

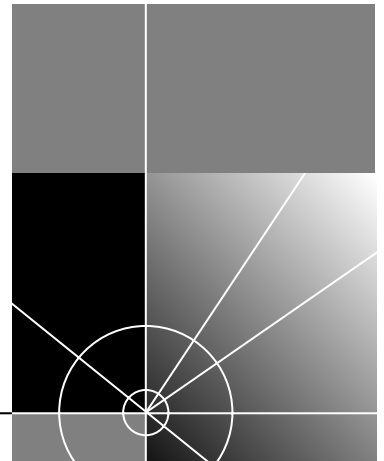


CoreBuilder® 9000 ATM Interface Module User Guide

Software Version 2.00

<http://www.3com.com/>

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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 ATM 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 Enterprise 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 information in the release notes that are 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/>

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.
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 <i>italics</i>	Italics are used to: <ul style="list-style-type: none"> ■ 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 <i>Help</i> menu, select <i>Contents</i>. Click <i>OK</i>.

Related Documents

This section provides information about supporting documentation, including:

- CoreBuilder 9000 Documents
- World Wide Web Site Documents
- 3Com Facts Automated Fax Service Documents

CoreBuilder 9000 Documents

The following documents compose the CoreBuilder 9000 documentation set. Documents are available in three forms:

- Paper Documents

The paper documents that are shipped with your system are listed on 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.

- World Wide Web and Fax Services

Various types of documentation and information are available from the 3Com Web site and fax services.

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

For a complete list of all CoreBuilder 9000 documents, see the *CoreBuilder 9000 Documentation Overview*.

Paper Documents

These documents are shipped with the CoreBuilder 9000 chassis:

- *16-Slot Chassis Quick Installation Guide for the CoreBuilder 9000 Enterprise Switch*

Instructions for installing the 16-slot chassis in a rack, on a table, or on a shelf, including prerequisites.

- *7-Slot Chassis Quick Installation Guide for the CoreBuilder 9000 Enterprise Switch*

Instructions for installing the 7-slot chassis in a rack, on a table, or on a shelf, including prerequisites.

- *CoreBuilder 9000 Enterprise Switch Getting Started Guide*

An overview of the Switch and its components, a description of the power management subsystem, information about what occurs when you start up your Switch, how to use the documentation CD-ROM, and important safety and preinstallation information.

- *16-Slot Chassis Power Supply Installation Guide for the CoreBuilder 9000 Enterprise Switch*

Instructions for installing and removing a power supply from the 16-slot chassis.

- *7-Slot Chassis Power Supply Installation Guide for the CoreBuilder 9000 Enterprise Switch*

Instructions for installing and removing a power supply from the 7-slot chassis.

- *CoreBuilder 9000 Documentation Overview*

A list of all CoreBuilder 9000 documents.

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

- Module *Quick Start Guides* or *Getting Started Guides*

An overview, LED status information, and installation instructions for each interface module, switch fabric module, and management module.

- Module *Command Quick Reference* cards or booklets

The commands for managing each module.

- *16-Slot Chassis Fan Tray Removal and Replacement Guide for the CoreBuilder 9000 Enterprise Switch*
Instructions for removing a faulty fan tray and installing a new one in the 16-slot chassis.
- *7-Slot Chassis Fan Tray Removal and Replacement Guide for the CoreBuilder 9000 Enterprise Switch*
Instructions for removing a faulty fan tray and installing a new one in the 7-slot chassis.
- *Chassis ID Printed Circuit Board for the CoreBuilder 9000 Enterprise Switch*
Information about a chassis ID printed circuit board (PCB).
- *16 MB Expansion Memory Card Installation Guide for the CoreBuilder 9000 Enterprise Switch*
Instructions for installing a 16 MB expansion memory card in the EME, and removing an existing 4 MB expansion memory card.
- *Module Release Notes*
An explanation of software issues and documentation issues in the current release.

Documents on CD-ROM

The Documentation CD-ROM contains online versions of the paper guides that are shipped with your chassis and other CoreBuilder 9000 documents in online format only, such as:

- *CoreBuilder 9000 Enterprise Management Engine User Guide*
How to use the CoreBuilder 9000 Enterprise Management Engine (EME) to manage the chassis and the network modules in the chassis.
- *CoreBuilder 9000 ATM Enterprise Switch User Guide*
How to use, configure, and network the ATM Switch Fabric Module, as well as a detailed explanation of networking theory.
- *CoreBuilder 9000 ATM Interface Module User Guide*
How to use, configure, and manage the ATM Interface Module, an explanation of networking theory, and troubleshooting information.
- *CoreBuilder 9000 Implementation Guide*
Information about using features of the CoreBuilder 9000 Enterprise Switch after you install it and attach it to your network.
- *Command Reference Guide*
Information about the Administration Console commands that you use to configure the Switch. This is a multiplatform guide. It documents commands for the CoreBuilder 9000 as well as other 3Com systems.

World Wide Web Site Documents

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

<http://support.3com.com>

In the *Select Product by Name* list under *Documents and Software*, select *CoreBuilder*.

3Com Facts Automated Fax Service Documents

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

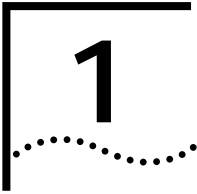
Call 3Com Facts using your Touch-Tone telephone:

1 408 727-7021

**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>



OVERVIEW

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

- About the ATM Interface Module
- CoreBuilder 9000 Chassis Models
- ATM Interface Module Capabilities
- The OC-3c/STM-1 Daughter Card
- The OC-12c/STM-4 Daughter Card
- The 155 Mbps-over-UTP5 Daughter Card
- Daughter Card Configurations
- Key Features
- A Typical Application

About the ATM Interface Module

The ATM Interface Module contains receptacles for:

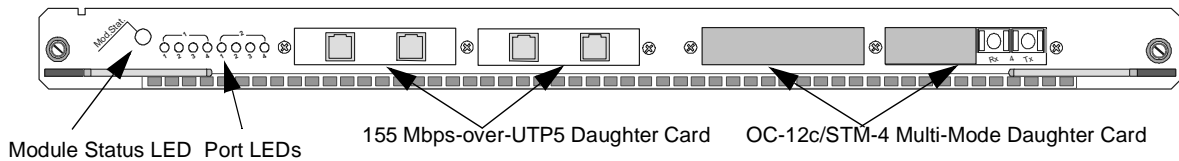
- An OC-3c/STM-1 single-mode and multi-mode four-port ATM interface daughter card
- An OC-12c/STM-4 single-mode and multi-mode one-port ATM interface daughter card
- A 155 Mbps-over-UTP5 four-port ATM interface daughter card

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-12c/STM-4 daughter card, an OC-3c/STM-1 daughter card or a 155 Mbps-over-UTP5 daughter card. These cards are sold together with the Interface Carrier Module as a bundle, and are also sold separately.

Front Panel Layout

Figure 1 shows the front panel of the ATM Interface Module with one 155 Mbps-over-UTP5 daughter card installed on the left and one OC-3c/STM-1 daughter card installed on the right. Note that, in Figure 1, the module is displayed on its side; but in the 16-slot chassis it is installed vertically with the LEDs on top.

Figure 1 ATM Interface Module Front Panel



The LED indicators on the front panel 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 34.

CoreBuilder 9000 Chassis Models

Two chassis models are available for the CoreBuilder® 9000:

- 16-slot chassis (Figure 2)
- 7-slot chassis (Figure 3)

You can install the interface modules in either chassis. In the 7-slot chassis you install the interface modules horizontally; in the 16-slot chassis, you install them vertically. For more information on installing the modules, see "Installing the ATM Interface Module into the Chassis" on page 32 and the *CoreBuilder 9000 ATM Interface Module Getting Started Guide*.

Figure 2 CoreBuilder® 9000 16-Slot Chassis

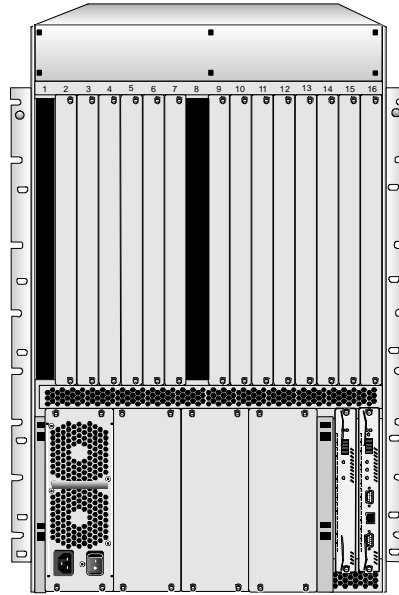
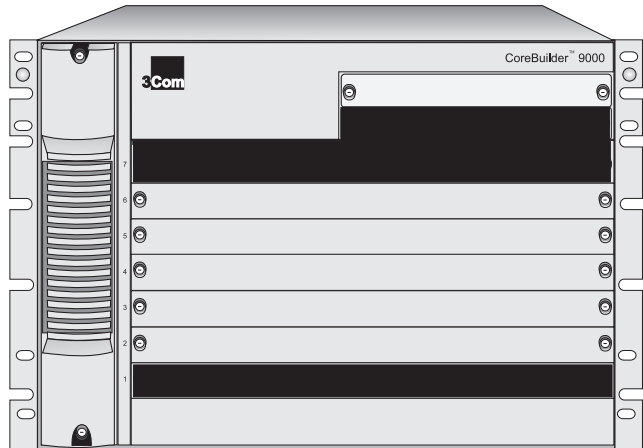


Figure 3 CoreBuilder® 9000 7-Slot Chassis



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
- External clock source capability

Traffic Management

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

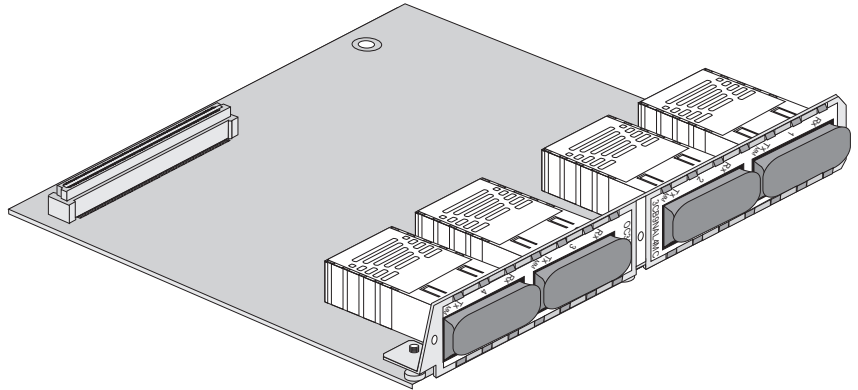
- Dynamic Distributed Output Buffer Architecture
- Multiple Queues
- Early Packet Drop (EPD) and Partial Packet Drop (PPD) Ready
- EFCI Marking
- CLP-based Cell Discard

The OC-3c/STM-1 Daughter Card

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

Figure 4 shows the OC-3c/STM-1 daughter card:

Figure 4 The OC-3c/STM-1 Daughter Card

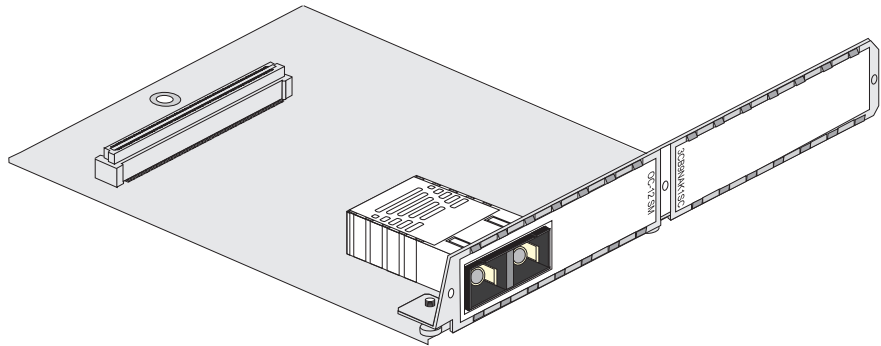


The OC-12c/STM-4 Daughter Card

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

Figure 5 shows the OC-12c/STM-4 daughter card:

Figure 5 The OC-12c/STM-4 Daughter Card

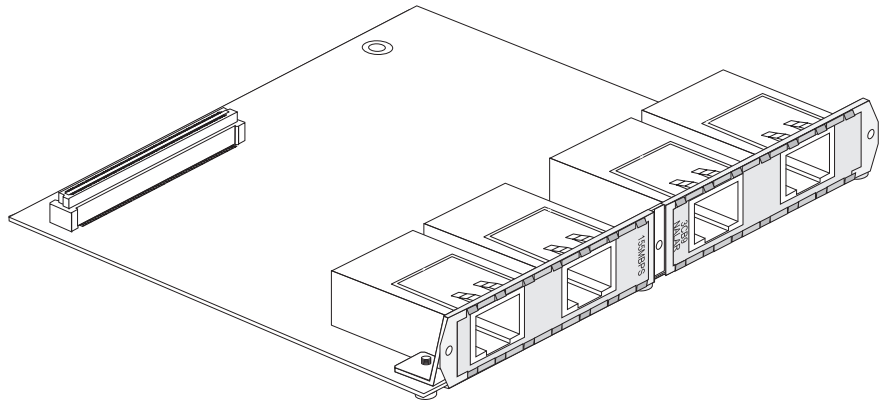


The 155 Mbps-over-UTP5 Daughter Card

The 155 Mbps-over-UTP5 daughter card is a pluggable interface module for the ATM Interface Module. You can install one or two 155 Mbps-over-UTP5 daughter cards on each ATM Interface Module.

Figure 6 shows the 155 Mbps-over-UTP5 daughter card:

Figure 6 The 155 Mbps-over-UTP5 Daughter Card



Daughter Card Configurations

Table 3 indicates possible configurations of the OC-3c/STM-1, OC-12c/STM-4, and 155 Mbps-over-UTP5 daughter cards in the ATM Interface Module.

Table 3 Daughter Cards Compatible with the ATM Interface Carrier Module

Card Type	No. of Ports	Rate (Mbps)	Granularity	3Com Part Number
OC-3c-MMF ¹	4	155	4	3CB9NAL4MC
OC-3c-SMF ²	4	155	4	3CB9NAL4SC
OC-3c-MMF +SMF ³	3+1	155	4	3CB9NAL3M1SC
OC-12c-MMF	1	622	1	3CB9NAK1MC
OC-12c-SMF	1	622	1	3CB9NAK1SC
155 Mbps-over-UTP5	4	155	4	3CB9NAL4R

1 MMF=Multimode Fiber

2 SMF=Single Mode Fiber

3 MMF+SMF=OC-3c/STM-1 daughter card with 3 MMF ports and 1 SMF port.

Available Combinations

The ATM Interface Carrier Module and daughter cards are available in the combinations specified in Table 4. You may order the daughter cards with the ATM Interface Carrier Module using a single 3Com part number or separately. In either case, the daughter cards are installed into the Carrier Module by the customer. See the *CoreBuilder 9000 ATM Interface Module Getting Started Guide* for instructions on how to install the daughter cards into the ATM Interface Carrier Module.

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

Item	Bundled/ Separate	3Com Part Number
ATM Interface Carrier Module	Separate	3CB9AK2
ATM Interface Module with: 2x Port OC-12c/STM-4 MMF ¹ 2x Port OC-12c/STM-4 SMF ²	Bundled	3CB9AK2MC 3CB9AK2SC
ATM Interface Module with: 8x Port OC-3c/STM-1 MMF 8x Port OC-3c/STM-1 SMF	Bundled	3CB9AL8MC 3CB9AL8SC

(continued)

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

Item	Bundled/ Separate	3Com Part Number
Daughter Card: 1x Port OC-12c/STM-4 MMF 1x Port OC-12c/STM-4 SMF	Bundled	3CB9NAK1MC 3CB9NAK1SC
Daughter Card: 4x Port OC-3c/STM-1 MMF 4x Port OC-3c/STM-1 SMF 3x Port OC-3c/STM-1 MMF +1x Port SMF	Separate	3CB9NAL4MC 3CB9NAL4SC 3CB9NAL1S3MC
Daughter Card: 4x Port 155 Mbps-over-UTP5	Separate	3CB9NAL4R

1 MMF=Multi-Mode Fiber

2 SMF=Single-Mode Fiber

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
- Up to 32K VCs per port

VPI/VCI Range Support - Rx

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

WAN Support

- External clock source
- Traffic policing ready

Traffic Management

- Distributed output buffer architecture
- Priority Output Queues
- Back Pressure
- Early Packet Drop (EPD) ready
- Partial Packet Drop (PPD) ready
- EFCI Marking
- CLP-based Cell Discard

Output Buffering

- Distributed output buffer capacity: At least 8K cells per OC-12c/STM-4 port
- Output buffer priorities: Three delay priorities per OC-12c/STM-4 port

A Typical Application

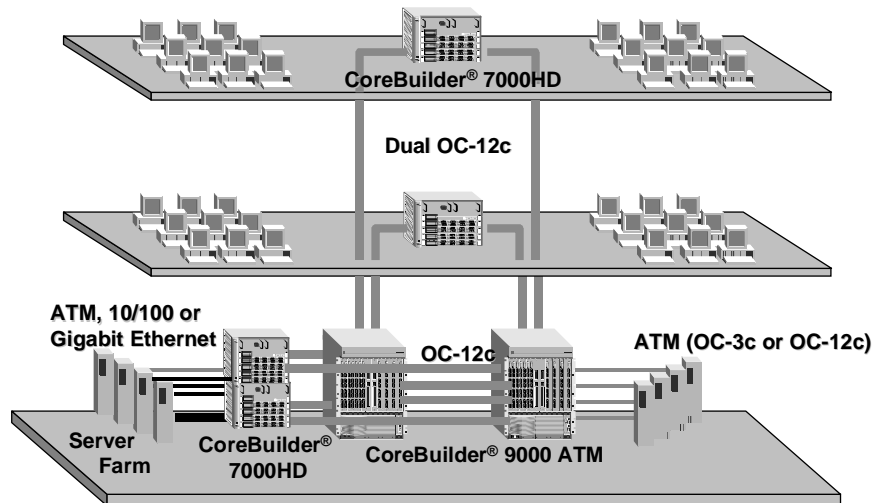
The ATM Interface Module installed in a high-density CoreBuilder 9000 Enterprise Switch provides advantages in many different locations and configurations.

Enterprise Network

Figure 7 illustrates the power, modularity, and flexibility of the CoreBuilder 9000 Enterprise ATM 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-12c
- Building a high-performance OC-12c Campus and Metropolitan Area Network
- Utilizing high-density Server Farm applications

Figure 7 A CoreBuilder® 9000 ATM Core in a Switched Ethernet Network



2

STARTING UP

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
- Précautions de Sécurité
- Précautions de Manipulation
- Sicherheitsvorkehrungen
- Vorkehrungen beim Umgang mit dem Modul
- Installation
- Connecting to Network Services
- System States

For information about installing the ATM Interface Module, see the *CoreBuilder 9000 ATM Interface Module Getting Started 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 9000 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.

Laser and LED Safety Information



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 (Class One Laser/LED Product).

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 front panel or as shown in the *ATM Interface Module Getting Started Guide*.
- Do not touch the components, pins, leads, or solder connections.
- Before you push the module into the chassis, make sure that the module ejector handles are open.
- When you insert the module into the chassis, match the upper and lower/left and right 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 on manipule les éléments du système CoreBuilder 9000, il faut bien respecter les précautions de sécurité. Pour éviter des décharges électriques, des brûlures, des incendies ainsi que pour ne pas endommager l'équipement, veuillez bien lire et respecter les précautions suivantes:



AVERTISSEMENT: Le système CoreBuilder 9000 contient énergie qui peut s'avérer dangereuse. Soyez très minutieux lorsque vous installez, enlevez ou remplacez un Module Interface ATM.



AVERTISSEMENT: Le Module Interface ATM ne doit être installé, enlevé ou remplacé que par personnel qualifié.



AVERTISSEMENT: Lorsque le système CoreBuilder 9000 est sous tension, ne jamais insérer des objets tels que tournevis ni même des doigts portant des bijoux dans l'emplacement 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 mettre en fonctionnement un module évidemment 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 oculaires éventuelle, 3Com vous recommande, comme pour toute lumière vive, de ne pas regarder directement la source de lumière.

Information sur la Prévention de Décharges Electrostatiques

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 ou comme indiqué dans le *ATM Interface Module Getting Started Guide*.
- Ne touchez pas 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/à gauche et à droite.
- Ne jamais forcer lorsque vous insérez le module dans les rails.

Sicherheitsvorkehrungen

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



WARNUNG: Im CoreBuilder 9000-System existieren hohe elektrische Spannungen. Sie sollten deshalb das ATM-Schnittstellen-Modul nur mit äußerster Vorsicht installieren, entfernen oder tauschen.



WARNUNG: Das ATM-Schnittstellen-Modul darf nur von ausgebildetem Servicepersonal installiert, entfernt oder getauscht werden.



WARNUNG: 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.



WARNUNG: Versuchen Sie nicht, ein offensichtlich beschädigtes Modul zu installieren oder in Betrieb zu setzen.



WARNUNG: Halten Sie sich beim Installieren des ATM-Schnittstellen-Moduls zur Gewährleistung der optischen Sicherheit an folgende Vorkehrung: Obwohl die für die Datenkommunikation verwendeten LEDs und Laser-Dioden die Sicherheitsvorkehrungen 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 Schäden 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-Schnittstellen-Modul:

- Fassen Sie das Modul immer nur an der Frontplatte an, oder wie in dem *ATM Interface Module Getting Started Guide* gezeigt.
- Berühren Sie nicht die Baugruppen, Stifte, Leitungen oder Lötverbindungen.
- Vergewissern Sie sich vor dem Einschieben des Moduls, 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/rechten und linken 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 *16-Slot Chassis Quick Installation Guide for the CoreBuilder 9000 Enterprise Switch* or the *7-Slot Chassis Quick Installation Guide for the CoreBuilder 9000 Enterprise Switch*. You can install the chassis in a rack, on a shelf, or on a tabletop.
- 2 Install the power supply as described in the *16-Slot Power Supply Installation Guide for the CoreBuilder 9000 Enterprise Switch* or the *7-Slot Power Supply Installation Guide for the CoreBuilder 9000 Enterprise Switch* and install the power cable as described in the *Enterprise Management Engine Quick Start Guide for the CoreBuilder 9000 Enterprise Switch*.
- 3 Install the Enterprise Management Engine as described in the *Enterprise Management Engine Quick Start Guide for the CoreBuilder 9000 Enterprise Switch*.
- 4 Install the ATM Switch Fabric Module as described in the *CoreBuilder 9000 ATM Switch Fabric Module Getting Started Guide*.
- 5 Read the *CoreBuilder 9000 ATM Interface Module Getting Started 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 ATM Enterprise Switch through the Simple Network Management Protocol (SNMP), you must install the 3Com Transcend® Enterprise Manager for UNIX or for Windows NT.
- 7 For site requirements, see Appendix C in the *CoreBuilder 9000 Enterprise Switch Getting Started Guide*.

Installing the Daughter Cards

For complete details on how to install the daughter cards into the ATM Interface Module, see the *CoreBuilder 9000 ATM Interface Module Getting Started Guide*.

Installing the ATM Interface Module into the Chassis

For complete details on how to install the ATM Interface Module into the CoreBuilder 9000 chassis, see the *CoreBuilder 9000 ATM Interface Module Getting Started Guide*.

Connecting to Network Services

Each of the OC-3c/STM-1 and OC-12c/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. UTP5 ports are connected with UTP category 5 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.

Connecting to the UTP5 Port

The 155 Mbps-over-UTP5 daughter card has four ports, each equipped with an 8-pin RJ-45 receptacle which is designated as a network device. In order to connect to the port, the connector must be wired as a user device as shown in Table 5:

Table 5 Pins in RJ-45 Connector

Pin Number	In User Device	In Network Device
1	transmit +	receive +
2	transmit -	receive -
3	----	----
4	----	----
5	----	----
6	----	----
7	receive +	transmit +
8	receive -	transmit -

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
- Failure

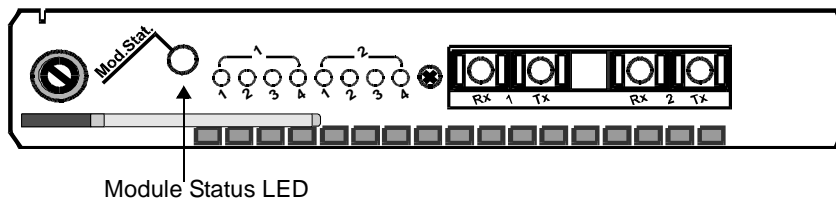
Power-on The power-on phase of the ATM Interface Module consists of the following parts:

- 1 Initializing card
- 2 Executing diagnostic tests
- 3 Downloading operational software from the ATM Switch Fabric Module
- 4 Start operational software
- 5 Initializing operational software

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 8).

Figure 8 ATM Interface Module LEDs



During the power-on phase, the Module Status LED blinks green. When the power-on phase has been 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 60 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 36)

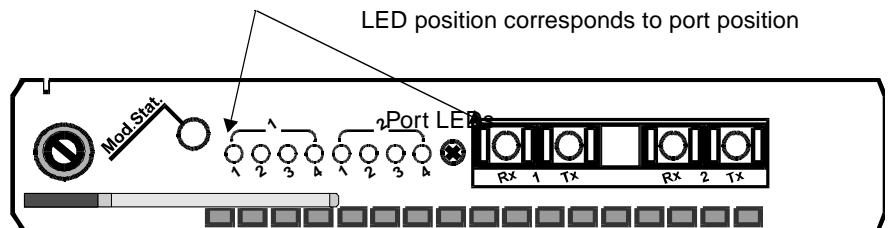
Normal Operation

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 9) indicates the status of the ATM port. The number under each port status LED corresponds to the number of its port.

Figure 9 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
There is no cable connected to the port or there is no port.	Off (no color)	No

Table 7 Port LED Indications (continued)

Port State (continued)	LED Color	Blinking?
Remote alarm indicator. (See <i>Chapter 5, Troubleshooting</i> .)	Yellow	No
Port is in loop state. (See <i>Chapter 5, Troubleshooting</i> .)	Yellow	Yes

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	Boot operational software LEDs; LED:operational software /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 interface software is loaded to the Boot. The operational software is loaded from the Boot to the DRAM. The Boot/Operational status LED can indicate if the problem occurred during the software download to the Boot memory or during the execution of the software. Table 9 indicates the status of the Boot/Operational Status LED as well as the recommended action to take.

Figure 10 The Boot /Operational Software Indicator LED

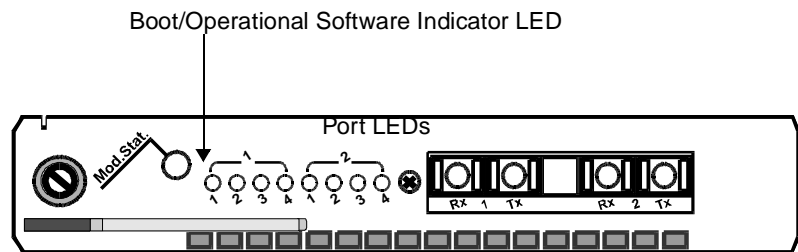


Table 9 Boot/Operational Software LED

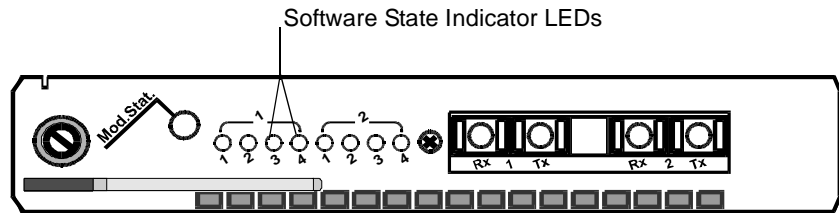
LED Status*	Type of Failure	Recommended Action
0	Operational software error	Download ATM Interface Module software again
1	Boot memory software error	<ol style="list-style-type: none"> 1 Remove the ATM Interface Module and reinsert it into the chassis. 2 Reset the ATM Interface Module via LMA. 3 Replace the ATM Interface Module.

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

Identifying When the Failure Occurred

Figure 11 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 Boot/Operational Software LED and the Software State Indicator LEDs. For example, if the Boot/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.

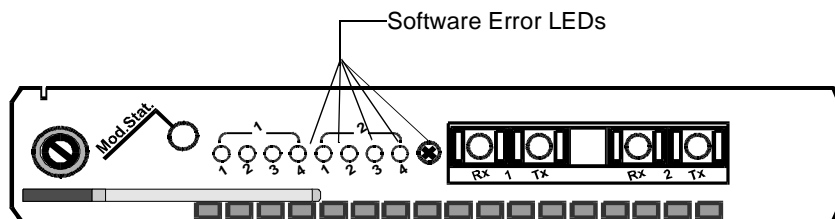
Figure 11 The Software State Indicator LEDs**Table 10** Software Status Indicator LEDs

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

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

Identifying the Nature of the Failure

The Software Error LEDs shown in Figure 12 give information about the nature of the failure.

Figure 12 Software Error LEDs

When a software error is detected, the Software Error LEDs light up as a binary number to indicate the nature of this error. Read the LEDs from top to bottom/left to right. 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	Faulty ATM Interface Module
0 0 0 1 1	Faulty daughter card #1 (upper)
0 0 1 0 0	Faulty daughter card #2 (lower)
0 0 1 0 1	Faulty carrier module
0 0 1 1 0	Faulty carrier module
0 0 1 1 1	Faulty carrier module
0 1 0 0 0	Faulty carrier module
0 1 0 0 1	Faulty carrier module
0 1 0 1 0	Faulty carrier module
1 0 0 1 1	Faulty carrier module
1 0 1 0 0	Faulty carrier module
1 0 1 0 1	Faulty carrier module
1 1 0 1 0	Faulty carrier module
1 1 1 1 0	Faulty carrier module
1 1 1 1 1	Faulty carrier module

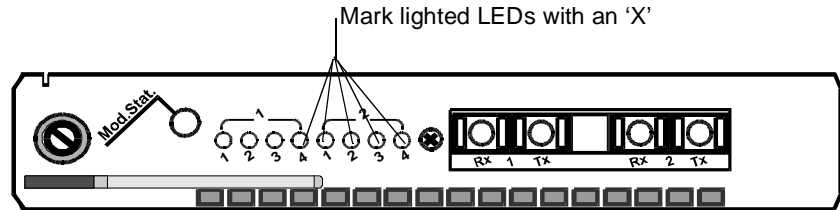
* 1 = LED is on. 0 = LED is off.

For additional information about the LEDs, see "Solving Common Problems" on page 57.

Reporting a Failure

When you report a failure to 3Com Technical Support, make a copy of this page and mark with an X, the LEDs in Figure 13 that were lighted when a failure occurred, and attach it to the RMA card.

Figure 13 Form for Marking Software Error LEDs



3

CONFIGURING PORTS

This chapter describes how to configure ports in the ATM Interface Module via the CoreBuilder® 9000 ATM Enterprise Switch Local Management Application (LMA). For details on how to use the LMA, see Chapter 3, “Using the Local Management Application” in the *CoreBuilder 9000 ATM Enterprise Switch User Guide*.

Topics covered in this chapter include:

- Configuring Interface Modules
- Accessing the Interface Cards Menu

Configuring Interface Modules

After the ATM Interface Module is installed and operating normally, you can configure each port individually via the LMA. The following sections explain the configuration procedures step-by-step.

Accessing the Interface Cards Menu

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

You can perform the following operations for the interface modules of the CoreBuilder 9000 ATM Enterprise Switch:

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

Display Interface Module Slot Occupancy

Displays the Interface Module Slot Occupancy.

Command Actions

Enter the menu sequence: (1) SYS: Platform configuration
(5) IFC: Interface cards
(1) GIF: Get interface card info

Direct access sequence: 1 5 1

Command Result

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

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

Display Interface Module Information and Parameters

Display the slot ID, slot status, and card type of each of the 11 interface modules or 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 6 in the 7-slot chassis and 1 through 7, 10, 12, 14, and 16 in the 16-slot chassis 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 Module Slot Occupancy Parameters

Table 12 describes the Interface Module slot occupancy parameters displayed by the command.

Table 12 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 (for the 16-slot chassis and 7-slot chassis)

Enter: 1 5 1

Interface Module slot occupancy information for the 16-slot chassis is displayed as follows:

Slot id	Slot status	Interface card type	Interface card status
1	Occupied	ATM I/F card	Up
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

Interface Module slot occupancy information for the 7-slot chassis is displayed as follows:

Slot id	Slot status	Interface card type	Interface card status
1	Occupied	ATM I/F card	Up
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

Interface Card Parameters

Table 13 describes the interface parameters displayed by the command for a specific slot ID.

Table 13 Interface Parameters

Parameter	Description
Port ID	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 media used by the port (for example, coaxial cable, multi-mode fiber).
Operational Status	The port may be "up" or "down", "up & connect", or "doesn't exist."
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 cannot connect to the other side via this port.
Frame Mode	The interface framing mode. Can be SDH or SONET.
Clock Src	This may be internal (Int) or external (Ext).
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 following example. The ATM Interface Module contains an OC-12c/STM-4 card, an OC-3c/STM-1 card and a 155 Mbps-over-UTP5 card.

Port id	Interface type	Media type	Operational status	Port status	Frame mode	Clk src	Loop 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	155-RJ45	UTP_5 Copper(User)	Up	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 12 describes the slot parameters.

Example

Enter: 1 5 5 0

Slot information of the ATM Interface Module in a 16-slot chassis 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

Slot information of the ATM Interface Module in a 7-slot chassis 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		Init
6	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.



CAUTION: When setting the port frame mode on one of the ports of an OC-3c or 155 Mbps-over-UTP5 card, all four ports are automatically updated, even if only one port was selected.

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)? y
```

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

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

The selected port(s) are set and saved.

Set Port Clock Mode Set the port clock command mode of a selected port as Normal or Loop Timing 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 Mode	0 for Normal 1 for Loop timing

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 port clock mode command has completed successfully.

Example

Enter: 1 5 4 1.1.2 1

The following message is displayed:

Setting port clock mode command has completed successfully.

The clock operational mode of port 1.1.2 is set to loop timing.

Set Loop Mode Set the loop mode of selected port as None, Loop Forward or Loop Back. You are prompted to specify a port and a mode. For details on loop mode, see “Diagnostic Procedures” on page 61.

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.



CAUTION: When setting the loop mode on one of the ports of an OC-3c or 155 Mbps-over-UTP5 card to Loop back, all four ports are automatically updated, even if only one port was selected.

Example

Enter: 1 5 5 1.1.2 1

The following messages are displayed:

```
The following settings will take place:
Changing port <1.1.1> setting from no loop mode to loopback mode.
Changing port <1.1.2> setting from no loop mode to loopback mode.
Changing port <1.1.3> setting from no loop mode to loopback mode.
Changing port <1.1.4> setting from no loop mode to loopback mode.
Do you really want to do these changes ? (Y/N)? y
Setting port loop mode command has completed successfully.
```

The loop mode of port 1.1.2 is set to Loop back.

Reset Interface Card Reset the interface module in a specific slot, or all the interface module.

Command Actions

Enter the menu sequence: (1) SYS: Platform Configuration
(5) IFC: Interface Cards
(6) 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 6 [parameters]

Command Result

System action taken: The selected interface module is reset.

System message display: The interface card was reset.

Example

Enter: 1 5 6 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.





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

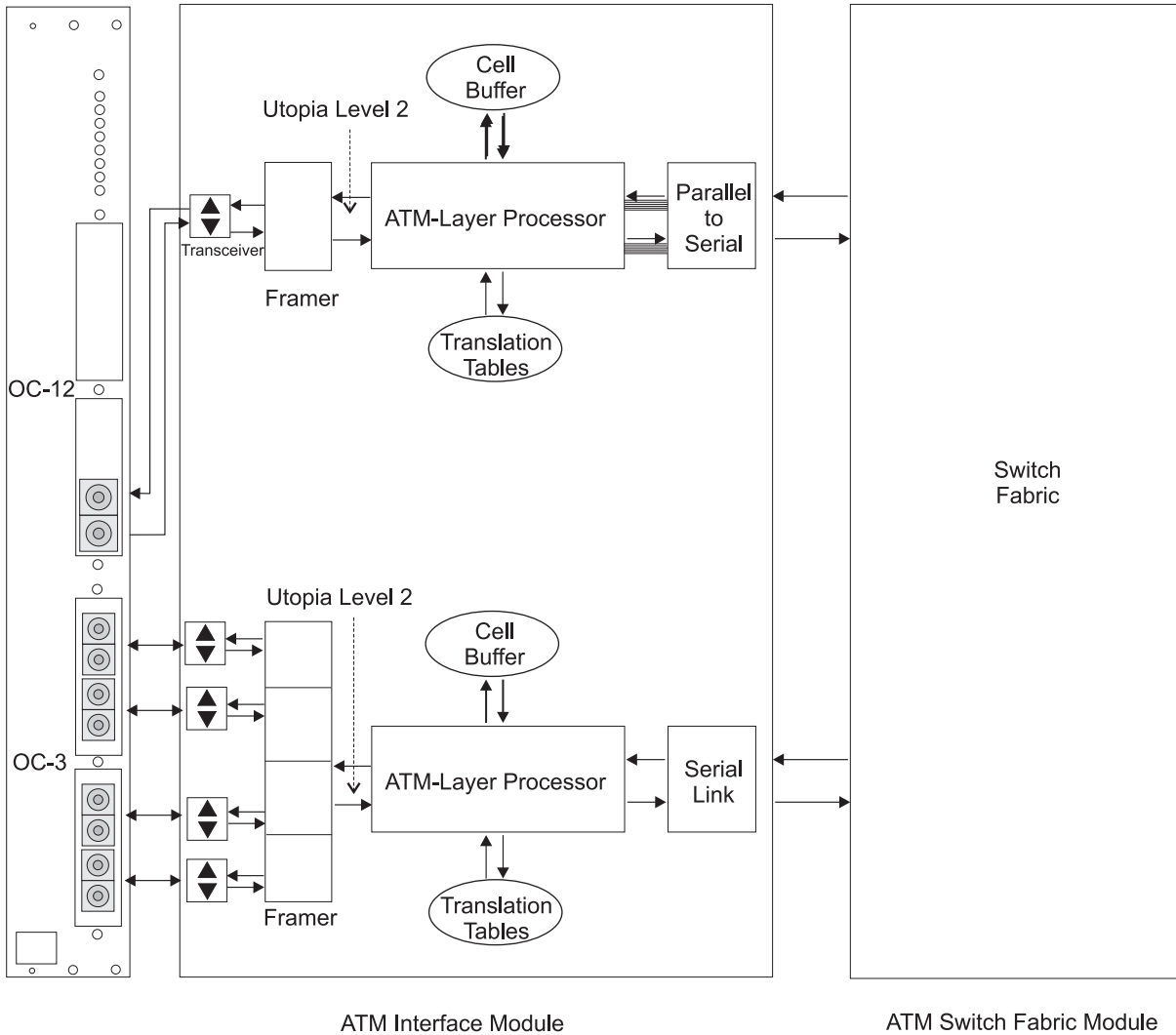
The ATM Interface Module is specially designed to provide an interface between full-rate line data flow at up to 622 Mbps and the ATM Switch Fabric Module. The ATM Interface Module provides two interface channels, each of which can carry traffic at 622 Mbps to and from the ATM Switch Fabric Module. The CoreBuilder® 9000 16-slot 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-12c ports. The CoreBuilder 9000 7-slot chassis can house up to 6 ATM interface modules, totaling 12 OC-12c ports.

The same interface modules can be used in either the CoreBuilder 9000 16-slot chassis or in the CoreBuilder 9000 7-slot chassis. 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. Three types of daughter cards are supported: an OC-12c/STM-4 daughter card, which has one 622 Mbps port; an OC-3c/STM-1 daughter card, which has four 155 Mbps ports; and a 155 Mbps-over-UTP5 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-12c/STM-4 daughter card, the 622 Mbps data stream is processed directly; in the case of the OC-3c/STM-1 or the 155 Mbps-over-UTP5 daughter card, the data from the four 155 Mbps ports is multiplexed into one 622 Mbps data stream. Figure 14 shows the two interface channels of the ATM Interface Module.

A one-port OC-12c/STM-4 daughter card occupies the upper chamber and a four-port OC-3c/STM-1 daughter card occupies the lower chamber.

Figure 14 ATM Data Flow in the ATM Interface Module



ATM Interface Module Components

Figure 14 shows the ATM data flow through the various components of the ATM Interface Module. The components are:

- Transceiver
- Framer
- ATM Layer Processor
- Serial Link

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

Transceiver

The transceiver provides the physical interface to the line. It converts the data transmitted by framer to the appropriate electrical or photonic signals. It also converts the signals received to a data stream.

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

Parallel Serial Adapter

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.

5

TROUBLESHOOTING

This chapter explains how to identify and correct problems, and how to perform related diagnostic tasks.

If you have problems that are not addressed in this chapter, contact 3Com Technical Support or your local 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, see the release notes.

Port LED Not Lighted

When a cable connector is inserted into a port, the corresponding port LED should light. If it does not light, Table 14 shows the symptoms, possible causes, and actions to take.

Table 14 Port Failures

Symptom	Possible Cause	Action
Port LED does not light	Port not connected	<ol style="list-style-type: none">1 Check that the cable is connected to a device at its other end.2 Check that cable is firmly seated.3 Make sure that each wire connected to the ATM port connects to Rx on one end and Tx on the other.4 Check that the daughter card(s) are inserted firmly into the ATM Interface Module.
	Faulty Cable	<ol style="list-style-type: none">1 Test the cable.2 Replace the cable3 Check cable type: MM or SM.

(continued)

Table 14 Port Failures (continued)

Symptom	Possible Cause	Action
	Faulty daughter card	<ol style="list-style-type: none"> 1 Replace the daughter card associated with the port. 2 Replace the Interface Module.
	Low power budget (optics)	<ol style="list-style-type: none"> 1 Test the cables power loss. 2 Compare with the allowed power budget. 3 Change the interface type. 4 Shorten the cable length.
	Cable length (UTP5)	<ol style="list-style-type: none"> 1 Measure the cable length. 2 Compare with the allowed distance.

Failure LED Lights

When the general purpose LED (top-most LED) turns yellow, it indicates a failure condition. Table 15 shows the symptoms, possible causes, and actions to take.

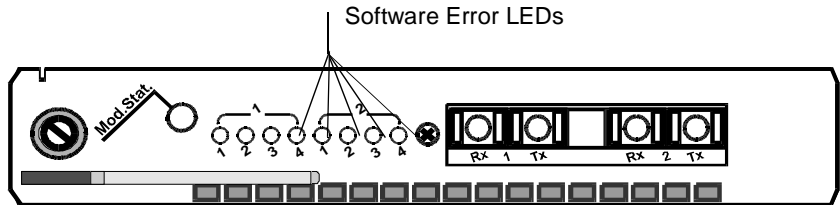
Table 15 General Failures

Symptom	Possible Cause	Action
General purpose LED turns yellow	Port failure	<ol style="list-style-type: none"> 1 Reset the ATM Interface Module via the LMA. 2 Remove and reinsert the ATM Interface Module.
LED remains yellow	Module failure	<ol style="list-style-type: none"> 1 Read the binary error code from the group of eight port LEDs. See Table 16 for an interpretation of the error codes. 2 Record the code and send it to 3Com Technical Support (see <i>Appendix C</i>).

Software Error LEDs

Figure 15 shows the Software Error LEDs.

Figure 15 Software Error Indicator LEDs



These LEDs are the last five LEDs in the set of LEDs. When a software error is detected, they light up as a binary number to indicate the nature of the error. Table 16 summarizes the Software Error LEDs. In Table 16, 1 indicates the LED is On and 0 that the LED is Off. Read the LEDs from top to bottom in the 16-slot chassis or from left to right in the 7-slot chassis. Combinations not shown are reserved.

Table 16 Software Error LED Interpretation

LED Status*	Action
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 identify the problem. These procedures are described in this section.

There are two types of loop tests used to diagnose faulty cables and various other faults:

- Loop Forward Test
- Loopback Test

These tests and an example of their use are described in this section.

Loop Forward Test

The loop forward test is used to diagnose faulty cables as well as dirt on the connector or transceiver. After a loop forward test is performed on a specific port, the LED of that port blinks. To set up the loop forward test, a port of the ATM Interface Module is connected to a remote CoreBuilder 9000 port and the remote port is set to loop forward mode, via the LMA or Telnet. See Chapter 3 for details on setting the port to loop forward state. Loop forward tests can be performed on a local or remote port.



For an OC-3c/STM-1 or a 155 Mbps-over-UTP5 daughter card, when setting one port to loop forward, if all four ports were in loopback mode, a warning message stating that all four ports will be changed, is displayed and you are asked for confirmation. After confirmation, the specified port is set to Loop Forward, and the remaining ports are set to No Loop.

Loopback Test

The loopback test is used to test the port (excluding the transceiver). To set up the loopback test, a port of the ATM Interface Module is connected in a loop to itself. See Chapter 3 for details on setting the port to loopback state.

In the 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 ATM Enterprise Switch Fabric Module.

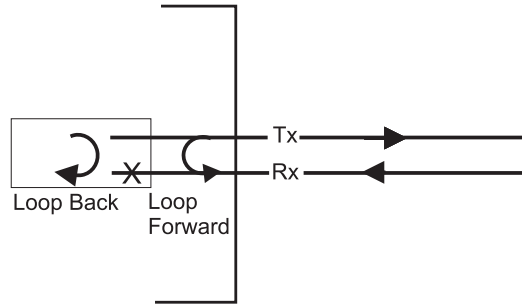


CAUTION: *For an OC-3c/STM-1 or a 155 Mbps-over-UTP5 daughter card, when setting one port to loopback, a warning message stating that all four ports will be changed, is displayed and you are asked for confirmation. After confirmation, all four ports are set to loopback.*

This may cause damage to the network operation if not handled carefully.

See Figure 16 for a diagram of loop back and loop forward.

Figure 16 Loop Back and Loop Forward



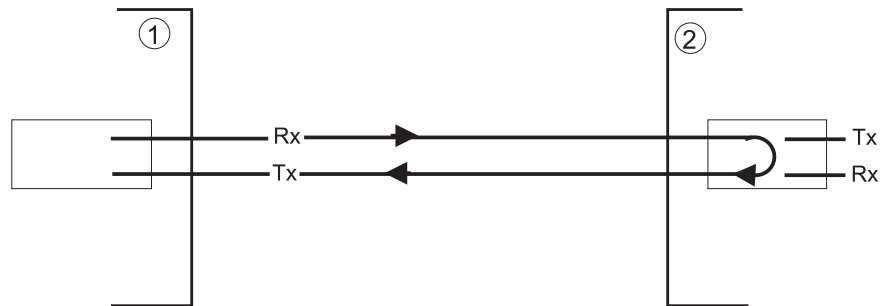
Example of Using Loop Tests for Physical Troubleshooting

The NMS identifies several BIP errors on a specific port. This could be a result of three possibilities:

- Faulty receiver (on the first side)
- Faulty transmitter (on the second side)
- Faulty fiber

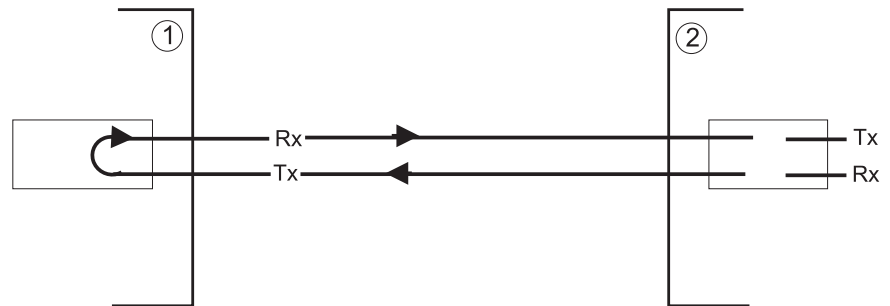
To identify the problem, perform the following procedure:

- 1 Perform a loop forward test on the second side.



The BIP errors continue.

- 2 Perform a loop forward test on the first side.



There are no BIP errors.

From these results, we can assume that the second switch's port transmitter is faulty.

- 3 Replace the daughter card in the second switch.

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.



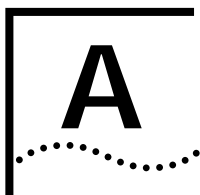
CAUTION: After you clean the connectors, avoid touching all surfaces, and keep all unused ports covered.



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

Interface Functionality

Table 17 lists the properties for the ATM Interface Module daughter cards.

Table 17 Interface Parameters by Port Types/Operational Rate (Mbps)

Parameter	OC-3c/155	OC-12c/622	UTP5
Framing	<ul style="list-style-type: none"> ■ SONET STS-3c ■ SDH STM-1 ■ NRZ line coding 	<ul style="list-style-type: none"> ■ SONET STS-12c ■ SDH STM-4c ■ NRZ line coding 	<ul style="list-style-type: none"> ■ SONET STS-3c ■ SDH STM-1
Media	<ul style="list-style-type: none"> ■ 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) 	<ul style="list-style-type: none"> ■ 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) 	<ul style="list-style-type: none"> ■ Category 5 UTP 100 m
Connectors	<ul style="list-style-type: none"> ■ Duplex SC connector for fiber 	<ul style="list-style-type: none"> ■ Duplex SC connector for fiber 	<ul style="list-style-type: none"> ■ RJ-45 for UTP
Clocking	<ul style="list-style-type: none"> ■ Internal - 19.44 MHz 20 ppm accuracy ■ External ■ Loop timing (sync on received signal) 	<ul style="list-style-type: none"> ■ Internal - 19.44 MHz 20 ppm accuracy ■ External ■ Loop timing (sync on received signal) 	<ul style="list-style-type: none"> ■ Internal - 19.44 MHz 20 ppm accuracy ■ External ■ Loop timing (sync on received signal)
Statistics	Received, transmitted, errored HEC, BIP, RDI	Received, transmitted, errored HEC, BIP, RDI	Received, transmitted, errored HEC, BIP, RDI
Alarms	LOS, LOF, LOP, AIS, RDI	LOS, LOF, LOP, AIS, RDI	LOS, LOF, LOP, AIS, RDI

(continued)

Table 17 Interface Parameters by Port Types/Operational Rate (Mbps) (continued)

Parameter	OC-3c/155	OC-12c/622	UTP5
Compliance	ATM Forum UNI V3.1, af-uni-0010.002, References used in accordance with the ATMF specs: ITG T G.957, ITU-T G.708, ITU-T G.709, ITU-T G.783, ITU-T G.432, ANSI T1.646, ANSI T1.105	ATM Forum 622.08 Mbps Physical Layer Specification af-phy-0046.000, References used in accordance with the ATMF specs: ITG T G.957, ITU-T G.708, ITU-T G.709, ITU-T G.783, ITU-T G.432, ANSI T1.646, ANSI T1.105	ATM Forum Physical Medium Dependent Interface Specification for 155 Mbps over Twisted Pair Cable af-phy-0015.000

Physical

The ATM Interface Module contains:

- OC-3c/STM-1 daughter card
- OC-12c/STM-4 daughter card
- 155 Mbps-over-UTP5 daughter card

Table 18 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 19 OC-3c/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 20 OC-12c/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

Table 21 155 Mbps-over-UPT5 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 in.
Weight	160 g	0.35 lb

Interfaces

Table 22 Interfaces

Element	Specification
Interfaces	OC-3c/STM-1 MMF
	OC-3c/STM-1 SMF
	OC-12c/STM-4 MMF
	OC-12c/STM-4 SMF
	UTP5

Environmental

Table 23 Environmental Specifications

Specification	Metric	Imperial
Operating Temperature	0 °C to 40 °C	32 to 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

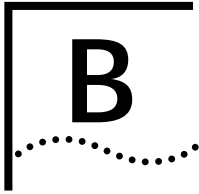
Table 24 Indicators

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

Standards Compliance

Table 25 Standards Compliance

Element	Specification
Safety	UL 1950 CSA 22.2 No 1950 Low Voltage Directive - Council Directive 72/23/EEC EN 60950 IEC 825-1 (Equipment classification, requirements, and user 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)
Electromagnetic Compatibility (EMC)	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 (EN61000-4-2, 3, 4, 5, 6, 11) VCCI Class B Limit



AVAILABLE CONFIGURATIONS AND 3COM PART NUMBERS

Table 26 lists the configuration options that are available for the ATM Interface Module.

Table 26 ATM Module Part Numbers

Configuration	3Com Part Number	Package Part Number
ATM Interface Carrier Module	3CB9AK2	3CB9AK2
ATM Interface 2xOC-12c SM ¹	3CB9AK2SC	(3CB9AK2 + 2 x 3CB9NAK1SC)
ATM Interface 2xOC-12c MM ²	3CB9AK2MC	(3CB9AK2 + 2 x 3CB9NAK1MC)
ATM Interface 8xOC-3c SM	3CB9AL8SC	(3CB9AK2 + 2 x 3CB9NAL4SC)
ATM Interface 8xOC-3c MM	3CB9AL8MC	(3CB9AK2 + 2 x 3CB9NAL4MC)
OC-12c/STM-4 SM	3CB9NAK1SC	3CB9NAK1SC
OC-12c/STM-4 MM	3CB9NAK1MC	3CB9NAK1MC
OC-3c/STM-1 SM	3CB9NAL4SC	3CB9NAL4SC
OC-3c/STM-1 MM	3CB9NAL4MC	3CB9NAL4MC
OC-3c/STM-1 SM+MM ³	3CB9NAL1S3MC	3CB9NAL1S3MC
155 Mbps-over-UTP5	3CB9NAL4R	3CB9NAL4R

1 SM - single-mode

2 MM - multi-mode

3 SM + MM = OC-3c/STM-1 daughter card with 1 SM port and 3 MM ports.

Table 27 lists the different configuration options.

Table 27 Daughter Card Installation Combinations

Daughter Card

OC-3c/STM-1 SM¹

OC-3c/STM-1 MM²

OC3/STM SM +MM³

OC-12c/STM-4 SM

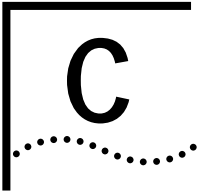
OC-12c/STM-4 MM

155 Mbps-over-UTP5

1 SM = Single-mode

2 MM = Multi-mode

3 SM + MM = OC3/STM-1 daughter card
with 1 SM port and 3 MM ports.



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, 3Com recommends that you access the 3Com Corporation World Wide Web site.

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 (3Com BBS)
- 3Com FactsSM automated fax service

World Wide Web Site

Access the latest networking information on the 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, software, and MIBs 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 3Com BBS 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 14,400 bps	61 2 9955 2073
Brazil	Up to 14,400 bps	55 11 5181 9666
France	Up to 14,400 bps	33 1 6986 6954
Germany	Up to 28,800 bps	4989 62732 188
Hong Kong	Up to 14,400 bps	852 2537 5601
Italy	Up to 14,400 bps	39 2 27300680
Japan	Up to 14,400 bps	81 3 3345 7266
Mexico	Up to 28,800 bps	52 5 520 7835
P.R. of China	Up to 14,400 bps	86 10 684 92351
Taiwan, R.O.C.	Up to 14,400 bps	886 2 377 5840
U.K.	Up to 28,800 bps	44 1442 438278
U.S.A.	Up to 53,333 bps	1 847 262 6000

Access by Digital Modem

ISDN users can dial in to the 3Com BBS using a digital modem for fast access up to 64 Kbps. To access the 3Com BBS using ISDN, use the following number:

1 847 262 6000

3Com Facts Automated Fax Service

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

Call 3Com Facts 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 021 6350 1590
Hong Kong	800 933 486	Singapore	800 6161 463
India	61 2 9937 5085	S. Korea	
Indonesia	001 800 61 009	From anywhere in S. Korea:	82 2 3455 6455
Japan	0031 61 6439	From Seoul:	00798 611 2230
Malaysia	1800 801 777	Taiwan, R.O.C.	0080 611 261
New Zealand	0800 446 398	Thailand	001 800 611 2000
Pakistan	61 2 9937 5085		
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	AT&T +800 666 5065	Mexico	01 800 CARE (01 800 2273)
Brazil	0800 13 3266	Peru	AT&T +800 666 5065
Chile	1230 020 0645	Puerto Rico	800 666 5065
Colombia	98012 2127	Venezuela	AT&T +800 666 5065
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 6500	65 543 6348
Europe, South Africa, and Middle East	+ 44 1442 435860	+ 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	1 408 326 3355
U.S.A. and Canada	1 800 NET 3Com (1 800 638 3266)	1 408 326 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. Because 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 geographically distant disparate networks. Also called cell relay.
- ATM Interface Module** An 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-3c, OC-12c, single-mode or multi-mode or 155 Mbps-over-UTP5. 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 ATM Enterprise Switch.
Enterprise Network	A network structure that is similar to a campus network.
Flash/Operational Status LED	An LED that indicates in which software unit the error occurred.
framer	An ATM Interface Module component that processes the SONET/SDH frames, 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 an edge device (user) and a switch (network) (UNI). Gateway is also referred to as IISP.
IISP (Interim Interswitch 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	A test used to diagnose faulty cables as well as faults in the framer or other components of a daughter card.
Module Status LED	An LED that 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 signaling protocol.

Partial Packet Drop (PPD)	A procedure for discarding cells related to one user frame to minimize the impact of congestion.
Port Status LED	LEDs that indicate the status of each port.
Software Error LED	LEDs that light up in a binary pattern to indicate the nature of the software error.
Software State Indicator LED	LEDs that 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.

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