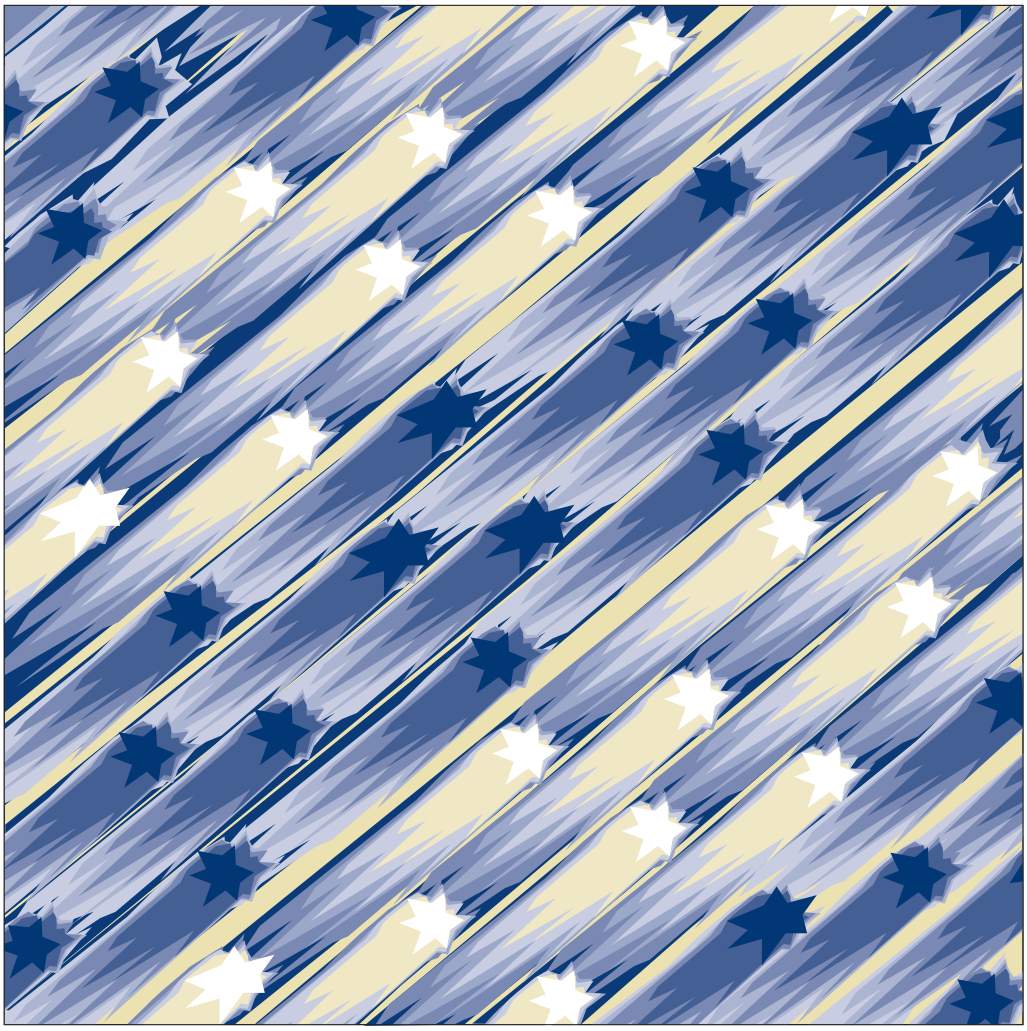
8265 Nways ATM Switch

Product Description



GA33-0449-02

8265 Nways ATM Switch

Product Description

GA33-0449-02

Note!

Before using this information and the product it supports, be sure to read the general information under Notices on page 73.

Third Edition (January 1998)

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About This Book

This book gives a description of the IBM 8265 Nways® ATM Switch, its components, functions, and accessories. It also describes the characteristics, specifications, and power requirements of modules and daughter cards that can be installed.

Who Should Use This Book

This book is intended for the following people at your site:

- Customers
- Network Designer
- Network Administrator
- IBM Field (Sales Support) and Marketing personnel.

How to Use This Book

This book is divided into the following chapters and appendixes:

Chapter 1 describes how the 8265 switch operates, and the network management environment for the switch.

Chapter 2 describes the basic and optional components, functions, and accessories for the 8265 switch.

Chapter 3 describes the media modules that can be used with the 8265 switch and the procedures for receiving and loading code updates.

Appendix A gives the specifications of the 8265 switch.

Appendix B gives the specifications and feature codes of the ATM modules and I/O cards that can be installed.

Appendix C lists the power consumption requirements for modules and I/O cards that can be installed.

Appendix D lists the 8260 ATM modules and daughter cards that can be installed in the 8265.

Appendix E contains various notices related to this product.

Prerequisite Knowledge

This book assumes that you are familiar with ATM networks and network management.

Where to Find More Information

Refer to the “Bibliography” on page 79 for a list of IBM manuals that contain related information and publications for the 8265 switch.

Information is also available via the Internet, at URL:

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http://www.networking.ibm.com
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Chapter 1. Introduction

8265 Switch Overview

The IBM 8265 Nways ATM Switch is a modular chassis that provides high flexibility in designing and configuring ATM networks.

The IBM 8265 is fully compatible with existing IBM 8260- and IBM 8285-based ATM networks, and allows the installation of 8265 and 8260 ATM media modules.

The IBM 8265 can be used as a building switch to provide native ATM/LAN switching, or as a backbone switch to provide:

- Media speed switching capacity
- Integrated bridging and routing
- Integrated LAN emulation client
- High call set-up rate
- Up to 16 000 bi-directional virtual connections (32 000 uni-directional)
- Up to 512 virtual path connections
- PBX attachment via multiple T1/E1 interfaces
- Switched LAN ports for LAN attached servers
- WAN feeder ports (T1/E1, DS3/E3, OC-3, and STM-1)
- OC-12 ports (formally known as STS-12c or STM-4c) for inter-building connections (up to 14)
- OC-3 ports to attach floor switches and servers (up to 56)
- Support of ATM Forum interfaces and qualities of service
- Conformance to PNN-I standards, all UNI levels
- High availability and hot-plugging of components.

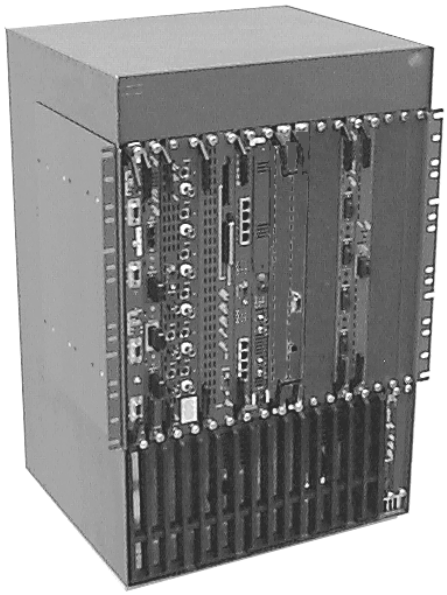

Figure 1. Front View of the IBM 8265

Switch Characteristics

The IBM 8265 Nways ATM Switch has the following characteristics:

Internetworking Technology

8265 internetworking solutions provide connectivity between internal networks, and connectivity from internal networks to ATM and WAN backbones. The internetworking capabilities of the 8265 system combine with the flexibility of port-switching media modules to deliver bandwidth on demand for existing LANs.

Support for All ATM Classes of Service

Constant Bit Rate, Variable Bit Rate, Available Bit Rate, and Unspecified Bit Rate classes of service are supported.

Advanced Traffic Management

Traffic shaping at Virtual Path (VP) level, statistics at connection level, traffic policy, and port mirroring are provided.

Intelligent Power Subsystem

The 8265 power subsystem provides easy access to load-sharing power supplies, high power availability, and controller-based power verification features designed to ensure optimal performance. The power supplies are installed from the front of the switch, and are easily accessible.

- Load-sharing power supplies

  The 8265 is powered by load-sharing power supplies. By evenly distributing power consumption among all supplies installed in the switch, the load-sharing design of the switch ensures that there is no single point of failure in the power subsystem.

- Hot swappable power supplies

  The 8265 power supplies are hot swappable. You do not have to power off the switch to install or remove them. Rather, you just plug the new power supply in and it automatically assumes its share of the power load.

- High power capacity

  When the 8265 switch runs in non-fault tolerant mode with full power capacity (four power supplies), its power supplies deliver up to 1500 watts of power.

  When the 8265 switch runs in fault-tolerant mode with full power capacity, up to 1100 watts of power is supplied to the installed modules. If a power supply fails, the power delivered by the remaining power supplies is sufficient to keep the switch and all installed modules running.

- Controller-managed power consumption

  The 8265 Fault Tolerant Controller Module polls each new module installed in the switch to confirm that the new module's power requirements can be fully satisfied. If enough power is available, the new module will power on. If available power is inadequate, the new module will not be permitted to power on.

  In addition, you can assign a power priority level to modules that determines whether a module is to be powered off when a power supply failure causes switch power to drop below the minimum level required to run all installed modules. This function allows you to specify the modules that will continue to run in case of a power deficit in the switch.

Support for 8260 ATM Media Modules

Certain 8260 ATM media modules can be installed in slots 1, 3, 5, and 7 of the 8265. Refer to page 71 for a list of supported modules.

Intelligent Cooling Subsystem

The 8265's cooling subsystem protects the switch, installed modules, and configuration information, from damage or loss that could result from a heat-related failure of the switch or a module.

Figure 2 shows the rear view of the 8265.

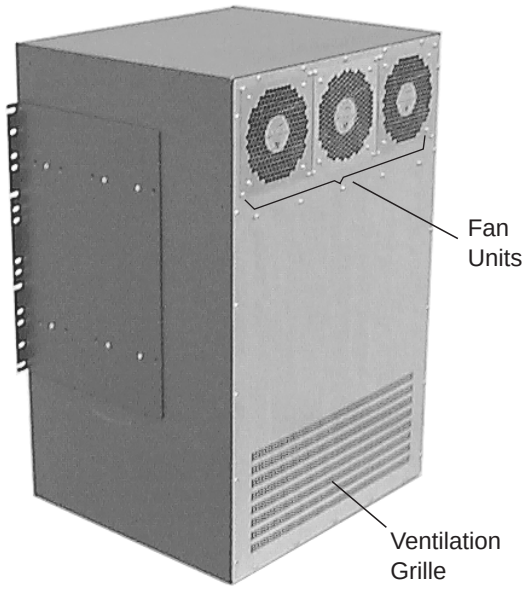

Figure 2. Rear View of the IBM 8265

Power Management

The Control Point and Switch (CPSW) module works with the Controller module to protect network integrity using power management. The CPSW module manages power usage in the switch, allowing you to prioritize how modules power off (when there is insufficient power available), and preventing newly-installed modules from receiving power when there is no power available.

There is, in addition, a function that allows you to implement fault tolerant power. This allows the switch to reserve some of its power capacity to protect against a power supply failure.

Multiple Front Panel and Backplane Interface Options

Interface options on both the front panel and the backplane of the 8265 allow you to connect a greater number of external segments than you could connect using conventional internetworking hardware.

ATM Backplane

All data transmitted between modules in the ATM subsystem passes through the ATM backplane. Data is switched between media modules in the ATM subsystem by a Control Point and Switch (CPSW) module. CPSW modules are installed in slot positions 9 and 10 or 11 and 12 in the 8265 switch (see Figure 3 on page 4).

Each media module has a dedicated set of connections to the CPSW module. This set of dedicated connections constitutes a star-wiring topology in which the media modules are at the tips of the star and the CPSW module at the center. The wiring topology used in the ATM backplane is shown in Figure 3.

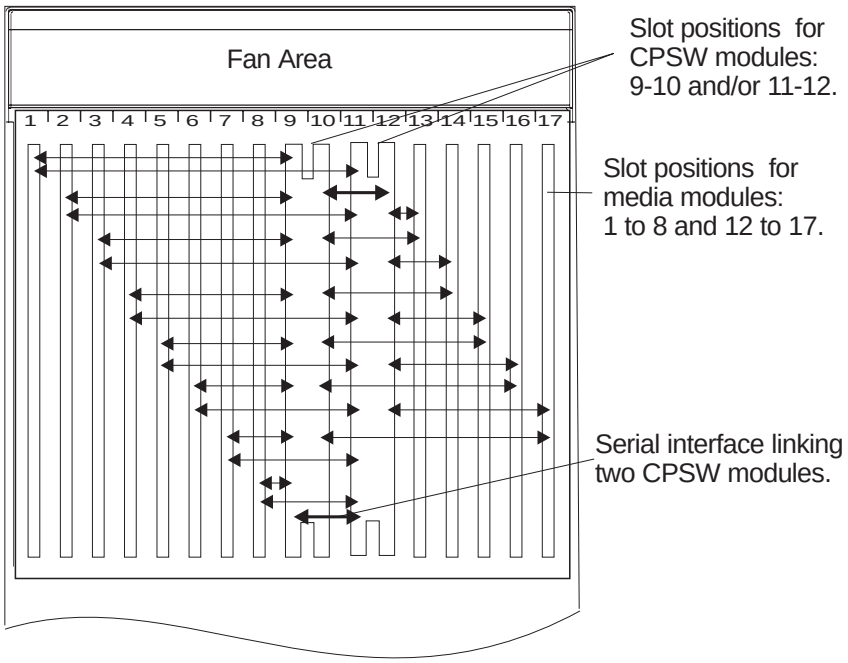

Figure 3. Star-Wiring Topology in ATM Backplane

The main characteristics of the ATM backplane are as follows:

- Modular structure
- Full floating media modules
- Support of two CPSW switch modules for reliability and redundancy.

You can install a media module in slots 1 to 8 and 12 to 17, but not in slots 9 to 11 (slots 9-12 are reserved for CPSW modules[1].) Certain media modules can only be installed in slots 1, 3, 5, and 7. See page 24 to determine which modules can be installed in which slots.

8260 ATM modules can only be installed in slots 1, 3, 5, and 7.

After installing the module, you must configure it for operation by entering a series of commands from the CPSW module console.

1. You cannot install a media module in slot 12 if a CPSW module is installed in slots 11-12.

Understanding 8265 Management

The management of the 8265 is achieved in four areas:

- Chassis Management
- Network Management
- Traffic Management
- Code Management.

Chassis Management

The 8265's controller module provides management of the power and cooling subsystems. The 8265 has one controller module as standard, and a second controller module can be installed as a backup in case of failure.

Network Management

You can manage the ATM subsystem in any of the following ways:

- From an ASCII terminal with a character-based command line interface that is directly connected to the RS-232 console port or RJ-45 Ethernet port on the control point and switch module.
- By remotely logging in to the control point console using TELNET. Management traffic flows via the network.
- From a network management station running a network management application that supports Simple Network Management Protocol (SNMP) protocols and the 8265 SNMP-compliant Management Information Base (MIB) extensions.
- Via the Internet. The 8265 features an integrated web server that provides a graphical view of the chassis and components, with easy navigation. Basic configuration functions (isolate and connect modules, enable and disable interfaces) are possible along with basic display functions. Debugging facilities include the ability to set up and display traces, display the error log, and display the connection table. A TELNET link to the Control Point is also provided.

SNMP Support

In a campus environment managed by SNMP, the 8265's control point and switch module acts as a SNMP agent allowing you to configure all ATM modules installed in the switch using SNMP. The SNMP agent implements the ATM MIB defined in the UNI (V3.0, 3.1, and 4.0) and ILMI (V4.0) specifications of the ATM Forum. The following MIBs are available for network management:

- MIB-II Evolution (RFC 1573), defined to model network interfaces
- ATM Supplemental MIB (draft-ietf-atommib-atm2), an extension of the AToMMIB, mainly covering SVC management
- AToMMIB and LAN Emulation MIBs
- ATM Forum PNNI MIB extension, which allows the creation, deletion, and management of soft-PVCs in relation to the AToMMIB tables
- WAN MIBs:
  - E1/T1 (RFC 1406)
  - E3/DS3 (RFC 1407)
  - SONET (RFC 1595)
- ATM Forum PNNI MIB, for PNNI management

Statistics

Counters are provided to:

- Control traffic or policy violations on a per-connection basis
- Monitor throughput at the switch or module level
- Detect congestion
- Track CPU and buffer initialization.

Summary files are used to collect and record statistical information over long periods of time (typically on a daily, weekly, or monthly basis).

Network Management Programs

The management of 8265 ATM networks can be significantly improved with the following program products, which provide a topological display, easy-to-use graphical interface, resource configuration, statistics display, and other functions.

Table 1. Network Management Programs

Platform	Product	Program Number	Part Number
NetView® for AIX®	IBM Nways Manager for AIX Version 1, Release 1 with the access key:	—	4304028
	Nways Campus Manager ATM Version 2, Release 2		4304041
HP OpenView for UNIX®	Nways Campus Manager ATM for HP-UX Version 2	5697-B12	

Contact your IBM representative for information on the latest versions of these, and other, network management programs for the 8265.

Traffic Management

The 8265 advanced traffic management functions are distributed on each 8265 module. The key functions are:

- Priority queues per Quality of Service:
  - Constant Bit Rate (CBR)
  - Variable Bit Rate (VBR)
  - Available Bit Rate (ABR), with Minimum Cell Rate value and relative rate flow
  - Unspecified Bit Rate (UBR).
- Early and Partial Packet Discard:

  This functions allow the 8265 to drop, when required (for example due to traffic congestion), cells belonging to the same end user packet.
- Policing per Virtual Circuit:

  The 8265 ensures that the contract is respected at the Virtual Circuit (VC) level, and drops cells over contract is required. To reduce the burstiness of traffic, a reshaping function is provided.

- Traffic shaping per Virtual Path:

  Traffic shaping regulates traffic to a lower rate than the line speed, and is active for incoming and outgoing traffic. The control at the Virtual Path (VP) level means that the 8265 can have different shaping values for different VPs that are active on the same port. Each of these VPs may have a different end user address.
- Counters:
  - Per connection:
    - number of valid cells received
    - number of valid cells received discarded due to policing or UBR
    - number of valid cells transmitted
    - number of valid cells transmitted and discarded due to congestion.

    The counters can be enabled either manually for a specific connection, or automatically for all connections (in this mode, there is a limitation of 4000 connections per module).
  - Per port:
    - number of unknown Virtual Path Identifiers and Virtual Channel Identifiers
    - number of Available Bit Rate (ABR) RM cells with invalid CRCs.
  - Per module:
    - number of cells transmitted to the Control Point.
- Buffering:

  The 8265 modules are equipped with input and output buffer queues, combining the benefits of the two queueing methods:
  - The output buffering helps to improve the link utilization when temporary traffics bursts occur, and delays the implementation of flow control on the traffic. In addition, it allows the shaping of traffic, down at the VP level, with a fine granularity.
  - The input buffering with the reshaping function reduces the burstiness of the traffic in the network, and minimizes the likelihood of contention within the 8265 or the network. By exercising backpressure inside the 8265, traffic can be held at the input buffer in various modules without significantly increasing the size of the output buffer.
- Port mirroring (snooping):

  This function duplicates and redirects traffic flow to a designated port. This allows traffic analysis by connecting a Traffic Analyzer to the port. Multiple mirrored ports can be active at the same time. When a port is used to redirect traffic from other port(s), the other ports on the same module are disabled.

Managing Code Updates

The following operations can be performed either inband using RFC1577 or LAN emulation client, or out-of-band using the Ethernet port or Serial Line Interface Protocol (SLIP) on the RS-232 port:

- Microcode can be downloaded using TFTP for update
- FPGA can be downloaded using TFTP for update
- Configuration data can be uploaded and downloaded using TFTP
- Error log, traces, and dumps can be uploaded for debugging
- Telnet and PING operations.

Security

Security is provided in two ways:

- Configuration protection
- Network Access Protection

Configuration Protection

The configuration of the 8265 and installed media modules in managed through terminal dialog with the CPSW module. Passwords are required in order to modify the configuration parameters.

Network Access Protection

Access to the 8265 ATM network is provided for all types of ATM applications. When an ATM station connects to the 8265 switch, it must register its address through ILMI. The network administrator can specify which ATM address are allowed access.

Chapter 2. Features and Components

Base Product

The base product of the 8265 switch consists of a chassis and the following components:

- Three fan units (already installed)
- Three fan mounting guards (already installed)
- Fourteen blank single-slot filler plates (already installed)
- Three blank power supply bay filler plates (already installed)
- One rubber feet kit, for use when mounting the 8265 on a table or shelf

The following components are delivered with the 8265 switch and are used to connect a console, locally or remotely, to the CPSW module serial port:

- RS-232 DTE/DCE cable (Part Number 59G0278)
- Null modem interposer (Part Number 58F2861)
- Gender changer interposer (Part Number 58G4422).

Note: The load sharing power supply with its power cord, the controller module, the CPSW module, and media modules are ordered separately.

Additional Required Components

In addition to the base components supplied with the switch, the following components are also required to operate the 8265:

- 8265 Controller Module (Feature Code 8000)
- 8265 Control Point and Switch Module (Feature Code 6501)
- PCMCIA card for Control Point and Switch Module, either:
  - Base microcode with UNI and IISP functions, or
  - Enhanced microcode with UNI, IISP, and PNNI functions.
- ATM media modules (8265 and/or 8260)
- Power supplies: either
  - 415 W AC (Feature Code 8027), or
  - 295 W -48 Vdc (Feature Code 8026)
- Power supply cables
- Documentation (on CD-ROM).

For additional optional components, refer to page 14.

Controller Module

The 8265 Controller Module (Feature Code 8000) monitors switch conditions and reports failures to the Control Point and Switch module.

You can install an additional controller module to the switch for increased fault tolerance.

For further details, refer to page 17.

Note: The Controller module must have a microcode level of 1.14 or higher to operate in the 8265. If you are using an 8260 Controller Module, refer to the *IBM 8260 Nways ATM Control Point and Switch Module Installation and User's Guide*, SA33-0326 for information on upgrading the microcode.

Control Point and Switch Module

The IBM 8265 Control Point and Switch (CPSW) module (Feature Code 6501) contains a control program to perform the functions associated with the establishment and management of ATM circuits. These functions are integrated into the switching element of each CPSW module. As a result, the 8265 ATM subsystem uses a distributed control system which offers the following advantages:

- Each ATM module benefits from the fault-tolerant design of the IBM 8265 chassis.
- Continued ATM network operation is ensured in case of a failure at a single point in the network.

You can add a second CPSW module to the switch for backup purposes.

For further details, refer to page 18.

PCMCIA Cards

The PCMCIA cards contain 4MB of Flash EEPROM and contain the operational microcode. The card fits into a type 3 PCMCIA slot on the CPSW module.

The following PCMCIA cards are available:

- Base microcode with UNI and IISP functions.

  The are two releases of the base microcode available:

  – Release 1 (Feature Code 6505)

  – Release 2 (Feature Code 6525) which includes support for OC 12 modules, a port mirroring function, WAN statistics, counters per connection, and ILMI 4.0 support.
- Enhanced microcode with UNI, IISP, and PNNI functions.

  The are two releases of the enhanced microcode available:

  – Release 1 (Feature Code 6506)

  – Release 2 (Feature Code 6526) which includes support for OC 12 modules, a port mirroring function, WAN statistics, counters per connection, and ILMI 4.0 support.

  Note: 32 MB of RAM is required in the CPSW module to operate the enhanced microcode (see page 14).

Media Modules and Daughter Cards

The media modules and daughter cards available for use with the 8265 switches are described in the following chapter.

For detailed specifications of each component, refer to one of the following appendixes:

- Appendix B for technical specifications
- Appendix C for power requirements.

A list of 8260 ATM modules that can be installed in the 8265 is given in Appendix D.

Power Supplies

Up to four power supplies can be installed in the 8265.

The following types of power supply may be installed:

- 415 W AC (Feature Code 8027)
- 295 W DC (-48 V, Feature Code 8026)
- Existing power supplies from an IBM 8260 (295 W and 415 W AC, or 295 W -48V DC).

The power supplies provide two main output voltages:

- + 12 volts, used by the 8265 components at power on time
- +5.2 volts, used by the 8265 components during operation.

As a rule, it is recommended that you run the switch with at least one power supply more than the minimum number needed to operate it. The minimum number of power supplies is determined by the amount of power required (at +5.2 volts) to operate all of the installed components.

The availability of extra power can help prevent the switch from shutting down when modules demand more power than the switch can provide. An additional power supply minimizes the chance that power supply redundancy will be lost without warning.

For example, if the total power requirement of all installed modules is 350 watts (at +5.2 volts), the switch can operate with only two power supplies. A third power supply, however, is needed to achieve power fault tolerance. If you use three power supplies and one power supply fails, the remaining two supplies can still support the load.

Power Capacity for Modules

The following tables show the power capacity (at +5.2 volts) available in non-fault tolerant and fault-tolerant modes. When calculating the number of power supplies required, you must also allow for the system overhead (power used by the fan units and backplane) which is 1 Watt.

415 W AC Power Supplies:

Table 2. Power Capacity at +5.2 Volts (AC Power Supplies)

Number of Power Supplies	Non-Fault Tolerant Mode	Fault Tolerant Mode
One	301	See note
Two	542	301
Three	813	542
Four	1084	813

Note: Power fault-tolerance can only be established if the unallocated power budget (of at least one power supply) can be held in reserve.

295 W DC Power Supplies:

Table 3. Power Capacity at +5.2 Volts (DC Power Supplies)

Number of Power Supplies	Non-Fault Tolerant Mode	Fault Tolerant Mode
One	204	See note
Two	367	204
Three	551	367
Four	734	551

Note: Power fault-tolerance can only be established if the unallocated power budget (of at least one power supply) can be held in reserve.

Using 8260 295 W AC Power Supplies

Although you can install both 8265 415 W and 8260 295 W AC power supplies in the same switch, this should be avoided when running in power fault-tolerant mode. This is because the lower output power supply (295 Watt) cannot backup a higher output power supply (415 Watt). See the *IBM 8260 Nways Multiprotocol Switching Hub Product Description*, GA33-0415 for power capacities when a mixture of 415 W and 295 W AC power supplies are used.

AC Power Cords

Different countries use different power cord plugs and receptacles. Table 4 identifies, by country, which power cord can be shipped with the 8265. All power cords are 2.8 m (9 ft) in length unless specified otherwise. Use this table to ensure that you receive the correct power cord with your 8265. This list does not include all countries. If your country is not listed, consult your IBM representative.

Table 4. AC Power Cord Plugs for Each Country

Country	**Part Number**	**Feature Code**
Bahamas, Barbados, Bermuda, Bolivia, Brazil, Canada, Colombia, Costa Rica, Dominican Republic, El Salvador, Equador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Japan, Liberia, Mexico, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Surinam, Taiwan, Thailand, Trinidad, U.S.A., Venezuela.	6952300 6952301 1.8 m (6 ft)	8039 8040
Argentina.	13F9940 6952291	8038 8046
Australia, China, New Zealand, Paraguay, Uruguay.	13F9940	8038
Afghanistan, Albania, Algeria, Angola, Austria, Belarus, Belgium, Bosnia, Bulgaria, Croatia, Czechia, Egypt, Finland, France, Germany, Greece, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Lebanon, Luxembourg, Macau, Macedonia, Mauritius, Mozambique, Netherlands, Norway, Poland, Portugal, Rhodesia, Romania, Russia, Serbia, Slovakia, Slovenia, South Korea, Spain, Sudan, Sweden, Syria, Turkey, Ukraine, Swaziland, Zaire, Zimbabwe.	13F9979	8036
Bahrain, Brunei, Cyprus, Ghana, Hong Kong, Iraq, Ireland, Jordan, Kenya, Kuwait, Malawi, Malaysia, Malta, Nepal, Nigeria, Oman, Qatar, Sierra Leone, Singapore, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, Yemen, Zambia.	14F0033	8037
Denmark.	13F9997	8044
Chile, Ethiopia, Italy, Libya.	14F0069	8042
Israel.	14F0087	8045
Liechtenstein, Switzerland.	14F0051	8043
Bangladesh, Myanmar, Pakistan, South Africa, Sri Lanka.	14F0015	8041

Optional Components

The following optional components are also available:

- Additional memory, 16 MB (Feature Code 6516)
- Universal code download kit (Feature Code 3150)
- Cable management tray (P/N 13J8751)
- Rack mount kit (P/N 25H1834)
- Documentation CD-ROM (Feature Code 6508).

Additional Memory

An additional memory module of 16MB can be installed in the Control Point and Switch Module (Feature Code 6501). This extends the memory from 16MB to 32MB. This additional memory is required in order to use the PNNI functions as supplied on the PCMCIA PNNI microcode cards (Feature Codes 6506 and 6256).

Universal Code Download Kit

The Universal Code Download Kit enables the installation of the ProComm™ terminal emulator on a PC. Once installed, the network administrator can upgrade the CPSW boot code and operational microcode using the out-of-band XMODEM protocol on the 8265 console port.

Cable Management Tray

The cable management tray available for the 8265 switch provides a simple way to route all cabling connected to the front panels and to the back of the switch. The cable management tray weighs 3.6 kg (8 lbs), and has the following dimensions:

Width	Depth	Height
444 mm (17.5 in.)	465 mm (18.3 in.)	45 mm (1.75 in.)

Rack Mount Kit

A rack mount kit is available that allows you to install the 8265 in a TELCO or metric rack.

Either rack may be used, providing it can support at least 170 kg (375 lbs) and allow enough space for the 8265 chassis:

- TELCO rack: 15U required

  1U (unit of measure) is 45 mm or 1.75 in.
- Metric rack: 26SU

  1SU (system unit of measure) is 25 mm or 1 in.

Documentation

All documentation related to the 8265 is available on a CD-ROM. This CD is automatically shipped with the PCMCIA card containing the basic Control Point and Switch microcode (Feature Code 6505). For a list of publications on this CD, refer to the Bibliography on page 79.

Figure 4 shows the 8265 with components.

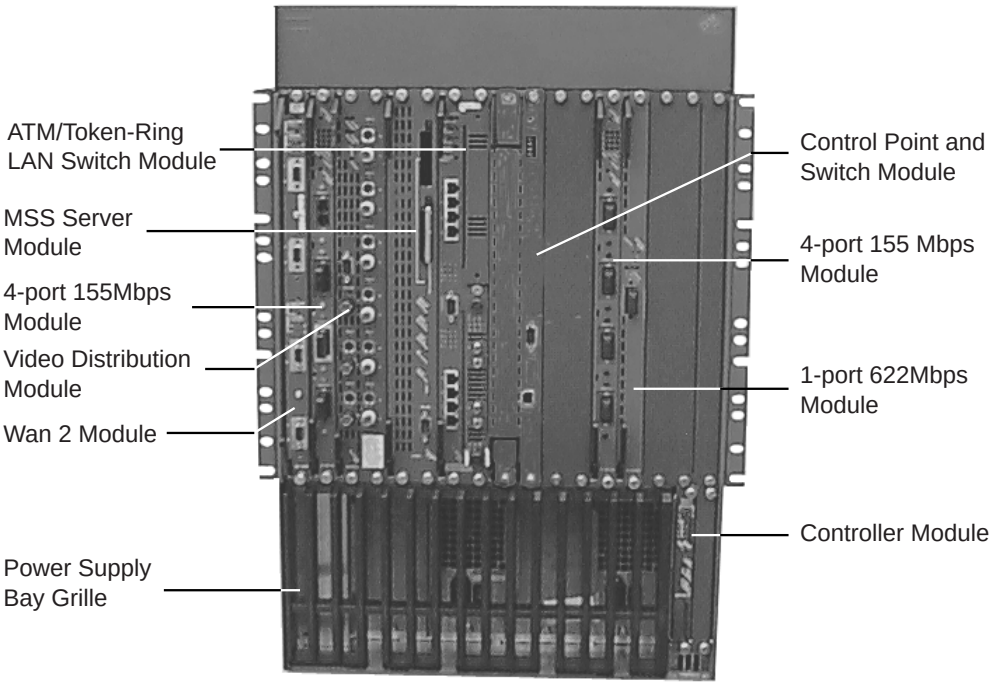

Figure 4. 8265 with Components Installed

Chapter 3. Modules

The chapter describes the modules and daughter cards that are available for the 8265 switches. A section is provided at the end of this chapter detailing how to obtain code updates.

Controller Module

The 8265 Controller Module (Feature Code 8000) monitors switch conditions such as power and temperature and reports failures to the Control Point and Switch module.

The controller module bay can accommodate two controller modules. One controller module is required for normal switch operation, and only one controller module can be active at any given time. A second controller module can be installed to achieve controller module fault tolerance (that is, if one controller module fails, the other controller module automatically takes over). Controller-based fault tolerance is highly recommended.

Figure 5 shows the faceplate of the Controller Module.

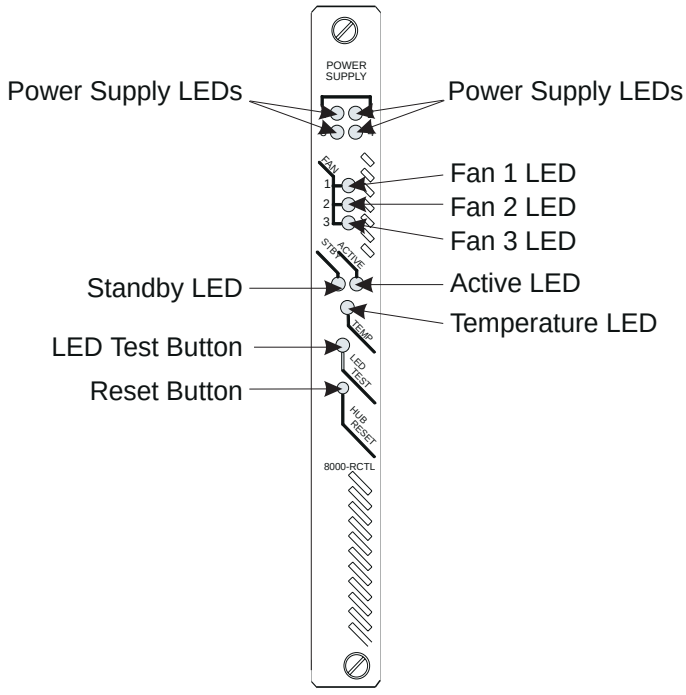

Figure 5. Controller Module Faceplate

For more information, refer to the *IBM 8265 Nways ATM Switch Installation Guide*, SA33-0441.

Control Point and Switch Module

The Control Point and Switch (CPSW) module (Feature Code 6501) used in the 8265 switch consists of three cards packaged into a double-slot module:

- A base card (ATM Switch fabric) that switches cells from one ATM concentration port to another port or to another output link on the same module.

  ATM cell switching is carried out by means of the Switch integrated circuit, made of two chips acting as a single non-blocking 16-by-16 times 16-bit parallel module, with an aggregate throughput of 12.8 Gbps full duplex, on a 25 Gbps ATM backplane.
- A control point card that houses a high speed Power PC processor where the control point resides. This card incorporates a PCMCIA card from which the control point is loaded.
- A daughter card that fits onto the base card and provides the logical and physical interface between the control point card and the switch fabric.

Figure 6 shows the faceplate of the CPSW module.

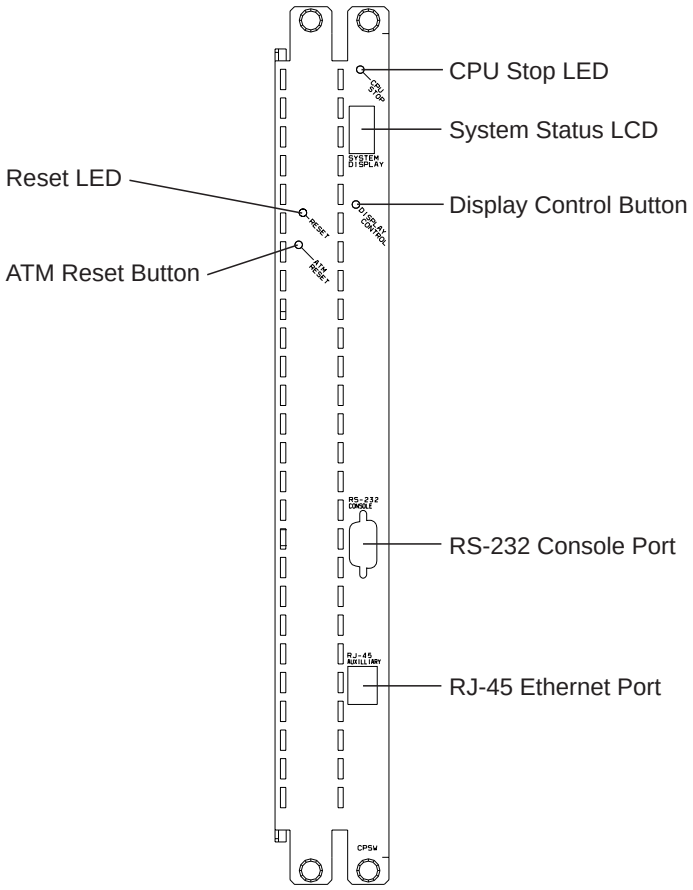

Figure 6. CPSW Module Faceplate

CPSW Module Functions

The imbedded Control Point provides a complete set of functions to control an ATM campus network and to interconnect local ATM networks over ATM wide area networks.

The CPSW module acts as an SNMP agent that implements the ATM MIB. The SNMP agent allows you to:

- Configure ATM modules
- Monitor ATM subnetworks.

Each IBM 8265 Control Point provides functions on three planes; the Control plane, User plane, and Management plane.

Control Plane

- Both Switched and Permanent Virtual Circuits (SVCs and PVCs)
- User-to-Network Interface (UNI)
  - Support of ATM signaling (SVC point-to-point and point-to-multipoint) according to ATM Forum V3.0, V3.1, and V4.0 specifications.
  - Support of permanent connections (PVC point-to-point and point-to-multipoint). The setting of PVCs is supported in accordance with PNNI Phase 1 Specification (soft-PVCs), ATM Forum.
  - Support of internetworking between UNI V3.0, V3.1, and V4.0 end-systems.
  - Support of ILMI V4.0.
- UNI without ILMI Registration
  - Some ATM devices from other vendors do not support the Interim Local Management Interface (ILMI) registration process, which prevents them from receiving incoming calls. With this extension, you can now connect these devices to the ATM network through the 8265.
- Network-to-Network Interface (NNI)
  - Support of Interim Inter-Switch Signalling Protocol (IISP) according to ATM Forum specifications.
  - Support of link backup and load balancing between independent peer groups.
  - Automatic call rerouting at peer group boundary through crankback.
- Private Network-to-Network Interface (PNNI-1)
  - Support of Private NNI (P-NNI Phase 1) according to ATM Forum specifications).
  - Support of Path Selection. Depending on network constraints, connections types and network operator wishes, either precomputed or on-demand paths, at either widest or shortest paths can be selected.

  This is an optional feature available with Feature Codes 6506 and 6526.
- Public UNI
  - Support of connectivity to Public Networks via VP tunneling (without supporting its signalling).

- VP Tunneling
  - Support of interconnection of ATM campus switches over an ATM WAN providing permanent virtual paths (PVPs). The signalling channel is transparently passed to the WAN.
  - Support of VP multiplexor.
  - Support of multiple VPs of differing types (UNI, IISP, PNNI) on the same physical interface.
- Virtual Path Assignment per Quality of Service (QOS)
  - Allows traffic of different QOS to be split over different virtual paths sharing the same physical ATM interface. This is a key function when connecting to WAN ATM carrier services or to a WAN ATM switch, such as the IBM Nways 2220 Broadband Switch.
- Link Redundancy
  - Supported on physical and VP tunnel interfaces regardless of interface type (UNI, IISP, or PNNI).
  - Link selection can be based on a load balancing algorithm, if all the parallel links share the same 'Administrative Weight', or on the lowest 'Administrative Weight'.
  - Automatic Call Setup rerouting on the next best-fit link in case of failure on the selected link.
- Link Sharing Control
  - Allows the network administrator to limit the proportion of the link bandwidth (or VP tunnel) that can be reserved by reserved bandwidth connections (CBR, rt VBR, nrt VBR, Minimum Cell Rate of ABR). This is supported on all interface types (UNI, IISP, PNNI).
- Switch Access
  - Support of Classical IP over ATM (CIP, RFC 1577) for switch management and services.
  - Support of LAN Emulation Client for Ethernet and Token-Ring for Switch management and services.

User Plane (Hardware)

- ATM layer switching
- Support of reserved bandwidth connections
- Support of unspecified bit rate (UBR) and available bit rate (ABR) connections
- Support of frame discard.

Management Plane

- Access Control
  - Unauthorized users are prevented from accessing the network.
- Network Management
  - Chassis Monitoring

    This feature allows the network administrator to monitor the 8265 environment parameters (power supplies, inventory, temperature) via the Control Point and Switch module. Environment parameters can be accessed either via the console or via Telnet. SNMP traps are triggered when major events (such as power supply failure and overheating) occur.
  - Counters per virtual connection, port, and module
  - ILMI support (3.0, 3.1, and 4.0) for plug-and-play operations on both physical and VP links on all interface types (UNI, IISP, PNNI)
  - SNMP support (Get, Getnext, Set, and Traps)
  - MIB 2 support
  - IETF AToMIB
  - ATM Forum PNNI MIB.
- Box Services
  - Command line interface
    - Local RS-232 console
    - Remote access via Telnet either inband (IP over ATM, IP over LAN Emulation) or out-of-band (IP over SLIP)
    - Ethernet port to connect a Management Station using Ethernet access.
  - Code and hardware picocode upgrade via TFTP (inband or out-of-band)
    - Dual codes images to resist download failures
  - Download of Controller Module microcode
  - Troubleshooting Support
    - Counters
    - Port mirroring
    - Trace services
    - Dump services
    - Error logging in non-volatile storage
    - Transfer of trace, dump, and error logs using TFTP (inband or out-of-band)
  - Configuration Services
    - Management of configuration parameters in non-volatile storage
    - Upload and download of configuration (for same microcode version) via TFTP (inband or out-of-band)
  - Box Survey
    - Module monitoring and failure handling
  - Switch Redundancy
    - Automatic configuration synchronization
    - Monitoring and automatic takeover in case of active switch failure.

SNMP

The SNMP ATM agent is a function of the Control program in the CPSW module and implements the ATM MIB defined in the V3.0 UNI Specification of the ATM Forum.

The AToMIB is defined by the IETF and by the IBM extensions. It can be driven by SNMP managers, such as IBM NetView for AIX. The IBM ATM management application, Nways Campus Manager - ATM, can be used by a LAN administrator to fine-tune the system.

Both PVCs and SVCs are supported. The signaling is compatible with the ATM Forum V3.0, V3.1, and V4.0 UNI. Control messages are encapsulated in the SAAL Adaptation Layer.

The ATM Forum ILMI is fully supported. End-systems can register their local address to the IBM 8265 and receive notification of their network address. ILMI messages are SNMP-formatted and conveyed using the AAL5 Adaptation Layer.

Connection Types

The Control Point supports an extensive set of ATM connections, including:

- Switched and permanent virtual channels (SVCs and PVCs)
- Switched and permanent virtual paths (SVPs and PVPs)
- Point-to-point and point-to-multipoint
- Reserved Bandwidth (CBR, real-time VBR, non-real time VBR, minimum cell rate of ABR) and best-effort (UBR).

Table 5 shows the types of ATM connections supported in 8265 switches.

Table 5. ATM Connections Supported in 8265 Switches

Virtual Connection Type	ATM Connection Type	Connection Class	Connection Mode
Virtual Path (VP) and Virtual Channel (VC)	Switched	Reserved Bandwidth and Best-Effort (CBR, VBR, ABR, UBR)	Point-to-point
		Reserved Bandwidth and Best-Effort (CBR, VBR, UBR)	Point-to-multipoint
Virtual Path (VP) and Virtual Channel (VC)	Permanent	Reserved Bandwidth and Best-Effort (CBR, VBR, ABR, UBR)	Point-to-point, and point-to-multipoint

Chassis Management

The CPSW module (with code at version v2.1 or higher) has a subset of DMM functions for power and inventory management.

CPSW Backup

The primary CPSW module is installed in slots 9-10. For backup purposes, a second standby CPSW may be installed in slots 11-12, to take over if the primary CPSW module fails. The active CSPW module permanently checks that the standby CPSW is present and up-to-date.

Media Modules

Media modules belong to the Nways family and can be used in the 8265 switch to:

- Send and receive data from an ATM subsystem in another 8265 switch
- Attach high capacity workstations and servers that function in ATM mode.

The media modules interface to the 8265 switch by means of the Control Point and Switch (CPSW) module. These modules process ATM cells of data by:

- Checking their validity
- Accessing the switching tables to locate the destination module
- Preparing the internal ATM format required by the CPSW module
- Sending the cells to the CPSW module.

The media modules support the following interfaces:

- User-to-network (UNI)
- Public User-to-Network (Public UNI)
- Private Network-to-Network (PNNI)
- Interim Inter-Switch Protocol (IISP)
- VOID.

The UNI, IISP, and PNNI interfaces supported are defined in the following documents:

- ATM User-Network Interface (UNI) Specifications V3.0, V3.1, and V4.0, ATM Forum
- ATM Interim Inter-Switch Signalling (IISP), ATM Forum
- ATM Public Network-to-network Interface (PNNI) Phase 1, ATM Forum.

Table 6 on page 24 lists the media modules that can be installed in the 8265. For a list of 8260 ATM media modules that can be installed, refer to page 71.

Available Media Modules

Table 6 lists the media modules available and the slots into which they can be installed. Note that certain media modules can only be installed in slots 1, 3, 5, or 7.

Equivalent 8260 ATM modules, where available, can also be installed in the 8265, provided they have a compatible FPGA level. See page 71 for a list of supported 8260 ATM modules and the required FPGA levels.

Data Speed

The data speed shown in Table 6 refers to the speed of data transfer between the module and the backplane. For individual port speeds, refer to the module description later in this chapter.

Table 6. Available Media Modules

Module	Feature Code	Slot Width	Data Speed (Mbps)	Slots
4-port 155Mbps (MMF)	6540	1	768 (non-blocking)	1-8, 12-17 (Note 1)
4-port 155Mbps	6543	1		
1-port 622Mbps (MMF)	6511	1		
1-port 622Mbps (SMF)	6512	1		
4-port 100Mbps	5104	1	256	1, 3, 5, 7 (Note 2)
12-port 25Mbps	5012	1		
WAN 2	5602	1		
Video Distribution	5008	2		
MSS Server (8210)	5300	2		
ATM/Ethernet (8271)	5212	2		
ATM/Ethernet (8271)	5312	3 (Note 3)		
ATM/Token-Ring (8272)	5208	2		
ATM/Token-Ring (8272)	5308	3 (Note 3)		
ATM Carrier	5102	1		

Notes:

1. Slot 12 cannot be used if a CPSW module is installed in slot 11.
2. Equivalent 8260 modules may also be used.
3. Slot 7 cannot be used if a CPSW module is installed in slot 9.

Daughter Cards

Table 7 lists the daughter cards available for 8265 media modules.

Table 7. Media Module Daughter Cards

Type	Feature Code	Connector Type(s)	No. of Ports
For 155Mbps Module (Feature Code 6543):			
Multimode Fiber	6580	SC	1
Singlemode Fiber	6581	SC	1
UTP/STP	6582	RJ-45	1
For WAN 2 Module (Feature Code 5602):			
E1/T1/J1:			
• U.S.A, Canada	6570	DB15, RJ-48	4
• CE Mark countries	6571		
• United Kingdom	6572		
• Switzerland	6573		
• Italy	6574		
E3:			
• France, Spain	6590	BNC	1
• Switzerland	6591		
• United Kingdom	6592		
• New Zealand	6593		
• Australia	6594		
• Italy	6595		
• Germany	6596		
• Belgium	6597		
• Netherlands	6598		
• Israel	6599		
DS3	8502	BNC	1
OC3 Singlemode Fiber	8503	SC	1
OC3 Multimode Fiber	8504	SC	1
STM-1 Singlemode Fiber	8505	SC	1
STM-1 Multimode Fiber	8506	SC	1
For 25Mbps Module:			
Multimode Fiber	8510	SC	1

Universal Feature Cards

Table 8 lists the universal feature cards available for 8265 media modules.

Table 8. Media Module Universal Feature Cards

Type	Feature Code	Connector Type(s)	No. of Ports
For 8271 ATM/Ethernet Modules:			
ATM/Ethernet MMF	6988	SC	1
100BASE-Tx	6995	RJ-45	1
100BASE-Fx	7000	ST	1
10BASE-FL	8603	ST	3
10BASE-T	9195	RJ-45	4
For 8272 ATM/Token-Ring Modules:			
ATM/Token-Ring MMF (enhanced)	2762	SC	1
Fiber (enhanced)	5087	ST	2
UTP/STP (enhanced)	5092	RJ-45	4

ATM Carrier Module

The ATM Carrier module (Feature Code 5102) is part of the IBM ATM Kit Development Program that provides companies and developers with a simple and inexpensive way to add their ATM technology to the 8265. This program allows you to build ATM functions and modules for the 8265, and develop new ATM applications.

The Carrier Module inserts into the 8265 switch and acts as a generic motherboard that accepts a feature daughter board. The Carrier Module uses well-known standard interfaces (UTOPIA) for communication with 1 or 2 daughter cards that contain the developer's function or application. Functions built on the daughter board benefit from the advanced features of the 8265 and the Carrier Module.

By using the UTOPIA interface on the ATM Carrier motherboard, the PHY-specific functions are separated from the standard ATM functions that are common to all ATM applications.

- Standard ATM functions are located on the Carrier Module motherboard
- All PHY-specific functions are concentrated on custom-designed daughter cards that are mounted on the Carrier Module.

The daughter cards access all necessary ATM functions via the UTOPIA interface.

Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7).

For more information, refer to *The IBM 8260 Nways ATM Kit Development Program, We Carry your Creativity to ATM*, GA33-0371.

Figure 7 shows the ATM Carrier module.

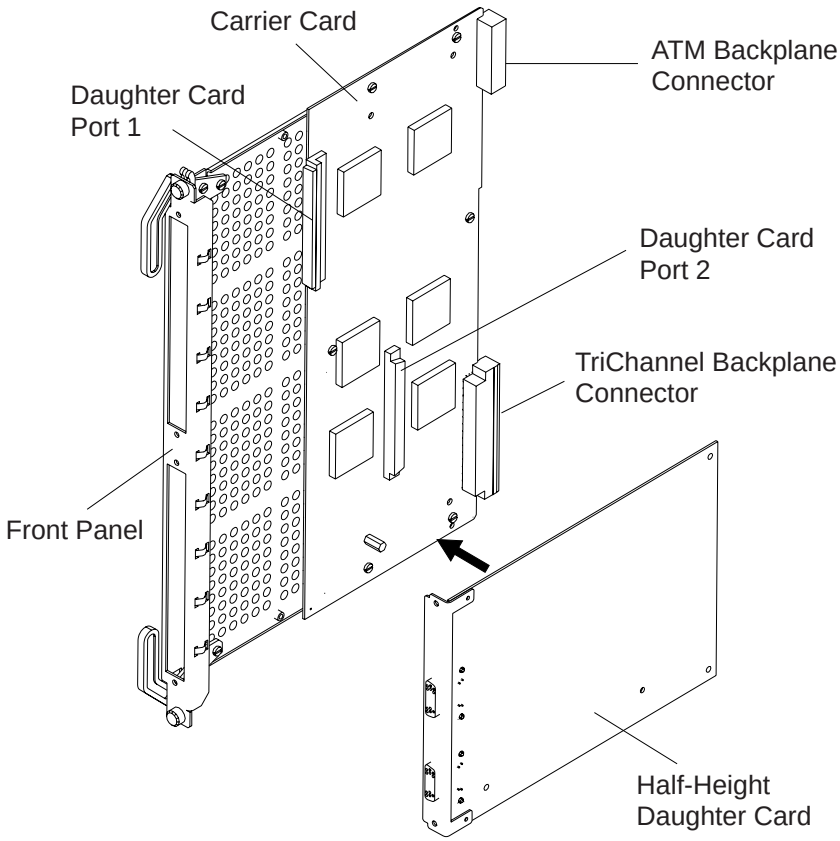

Figure 7. ATM Carrier Module

4-Port 155Mbps Modules

There two types of 4-port 155Mbps OC3 module available for the 8265:

- Feature Code 6540, a single-slot, multimode fiber module.
- Feature Code 6543, a single-slot module that allows you to install up to four different types of daughter cards according to your ATM networking needs.

Feature Code 6540 (MMF)

The 4-port 155Mbps multimode fiber module has the following characteristics:

- Four ports operating at up to 155Mbps (non-blocking) to connect to stations, servers, and other switches or hubs. Each port may connect to:
  - An ATM or multimedia workstation that requires a high bit rate
  - A UNI, IISP, or PNNI device using a supported interface.
- Physical interface: optical multimode fiber
- Connections up to 2 km (1.24 miles)
- Up to 14 modules can be used in the 8265 switch at the same time.

The modules may be installed or removed from the switch (hot-pluggable) without disturbing data traffic on other ATM modules.

For further information, refer to page 52.

Feature Code 6543 (Flex)

The 4-port 155Mbps Flex module has the following characteristics:

- Up to four ports operating at up to 155Mbps (non-blocking) to connect to stations, servers, and other switches or hubs. Each port may connect to:
  - An ATM or multimedia workstation that requires a high bit rate
  - A UNI, IISP, or PNNI device using a supported interface.
- A motherboard with up to four daughter cards for port-to-port and port-to-device connections. By using different daughter cards you can mix and match different media types. The module supports the following daughter cards:
  - Multimode fiber
  - Singlemode fiber
  - Shielded or unshielded twisted pair (STP/UTP5).
- Physical interface: optical fiber or copper cable, depending on the type of daughter card used.
- Connections up to:
  - 2 km (1.24 miles) using multimode fiber cable
  - 20 km (12.4 miles) using singlemode fiber cable
  - 100 m (328 ft) using 100 ohm UTP5 cable
  - 150 m (493 ft) using 150 ohm STP cable.
- Up to 14 modules can be used in the 8265 switch.

The modules may be installed or removed from the switch (hot-pluggable) without disturbing data traffic on other ATM modules.

For further information, refer to page 52.

Figure 8 shows the faceplate of the multimode fiber module.

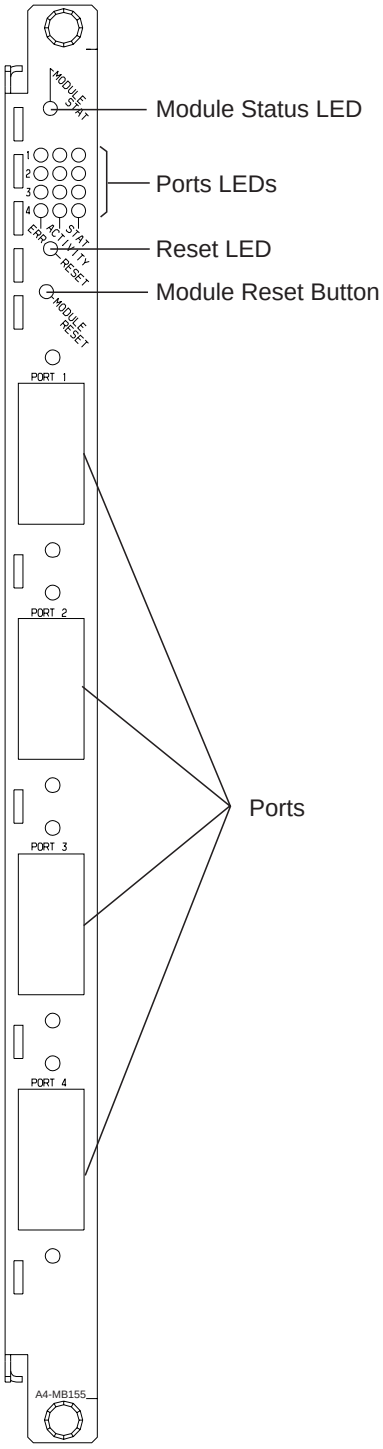

Figure 8. 4-port 155Mbps Module Faceplate

622Mbps Modules

There are two types of single port OC12 (formally known as STS12C or STM-4c) modules available for the 8265:

- Feature Code 6511, for multimode fiber.
- Feature Code 6512, for singlemode fiber.

The modules have the following characteristics:

- One port operating at up to 622Mbps (non-blocking) to:
  - connect to high capacity workstations and servers that function in ATM mode and support the SONET lite (LAN) standard servers and other switches or hubs.
  - exchange data with other ATM subsystems.
- Physical interface: optical fiber.
- Connections up to:
  - 500 m (1640 ft) using multimode fiber cable
  - 15 km (9.32 miles) using singlemode fiber cable.

  The maximum length of connection depends on the type of cabling used.

Table 9. Maximum Distances for Valid ATM Connections

Module Type	**Fiber Type**		
	MMF 50/125 micron	MMF 62.5/125 micron	SMF 9/125 micron
Multimode (A1-MF622)	500 m[1]	800 m	—
Singlemode (A1-SF622)	3.1 km[2]	2.9 km[2]	15 km

Notes:

1. The A1-MF622 module may be connected to an existing 50/125 micron fiber base, however this is not recommended when setting up a new fiber base.
2. The A1-SF622 singlemode fiber module may be connected to multimode fiber cabling.

- Up to fourteen 622Mbps modules can be used in the 8265 switch.

The modules may be installed or removed from the switch (hot-pluggable) without disturbing data traffic on other ATM modules.

For further information, refer to page 55.

Figure 9 on page 31 shows the faceplate of the 622Mbps module.

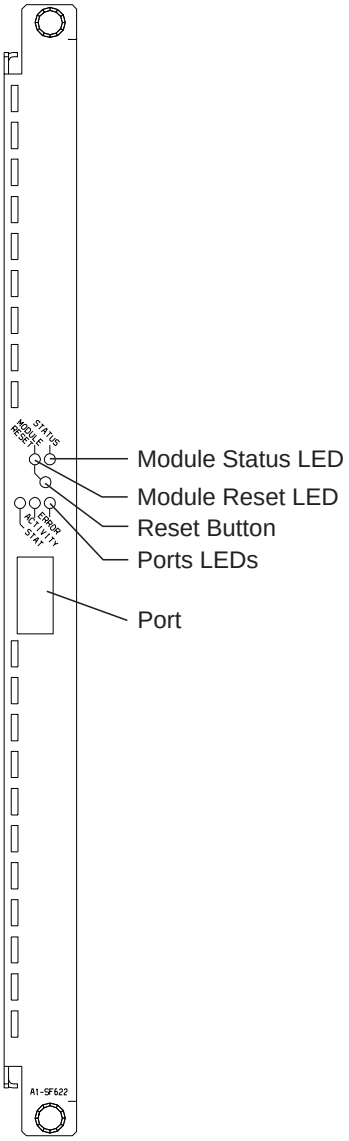

Figure 9. 622Mbps Module Faceplate

4-Port 100Mbps Module

The 4-port 100Mbps module (Feature Code 5104) is a single-slot module that uses SC port connectors.

The module has the following characteristics:

- Four ports operating at up to 100Mbps to connect to stations, servers, hubs, or switches. Each port may connect to:
  - A concentrator with up to twelve workstation connections
  - An ATM bridge with either up to four Token-Ring (N station) connections or up to four Ethernet connections
  - An ATM or multimedia workstation that requires a high bit rate
  - A UNI, PNNI, or IISP device using a supported interface.
- Physical interface: optical fiber cable with an SC connector, as specified in ISO DIS 9314-3.
- Workstation and server connections of up to two kilometers (1.24 miles) from the switch.
- Port-to-port connections of up to 2.2 kilometers (1.36 miles), depending on the quality of the cabling used.
- Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7).

For further information, refer to page 56.

Figure 10 on page 33 shows the faceplate of the module.

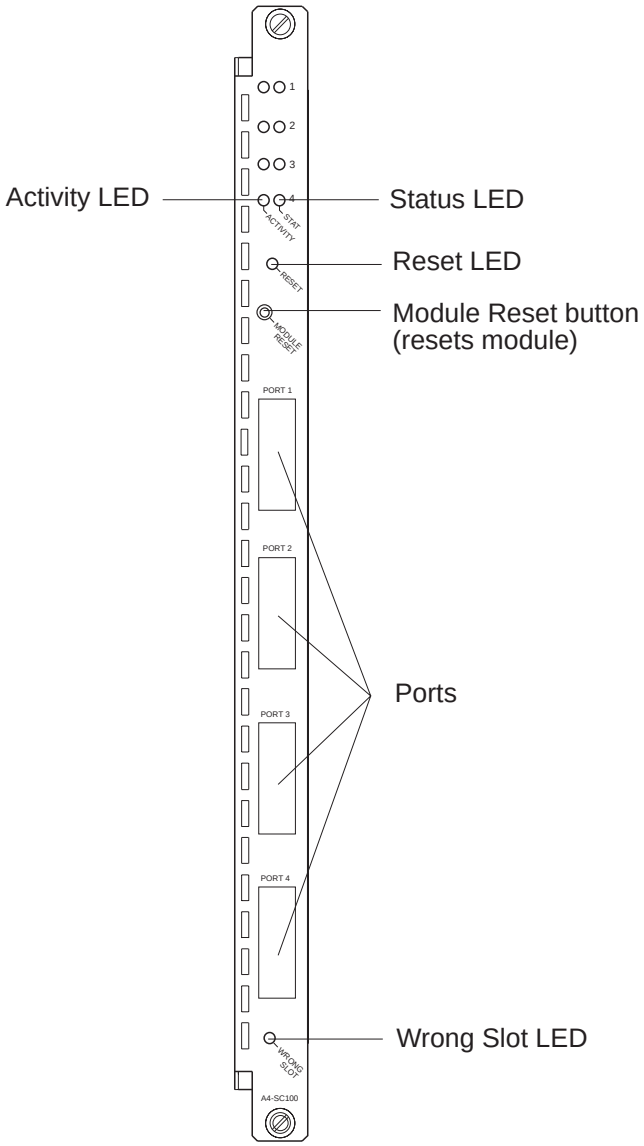

Figure 10. 4-port 100Mbps Module Faceplate

12-Port 25Mbps Module

The 12-port 25Mbps module (Feature Code 5012) is a single-slot module that uses RJ-45 connectors, enabling the building of large ATM workgroups or a smooth evolution from Legacy LAN to ATM networks.

The module has the following characteristics:

- Twelve ports operating at up to 25Mbps to connect to stations, servers, hubs, or switches. Each port may connect to:
  - A concentrator with up to twelve workstation connections
  - An ATM bridge with either up to four Token-Ring (N station) connections or up to four Ethernet connections
  - An ATM or multimedia workstation that requires a high bit rate
  - A UNI, PNNI, or IISP device using a supported interface.
- Physical interface: twisted pair cables with RJ-45 connectors
- Workstation and server connections of up:
  - 100 meters (329 ft.) on 100 ohm UTP Category 3 cable
  - 255 meters (837 ft.) on 150 ohm STP cable.
- A 1-port 155Mbps daughter card can be added as a feature. This card allows the attachment of the module to a server or ATM backbone via a multimode fiber cable. This port supports all types of interface: UNI, PNNI, and IISP, and allows port-to-port connections of up to 2.2 kilometers (1.36 miles), depending on the quality of the cabling used.
- Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7).

For further information, refer to page 56.

Figure 11 on page 35 shows the faceplate of the module.

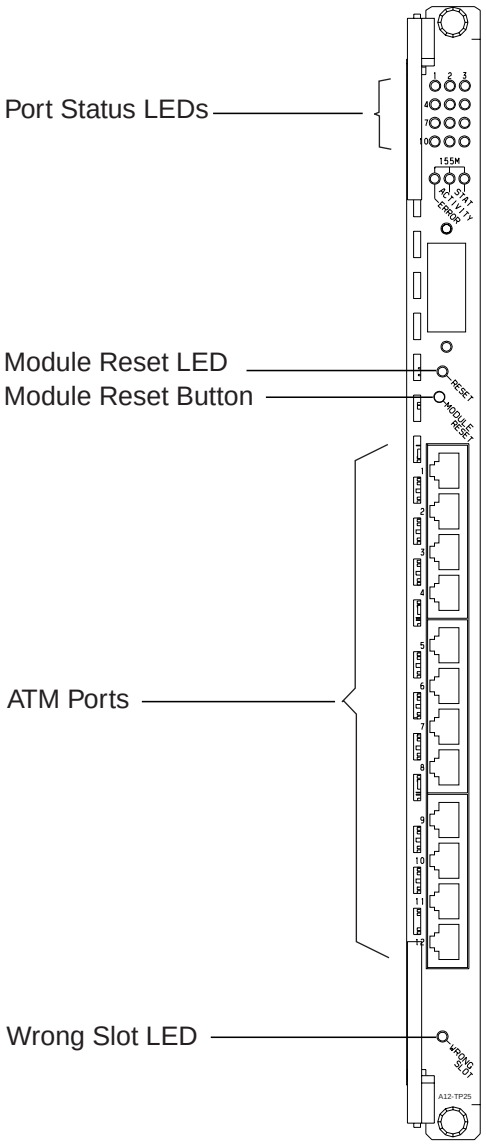

Figure 11. 12-Port 25Mbps Module Faceplate

WAN 2 Module

The WAN 2 module (Feature Code 5602) enables direct communication between ATM networks, residing in different locations, over the Wide Area Network (WAN).

The module is a single-slot module that can host any two daughter cards of the following types:

- 4-port E1/T1, with DB15 connectors for E1 over coaxial cable at 2Mbps, RJ-48 connectors for E1/T1 over twisted pair cable at 2Mbps (E1) or 1.5Mbps (T1)
- 1-port E3, with BNC connector, over a coaxial cable at 34Mbps
- 1-port DS3, with BNC connector, over a coaxial cable at 45Mbps
- 1-port STM-1, with SC connector, over a multimode fiber cable at 155Mbps
- 1-port STM-1, with SC connector, over a singlemode fiber cable at 155Mbps
- 1-port OC3, with SC connector, over a multimode fiber cable at 155Mbps
- 1-port OC3, with SC connector, over a singlemode fiber cable at 155Mbps.

The module supports the UNI, IISP, and PNNI interfaces. The STM-1 interface implements full SDH support, while the OC3 interface implements SONET support.

The UTOPIA interface connects the daughter cards to the motherboard in the following way:

- ATM data cells are transferred via UTOPIA
- Daughter cards access the ATM functions via UTOPIA

Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7).

For further information, refer to page 57.

Figure 12 shows the faceplate of the WAN 2 module.

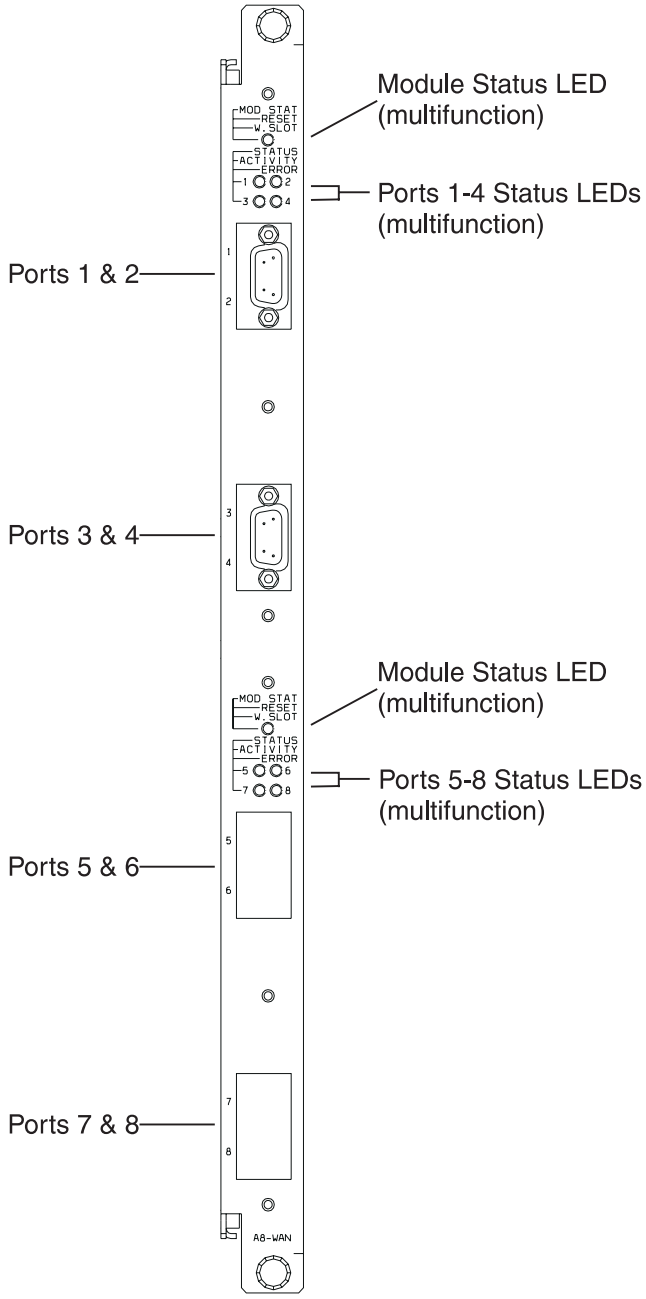

Figure 12. WAN 2 Module Faceplate

Multiprotocol Switched Services (MSS) Server Module

The MSS Server (8210) module (Feature Code 5300) provides a multiprotocol networking solution for the ATM environment and allows a smooth migration from shared LANs to high speed ATM backbones.

The module has the following hardware specifications:

- Two PCMCIA adapter slots (for type 3 cards)
- One PCMCIA hard disk for operational code, configuration data, and service information (logs, traces, and so on). The PCMCIA disk is a required hardware feature.
- One PCMCIA modem for remote access. Depending on to country homologation rules, it is either a PCMCIA data/fax modem or a PCMCIA voice/data/fax modem.
- A service port conforming to the EIA-232 standard.

The module provides LAN Emulation and Classical IP network functions, as well as various bridging and routing functions through the following features:

- ATM Forum compliant LAN emulation. The module supports:
  - Ethernet and Token-Ring emulated LANs
  - LAN Emulation Client (LEC)
  - LAN Emulation Server (LES)
  - LAN Emulation Configuration Server (LECS)
  - Broadcast and Unknown Server (BUS).
- Virtual LAN support: logical groups of end stations
- Enhanced availability of LAN emulation: an IBM extension to LAN emulation that supports multiple LAN Emulation Servers for backup purposes.
- Enhanced LAN emulation broadcast management: an IBM extension to the BUS that reduces the broadcast traffic to improve network performance.
- Standard bridging and routing support:
  - Source route (SR) bridging
  - Transparent bridging (TB)
  - SR and TB
  - Source route transparent bridging (SRT)
  - Source route to transparent bridging (SR-TB)
  - Adaptive source route transparent bridging (ASRT).
- IP routing over ATM
- Novell IPX routing on emulated LANs.

There are several options for operating and managing the MSS Server module:

- Local console (ASCII terminal) on the service port
- Remote login via a Telnet session
- Remote connection via an HTML Web browser
- SNMP management station.

In addition to the remote attachment, via a modem connected to the service port, the integrated PCMCIA modem can also be used.

Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7).

For further information, refer to page 60 and the Bibliography, on page 79, for related publications.

Figure 13 shows the faceplate of the MSS Server module.

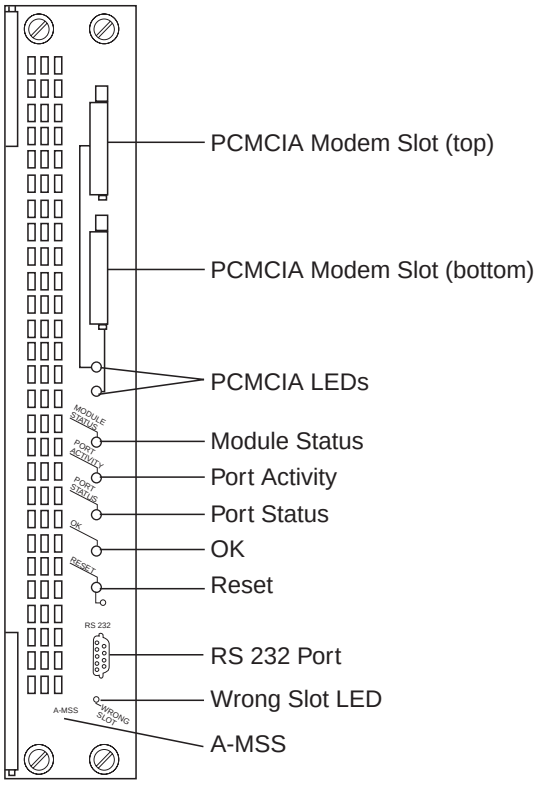

Figure 13. MSS Server Module Faceplate

Video Distribution Module

The Video Distribution Module (Feature Code 5008) is a two-slot module providing 8 independent ports to decode MPEG-2 video streams. A video source, such as the IBM Media Streamer or the Video Access Node (IBM 8300), can connect to one or more of the module's ports and transmit MPEG-2 video streams through the ATM network and into the module.

The module receives the cells, reassembles the MPEG-2 video and audio packets, decompresses and decodes the digitized video information, and converts it into separate analog audio and video signals. External ports provide baseband NTSC compliant (US standard) and PAL (worldwide standard) video, and CD-quality audio.

The module also has the capability to receive Closed Caption information in the MPEG-2 transport stream and reinsert that information into the Vertical Banking Interval of the outgoing analog video signal.

The VDM video output signals can be synchronized to an external video clocking signal via the genlock input (an RG59/U cable with BNC connector is required). The VDM microcode controls the clocking source used for the video (either the genlock signal or internal VDM clocking). The VDM supports H-sync and V-sync clocking via the genlock input.

Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7).

For further information, refer to page 60 and also the *IBM Video Distribution Module User's Guide*, GA27-4173.

Figure 14 on page 41 shows the faceplate of the Video Distribution module.

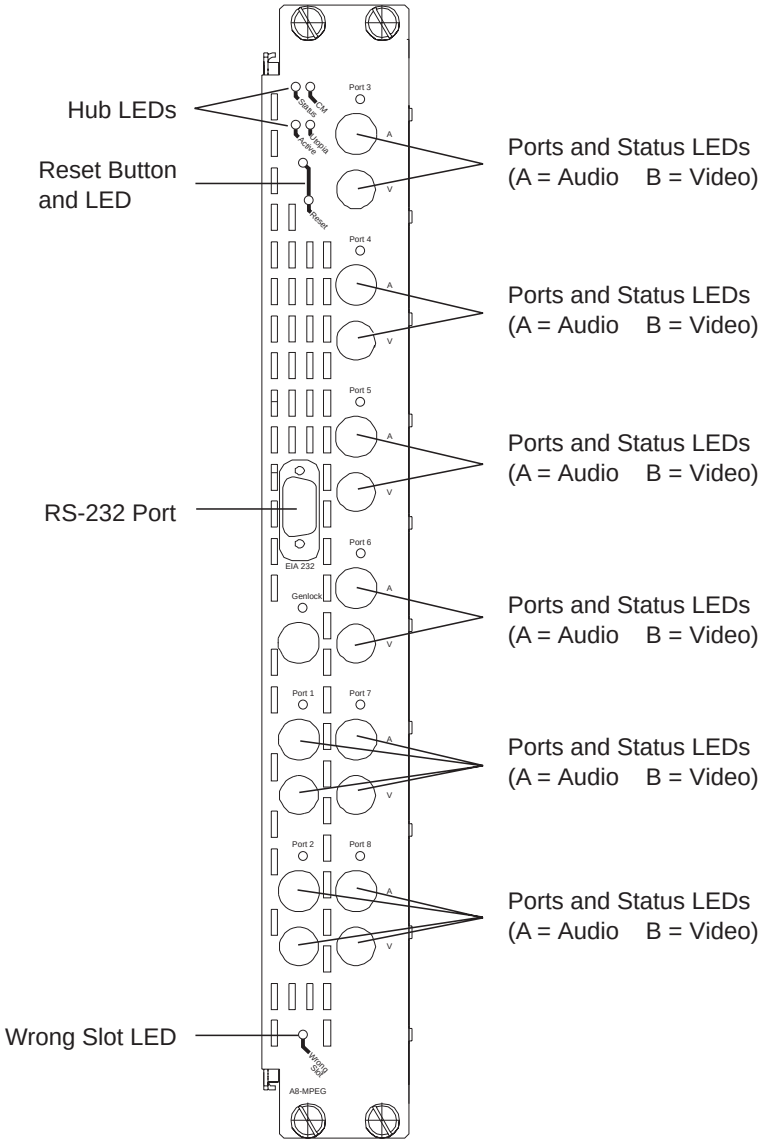

Figure 14. Video Distribution Module Faceplate

ATM/Ethernet LAN Switch Modules (8271)

The 8271 ATM/Ethernet LAN Switch (8271) modules, by using Ethernet MAC addresses to forward Ethernet frames between ports, can accommodate any type of LAN segment to provide a high-performance switching solution.

The modules provide direct ATM backplane connectivity allowing segments of Ethernet LAN users to be interconnected to other Ethernet LAN segments via LAN switching or high-speed ATM switching.

The modules are offered in two- and three-slot versions (Feature Codes 5212 and 5312), with the following characteristics:

- 12 frontal 10BASE-T Ethernet ports with RJ-45 UTP/STP connectors (UTP cabling Category 3, 4, or 5 is supported)
- Universal Feature Cards (UFCs) can be installed, allowing the attachment of LAN segments. Up to four UFCs are supported on the three-slot version (two on the two-slot version). The following UFCs are available, and may be installed in any combination:
  - 4-port 10BASE-T UFC for UTP or STP cabling
  - 3-port 10BASE-FL UFC for fiber cabling
  - 1-port 100BASE-Tx UFC for UTP or STP cabling
  - 1-port 100BASE-Fx UFC for fiber cabling
  - 1-port ATM/Ethernet UFC for fiber cabling
  - MSS Domain Client UFC. Provides network layer forwarding between LAN ports and the ATM network.

  UFCs working with fiber optic cables allow the connection of LAN segments up to two kilometers (1.25 miles) from the 8265 using multimode fiber cabling.
- Full compliance with IEEE 802.3 standard
- Variable switching mode:
  - Cut-through mode, where the frames are forwarded as soon as the address has been received
  - Store-and-forward mode, where frames are checked before being forwarded
  - Adaptive mode, which offers the benefits of both cut-through and store-and-forward modes.
- Virtual switch capability - which allows a single physical LAN to be divided into two or eight virtual switches.
- Full duplex support - provides 2 independent paths, each at 10Mbps, per port.
- Etherpipe support - allows multiple ports (up to four) to be connected together between two 8271 modules.
- MAC addresses - up to 1790 Ethernet MAC addresses per port and 10 000 per module are supported.
- Transparent bridging and filtering.
- Statistics - the 8271 modules keeps statistics on a per-port, per-station, or entire module basis.
- Management - either via the service port or from an SNMP management station.

Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7). Slot 7 cannot be used for a 3-slot module when a CPSW module is installed in slot 9.

For more information, refer to page 61 and the Bibliography, on page 79, for related publications.

Figure 15 shows the faceplates of the 2- and 3-slot 8271 modules.

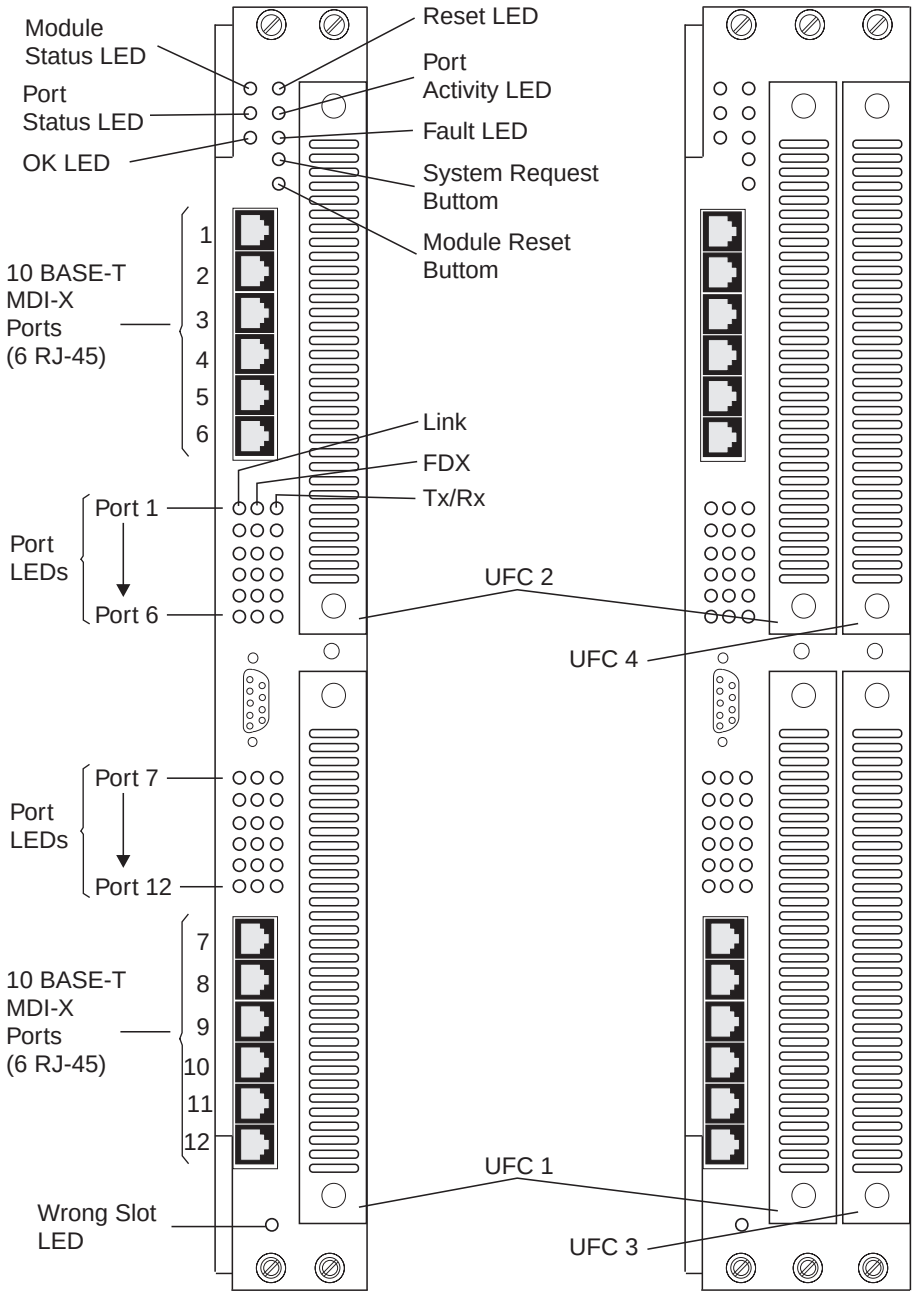

Figure 15. 8271 Ethernet LAN Switching Module Faceplates

ATM/Token-Ring LAN Switch Modules (8272)

The ATM/Token-Ring LAN Switch (8272) modules, by using Token-Ring MAC addresses and source route descriptors to forward Token-Ring frames between ports, provides a high-performance switching solution.

The module provides direct ATM backplane connectivity allowing segments of Token-Ring LAN users to be interconnected to other Token-Ring LAN segments via LAN switching or high-speed ATM switching.

The modules are offered in two- and three-slot versions (Feature Codes 5208 and 5308), with the following characteristics:

- 8 frontal Token-Ring (4Mbps or 16Mbps) ports with RJ-45 UTP/STP connectors (UTP cabling Category 3, 4, or 5 is supported)
- UFCs working with fiber optic cables allow the connection of LAN segments up to two kilometers (1.25 miles) from the 8265 using multimode fiber cabling. The ports can be used as ring-in/ring-out connections. Up to four UFCs are supported on the three-slot version (two on the two-slot version).

  The following UFCs are available, and may be installed in any combination:

  – 4-port UFC for UTP or STP cabling
  – 2-port UFC for fiber cabling
  – 1-port ATM multimode fiber/Token-Ring II UFC for fiber cabling.
- Full compliance with IEEE 802.5 standard
- Variable switching mode:
  – Cut-through mode, where the frames are forwarded as soon as the address has been received
  – Store-and-forward mode, where frames are checked before being forwarded
  – Adaptive mode, which offers the benefits of both cut-through and store-and-forward modes.
- Virtual switch capability - which allows a single physical LAN to be divided into two or eight virtual switches.
- Full duplex support - provides 2 independent paths, each with a bandwidth of 16Mbps per port.
- Tokenpipe support - allows multiple ports (up to four) to be connected together between two 8272 modules.
- MAC addresses - up to a maximum of 1790 Token-Ring MAC addresses per port and 10 000 per module are supported.
- Transparent bridging and filtering.
- Source route switching - based on source route descriptors rather than MAC addresses.
- Source route bridging - allows frame transport between Token-Ring segments with different ring numbers.
- Auto-sense/auto-configure capabilities - to automatically configure the port to the network characteristics.
- Statistics - the 8272 modules keeps statistics on a per-port, per-station, or entire module basis.
- Token Probe - a port can be defined to monitor other ports.
- Management - either via the service port or from an SNMP management station.

Up to four modules can be used in the 8265 (slots 1, 3, 5, and 7). Slot 7 cannot be used for a 3-slot module when a CPSW module is installed in slot 9.

For more information, refer to page 65 and the Bibliography, on page 79.

Figure 16 shows the faceplates of the 2- and 3-slot 8272 modules.

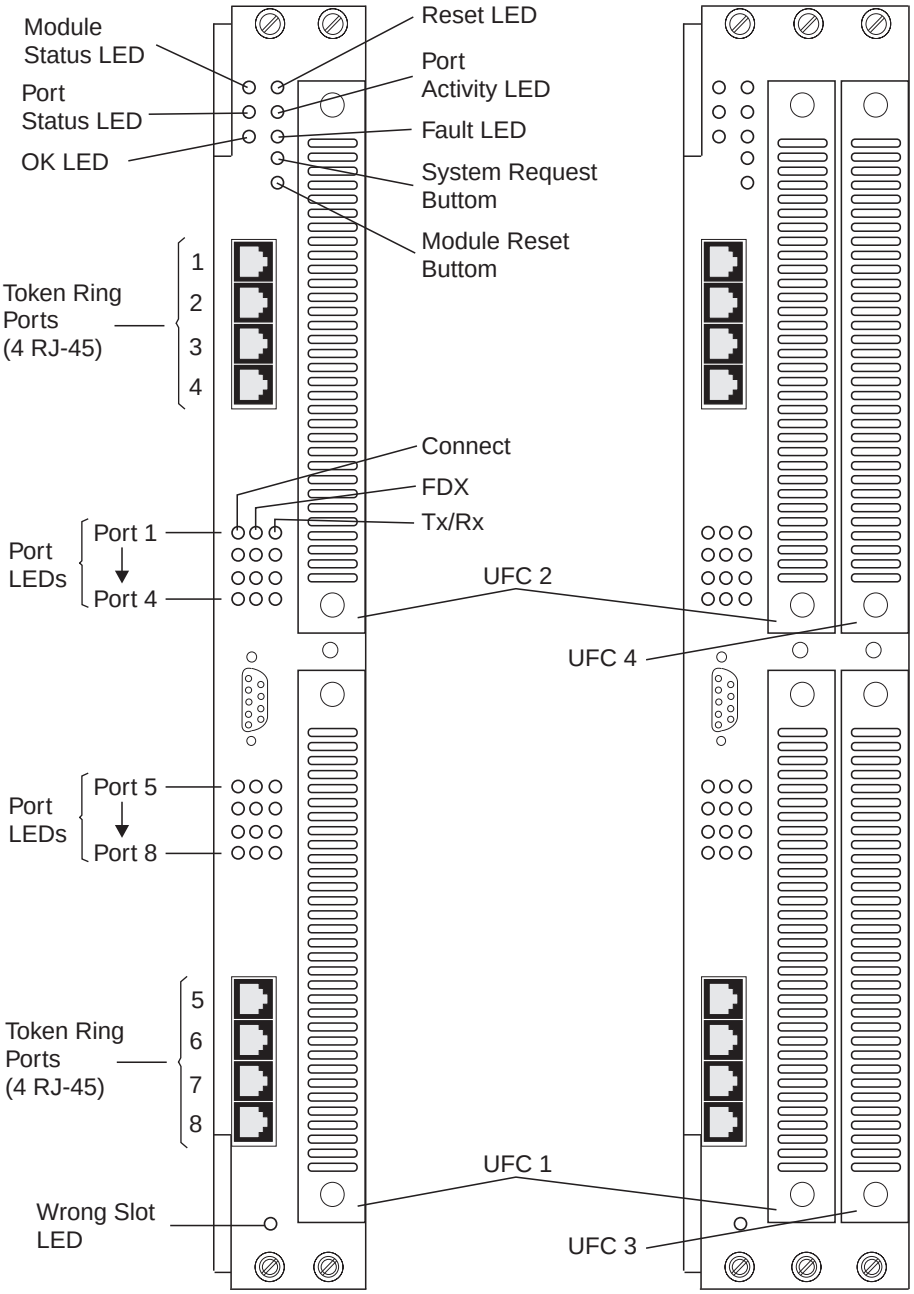

Figure 16. 8272 Token-Ring LAN Switching Module Faceplates

Receiving Code Updates

New versions of code for 8265 modules that are already in operation are available via the Internet, at the following URL:.

`http://www.networking.ibm.com/8265/8265fix.html`

This is the “8265 Microcode Upgrades” home page. From here, you can select the right 8265 module.

Automatic Notification of Updates

To automatically receive notification when microcode updates are available, register your e-mail address at the following URL:

`http://www.networking.ibm.com/8265/8265reg.html`

Upgrading ATM Microcode

The hardware microcode for your CPSW and ATM media modules can be upgraded by inband operations. The software microcode for your CPSW and ATM media modules can be upgraded by out-of-band operations. These operations are shown in Figure 17.

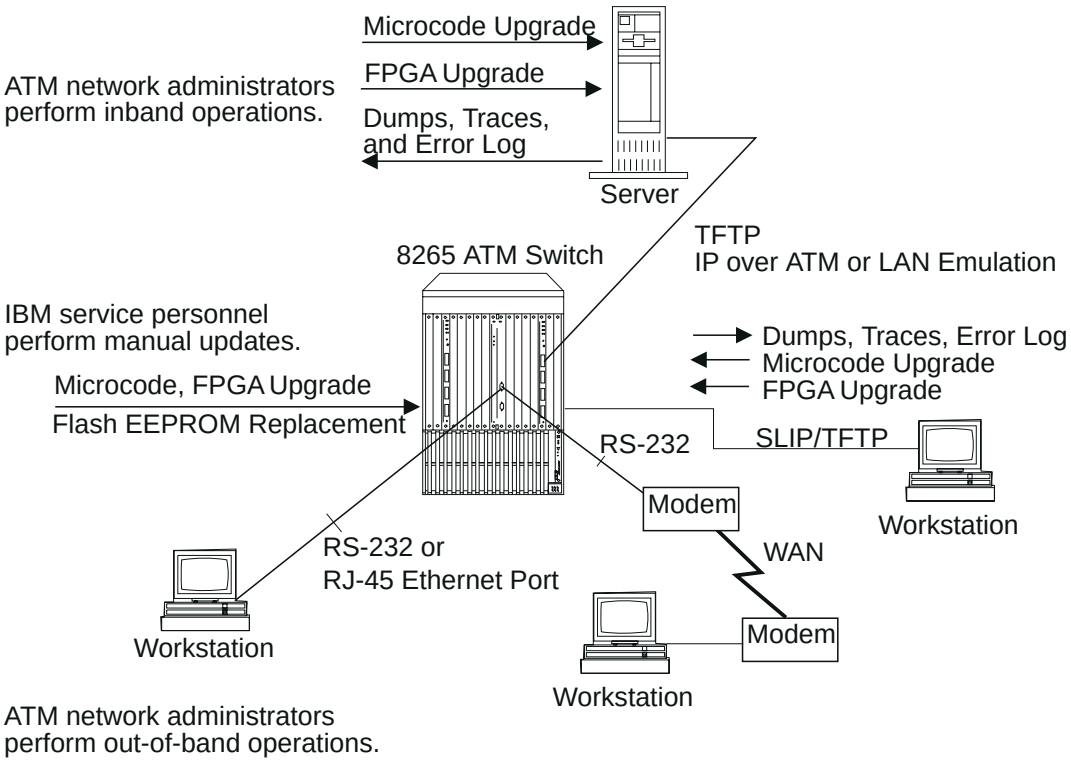

Figure 17. Microcode Upgrade Procedures

For more information on upgrading ATM microcode, refer to the *IBM 8265 Nways ATM Switch User’s Guide,* SA33-0456.

Appendix A. Technical Specifications

Physical Characteristics

The 8265 is designed to be either rack mounted or placed on a table, stand, or shelf.

Table 10. 8265 Weight and Dimensions

Weight[1]	Width	Length	Height
21.9 kg (48.4 lb)	44.5 cm (17.52 in.)	38.5 cm (15.06 in.)	67.3 cm (26.52 in.)

[1] Unloaded, with blank filler plates, three fan units, one controller module and one power supply installed.

Environment Specifications

Product Operating Environment

Air temperature: 10°C to 60°C (50°F to 140°F)

Relative humidity: 8% - 85% (non condensing)

Electrical power: 2.2kVA

Calorific value per power supply: 1416 BTU/hour

Wet bulb: 27°C (80.6°F)

Product Power-Off Environment

Air temperature: 10 to 52°C (50 to 125.6°F)

Relative humidity: 8 to 80%

Wet bulb: 27°C (80.6°F)

Storage and Shipping Environment

Shipping temperature: -40 to 60°C (-40 to 140°F)

Storage temperature: 1 to 60°C (33.8 to 140°F)

Wet bulb: 29°C (84.2°F)

Shipping relative humidity: 5 to 100%

Storage relative humidity: 5 to 80%

Acoustics

A weighted sound power level not exceeding 6.6 Bels.

Power and Electrical Wiring Requirements

AC Power Supply

A dedicated 15 ampere circuit (or an equivalent method of providing this current) is recommended to supply power to the switch when operated at voltage between 90 and 130 volts ac. This will ensure adequate power for a fully loaded switch configuration. This circuit must be grounded to a safety protected ground (earth), NOT to a neutral ground that carries current back to the transformer. Do not use an electrical conduit pipe as your only means of grounding the switch. There must be four ac power outlets available within 2 m (6 ft) of the 8265 in the event that there are four power supplies installed in the switch.

DC Power Supply

To comply with the UL requirements, an 8265 equipped with a -48 Vdc power supply must be installed in a rack or enclosed cabinet. Do not installed an 8265 with a -48 Vdc power supply on a table or shelf. The power cord must be routed through a raceway up to the -48 Vdc distribution panel.

Connect the -48 Vdc power supply to Safety Extra Low Voltage only.

Power Requirements

The power source (wall outlet or receptacle) at the place you have chosen for the 8265 must provide the electrical specifications shown in Table 11 through Table 14 on page 49 to ensure that the 8265 will not be damaged and will work satisfactorily.

Table 11. 8265 Operating Conditions

Phase	Single phase + earth
Frequency	50 or 60 Hz ± 2%
110-Volt range	90 V ac (minimum), 132 V ac (maximum)
220-Volt range	180 V ac (minimum), 256 V ac (maximum)
-48 Vdc	-40 Vdc (minimum), -57 Vdc (maximum)

Table 12. Maximum Inrush Current per 415 W Power Supply

Model	
8265-17S	20 A

Table 13. Site Power Requirement Recommendations

Model	**90-256 V (47/63 Hz)**	**-48 Vdc**
8265-17S	2.2 kVA	—

Table 14. Leakage Current With Four 415 W Power Supplies	
Model	
8265-17S	2.1 mA

Ventilation Requirements

Three fan units draw air in through the front and center of the chassis and exhaust air out the back. To ensure that the fans provide adequate ventilation, you must allow a minimum of 15 cm (6 in.) between the rear of the switch and the nearest wall (or other vertical surface).

Lightning Protection

Power Lines

You should add lightning protection on your redundant power source when:

- The utility company installs lightning protectors on the primary source.
- The area is subject to electrical storms or equivalent power surges.

Signal Lines

You are responsible for selecting and setting up lightning protection, if needed.

Magnetic Compatibility

In some instances, the site chosen for setup of the 8265 may have surrounding magnetic fields.

These fields can result from nearby radio-frequency sources, such as transmitting antennas (AM radio, FM radio, television, and two-way radios), radar, and industrial equipment (radio-frequency induction heaters, arc welders, and insulation testers).

Other sources of interference are transformers (including those within other units), distribution displays, rotating machinery, fluorescent light fixtures, and electric floor heating.

Check with your building engineer or get help in identifying possible sources of magnetic interference at the site you choose to set up the 8265.

Before positioning control units or cabling, a setup planning review may be appropriate to evaluate the environment and to determine whether any special setup or product considerations are required to ensure normal system operation and maintenance. Consult your IBM representative or LAN installation provider.

Electrostatic Discharge

Electrostatic charges can build up on buildings and people as a result of:

- Movement of personnel, carts, or furniture in contact with floor covering
- Personnel in contact with furniture coverings, such as plastic seat covers.

Discharge of these static charges to the metal parts of the 8265, or on the furniture to which it is situated, may cause interference with the operation of the electronic equipment. The 8265 is a Class 2 product (RH not always > 20%, no specified minimum floor surface conductivity, and no specified furniture resistance).

Major factors that contribute to this problem include:

- High-resistance floor surface material
- Carpeting without antistatic properties
- Plastic seat covering
- Very low humidity (usually less than 20%)
- Metal-framed furniture.

If any of the previous factors are present at your site, review the building with your IBM representative or LAN installation provider.

Appendix B. Module Specifications

This appendix describes the modules that you can use with the IBM 8265 Nways ATM Switch.

For details on supported 8260 ATM media modules, refer to page 71.

Controller Module (Feature Code 8000)

Faceplate marking:	8000-RCTL
Power consumption:	5W at +5 Vdc
Operating temperature:	0° to 50° C (32° to 122° F)
Humidity:	Less than 95%, non-condensing
Front panel indicators:	Power supply status, Fan status, Temperature status, Current active controller
Front panel buttons:	Switch reset, LED test

Control Point and Switch Module (Feature Code 6501)

Faceplate marking:	CPSW
Power consumption:	80W at +5 Vdc
Operating temperature:	0° to 40° C (32° to 104° F)
Humidity:	Less than 95%, non-condensing
Connectors:	• One RS-232 DB-9 connector for console port connections • One Ethernet port for configuration, management, file transfer, and debugging.
Processors:	MPC860 (33MHz)
Memory:	• 256KB static RAM • 512KB Boot Flash EEPROM • 4MB PCMCIA Flash EEPROM 16MB EDO Dynamic RAM, expandable to 32MB • 128KB Nonvolatile RAM.
Special circuits:	Imbedded real time clock
Front panel indicators:	System Status LCD, Reset LED, CPU Stop LED.
Front panel buttons:	ATM Reset, Display Control

155Mbps Module (Feature Code 6540)

Faceplate marking:	A4-MF155
Connectors:	SC multimode fiber
Number of ports:	4
Switch interface	16-bit, 20ns (768Mbps)
Memory	5 Mb SRAM (synchronous)
Power requirements:	29 W at +5 Vdc
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460
Front panel indicators:	Module Status LED, Port LEDs (Status, Activity, and Error), Reset LED.
Front panel buttons:	Module Reset

155Mbps Module (Feature Code 6543)

Faceplate marking:	A4-MB155
Connectors:	SC for fiber I/O cards RJ-45 for twisted pair I/O cards
Number of ports:	Up to 4, depending on number of I/O cards installed
Switch interface	16-bit, 20ns (768Mbps)
Memory	5 Mb SRAM (synchronous)
Power requirements:	20 W at +5 Vdc
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460
Front panel indicators:	Module Status LED, Port LEDs (Status, Activity, and Error), Reset LED.
Front panel buttons:	Module Reset

Daughter Cards for 4-Port 155Mbps Flex Modules (Feature Code 6543)

Common Technical Specifications

Connectors:	40-pin connector
Power requirements:	2.5 W at +5 Vdc
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing
Btus/hour:	8.5
Mechanical:	6.35 cm x 6 cm (2.5 in. x 2.36 in.)
Regulatory compliance:	EMI emissions: FCC Class A certification, VDE B certification, CCI, CISPR22/A, EN 55022 Safety: CSA-22.2, IEC 950 (EN 60950), UL 1950, AS 3260, NZS 6661

Multimode Fiber I/O Card (Feature Code 6580)

Faceplate marking:	MF
Connector:	SC
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

Singlemode Fiber I/O Card (Feature Code 6581)

Faceplate marking:	SF
Connector:	SC
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

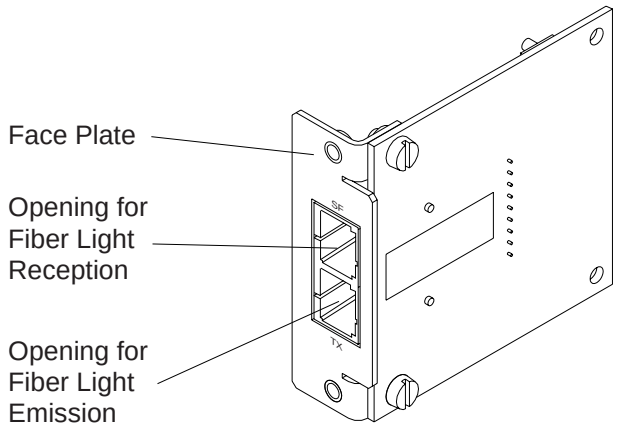

Figure 18. 155Mbps Module Fiber Daughter Card

UTP/STP I/O Card (Feature Code 6582)

Faceplate marking:	TP
Connector:	RJ-45

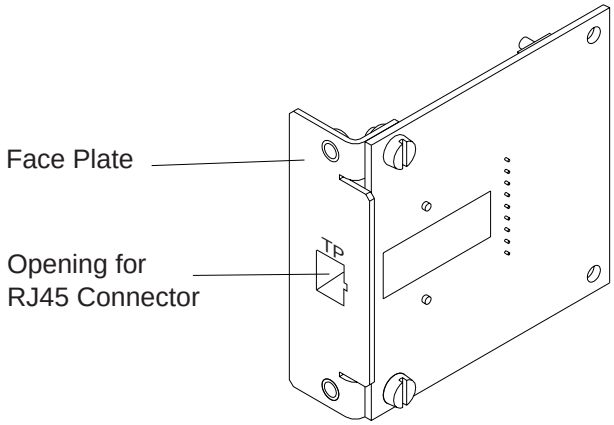

Figure 19. 155Mbps Module UTP/STP Daughter Card

622Mbps Module (Feature Code 6511)

Faceplate marking:	A1-MF622
Connectors:	SC multimode fiber: • 62.5/125 micron (preferred) • 50/125 micron
Number of ports:	1
Power requirements:	28 W at +5 Vdc
Switch interface	16-bit, 20ns (768Mbps)
Memory	5 Mb SRAM (synchronous)
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

622Mbps Module (Feature Code 6512)

Faceplate marking:	A1-SF622
Connectors:	SC singlemode fiber, 9/125 micron
Number of ports:	1
Switch interface	16-bit, 20ns (768Mbps)
Memory	5 Mb SRAM (synchronous)
Power requirements:	28 W at +5 Vdc
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

4-Port Fiber 100Mbps Module (Feature Code 5104)

Faceplate marking:	A4-SC100
Connectors:	SC fiber
Number of ports:	4
Switch interface	16-bit, 20ns (256Mbps)
Power requirements:	35 W at +5 Vdc, 2.5 W at +12 Vdc
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

12-Port 25Mbps Concentration Module (Feature Code 5012)

Faceplate marking:	A12-TP25
Connectors:	RJ-45
Number of ports:	12
Switch interface	16-bit, 20ns (256Mbps)
Power requirements:	25 W at +5 Vdc
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing

Daughter Card for 12-Port 25Mbps Concentration Module

MMF I/O Card (Feature Code 8510)

Faceplate Marking:	MF
Connectors:	SC
Data rate:	155.520Mbps
Cable type:	Multimode fiber
Power requirements:	10 W at +5 Vdc
Maximum link distance:	2.2 km (1.36 miles)
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

WAN 2 Module (Feature Code 5602)

Faceplate marking:	A8-WAN
Connectors:	See daughter cards below
Number of ports:	8 maximum
Switch interface	16-bit, 20ns (256Mbps)
Power requirements:	18.4 W at +5 Vdc
Operating temperature:	0°C to 50°C (32°F to 122°F)
Humidity:	Less than 95% non-condensing

Daughter Cards for WAN 2 Module

DS3 I/O Card (Feature Code 8502)

Faceplate Marking:	DS3
Connectors:	BNC
Data rate:	44.736Mbps
Cable type:	Coax RG59 (75 ohm)
Power requirements:	7.9 W at +5 Vdc
Maximum link distance:	135m (443 ft.)

E3 I/O Card (Feature Codes 6590-6599)

Faceplate Marking:	E3
Connectors:	BNC
Data rate:	34.368Mbps
Cable type:	Coax RG59 (75 ohm)
Power requirements:	7.9 W at +5 Vdc
Maximum link distance:	100m (330 ft.)

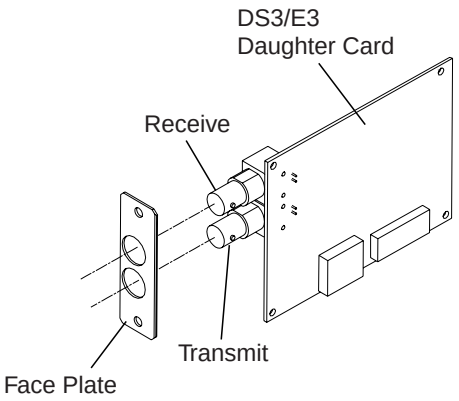

Figure 20. WAN Module DS3/E3 Daughter Card

STM-1 MMF I/O Card (Feature Code 8506)

Faceplate Marking:	S-MF
Connectors:	SC
Data rate:	155.520Mbps
Cable type:	Multimode fiber
Power requirements:	7.9 W at +5 Vdc
Maximum link distance:	2.2 km (1.36 miles)
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

STM-1 SMF I/O Card (Feature Code 8505)

Faceplate Marking:	S-SF
Connectors:	SC
Data rate:	155.520Mbps
Cable type:	Singlemode fiber
Power requirements:	7.9 W at +5 Vdc
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460
Maximum link distance:	20 km (12.42 miles)
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

OC3 MMF I/O Card (Feature Code 8504)

Faceplate Marking:	O-MF
Connectors:	SC
Data rate:	155.520Mbps
Cable type:	Multimode fiber
Power requirements:	7.9 W at +5 Vdc
Maximum link distance:	2.2 km (1.36 miles)
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

OC3 SMF I/O Card (Feature Code 8503)

Faceplate Marking:	O-SF
Connectors:	SC
Data rate:	155.520Mbps
Cable type:	Singlemode fiber
Power requirements:	7.9 W at +5 Vdc
Maximum link distance:	20 km (12.42 miles)
Optical Specifications:	For details, refer to the *IBM 8265 Nways ATM Switch Planning and Site Preparation Guide*, SA33-0460

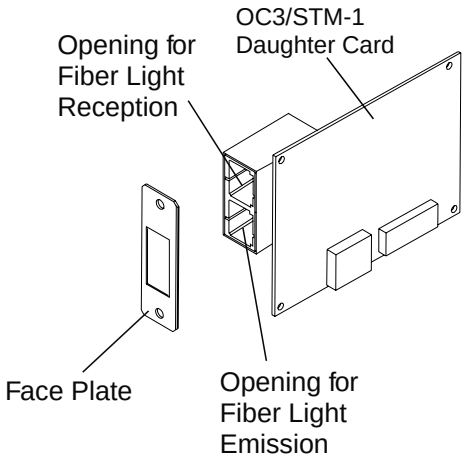

Figure 21. WAN Module OC3/STM-1 Daughter Card

E1/T1 I/O Card (Feature Codes 6570-6574)

Faceplate Marking:	E1/T1
Connectors:	DB9
Data rate:	2Mbps for E1, 1.5Mbps for T1
Cable type:	RG59 coax (75 ohm) or STP (120 ohm) for E1 STP (100 ohm) for T1
Power requirements:	7.9 W at +5 Vdc
Maximum link distance:	122m (400 ft.) for coax, 130m (426 ft) for STP.

Carrier Module (Feature Codes 5102)

Faceplate marking:	A-CMU1 (for 1-slot module)
Internal clocking:	20 MHz
Number of ports:	2
Switch interface	16-bit, 20ns (256Mbps)
Port connector:	120-pin AMP
Power requirements:	18.2 W at +5 Vdc
Daughter cards:	2
Daughter card interface:	UTOPIA-1 (8 bits)
Maximum allowable power (for daughter card):	28.6 W at +5 Vdc 9.6 W at +12 Vdc 2.5 W at -5 Vdc 3 W at -12 Vdc

Multiprotocol Switched Services Server Module (Feature Code 5300)

Faceplate marking:	A-MSS
Connectors:	One RS-232 DB-9 connector for service port connection Two Type 3 PCMCIA slots
Switch interface	16-bit, 20ns (256Mbps)
Processor:	Power PC 603E at 100 MHz
Power requirements:	42 W at + 5 Vdc
Memory:	• 8KB of non-volatile RAM • 512KB of high-speed level 2 cache memory • 12MB of Flash EPROM • 32MB of dynamic RAM (two 16MB SIMMs) • 10MB of ATM packet memory
Special circuits:	ATM dedicated chip sets
Modem support:	PCMCIA data/FAX 28.2Kbps modem PCMIA voice/data/FAX 28.2Kbps modem 100% Hayes-compatible modem via RS-232 port

Video Distribution Module

Number of ports:	8 video, 8 audio
Connectors:	BNC for video, 5-pin mini-DIN for audio
Cable type:	• RG59/U (75 ohm) for video • unbalanced audio cable for audio
Power consumption:	62.5 W at +5 Vdc

8271 ATM/Ethernet LAN Switch Module (Feature Code 5212)

Faceplate marking:	A-E12LS2
Number of slots:	2
Numbers of UFCs:	2
Number of ports:	12
Switch interface	16-bit, 20ns (256Mbps)
Power consumption:	58.5 W at +5 Vdc
Data rate:	10Mbps
Port connector:	RJ-45

8271 ATM/Ethernet LAN Switch Module (Feature Code 5312)

Faceplate marking:	A-E12LS4
Number of slots:	3
Numbers of UFCs:	4
Number of ports:	12
Switch interface	16-bit, 20ns (256Mbps)
Power consumption:	58.5 W at +5 Vdc
Data rate:	10Mbps
Port connector:	RJ-45

Universal Feature Cards for 8271 LAN Switch Modules

4-Port Ethernet 10BASE-T UFC (Feature Code 9195)

Number of ports:	4
Connector:	RJ-45
Date rate:	10Mbps
Cable type:	STP, UTP Category 3 or better
Power consumption:	5.5 W at +5 Vdc

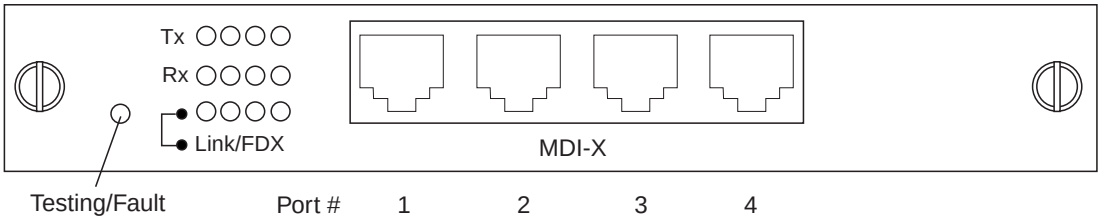

Figure 22. 4-port Ethernet 10BASE-T UFC

3-Port Ethernet 10BASE-FL UFC (Feature Code 8603)

Number of ports:	3
Connector:	ST
Date rate:	10Mbps
Cable type:	Multimode fiber
Power consumption:	6.7 W at +5 Vdc

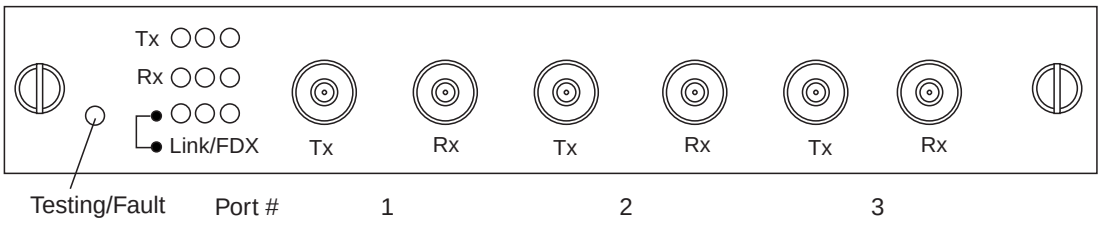

Figure 23. 3-Port Ethernet 10BASE-FL UFC

1-port Ethernet 100BASE-Tx UFC (Feature Code 6995)

Number of ports:	1
Connector:	RJ-45
Date rate:	100Mbps
Cable type:	STP, UTP Category 5
Power consumption:	5.7 W at +5 Vdc

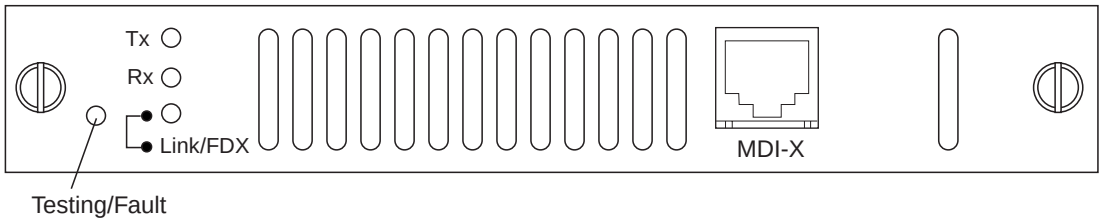

Figure 24. 1-port Ethernet 100BASE-Tx UFC

1-Port Ethernet 100BASE-Fx UFC (Feature Code 7000)

Number of ports:	1
Connector:	ST
Date rate:	100Mbps
Cable type:	Multimode fiber
Power consumption:	6 W at +5 Vdc

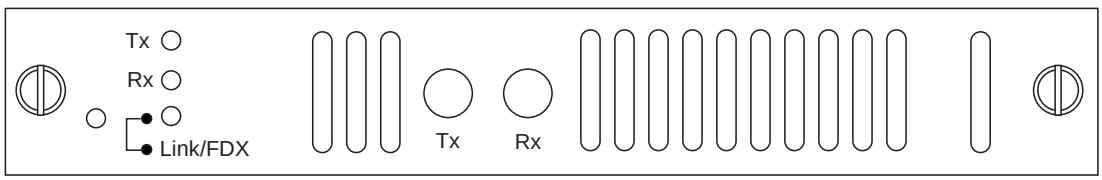

Figure 25. 1-Port Ethernet 100BASE-Fx UFC

1-Port ATM/Ethernet UFC (Feature Code 6988)

Number of ports:	1
Connector:	SC
Date rate:	155Mbps
Cable type:	Multimode fiber
Power consumption:	25 W at +5 Vdc

8272 ATM/Token-Ring LAN Switch Module (Feature Code 5208)

Faceplate marking:	A-TR8LS2
Number of slots:	2
Numbers of UFCs:	2
Number of ports:	8
Switch interface	16-bit, 20ns (256Mbps)
Power consumption:	67.5 W at +5 Vdc
Data rate:	4Mbps or 16Mbps
Port connector:	RJ-45

8272 ATM/Token-Ring LAN Switch Module (Feature Code 5308)

Faceplate marking:	A-TR8LS4
Number of slots:	3
Numbers of UFCs:	4
Number of ports:	8
Switch interface	16-bit, 20ns (256Mbps)
Power consumption:	67.5 W at +5 Vdc
Data rate:	4Mbps or 16Mbps
Port connector:	RJ-45

Universal Feature Cards for 8272 LAN Switch Modules

4-Port Token-Ring UTP/STP UFC (Feature Code 5092)

Number of ports:	4
Connector:	RJ-45
Date rate:	4Mbps or 16Mbps
Cable type:	STP, UTP Category 3 or better
Power consumption:	• 11 W at +5 Vdc (Feature Code 9196) • 12 W at +5 Vdc (Feature Code 5092)

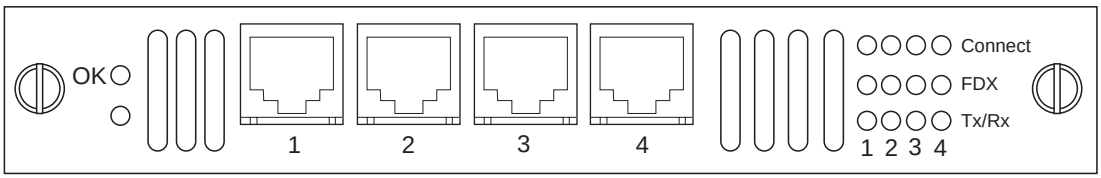

Figure 26. 4-Port Token-Ring UTP/STP UFC

2-Port Token-Ring Fiber UFC (Feature Code 5087)

Number of ports:	2
Connector:	ST
Date rate:	4Mbps or 16Mbps
Cable type:	Multimode fiber
Power consumption:	8 W at +5 Vdc (Feature Code 6985) 11 W at +5 Vdc (Feature Code 5087)

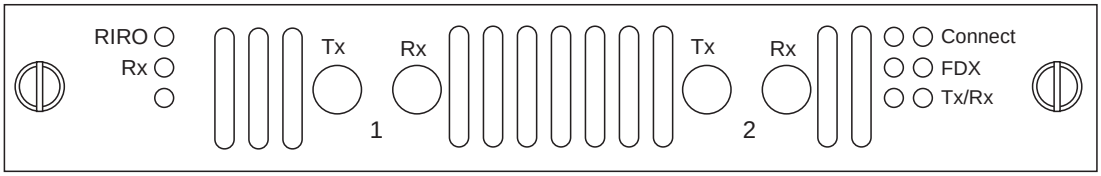

Figure 27. 2-Port Token-Ring Fiber UFC

1-Port ATM Multimode Fiber/Token-Ring II UFC (Feature Code 2762)

Number of ports:	1
Connector:	SC
Date rate:	155Mbps
Cable type:	Multimode fiber
Power consumption:	25 W at +5 Vdc

Appendix C. Power Consumption

8265 Modules and Daughter Cards

Table 15. 8265 Module and Daughter Card Power Consumption

Type	Feature Code	Slot Width	Power Required (Watts @ +5 Volts)
Modules			
Control Point & Switch	6501	2	80
Controller	8000	1	5
4-port 155Mbps (MMF)	6540	1	29
4-port 155Mbps (Flex)	6543	1	20
1-port 622Mbps (MMF)	6511	1	28
1-port 622Mbps (SMF)	6512	1	28
4-port 100Mbps	5104	1	35
12-port 25Mbps	5012	1	25
ATM WAN 2	5602	1	18.4
Video Distribution	5008	2	62.5
MSS Server (8210)	5300	2	42
ATM/Ethernet (8271)	5212	2	58.5
ATM/Ethernet (8271)	5312	3	58.5
ATM/Ethernet (8272)	5208	2	30
ATM/Ethernet (8272)	5308	3	30
Daughter Cards for 4-Port 155Mbps Flex Module:			
MM Fiber I/O Card	6580	—	2.5
SM Fiber I/O Card	6581	—	2.5
UTP/STP I/O Card	6582	—	2.5
Daughter Card for 12-Port 25Mbps Module:			
155Mbps I/O card	8510		10
Daughter Cards for WAN 2 Module:			
E1/T1 I/O Card	See Note	—	7.9
E3 I/O Card	See Note	—	7.9
DS3 I/O Card	8502	—	7.9
STM-1 MMF I/O Card	8506	—	7.9
STM-1 SMF I/O Card	8505	—	7.9
OC3 MMF I/O Card	8504	—	7.9
OC3 SMF I/O Card	8503	—	7.9

Note: Feature Code varies according to country (see page 24.)

Table 15. 8265 Module and Daughter Card Power Consumption

Type	Feature Code	Slot Width	Power Required (Watts @ +5 Volts)
Universal Feature Cards for 8271 ATM/Ethernet LAN Switch Modules:			
4-port Ethernet 10BASE-T	9195	—	5.5
3-port Ethernet 10BASE-FL	8603	—	6.7
1-port Ethernet 100BASE-Tx	6995	—	5.7
1-port Ethernet 100BASE-Fx	7000	—	6.0
1-port ATM/Ethernet	6988	—	25
Universal Feature Cards for 8272 ATM/Token-Ring LAN Switch Modules:			
4-port Token-Ring UTP/STP	5092	—	12
2-port Token-Ring Fiber	5087	—	11
1-port ATM MMF/Token-Ring II	2762	—	25

Appendix D. Supported 8260 ATM Modules

This appendix lists the 8260 ATM modules that you can use with the IBM 8265 Nways ATM Switch.

ATM Modules

Type	Connector Type(s)	Number of Ports	Slot Width	Faceplate Marking
4-Port 100Mbps	SC	4	1	A4-SC100
4-Port 100Mbps	MIC	4	1	A4-FB100
12-Port 25Mbps	RJ-45	12	1	A12-TP25
2-Port 155Mbps	—	2	1	A2-MB155
3-Port 155Mbps	—	3	1	A2-MB155
ATM WAN	—	2	1	A2-WAN
ATM WAN 2	—	8	1	A8-WAN
Video Distribution	—	8	2	A8-MPEG
ATM Carrier	—	—	1	A-CMU1
ATM Carrier	—	—	2	A-CMU2
8210 MSS Server	RS-232, DB9	—	2	A-MSS
8271 ATM/Ethernet	RJ-45	12	2	A-E12LS2
8271 ATM/Ethernet	RJ-45	12	3	A-E12LS4
8272 ATM/Token-Ring	RJ-45	8	2	A-TR8LS2
8272 ATM/Token-Ring	RJ-45	8	3	A-TR8LS4
8281 ATM LAN Bridge	RJ-45, DB-15	4	2	A04MB-BRG

Daughter Cards

Type	Connector Type(s)	Number of Ports	Slot Width	Faceplate Marking
For 155Mbps Modules:				
Multimode Fiber I/O Card	SC	1	—	MF
Singlemode Fiber I/O Card	SC	1	—	SF
UTP/STP I/O Card	RJ-45	1	—	TP
For WAN Modules:				
E1/T1/J1 I/O Card	BNC, RJ-48	4	—	E1/T1
E3 I/O Card	BNC	1	—	E3
DS3 I/O Card	BNC	1	—	DS3
OC3 SMF I/O Card	SC	1	—	O-SF
OC3 MMF I/O Card	SC	1	—	O-MF
STM-1 SMF I/O Card	SC	1	—	S-SF
STM-1 MMF I/O Card	SC	1	—	S-MF
For 25Mbps Module:				
Multimode Fiber I/O Card	SC	1	—	MF

Universal Feature Cards

Type	Connector Type(s)	Number of Ports	Slot Width	Faceplate Marking
For 8271 ATM/Ethernet Modules:				
ATM/Ethernet MMF	SC	1	—	—
100BASE-Tx	RJ-45	1	—	—
100BASE-Fx	ST	1	—	—
10BASE-FL	ST	3	—	—
10BASE-T	RJ-45	4	—	—
For 8272 ATM/Token-Ring Modules:				
ATM/Token-Ring MMF	SC	1	—	—
Fiber (enhanced)	ST	2	—	—
UTP/STP (enhanced)	RJ-45	4	—	—

Required FPGA Levels

Some 8260 ATM modules must have a minimum FPGA level to operate in the 8265.

Table 16 lists the modules and the minimum FPGA levels required. **The modules must have this FPGA level, or higher, before being installed in the 8265**.

If your 8260 ATM module does not have the specified FPGA level (or higher), upgrade the module **before** removing it from the 8260, using MES 5099. For information on how to upgrade FPGA code, refer to *IBM 8260 Nways Multiprotocol Switching Hub, ATM Control Point and Switch Module Installation and User's Guide*, SA33-0326.

Table 16. Minimum FPGA Levels Required for 8260 ATM Modules

Module	Faceplate Marking	Required FPGA Level
4-Port 100Mbps	A4-SC100	B50
4-Port 100Mbps	A4-FB100	B50
12-Port 25Mbps	A12-TP25	C30
2-Port 155Mbps	A2-MB155	B50
3-Port 155Mbps	A2-MB155	C31
ATM WAN	A2-WAN	B50
ATM Carrier	A-CMU1	B50
ATM Carrier	A-CMU2	B50
8210 MSS Server	A-MSS	B50
8281 ATM LAN Bridge	A04MB-BRG	B50

Other supported 8260 ATM modules (8271/8272 LAN Switch modules, for example), are fully compatible with the 8265, and have no minimum FPGA level requirement.

Appendix E. Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product, program, or service. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

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Safety Information

General Safety

The IBM 8265 Nways ATM Switch complies with the following safety standards or their updated versions:

Industry Safety Standards

Safety of Information Technology Equipment:		
Number	Date	Description
IEC 950	1991	International Standard
C22.2 No. 950	1989	(Canadian Standard)
UL 1950	1991	(U.S.A. Standard)
EN 60 950	1992	(European CENELEC Standard)
AS/NZS 3260	1993	(Australian and New Zealand Standard)
Safety of Laser Products:		
Number	Date	Description
IEC 825-1	1993	Equipment Classification, Requirements, and User's Guide
IEC 825-2	1993	Safety of Optical Fiber Communications Systems
EN 60825-1	1993	(European CENELEC IEC 825-1 Standard)
EN 60825-2	1993	(European CENELEC IEC 825-2 Standard)

Safety Notice for United Kingdom

The network adapter interfaces housed within the IBM 8265 Nways ATM Switches are approved separately, each one having its own independent approval number. These interface adapters, supplied by IBM, do not use or contain excessive voltages. An excessive voltage is one that exceeds 42.4 V peak ac or 60 Vdc. They interface with the IBM 8265 Nways ATM Switch using Safety Extra Low Voltages (SELV) only. In order to maintain the separate (independent) approval of the IBM adapters, it is essential that other optional cards, not supplied by IBM, do not use mains voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by IBM.

Industry Standards Reflected in This Product

The IBM 8265 Nways ATM Switch is designed according to the specifications of the following industry standards as understood and interpreted by IBM as of October 1992.

International Organization for Standardization (ISO)

- ISO 8802/1
- ISO 8802/3
- ISO 8802/5

IEEE (Institute of Electrical and Electronic Engineers)

- 802.1 Local area network (LAN) management and Internet working
- 802.3 Carrier sense multiple access and collision detection
- 802.5 Token passing ring

ANSI (American National Standard Institute)

The IBM Fiber Distribution Data Interface (FDDI) network is an implementation of the American National Standards Institute (ANSI) X3T9.5 family of standards.

The IBM base standards for the implementation of the FDDI are:

- ANSI X3.166-1990, FDDI physical layer medium-dependent (PMD), ISO 93/4-3
- ANSI X3.148-1988, FDDI token-ring physical layer protocol (PHY), ISO 93/4-1
- ANSI X3.139-1987, FDDI token-ring media access control (MAC)
- ANSI X3.T9, 5/84-49 RFC 1285 FDDI station management (SMI).

ITU-T (International Telecommunications Union - Telecommunication)

The IBM standards for the implementation of ATM are:

- Q.2110 Service Specific Connection-Oriented Protocol (SSCOP)
- Q.2130 Service Specific Coordination Function (SSCF)

ATM Forum

The ATM Forum has defined the ATM User-Network Interface Specification V3.0 and V3.1.

CE European Community Marking

The CE marking has been applied to this product, meaning its compliance to the following directives:

- EMC Directive 89/336/EEC and amendment 93/31/EEC
- Low Voltage Directive

Electronic Emission Notices

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Compliance Statement

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

Avis de conformité aux normes d'Industrie Canada

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

Japanese Voluntary Control Council for Interference (VCCI) Statement

This equipment is Class 1 Equipment (information equipment to be used in commercial and industrial districts) which is in conformance with the standard set by Voluntary Control for Interference by Data Processing Equipment and Electronic Office Machines (VCCI) with an aim to prevent radio interference in commercial and industrial districts. This equipment could cause interference to radio and television receivers when used in and around residential districts. Please handle the equipment properly according to the instruction manual.

Power Line Harmonics (JEIDA) Statement

The guidelines of the power line harmonics required by JEIDA are satisfied.

Korean Communications Statement

Please note that this device has been approved for business use with regard to electromagnetic wave interference. If you find this is not suitable for your use, you may exchange it for one designated for non-business purposes.

New Zealand Statement

Attention: This is a Class A product. In a domestic environment, this product may cause radio interference in which case you may be required to take adequate measures.

Taiwanese Class A Warning Statement

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user will be required to take adequate measures.

警告使用者:
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Radio Frequency Interference (RFI) Compliance

- Class A digital device pursuant to part 15 of the Federal Communications Commissions (FCC) rules
- VDE Class B
- VCCI Class 1
- EN 55022 requirement
- CISPR22 Class A.

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Bibliography

Related Publications

The related publications available for the IBM 8265 are:

Table 17. Related Publications

Title	Form Number
8265 Nways ATM Switch Planning and Site Preparation Guide	GA33-0460
8265 Nways ATM Switch Installation Guide	SA33-0441
8265 Nways ATM Switch User's Guide	SA33-0456
8265 Nways ATM Switch Command Reference Guide	SA33-0458
8265 Nways ATM Switch Media Module Reference Guide	SA33-0459
Multiprotocol Switched Services (MSS) Server Introduction and Planning Guide	GC30-3820
Nways Multiprotocol Switched Services Server Interface Configuration and Software User's Guide	SC30-3818
Nways Multiprotocol Switched Services (MSS) Configuring Protocols and Features	SC30-3819
Multiprotocol Switched Services (MSS) Server Service Manual	GY27-0354
Multiprotocol Switched Services (MSS) Server Setup and Problem Determination Guide	GA27-4140
Nways Multiprotocol Switched Services (MSS) Server Module Setup and Problem Determination Guide	GA27-4141
Nways MAS/MRS/MSS Library, Configuration Program User's Guide for Nways Multiprotocol Access, Routing and Switched Services	GC30-3830
Nways Event Logging System Messages Guide	SC30-3682
8271 LAN Switch Module: Planning and Installation Guide	GA27-4162
8272 LAN Switch Module: Planning and Installation Guide	GA27-4163
4-Port 10BASE-T & 3-Port 10BASE-FL UFCs: Planning and Installation Guide	GA27-4120
100BASE-TX and 100BASE-FX Universal Feature Cards: Planning and Installation Guide	GA27-4096
ATM 155Mbps Multimode Fiber Universal Feature Card: Planning and Installation Guide	GA27-4156
2-Port Fiber and 4-Port UTP/STP Token-Ring Enhanced Universal Feature Card Planning and Installation Guide	GA27-4168
IBM Video Distribution Module, User's Guide	GA27-4173
The 8260 Nways ATM Kit Development Program, We Carry Your Creativity to ATM	GA33-0371

These publications are included on the *IBM 8265 ATM Switch Documentation Library* CD, SA33-0454.

The above documentation is also available via the Internet at `www.networking.ibm.com/did/8265bks.html`.

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