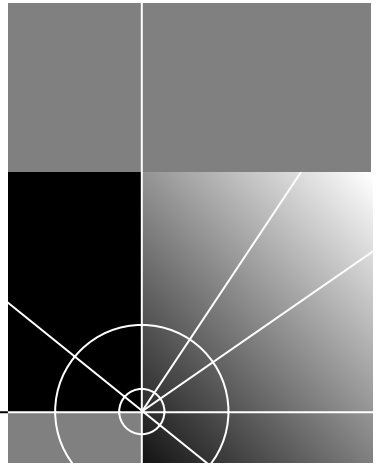
CoreBuilder™ 9000 ATM Interface Module User Guide

Software Version 1.5



http://www.3com.com/

Part No. DUA-C900-2FAA02
Published June 1998

3Com Corporation
5400 Bayfront Plaza
Santa Clara, California
95052-8145

Guide written by Joel Harband, Laura Novich and Leah Hakim. Edited by Benjamin Mann. Illustrated by Pearl Goldberg. Produced by Tracey Taylor.

CONTENTS

ABOUT THIS GUIDE

The *CoreBuilder™ 9000 ATM Interface Module User Guide* provides the information for installing, setting up and configuring the ATM Interface Module in your CoreBuilder™ 9000 Enterprise Switch. This guide provides an overview of the ATM Interface Module, installation and power-on; how to configure, manage, and troubleshoot the module; and theory of operation.

This guide is intended for the system administrator, network equipment technician, or network manager who is responsible for installing and managing interface cards designed for operation with network hardware CoreBuilder 9000™ ATM switches. 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.

If the information in the release notes shipped with your ATM Interface Module differs from the information in this guide, follow the instructions in the release notes.

Most user guides and release notes are available in Adobe Acrobat Reader Portable Document Format (PDF) or HTML on the 3Com World Wide Web site:

http://www.3com.com/

Finding Specific Information in This Guide

This table shows the location of specific information in this guide:

If you are looking for	Turn to
An overview of the ATM Interface Module and its functions and features	Chapter 1
An explanation on how to install the components, power-on the module, and a description of system states and LED indicators.	Chapter 2
An explanation on how to use and log into the LMA as well as an explanation on its structure	Chapter 3
An explanation on how to configure the ATM Interface Module ports and how to set up the network connections	Chapter 4
Information on the principles underlying the operation of the ATM Interface Module including ATM layer processing and traffic management.	Chapter 5
Help to isolate and correct problems that may occur during installation and normal operation	Chapter 6
Descriptions of the electrical, environmental, mechanical, and physical specifications of the ATM Interface Module, including the OC-3/STM-1 and OC-12/STM-4 cards	Appendix A
Information on 3Com Part Numbers for all ATM Interface Module components and configuration possibilities.	Appendix B
Methods for contacting the 3Com technical support organization and for accessing other product services	Appendix C

Conventions

Table 1 and Table 2 list conventions that are used throughout this guide.

Table 1 Notice Icons

Icon	Notice Type	Description
	Information note	Information that describes important features or instructions
	Caution	Information that alerts you to potential loss of data or potential damage to an application, system, or device
	Warning	Information that alerts you to potential personal injury

Table 2 Text Conventions

Convention	Description
`Screen displays`	This typeface represents information as it appears on the screen.
`Syntax`	The word "syntax" means that you must evaluate the syntax provided and then supply the appropriate values for the placeholders that appear in angle brackets. Example: To enable RIPIP, use the following syntax: `SETDefault !<port> -RIPIP CONTrol = Listen` In this example, you must supply a port number for <port>.
`Commands`	The word "command" means that you must enter the command exactly as shown and then press Return or Enter. Commands appear in bold. Example: To remove the IP address, enter the following command: **`SETDefault !0 -IP NETaddr = 0.0.0.0`**
The words "enter" and "type"	When you see the word "enter" in this guide, you must type something, and then press Return or Enter. Do not press Return or Enter when an instruction simply says "type."
Keyboard key names	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press Ctrl+Alt+Del
Words in *italics*	Italics are used to: ■ Emphasize a point. ■ Denote a new term at the place where it is defined in the text. ■ Identify menu names, menu commands, and software button names. Examples: From the *Help* menu, select *Contents*. Click *OK*.

Related Documents

The following lists information about supporting documentation, including:

- CoreBuilder 9000 Documents
- Related Documents

CoreBuilder 9000 Documentation

The following documents comprise the CoreBuilder 9000 documentation set. Documents are available in two forms:

- Paper Documents

  The paper documents that are shipped with your system are listed on this and the next page.

- CD-ROM

  Additional documents are included in your CoreBuilder 9000 System Documentation CD-ROM. This CD-ROM contains on-line versions of the paper documents as well as additional documents not shipped with your system. Note that release notes are not on the CD-ROM.

To order a paper copy of a document that you see on the CD-ROM, or to order additional CDs, contact your sales representative.

Paper documents

These documents are shipped with the CoreBuilder 9000 chassis:

- Chassis Quick Installation Guide for the CoreBuilder 9000 Enterprise Switch
- CoreBuilder 9000 Enterprise Switch Getting Started Guide

These documents are shipped with their individual modules or field replaceable units:

- *Module Quick Start Guides*

  An overview, LED status information and installation instructions for each module

- *CoreBuilder 9000 Module Quick Command Reference* cards

  Lists the commands used on each module.

- *Power Supply Installation Guide*

  Overview information and installation instructions for the CoreBuilder 9000 power supplies.

- *Fan Tray Removal and Replacement Guide*

  Overview information and removal and replacement instructions for the CoreBuilder 9000 power supplies.

- *Release Notes*

  Contains the most updated information.

Documents on CD-ROM

The CD-ROM that comes with your system contains online versions of the paper documents that were shipped with your system (excluding the release notes), as well as these documents:

- *CoreBuilder 9000 Enterprise Management Engine User Guide*

  This guide describes how to use the CoreBuilder 9000 Enterprise Engine (EME) to manage the chassis and the network modules in the chassis.

- *CoreBuilder 9000 ATM Switch Fabric User Guide*

  This guide explains how to use, configure and network the ATM Switch Module, as well as a detailed explanation of networking theory.

- *CoreBuilder 9000 ATM Interface Module User Guide*

  This guide explains how to use, configure and manage the ATM Interface Module, explains networking theory and provides troubleshooting information.

Reference Documents

The following documents supply related background information:

Case, J., Fedor, M. Scoffstall, M., and J. Davin, *The Simple Network Management Protocol*, RFC 1157, University at Knoxville, Performance Systems International and the MIT Laboratory for Computer Science, May 1990.

Rose, M., and K. Mc Cloghrie, *Structure and Identification of Management Information for TCP/IP based Internets*, RFC 1155, Performance Systems International and Hughes LAN Systems, May 1990.

Documentation Comments

Your suggestions are very important to us. They help us make our documentation more useful to you.

Please send e-mail comments about this guide to:

sdtechpubs_comments@3Com.com

Please include the following information when commenting:

- Document Title
- Document Part Number (found on the front cover of this document)
- Page Number (if appropriate)

Example:

CoreBuilder 9000 ATM Interface Module User Guide

Part Number DUA-C900-2FAA02

Page 8

Year 2000 Compliance

For information on the Year 2000 compliance and 3Com products, visit the 3Com Year 2000 Web page:

http://www.3Com.com/products/yr2000.html

1 OVERVIEW

This chapter describes the major characteristics and capabilities of the ATM Interface Module. The following topics are described:

- About the ATM Interface Module
- ATM Interface Module Capabilities
- The OC-3/STM-1 Daughter Card
- The OC-12/STM-4 Daughter Card
- Daughter Card Configurations
- Key Features
- A Typical Application

About the ATM Interface Module

The ATM Interface Module contains receptacles for:

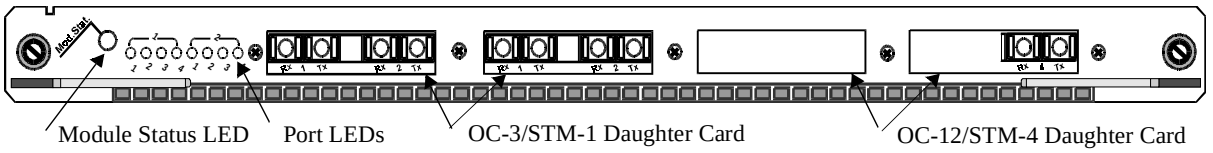
- An OC-3/STM-1 four-port ATM interface daughter card
- An OC-12/STM-4 one-port ATM interface daughter card

The daughter cards are designed to be installed into receptacles in the ATM Interface Carrier Module. each of the daughter card receptacles can hold an OC-12/STM-4 daughter card or an OC-3/STM-1 daughter card. These cards are sold together with the Interface Carrier Module as a kit, and are also sold separately.

Faceplate Layout

Figure 1 shows the faceplate of the ATM Interface Module with one OC-12/STM-4 daughter card installed on the left and one OC-3/STM-1 daughter card installed on the right. Note that, in Figure 1, the module is displayed on its side; but it is installed vertically into the chassis with the LEDs on top.

Figure 1 ATM Interface Module Faceplate



The LED indicators on the faceplate show the operational ATM Interface Module status of the ATM Interface Module. The Module Status LED indicator is a general purpose LED that shows the ATM Interface Module's status; the two groups of four Port LEDs show the status of individual ports in the daughter cards. For more information, see "System States" on page 30.

ATM Interface Module Capabilities

The ATM Interface Module provides the following capabilities:

- Multiple high speed ATM physical connectivity
- Traffic management to prevent loss of high priority data
- Flexibility of mixing and matching different physical interfaces

Traffic Management

The ATM Interface Module features several different methods of preventing loss of high priority data including:

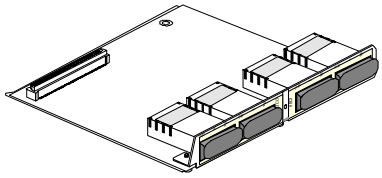
- Priority Output Queues
- Back Pressure Cell Storage
- Early Packet Drop (EPD) and Partial Packet Drop (PPD)
- EFCI Marking
- CLP-based Cell Discard

The OC-3/STM-1 Daughter Card

The OC-3/STM-1 daughter card is a pluggable interface module for the ATM Interface Module. You can install one or two OC-3/STM-1 daughter cards on each ATM Interface Module.

Figure 2 shows the OC-3/STM-1 daughter card:

Figure 2 The OC-3/STM-1 Daughter Card

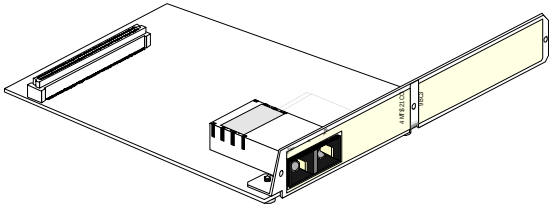


The OC-12/STM-4 Daughter Card

The OC-12/STM-4 daughter card is a pluggable interface module for the ATM Interface Module. You can install one or two OC-12/STM-4 daughter cards.

Figure 3 shows the OC-12/STM-4 daughter card:

Figure 3 The OC-12/STM-4 Daughter Card



Daughter Card Configurations

Table 3 indicates possible configurations of the OC-3/STM-1 and OC-12/STM-4 daughter card in the ATM Interface Module.

Table 3 Daughter Cards Compatible with the ATM Interface Module

Card Type	No. of Ports	Rate (Mbps)	Granularity	3Com Part Number
OC3-MMF*	4	155	4	3CB9NAL4MC
OC3-SMF SR†	4	155	4	3CB9NAL4SC
OC3-MMF +SMF SR‡	3+1	155	4	3CB9NAL3M1SC
OC12-MMF	1	622	1	3CB9NAK1MC
OC12-SMF SR	1	622	1	3CB9NAK1SC

* MMF=Multimode Fiber
† SMF SR=Single Mode Short Reach
‡ MMF+SMF SR = An OC-3/STM-1 daughter card with 3MMF ports and 1 SMF SR port.

Available Combinations

The ATM Interface Module and daughter cards are available in the combinations specified in Table 4. The daughter cards may be ordered either packaged together with the Carrier module or ordered separately. In either case, the daughter cards are installed into the Carrier module by the customer. See the *ATM Interface Module Quick Start Guide* for instructions on how to install the daughter cards into the ATM interface module.

Table 4 Configuration Options for the ATM Interface Carrier Module and Daughter Cards

Item	Packaged/ Separate	3Com Part Number
ATM Interface Carrier Module	Separate	3CB9AK2
ATM Interface Module with: 2x Port OC-12/STM-4 MMF* 2x Port OC-12/STM-4 SMF SR†	Packaged	 3CB9AK2MC 3CB9AK2SC
ATM Interface Module with: 8x Port OC-3/STM-1 MMF 8x Port OC-3/STM-1 SMF SR	Packaged	 3CB9AL8MC 3CB9AL8SC
Daughter Card: 1x Port OC-12/STM-4 MMF 1x Port OC-12/STM-4 SMF SR	Separate	 3CB9NAK1MC 3CB9NAK1SC

Table 4 Configuration Options for the ATM Interface Carrier Module and Daughter Cards (continued)

Item	Packaged/ Separate	3Com Part Number
Daughter Card:	Separate	
4x Port OC-3/STM-1 MMF		3CB9NAL4MC
4x Port OC-3/STM-1 SMF SR		3CB9NAL4SC
3x Port OC-3/STM-1 MMF +1x Port SMF SR		3CB9NAL1S3MC

* MMF=Multi-mode Fiber

† SMF SR=Single Mode Short Reach

Key Features

The ATM Interface Module has the following key features:

Data Flow Capacity

- 622 Mbps x two channels

VPI/VCI Range Support - Tx

- Up to 8 VPI bits
- Up to 16 VCI bits
- 13K connections per port

VPI/VCI Range Support - Rx

- Up to 8 VPI bits
- Up to 14 VCI bits
- 13K connections per port

WAN Support

- Clocking
- Peak cell rate control

Traffic Management

- Priority Output Queues
- Back Pressure Cell Storage
- Early Packet Drop (EPD)
- Partial Packet Drop (PPD)
- EFCI Marking
- CLP-based Cell Discard

Output Buffering

- Output buffer capacity: 8K cells per OC-12/STM-4 channel
- Output buffer priorities: Three delay priorities per OC-12/STM-4 channel

A Typical Application

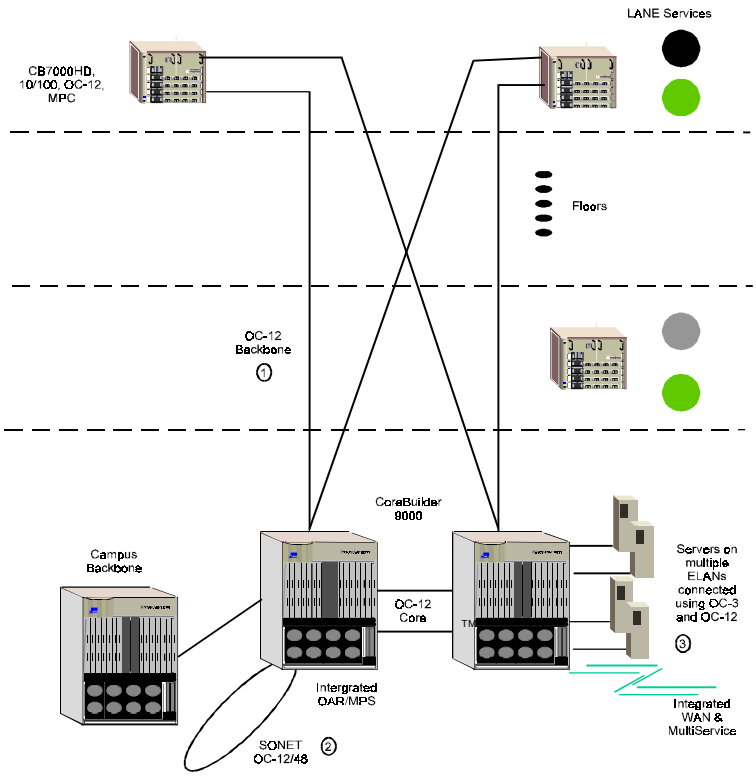
The ATM Interface Module installed in a high-density CoreBuilder 9000 Enterprise Switch provides advantages in many different locations and configurations.

Enterprise Network

This example illustrates the power, modularity, and flexibility of the CoreBuilder 9000 Enterprise Switch in a large-scale enterprise network consisting of headquarters offices, regional offices, and branch offices. The following applications of the CoreBuilder 9000 are shown:

- Upgrading the backbone to OC-12
- Building a high-performance OC-12 Campus and Metropolitan Area Network
- Utilizing high-density Server Farm applications

Figure 4 A CoreBuilder 9000 ATM Core in a Switched Ethernet Network



2 POWER-ON

This chapter contains a description of the system states of the CoreBuilder 9000 ATM Interface Module and its daughter cards. Topics covered in this chapter include:

- Safety Precautions
- Handling Precautions
- Installation
- Connecting to Network Services
- System States

For information about installing the ATM Interface Module see the *CoreBuilder 9000 ATM Interface Module Quick Start Guide*.

Safety Precautions

When you handle components in a CoreBuilder 9000 system, be sure that you follow all safety precautions. To avoid electric shocks, burns, fire or equipment damage, read and follow these warnings:

***WARNING**: Hazardous energy exists within the CoreBuilder System. Use extreme caution when you install, remove, or replace the ATM Interface Module.*

WARNING: *The ATM Interface Module must be installed, removed, or replaced only by trained service personnel.*

***WARNING:** When the CoreBuilder 9000 system is on, never insert metal objects, such as a screwdriver into open module slots and sure to remove all hand worn jewelry (such as watches and rings). When the system is on, do not touch any connections within the chassis with your fingers. Do not insert metal objects into the backplane.*

WARNING: *Do not plug in, turn on, or attempt to operate an obviously damaged module.*

WARNING*: To ensure optical safety when you install the ATM Interface Module, comply with this precaution:*

Although the data communications LEDs and lasers that are used in this product meet the regulatory requirements for casual exposure to the eye, as with any bright source of bright light, 3Com recommends that you do not look into the light source.

ESD Safety Information

Electrostatic Discharge (ESD) can damage components on the module. ESD, which occurs when the module is handled improperly, can cause complete or intermittent failure.

CAUTION: *To prevent ESD-related damage:*

- *Make sure that you are properly grounded. Use a footstrap and a grounded mat, or wear a grounded wrist strap, ensuring that the strap makes good skin contact.*
- *Keep the module in its antistatic bag until you are ready to install it.*

Handling Precautions

Observe the following precautions when you handle the ATM Interface Module:

- Always handle the module by the faceplate or as shown in the ATM Interface Module Quick Start Guide.
- Do not touch the components, pins, leads, or solder connections.
- Before you push the module into the chassis, make sure that the injector/ejector handles are open.
- When you insert the module into the chassis, match the upper and lower module guides.
- When you insert the module into the chassis module guides, do not twist or otherwise force the module into the chassis.

Précautions de sécurité

Lorsque vous manipulez les éléments du système CoreBuilder 9000, veillez à bien respecter les précautions de sécurité. Pour éviter les décharges électriques, les brûlures, l'incendie ainsi que pour ne pas endommager l'équipement, veuillez lire et respecter les précautions suivantes:

AVERTISSEMENT: *Le système CoreBuilder 9000 contient une énergie qui peut être dangereuse. Soyez trez minutieux lorsque vous installez, ôtez ou replacez un Module Interface ATM.*

AVERTISSEMENT: *Seul un personnel habilité à le faire peut installer, ôter ou remplacer un Module Interface ATM.*

AVERTISSEMENT: *Lorsque le systeme CoreBuilder 9000 est sous tension, ne jamais insérer des objets tels que tournevis ni même des doigts portant des bijoux dans les emplacements d'un module ouvert. Lorsque le système est sous tension, ne touchez aucune connexion du châssis avec les mains ou les doigts. Ne pas insérer d'objets métalliques dans la face arrière.*

AVERTISSEMENT: *Ne pas brancher, allumer ou essayer de faire fonctionner un module d'évidence défectueux.*

AVERTISSEMENT: *Pour vous protéger les yeux lors de l'installation du Module d'Interface ATM, respectez les précautions suivantes:*

Bien que les LEDs et lasers des communications de données utilisés dans ce produit soient conformes aux normes d'exposition oculairs éventuelle, 3Com vous recommande, comme pour toute lumière vive, de ne pas regarder directement la source de lumière.

Information sur la prévention de décharges électrostatiques

Les décharges électrostatiques peuvent endommager des éléments du module. Ces décharges, qui surviennent lors d'une manipulation inadéquate du module, peuvent entraîner une défaillance temporaire ou permanente.

ATTENTION: *Pour éviter des dommages électrostatiques:*

- *Assurez-vous d'être bien branché à la terre. Utilisez un sous-pied et un tapis relié à la terre ou portez un bracelet mis à la terre et veillez à ce que le contact dermique soit bon.*
- *Conservez le module dans un sac antistatique jusqu'à son installation.*

Précautions de manipulation

Respectez les précautions suivantes lorsque vous manipulez le Module Interface ATM:

- Tenez le module par son panneau avant uniquement.
- Ne pas toucher les éléments, broches, branchements ou soudures.
- Avant d'insérer le module dans le châssis, assurez-vous que les poignées d'insertion/d'éjection sont ouvertes.
- Lorsque vous faites glisser le module dans le châssis, faites coïncider les rails inférieurs et supérieurs.
- Ne jamais forcer lorsque vous insérez le module dans les rails.

Sicherheitsvorkehrngen

Halten Sie beim Umgang mit Modulen des CoreBuilder-9000-Systems unbedingt alle Sicherheitsvorkenhrungen ein. Lesen und befoldgen Sie folgende Warnungen, um elektrische Schläge, Verbrennungen, Brände oder Materialschäden zu vermeiden:

Im CoreBuilder-System existieren hohe elektrische Spannungen. Sie sollten deshalb das ATM-Schnittstellen-Modul nur mit aüßerster Vorsicht installieren, entfernen oder tauschen.

Das ATM-Schnittstellen-Modul darf nur von ausgebildetem Service-Personal installiert, entfernt oder getauscht werden.

Führen Sie bei eingeschaltetem CoreBuilder-9000-System niemals Metallgegenstände wie Schraubenzieher oder Schmuck an Fingern in offene Modulschlitze ein. Berühren Sie bei eingeschaltetem System keine Verbindungsstellen in Gerät mit Händen oder Fingern. Setzen Sie keine Metallgegenstände in die Rückwand ein.

Versuchen Sie nicht, ein offensichtlich beschädigtes Modul zu installieren oder in Betrieb zu nehmen.

Halten Sie sich beim Installieren des ATM-Scnittstellen-Moduls zur Gewährleistung des optischen Sicherheit an folgende Vorkehrung: Obwohl die für die Datenkommunikation verwendeten LEDs und Laser-Dioden die Sicherheitvorkehrungen für zufälligen Augenkontakt erfüllen, entsprechend wie bei anderen hellen Lichtquellen, empfiehlt 3Com nicht direkt in die Lichtquellen zu blicken.

Sicherheitsinformationen für Elektrostatische Entladungen

Elektrostatische Entladungen (ESD) können einzelne Baugruppen oder das gesamte Modul beschädigen. ESD können vorkommen, wenn das Modul nicht richtig gehandhabt wird und können eine dauerhafte oder zeitweilige Fehlfunktion bewirken.

***VORSICHT**: Zur Verhütung von Schadën durch ESD:*

- *Vergewissern Sie sich, daß Sie richtig geerdet sind. Benutzen Sie ein Fußband und eine geerdete Matte oder tragen Sie ein geerdetes Handgelenkband mit gutem Hautkontakt.*
- *Lassen Sie das Modul bis zur Installation in der Anti-Statik-Tasche.*

Vorkehrungen beim Umgang mit dem Modul

Beachten Sie folgende Vorkehrungen beim Umgang mit dem ATM-Scnittstellen-Modul:

- Fassen Sie das Modul immer nur an der Frontplatte an.
- Berühren Sie nicht die Baugruppen, Stifte, Leitungen oder Lötverbindungen.
- Vergewissern Sie sich vor dem Einschieben des Modules, daß die beiden Bügel zum Einschieben bzw. Entfernen offen stehen.
- Achten Sie beim Einschieben des Moduls darauf, daß es sich in der oberen und unteren Führungsschiene befindet.
- Achten Sie beim Einschieben des Moduls darauf, daß Sie es nicht verkannten. Schieben Sie das Module nicht mit Gewalt in das Gerät.

Installation

This section describes installing the ATM Interface Module.

Installation Prerequisites

Before you install the ATM Interface Module, ensure that you have met all of the following prerequisite conditions:

1. Complete the chassis unpacking and installation procedure as described in the *CoreBuilder 9000 Chassis Quick Installation Guide.* You can install the chassis in a rack or on a tabletop.
2. Install the power supply as described in the *Power Supply Installation Guide* and install the power cable as described in the *EME Quick Start Guide.*
3. Install the Ethernet Management Engine as described in the *EME Quick Start Guide*.

4 Install the Switch Fabric Module as described in the *ATM Switch Fabric Module Quick Start Guide*

5 Read the *ATM Interface Module Quick Start Guide* to make sure that you have all of the required components to get your system up and running and that you have completed all of the prerequisite work.

6 To manage the ATM Interface Module and CoreBuilder 9000 Enterprise ATM Switch through the SNMP, you must install the 3Com Transcend® Enterprise Manager for UNIX or for Windows NT.

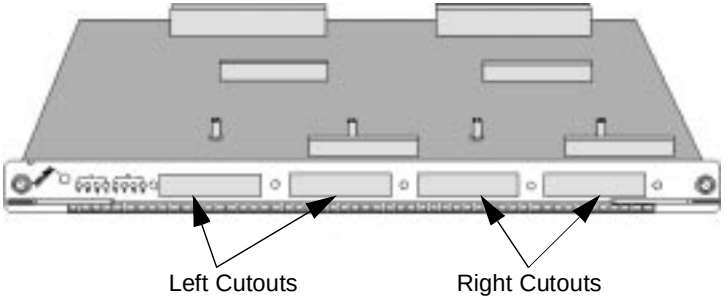
7 For cabling requirements, see Appendix D in the *CoreBuilder 9000 Enterprise Switch Getting Started Guide*.

8 For site requirements, see Appendix C in the *CoreBuilder 9000 Enterprise Switch Getting Started Guide*.

Installing the Daughter Cards

You can install an OC-3/STM-1 daughter card or an OC-12/STM-4 daughter card in either the right pair or the left pair of cutouts of the ATM Interface Module (Figure 5). However, if you are installing a single OC-3/STM-1 card or a single OC-12/STM-4 card, 3Com recommends that you install it in the left cutouts, which are shipped uncovered for this purpose.

Figure 5 ATM Interface Module Faceplate Cutouts



Installation Options

You can install daughter cards into the ATM Interface Module in the combinations indicated in Table 5:

Table 5 ATM Interface Carrier Card Options

Left Cutout	Right Cutout
OC-12/STM-4 SM*	covered
OC-12/STM-4 MM†	covered
OC-3/STM-1 SM	covered
OC-3/STM-1 MM	covered
OC-3/STM-1 SM+MM‡	covered
OC-12/STM-4 SM	OC-12/STM-4 SM
OC-12/STM-4 SM**	OC-12/STM-4 MM
OC-12/STM-4 MM	OC-12/STM-4 MM
OC-3/STM-1 SM	OC-3/STM-1 SM
OC-3/STM-1 SM**	OC-3/STM-1 MM
OC-3/STM-1 SM**	OC-3/STM-1 SM + MM
OC-3/STM-1 MM	OC-3/STM-1 MM
OC-3/STM-1 MM**	OC-3/STM-1 SM + MM
OC-3/STM-1 SM + MM	OC-3/STM-1 SM + MM
OC-3/STM-1 SM	OC-12/STM-4 SM
OC-3/STM-1 SM**	OC-12/STM-4 MM
OC-3/STM-1 SM**	OC-12/STM-4 SM + MM
OC-3/STM-1 MM	OC-12/STM-4 MM
OC-3/STM-1 MM**	OC-12/STM-4 SM + MM
OC-3/STM-1 SM + MM	OC-12/STM-4 SM + MM

* SM = Single-mode
† MM = Multi-mode
‡ SM + MM = OC-3/STM-1 daughter card with 1SM port and 3 MM ports.
**This configuration can be switched (The daughter card in the left cutout can be put into the right).

Installation Equipment

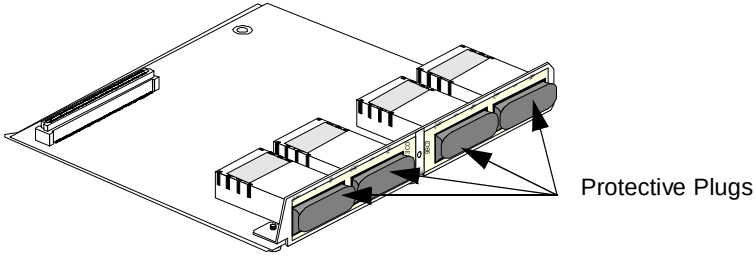
To install a daughter card you will need:

- A #1 Phillips screwdriver
- The daughter card
- Three flathead countersink screws (included with the daughter card package).

Installing the OC-3/STM-1 Daughter Card

Figure 6 shows an OC-3/STM-1 card with its protective plugs in place. To install the daughter card, see the *ATM Interface Module Quick Start Guide*.

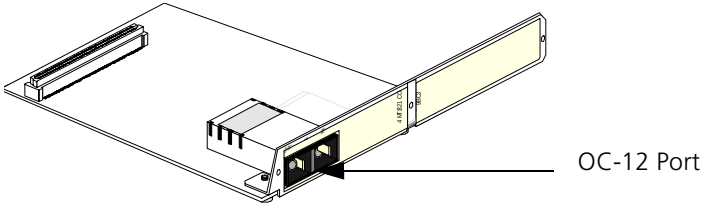
Figure 6 OC-3/STM-1 Daughter Card



Installing the OC-12/STM-4 Daughter Card

Figure 7 shows an OC-12/STM-4 daughter card with its protective plug removed. To install the OC-12/STM-4 daughter card, see the *ATM Interface Module Quick Start Guide.*

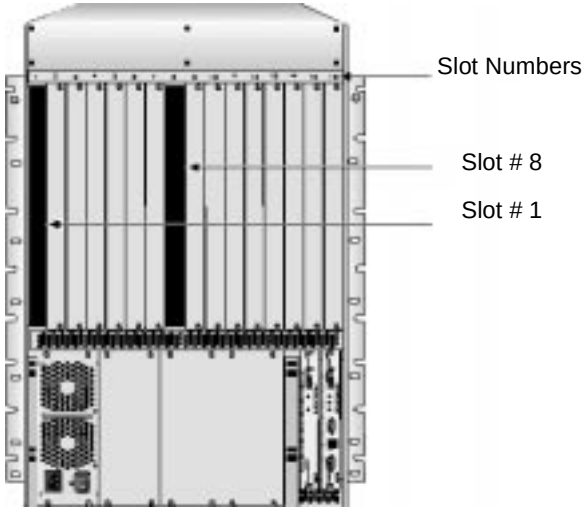
Figure 7 OC-12/STM-4 Daughter Card



Installing the ATM Interface Module into the Chassis

Figure 8 shows the chassis with slots 1 and 8 open. To install the ATM Interface Modules into the chassis, see the *ATM Interface Module Quick Start Guide*.

Figure 8 CoreBuilder 9000 Chassis



You can install the ATM Interface Module in the following slots: 1 through 7, 10,12,14, and 16. Slot numbers are located on the top of the chassis for easy identification.

The CoreBuilder 9000 chassis is shipped with slot 1 open; a protective plate covers the remaining ATM Interface Module slots. The first ATM Interface Module is installed in slot 1. 3Com recommends that you do not remove the protective plates from the remaining ATM Interface Module slots until you need them.

Connecting to Network Services

Each of the OC-3/STM-1 and OC-12/STM-4 ports are available in single-mode or multi-mode. Single-mode ports support single-mode cables, and multi-mode ports support multi-mode cables.

To connect the fiber-optic cable to the port:

1. Remove the protective plug from the port you want to use.
2. Hold the fiber-optic cable in the vertical position.
3. Make sure that the stopper that is located at the end of the cable is facing left.
4. Insert the cable into the port.

System States

This section describes the different system states of the CoreBuilder 9000 ATM Interface Module and how they are indicated by the LEDs. The system states are:

- Power-on
- Normal Operation
- Loopback Test
- Failure

Power-on

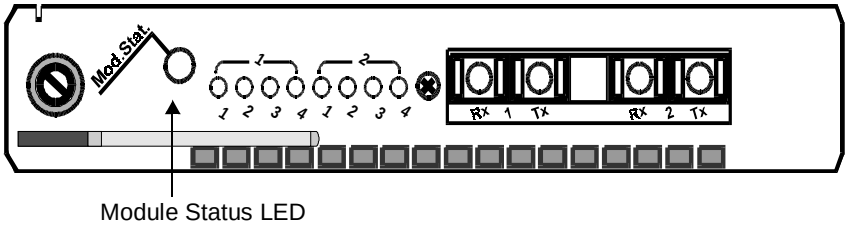
The power-on phase of the ATM Interface Module consists of the following parts:

1. Initializing Flash software
2. Downloading operational software from the ATM Switch Fabric module
3. Initializing operational software
4. Executing port diagnostic tests

Module Status LED

The Module Status LED indicates the system state of the ATM Interface Module. This LED is located on the top of the ATM Interface Module (shown on the left of Figure 9).

Figure 9 ATM Interface Module LEDs



During the power-on phase, the Module Status LED blinks green. When the power-on phase has completed successfully, normal operation begins. The Module Status LED stops blinking and remains a steady green. If one of the power-on diagnostic tests fails, the Module Status LED turns a steady yellow. The entire power-on phase takes about 10 seconds.

Table 6 shows the Module Status LED indications:

Table 6 Module Status LED Indications During Power-on

LED Indication	Blinking?	System Event
Green	Yes	Power-on phase executing
Green	No	Power-on phase completed; normal operation started
Yellow	No	Failure (see "Failure State" on page 2-32)

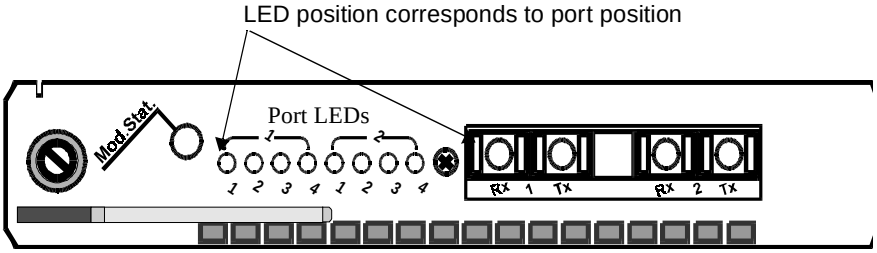
Normal Operation

After successful completion of the power-on phase, the ATM Interface Module begins to function in the normal state.

Port Status LEDs

A group of eight port status LEDs (Figure 10) indicates the status of each ATM port. The number under each port status LED corresponds to the number of its port.

Figure 10 Port Status LEDs



There are five possible states for each port; each is indicated by a different LED color and blinking mode. Table 7 presents the port states and the corresponding LED indications:

Table 7 Port LED Indications

Port State	LED Color	Blinking?
Cable is connected to port. There is no traffic through the port.	Green	No
There is traffic through the port.	Green	Yes
Remote alarm indicator. (See *Chapter 6, Troubleshooting*).	Yellow	No
Port is in loopback state. (See *Chapter 6, Troubleshooting*)	Yellow	Yes
There is no cable connected to the port or there is no port.	Off (no color)	No

Failure State

This section describes the various failure states that can occur in the ATM Interface Module and includes:

- Failure during power-on
- Failure during operation

A failure is indicated when the Module Status LED turns yellow. The port LEDs display details about the failure. The eight port LEDs are grouped as indicated in Table 8, beginning from top to bottom:

Table 8 Port LED Error Indications

Port LEDs	LED Name	Purpose
1	Flash/operational software LED	Identifies failed software unit
2-3	Software status LEDs	Identifies when failure occurred
4-8	Software error LEDs	Identifies nature of failure

In Table 9 through Table 11, 1 denotes that the LED is On and 0 denotes that the LED is Off.

Identifying the Failed Unit

The ATM Interface Module has two distinct software units: the Flash memory software unit and the operational software unit. The Flash/Operational Software LED (shown in Figure 11) indicates in which software unit the error occurred. Table 9 indicates the status of the Flash/Operational Status LED as well as the recommended action to take.

Figure 11 The Flash /Operational Software Indicator LED

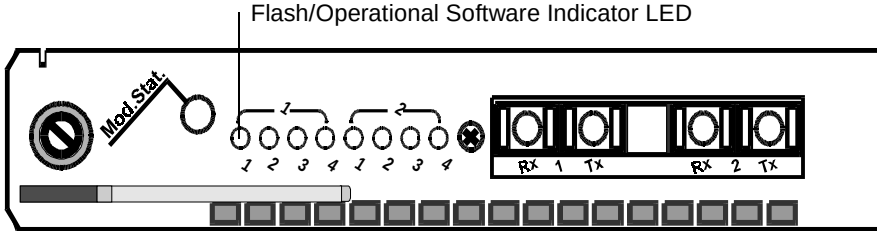


Table 9 Flash/Operational Software LED

LED Status*	Type of Failure	Action
0	Operational software error	Download ATM Interface Module software again
1	Flash memory software error	Replace ATM Interface Carrier unit

* 1=LED is on. 0=LED is off.

Identifying When the Failure Occurred

Figure 12 shows the Software State Indicator LEDs. The Software State Indicator LEDs pinpoint the stage of the software execution at which the failure occurred.

Table 10 indicates the stage of software execution in which the failure occurred for all combinations of the Flash/Operational Software LED and the Software State Indicator LEDs. For example, if the Flash/Operational Software LED is off (0) and the Software State Indicator LEDs are off (0) and on (1) respectively, then, from the second row of Table 10, you conclude that the failure occurred while the operational software was initializing.

Figure 12 The Software State Indicator LEDs

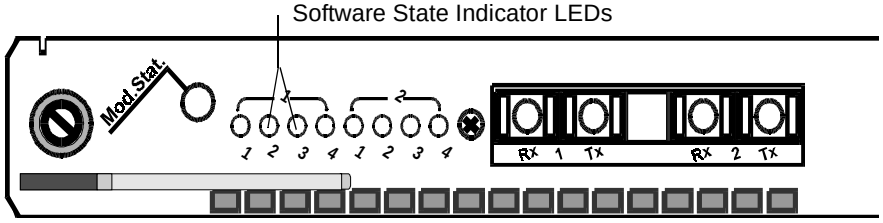


Table 10 Software Status Indicator LEDs

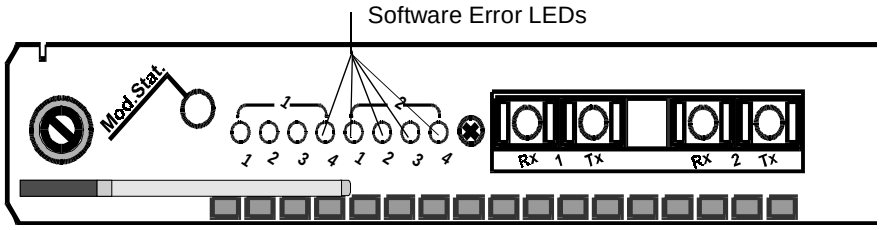
Flash/ Operational Software LED Status*	Software Status Indicator LED Status*	Operational Software Status	Flash Software Status
0	0 0	Reserved	_____
0	0 1	Software initializing	_____
0	1 0	Software executing	_____
0	1 1	Reserved	_____
1	0 0	_____	Reserved
1	0 1	_____	Software Initializing
1	1 0	_____	Waiting for download
1	1 1	_____	Download started

* 1=LED is on. 0=LED is off.

Identifying the Nature of the Failure

The Software Error LEDs are shown in Figure 13, give information about the nature of the failure.

Figure 13 Software Error LEDs



When a software error is detected, the Software Error LEDs light up in a binary pattern to indicate the nature of this error. Read the LEDs from top to bottom. Table 11 shows the binary LED status and meaning for each type of error. LED combinations not shown in Table 11 are reserved.

Table 11 Software Error LED Interpretation

LED Status*	Meaning
0 0 0 0 1	None
0 0 0 1 0	Error in ATM Interface Module
0 0 0 1 1	Error in daughter card #1 (upper)
0 0 1 0 0	Error in daughter card #2 (lower)
0 0 1 0 1	Error in carrier module
0 0 1 1 0	Error in carrier module
0 0 1 1 1	Error in carrier module
0 1 0 0 0	Error in carrier module
0 1 0 0 1	Error in carrier module
0 1 0 1 0	Error in carrier module
1 0 0 1 1	Error in carrier module
1 0 1 0 0	Error in carrier module
1 0 1 0 1	Error in carrier module
1 1 0 1 0	Error in carrier module

Table 11 Software Error LED Interpretation (continued)

LED Status*	Meaning (continued)
1 1 1 1 0	Error in carrier module
1 1 1 1 1	Error in carrier module

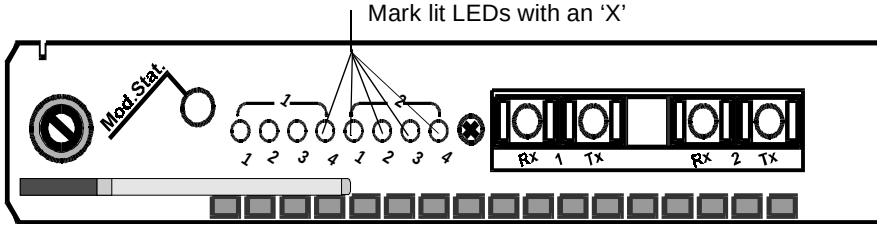
* 1 = LED is on. 0 = LED is off.

For additional information about the LEDs, see "Solving Common Problems" on page 61.

Reporting a Failure

When you report a failure to 3Com Technical Support, make a copy of this page, mark on Figure 14 the LEDs that were lit by an X when a failure occurred and attach it to the RMA card.

Figure 14 Form for Marking Software Error LEDs



3 USING THE LOCAL MANAGEMENT APPLICATION

This chapter describes how to use the CoreBuilder™ 9000 Enterprise ATM Switch Local Management Application (LMA) to configure and administrate the CoreBuilder 9000 Enterprise ATM Switch. A Menu Index shows the command structure of the LMA and refers to the command description for each menu command. You run the LMA is run from a terminal via a direct RS-232 connection or via Telnet.

Management Capabilities

Use the LMA to configure your CoreBuilder 9000 Enterprise ATM Switch. To augment network management, you can use an external application, such as 3Com's Transcend® Enterprise Manager ATMvLAN Manager.

LMA functions include:

- Platform administration
- ATM Connections administration
- Statistics display
- Testing & Diagnostics administration

Starting Up

In order to log in to the LMA, you need:

- The desired access level
- Your password

LMA Access Level

The LMA has three levels of access: read access, write access, and administrate access. Each level grants different access privileges and is suited to a different type of user. Table 12 lists the privileges granted for each access level.

Table 12 Access Levels

Access Level	Privileges
Read	Read-only privilege
Write	Right to make local changes to LMA. No right to change passwords or parameters that affect the global network.
Admin	All privileges

Logging In When you boot the system the following login screen appears:

```
------------------------------
-      CoreBuilder 9000       -
-                              -
-  Enterprise ATM Switch    -
------------------------------
Access level (read, write, admin):admin
Password:
```

To log in to the LMA:

1 Enter your access level (default is admin)

2 Enter your password

After a successful login the Main Menu is displayed as shown:

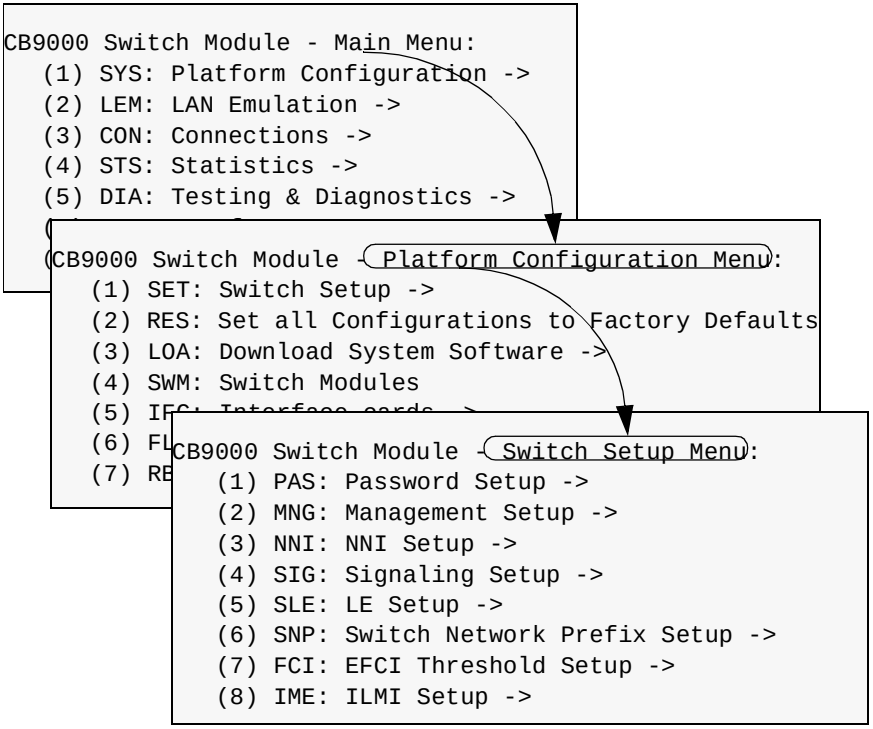
```
 CB9000 switch module - Main Menu:
(1) SYS: Platform Configuration ->
(2) LEM: LAN Emulation ->
(3) CON: Connections ->
(4) STS: Statistics ->
(5) DIA: Testing and Diagnostics ->
(6) FTR: ATM Features
(7) LOG: Logout
(8) VER: Version
(9) FST: Fast Setup
```

The LMA Menu System

The LMA menu system is a set of command menus organized in a hierarchical, top-down fashion. Figure 15 shows the menu structure. Each command menu contains a numbered list of menu items. Each menu item has a three-letter mnemonic identifier and a short description of the item. There are two kinds of menu items: commands that display another, lower-level, command menu (*submenu*) and commands that perform a specific administrative task. The submenu command is distinguished by the arrow (->) on the right.

The Main Menu is at the top of the hierarchy. Through it, you access the submenus for the main topics of management such as "Platform Configuration", "LAN Emulation" and "Connections". Figure 15 shows the Main Menu and some of its successive submenus.

Figure 15 LMA Menu Structure



Selecting Menu Options

A menu option is selected by entering its number or its mnemonic identifier at the prompt symbol (>) displayed below the menu item list. Only the first unique character(s) of the mnemonic identifier needs to be entered.

The hierarchical path from the Main Menu down to the currently displayed submenu option is displayed in front of the angle bracket prompt. This helps you orient yourself in the menu hierarchy.

Example - Changing a Password

To illustrate how to work with the menu system, we will change the read-access password. This example is shown in Figure 16. The following command description guides you through the execution of the command. It specifies the menu sequence you need to enter, the parameters to enter and their format, the command results and any system messages. A similar command description format is provided for each command in this manual.

Figure 16 LMA Command Description Format

Command Actions

Enter menu sequence:

```
(1) SYS: Platform config
 (1) SET: Switch setup
    (1) PAS: Password setup
      (1) REA: Set Read-access Password
```

Enter parameter at prompt

Parameter	in format/range
New password	Up to eight alphanumeric characters
New password again	enter the password exactly as you did before.

Direct access sequence: **1 1 1 1** [parameters]

Command Result

System action: The read-access password is updated.

System message: `The password has been changed.`

Entering the Menu Sequence

First, enter the menu sequence in the order shown in the first line of Figure 16 "Enter menu sequence". In this example, the menu item numbers will be entered but you can enter the three-letter mnemonic code instead.

1 Enter **1** at the Main Menu prompt.

The Platform Configuration Menu is displayed (the second screen in Figure 15), followed by the path `(1) SYS`: and the (>) prompt.

2 Enter **1** at the Platform Configuration Menu prompt.

The Switch Setup Menu submenu is displayed (the third screen in Figure 15), followed by the path `(1)SYS\(1)SET` and the (>) prompt.

3 Enter **1** at the Switch Setup Menu prompt.

The Password Setup Menu is displayed as follows, followed by the path `(1)SYS\(1)SET\(1)PAS` and the (>) prompt. These menu items are all configuration commands; none of them have arrows to the right.

```
  CB9000 switch module - Password Setup Menu:
   (1) REA: Set Read-access Password
   (2) WRI: Set Write-access Password
   (3) ADM: Set Admin-access Password
[ '\' -Main,      '-' -Back in menus]
(1)SYS\(1)SET\(1)PAS>1
```

4 Enter **1** at the Password Setup Menu prompt.

The prompt for the new read password is displayed as follows:

```
Enter the new read password:
```

This completes the menu sequence.

Entering the Command Parameters

Now refer to the section "Enter parameter at prompt" in Figure 16. this section explains which parameters to enter and the format in which you enter them.

5 At the `Enter the new read password:` prompt, enter the new password in a format of up to eight alphanumeric characters.

6 At the `Enter the new read password again:` prompt, enter the new password again exactly as before.

Command Results

After the command executes successfully, a system message is displayed:
`The password has been changed.`

The command results and systems messages are shown in the last rows of the command description Figure 16.

Direct Access to Submenus

You can display a submenu or execute a command directly without having to step down through the hierarchy as in the previous example. At the Main Menu prompt, type the required sequence of menu item numbers or menu item mnemonic followed by the command parameters all on one line, separated by blanks. For the example of the previous section, if you wish to display the password prompt directly from the Main Menu, just type **`1 1 1 1`** at the Main Menu prompt. The direct access menu sequence is included in the command description format Figure 16.

Entering Multiple Parameters

When a command has more than one parameter, you can enter them all on the same command line with blanks in between or you can enter some or all of them on separate command lines. If you do not enter them all on one line, you are repeatedly prompted for the remaining parameters.

Should you enter an illegal character or string (such as an out-of-range parameter), the LMA display will respond with an error message indicated by a three-asterisk (***) prefix.

Quick Key Functions

The following quick key functions are available when working with the management menus. Table 13 lists functions for navigating in the menu system; Table 13 lists aids for editing parameters.

Table 13 Menu Navigation Functions

To go	Type
To the Main Menu from any point	\
To the previous menu	-
Back and forth within the command line	Left/Right Arrows
To the beginning of the command line	Home
To the end of the command line	End

4 CONFIGURING PORTS

This chapter describes how to configure ports in the ATM Interface Module. Topics covered in this chapter include:

- Configuring Ports of the ATM Interface Module
- Setting the Port Interface Type

Configuring Interface Modules

After the ATM Interface Module is installed and operating normally, you can configure each port individually via the LMA. You can perform the following operations:

You use the Local Management (LMA) console of the CoreBuilder 9000™ Enterprise ATM Switch to configure the ports. The following sections explain the configuration procedures step-by-step. If you are unfamiliar with the use of the LMA, see Chapter 3.

The ATM Interface Module is supported by CoreBuilder™ 9000 Enterprise ATM Switch software version 1.1.

Accessing the Interface Cards Menu

You configure the ATM Interface Module from the Interface Cards Menu of the CoreBuilder 9000 Enterprise ATM Switch Local Management software.

You can configure the following parameters for the interface cards of the CoreBuilder™ 9000 Enterprise ATM Switch.

- Display Interface Module Slot Occupancy
- Display Interface Module Card Parameters
- Enable Interface
- Set Port Frame Mode
- Set Port Clock Mode
- Set Loop Mode
- Reset Interface Card

Display Interface Module Slot Occupancy

Display the slot ID, slot status, and card type of each of the 11 interface modules.

Command Actions

Enter the menu sequence:
```
(1) SYS: Platform configuration
  (5) IFC: Interface cards
```

Direct access sequence: **`1 5`**

Command Result

System action taken: Interface Module slot occupancy information is displayed.

System message display: Information is displayed as shown in the example.

Interface Card Slot Occupancy Parameters

Table 14 describes the interface card slot occupancy parameters displayed by the command.

Example

Enter: **`1 5`**

Interface Module slot occupancy information is displayed as follows:

```
Slot id     Slot  status     Interface card type Interface card status
-------     ------------     ------------------- ---------------------
   1         Occupied     ATM I/F card   Up
   2         Free                                        Not exist
   3         Free                                         Not exist
   4         Free                                         Not exist
   5         Occupied                    ATM I/F card                    Up
   6         Free                                           Not exist
   7         Free                                        Not exist
  10         Free                                        Not exist
  12         Free                                        Not exist
  14         Free                                        Not exist
  16         Free                                        Not exist
```

Display Interface Module Card Parameters

Display parameters of an installed interface module. You are prompted to specify an interface module for display.

Command Actions

Enter the menu sequence:

```
(1) SYS: Platform configuration
 (5) IFC: Interface cards
  (1) GIF: Get interface card info
```

Enter a parameter at the prompt

Parameter	Format or Range
Slot ID	1 through 7, 10, 12, 14, and 16 for interface card information or 0 for general slot information

Direct access sequence: **1 5 1** [parameters]

Command Result

System action taken: Interface Card parameters for the ATM Interface Module parameters for a specific slot "slot ID" or for all slots (for slot ID=0) are displayed.

System message display: Information is displayed as shown in the examples.

Interface Card Parameters

Table 14 describes the interface parameters displayed by the command for a specific slot ID.

Table 14 Interface Parameters

Parameter	Description
Port Number	The port number for each of the module's ports in the format slot.group.port.
Interface Type	The port interface type (for example, OC3-SC). The type determines the interface, including the type of connector.
Media Type	The type of fiber used by the port (for example, coaxial cable, multi-mode fiber).
Operational Status	The port may be "up" or "down", or "up and connect."
Port Status	Whether the port has been enabled or disabled by management. Can be either "enabled" or "disabled". If a port is disabled, the CoreBuilder 9000 will not be able to connect to the software on the other side via this port.

(continued)

Table 14 Interface Parameters (continued)

Parameter	Description
Frame Mode	The interface framing mode. Can be, for example, SDH or SONET
Clock Src	This may be "int" (internal) only.
Loop Mode	Indicate the loopback state of the ATM interface module port. May be "None", "Loop Forward" or "Loop Back"

Example

Enter: **1 5 1 5**

Parameters of the ports of the selected ATM Interface Module in slot 5 are displayed in the example below. The ATM Interface Module contains an OC-12/STM-4 card and an OC-3/STM-1 card.

```
Port   Interface       Media type       Operational   Port    Frame  Clk Loop
 id       type                             status     status  mode  src mode
------ ---------- --------------------- ------------ -------- ----- --- -------
 5.1.1 OC3-SC     MM fiber              Up & Connect Disabled SONET Int None
 5.1.2 OC3-SC     MM fiber              Up & Connect Enabled  SONET Int None
 5.1.3 OC3-SC     MM fiber              Up           Enabled  SONET Int None
 5.1.4 OC3-SC     MM fiber              Up           Enabled  SONET Int None
 5.2.1 OC12-SC    MM fiber              Up           Enabled  SONET Int None
 5.2.2                                  Not exist    Enabled  SONET Int None
 5.2.3                                  Not exist    Enabled  SONET Int None
 5.2.4                                  Not exist    Enabled  SONET Int None
```

Slot ID Parameters

Table 15 describes the slot parameters.

Table 15 Slot ID Parameters

Parameter	Description
Slot ID	The slot ID number.
Slot Status	The slot may be “Free” or “Occupied”.
Interface card type	The card type is displayed.
Interface card status	The port may be “up” or “doesn’t exist”.

Example

Enter: **`1 5 5 0`**

Slot information of the ATM Interface Module is displayed.

```
Slot id   Slot  status   Interface card type         Interface card status
-------   ------------   -------------------------   ---------------------
          1     Free                                      Doesn`t exist
          2     Free                                      Doesn`t exist
          3     Free                                      Doesn`t exist
          4     Free                                      Doesn`t exist
      5     Occupied       ATM I/F card                Up
          6     Free                                      Doesn`t exist
          7     Free                                      Doesn`t exist
         10     Free                                     Doesn`t exist
         12     Free                                     Doesn`t exist
         14     Free                                     Doesn`t exist
         16     Free                                     Doesn`t exist
```

Enable Interface Enable interface module port. You are prompted to specify a port.

Command Actions

Enter the menu sequence:
```
(1) SYS: Platform Configuration
 (5) IFC: Interface Cards
  (2) EIF: Enable Interface
```

Enter a parameter at the prompt

Parameter	Format or Range
Port ID	slot.group.port

Direct access sequence: **`1 5 2`** [parameters]

Command Result

System action taken: The selected port on the interface module is enabled.

System message display:
```
Setting port state has completed
successfully.
```

Example

Enter: **`1 5 2 1.1.2`**

The following message is displayed:

```
Setting port state has completed successfully.
```

Port 2 of the selected ATM Interface Module is enabled.

Set Port Frame Mode

Set the interface mode of the selected port as SDH or SONET and save to flash memory. You are prompted to specify a port and a mode.

Command Actions

Enter the menu sequence:
```
(1) SYS: Platform Configuration
 (5) IFC: Interface Cards
  (3) SFM: Set Port Frame Mode
```

Enter a parameter at the prompt

Parameter	Format or Range
Port ID	slot.group.port (0.0 - For all)
Frame Mode	**0** - SDH **1** - SONET

Direct access sequence: **1 5 3** [parameters]

Command Result

System action taken: The frame mode of the selected port on the interface module is set and saved.

System message display:
```
Setting port frame mode has completed
successfully.
```

Example

Enter: **1 5 3 5.1.1 0**

The following messages are displayed:

```
The following settings will take place:
Changing port <5.1.1> setting from SONET mode to SDH mode.
Changing port <5.1.2> setting from SONET mode to SDH mode.
Changing port <5.1.3> setting from SONET mode to SDH mode.
Changing port <5.1.4> setting from SONET mode to SDH mode.
Do you really want to do these changes? (Y/N)?
```

Enter **y** to confirm. The following message is displayed:

```
Setting port frame mode has completed successfully.
```

The selected ports are set and saved.

Set Port Clock Mode

Set the port clock operational mode of selected port as Internal or External and save to flash memory. You are prompted to specify a port and a mode.

Command Actions

Enter the menu sequence:

```
(1) SYS: Platform Configuration
 (5) IFC: Interface Cards
  (4) PCK: Set Port Clock Mode
```

Enter a parameter at the prompt

Parameter	Format or Range
Port Number	slot.group.port (0.0 - For all)
Port Clock Source	**0** for Internal **1** for External

Direct access sequence: **1 5 4** [parameters]

Command Result

System action taken: The clock operational mode of the selected port on the interface module is set and saved.

System message display:

```
Setting clock source mode has completed
successfully.
```

Example

Enter: **1 5 4 1.1.2 1**

The following message is displayed:

```
Setting clock source mode has completed successfully.
```

The clock operational mode of port 1 is set to external.

Set Loop Mode

Set the loop mode of selected port as None, Loop Forward or Loop Back and save to flash memory. You are prompted to specify a port and a mode.

Command Actions

Enter the menu sequence:

```
(1) SYS: Platform Configuration
 (5) IFC: Interface Cards
  (5) SLM: Set Loop Mode
```

Enter a parameter at the prompt

Parameter	Format or Range
Port Number	slot.group.port (0.0 - For all)
Loop Mode	**0** for No loop **1** for Loop back **2** for Loop forward

Direct access sequence: **1 5 5** [parameters]

Command Result

System action taken: The loop mode of the selected port on the interface module is set and saved.

System message display:

```
Setting loop mode has completed
successfully.
```

Example

Enter: **1 5 5 1.1.2 1**

The following message is displayed:

```
Setting loop mode has completed successfully.
```

The loop mode of port 1 is set to Loop back.

Reset Interface Card

Reset the interface card in a specific slot, or all the interface cards.

Command Actions

Enter the menu sequence:

```
(1) SYS: Platform Configuration
 (5) IFC: Interface Cards
  (8) RST: Reset Interface Card
```

Enter a parameter at the prompt

Parameter	Format or Range
Slot Number	1 - 16 or 0 for all

Direct access sequence: **`1 5 8`** [parameters]

Command Result

System action taken: The selected interface card is reset.

System message display:

```
The interface card was reset.
```

Example

Enter: **`1 5 8 0`**

The following prompt is displayed:

```
Do you really want to reset all the interface cards (Y/N)?
```

Enter **y** to confirm. The following message is displayed:

```
All the interface cards were reset.
```

Setting the Port Interface Type

You can the interface type for a specified port or a group of ports. You can use either the LMA or the intergrated fast setup. If you want to use the fast setup, see the *ATM Interface Module Quick Start Guide*. You can set the interface type to: (NNI, UNI or GWY)

Setting the Interface Type for a Specific Port

Port Interface Type

You can configure the port interface type.

- Display Port Interface Type
- Update Port Interface Type
- Reset NNI Configuration

Display Port Interface Type

Display the interface type for each port of the CoreBuilder 9000 Enterprise ATM Switch. The interface type is Gateway (GWY), User to Network Interface (UNI) or Network to Network Interface (NNI). When the port is connected to another ATM Switch Fabric Module, the interface is NNI. If it is connected to an edge device such as an Ethernet to ATM device, or ATM attached server, the interface type is UNI.

Command Actions

Enter the menu sequence:

```
(1) SYS: Platform Configuration
 (1) SET: Switch Setup
  (3) NNI: NNI Setup
   (3) GIF: NNI Get Interface Type
```

Direct access sequence: **`1 1 3 3`**

Command Result

System action taken: The interface type for each port of the CoreBuilder 9000 Enterprise ATM Switch is displayed.

System message display: Information is displayed as shown in the example.

Example

Enter: **1 1 3 3**

The following information is displayed:

```
Port:  < 1.1.1> < 1.1.2> < 1.1.3> < 1.1.4> < 1.2.1> < 1.2.2> < 1.2.3> < 1.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  < 2.1.1> < 2.1.2> < 2.1.3> < 2.1.4> < 2.2.1> < 2.2.2> < 2.2.3> < 2.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  < 3.1.1> < 3.1.2> < 3.1.3> < 3.1.4> < 3.2.1> < 3.2.2> < 3.2.3> < 3.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  < 4.1.1> < 4.1.2> < 4.1.3> < 4.1.4> < 4.2.1> < 4.2.2> < 4.2.3> < 4.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  < 5.1.1> < 5.1.2> < 5.1.3> < 5.1.4> < 5.2.1> < 5.2.2> < 5.2.3> < 5.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  < 6.1.1> < 6.1.2> < 6.1.3> < 6.1.4> < 6.2.1> < 6.2.2> < 6.2.3> < 6.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  < 7.1.1> < 7.1.2> < 7.1.3> < 7.1.4> < 7.2.1> < 7.2.2> < 7.2.3> < 7.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  <10.1.1> <10.1.2> <10.1.3> <10.1.4> <10.2.1> <10.2.2> <10.2.3> <10.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  <12.1.1> <12.1.2> <12.1.3> <12.1.4> <12.2.1> <12.2.2> <12.2.3> <12.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
Port:  <14.1.1> <14.1.2> <14.1.3> <14.1.4> <14.2.1> <14.2.2> <14.2.3> <14.2.4>
Value:   UNI      UNI      UNI      UNI      UNI      UNI      UNI      UNI
```

Update Port Interface Type

Update the Interface Type (NNI, UNI or GWY) for a specified port of the CoreBuilder 9000 Enterprise ATM Switch.

Command Actions

Enter the menu sequence:

```
(1) SYS: Platform Configuration
 (1) SET: Switch Setup
  (3) NNI: NNI Setup
   (4) SIF: NNI Set Interface Type
```

Enter a parameter at the prompt

Parameter	Format or Range
Port number	slot.group.port (0.0 for all ports)
NNI interface type	**0** to set interface type to NNI **1** to set interface type to UNI **2** to set interface type to GWY

Direct access sequence: **1 1 3 4** [parameters]

Command Result

System action taken: The interface type for the specified port is updated.

System message display:

```
NNI type was set.
```

Example

Enter: **1 1 3 4 3.1.2 1**

The following message is displayed:

```
This operation will release all connections of the specified
port(s)!
Are you sure (Y/N)?
```

Enter **y** to confirm.The following message is displayed:

```
UNI type was set.
```

The Interface type for port 3.1.2 is updated to UNI.

Reset NNI Configuration

Reset the NNI configuration parameters for the CoreBuilder 9000 Enterprise ATM Switch to their factory default settings. The default setting is UNI for all ports, and 7 for maximum number of hops.

Command Actions

Enter the menu sequence:

```
(1) SYS: Platform Configuration
(1) SET: Switch Setup
 (3) NNI: NNI Setup
  (5) NNI: Set NNI configuration to
           factory defaults
```

Direct access sequence: **`1 1 3 5`**

Command Result

System action taken: The NNI configuration parameters are reset to their factory default values.

System message display: `NNI configuration was set to defaults.`

Example

Enter: **`1 1 3 5`**

The following prompt is displayed:

```
Do you really want to reset config? [y/n]
```

Enter **y** to confirm. The following message is displayed:

```
NNI configuration was set to defaults.
```

The NNI configuration parameters are reset to UNI for all ports.

5 ATM-LAYER PROCESSING

This chapter describes ATM-layer processing in the ATM Interface Module. The following topics are discussed:

- ATM Data Stream
- ATM Interface Module Components

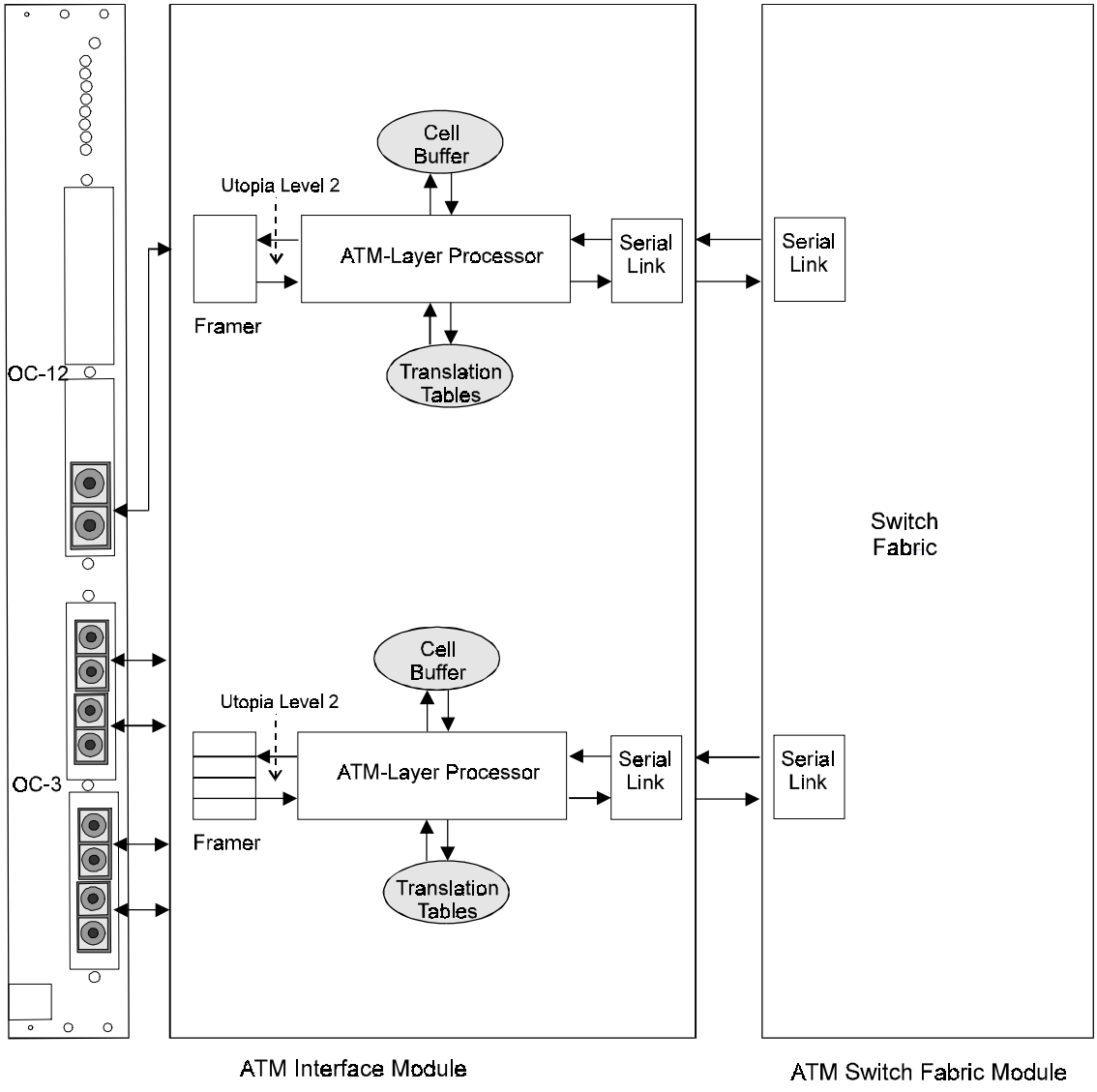
ATM Data Stream

The ATM Interface Module is specially designed to provide an interface between full-rate line data flow at 622 Mbps and the ATM Switch Fabric Module. The ATM Interface Module provides two interface channels, each of which can carry traffic at 622 Mbps to and from the ATM Switch Fabric Module. The CoreBuilder 9000 Release 1.0 chassis can house up to 11 ATM Interface Modules, making a total data flow of 15 Gbps into the ATM Switch Fabric Module configured with 22 OC-12 ports.

Each of the two interface channels of an ATM Interface Module is designed to work with a group of ports installed on a daughter card. In Release 1.0, there are two types of daughter cards: an OC-12/STM-4 daughter card, which has one 622 Mbps port, and an OC-3/STM-1 daughter card, which has four 155 Mbps ports.

The ATM Interface Module processes the data from each channel in parallel. In the case of an OC-12/STM-4 daughter card, the 622 Mbps data stream is processed directly; in the case of the OC-3/STM-1 daughter card, the data from the four 155 Mbps ports is multiplexed into one 622 Mbps data stream. Figure 17 shows the two interface channels of the ATM Interface Module. A one-port OC-12/STM-4 daughter card occupies the upper chamber and a four-port OC-3/STM-1 daughter card occupies the lower chamber.

Figure 17 ATM Data Flow in the ATM Interface Module



ATM Interface Module Components

Figure 17 shows the ATM data flow through the various components of the ATM Interface Module. The components are:

- **Framer** — In daughter card
- **ATM Layer Processor** — Processes ATM cells
- **Serial Link** — Parallel to/from Serial conversion

The operation of these components is described in the following sections.

Framer

The framer processes the SONET/SDH frames and extracts the ATM cells from the incoming serial data, verifies cell header validity and transfers cells to the ATM Layer Processor. In addition, the framer processes the overhead of the SONET/SDH frame and provides SONET/SDH statistics including BIP error and AIS. On the transmit side, it builds the frames and adds overhead data and serializes the cells out to the line.

ATM Layer Processor

The ATM Layer Processor prepares cell header information and manages temporary cell storage.

ATM Cell Header Processing

The ATM Layer Processor adds an additional header to the ATM cell, which contains the following information:

- **Routing** — Specifies the output port of the ATM Switch Fabric Module to which the cell will be directed.
- **VPI/VCI** — Specifies VPI/VCI header translation at the output port of the ATM Switch Fabric Module.
- **Priority** — Determines the cell priority for the prioritized output queues in the ATM Interface Module.
- **Statistics** — Provides cell flow statistics, including received cells, transmitted cells and errored cells.

Buffer Management

The ATM Layer Processor handles the temporary storage of ATM cells in the 8K-cell Cell RAMs. It has the following features:

- On Tx, it handles the cell queues in the three priority Cell RAM queues for each subport.

- On Rx, it handles the cell queues in the three priority Cell RAM queues for each fabric port.
- Handles EPD, PPD and CLP traffic management
- Handles EFCI marking

Serial Link The serial link handles the parallel-to-serial conversion for data transmission over the backplane. It transforms data from the parallel channels running in the ATM Interface Module to a serial channel running on the backplane. It also handles serial-to-parallel conversion from backplane to ATM Interface Module.

6 TROUBLESHOOTING

This chapter explains how to identify and correct problems, and how to perform related diagnostic tasks, such as replacing fuses and cleaning fiber optic cables.

If you have problems that are not addressed in this chapter, contact 3Com® Technical Support or your service person. For Technical Support information, see Appendix C.

Solving Common Problems

The following common problems may arise with the ATM Interface Module. If your problem does not appear on this list, please read the release notes.

Port LED Not Lit

When a cable connector is inserted into a port the corresponding port LED should light. If it does not light, Table 16 shows the symptoms, possible causes and actions to take.

Table 16 Port Failures

Symptom	Possible Cause	Action
Port LED does not light	Port not connected	**1** Check that the cable is connected to a device at its other end. **2** Check that cable is firmly snapped in place. **3** Make sure that each wire connected to the ATM port connects to Rx on one end and Tx on the other.
	Faulty Cable	**1** Test the cable. **2** Replace the cable.

Table 16 Port Failures (continued)

Symptom	Possible Cause	Action
	Faulty daughter card	**1** Replace the balcony associated with the port. **2** Replace the daughter card.

Failure LED Lit

When the general purpose LED (top-most LED) turns yellow, it indicates a failure condition. Table 17 shows the symptoms, possible causes and actions to take.

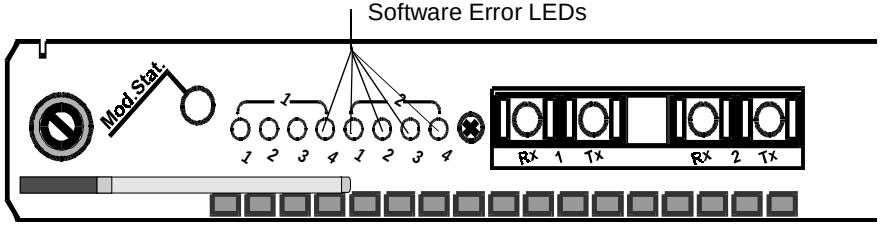
Table 17 General Failures

Symptom	Possible Cause	Action
General purpose LED turns yellow	Port failure	Remove and reinsert the ATM Interface Module.
LED remains yellow	Module failure	**1** Read the binary error code from the group of eight port LEDs. See Table 18 for an interpretation of the error codes. **2** Record the code and send it to 3Com Technical Support *(see Appendix C)*.

Software Error LEDs

Figure 18 shows the Software Error LEDs.

Figure 18 Software Error Indicator LEDs



These LEDs are the last five LEDs in the set of LEDs. When an software error is detected, they light up in a binary pattern to indicate the nature of the error. Table 18 summarizes the Software Error LEDs. Note that in

the table, 1 denotes the LED is On and 0 denotes the LED is Off. Read the LEDs from top to bottom. Combinations not shown are reserved.

Table 18 Software Error LED Interpretation

LED Status*	Action
0 0 0 0 1	None
0 0 0 1 0	Replace carrier module
0 0 0 1 1	Replace daughter card #1 (upper)
0 0 1 0 0	Replace daughter card #2 (lower)
0 0 1 0 1	Replace carrier module
0 0 1 1 0	Replace carrier module
0 0 1 1 1	Replace carrier module
0 1 0 0 0	Replace carrier module
0 1 0 0 1	Replace carrier module
0 1 0 1 0	Replace carrier module
1 0 0 1 1	Replace carrier module
1 0 1 0 0	Replace carrier module
1 0 1 0 1	Replace carrier module
1 1 0 1 0	Replace carrier module
1 1 0 1 1	Replace carrier module
1 1 1 1 0	Replace carrier module
1 1 1 1 1	Replace carrier module

* 1 = LED is on. 0 = LED is off.

Contact your 3Com Technical Support service person in case of any serious failure (see Appendix C).

Diagnostic Procedures

When you troubleshoot, you may have to perform minor procedures to help correct the problem. These procedures are described in this section.

Loopback Test

The loopback test is used to diagnose faulty cables as well as faults in the framer or other components of a daughter card. According to the port setting, a special protocol is executed. When this protocol is transmitted, the LEDs blink for each packet that is transmitted over the cable. To set up the loopback test, a port of the ATM Interface Module is connected to a remote CoreBuilder 9000 and the port is set to loopback mode. See Chapter 4 for details on setting the port to loopback state.

There are two types of loopback tests that can be performed with the ATM Interface Module: local loopback and remote loopback.

Local Loopback Test

In the local loopback test, a loop is created between the framer and the transceiver of the daughter card. The loop returns any transmitted signals exiting the framer back through the framer to the CoreBuilder 9000 Enterprise Switch.

For an OC-3/STM-1 daughter card, data from all four ports will be returned, even if only one port was set to loopback.

Remote Loopback Test

In the remote loopback test, a loop is created between the framer and the transceiver of the daughter card. The loop returns any received signals exiting the transceiver back through the transceiver to the remote CoreBuilder 9000 Enterprise Switch.

Loop foward Test

The loop foward test is used to diagnose faulty cables as well as faults in the framer or other components of another daughter card. According to the port setting, a special protocol is executed. When this protocol is transmitted, the LEDs blink for each packet that is transmitted over the cable between two ATM Interface Modules or between two ports in the same module. To set up the loopfoward test, a port of the ATM Interface Module is connected to a remote CoreBuilder 9000 and the port is set to loopback mode, via the LMA. See Chapter 4 for details on setting the port to loop foward state.

There are two types of loop foward tests that can be performed with the ATM Interface Module: local loop foward and remote loop foward.

Local Loop foward Test

In the local loop foward test, a loop is created between the transmitter of one port and the receiver of the another port. The ports can be in the same daughter card or in different daughter cards. The loop returns any transmitted signals exiting in the receiver back through the transmitter of its own port to the receiver of the other daughter card's port. This transmission is done via the ATM Enterprise Switch

For an OC-3/STM-1 daughter card, data from all four ports will be returned, even if one port was set to loop foward.

Remote Loop foward Test

In the remote loopfoward test, the same connections are made locally, but the ports are set to loopfoward via the NMS.

Cleaning Dirty Fiber-Optic Cables

Fiber-optic transceivers are sensitive optical devices that need to be handled carefully. If dirt collects on the fiber-optic lens, you may notice that the LED for an ATM port link status does not light. You may also notice degraded performance of that port, indicated by an increase in the physical layer statistics error count for that port.

To prevent dust from collecting on the fiber-optic lens, keep the dust covers on the ports at all times when they are not in use.

To clean a fiber-optic lens, perform the following procedure:

1. Disconnect the cable from the port.
2. With a canned air duster, blow off any accumulated dust or debris from the port or connector.

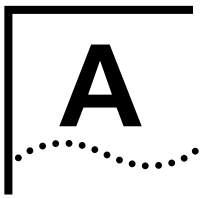
   3Com recommends that you use compressed gas, such as Chemtronics' Ultrajet or the Triangle Tool Group's Liqui-Too! Dust-A-Way. Do not use commercial compressed air or "house air" because of the risk of oil contamination.
3. Reconnect the cable to the port.
4. If the LED still does not light, or if it lights yellow:
   a. Gently wipe the ports with a lint-free, nonabrasive, nonadhesive swab. Microswabs by Texwipe are recommended.

b Gently wipe the connectors with a lint-free, nonabrasive wipe or pad. Texwipe pads are recommended.

CAUTION: *After you clean the connectors, avoid touching all surfaces, and keep all unused ports covered.*

ATTENTION: *Ne toucher aucune surface après le nettoyage des connecteurs et garder les pièces inutilisées couvertes.*

VORSICHT: *Vermeiden Sie das Berühren aller Oberflächen nach dem Säubern der Kontakte und verdecken Sie alle nicht benutzten Öffnungen.*



ATM Interface Module Specifications

Physical

The ATM Interface Module contains:

- OC-3/STM-1 daughter card
- OC-12/STM-4 daughter card

Table 19 ATM Interface Module Specifications

Specification	Metric	Imperial
Height	38.8 cm	15.3 in.
Width	2.54 cm	1.0 in.
Depth	32.74 cm	12.9 in.
Weight	1050 g	2.31 lb

Table 20 OC-3/STM-1 Daughter Card Specifications

Specification	Metric	Imperial
Height	15.36 cm	6.0 in.
Width	1.82 cm	0.7 in.
Depth	12.7 cm	5.0 in.
Weight	160 g	0.35 lb.

Table 21 OC-12/STM-4 Daughter Card Specifications

Specification	Metric	Imperial
Height	8.91 cm	3.51 in.
Width	1.82 cm	0.7 in.
Depth	12.7 cm	5.0 in.
Weight	120 g	0.264 lb

Interfaces

Table 22 Interfaces

Element	Specification
Interfaces	OC-3/STM-1 MMF
	OC-3/STM-1 SMF - SR
	OC-12/STM-4 MMF
	OC-12/STM-4 SMF - SR

ATM Switching

Table 23 ATM Switching

Element	Specification
ATM Switching	SVC signaling in compliance with UNI 3.0/3.1
	Congestion Management
	Rate-based Flow Control

Environmental

Table 24 Environmental Specifications

Specification	Metric	Imperial
Operating Temperature	0°C to 40° C	32 - 104° F
Operating Humidity	10% to 90% noncondensing	
Storage Temperature	-20°C to 70° C	-4 to 163° F
Storage Humidity	10% to 90% noncondensing	

Indicators

Table 25 Indicators

Element	Specification
Indicators	ATM Ports — per-port Link Status, Fail, and Activity
	Module Status — Power, Fail

Standards Compliance

Table 26 Standards Compliance

Element	Specification
Safety	UL 1950
	CSA 22.2 No 1950
	EN 60950
	IEC 825-1 (Equipment classification, requirements, and user's guide)
	IEC 825-2 (Safety of optical fiber communication systems)
	PCB UL flammability rating of 94V-0
	PCB fabrication as per ANSI/IPC-RB-276, class 2 (General Industry)
	Should be able to carry the CE mark

Element	Specification
Electromagnetic Emissions (Agency Certifications)	Meets FCC part 15, Subparagraph B, Class A limits, and CISPR-22 Class A limits.
	Directive complied with: EMC 89/336/EEC as amended by 92/31/EEC and 93/68/EEC.
	Emission: EN50081-1 (EN55022 Class B)
	Immunity: EM50082-1 (IEC801-2,-3,-4)

Interface Functionality

Table 27 lists the properties for the ATM Interface Module daughter cards.

Table 27 Interface Parameters by Port Types/Operational Rate (Mbps)

Parameter	OC-3/155	OC-12/622
Framing	■ SONET STS-3c ■ SDH STM-1 ■ NRZ line coding	■ SONET STS-12c ■ SDH STM-4c ■ NRZ line coding
Media	■ Fiber Optics Multimode (MMF) 62.5/125 10 dB power budget - 2 Km (1.24 mi) ■ Fiber Optics Single Mode 9/125 (SMF SR) (Short), 13 dB power budget - 15 Km (9.3 mi)	■ Fiber Optics Multimode (MMF) 62.5/125 6 dB power budget - 500 m (0.31 mi) ■ Fiber Optics Single Mode 9/125 (SMF SR) (Short), 13 dB power budget - 15 Km (9.3 mi)

continued

Table 27 Interface Parameters by Port Types/Operational Rate (Mbps)

Parameter	OC-3/155	OC-12/622
Connectors	Duplex SC connector for fiber	Duplex SC connector for fiber
Clocking	■ Internal - 19.44 MHz 20 ppm accuracy ■ Loop timing (sync on received signal)	■ Internal - 19.44 MHz 20 ppm accuracy ■ Loop timing (sync on received signal)
Statistics	Received, transmitted, errored HEC, BIP, RDI	Received, transmitted, errored HEC, BIP, RDI
Alarms	LOS, LOF, LOP, AIS, RDI	LOS, LOF, LOP, AIS, RDI
Compliance	ATM Forum UNI V3.1, af-uni-0010.002, References used in accordance with the ATMF spec: ANSI T1EI.2/au-002R1, ITU-T I.432	ATM Forum 622.08 Mbps Physical Layer Specification af-phy-0046.000, References used in accordance with the ATMF specs:ITGT G.957, ITU-T G.708, ITU-T G.709, ITU-T G.783, ITU-T G.432, ANSI T1.646, ANSI T1.105

B

AVAILABLE CONFIGURATIONS AND 3COM PART NUMBERS

This following configuration options are available for the ATM Interface Module.

Table 28 ATM Module Part Numbers

Configuration	3Com Part Number	Package Part Number
ATM Interface Carrier Module	3CB9AK2	3CB9AK2
ATM Interface 2xOC-12 SM*	3CB9AK2SC	(3CB9AK2 + 2 x 3CB9NAK1SC)
ATM Interface 2xOC-12 MM†	3CB9AK2MC	(3CB9AK2 + 2 x 3CB9NAK1MC)
ATM Interface 8xOC-3 SM	3CB9AL8SC	(3CB9AK2 + 2 x 3CB9NAL4SC)
ATM Interface 8xOC-3 MM	3CB9AL8MC	(3CB9AK2 + 2 x 3CB9NAL4MC)
OC-12/STM-4 SM	3CB9NAK1SC	3CB9NAK1SC
OC-12/STM-4 MM	3CB9NAK1MC	3CB9NAK1MC
OC-3/STM-1 SM	3CB9NAL4SC	3CB9NAL4SC
OC-3/STM-1 MM	3CB9NAL4MC	3CB9NAL4MC
OC-3/STM-1 SM+MM‡	3CB9NAL1S3MC	3CB9NAL1S3MC

* SM - single-mode
† MM - multi-mode
‡ SM + MM = OC-3/STM-1 daughter card with 1SM port and 3 MM ports.

Table 29 shows the different configuration options.

Table 29 ATM Interface Carrier Card Options

Left Cutout	Right Cutout
OC-12/STM-4 SM*	covered
OC-12/STM-4 MM†	covered
OC-3/STM-1 SM	covered
OC-3/STM-1 MM	covered
OC-3/STM-1 SM+MM‡	covered
OC-12/STM-4 SM	OC-12/STM-4 SM
OC-12/STM-4 SM**	OC-12/STM-4 MM
OC-12/STM-4 MM	OC-12/STM-4 MM
OC-3/STM-1 SM	OC-3/STM-1 SM
OC-3/STM-1 SM**	OC-3/STM-1 MM
OC-3/STM-1 SM**	OC-3/STM-1 SM + MM
OC-3/STM-1 MM	OC-3/STM-1 MM
OC-3/STM-1 MM**	OC-3/STM-1 SM + MM
OC-3/STM-1 SM + MM	OC-3/STM-1 SM + MM
OC-3/STM-1 SM	OC-12/STM-4 SM
OC-3/STM-1 SM**	OC-12/STM-4 MM
OC-3/STM-1 SM**	OC-12/STM-4 SM + MM
OC-3/STM-1 MM	OC-12/STM-4 MM
OC-3/STM-1 MM**	OC-12/STM-4 SM + MM
OC-3/STM-1 SM + MM	OC-12/STM-4 SM + MM

* SM = Single-mode
† MM = Multi-mode
‡ SM + MM = OC-3/STM-1 daughter card with 1SM port and 3 MM ports.
**This configuration can be switched (The daughter card in the left cutout can be put into the right).

TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the very latest, we recommend that you access 3Com Corporation's World Wide Web site as described below.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com FTP site
- 3Com Bulletin Board Service (3ComBBS)
- 3ComFacts[SM] automated fax service

World Wide Web Site

Access the latest networking information on 3Com Corporation World Wide Web site by entering the URL into your Internet browser:

`http://www.3Com.com/`

This service provides access to online support information such as technical documentation and software library, as well as support options ranging from technical education to maintenance and professional services.

3Com FTP Site

Download drivers, patches, and software across the Internet from the 3Com public FTP site. This service is available 24 hours a day, 7 days a week.

To connect to the 3Com FTP site, enter the following information into your FTP client:

- Hostname: **ftp.3com.com** (or **192.156.136.12**)
- Username: **anonymous**
- Password: **<your Internet e-mail address>**

A user name and password are not needed with Web browser software such as Netscape Navigator and Internet Explorer.

3Com Bulletin Board Service

The 3ComBBS contains patches, software, and drivers for 3Com products. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Data Rate	Telephone Number
Australia	up to 14400 bps	61 2 9955 2073
Brazil	up to 14400 bps	55 11 547 9666
France	up to 14400 bps	33 1 6986 6954
Germany	up to 28800 bps	4989 62732 188
Hong Kong	up to 14400 bps	852 2537 5608
Italy (fee required)	up to 14400 bps	39 2 27300680
Japan	up to 14400 bps	81 3 3345 7266
Mexico	up to 28800 bps	52 5 520 7853
P. R. of China	up to 14400 bps	86 10 684 92351
Singapore	up to 14400 bps	65 534 5693
Taiwan	up to 14400 bps	886 2 377 5840
U.K.	up to 28800 bps	44 1442 438278
U.S.A.	up to 28800 bps	1 408 980 8204

Access by Digital Modem

ISDN users can dial in to 3ComBBS using a digital modem for fast access up to 56 Kbps. To access 3ComBBS using ISDN, use the following number:

1 408 654 2703

3ComFacts Automated Fax Service

The 3ComFacts automated fax service provides technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone:

1 408 727 7021

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to obtain assistance from the 3Com online technical resources or from your network supplier, 3Com offers technical telephone support services. To find out more about your support options, please call the 3Com technical telephone support phone number at the location nearest you.

When you contact 3Com for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

Below is a list of worldwide technical telephone support numbers:

Country	Telephone Number	Country	Telephone Number
Asia Pacific Rim			
Australia	1 800 678 515	P.R. of China	10800 61 00137 or
Hong Kong	800 933 486		021 6350 1590
India	61 2 9937 5085	Singapore	800 6161 463
Indonesia	001 800 61 009	S. Korea	
Japan	0031 61 6439	From anywhere in S. Korea:	82 2 3455 6455
Malaysia	1800 801 777	From Seoul:	00798 611 2230
New Zealand	0800 446 398	Taiwan, R.O.C.	0080 611 261
Pakistan	61 2 9937 5085	Thailand	001 800 611 2000
Philippines	1235 61 266 2602		
Europe			
From anywhere in Europe, call:	+31 (0)30 6029900 phone +31 (0)30 6029999 fax		
From the following European countries, you may use the toll-free numbers:			
Austria	06 607468	Netherlands	0800 0227788
Belgium	0800 71429	Norway	800 11376
Denmark	800 17309	Poland	0800 3111206
Finland	0800 113153	Portugal	05 05313416
France	0800 917959	South Africa	0800 995014
Germany	0130 821502	Spain	900 983125
Hungary	00800 12813	Sweden	020 795482
Ireland	1 800 553117	Switzerland	0800 55 3072
Israel	177 3103794	U.K.	0800 966197
Italy	1678 79489		
Latin America			
Argentina	541 312 3266	Colombia	571 629 4847
Brazil	55 11 523 2725, ext. 422	Mexico	01 800 849 2273
North America	1 800 NET 3Com (1 800 638 3266)		

Returning Products for Repair

Before you send a product directly to 3Com for repair, you must first obtain a Return Materials Authorization (RMA) number. Products sent to 3Com without RMA numbers will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
Asia, Pacific Rim	65 543 6342	65 543 6348
Europe, South Africa, and Middle East	011 44 1442 435860	011 44 1442 435718
From the following European countries, you may call the toll-free numbers; select option 2 and then option 2:		
Austria	06 607468	
Belgium	0800 71429	
Denmark	800 17309	
Finland	0800 113153	
France	0800 917959	
Germany	0130 821502	
Hungary	00800 12813	
Ireland	1800553117	
Israel	177 3103794	
Italy	1678 79489	
Netherlands	0800 0227788	
Norway	800 11376	
Poland	00800 3111206	
Portugal	05 05313416	
South Africa	0800 995014	
Spain	900 983125	
Sweden	020 795482	
Switzerland	0800 55 3072	
U.K.	0800 966197	
Latin America	1 408 326 2927	1 408 764 6883
U.S.A. and Canada	1 800 876 3266, option 2	1 408 764 7120

GLOSSARY

ASIC Application Specific Integrated Circuit, a chip designed for a particular application. ASICs are built by connecting existing circuit building blocks in new ways. Since the building blocks already exist in a library, it is much easier to produce a new ASIC than to design a new chip from scratch.

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 intergrate geographicaly distant disparate networks. Also called cell relay.

ATM Interface Module A ATM Interface Carrier Module with one or two daughter cards.

ATM Layer Processor The ATM Layer Processor prepares cell header information and manages temporary cell storage.

backplane The main bus that carries data within a device.

carrier module The ATM Interface Module without daughter cards.

cell An ATM Layer protocol data unit (PDU) characterized by fixed, rather than variable, length payloads. The standard ATM cell is 48 bytes of payload with 5 bytes of header.

Cell Loss Priority (CLP) A 1-bit field in the ATM cell header that corresponds to the loss priority of a cell. Lower priority (CLP = 1) cells can be discarded under a congestion situation.

chassis The hardware housing unit for the CoreBuilder 9000.

CoreBuilder 9000 A high performance modular switching family, which runs on an ATM or Ethernet backplane.

daughter card Can be either OC-3 or OC-12, single-mode or multi-mode. These cards are attached to the ATM Interface Carrier Module, to make the Interface Module complete.

Early Packet Discard (EPD) A procedure for discarding cells related to one user frame to minimize the impact of congestion.

EFCI Explicit Forward Congestion Indication. A 1-bit field in the PTI that contains information about whether congestion at an intermediate node has been experienced.

e-IISP Extended Interim Interswitch Protocol. A signaling protocol that uses network to network (NNI) based signaling for communication.

Enterprise Management Engine (EME) The management engine for the CoreBuilder 9000 Enterprise Switch.

Enterprise Network A nework structure that is similar to a campus network.

Faceplate The front panel.

Flash/Operational Status LED The Flash/Operational Status LED indicates in which software unit the error occurred.

framer The framer processes the SONET/SDH frames and extracts the ATM cells from the incoming serial data, verifies cell header validity and transfers cells to the ATM Layer Processor.

Gateway Interface Type (GWY) A static routing protocol between a an edge device(user) and a switch (network) (UNI). Gateway is also refered to as IISP.

IISP (Interim Inrterswitch Protocol) A signaling protocol that uses user to network (UNI or GWY) based signaling for switch to switch communication.

Local Management console (LMA) The graphic interface used to manage the Enterprise Switch locally.

loopback test The loopback test is used to diagnose faulty cables as well as faults in the framer or other components of a daughter card.

Module Status LED The Module Status LED indicates the system state of the ATM Interface Module.

multiplexing A function within a layer that interleaves the information from multiple connections into one connection.

Network to Network Interface (NNI) ITU-T-specified standard interface between nodes, typically ATM switches within the same network. This network uses e-IISP as its signalig protocol.

Partial Packet Drop (PPD) A procedure for discarding cells related to one user frame to minimize the impact of congestion.

Port Status LED The Port Status LEDs indicate the status of each port.

Software Error LED The Software Error LEDs light up in a binary pattern to indicate the nature of the software error.

Software State Indicator LED The Software State Indicator LEDs pinpoint the stage of the software execution at which the failure occurred.

Synchronous Digital Hierarchy (SDH) An ITU-T defined hierarchy that standardizes the signal interfaces for very high-speed digital transmission over optical fiber links.

Synchronous Optical Network (SONET) An ANSI-defined standard for high-speed and high-quality digital optical transmission.

traffic management A mechanism for preventing congestion or other traffic flow problems in a network, by means of performing a set of actions for managing the traffic.

User Network Interface (UNI) The interface, defined as a set of protocols and traffic characteristics, between the CPE (user) and the ATM network (ATM switch).

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.

INDEX

Numbers

A

B

C

D

E

F

G

H

I

L

M

N

O

P

Q

W

Y

3Com Corporation LIMITED WARRANTY

The duration of the warranty for the ATM Interface Module is for 1 year.

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:

Network Interface Cards	Lifetime
Other hardware products *unless otherwise specified above	1 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.

SOFTWARE

3Com warrants that the software programs licensed from it will perform in substantial conformance to the program specifications therefor for a period of ninety (90) days from the date of purchase from 3Com or its authorized reseller. 3Com warrants the media containing software against failure during the warranty period. No updates are provided. 3Com's sole obligation with respect to this express warranty shall be (at 3Com's discretion) to refund the purchase price paid by Customer for any defective software products, or to replace any defective media with software which substantially conforms to applicable 3Com published specifications. Customer assumes responsibility for the selection of the appropriate applications program and associated reference materials. 3Com makes no warranty or representation that its software products will meet Customer's requirements or work in combination with any hardware or applications software products provided by third parties, that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected. For any third party products listed in the 3Com software product documentation or specifications as being compatible, 3Com will make reasonable efforts to provide compatibility, except where the non-compatibility is caused by a "bug" or defect in the third party's product.

YEAR 2000 WARRANTY

In addition to the Hardware Products Warranty and Software Products Warranty identified above, 3Com warrants that all Heritage 3Com products sold or licensed to Customer on and after January 1, 1998 that are date sensitive will continue performing properly with regard to such date data on and after January 1, 2000, provided that all other products used by Customer in connection or combination with the 3Com products, including hardware, software, and firmware, accurately exchange date data with the 3Com products, with the exception of those products identified at 3Com's Web site, http://www.3com.com/products/yr2000.html, as not meeting this standard. A product is considered a "Heritage 3Com product" if it is a member of a product family which was manufactured by 3Com prior to its merger with US Robotics Corporation. This Year 2000 limited warranty does not apply to Heritage US Robotics Corporation products. If it appears that any such product does not perform properly with regard to such date data on and after January 1, 2000, and Customer notifies 3Com before the later of April 1, 2000, or ninety (90) days after purchase of the product from 3Com or its authorized reseller, 3Com shall, at its option and expense, provide a software update which would effect the proper performance of such product, repair such product, deliver to Customer an equivalent product to replace such product, or if none of the foregoing is feasible, refund to Customer the purchase price paid for such product.

Any software update or replaced or repaired product will carry a Year 2000 Warranty for ninety (90) days or until April 1, 2000, whichever is later.

OBTAINING WARRANTY SERVICE

Customer must contact 3Com's Corporate Service Center or an Authorized 3Com Service Center within the applicable warranty period to obtain warranty service authorization. Dated proof of purchase may be required. Products returned to 3Com's Corporate Service Center must be pre-authorized by 3Com with a Return Material Authorization (RMA) number marked on the outside of the package, and sent prepaid and packaged appropriately for safe shipment, and it is recommended that they be insured. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after receipt of the defective product by 3Com.

Dead- or Defective-on-Arrival. In the event a product completely fails to function or exhibits a defect in materials or workmanship within the first forty-eight (48) hours of installation but no later than thirty (30) days after the date of purchase, and this is verified by 3Com, it will be considered dead- or defective-on-arrival (DOA) and a replacement shall be provided by advance replacement. The replacement product will normally be shipped not later than three (3) business days after 3Com's verification of the DOA product, but may be delayed due to export or import procedures. When an advance replacement is provided and Customer fails to

return the defective product to 3Com within fifteen (15) days after shipment of the replacement, 3Com will charge Customer for the replacement product, at list price.

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.

WARRANTIES EXCLUSIVE

IF A 3COM PRODUCT DOES NOT OPERATE AS WARRANTED ABOVE, CUSTOMER'S SOLE REMEDY FOR BREACH OF THAT WARRANTY SHALL BE REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. TO THE FULL EXTENT ALLOWED BY LAW, THE FOREGOING WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES, TERMS, OR CONDITIONS, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING WARRANTIES, TERMS, OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND SATISFACTORY QUALITY. 3COM NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE OR USE OF ITS PRODUCTS.

3COM SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THAT THE ALLEGED DEFECT IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY CUSTOMER'S OR ANY THIRD PERSON'S MISUSE, NEGLECT, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR OR MODIFY, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING, OR OTHER HAZARD.

LIMITATION OF LIABILITY

TO THE FULL EXTENT ALLOWED BY LAW, 3COM ALSO EXCLUDES FOR ITSELF AND ITS SUPPLIERS ANY LIABILITY, WHETHER BASED IN CONTRACT OR TORT (INCLUDING NEGLIGENCE), FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE OR PROFITS, LOSS OF BUSINESS, LOSS OF INFORMATION OR DATA, OR OTHER FINANCIAL LOSS ARISING OUT OF OR IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE, USE, PERFORMANCE, FAILURE, OR INTERRUPTION OF ITS PRODUCTS, EVEN IF 3COM OR ITS AUTHORIZED RESELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND LIMITS ITS LIABILITY TO REPAIR, REPLACEMENT, OR REFUND OF THE PURCHASE PRICE PAID, AT 3COM'S OPTION. THIS DISCLAIMER OF LIABILITY FOR DAMAGES WILL NOT BE AFFECTED IF ANY REMEDY PROVIDED HEREIN SHALL FAIL OF ITS ESSENTIAL PURPOSE.

DISCLAIMER

Some countries, states, or provinces do not allow the exclusion or limitation of implied warranties or the limitation of incidental or consequential damages for certain products supplied to consumers or the limitation of liability for personal injury, so the above limitations and exclusions may be limited in their application to you. When the implied warranties are not allowed to be excluded in their entirety, they will be limited to the duration of the applicable written warranty. This warranty gives you specific legal rights which may vary depending on local law.

GOVERNING LAW

This Limited Warranty shall be governed by the laws of the State of California, U.S.A. excluding its conflicts of laws principles and excluding the United Nations Convention on Contracts for the International Sale of Goods.

3Com Corporation, 5400 Bayfront Plaza, Santa Clara, CA 95052-8145 (408) 764-5000

Part No. DUA-C900-2FAA02