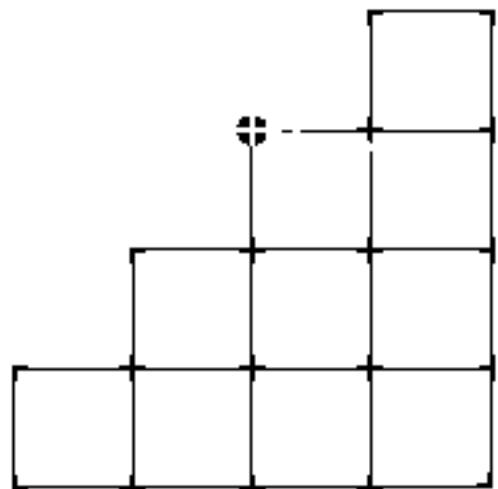




ATM LONG/VERY LONG REACH CONVERTER USER GUIDE

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About This Guide

Scope of This Guide

The *ATM Long/Very Long Reach Converter User Guide* provides all the information you need to install and set up the ATM Long/Very Long Reach Converter. This document provides an overview of the unit, step-by-step installation, power-up procedures, and operation/troubleshooting.

If the information in the release notes shipped with your ATM Long/Very Long Reach Converter differs from the information in this document, follow the release notes.

Who Should Use This Document

The *ATM Long/Very Long Reach Converter User Guide* is intended for the system administrator, network equipment technician, or network manager who is responsible for installing and managing equipment designed for operation with network hardware such as the CoreBuilder 7000/7000HD ATM switches or the SuperStack II family with ATM downlink. It assumes a working knowledge of network operations and familiarity with communications protocols that are used in networks. No prior knowledge of 3Com's CoreBuilder networking equipment is necessary to understand this manual.

Organization

The *ATM Long/Very Long Reach Converter User Guide* is organized so that you can go directly to the information you need. The parts of the document are described below.

Chapter 1: Introduction

This chapter contains an overview of general ATM converter theory, the ATM Long/Very Long Reach Converter modules and their functions/capabilities, as well as features, applications, and specifications.

Chapter 2: Installation

This chapter contains a description of the installation of the ATM Long/Very Long Reach Converter. The topics covered in this chapter include unpacking, site requirements, cable connections, and the modules available.

Chapter 3: Operation




This chapter describes the controls and indicators of the ATM Long/Very Long Reach Converter, its jumpers, activation, normal operation and troubleshooting.

Conventions

Table 1 lists the icons and typographical conventions used in this guide.

Notice icons indicate statements that you need to read before continuing in the guide. Table 1 describes these icons.

Table 1 Notice Icons

Icon	Type	Description
	Information Note	Information notes call attention to important features or instructions.
	Caution	Cautions alert you to personal safety risk, system damage, or loss of data.
	Warning	Warnings alert you to the risk of severe personal injury.

Related Documentation

The complete documentation for the ATM Long/Very Long Reach Converter and the CoreBuilder 7000/7000HD which it serves includes:

- ATM Long/Very Long Reach Converter User Guide
- ATM Long/Very Long Reach Converter Release Notes
- CoreBuilder 7000 Installation and Setup Guide



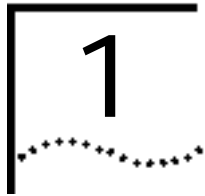
- CoreBuilder 7000 Operation Guide
- CoreBuilder 7000 Administration Guide
- CoreBuilder 7000/7000HD Release Notes

Table 2 describes important information in the CoreBuilder 7000/7000HD documentation to help you locate the information you need.

Table 2 CoreBuilder 7000/7000HD Documentation Road Map

If you want to...	Read...
Get an overview of the CoreBuilder 7000 ATM switch, including system components.	<i>Installation and Setup Guide</i>
Learn about various configurations in which you can install your CoreBuilder 7000 ATM switch.	<i>Installation and Setup Guide</i>
Install and power up your CoreBuilder 7000 ATM switch.	<i>Installation and Setup Guide</i>
Learn about how you administer and manage the CoreBuilder 7000 ATM switch.	<i>Operation Guide</i>
Learn about ATM and how it is implemented in the CoreBuilder 7000 ATM switch.	<i>Operation Guide</i>
Learn about LAN Emulation and how it is implemented in the CoreBuilder 7000 ATM switch	<i>Operation Guide</i>
Find out what type of configuration tasks you can perform on the CoreBuilder 7000 ATM switch.	<i>Administration Guide</i>
Perform configuration or administration tasks using the Administration Console.	<i>Administration Guide</i>
Get assistance.	Technical Support Appendix in any guide





Introduction

General

3Com's ATM Converter is available in two models: Long Reach and Very Long Reach. Each member of the ATM Long/Very Long Reach Converter (AL/VLRC) set provides retimed or transparent conversion of optical and electrical signals for ATM at data rates up to 155 Mbps. The modularity of the AL/VLRC interfaces enables field-changeable conversion between any two media.

Both transparent and retimed modules are available. Transparent modules provide cost-effective media conversion without reclocking. Retimed modules provide media conversion with reclocking, which enables using the AL/VLRC as a repeater. These modules can also be set for transparent operation.

The AL/VLRC is supplied as a stand-alone unit. Special hardware for mounting either a single unit or two units side-by-side in a 19" rack can be ordered separately.

Retimed Modules

The AL/VLRC provides retimed media conversion for the following ATM interfaces:

- STM-1/STS-3c.

The retimed modules provide rate selection for 51, 100 or 155 Mbps. When set to one of these rates, the retimed module regenerates and reclocks the incoming signal and acts as an ATM repeater.

When the switch is set to OTHER, the modules regenerate the signal without reclocking as transparent modules do.

Features

Modular Media Converter and Repeater

- Media types supported:
 - Single Mode Fiber
 - Multimode Fiber
- Retimed media conversion for 155 Mbps
- Transparent media conversion up to 155 Mbps
- In retimed mode can be used as a Fiber Optic repeater
- 155 Mbps OC-3 protocols supported in retimed mode
- Complies with ATM forum specifications.
- Multiple connector types are available for both electrical and optical interfaces.

Applications

A single AL/VLRC is used to connect two devices operating with dissimilar fiber or electrical interfaces. (See Figure 1.1.)

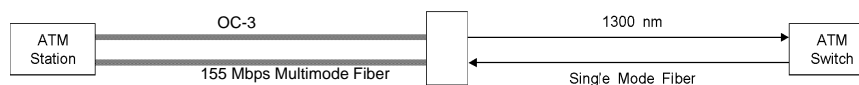


Figure 1-1 Dissimilar Device Connectivity

Specifications

Data Rate: Up to 155 Mbps

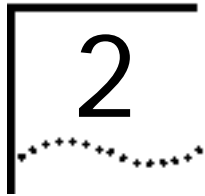
Indicators:	POWER (PWR):	ON when unit is powered FAULT (FLT) blinks when card configuration is wrong.
	WRAP:	ON when the two interfaces are wrapped.
	SIG:	ON when received signal from Rx is valid. BLINKS when the PLL is out of lock.
Controls:	WRAP:	For double conversion or test purposes.
	RATE:	For data rate selection 155 Mbps.
	OTHER:	For transparent mode.
Power:	100-240 VAC, 0.8 - 0.4 A, 47-63 Hz	
Physical:	Height:	4.4cm / 1.8 in (1U)
	Width:	21.6cm / 8.5 in
	Depth:	24.2cm / 9.5 in
	Weight:	1.1kg / 2.8lb
Environment:	Temperature:	0-40°C/32-104°F
	Humidity:	Up to 90%, non-condensing

Radiation Suppression: Complies with FCC part 15 subpart J, class A, Complies with EN-55022, Class A

Table 1-1 Optical Module Characteristics

Module Name	Protocols Supported	Fiber type (Wavelength)	Connector Type	Dynamic Range (dB)	Coding Method	Optical Power (dBm)	Sensitivity (dBm)
OC-3MM*	STS-3c/STM-1, STS-1	62.5/125 (1300 nm)	Duplex SC	19	4B/5B, NRZ	-18	-31
OC-3LRSM*	STS-3c, STM-1, STS-1	9/125 (1300 nm)	FC-PC	34		-2	-34
OC-3VLRSM*	STS-3c, STM-1, STS-1	9/125 (1550 nm)	FC-PC	34		0	-34

* Data rates are switch-selectable from the front panel.



Installation

Unpacking

Before Unpacking Inspect the equipment container before unpacking. Note and report evidence of damage immediately.

Unpacking Procedure

- Place the container on a clean flat surface. Cut all straps and open or remove top.
- Remove the unit carefully and place it securely on a clean surface.
- Remove all packing material.
- Inspect the unit for damage. Report any damage immediately.

Site Requirements

Power The AL/VLRC is powered by 100 - 240 VAC or from -48 VDC.

The unit should be installed within 1.5 meters (5 ft) of an easily accessible grounded AC outlet capable of supplying 230 V (115 V).

Front and Rear Panel Clearance

Allow at least 90 cm (36 inches) of clearance at the front of the unit for operator access. Allow at least 10 cm (4 inches) clearance at the rear of the unit for power cord connection.

Ambient Requirements

The ambient operating temperature of the AL/VLRC should be 0-40°C (32-122°F) at a relative humidity of up to 90% non-condensing.

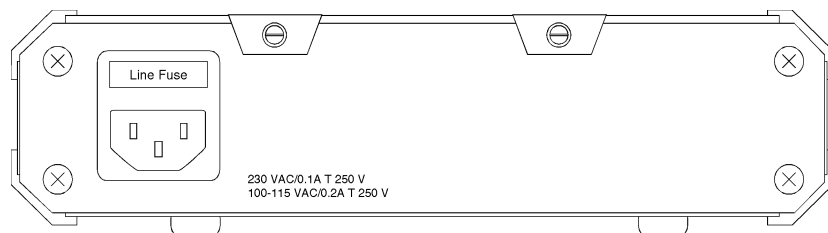


Figure 2-1 AL/VLRC Rear Panel (AC Version)

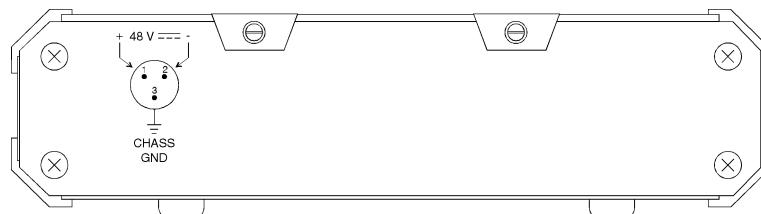


Figure 2-2 AL/VLRC Rear Panel (DC Version)

Installation of a Single Unit

Rack adapter components for installing a single unit include one short bracket and one long bracket. Each bracket is fastened to the side walls of the unit by two screws (with flat washers) which are inserted into the two front holes on the side wall (The unit is supplied with nuts already in place on the inner side wall). Note that the short bracket fastens to the left side of the unit, and the long bracket to the right side of the unit. See Figure 2.3.

Once the brackets are fastened to the side walls, the unit is ready for installation in the 19" rack. Place the unit in the rack and fasten

the brackets to the side rails of the rack by means of the two screws situated on each side (not included in the kit).

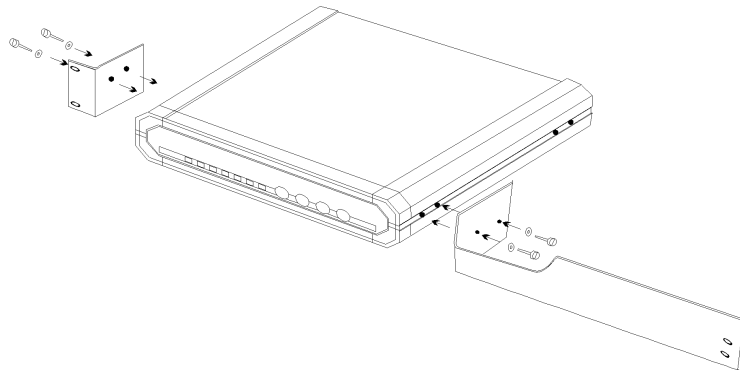


Figure 2-3 Installation of a Single Unit

Cable Connections

AC Power Connection

AC power should be supplied to the AL/VLRC through a 1.5 m (5 ft) standard power cord terminated by a grounded 3-wire plug.



When applying AC power, first connect the plug of the AC cable to the power connector on the rear panel of the AL/VLRC and then to the mains outlet.

Grounding



Interrupting of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective earth terminal can make this instrument dangerous. Intentional interruption of the grounding conductor is prohibited.

AL/VLRC Modules

The upper part of the module panel contains the AMC-R in case of a retimed conversion module, or the AMC-T for a transparent conversion module. The lower part of the panel contains the module name.

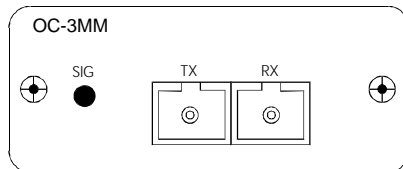
OC-3MM

Figure 2-4 OC-3MM Module Front Panel

Wavelength:	1300 nm
Connector:	SC
Used with:	Multimode fiber
Protocols supported:	STS-3c, STM-1, STS-1
Timing mode:	Retimed
Coding method:	4B/5B, NRZ
Optical output into 62.5 fiber:	-18 dBm
Receiver sensitivity:	-31 dBm
Maximum input power:	-14 dBm

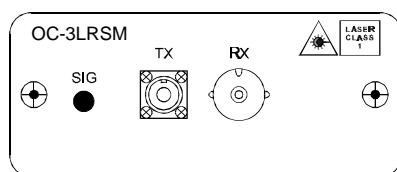
OC-3LRSM Module

Figure 2-5 OC-3LRSM Module Front Panel

Wavelength:	1300 nm
Connector:	FC
Used with:	Single mode fiber

Protocols supported:	STS-1, STS-3c, and STM-1
Timing mode:	Retimed
Optical output into 9/125 fiber:	-2 dBm
Receiver sensitivity:	-34 dBm

OC-3VLRSM Module

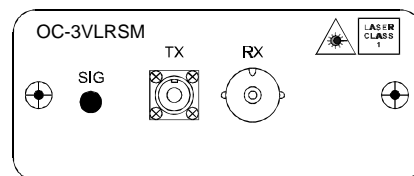


Figure 2-6 OC-3VLRSM Module Front Panel

Wavelength:	1550 nm
Connector:	FC
Used with:	Single mode fiber
Protocols supported:	STS-1, STS-3c, and STM-1
Timing mode:	Retimed
Optical output into 9/125 fiber:	0 dBm
Receiver sensitivity:	-34 dBm

3

Operation

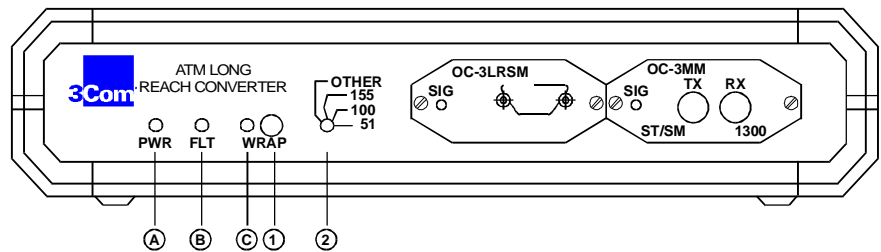


Figure 3-1 ATM Long Reach Converter Front Panel

Controls and Indicators

All controls and indicators are located on the front panel of the ATM Long Reach Converter.

Indicators	(A) POWER:	ON when unit is powered (GREEN)
	(B) FAULT:	BLINKS when card configuration is wrong (RED)
	(C) WRAP:	ON when the two interfaces are wrapped (GREEN)
Controls	(1) WRAP:	Activates loopback at the two interfaces
	(2) RATE:	For data rate selection (51, 100, 155 Mbps) or transparent mode (other)

Jumpers

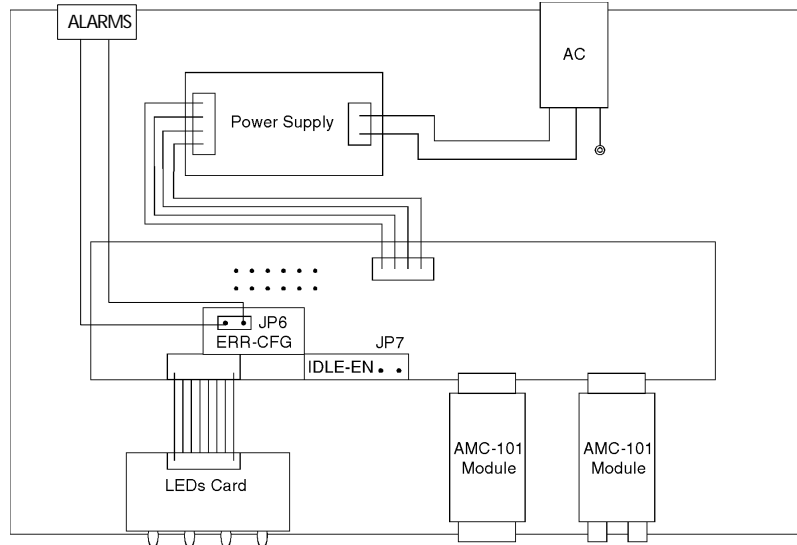


Figure 3-2 Jumper Locations and Functions

Table 3-1 Jumper Functions and Settings

Jumper ID	Function	Conditional Setting
JP6	ERR-CFG	Mounted (factory default)
JP7	Idle-Enable	Not mounted (factory default). If mounted, idle transmitted when no signal received from other side

Turning On the AL/VLRC

Connect the AC cable of the AL/VLRC to the mains outlet. The POWER indicator on the front panel should light.

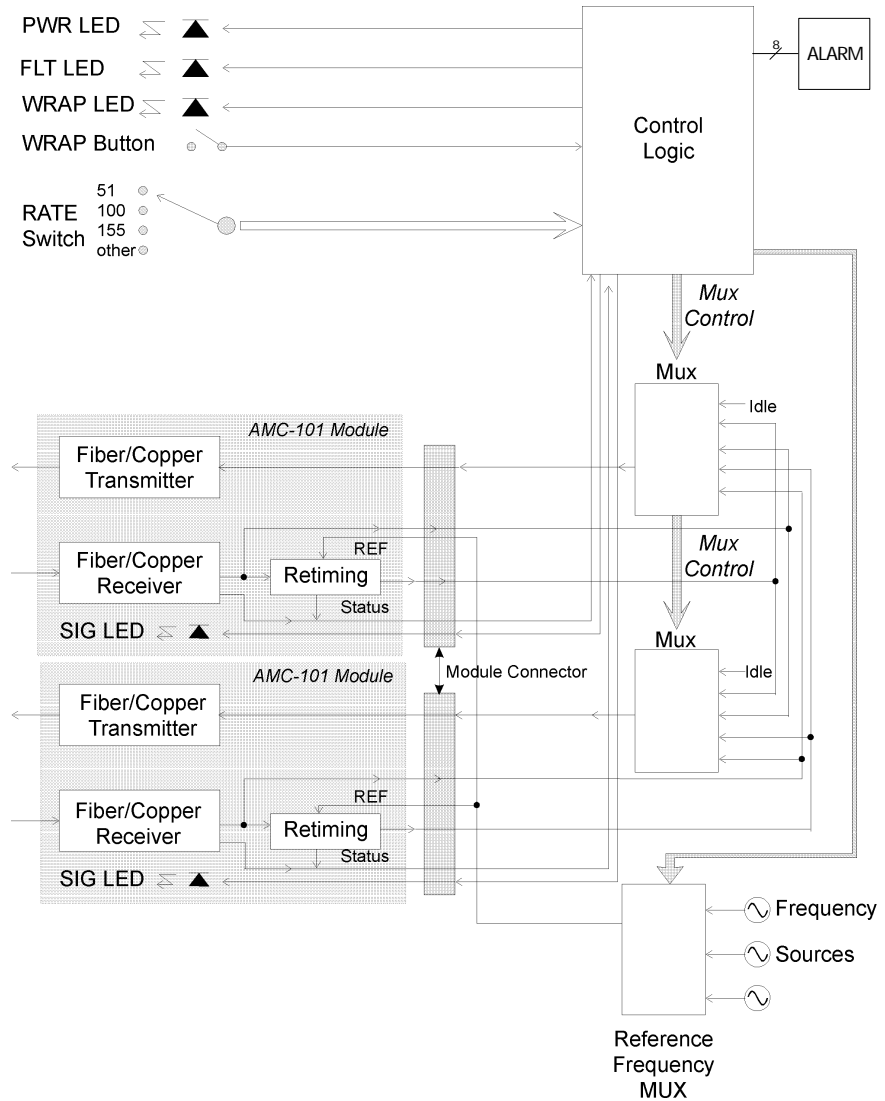


Figure 3-3 AL/VLRC Block Diagram

Normal Operation

Once powered on, the POWER indicator should light and the FLT should be turned off. If the FLT indicator blinks, a configuration error exists: the combination of the card types and the selected data rate is illegal.

Each AL/VLRC module contains a SIG indicator. If the SIG indicator is turned off; no signal is received by the module. If the SIG is turned on; a signal is received by the module, and if the re-timing option is in use, the PLL is synchronized to the receive signal. If the SIG blinks, a signal is received by the module but the PLL is out of sync.

A special circuitry can be configured to transmit idle signal in case of not receiving any signal from the other side. This option is enabled by the idle jumper (JP-6) and can be used for power measurements in case of absence of "real" data.

The WRAP function can be locally activated at any time and causes the signal received by the module to be transmitted by the same module. If the module features retiming, the looped back signal is retimed and re-clocked.

Turning Off the AL/VLRC

Disconnect the AL/VLRC asc cable from the mains outlet.

Procedure in Case of Malfunctioning

The POWER LED does not light

- Check the power cord connection on the back of the unit and at the mains outlet.
- Verify power availability at the mains outlet.

Data transmission difficulties

- Ensure that the plugged-in modules are compatible with the protocol used (media, data rate).

- Ensure that the FLT LED is off. (If the LED blinks, a configuration error exists: the combination of the module types and the selected data rate is illegal).
- Verify that the SIG LED is on and fixed. If the LED is off, no signal is being received by the module. If the LED is blinking, the module PLL is out of sync.
- Use the WRAP option to localize the problematic segment.



GLOSSARY

ATM	Asynchronous Transfer Mode. A transfer method used for LAN and WAN. ATM carries voice, video, and data at speeds up to 2.2 Gbps and can integrate geographically distant disparate networks. Also called cell relay.
ATM Adaptation Layer (AAL)	A set of protocols that translate user higher-layer protocols into ATM format.
ATM Forum	A consortium of vendors, carriers, and users formed to expedite industry agreement on ATM interfaces.
ATM Layer	The part of the BISDN protocol stack that handles most of the ATM routing and processing.
ATM Long/Very Long Reach Convertor	Models of a unit providing retimed or transparent conversion of optical and electrical signals for ATM at data rates up to 155 Mbps.
ATM Member	An alias given to an ATM address on a specific port in order to avoid typing in the ATM address 20 octets long.
AU ID	Unique number assigned to the LinkSwitch 2700. May be found through the Administration Console Menus of the LinkSwitch.
backbone	The main segment of a campus network, to which are attached department networks, or ribs.
back pressure	Control signals restraining data traffic for various reasons
broadcasting	A common method of information transmission in which every port on the network receives the packet being sent, though only the port with the proper address passes it on to the user.
bridge	Device connecting between two networks which filters and forwards data between the networks according to their destination address.

- cell** An ATM Layer protocol data unit (PDU) characterized by fixed, rather than variable, length payloads.
- CoreBuilder 7000** The 3Com CoreBuilder 7000 switch is a high-performance, modular ATM switch.
- CoreBuilder 7000HD** A 5Gbps switch able to support up to 32 ports and can reach this total when its chassis houses 8-Port Boards to full capacity.
- CLP** Cell Loss Priority. A bit in the ATM cell header indicating that if there is a need to discard a cell, the cell with the CLP bit marked is to be discarded.
- collision** Overlapping transmission of two or more nodes onto media. All data is unusable.
- connection** An ATM connection consists of the concatenation of ATM Layer links in order to provide an end-to-end information transfer capability to access points.
- connectionless communications** A form of packet-switching that relies on global addresses in each packet rather than on predefined virtual circuits.
- connection-oriented communications** A form of packet-switching that requires a predefined circuit from source to destination to be established before data can be transferred.
- Data Communications Equipment (DCE)** The equipment providing functions that establish, maintain and terminate a data transmission connection.
- Data Terminal Equipment (DTE)** The equipment connected to the common carrier communications facility. The DTE is typically a computer system or terminal.
- end system** A system where an ATM connection is terminated or initiated. An originating end system initiates the ATM connection, and a terminating end system terminates the ATM connection. OAM cells may be generated and received.

EPD	Early Packet Drop, a traffic management mechanism whereby the frame is discarded in cases of congestion, with the decision to discard being taken from the first byte. (See also PPD.)
Ethernet	A CSMA/CD, 10 Mbps, local area data network, developed by Xerox Corporation. It is one of the most popular baseband LANs in use.
header	Protocol control information located at the beginning of a protocol data unit.
IEEE 802.3	IEEE standard for Ethernet local area networks.
IEEE 802.1D	IEEE standard for bridging.
in-band	Transmission of auxiliary information, e.g., management messages over the media also used by the system users.
Internet Protocol (IP)	The protocol governing packet forwarding within the Transmission Control Protocol/Internet Protocol (TCP/IP) suite of standards developed and used on the Internet.
IP address	Internet Protocol address. A unique identifier for a machine attached to a network made up of two or more interconnected local area or wide area networks.
LAN	Local Area Network. A data communications network spanning a limited geographical area, such as a single building or campus. It provides communication between computers and peripherals. LANs are distinguished by their small geographical size, high data rate, and low error rate.
LAN Emulation	A way for legacy LANs and all higher-layer protocols and applications to integrate transparently with ATM networks.
LM	Local management of a network device, via a connected terminal.
MIB	Management Information Base. A database of network management information that describes the specifics of individual network components.

Network to Network Interface (NNI)	The interface between two ATM network nodes.
Operation and Maintenance cell (OAM)	A cell that contains ATM maintenance and performance monitoring information. It does not form part of the upper layer information transfer.
out-of-band	Transmission of auxiliary information e.g., management messages, over a media other than that used by the system users.
pipe	Channel in a switching fabric allowing connectivity to one or more interface ports.
PPD	Partial Packet Drop, a traffic management mechanism whereby the entire frame is discarded following suspected damage to one or more of its bytes. Also known as "Tail Drop". (See also EPD.)
point-to-point call	A two-way call or connection that has one source and one destination.
point-to-multipoint call	A one-way call or connection that has only one source, but may have many destinations.
protocol	A set of rules for communicating between communication devices. The rules dictate format, timing, sequencing, and error control.
Protocol Data Unit (PDU)	A unit of data specified in a layer protocol and consisting of protocol control information and layer user data.
PVC	Permanent Virtual Connection. A basic connection method that requires the user to define each connection manually.
router	A device that connects two or more remote networks by selectively forwarding messages between them. A router differs from a bridge and a gateway in that it selectively forwards information between the networks, based on layer 3 protocols.



- RS-232 serial port** Use of this port changes the parallel arrangement of data within computers to the serial (one after the other) form used on data transmission links. This port can be used for dedicated local management access.
- server** A computer that provides clients with application and network services. Servers are shared by multiple users.
- SNMP** Simple Network Management Protocol. A protocol originally designed to be used in managing TCP/IP-based internets. SNMP is presently implemented on a wide variety of computers and networking equipment and may be used to manage many aspects of network and end-station operation.
- SuperStack II** A family of 3Com and OEM products designed to operate together in a single system.
- SVC** Switched Virtual Connection. An ATM standard signaling protocol that automatically defines connections as they are needed, and discards them when complete.
- Switch 2700** 3Com Ethernet-to-ATM switch used in SuperStack II to connect Ethernet network devices to each other and to an ATM backbone.
- topology** The physical or logical placement of stations on a network in relation to one another.
- VCI** Virtual Channel Identifier. Part of the identifier of a particular virtual circuit in the ATM fabric.
- VPI** Virtual Path Identifier. Part of the identifier of a particular virtual circuit in the ATM fabric.
- WAN** Wide Area Network. Data communications network spanning very large geographical areas.



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GLOSSARY



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LIMITED WARRANTY

HARDWARE: 3Com warrants its hardware products to be free from defects in workmanship and materials, under normal use and service, for the following lengths of time from the date of purchase from 3Com or its Authorized Reseller:

Internetworking products	One year
Network adapters	Lifetime
Ethernet stackable hubs and Unmanaged Ethernet fixed port repeaters	Lifetime* (One year if not registered)
*Power supply and fans in these stackable hubs and unmanaged repeaters	One year
Other hardware products	One year
Spare parts and spares kits	90 days

If a product does not operate as warranted above during the applicable warranty period, 3Com shall, at its option and expense, repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

3Com shall not be responsible for any software, firmware, information, or memory data of Customer contained in, stored on, or integrated with any products returned to 3Com for repair, whether under warranty or not.

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