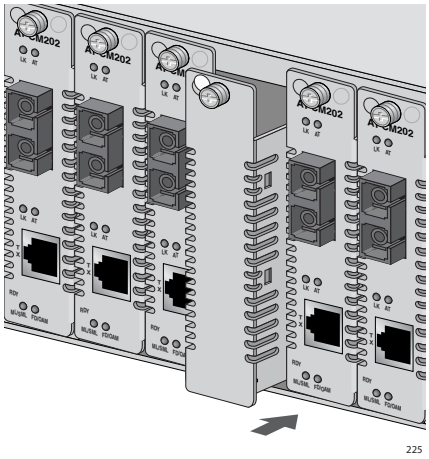

Figure 37. Inserting an AT-CV5PNL1 Blank Slot Cover

8. Use a Phillips screwdriver to tighten the captive screw, as shown in Figure 38.

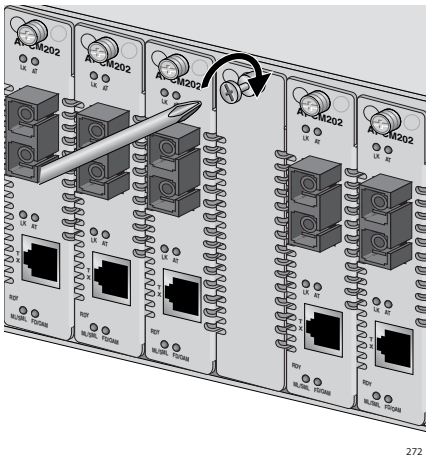

Figure 38. Tightening the Captive Screw on an AT-CV5PNL1

Note
Always tighten the captive screw to secure the blank slot cover to the chassis.

9. Repeat this procedure to install additional AT-CV5PNL1 blank slot covers.

Warranty Registration

When you have finished installing the system, you should register your product by completing and mailing the enclosed warranty card.

Chapter 3

Troubleshooting

This chapter contains information about how to troubleshoot the line cards in the event that a problem occurs.

> **Note**
> If after following the instructions in this chapter you are unable to resolve the problem, contact Allied Telesis Technical Support for assistance. Refer to “Contacting Allied Telesis” on page 14 for contact information.

Converteon™ Line Cards

RDY LED is OFF

If the RDY LED on a Converteon™ line card is OFF, perform the following:

- ❒ Verify that the card is firmly inserted in the slot.
- ❒ Remove and re-insert the card.
- ❒ Verify that at least one power supply in the back of the converter is operational.
- ❒ Make sure that the power cord is securely connected to the power source and to the DC connector on the back panel of the switch.
- ❒ Verify that the power outlet has power by connecting another device to it.
- ❒ Try connecting the unit to another power source.
- ❒ Try using a different power adapter.
- ❒ Check that the voltage from the power source is within the required levels for your region.

RDY LED is Flashing

If the RDY LED on an AT-CV5M01 card is flashing, perform the following:

- ❒ Verify that the settings on the DIP switches and jumpers are correct.
- ❒ Try using the default settings.
- ❒ Remove and re-insert the card.

LK LED is OFF

If the LK LED for the twisted pair port on a line card is OFF, do the following:

- ❒ Check that the end-node connected to the port is powered ON and is operating properly.
- ❒ Check that the twisted pair cable is securely connected to the twisted pair port on the switch and on the end-node.
- ❒ Make sure that the twisted pair cable does not exceed 100 meters (328 feet) and that you are using a Category 5 or better cable.
- ❒ Check for MissingLink™ option.

If the LK LED for the fiber optic port on a line card is OFF, do the following:

- ❒ Verify that the end-node connected to the port is ON and is operating properly.
- ❒ Check that the fiber optic cable is securely connected to the fiber optic port on the media converter and on the end-node.
- ❒ Check to be sure that the end-node connected to the port is operating at the same port speed.
- ❒ Verify the fiber connections are correct that is the converter's TX port is connected to the end node's RX port, and the converter's RX port is connected to the end node's TX port.
- ❒ Check to be sure that the end-nodes connected to the switch are operating at the same duplex mode.
- ❒ Test the attenuation on the fiber cable to ensure that it does not exceed acceptable values.
- ❒ Verify that you are using the appropriate type of fiber optic cables and that you have not exceeded the maximum operating distances.
- ❒ Check that the operating specifications of the fiber optic port on the end-node are compatible with the operating specifications of the fiber optic port on the converter.

LK LED is Flashing

If the LK LEDs for the fiber optic ports on two AT-CV102 line cards are flashing when they are operating back-to-back in SML mode, do the following:

- ❒ Unplug the twisted pair port on either of the two AT-CV102's for at least 20 seconds, then re-insert it.

If you are still experiencing problems after testing and troubleshooting the installation, contact Allied Telesis Technical Support for assistance. Refer to "Contacting Allied Telesis" on page 14 or visit our web site at www.alliedtelesis.com for support information.

Appendix A

Technical Specifications

Physical Specifications

Dimensions:	(H x W x L)
AT-CM201 AT-CM202 AT-CM212x/1 AT-CM2K0S AT-CV10x AT-CV102/x AT-CV1KSS	.855" x 2.89" x 5.1" (2.2 cm x 7.3 cm x 13.0 cm)
AT-CM70S	1.71" x 2.89" x 5.1" (4.4 cm x 7.3 cm x 13.0 cm)

Environmental Specifications

Operating Temperature:	0° C to 40° C (32° F to 104° F)
Storage Temperature:	-25° C to 70° C (-13°F to 158° F)
Operating Humidity:	5% to 90% non-condensing
Storage Humidity:	5% to 95% non-condensing
Maximum Operating Altitude:	3,000 m (10,000 ft.)
Maximum Storage Altitude:	4,000 m (13,100 ft.)

Electrical Specifications

Maximum Power Consumption

AT-CM201	3.0 watts
AT-CM202	3.0 watts
AT-CM202/x	3.0 watts
AT-CM212x/1	3.0 watts
AT-CM2K0S	7.3 watts
AT-CV10x	3.0 watts
AT-CV102/1	2.5 watts
AT-CV102/2	5.0 watts
AT-CV1KSS	3.5 watts
AT-CM70S	8.5 watts

Optical Specifications

Table 19 lists the specifications for the fiber optic ports.

Table 19. Fiber Optic Cabling Specifications

Line Card	Fiber Type	Connector Type	Fiber Optic Diameter (microns)	Optical Wavelength	Maximum Distance
AT-CM201	Multi-Mode	Dual ST	50/125 or 62.5/125	1310 nm	2 kilometers (1.24 miles)
AT-CM202	Multi-Mode	Dual SC	50/125 or 62.5/125	1310 nm	2 kilometers (1.24 miles)
AT-CM202/1	Single-Mode	Dual SC	9/125	1310 nm	15 kilometers (9.4 miles)
AT-CM202/2	Single-Mode	Dual SC	9/125	1310 nm	40 kilometers (24.8 miles)
AT-CM212x/1	Single-Mode	Simplex SC	9/125	1310 nm/ 1550 nm	15 kilometers (9.4 miles)
AT-CV101	Multi-Mode	Dual ST	50/125 or 62.5/125	1310 nm	2 kilometers (1.24 miles)
AT-CV102	Multi-Mode	Dual SC	50/125 or 62.5/125	1310 nm	2 kilometers (1.24 miles)
AT-CV102/1	Single-Mode	Dual SC	9/125	1310 nm	15 kilometers (9.4 miles)
AT-CV102/2	Single-Mode	Dual SC	9/125	1310 nm	40 kilometers (24.8 miles)
AT-CM2K0S AT-CV1KSS AT-CM70S	Varies by SFP transceiver				

Safety and Electromagnetic Emissions Certifications

EMI:	FCC Class A, EN55022 Class A, VCCI Class A, C-TICK, CE
Immunity:	EN55024
Safety:	UL60950-1 ($_{C}UL_{US}$), EN60950-1 (TUV), CAN/CSA C22.2 No. 60950-1
Laser:	EN60825
Quality and Reliability:	MTBF (Telcordia Standards)
AT-CM20x	990,000 hrs
AT-CM212x/1	950,000 hrs
AT-CM2K0S	880,000 hrs
AT-CV101	1,020,000 hrs
AT-CV102	890,000 hrs
AT-CV102/x	1,020,000 hrs
AT-CV1KSS	1,370,000 hrs
AT-CM70S	670,000 hrs

RJ-45 Twisted Pair Port Pinouts

Figure 39 illustrates the pin layout to an RJ-45 connector and port.

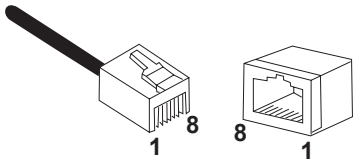

Figure 39. RJ-45 Connector and Port Pin Layout

Table 20 lists the RJ-45 pin signals when a twisted pair port is operating in the MDI configuration at 10 or 100 Mbps.

Table 20. MDI Pin Signals (10/100Base-TX)

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 21 lists the RJ-45 port pin signals when a twisted pair port is operating in the MDI-X configuration at 10 or 100 Mbps.

Table 21. MDI-X Pin Signals (10/100Base-TX)

Pin	Signal
1	RX+
2	RX-
3	TX+
6	TX-

Table 22 lists the RJ-45 pin signals for the 10/100/1000-Base-T port on the AT-CM2K0S line card when it is operating at 1000 Mbps.

Table 22. MDI and MDI-X Pin Signals (1000Base-T)

MDI Configuration		**MDI-X Configuration**	
Pinout	**Pair**	**Pinout**	**Pair**
1	Pair 1 +	1	Pair 2 +
2	Pair 1 -	2	Pair 2 -
3	Pair 2 +	3	Pair 1 +
4	Pair 3 +	4	Pair 4 +
5	Pair 3 -	5	Pair 4 -
6	Pair 2 -	6	Pair 1 -
7	Pair 4 +	7	Pair 3 +
8	Pair 4 -	8	Pair 3 -

RJ-48 T1/E1 Port Pinouts

Figure 40 illustrates the pin layout to an RJ-48 connector and port.

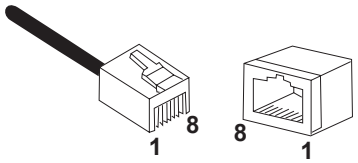

Figure 40. RJ-48 Connector and Port Pin Layout

Table 23 lists the RJ-48 pin signals.

Table 23. RJ-48 Pin Signals

Pin	Signal
1	Receive Ring (RX, Ring, -)
2	Receive Tip (RX, Tip, +)
4	Transmit Ring (TX, Ring, -)
5	Transmit Tip (TX, Tip, +)

Note
TDM(T1/E1) Transport over fiber operates point-to-point between two AT-CM70S modules across fiber; and there is an auto-discovery process at power-ON which detects the presence of an AT-CM70S at the remote end.

RS-232 Terminal Port Pinouts

Figure 39 illustrates the pin layout to an RS-232 terminal port.

Figure 41. RS-232 Terminal Port Pinouts

Table 24 lists the pin signals on the RS-232 Terminal Port.

Table 24. RS-232 Terminal Port Pin Signals

Pin	Signal	Description
1	DCD	Data Carrier Detect
2	TxD	Transmit Data
3	RxD	Receive Data
4	DSR	Data Set Ready
5	GND	Signal Ground
6	DTR	Data Terminal Ready
7	CTS	Clear To Send
8	RTS	Request to Send
9	RI	Ring Indicator

8-Pin Mini-DIN Console Port Pinouts

Figure 43 illustrates the pin layout of the 8-Pin Mini-DIN console port and connector.

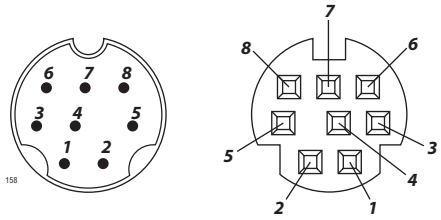

Figure 42. 8-Pin Mini-DIN Console Port and Connector Pin Layouts

Table 25 lists the definitions for the 8-Pin Mini-DIN console port pinouts.

Table 25. 8-Pin Mini-DIN Console Port Pinouts

Pin	Signal	Description
1	NC	Not Connected
2	DTR	Data Terminal Ready
3	TxD	Transmit Data
4	RxD	Receive Data
5	DSR	Data Set Ready
6	GND	Signal Ground
7	RTS	Request To Send
8	CTS	Clear To Send

9-Pin Mini-DIN Serial Port Pinouts

Figure 43 illustrates the pin layout of the 9-Pin Mini-DIN serial port and connector.

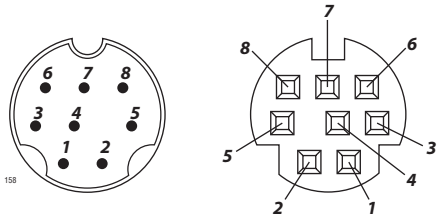

Figure 43. 9-Pin Mini-DIN Serial Port and Connector Pin Layouts

Table 26 lists the definitions for the 9-Pin Mini-DIN serial port pinouts.

Table 26. 8-Pin Mini-DIN Console Port Pinouts

Pin	Signal	Description
1	DCD	Data Carrier Detect
2	RxD	Receive Data
3	TxD	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicator

SC Type Connectors

Dual SC Connector

The fiber optic cable, as shown in Figure 44, is used to connect to the dual SC connectors in various Converteon™ line cards.

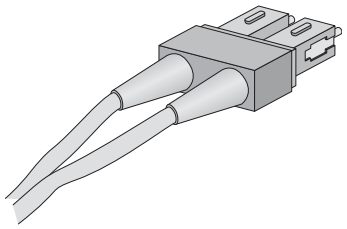

Figure 44. Dual SC Connector Cable

Simplex SC Connector

The fiber optic cable, as shown in Figure 45, is used to connect to the simplex SC connectors in various Converteon™ line cards.

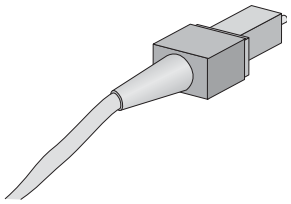

Figure 45. Simplex SC Connector Cable

Dual ST Type Connector Cable

Dual ST Connector Cable

The fiber optic cable, shown in Figure 46, is used to connect to the dual ST connectors in various Converteon™ line cards.

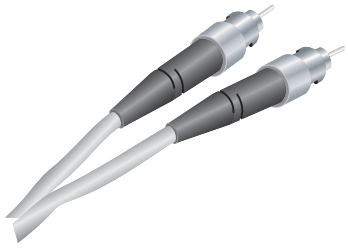

Figure 46. Dual ST Connector Cable

SFP Transceiver

The SFP transceiver, as shown in Figure 47, is used in various Converteon™ line cards.

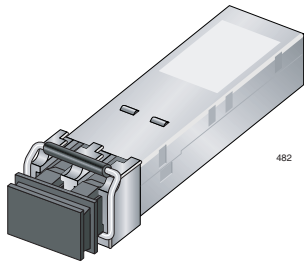

Figure 47. SFP Transceiver

The fiber optic cable, shown in Figure 48, is one of the cable types that can be used to connect to the SFP transceiver.

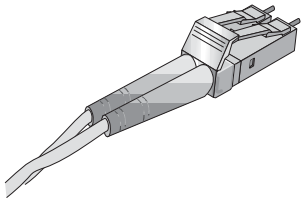

Figure 48. SFP Transceiver Cable

Note
For a list of the SFP transceivers supported by the Converteon™ line cards, please refer to the Installation Guides shipped with the respective line cards.

Link Test, MissingLink™, and Smart MissingLink LED Functionalities

In Stand-Alone Topology

This section describes how the Link Test, MissingLink™, Smart MissingLink LEDs function when a Converteon™ module is configured in a stand-alone topology

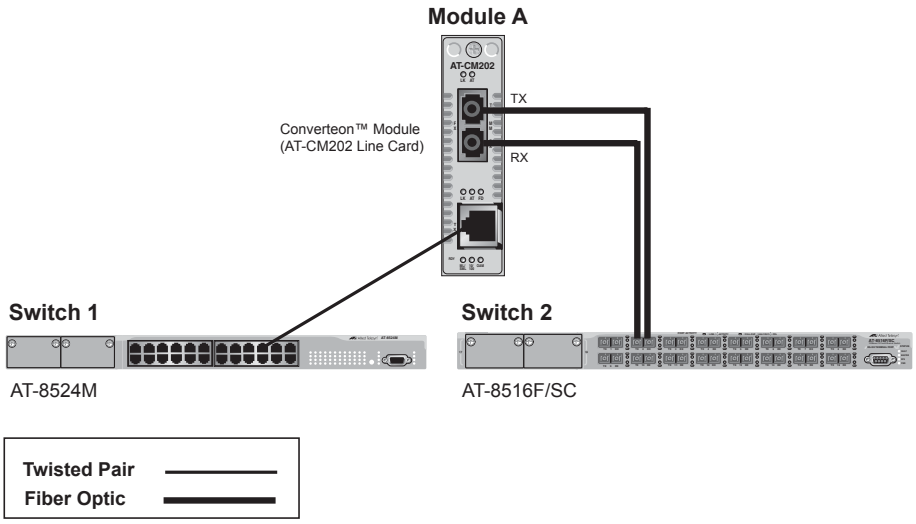

Figure 49. Converteon™ Module Configured in a Stand-Alone Topology

Stand-Alone – Converteon™ Module Configured for Link Test

Figure 49 on page 98 shows a stand-alone configuration for a Converteon™ line card (Module A) that has been configured for the Link Test mode. Refer to “Link Test” on page 44 for configuring the module of the Link Test mode. Module A is connected to an AT-8524M (Switch 1) with a copper cable and to an AT-8516F/SC (Switch 2) with a dual fiber cable.

Table 27 shows the Link (LK) LED status for each of the ports involved when the cables are connected and disconnected from Module A's ports.

Table 27. Stand-Alone – Converteon™ Module in Link Test Mode

	Network Device	Port Link	Converteon™ Module Cable Status		
			All Cables Connected	Copper Cable Switch 1 to Module A - Disconnected	Module A Transmit/ Receive Fiber Cable Disconnected
Port LINK Status	Switch 1	Copper LK LED	ON	OFF	ON
	Converteon™ Module A	Copper LK LED	ON	OFF	ON
		Fiber LK LED	ON	ON	OFF
	Switch 2	Fiber LK LED	ON	ON	OFF

Stand-Alone – Converteon™ Module Configured for MissingLink™ Test

Figure 49 on page 98 shows a stand-alone configuration for a Converteon™ module (Module A) that has been configured for the MissingLink™ Test mode. Refer to “MissingLink™” on page 44 for configuring the module of the Missing Link™ Test mode. Module A is connected to an AT-8524M (Switch 1) with a copper cable and to an AT-8516F/SC (Switch 2) with a dual fiber cable.

Table 28 shows the Link (LK) LED status for each of the ports involved when the cables are connected and disconnected from Module A's ports.

Table 28. Stand-Alone – Converteon™ Module in MissingLink™ Test Mode

	Network Device	Port Link	Converteon™ Module Cable Status		
			All Cables Connected	Copper Cable Switch 1 to Module A - Disconnected	Module A Transmit/ Receive Fiber Cable Disconnected
Port LINK Status	Switch 1	Copper LK LED	ON	OFF	OFF
	Converteon™ Module A	Copper LK LED	ON	OFF	OFF
		Fiber LK LED	ON	OFF	OFF
	Switch 2	Fiber LK LED	ON	OFF	OFF

Stand Alone – Converteon™ Module Configured for Smart MissingLink Test

Figure 49 on page 98 shows a stand-alone configuration for a Converteon™ module (Module A) that has been configured for the Smart MissingLink Test mode. Refer to “Smart MissingLink” on page 45 for configuring the module of the Smart MissingLink Test mode. Module A is connected to an AT-8524M (Switch 1) with a copper cable and to an AT-8516F/SC (Switch 2) with a dual fiber cable.

Table 29 shows the Link (LK) LED status for each of the ports involved when the cables are connected and disconnected from Module A's ports.

Table 29. Stand-Alone – Converteon™ Module in Smart MissingLink Test Mode

	Network Device	Port Link	Converteon™ Module Cable Status		
			All Cables Connected	Copper Cable Switch 1 to Module A - Disconnected	Module A Transmit/ Receive Fiber Cable Disconnected
Port LINK Status	Switch 1	Copper LK LED	ON	OFF	Blinking
	Converteon™ Module A	Copper LK LED	ON	OFF	Blinking
		Fiber LK LED	ON	Blinking	OFF
	Switch 2	Fiber LK LED	ON	Blinking	OFF

In Back-to-Back Topology

This section describes how the Link Test, MissingLink™, Smart MissingLink LEDs function when a Converteon™ module is configured in a back-to-back topology

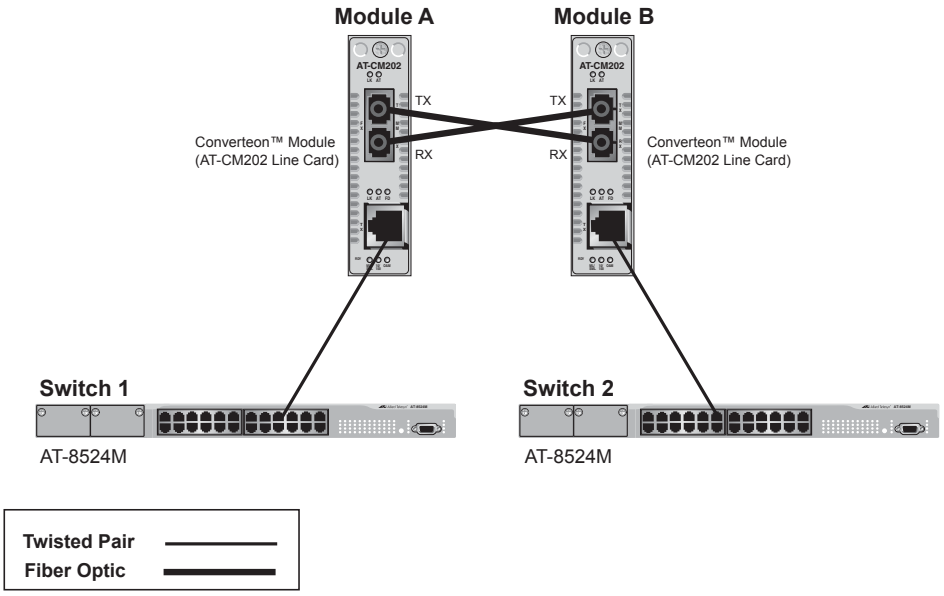

Figure 50. Converteon™ Module Configured in a Back-to-Back Topology

Back-to-Back – Converteon™ Module Configured for Link Test

Figure 50 on page 102 shows a back-to-back configuration for two Converteon™ modules (Module A and Module B) that has been configured for the Link Test mode. Refer to “Link Test” on page 44 for configuring the module of the Link Test mode. Module A is connected to an AT-8524M (Switch 1) with a copper cable and to Module B with a dual fiber cable. Module B is connected to a AT-8524M (Switch 2) with a copper cable.

Table 30 shows the Link LED status for each of the ports involved when the cables are connected and disconnected from Module A's ports.

Table 30. Back-to-Back – Converteon™ Module in Link Test Mode

	Network Device	Port Link	Converteon™ Module Cable Status		
			All Cables Connected	Copper Cable Switch 1 to Module A - Disconnected	Module A Transmit/ Receive Fiber Cable Disconnected
Port LINK Status	Switch 1	Copper LK LED	ON	OFF	ON
	Converteon™ Module A	Copper LK LED	ON	OFF	ON
		Fiber LK LED	ON	ON	OFF
	Converteon™ Module B	Fiber LK LED	ON	ON	OFF
		Copper LK LED	ON	ON	ON
	Switch 2	Copper LK LED	ON	ON	ON

Back-to-Back – Converteon™ Module Configured for MissingLink™ Test

Figure 50 on page 102 shows a back-to-back configuration for two Converteon™ modules (Module A and Module B) that has been configured for the Missing Link Test mode. Refer to “MissingLink™” on page 44 for configuring the module of the MissingLink™ Test mode. Module A is connected to an AT-8524M (Switch 1) with a copper cable and to Module B with a dual fiber cable. Module B is connected to a AT-8524M (Switch 2) with a copper cable.

Table 31 shows the Link LED status for each of the ports involved when the cables are connected and disconnected from Module A's ports only.

Table 31. Back-to-Back – Converteon™ Module in MissingLink™ Test Mode

	Network Device	Port Link	Converteon™ Module Cable Status		
			All Cables Connected	Copper Cable Switch 1 to Module A - Disconnected	Module A Transmit/ Receive Fiber Cable Disconnected
Port LINK Status	Switch 1	Copper LK LED	ON	OFF	OFF
	Converteon™ Module A	Copper LK LED	ON	OFF	OFF
		Fiber LK LED	ON	OFF	OFF
	Converteon™ Module B	Fiber LK LED	ON	OFF	OFF
		Copper LK LED	ON	ON	OFF
	Switch 2	Copper LK LED	ON	ON	OFF

Back-to-Back – Converteon™ Module Configured for Smart MissingLink Test

Figure 50 on page 102 shows a back-to-back configuration for two Converteon™ modules (Module A and Module B) that has been configured for the Smart MissingLink Test mode. Refer to “Smart MissingLink” on page 45 for configuring the module of the Link Test mode. Module A is connected to an AT-8524M (Switch 1) with a copper cable and to Module B with a dual fiber cable. Module B is connected to a AT-8524M (Switch 2) with a copper cable.

Table 32 shows the Link LED status for each of the ports involved when the cables are connected and disconnected from Module A's ports only.

Table 32. Back-to-Back – Converteon™ Module in Smart MissingLink Test Mode

	Network Device	Port Link	Converteon™ Module Cable Status		
			All Cables Connected	Copper Cable Switch 1 to Module A - Disconnected	Module A Transmit/ Receive Fiber Cable Disconnected
Port LINK Status	Switch 1	Copper LK LED	ON	OFF	Blinking
	Converteon™ Module A	Copper LK LED	ON	OFF	Blinking
		Fiber LK LED	ON	Blinking	OFF
	Converteon™ Module B	Fiber LK LED	ON	Blinking	OFF
		Copper LK LED	ON	Blinking	Blinking
	Switch 2	Copper LK LED	ON	Blinking	Blinking

Appendix B

Cleaning Fiber Optic Connectors

The fiber optic connector consists of a fiber optic plug and its adapter. The end of the fiber optic cable is held in the core of the ferrule in the plug. Light signals are transmitted through the core of the fiber. Even minor smudges or dirt on the end face of the fiber, completely invisible to the naked eye, can disrupt light transmission and lead to failure of the component or of the entire system. Therefore, it is of utmost importance to clean all fiber optic connectors before use.

Figure 51 shows the ferrule in an SC connector.

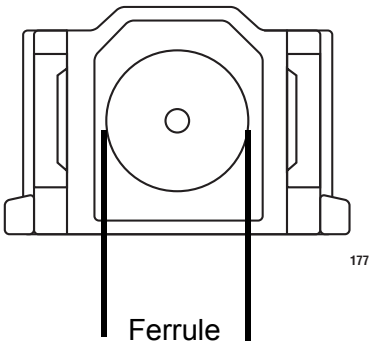

Figure 51. Ferrule in an SC Connector Plug

Figure 52 shows part of the end face of an unclean and clean ferrule.

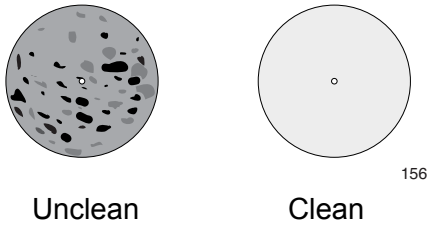

Figure 52. Unclean and Clean Ferrule

This appendix provides the following procedures

Using a Cartridge-Type Cleaner

Fiber optic cartridge cleaners, shown in Figure 53, are available from many vendors and are typically called “cartridge cleaners”.

Figure 53. Cartridge Cleaner

Note
Do not use compressed air or aerosol air to clean a fiber optic connector.

To clean a fiber optic connector using a cartridge cleaner, perform the following procedure.

1. With one hand, hold the cartridge cleaner and push the lever on the cleaning cartridge in the direction of the arrow to expose the cleaning surface, as shown in Figure 54.

2. Place the ferrule tip on the exposed cleaning surface and rub the ferrule in a downward direction, as shown in Figure 54.

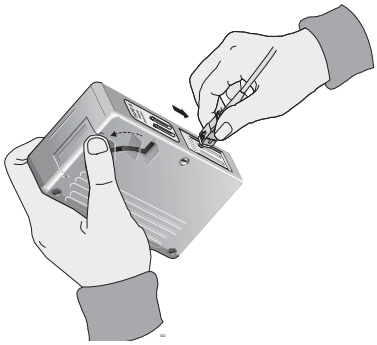

Figure 54. Rubbing the Ferrule Tip on the Cleaning Surface

Note
Rub the ferrule tip on the cleaning surface in one direction only.

3. When you reach the end of the cleaning surface, pick up the ferrule tip, rotate and place it at the top and rub downwards at least 2 times.

Caution
Failing to pick up the ferrule tip when you reach the bottom of the cleaning surface can result in static electricity that can damage the fiber optic cable.

4. If desired, repeat steps 1 and 2.
5. If a fiber inspection scope is available, use the scope to inspect the ferrule end face to make sure that it is clean.
6. Reconnect the cable to the port or protect the ferrule tip with a dust cap.

Note
Always keep a dust cap on a fiber optic cable when it is not in use.

Note
Do not touch the end face of the ferrule in the connector.

Warning
Do not look directly at the cable ends or inspect the cable ends with an optical lens when the cable is connected at the other end.

Using a Swab

Specially treated swabs (stick cleaners), shown in Figure 55, are for cleaning inside connector adapters or hard-to-reach ferrule tips. These swabs, often referred to as “lint free” or “alcohol free” swabs, are available from many vendors. Stick cleaners are available in both 2.5 mm and 1.25 mm sizes for use on SC and MU connectors respectively.

Note
NEVER use a household cotton swab and/or alcohol to clean a fiber optic connector. This may leave a residue on the ferrule tip.

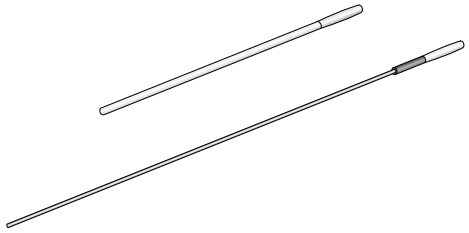

Figure 55. Lint-Free and Alcohol-Free Swabs

Note
Do not use compressed air or aerosol air to clean a fiber optic connector.

To clean a recessed ferrule using a swab, perform the following procedure.

1. Insert the swab into the adapter as shown in Figure 56 and rub the ferrule tip with the swab.

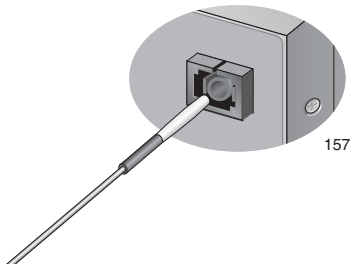

Figure 56. Cleaning a Recessed Ferrule

2. If desired, repeat step 1.

3. If a fiber inspection scope is available, use the scope to inspect the connector to make sure that it is clean and to check for scratches, pits, or other problems that may affect performance.

Note
Always keep a dust cap on a fiber optic cable when it is not in use.

Warning
Do not look directly at the cable ends or inspect the cable ends with an optical lens when the cable is connected at the other end.

Appendix C

Translated Safety Statements

Important: This appendix contains multiple-language translations for the safety statements in this guide.

Wichtig: Dieser Anhang enthält Übersetzungen der in diesem Handbuch enthaltenen Sicherheitshinweise in mehreren Sprachen.

Importante: Este apéndice contiene traducciones en múltiples idiomas de los mensajes de seguridad incluidos en esta guía.

Important: Cette annexe contient la traduction en plusieurs langues des instructions de sécurité figurant dans ce guide.

Importante: Questa appendice contiene traduzioni in più lingue degli avvisi di sicurezza di questa guida.

Важно: Данное приложение содержит переводы с разных языков по безопасности, приведенное в данном руководстве.

Laser Safety Notices

1  **Warning:** Class 1 Laser product.

2  **Warning:** Do not stare into the laser beam.

Electrical Safety Notices

3  **Warning:** To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables.

4  **Warning:** Do not work on equipment or cables during periods of lightning activity.

5  **Warning:** Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord.

6  **Warning:** Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

7 Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible.

8  **Caution:** Air vents must not be blocked and must have free access to the room ambient air for cooling.

9 **Warning:** Operating Temperature. This product is designed for a maximum ambient temperature of 40° degrees C.

10 All Countries: Install product in accordance with local and National Electrical Codes.

11  **Warning:** As a safety precaution, install a circuit breaker with a minimum value of 15 Amps between the equipment and the DC power source.

Always connect the wires to the LAN equipment first before you connect the wires to the circuit breaker. Do not work with HOT feeds to avoid the danger of physical injury from electrical shock. Always be sure that the circuit breaker is in the OFF position before connecting the wires to the breaker.

12  **Warning**: Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation.

13  **Warning:** When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last.

14 **Warning:** Check to see if there are any exposed copper strands coming from the installed wire. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires.

15 This system works with positive grounded or negative grounded DC systems.

16 **Warning:** Only trained and qualified personnel are allowed to install or to replace this equipment.

17 **Caution:** The attached mounting brackets must be used to securely mount the device on the wall.

18 **Caution:** Do not install in direct sunlight, or a damp or dusty place.

19 **Caution:** Do not expose the gateway device to moisture or water.

20 **Caution:** If the gateway device is installed indoors, make sure that the site is a dust-free environment. The site should provide for easy access to the ports of the gateway device.This will make it easy for you to connect and disconnect cables, as well as view the LEDs.

21 **Warning:** The power source for the gateway unit should be located near the unit and should be easily accessible.

22 **Caution:** To allow proper cooling of the gateway device, make sure that the air flow around the unit and through its heatsink cooling fins on the rear is not restricted.

23 Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

24 **Caution:** Risk of explosion if battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

Attention: Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d’explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur.

25 **Warning:** For centralized DC power connection, install only in a restricted access area.

26 A tray cable is required to connect the power source if the unit is powered by centralized DC power. The tray cable must be a UL listed Type TC tray cable and rated at 600 V and 90 degrees C, with three conductors, minimum 14 AWG.

27 **Warning:** Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading.

28  **Warning:** Remove all metal jewelry, such as rings and watches, before installing or removing a line card from a powered-on chassis.

29 Use dedicated power circuits or power conditioners to supply reliable electrical power to the device.

30 **Warning:** The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack.

31  **Warning:** Do not look directly at the fiber optic cable ends or inspect the cable ends with an optical lens.

32  **Warning:** This unit might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing the unit.

33 **Warning:** Only trained and qualified personnel are allowed to install or to replace this equipment.

34 **Warning:** The power input must be provided from SELV source only, per IEC 60950. Do not connect to a centralized DC battery bank.

35 UL recognized wires of 18 AWG minimum should be provided by the installer.

36 UL recognized wires of 22 AWG minimum should be provided by the installer.

37 **Caution:** Power to the hub must be sourced only from the adapter.

38 If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer’s maximum rated ambient temperature (Tmra).

39 **Caution:** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

40  **Warning:** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuits (e.g., use of power strips).

Telecommunications Compliance Notices

41 ⚠ **Warning:** When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electronic shock, and injury to persons, including the following:

Do not use this product near water, for example, near a bathtub, washbowl, kitchen sink, or laundry tub in a wet basement or near a swimming pool.

Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

Do not use the telephone to report a gas leak in the vicinity of the leak.

42 ⚠ **Warning:** Before connecting to the telephony (TEL) ports on the gateway device, make sure to disconnect the Public Switch Telephone Network (PSTN) feed to the premises.

43 **Warning:** To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.

FCC Part 68 Customer Information

a) This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the side plate of the chassis of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, this number must be provided to the telephone company.

b) The following are required when the customer orders service from the local telephone company:
Universal Service Order Codes ("USOC") for the Equipment: RJ48C
Facility Interface Code ("FIC"): 04DU9.1SN
Service Order Code ("SOC"): 6.0N

c) A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

d) If this equipment, model AT-CM70S causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

e) The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

f) If trouble is experienced with this equipment model AT-CM70S, for repair or warranty information, please contact:

Allied Telesyn Inc.
Technical Support
19800 North Creek Parkway, Suite 200
Bothell, WA 98011
1-800-428-4835
www.alliedtelesyn.com

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

g) This product is not intended to be repaired by the customer (user).

h) Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

i) If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this US: A5TDWNANAT-CM70S does not disable your alarm equipment. If you have question about what will disable alarm equipment, consult your telephone company or a qualified installer.

Lasersicherheitshinweise

1  **Achtung:** Laserprodukt der Klasse 1.

2  **Achtung:** Blicken Sie nicht in den Laserstrahl.

Elektrische Sicherheitshinweise

3  **Achtung:** Um Stromschläge zu vermeiden, darf die Abdeckung nicht entfernt werden. Die Ausrüstung enthält keine benutzerwartbaren Teile. Diese Einheit führt gefährliche Spannungen und sollte nur durch einen ausgebildeten und qualifizierten Techniker geöffnet werden. Zur Vermeidung der Möglichkeit von Stromschlägen ist die Stromversorgung des Produkts vor dem Anschließen oder Abtrennen von LAN-Kabeln zu unterbrechen.

4  **Achtung:** Bei Gewittern und Blitzaktivität dürfen keine Arbeiten an der Ausrüstung oder an Kabeln erfolgen.

5  **Achtung:** Das Stromkabel dient als Abtrennungselement. Zum Abschalten der Ausrüstung Stromkabel abziehen.

6  **Achtung:** Ausrüstung der Klasse I. Diese Ausrüstung muss geerdet werden. Der Stromstecker muss an eine vorschriftsmäßig geerdete Steckdose angeschlossen werden. Eine inkorrekt verdrahtete Steckdose kann gefährliche Spannungen auf zugängliche Metallteile aufbringen.

7 Steckbare Ausrüstung. Die Steckdose sollte in der Nähe der Ausrüstung installiert und leicht zugänglich sein.

8  **Vorsicht:** Belüftungsöffnungen dürfen nicht blockiert werden und müssen zur Kühlung durch die Umluft frei zugänglich sein.

9 **Achtung:** Betriebstemperatur. Dieses Produkt ist für eine maximale Umgebungstemperatur von 40° C konzipiert.

10 Alle Länder: Dieses Produkt muss entsprechend den örtlichen und nationalen Elektrizitätsvorschriften installiert werden.

11  **Achtung:** Als Sicherheitsvorkehrung sollte ein Überlastschalter mit einem minimalen Nennwert von 15 Ampere zwischen der Ausrüstung und der Gleichstromversorgung installiert werden.

Vor dem Anschluss der Kabel am Überlastschalter sollten stets zuerst die Kabel an die LAN-Ausrüstung angeschlossen werden. Zur Vermeidung von Verletzungen in Folge von Stromschlag sollte nicht mit SPANNUNGSFÜHRENDEN Versorgungen gearbeitet werden. Vor dem Anschluss der Kabel an den Überlastschalter ist stets Sorge zu tragen, dass der Überlastschalter AUSGESCHALTET ist.

12  **Achtung:** Nicht mehr als die empfohlene Kabellänge abisolieren. Durch das Abisolieren von mehr als der empfohlenen Länge können gefährliche blanke Drähte aus dem Anschlussblock hervorragen.

13  **Achtung:** Beim Installieren dieser Ausrüstung ist stets darauf zu achten, dass die Rahmenerdung zuerst angeschlossen und zuletzt abgetrennt wird.

14  **Achtung:** Das installierte Kabel muss auf etwaige freiliegende Kupferlitzen überprüft werden. Bei der korrekten Installation sollten keine freiliegenden Kupferdrahtlitzen aus dem Anschlussblock herausragen. Jegliche freiliegende Drähte können für Personen, die sie berühren, gefährlichen Strom führen.

15 Dieses System kann in Verbindung mit positiv geerdeten oder negativ geerdeten Gleichstromsystemen verwendet werden.

16 **Achtung:** Das Installieren und der Austausch dieser Ausrüstung ist nur ausgebildetem und qualifiziertem Personal gestattet.

17  **Vorsicht:** Mechanische Montage. Zur sicheren Wandmontage des Geräts sind die beiliegenden Montageklammern zu verwenden.

18  **Vorsicht:** Das Gerät darf nicht an feuchten, staubigen oder direktem Sonnenlicht ausgesetzten Orten installiert werden.

19  **Vorsicht:** Das Gateway-Gerät darf keiner Feuchtigkeit oder Wasser ausgesetzt werden.

20  **Vorsicht:** Bei der Innenraummontage des Gateway-Geräts ist darauf zu achten, dass es in einer staubfreien Umgebung installiert wird. Es sollte ein Installationsort gewählt werden, an dem die Ports am Gateway-Gerät gut zugänglich sind, um das Anschließen und Abtrennen von Kabeln zu erleichtern und den freien Blick auf die LEDs zu ermöglichen.

21 **Achtung:** Die Stromquelle für die Gateway-Einheit sollte sich in ihrer Nähe befinden und leicht zugänglich sein.

22  **Vorsicht:** Zur Gewährleistung der erforderlichen Kühlung des Gateway-Geräts ist darauf zu achten, dass der Luftfluss um die Einheit und über seine an der Rückseite befindlichen Kühlrippen nicht behindert wird.

23 Stromkreisüberlastung: Der Anschluss der Ausrüstung an den Versorgungsstromkreis und die möglichen Auswirkungen der Überlastung von Schaltkreisen auf den Überstromschutz und die Versorgungskabel sollten erwogen werden. In diesem Zusammenhang sollten auch die auf dem Typenschild der Ausrüstung angegebenen Nennwerte entsprechend berücksichtigt werden.

24 **Vorsicht:** Beim Ersetzen der Batterie durch einen inkorrekten Typ besteht Explosionsgefahr. Die Batterie sollte nur durch denselben oder einen gleichwertigen, vom Hersteller empfohlenen Typ ersetzt werden. Die Batterien sind gemäß der Anleitungen des Herstellers zu entsorgen.

25 **Achtung:** Bei einem zentralisierten Gleichstromanschluss darf die Installation nur in einem Bereich mit gesichertem Zugang erfolgen.

26 Bei der Versorgung der Einheit durch zentralisierten Gleichstrom ist ein Tray-Kabel zum Anschluss der Stromquelle erforderlich. Das Tray-Kabel muss ein UL-gelistetes Typ-TC-Tray-Kabel mit einer Nennspannung von 600 V und einer Nenntemperatur von 90 Grad Celsius, mit drei Leitern und mindestens 14 AWG sein.

27 **Achtung:** Bei der Rackmontage der Ausrüstung ist darauf zu achten, dass keine Gefahrenbedingung durch ungleichmäßige mechanische Belastung geschaffen wird.

28  **Achtung:** Vor dem Installieren oder Ausbauen einer Leitungskarte in das bzw. aus dem Chassis einer eingeschalteten Einheit ist aller metallischer Schmuck wie zum Beispiel Ringe oder Uhren zu entfernen.

29 Zur zuverlässigen Stromversorgung des Geräts sollte ein dedizierter Stromkreis oder Netzfilter und Stabilisator (Power Conditioner) verwendet werden.

30 **Achtung:** Das Chassis kann schwer und schwierig zu heben sein. Allied Telesis empfiehlt, bei der Rackmontage des Chassis Hilfspersonal heranzuziehen.

31  **Achtung:** Sehen Sie nicht direkt auf die Enden der Faseroptikkabel und inspizieren Sie die Kabelenden nicht mit einer optischen Linse.

32  **Achtung:** An dieser Einheit kann mehr als ein Stromkabel vorhanden sein. Vor Wartungsarbeiten sollten zur Reduzierung des Stromschlagrisikos alle Stromkabel abgetrennt werden.

33 **Achtung:** Das Installieren und der Austausch dieser Ausrüstung ist nur ausgebildetem und qualifiziertem Personal gestattet.

34 **Achtung:** Der Stromeingang darf nur über eine SELV-Quelle gemäß IEC 60950 erfolgen. Eine zentralisierte Gleichstrom-Batteriebank darf nicht angeschlossen werden.

35 UL-anerkannte Kabel mit mindestens 18 AWG sollten vom Installateur bereitgestellt werden.

36 UL-anerkannte Kabel mit mindestens 22 AWG sollten vom Installateur bereitgestellt werden.

37 **Vorsicht:** Die Stromversorgung des Hub darf nur über den Adapter erfolgen.

38 Bei der Installation in einer geschlossenen oder einer mehrere Einheiten umfassenden Anordnung kann die Temperatur der Betriebsumgebung die Raumtemperatur übersteigen. Es sollte deshalb darauf geachtet werden, das die Ausrüstung in einer Umgebung installiert wird, die der maximalen Nennumgebungstemperatur (Tmra) des Herstellers entspricht.

39 **Vorsicht:** Beim Installieren der Ausrüstung in einem Rack ist darauf zu achten, dass der für den sicheren Betrieb der Ausrüstung erforderliche Luftfluss nicht beeinträchtigt wird.

40  **Achtung:** Es sollte eine zuverlässige Erdung der rackmontierten Ausrüstung aufrechterhalten werden. Andere Versorgungsleitungen als direkte Verbindungen zu den Zweigschaltungen (z. B. Verwendung von Verlängerungskabeln) sollten besonders sorgfältig erwogen werden.

Telekommunikationskonformitätshinweise

41 ⚠ **Achtung:** Bei der Verwendung Ihrer Telefonausrüstung sollten zur Reduzierung der Brand-, Stromschlag und Verletzungsgefahr stets grundsätzliche Sicherheitsrichtlinien, einschließlich der folgenden, befolgt werden:

Verwenden Sie dieses Produkt nicht in der Nähe von Wasser, zum Beispiel in der Nähe einer Badewanne, einer Waschschüssel, eines Spülbeckens, eines Waschbottichs, in einem nassen Kellerraum oder in der Nähe eines Schwimmbads.

Vermeiden Sie die Verwendung eines Telefons (mit Ausnahme eines schnurlosen Typs) während eines Gewitters. Es könnte eine geringfügige Blitzschlaggefahr bestehen.

Verwenden Sie das Telefon nicht, um das Austreten von Gas zu melden, wenn es sich in der Nähe dieser Gefahrenquelle befindet.

42 ⚠ **Achtung:** Vergewissern Sie sich vor dem Anschluss der Telefonports (TEL) am Gateway-Gerät, dass die Verbindung des Gebäudes zum öffentlichen Telefonnetz (PTSN) unterbrochen ist.

43 **Achtung:** Verwenden Sie zur Reduzierung der Brandgefahr nur Telekommunikationsleitungskabel Nr. 26 AWG oder stärkeres Kabel.

Avisos de seguridad láser

1  **Atención:** Producto láser de clase 1.

2  **Atención:** No mire el rayo láser.

Avisos de seguridad eléctricas

3  **Atención:** Para evitar la electrocución, no quite la tapa. La unidad no contiene piezas que pueda reparar el usuario. Esta unidad contiene tensiones peligrosas y sólo la debe abrir un técnico convenientemente formado y cualificado. Para evitar todo riesgo de electrocución, desconecte la alimentación eléctrica del producto antes de conectar o desconectar los cables de la LAN.

4  **Atención:** No manipule el equipo ni los cables mientras haya rayos en la atmósfera.

5  **Atención:** El cable de alimentación se utiliza como dispositivo de desconexión. Para desactivar el equipo, desconecte el cable de alimentación.

6  **Atención:** Equipo de Clase I. Este equipo debe conectarse a tierra. La clavija de alimentación se debe enchufar a una toma eléctrica convenientemente conectada a tierra. El uso de una toma mal conectada podría provocar tensiones peligrosas en las piezas metálicas accesibles para el usuario.

7 El equipo requiere conexión. La toma eléctrica debe estar situada cerca del equipo y ser de fácil acceso.

8  **Precaución:** Las rejillas de ventilación no deben estar obstruidas y deben tener libre acceso al aire de la sala para facilitar la refrigeración.

9 **Atención:** Temperatura de funcionamiento. Este producto está diseñado para funcionar con una temperatura ambiente máxima de 40 ºC.

10 Todos los países: Instale el producto de acuerdo con las recomendaciones de la normativa sobre instalaciones eléctricas de su país.

11  **Atención:** Como medida de seguridad, instale un disyuntor con un valor mínimo de 15 A entre el equipo y la toma de alimentación CC.

Conecte siempre los cables a los equipos de la LAN antes de conectarlos al disyuntor. No trabaje con cables activos para evitar el riesgo de lesiones físicas derivadas de una descarga eléctrica. Asegúrese siempre de que el disyuntor está en la posición desconectada antes de conectar los cables.

12  **Atención:** No pele más que la longitud recomendable de cable. Si se supera dicha longitud, puede producirse un riesgo al quedar cable al descubierto en el bloque de terminales después de la instalación.

13  **Atención:** Cuando instale el equipo, asegúrese de instalar primero la conexión a tierra del bastidor y de desconectarla en último lugar.

14  **Atención:** Compruebe si hay algún hilo de cobre al descubierto que proceda del cable instalado. Cuando la instalación se realiza correctamente, no debe quedar ningún hilo de cobre al descubierto fuera del bloque de terminales. Todo cable descubierto puede conducir un nivel peligroso de electricidad a las personas que lo toquen.

15 Este sistema funciona con sistemas CC con conexión a tierra positiva y negativa.

16 **Atención:** Este equipo sólo debe ser instalado y manipulado por personal convenientemente formado y cualificado.

17  **Precaución:** Utilice los soportes de montaje que acompañan al dispositivo para montarlo en un muro.

18  **Precaución:** No instale el dispositivo expuesto a la luz solar directa ni en un lugar húmedo o con polvo.

19  **Precaución:** No exponga el dispositivo de puerta de enlace a la humedad o el agua.

20  **Precaución:** Si el dispositivo de puerta de enlace se instala en el exterior, asegúrese de que el entorno esté libre de polvo. El emplazamiento debe permitir un acceso fácil a los puertos del dispositivo de puerta de enlace. De esta forma, resultará fácil conectar y desconectar los cables y ver los indicadores LED.

21 **Atención:** La toma eléctrica de la unidad de puerta de enlace debe estar situada cerca de la unidad y ser de fácil acceso.

22  **Precaución:** Para permitir la refrigeración adecuada del dispositivo de puerta de enlace, asegúrese de no limitar la circulación de aire alrededor de la unidad ni a través de las aletas de refrigeración del radiador de la parte trasera.

23 Sobrecarga de circuitos: Tenga en cuenta la conexión del equipo al circuito de alimentación y el posible efecto de la sobrecarga de los circuitos en la protección contra excesos de corriente y en los cables de alimentación. Para ello, consulte los valores que se indican en la placa de características del equipo.

24 **Precaución:** Si la batería se sustituye por otra de tipo incorrecto, existe un peligro de explosión. Sustitúyala únicamente por otra batería del mismo tipo, o equivalente, recomendada por el fabricante. Deseche la batería de acuerdo con las instrucciones del fabricante.

25 **Atención:** En el caso de una conexión CC centralizada, instale la unidad en una zona de acceso restringido.

26 Utilice un cable de control para la conexión a la toma eléctrica si la unidad utiliza alimentación CC centralizada. El cable de control debe ser de tipo TC, figurar en la lista UL y tener una capacidad nominal de 600 V y 90 ºC, con tres conductores y de un mínimo de14 AWG.

27 **Atención:** Si el equipo se monta en un rack, se deberá evitar todo peligro de irregularidad en la carga mecánica.

28  **Atención:** Quítese todas las joyas metálicas, como anillos y relojes, antes de instalar o quitar una tarjeta de red de un chasis con alimentación eléctrica.

29 Utilice circuitos de alimentación dedicados o acondicionadores de alimentación para suministrar energía eléctrica fiable al dispositivo.

30 **Atención:** El chasis puede ser pesado y difícil de levantar. Allied Telesis recomienda buscar ayuda para montar el chasis en un rack.

31  **Atención:** No mire directamente los extremos del cable de fibra óptica ni los inspeccione con una lente óptica.

32  **Atención:** Esta unidad puede tener más de un cable de alimentación. Para reducir el peligro de electrocución, desconecte todos los cables de alimentación antes de manipular la unidad.

33 **Atención:** Este equipo sólo debe ser instalado y manipulado por personal convenientemente formado y cualificado.

34 **Atención:** La alimentación sólo debe proceder de una toma SELV, conforme a la norma UEC 60950. No conecte la unidad a un banco centralizado de baterías CC.

35 El instalador debe suministrar cables que figuren en la lista UL de un mínimo de 18 AWG.

36 El instalador debe suministrar cables que figuren en la lista UL de un mínimo de 22 AWG.

37 **Precaución:** La alimentación del concentrador sólo debe proceder del adaptador.

38 Si la unidad se instala en un conjunto de rack cerrado o con varias unidades, la temperatura ambiente de funcionamiento del entorno del rack puede ser superior a la de la sala. El equipo se debe instalar en un entorno que no supere la temperatura ambiente nominal máxima (Tmra) indicada por el fabricante.

39 **Precaución:** La instalación en un rack debe realizarse de forma que se garantice el caudal de aire necesario para el buen funcionamiento del equipo.

40  **Atención:** Se debe mantener en todo momento la fiabilidad de la conexión a tierra de los equipos montados en rack. Preste especial atención a las conexiones que no procedan directamente de los circuitos de bifurcación (por ej., regletas de conexión).

Avisos de conformidad de telecomunicaciones

41  **Atención:** Cuando utilice su equipo telefónico, deberá adoptar las siguientes precauciones de seguridad básicas para reducir el riesgo de incendio, descarga electrónica y lesiones:

No utilice este producto en zonas húmedas; por ejemplo, cerca de una bañera, un lavabo o un fregadero, en un sótano húmedo o cerca de una piscina.

Evite el uso de teléfonos no inalámbricos durante una tormenta eléctrica. a fin de evitar el riesgo de electrocución como consecuencia de un rayo.

No utilice el teléfono para notificar una fuga de gas en las inmediaciones de la misma.

42  **Atención:** Antes de realizar la conexión a los puertos de telefonía (TEL) del dispositivo de puerta de enlace, asegúrese de desconectar la alimentación de la red telefónica conmutada pública (PSTN/RTC) de las instalaciones.

43 **Atención:** Utilice sólo cable de telecomunicación 26 AWG o superior para reducir el riesgo de incendio.

Avis de sécurité laser

1  **Avertissement:** Produit laser de classe 1.

2  **Avertissement:** Ne pas observer directement le rayon laser.

Avis de sécurité électrique

3  **Avertissement:** Pour éviter tout risque d'électrocution, ne pas déposer le capot. L'appareil ne contient aucun composant réparable par l'utilisateur. Il est exposé à des tensions dangereuses et ne doit être ouvert que par un technicien compétent et qualifié. Pour éviter tout risque d'électrocution, débrancher l'alimentation électrique du produit avant de connecter ou de déconnecter les câbles de réseau local.

4  **Avertissement:** Ne pas travailler sur cet équipement ni sur ses câbles en présence de foudre.

5  **Avertissement:** Le cordon d'alimentation est utilisé en tant que mécanisme de déconnexion. Pour mettre l'équipement hors tension, débrancher le cordon d'alimentation.

6  **Avertissement:** Équipement de classe I. Cet équipement doit être mis à la terre. La prise d'alimentation doit être branchée sur une sortie d'alimentation correctement mise à la terre. Dans le cas contraire, les pièces métalliques accessibles risquent d'être soumises à des tensions dangereuses.

7 Équipement à connecter. La prise d'alimentation doit se situer à proximité de l'équipement et être facilement accessible.

8  **Attention:** Les orifices de ventilation doivent rester libres de toute obstruction pour pouvoir assurer le refroidissement par l'air de la pièce.

9 **Avertissement:** Température de fonctionnement. Ce produit a été conçu pour fonctionner à une température ambiante maximum de 40° C.

10 Dans tous les pays: installer le produit conformément aux réglementations électriques nationales et locales.

11  **Avertissement:** Par mesure de sécurité, installer un coupe-circuit d'une intensité minimum de 15 ampère entre l'équipement et la source d'alimentation en courant continu.

Toujours connecter les fils à l'équipement de réseau local avant de les raccorder au coupe-circuit. Ne pas travailler sur des composants d'alimentation CHAUDS pour éviter tout risque d'accident corporel par électrocution. Toujours s'assurer que le coupe-circuit est DÉSACTIVÉ avant de connecter les fils au coupe-circuit.

12 **Avertissement**: Respecter les recommandations pour dénuder les fils. Un dénudage excessif risque de présenter des risques pour la sécurité en laissant le fil exposé sur le bornier après l'installation.

13 **Avertissement:** Lors de l'installation de cet équipement, toujours s'assurer que la connexion de terre de la structure est installée en premier et déconnectée en dernier.

14 **Avertissement:** Vérifier la présence de fils de cuivre exposés sur le câble d'installation. Si l'installation a été correctement réalisée, aucun fil de cuivre sortant du bornier ne doit être exposé. Tout fil exposé peut exposer les personnes qui y touchent à une tension dangereuse.

15 Ce système fonctionne avec les mécanismes c.c. de mise à la terre négative ou positive.

16 **Avertissement:** Seul le personnel qualifié et compétent est autorisé à installer ou à remplacer cet équipement.

17 **Attention:** Les supports de montage fournis doivent être utilisés pour fixer l'équipement au mur.

18 **Attention:** Ne pas installer l'équipement au soleil, ni dans un endroit humide ou poussiéreux.

19 **Attention:** Ne pas exposer le périphérique servant de passerelle à l'eau ou l'humidité.

20 **Attention:** Si le périphérique servant de passerelle est installé à l'intérieur, s'assurer qu'il se trouve dans en endroit non poussiéreux. Le site doit offrir un accès aisé au port du périphérique servant de passerelle afin de faciliter la connexion et la déconnexion des câbles, tout en permettant d'observer aisément les voyants.

21 **Avertissement:** La source d'alimentation d'une unité servant de passerelle doit se situer à proximité de l'unité et rester facilement accessible.

22 **Attention:** Pour permettre le refroidissement correct de l'unité servant de passerelle, s'assurer que l'air circule librement autour de l'unité et à travers les ailettes du dissipateur thermique à l'arrière.

23 Surcharge du circuit: En connectant l'équipement au circuit d'alimentation, tenir compte des répercussions éventuelles d'une surcharge du circuit sur la protection contre les surcharges et le câblage d'alimentation. Tenir compte des valeurs nominales indiquées sur la plaque signalétique de l'équipement.

24 **Attention:** Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d'explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur.

25 **Avertissement:** Pour une connexion d'alimentation c.c. centralisée, installer uniquement dans un emplacement d'accès limité.

26 Un chemin de câble doit être utilisé pour la connexion à la source d'alimentation si l'unité est alimentée par alimentation c.c. centralisée. Le chemin de câble doit être de type TC agréé UL, intensité nominale de 600 V, 90 °C, trois conducteurs, 14 AWG minimum.

27 **Avertissement:** L'installation de l'équipement sur un rack doit se faire sans provoquer de danger par un chargement mécanique déséquilibré.

28  **Avertissement:** Retirer les bijoux en métal, tels que les bagues et les montres, avant d'installer ou de retirer une carte d'un châssis sous tension.

29 Utiliser des circuits d'alimentation ou des unités de conditionnement dédiés pour fournir une alimentation électrique fiable à l'équipement.

30 **Avertissement:** Le châssis peut être lourd et difficile à soulever. Allied Telesis recommande de demander de l'aide pour installer le châssis dans un rack.

31  **Avertissement:** Ne pas observer directement l'extrémité des câbles en fibres optiques ou les inspecter à l'aide d'un objectif optique.

32  **Avertissement:** Cette unité peut être équipée de plusieurs cordons d'alimentation. Pour réduire les risques d'électrocution, débrancher tous les cordons d'alimentation avant de procéder à la maintenance de l'unité.

33 **Avertissement:** Seul le personnel qualifié et compétent est autorisé à installer ou à remplacer cet équipement.

34 **Avertissement:** L'alimentation doit être fournie par une source SELV uniquement, conformément à la norme IEC 60950. Ne pas connecter à une rangée de batteries c.c. centralisée.

35 L'installateur doit fournir des fils de 18 AWG agréés UL.

36 L'installateur doit fournir des fils de 22 AWG agréés UL.

37 **Attention:** Le concentrateur doit uniquement être alimenté par l'adaptateur.

38 Si l'équipement est installé dans un rack fermé ou à plusieurs unités, la température ambiante de fonctionnement du rack risque d'être supérieure à la température ambiante de la pièce. Il convient d'en tenir compte avant d'installer l'équipement dans un environnement conforme à la température ambiante maximum du constructeur.

39 **Attention:** Réduction de la circulation d'air: l'installation de l'équipement dans un rack ne doit pas compromettre la circulation d'air requise pour son fonctionnement sécurisé.

40  **Avertissement:** Une terre fiable doit être maintenue sur l'équipement en rack. Faire plus particulièrement attention aux connexions d'alimentation autres que les connexions directes sur les circuits de dérivation (par ex. utilisation de barrettes d'alimentation).

Télécommunications – Avis de conformité

41 ⚠ **Avertissement:** Les précautions élémentaires de sécurité doivent être systématiquement respectées en utilisant l'équipement téléphonique pour réduire les risques d'incendie, d'électrocution et d'accident corporel, notamment:

Ne pas utiliser ce produit près d'une source d'eau, telle qu'une baignoire, un lavabo, un évier ou un baquet dans un sous-sol humide ou près d'une piscine.

Éviter d'utiliser le téléphone (autre que sans fil) en présence de foudre pendant un orage. La foudre peut entraîner un léger risque d'électrocution.

Ne pas utiliser le téléphone pour signaler une fuite de gaz à proximité de la fuite.

42 ⚠ **Avertissement:** Avant de connecter les ports téléphoniques (TEL) sur le périphérique servant de passerelle, veiller à déconnecter les alimentations RTPC (réseau téléphonique public commuté) du local.

43 **Avertissement:** Pour réduire les risques d'incendie, utiliser uniquement un cordon de télécommunication n° 26 AWG ou supérieur.

Indicazioni sulla sicurezza laser

1  **Avvertenza:** Prodotto laser Classe 1.

2  **Avvertenza:** Non fissare il raggio laser.

Indicazioni sulla sicurezza elettrica

3  **Avvertenza:** Per evitare scosse elettriche, non rimuovere la copertura. All'interno non sono presenti componenti utilizzabili dall'utente. Questa unità presenta voltaggi rischiosi e deve essere aperta solo da un tecnico qualificato ed esperto. Per eliminare il rischio di scosse elettriche, scollegare il cavo di alimentazione del prodotto prima di collegare o scollegare i cavi della rete locale LAN.

4  **Pericolo:** Non utilizzare l'apparecchiatura o maneggiare i cavi in caso di lampi.

5  **Attenzione:** Il cavo di alimentazione viene utilizzato come dispositivo di scollegamento. Per togliere la corrente all'apparecchiatura, scollegare il cavo di alimentazione.

6  **Attenzione:** Apparecchiatura Classe I. Questa apparecchiatura deve essere messa a terra. Il cavo di alimentazione deve essere collegato a un socket correttamente cablato e messo a terra. Un socket non correttamente cablato potrebbe trasferire voltaggi pericolosi su componenti di metallo accessibili.

7 Apparecchiatura cablata. Il socket deve essere installato accanto all'apparecchiatura e deve essere facilmente accessibile.

8  **Attenzione:** Le prese d'aria non devono essere ostruite e devono avere libero accesso all'aria dell'ambiente per raffreddare l'apparecchiatura.

9 Temperatura di esercizio. Questo prodotto è progettato per una temperatura ambiente massima di 40°C.

10 Per tutti i paesi: Installare il prodotto in conformità con le normative sull'elettricità locali e nazionali.

11  **Avvertenza:** Per precauzione, installare un salvavita con un valore minimo di 15 ampere tra l'apparecchiatura e la fonte di alimentazione CC.

Collegare i cavi all'apparecchiatura LAN prima di collegarli al salvavita. Per evitare il rischio di danni fisici causati da scosse elettriche, non utilizzare l'apparecchiatura ad alte temperature. Verificare che il salvavita sia in posizione OFF prima di collegare i cavi.

12  **Avvertenza:** Non scollegare più cavi di quelli raccomandati: può essere pericoloso lasciare dei cavi esposti sul blocco terminale dopo l'installazione.

13  **Avvertenza:** Quando si installa l'apparecchiatura, verificare che il collegamento di messa a terra FG (frame ground) sia installato per primo e disinstallato per ultimo.

14  **Avvertenza:** Verificare che non sporgano fili di rame dai cavi installati. Se l'installazione viene effettuata correttamente, non vi sono fili di rame scoperti, sporgenti dal blocco terminale. Gli eventuali fili scoperti possono condurre livelli di elettricità dannosi sulle persone che li toccano.

15 Questa apparecchiatura funziona con sistemi CC con messa a terra a polarità positiva o negativa.

16 **Avvertenza:** Solo personale esperto e qualificato può installare o sostituire l'apparecchiatura.

17  **Attenzione:** Per un montaggio a muro sicuro del dispositivo, è necessario utilizzare i supporti di montaggio forniti in dotazione.

18  **Attenzione:** Non installare il dispositivo in un luogo esposto alla luce solare, umido o polveroso.

19  **Attenzione:** Non esporre il dispositivo gateway all'umidità o all'acqua.

20  **Attenzione:** Se il gateway è installato in un ambiente chiuso, verificare che l'ambiente sia privo di polvere. Il sito di installazione dovrebbe disporre di un facile accesso alle porte del gateway. Questo vi consentirà di collegare e scollegare i cavi e visualizzare i LED in modo semplice.

21 **Avvertenza:** La fonte di alimentazione dell'unità gateway deve essere posizionata vicino all'unità, in un luogo facilmente accessibile.

22  **Attenzione:** Per consentire il raffreddamento appropriato del dispositivo gateway, verificare che il flusso d'aria attorno all'unità e attraverso le ventole di raffreddamento per la dispersione del calore poste sul retro non sia ostruito.

23 Sovraccarico del circuito: Prestare attenzione al collegamento dell'apparecchiatura al circuito di alimentazione e all'effetto che il sovraccarico dei circuiti potrebbe avere sulla protezione contro i sovraccarichi di corrente e sui cavi di alimentazione. In tal senso, tenere presente i valori riportati sull'etichetta dell'apparecchiatura.

24 **Attenzione:** Se si sostituisce la batteria con un tipo di batteria non corretto, si rischia di provocare un'esplosione. Sostituire la batteria solo con una dello stesso tipo o di un tipo equivalente raccomandato dal produttore. Eliminare le batterie usate secondo le istruzioni del produttore.

25 **Avvertenza:** In caso di alimentazione CC centralizzata, installare l'apparecchiatura solo in aree ad accesso limitato.

26 Se l'unità ha un'alimentazione CC centralizzata, è necessario un cavo di tipo TC approvato UL, valutato a 600 V e 90°C, con tre conduttori, di minimo 14 AWG.

27 **Avvertenza:** Il montaggio dell'apparecchiatura in rack deve essere effettuato in modo da evitare di provocare rischi dovuti a un carico meccanico irregolare.

28  **Avvertenza:** Rimuovere tutti gli oggetti di metallo, ad esempio anelli e orologi, prima di installare o estrarre una scheda di linea da un chassis acceso.

29 Utilizzare circuiti di alimentazione o alimentatori dedicati per fornire energia elettrica al dispositivo in modo affidabile.

30 **Avvertenza:** Il chassis potrebbe risultare pesante e scomodo da sollevare. Allied Telesis consiglia di richiedere assistenza per il montaggio del chassis in rack.

31  **Avvertenza:** Non osservare le estremità dei cavi a fibre ottiche direttamente oppure attraverso una lente ottica.

32  **Avvertenza:** Questa unità potrebbe disporre di più cavi di alimentazione. Per ridurre il rischio di scosse elettriche, scollegare tutti i cavi di alimentazione prima di iniziare la manutenzione dell'unità.

33 **Avvertenza:** Solo personale esperto e qualificato può installare o sostituire l'apparecchiatura.

34 **Avvertenza:** L'alimentazione deve essere fornita da una fonte SELV, come specificato nello standard IEC 60950. Non collegare il dispositivo a una batteria CC centralizzata.

35 I cavi riconosciuti UL di minimo 18 AWG non sono forniti in dotazione.

36 I cavi riconosciuti UL di minimo 22 AWG non sono forniti in dotazione.

37 **Attenzione:** L'hub deve essere alimentato solo mediante l'adattatore.

38 Se l'installazione è posizionata in un ambiente chiuso o in rack multi-unità, la temperatura operativa del rack potrebbe essere maggiore della temperatura ambiente. Per questo motivo, installare l'apparecchiatura in un ambiente compatibile con la temperatura ambiente massima stimata dal produttore (Tmra).

39 **Attenzione:** L'installazione dell'apparecchiatura in rack dovrebbe essere effettuata in modo che il flusso d'aria richiesto per un funzionamento sicuro non venga compromesso.

40  **Attenzione:** È necessario mantenere la messa a terra dell'apparecchiatura montata in rack. Prestare particolare attenzione ai collegamenti di alimentazione non CC ai circuiti periferici (ad esempio all'uso dei cavi di alimentazione).

Indicazioni per la conformità con le norme sulle telecomunicazioni

41  **Avvertenza:** Quando si utilizza l'apparecchiatura telefonica, per ridurre il rischio di incendio, scosse elettriche e danni alle persone, è necessario seguire alcune precauzioni di base per la sicurezza, ad esempio:

Non utilizzare il prodotto in prossimità di acqua, ad esempio, vicino a vasche da bagno, lavabi, lavandini, piscine oppure in ambienti umidi.

Non utilizzare un telefono (di tipo non cordless) durante un temporale: esiste il rischio remoto che i lampi provochino scosse elettriche.

Per segnalare una perdita di gas, non utilizzare il telefono in prossimità della perdita.

42  **Avvertenza:** Prima di utilizzare le porte per il collegamento telefonico (TEL) del dispositivo gateway, verificare che la rete telefonica pubblica (PSTN) sia disconnessa.

43 Per ridurre il rischio di incendi, utilizzare solo un cavo di linea telefonica di 26 AWG o superiore.

Лазерная безопасность

1  **Внимание:** лазерный продукт, класс 1.

2  **Внимание:** Не смотрите прямо в лазерный луч.

Электрическая безопасность

3  **Внимание:** Для предотвращения электрического шока, не снимайте кожух. Внутри нет частей, подлежащих обслуживанию пользователем. Этот устройство – под опасным напряжением и должно открываться только обученным и квалифицированным инженером. Для избежания возможности поражения электрическим током, отсоедините питание перед соединением или отсоединением сетевых кабелей LAN.

4  **Внимание:** Не работайте с оборудованием во время грозы.

5  **Внимание:** Кабель питания используется для отсоединения. Для отсоединения оборудования, отсоедините кабель питания.

6  **Внимание:** Оборудование Класса I. Это оборудование должно быть заземлено. Вилка питания должны быть присоединена к соответствующим образом подключенному заземлению. Неправильное соединение может подвергнуть доступные металлические части действию опасного напряжения.

7 Розетки. Розетка должна быть установлена невдалеке от оборудования и должна быть легко доступной.

8  **Предостережение:** Вентиляционные отверстия не должны быть заблокированы и должен быть свободный доступ к воздуху в комнате для охлаждения.

9 **Внимание:** Рабочая температура. Этот продукт предусмотрен для температуры окружающего воздуха не выше + 40° C.

10 Во всех странах: Инсталлируйте продукт в соответствии с национальными нормами электротехники.

11  **Внимание:** Для безопасности установите прерыватель для максимальной силы тока 15 ампер между оборудованием и источником постоянного тока.

Всегда подсоединяйте провода к сетевому оборудованию (LAN) перед тем, как присоединять кабели к прерывателю. Не работайте с кабелями под напряжением, чтобы избежать поражения электротоком. Перед присоединением проводов к прерывателю, убедитесь, что прерыватель находится в положении ВЫКЛ (OFF).

12  **Внимание:** Не очищайте от изоляции провод больше, чем рекомендовано. Чрезмерное очищение кабеля может составлять опасность после инсталляции.

13  **Внимание:** При инсталляции оборудования, убедитесь, что заземление подключается в первую, а отключается в последнюю очередь.

14  **Внимание:** Проверьте, нет ли на инсталлированных проводков на кабеле. При правильной инсталляции на терминале свободных проводков быть не должно. Открытые провода могут представлять опасность электрического поражения тем лицам, которые прикасаются к проводам.

15 Эта система действует как с плюсовым, так и минусовым заземлением постоянного тока.

16 **Внимание:** Это оборудование должно быть инсталлировано только обученными и квалифицированным работниками.

17  **Предостережение:** Оборудование должно быть надежно прикреплено к стене с помощью скоб.

18  **Предостережение:** Не инсталлируйте на солнцепеке, во влажном или пыльном месте.

19  **Предостережение:** Не подвергайте шлюзовую установку действию влажности или воды.

20  **Предостережение:** Если шлюзовая установка инсталлируется в помещении, позаботьтесь, чтобы в помещении не было пыли. Должен быть обеспечен легкий доступ к портам оборудования, чтобы Вам было легко соединять и отсоединять кабели и видеть светодиоды.

21 **Внимание:** Источник питания должен быть невдалеке от установки, и к нему должен быть удобный доступ.

22  **Предостережение:** Для хорошей вентиляции шлюзовой установки, позаботьтесь, чтобы вокруг установки и через вентиляционные решетки мог свободно циркулировать воздух.

23 Перегрузка контура: Следует подумать о том, какое количество оборудования присоединяется к контуру питания и на возможный эффект перегрузки контуров на защиту перегрузки и провода питания. Следует обращать внимание на указанные предельные показатели на фабричных табличках.

24 **Литиевая батарея:** Должна заменяться только обученным и квалифицированным инженером.

Предостережение: Возможен взрыв при замене неправильным типом батареи. Заменяйте только тем же или эквивалентным типом, рекомендованным производителем. Утилизируйте использованные батареи только в соответствии с указаниями производителя.

25 **Внимание:** Для централизованного подсоединения постоянного тока, устанавливайте только в помещении, доступ к которому ограничен.

26 Для подсоединения источника питания, если установка питается централизованным постоянным током, требуется желобной кабель. Кабель должен быть признанным UL типа и предназначен для 600 В и + 90°C, с тремя кондукторами, минимум 14 AWG (американский калибр).

27 **Внимание:** Установка оборудования на раме должна быть такой, чтобы не создавалось опасности от неровной механической нагрузки.

28  **Внимание:** Снимите все механические украшения, кольца и часы, перед инсталляцией и удалением линейной карты с корпуса под напряжением.

29 Для надежного питания используйте отдельные контуры питания и выравниватели энергии.

30 **Внимание:** Корпус может быть тяжелым и поднять его может быть сложно. Allied Telesis рекомендует, что при установке корпуса на раме Вам необходимо обеспечить соответствующую помощь.

31  **Внимание:** Не смотрите прямо на торцы волоконно-оптического кабеля и не инспектируйте торцы кабеля с помощью оптической линзы.

32  **Внимание:** Установка может быть оборудована несколькими проводами питания. Перед техническим обслуживанием установки, отсоедините все провода питания.

33 **Внимание:** Оборудование должно обслуживаться и заменяться только обученными и квалифицированными работниками.

34 **Внимание:** Питание должно подаваться только от источника SELV, в соответствии с IEC 60950. Не подключайте к централизованному блоку аккумуляторов постоянного тока.

35 Инсталлятор должен обеспечивать провода, признанные UL, минимум 18 AWG.

36 Инсталлятор должен обеспечивать провода, признанные UL минимум 22 AWG.

37 **Предостережение:** Питание на узел должно подаваться только с адаптера.

38 При монтировке на раме с несколькими установками или в закрытом контуре, рабочая температура оборудования на раме может быть выше, чем температура окружающей среды. Поэтому следует позаботиться о том, чтобы температура не превышала максимальной температуры окружающей среды, указанной производителем (Tmra).

39 **Предостережение:** Уменьшенный воздушный поток: инсталляция оборудования на раме должна быть такой, чтобы не ограничивать циркуляцию воздуха, необходимую для безопасной работы оборудования.

40  **Внимание:** Оборудование на раме необходимо надежно заземлять. Особое внимание следует обращать на соединения питания, помимо прямых соединений к веткам контура (например, на розеточные блоки).

Телекоммуникационное соответствие

41 **Внимание:** При использовании телефонного оборудования, всегда следует обращать внимания на требования безопасности для снижения риска пожара, поражения током и ранения, в том числе:

Не используйте оборудование рядом с водой – например ванной, раковиной или стиральным резервуаров или в мокром подвале рядом с бассейном.

Во время электрической бури не используйте телефон (кроме беспроводного). Есть некоторый риск поражения от молнии.

Не используйте телефон для сообщения об утечке газа вблизи от утечки.

42 **Внимание:** Перед соединения к телефонным портам (TEL) на шлюзовой установке, отсоедините городской телефон (PSTN) от помещения.

43 **Внимание:** Для снижения риска пожара, используйте коммуникационный кабель не меньше 26 AWG.