Using the Centillion 100 ATMSpeed/155 Switch Modules and Media Dependent Adapters

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Bay Networks

4401 Great America Parkway
Santa Clara, CA 95054

8 Federal Street
Billerica, MA 01821

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Preface

Congratulations on your purchase of a Bay Networks® Centillion™ ATMSpeed™/155 switch module. The family of ATMSpeed/155 switch modules provide asynchronous transfer mode (ATM) connectivity for the Centillion 100™ switch. The switch modules incorporate Bay Networks and System 5000™ ATMSpeed technologies. In addition, the ATMSpeed/155 MCP Switch Module and the ATMSpeed/155 MDA Switch Module can provide the master control processing functions for the Centillion 100 switch.

Purpose

This guide provides information about installing and using the ATMSpeed/155 modules. Configuration of the ATMSpeed/155 modules is covered in *Using SpeedView 2.1 for Windows*. For more information on these guides, see "Related Publications."

Audience

This guide is intended for local area network administrators with the following background:

- Familiarity with ATM network administration
- SpeedView™ for Windows®: working knowledge of Windows

Conventions

This section describes the conventions used in this guide.

Special Message Formats

This guide uses the following formats to highlight special messages:

Note: This format is used to highlight information of importance or special interest.

Caution: This format is used to highlight information that will help you prevent equipment failure or loss of data.

Warning: This format is used to highlight material involving possibility of injury or equipment damage.

Two-tiered Procedure Format

The procedural steps in this guide are presented in a two-tiered format. The first tier describes the step briefly but precisely and is printed in bold type. An experienced user may need to read only the first tier to complete the task. The second tier describes the step in more detail and includes results of performing the step.

Use of Enter, Type, and Press

This guide uses “enter,” “type,” and “press” to describe the following actions:

- When you read “enter,” type the text and press the Enter key.
- When you read “type,” type the text, but do not press the Enter key.
- When you read “press,” press only the alphanumeric or named key.

Other Conventions

This guide uses the following additional conventions:

italics	Book titles and UNIX file, command, and directory names.
`courier font`	Screen text, user-typed command-line entries.
Initial Caps	Menu titles and window and button names.
[Enter]	Named keys in text are shown enclosed in square brackets. The notation [Enter] is used for the Enter key and the Return key.
[Ctrl]+C	Two or more keys that must be pressed simultaneously are shown in text linked with a plus (+) sign.
ALL CAPS	DOS file and directory names.
Left mouse button	Click the left mouse button to select an object on a map or an item from a menu or list.
Right mouse button	Click the right mouse button to select an object to display a pop-up menu.

Related Publications

For more information about using the ATMSpeed/155 modules, refer to the following publications:

- *Installation and Reference for the Centillion 100 Chassis* (Bay Networks part number 893-894-B)
- *Using SpeedView 2.1 for Windows* (Bay Networks part number 893-891-B)
- *Reference Guide for the Centillion Command Line Interface* (Bay Networks part number 893-00985-A)
- Release Notes for the Centillion Platform Release 2.2 (Bay Networks part number 896-00165-C)

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Santa Clara, CA	800-2LANWAN	408-495-1188
Valbonne, France	33-4-92-96-69-68	33-4-92-96-69-98
Sydney, Australia	61-2-9927-8800	61-2-9927-8811
Tokyo, Japan	81-3-5402-0180	81-3-5402-0173

Chapter 1
Overview of the ATMSpeed/155 Modules and Media Dependent Adapters

This chapter introduces the ATMSpeed/155 modules and covers the following topics:

- A summary of module and media dependent adapter (MDA) physical description, functionality, and capability, page 1-2
- A summary of module and MDA features, page 1-8

In this guide, the ATMSpeed/155 MMF Switch Modules (two-port and four-port models), ATMSpeed/155S Switch Module, ATMSpeed/155 MDA Switch Module, ATMSpeed/155 MCP Switch Module, and ATMSpeed/155 MDA MCP Switch Module are referred to collectively as the ATMSpeed/155 modules. Each model is referred to specifically when features and functions are unique to that particular model.

About the ATMSpeed/155 Modules

An ATMSpeed/155 module inserts into one slot of a Centillion 100 chassis providing ATM ports and, optionally, an integrated master control processor (MCP). The ATMSpeed/155 module comes in the following configurations:

- An ATMSpeed/155S switch module with two single-mode (SMF) ports
- An ATMSpeed/155 switch module with two multimode (MMF) ports
- An ATMSpeed/155 switch module with four MMF ports
- An ATMSpeed/155 MCP switch module with four MMF ports, a serial port, and a 10BASE-T port
- An ATMSpeed/155 MDA switch module with two MDA slots and three flavors of two port MDAs: MMF, SMF, and UTP
- An ATMSpeed/155 MDA MCP switch module with two MDA slots and three flavors of two port MDAs: MMF, SMF, and UTP; a serial port, and a 10BASE-T port

These modules offer identical functional features for ATM connectivity; the only difference is the type of connectors on the front panel. In this guide, the switch modules for the Centillion 100 chassis are referred to collectively as the ATMSpeed switch modules. Each model is referred to specifically when features and functions are unique to that particular model.

The ATMSpeed/155 switch module is an assembly that consists of a printed circuit board with a metal module faceplate. The module includes inserter/extractor levers and captive retaining screws on each side of the module front panel. The module occupies a single slot in the Centillion 100 chassis.

Figure 1-1 shows the ATMSpeed/155 switch module with two MMF or SMF ports (SC connectors).

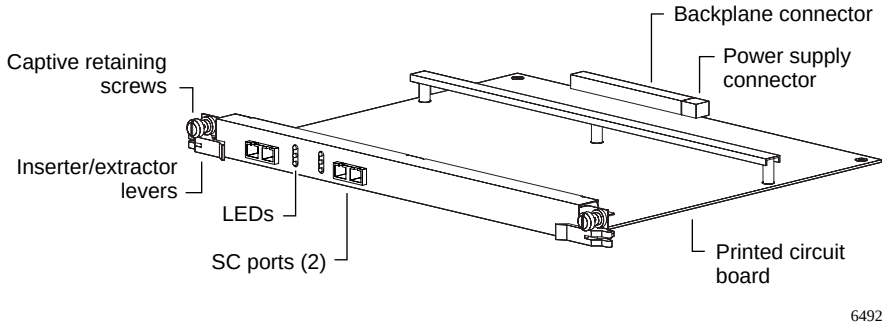


Figure 1-1. Hardware features of the ATMSpeed/155 module with two MMF or SMF ports

Figure 1-2 shows an ATMSpeed/155 switch module with four MMF ports (SC connectors), one 10BASE-T Ethernet port (RJ-45), and one serial port (Mini DIN 8).

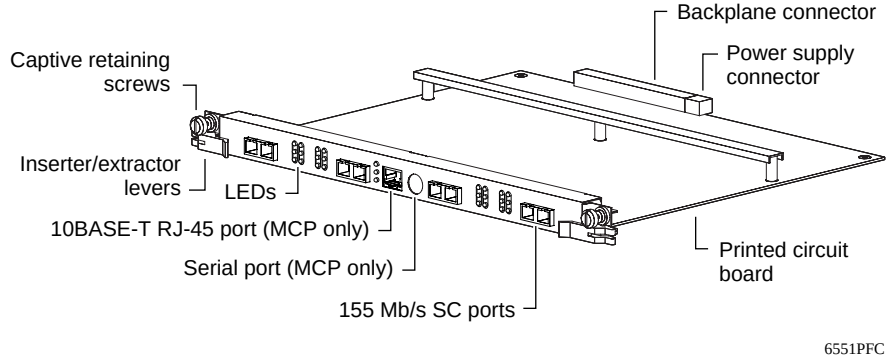


Figure 1-2. Hardware features of the ATMSpeed/155 switch module with four MMF ports and the 10BASE-T and serial MCP ports

Note: The 10BASE-T Ethernet port on the ATMSpeed/155 MCP switch module is not supported by the switch software at this time. It will be supported in a future release.

Figure 1-3 shows an ATMSpeed/155 MDA module with two MDA slots for two-port SMF, MMF, and UTP MDAs, one 10BASE-T Ethernet port (RJ-45), and one serial port (Mini DIN 8).

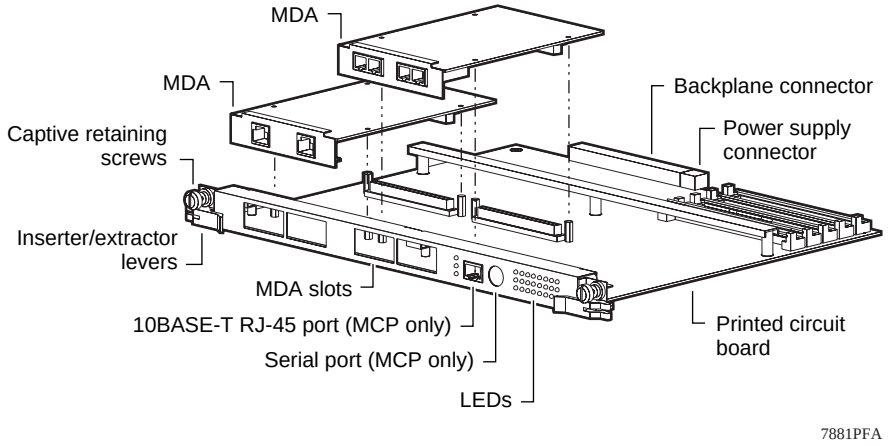


Figure 1-3. Hardware features of the ATMSpeed/155 module with two MDA slots for two-port SMF, MMF, and UTP MDAs, one 10BASE-T Ethernet port (RJ-45), and one serial port (Mini DIN 8)

Note: The 10BASE-T Ethernet port on the ATMSpeed/155 MCP switch module is not supported by the switch software at this time. It will be supported in a future release.

ATMSpeed/155 Switch Module

The ATMSpeed/155 Switch Module (Figure 1-1) provides two ATM ports on each module. Onboard connectors include OC-3 ports with SC connectors for multimode fiber (MMF) interfaces.

ATMSpeed/155S Switch Module

The ATMSpeed/155S Switch Module (Figure 1-1) provides two ATM ports on each module. Onboard connectors include OC-3 ports with SC connectors for single-mode fiber (SMF) interfaces.

ATMSpeed/155 MMF Switch Module

The ATMSpeed/155 MMF Switch Module (Figure 1-2) provides four ATM ports on each module. Onboard connectors include four OC-3 ports with SC connectors for multimode fiber (MMF) interfaces.

ATMSpeed/155 MCP Switch Module

In addition to connectivity provided by four ATM ports, the ATMSpeed/155 MCP Switch Module (Figure 1-2) manages the Centillion 100 switch. One (and only one) MCP module is required for each Centillion 100 chassis; however, a TokenSpeed/MCP or an EtherSpeed/MCP module could also be used to meet this requirement.

Onboard connectors include OC-3 ports with SC connectors for multimode fiber (MMF) ATM interfaces. The ATMSpeed/155 MCP module has both a serial port (Mini DIN 8) and a 10BASE-T port (RJ-45) to connect a network management station.

Note: The 10BASE-T Ethernet port on the ATMSpeed/155 MCP module is not supported by the switch software at this time. It will be supported in a future release.

ATMSpeed/155 MDA Switch Module

The ATMSpeed/155 MDA Switch Module (Figure 1-3) provides two slots for installing MDAs to provide ATM port connections. Each MDA provides two OC-3 ports; a fully equipped MDA switch module therefore has four ports for making ATM connections. You can install different MDAs in one MDA host module as needed to obtain maximum flexibility of connection types.

The MDA switch module provides different types of ATM connectivity through the following MDAs:

- A multimode fiber optic MDA (Model 5720-14 MDA) provides synchronous optical network/synchronous digital hierarchy (SONET/SDH) synchronous transport signal-3c (STS-3c/OC-3c) connectivity over 62.5/125 µm or 50/125 µm multimode fiber cable.
- An unshielded twisted pair (UTP) MDA (Model 5720-15 MDA) provides SONET/SDH STS-3c/OC-3c connectivity over Category 5 UTP cable.

- A single-mode fiber optic MDA (Model 5720-17 MDA) provides SONET/SDH STS-3c connectivity over 8.5/125 µm single-mode fiber cable.

ATMSpeed/155 MDA MCP Switch Module

The ATMSpeed/155 MDA MCP Switch Module (Figure 1-3) manages the Centillion 100 switch. One (and only one) MCP module is required for each Centillion 100 chassis; however, a TokenSpeed/MCP or an EtherSpeed/MCP module could also be used to meet this requirement.

The ATMSpeed/155 MDA MCP module has both a serial port (Mini DIN 8) and a 10BASE-T port (RJ-45) to connect a network management station.

Note: The 10BASE-T Ethernet port on the ATMSpeed/155 MCP module is not supported by the switch software at this time. It will be supported in a future release.

In addition to Centillion 100 chassis management, the MDA MCP switch module has two slots for installing MDAs provide ATM port connection. Each MDA provides two OC-3 ports; a fully equipped MDA MCP switch module therefore has four ports for making ATM connections. You can install different MDAs in one MDA MCP switch module as needed to obtain maximum flexibility of connection types.

The MDA MCP switch module provides different types of ATM connectivity through the following MDAs:

- A multimode fiber optic MDA (Model 5720-14 MDA) provides synchronous optical network/synchronous digital hierarchy (SONET/SDH) synchronous transport signal-3c (STS-3c/OC-3c) connectivity over 62.5/125 µm or 50/125 µm multimode fiber cable.
- An unshielded twisted pair (UTP) MDA (Model 5720-15 MDA) provides SONET/SDH STS-3c connectivity over Category 5 UTP cable.
- A single-mode fiber optic MDA (Model 5720-17 MDA) provides SONET/SDH STS-3c/OC-3c connectivity over 8.5/125 µm single-mode fiber cable.

Model 5720-x ATM Media Dependent Adapters

The 5720-x ATM Media Dependent Adapters (Figure 1-3) are adapters that you install on the ATMSpeed/155 MDA and ATMSpeed/155 MDA MCP switch modules. Each MDA provides two ports for connections to an ATM network. You can mix types of the Model 5720 ATM MDAs on the 5000BH and Centillion switch modules to achieve flexibility in connectivity types. Table 1-1 shows the available types of the Model 5720 ATM MDAs.

Table 1-1. Types of ATMSpeed/155 media dependent adapters

Model number	Port type	Connector type	Cable type
5720-14	SONET/SDH STS-3c/OC-3c	SC	Multimode fiber
5720-15	SONET/SDH STS-3c/OC-3c	RJ-45	Unshielded twisted pair (UTP)
5720-17	SONET/SDH STS-3c/OC-3c	SC	Single-model fiber

Features

This section provides a summary of the features of the ATMSpeed/155 modules, including the following topics:

- ATMSpeed/155 module ports and connectivity
- Fault tolerance
- Network management

ATMSpeed/155 Module Ports and Connectivity

ATMSpeed/155 module ports have the following features:

- 155 megabit per second (Mb/s) full-duplex OC-3 ATM ports on each module
- Onboard connectors
  - — The ATMSpeed/155 switch module (two-port and four-port versions) offers multimode fiber support with SC connectors.
  - — The ATMSpeed/155S switch module offers single-mode fiber support with SC connectors.
  - — The ATMSpeed/155 MCP switch module offers multimode fiber with SC connectors. It also offers one serial port with a Mini DIN 8 connector and one 10BASE-T port (configured as MDI-X) with an RJ-45 connector for network management.
  - — The ATMSpeed/155 MDA and ATMSpeed/155 MDA MCP switch modules offer field installable two-port MDAs for MMF, SMF, and UTP connectivity. The ATMSpeed/155 MDA MCP module also offers one serial port with a Mini DIN 8 connector and one 10BASE-T port (configured as MDI-X) with an RJ-45 connector for network management.
- Per-port features
  - — LEDs to indicate operational status of each port
  - — Wirespeed port-to-port switching for local traffic without using any ATM backplane bandwidth

- The following ATM connectivity is currently supported by the switch software:
  - — ATM connectivity between two Centillion 100 switches with or without intermediate ATM switches
  - — ATM Forum UNI 3.0 and 3.1 compliance (release 2.0 or later)
  - — Connectivity to another manufacturer's ATM switch or to carrier services through PVC/PVP or Interim Inter-switch Signaling Protocol (IISP) (release 2.0 or later)
  - — Connectivity to ATM adapters or ATM routers and other UNI devices through UNI 3.x (release 2.0 or later)

Fault Tolerance

The following fault tolerance features are supported on the Centillion 100 modules:

- Ability to install, remove, and replace a module in an operational chassis (hot-swapping)
- Software update and management access over the network or a serial connection on the ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP modules

Network Management

You can manage and configure the ATMSpeed/155 module through access to the MCP module with the following network management features:

- Simple Network Management Protocol (SNMP) agent with Centillion 100 management information base (MIB) extensions
- Bootstrap Protocol (BootP) and Trivial File Transport Protocol (TFTP) support
- SpeedView™ application for configuration management and monitoring. SpeedView for Windows runs over SNMP or serial port connection.

For additional information on SpeedView, refer to *Using SpeedView 2.1 for Windows*.

Chapter 2
Installing the ATMSpeed/155 Modules

This chapter explains how to install and connect ATMSpeed/155 modules and includes the following information and procedures:

- Preparing for installation, next
- Installing the ATMSpeed/155 module (page 2-2)
- Installing the 5720-x ATM MDA (page 2-5)
- Connecting cables to ATMSpeed/155 ports (page 2-15)
- Verifying the installation (page 2-17)
- Removing and replacing a module (page 2-21)

Preparing for Installation

Before you install the ATMSpeed/155 module, make sure that the Centillion 100 chassis is assembled and ready to accept modules. For more information, refer to *Installation and Reference for the Centillion 100 Chassis*.

You need the following tools and materials for installation:

- Medium flat-tip screwdriver for the captive retaining screws
- #1 Phillips screwdriver
- Grounded antistatic mat and wrist strap

Caution: Centillion 100 modules use electronic components that are sensitive to static electricity. Static discharge from your clothing or other items around you, even at levels that do not create a spark, can cause damage.

You should take all possible precautions to prevent static discharge damage when working with printed circuit boards. Keep each board in its protective conductive bag until you are ready to install it. Before you touch a printed circuit board, be sure to put on a grounded antistatic wrist strap and leash to free yourself of static.

If you lack a grounded antistatic wrist strap and mat, be careful to stand in one place where you work (so you do not generate static electricity by friction) and to free yourself of static by touching the metal of a grounded chassis before handling a printed circuit board.

Installing the ATMSpeed/155 Module

You can insert or remove an ATMSpeed/155 module from a chassis while the power is on without interrupting service in the other modules. This ability is referred to as "hot-swapping."

Note: ATMSpeed/155 modules can be hot inserted in a chassis at any time. However, before removing an active module from the Centillion 100 chassis, either unplug all port cables or disable all ports on the module. This step deactivates the module. For additional information, see "Removing a Module" and "Replacing a Module" later in this chapter.

To install and secure the module in the chassis, follow these steps:

1. **Remove the filler panel from the chassis slot where you intend to install the module.**

   Using the medium flat-tip screwdriver, loosen the two captive retaining screws on the filler panel until they pop free of the chassis. Rotate the left and right inserter/extractor levers away from the center of the filler panel to their protruding positions and remove the filler panel (see Figure 2-1).

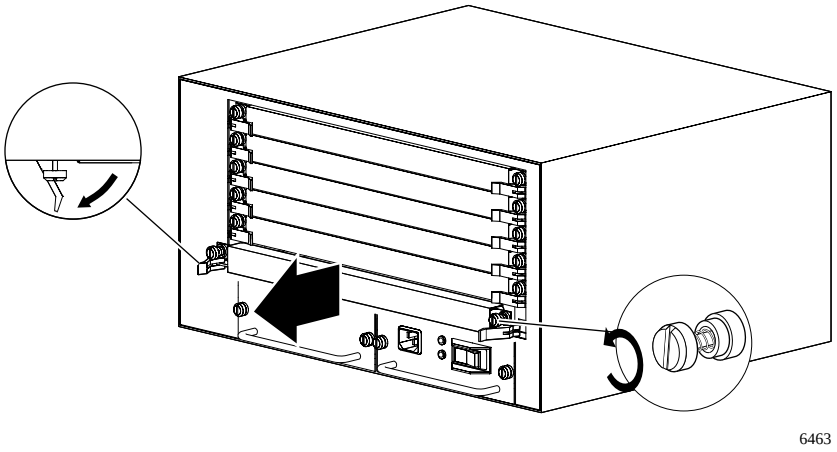


Figure 2-1. Removing the filler panel

2. **Extend the module's inserter/extractor levers forward (see Figure 2-2).**

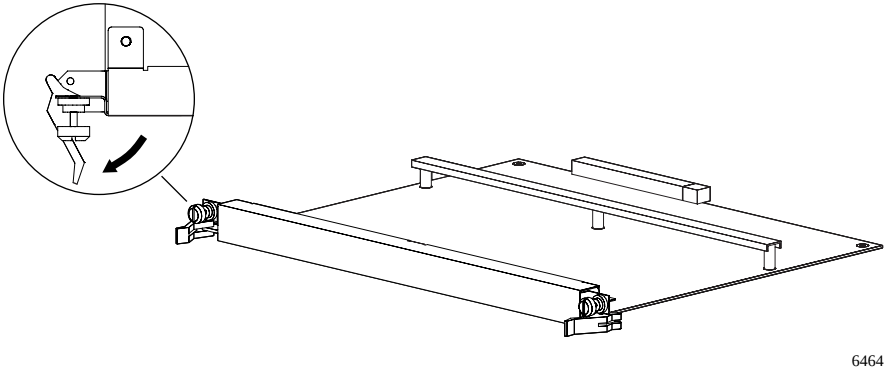


Figure 2-2. Inserter/extractor levers ready for installation

3. **Align the left and right edges of the printed circuit board carrier with the slot card guides on each side of the slot (see Figure 2-3).**

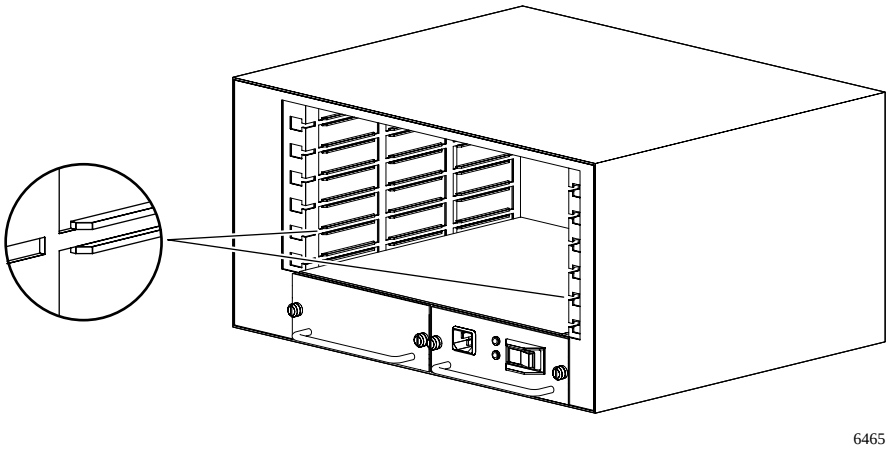


Figure 2-3. Slot module guides

4. **Slide the module into the chassis until you feel it engage the backplane.**

   The inserter/extractor levers should still be protruding and in contact with the front of the chassis. *Do not* push the module all the way into the chassis (see Figure 2-4).

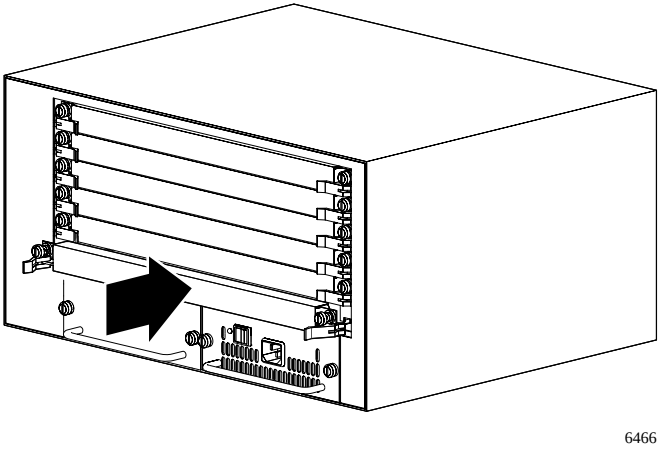


Figure 2-4. Inserting the module until it engages the backplane

5. **Seat the backplane connectors by simultaneously rotating the inserter/extractor levers inward toward the center of the switch module front panel to the horizontal position (see Figure 2-5).**

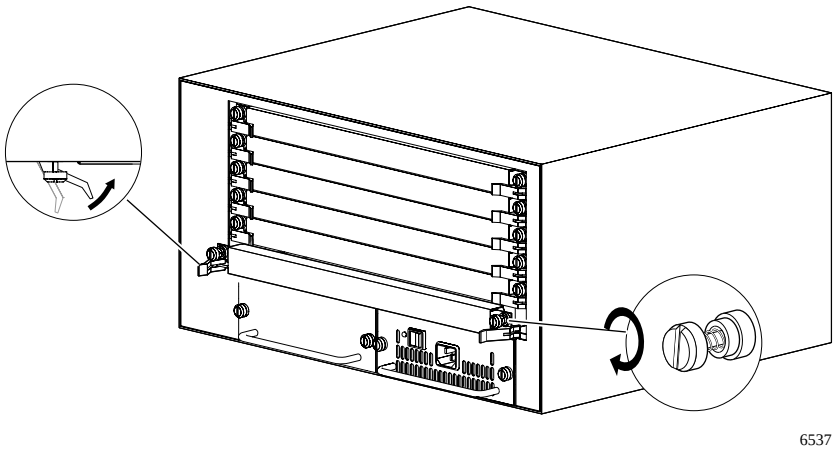


Figure 2-5. Seating the module

When the front panel of the module is flush with the front of the chassis, the module backplane connectors are properly seated.

6. **Use the flat-tip screwdriver to tighten the captive retaining screws at both ends of the module front panel.**

Note: The captive retaining screws on the module must be tightened to at least 2 inch-pounds, but no more than 4 inch-pounds, of torque. Finger tightening is also adequate. Do not overtighten.

Installing or Replacing the Media Dependent Adapter

The following section provides information about:

- Installing any of the 5720-x ATM MDAs on a ATMSpeed/155 MDA and ATMSpeed/155 MDA MCP switch modules
- Replacing an MDA on an MDA switch module
- Connecting UTP cables to the MDA
- Connecting fiber optic cables to the MDA

Installing the MDA

The following steps guide you through installing an MDA:

1. **Remove the screws from the cover on an MDA slot (Figure 2-6).**

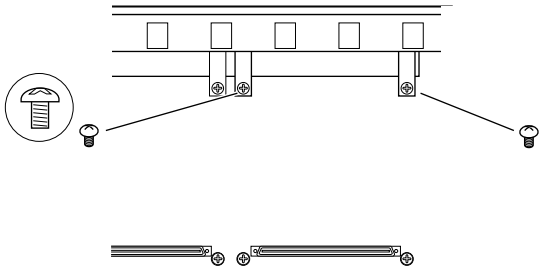


Figure 2-6. MDA slot cover screws

2. **Lift the cover out of the slot (Figure 2-7).**

   Set the cover aside.

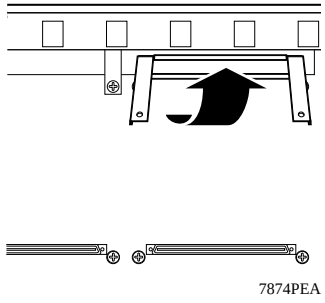


Figure 2-7. Removing an MDA slot cover

3. **Tilt the MDA and slip it into place against the back of the front panel (Figure 2-8).**

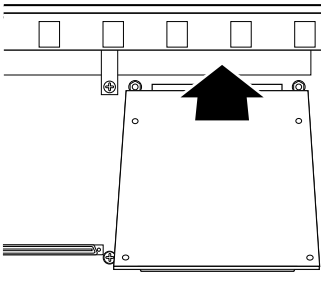


Figure 2-8. Installing the MDA

4. **Align the connector on the MDA with the connector on the baseboard (Figure 2-9).**

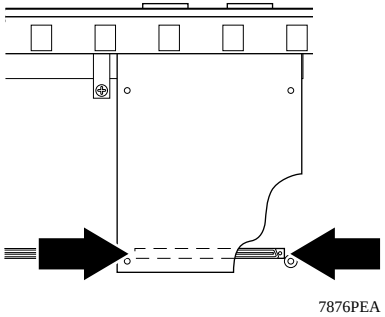


Figure 2-9. Aligning the MDA connector

5. **Press firmly on the board at the ends of the connector to seat the MDA in the connector on the baseboard (Figure 2-10).**

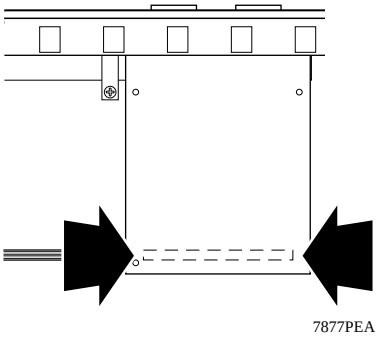


Figure 2-10. Seating MDA in the baseboard connector

6. **Insert the Phillips pan-head screws through the holes (Figure 2-11).**

   Use the #1 Phillips screwdriver to tighten the screws.

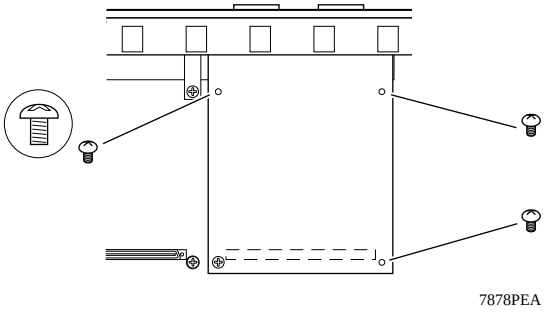


Figure 2-11. Tightening screws

7. **For each Model 5720-17 MDA you have installed, attach the supplied laser product label to the front panel of the switch module, immediately below the MDA (Figure 2-12).**

   Use the label that is printed in the appropriate language for the country where you are installing the equipment.

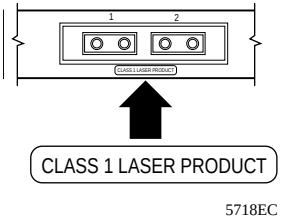


Figure 2-12. Attaching product label

Replacing an MDA

The following steps guide you through replacing an MDA on an ATMSpeed/155 MDA and ATMSpeed/155 MDA MCP switch module:

1. **Remove the screws from the MDA (Figure 2-13).**

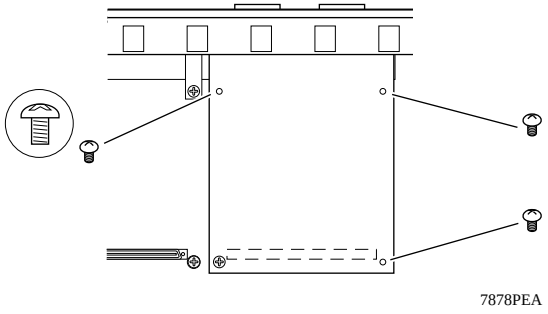


Figure 2-13. Preparing the MDA for removal

2. **Loosen the connector (Figure 2-14). Then tilt the MDA and lift it away from the baseboard.**

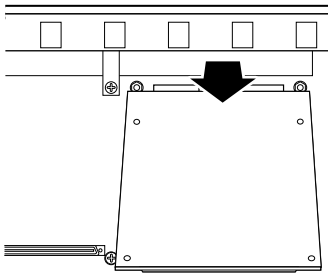


Figure 2-14. Removing the MDA from the switch module

3. **Tilt the new MDA and slip it into place against the back of the front panel (Figure 2-15).**

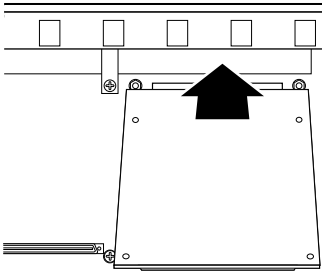


Figure 2-15. Installing the new MDA

4. **Align the connector on the MDA with the connector on the baseboard (Figure 2-16).**

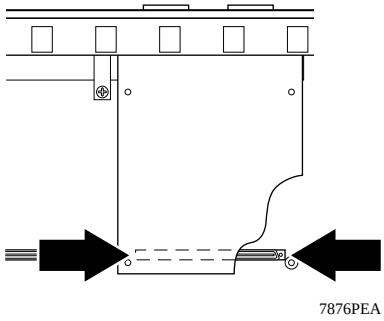


Figure 2-16. Aligning the MDA connector

5. **Press firmly on the board at the ends of the connector to seat the MDA in the connector on the baseboard (Figure 2-17).**

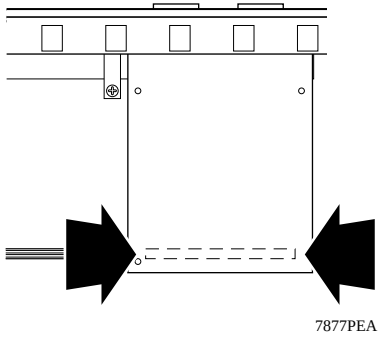


Figure 2-17. Seating the connector

6. **Insert the Phillips pan-head screws through the holes (Figure 2-18). Use the #1 Phillips screwdriver to tighten the screws.**

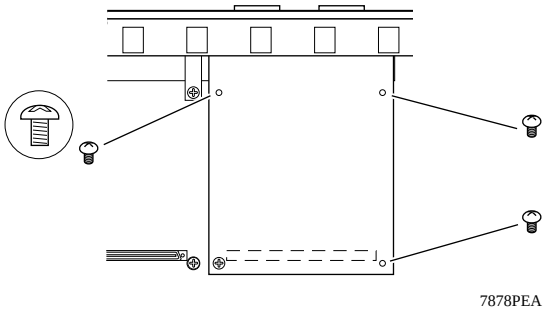


Figure 2-18. Tightening screws

Connecting Cables

The following sections guide you through connecting UTP and fiber cables to the MDA.

Connecting UTP Cables

Align the RJ-45 plug with the jack on the MDA. Push gently until the plug clicks into place (Figure 2-19).

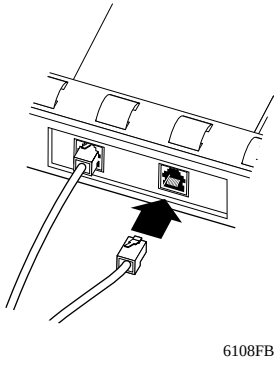


Figure 2-19. Connecting a UTP cable to an ATM MDA

Connecting Fiber Cables

1. **Remove the protective dust plug from the SC connector on the MDA (Figure 2-20).**

   Store the dust plug for later use.

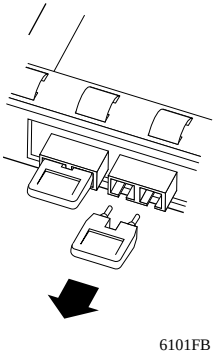


Figure 2-20. Removing the dust plug from the MDA SC connector

Warning: The 5720-17 Media Dependent Adapters use Class 1 lasers as data transfer element. Be careful to avoid exposing your eyes to laser beams.

WARNUNG: Das 5720-17 Media Abhängige Adaptors verwendet laser der Klasse 1 zur Datenübertragung. Vorsichtig vorgehen, um die Augen keinen Laserstrahlen auszusetzen.

AVERTISSEMENT: Les adaptateurs dependants aus les media 5720-17 utilisent des lasers de Classe 1 comme éléments de transfert de données. Il est important d'éviter tout contact entre le rayonnement laser et les yeux.

AVISO: Os Adaptadores Dependente de Mídia 5720-17 usam o laser do tipo Class 1 como elemento de transferimento de dados. Deve-se ter o maior cuidado a fim de se evitar o contacto visual com raios laser.

ADVERTENCIA: Los Adaptadores Dependentes de Medios 5720-17 utiliazan el láser de tipo 1 como elemento de transmisión de datos. Como precaución, evite exponer la vista a la radiación láser.

2. **Remove the protective dust caps from the SC connector on the fiber cable (Figure 2-21).**

   Store the dust caps for later use.

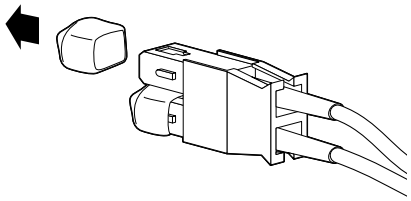


Figure 2-21. Removing a dust cap from the MDA fiber cable connector

3. **Hold the cable connector so the keyed surface will insert easily into the MDA connector. Carefully insert the cable connector into the MDA connector and push gently until you hear the cable connector snap into place (Figure 2-22).**

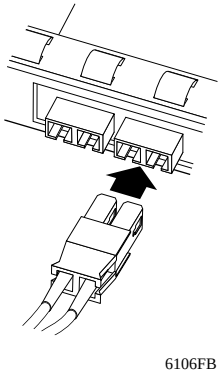


Figure 2-22. Inserting the cable connector into the MDA connector

Connecting Cables to ATMSpeed/155 Ports

This section describes how to connect cables to the ports on an ATMSpeed/155 module with the following connections:

- Fiber
- Serial and Ethernet MCP

Fiber Connections

For fiber cable connections to the ATMSpeed/155 module, attach the corresponding cable with SC connectors (Figure 2-23).

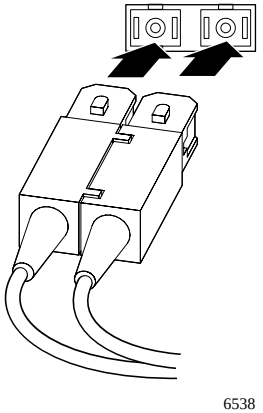


Figure 2-23. Connecting a fiber cable to the ATMSpeed/155 module

Serial and Ethernet MCP Connection

Serial and Ethernet connections are provided for a SpeedView network management station on the ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP modules. To use the serial connection, attach the serial MCP cable that was shipped with the Centillion 100 chassis to the Mini DIN 8 port on the MCP modules (Figure 2-24). Attach the other side of the MCP cable to the serial port of your PC.

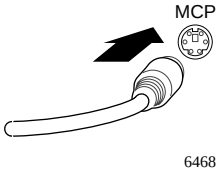


Figure 2-24. Connecting the serial MCP cable to the MCP modules

To use the Ethernet connection, attach an Ethernet cable to the RJ-45 port on the ATMSpeed/155 MCP module (see Figure 2-25).

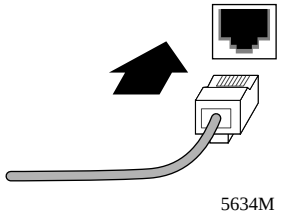


Figure 2-25. Connecting an Ethernet cable to the MCP modules

Note: The 10BASE-T Ethernet port on the ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP modules is not supported by the switch software at this time. It will be supported in a future release.

Verifying the Installation

When the ATMSpeed/155 module is installed and the cables are connected to the ports, the module is ready for operation. All connected ports are enabled, unless they have been disabled by SpeedView. Enabling and disabling ATMSpeed/155 module ports is described in *Using SpeedView 2.1 for Windows*.

You can verify the installation of an ATMSpeed/155 module by observing the LEDs on the module while the module is operating and at system startup. This section describes the ATMSpeed/155 module LEDs and the LED sequence at startup.

Interpreting ATMSpeed/155 Module LEDs

The four-port version of the ATMSpeed/155 module, the ATMSpeed/155 MCP module, and the ATMSpeed/155 MDA and MDA MCP modules have six LEDs for each ATM port, as shown in Figure 2-26. Table 2-1 lists the meaning of each LED.

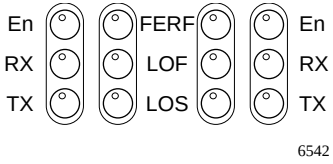


Figure 2-26. ATMSpeed/155 and ATMSpeed/155 MCP module LEDs for ATM ports

The ATMSpeed/155 MDA and MDA MCP modules have six LEDs for each ATM port, as shown in Figure 2-27. Table 2-1 lists the meaning of each LED.

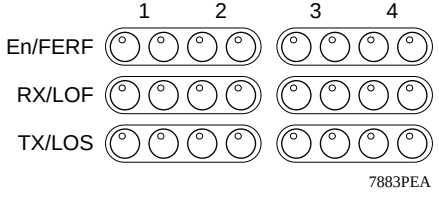


Figure 2-27. ATMSpeed/155 MDA and MDA MCP module LEDs for ATM ports

Table 2-1. ATMSpeed/155, ATMSpeed/155 MCP, and ATMSpeed/155 MDA and MDA MCP module LED definitions for ATM ports

LED name	Meaning
En	Remains on while port is enabled from network management.
RX	Turns on as calls are received on the port.
TX	Turns on as cells are transmitted on the port.
FERF	Turns on for far end receiver fault (FERF), also known as remote defect indication (RDI).
LOF	Turns on to indicate loss of frame.
LOS	Turns on to indicate loss of signal.

The ATMSpeed/155 MCP module also has three LEDs for the 10BASE-T Ethernet MCP port, as shown in Figure 2-28. Table 2-2 lists the meaning of each LED.

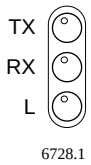


Figure 2-28. ATMSpeed/155 MCP module LEDs for the 10BASE-T MCP port

The ATMSpeed/155 MDA MCP module also has three LEDs for the 10BASE-T EThernet MCP port, as shown in Figure 2-29. Table 2-2 lists the meaning of each LED.

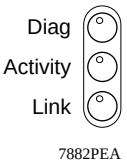


Figure 2-29. ATMSpeed/155 MDA MCP module LEDs for the 10BASE-T MCP port

Table 2-2. ATMSpeed/155 MDA MCP module LED definitions for the 10BASE-T MCP port

LED name	Meaning
RX	Turns on as packets are received on the port.
TX	Turns on as packets are transmitted on the port.
L	Turns on when the 10BASE-T link is functioning correctly.

Two-port versions of the ATMSpeed/155 module have three LEDs on each module, as shown in Figure 2-30. Table 2-3 lists the meaning of each LED.

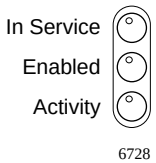


Figure 2-30. Two-port ATMSpeed/155 module LEDs

Table 2-3. Two-port ATMSpeed/155 LED definitions

LED name	Meaning
In Service	Turns on when the receive fiber receives valid SONET framing. Turns off to indicate loss of signal, loss of frame, or out of frame.
Enabled	Remains on while port is enabled from network management.
Activity	Turns on when the port is engaged in non-idle cell transfer.

LED Sequence at Startup

At startup, all ATMSpeed/155 module LEDs turn on for 2 or 3 seconds. Then they turn on and off in the following sequences, depending on the type of module.

On the four-port version of the ATMSpeed/155 module, the ATMSpeed/155 MCP module, and the ATMSpeed/155 MDA and MDA MCP modules with six LEDs per port, the following sequence occurs:

- The En LED turns on when the port is enabled through network management software.
- The LOS, LOF, and FERF LEDs turn off when valid SONET framing is received on the port.

On ATMSpeed/155 modules with three LEDs per port, the following sequence occurs:

- The Enabled LED turns on when the port is enabled through network management software.
- The In Service LED turns on when valid SONET framing is received on the receive port.

Removing and Replacing a Module

This section describes how to remove and replace an ATMSpeed/155 module described in the following procedures:

- Removing a module
- Replacing a module

Removing a Module

ATMSpeed/155 modules can be hot-inserted in a chassis at any time. However, to remove an active module from the Centillion 100 chassis, follow these steps:

1. **Disable all ports on the module using SpeedView, or disconnect the cables from each port.**

   Disabling the ports on a module is described in *Using SpeedView 2.1 for Windows*.

Note: If the power for the Centillion 100 chassis is off, this step is not necessary.

2. **Wait 45 seconds.**

   Waiting allows the system software to process the requests to disable the ports.

Caution: If you remove a module without waiting 45 seconds after disabling the ports, you must power cycle the Centillion 100 chassis. When you turn off the power on the Centillion 100 chassis, you must wait 15 to 20 seconds before turning the power back on. The Centillion 100 modules begin switching an additional 15 to 20 seconds after power is resumed.

3. **Using the medium flat-tip screwdriver, loosen the two captive retaining screws on the module until they pop free of the chassis.**
4. **Rotate the left and right inserter/extractor levers away from the center of the module to their protruding positions (see Figure 2-31).**

   The module is disengaged from the backplane.

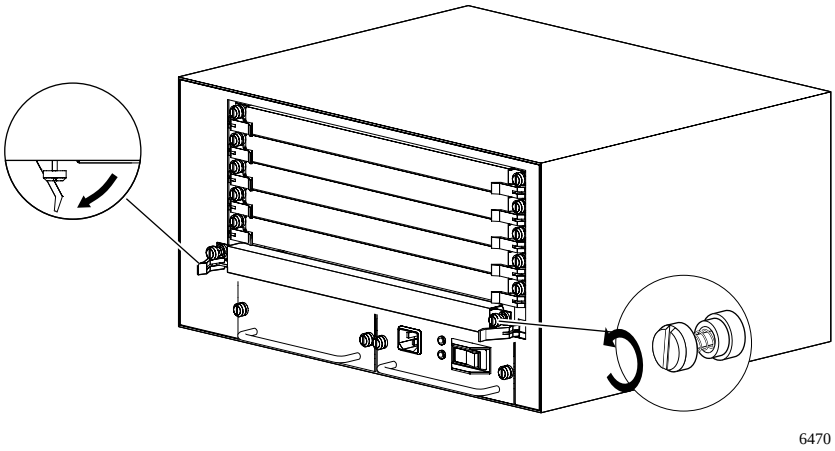


Figure 2-31. Disengaging the module

5. **Slide the module out of the chassis (see Figure 2-32).**

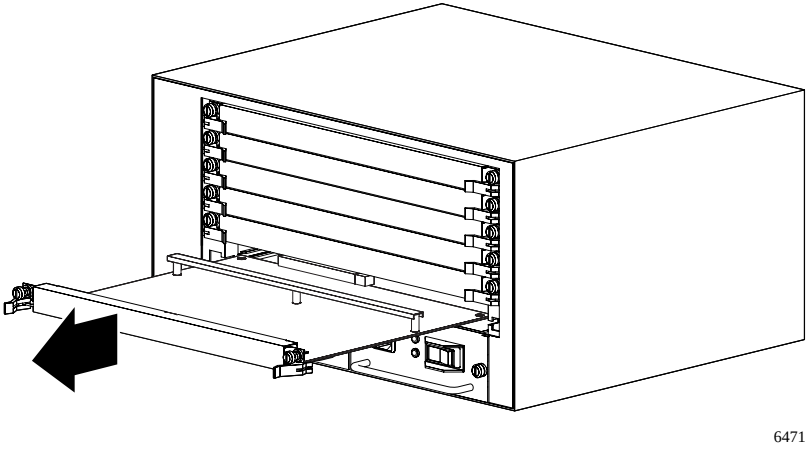


Figure 2-32. Removing the module from the Centillion 100 chassis

Replacing a Module

Note: To minimize configuration conflicts, you should replace a module with another identical module.

The configuration of the new module is the same as the previously installed module in that slot. If the module you replace is not identical to the module previously in that slot, the module remains inoperative until you reconfigure it from the SpeedView application.

To install a new ATMSpeed/155 module, follow the instructions in "Installing the ATMSpeed/155 Module" on page 2.

To install a new ATMSpeed/155 MCP or MDA MCP module, follow these steps:

1. **Save the current configuration in a file on your SpeedView station.**
2. **Disable all ports and remove the module, following the instructions in "Removing a Module" on page 2-21.**
3. **Install the new module, following the instructions in "Installing the ATMSpeed/155 Module" on page 2-2.**
4. **Load the saved configuration file on the new ATMSpeed/155 MCP or MDA MCP module.**

Caution: Installing the ATMSpeed/155 MCP or MDA MCP module resets the switch and loads the default configuration, thus interrupting network connectivity. To minimize network disruption, load the saved configuration on the new ATMSpeed/155 MCP or MDA MCP module using an additional chassis; then replace the old module.

For module configuration instructions and for help with saving and loading configuration files, refer to *Using SpeedView 2.1 for Windows*.

Chapter 3
Applications and Default Configuration

This chapter provides connection instructions for typical ATMSpeed/155 applications. The chapter also describes the factory-set default configuration for the ATMSpeed/155 module.

ATMSpeed/155 Port Applications

You can connect the ATMSpeed/155 module for optimal LAN performance. This section provides instructions for the following types of ATM connections:

- Connecting Centillion 100 switches directly
- Connecting Centillion 100 switches through an intermediate ATM switch
- Connecting an ATM LAN emulation station to a Centillion 100 switch

Connecting Centillion 100 Switches Directly

To connect two Centillion 100 switches directly, follow these steps:

1. **Configure each ATMSpeed/155 module port.**

   To configure ATM ports, refer to *Using SpeedView 2.1 for Windows*. Both switches must have the same kind of virtual port configured.

2. **Connect one end of the fiber cable to the first switch.**

   Note that the SC connector of the fiber cable is keyed.

3. **Connect the other end of the fiber cable to the other switch.**

   The In Service LED for the ATM port turns on when the switch recognizes the physical connection. You can view the LED on the switch itself or through the SpeedView application by selecting the Switch menu and choosing View.

Connecting Centillion 100 Switches through an Intermediate ATM Switch

Two Centillion 100 switches can communicate through an intermediate ATM switch if each switch is connected to a port on the intermediate ATM switch.

To connect two Centillion 100 switches through an intermediate ATM switch, follow these steps:

1. **Configure the ATMSpeed/155 module ports.**

   To configure ATM ports, refer to *Using SpeedView 2.1 for Windows*. Both switches must have the same kind of virtual port configured.

   Configure the intermediate ATM switch and the Centillion 100 switch with matching VPI and VCI values.

2. **Connect one end of the fiber cable to the ATMSpeed/155 port.**

   The SC connector of the fiber cable is keyed.

3. **Connect the other end of the fiber cable to the other ATM switch.**

   On an ATMSpeed/155 module with six LEDs per port, the LOS, LOF, and FERF LEDs for the ATM port turn off when the switch recognizes the physical connection.

   On an ATMSpeed/155 module with three LEDs per port, the In Service LED for the ATM port turns on when the switch recognizes the physical connection.

   You can view LEDs on the switch itself or through the SpeedView application by selecting the Switch menu and choosing View.

4. **Repeat steps 1 through 3 to install and configure the other Centillion 100 switch.**

Connecting an ATM LAN Emulation Station to a Centillion 100 Switch

To connect an ATM LAN emulation station to a Centillion 100 switch, follow these steps:

1. **Configure the ATMSpeed/155 ports.**

   To configure ATM ports, refer to *Using SpeedView 2.1 for Windows*.

2. **Connect one end of the fiber cable to the ATMSpeed/155 module port.**

   The SC connector of the fiber cable is keyed.

3. **Connect the other end of the fiber cable to the other ATM switch.**

4. **Repeat steps 1 through 3 to install and configure the other switch.**

Default Configuration

The Centillion 100 switch supports “plug-and-play” operation. Table 3-1 lists the factory defaults for the ATMSpeed/155 module ports.

Table 3-1. Factory defaults

Parameter	Factory default	Configurable option
Physical type	SONET/SDH	Auto-sensing, not configurable
Physical media type	Multimode fiber or single-mode fiber	Fixed at factory, not configurable
Speed	155 Mb/s full duplex	Fixed at factory, not configurable
State	Enabled	Enabled, disabled
Loop timing	Disabled	Enabled, disabled
Scrambling	Enabled	Enabled, disabled
Network timing	Disabled	Enabled, disabled

Parameter Descriptions

The physical type, networks timing, physical media type and speed of the ATM ports are not configurable. They are fixed at the factory for each model type. You can use SpeedView to enable or disable the state of an ATM port.

The loop timing, networks timing, scrambling, and physical loop parameters are configurable, as described in this section.

Loop Timing

When loop timing is disabled, the local clock generates transmit timing. When loop timing is enabled, timing is derived from the receive side of the port.

Network Timing

When network timing is enabled, the clock is derived from an input port and can be distributed to any of the output ports on a module (it may not be distributed to other modules across the backplane).

Scrambling

SONET uses a scrambling algorithm to prevent long strings of zeros or ones from being transmitted. Most ATM equipment has scrambling enabled. Although you can disable scrambling, the destination port must also have scrambling disabled.

Predefined Configurations

SpeedView does not offer predefined configurations for ATM. Configuration instructions appear in *Using SpeedView 2.1 for Windows.*

Appendix A
Technical Specifications

This section provides technical specifications for the ATMSpeed/155 MMF Switch Modules (two and four-port models), ATMSpeed/155 MCP Switch Module, ATMSpeed/155 MDA Switch Module, and ATMSpeed/155 MDA MCP Switch Module.

Network Protocol and Standards Compatibility

OC-3

SONET

SDH

ATM Forum UNI 3.0 and 3.1

STS-3c

IISP

LANE version 1.0

Data Rate

155 Mb/s full-duplex mode per port

Microprocessors

ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP baseboard:	64-bit MIPS 4000 series processor, 133 MHz (MIPS)

Memory

Processor:	16 MB expandable to 32 MB (ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP switch modules)
Packet buffer:	4 MB (ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP modules)

Flash:	2.5 MB (ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP modules)
Cell buffers:	16,384 cells (ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP switch modules; 4 port ATMSpeed/155 MMF switch module) 4096 cells (2 port ATMSpeed/155 MMF)

Electrical Specifications

Power Consumption:	40 W

Physical specifications

Dimensions:	10.5 (L) x 12.5 (W) x 1.0 (H) inches 26.7 (L) x 31.7 (W) x 2.5 (H) cm
Weight:	2.5 lbs (1.1 kg)

Environmental specifications

Operating temperature:	41° to 104° F (0° to 40° C)
Storage temperature:	–13° to 158° F (–25° to 70° C)
Operating altitude:	Up to 10,000 ft. (3,000 m) maximum
Operating humidity:	85% maximum relative humidity, noncondensing
Storage humidity:	95% maximum relative humidity
Storage altitude:	Up to 10,000 ft. (3,000 m) maximum
Free fall/drop:	ISO 4180-s, NSTA 1A
Vibration:	IEC 68-2-6/34
Shock/bump:	IEC 68-2-27-29

Electromagnetic Susceptibility

Electrostatic discharge (ESD):	EC 801-2, Level 2
Radiated electromagnetic field:	EC 801-2, Level 2
Electrical fast transient/burst:	EC 801-4, Level 2
Electrical surge:	IEC 801-5, Level 1/2

Interface Options

SC connectors for multimode and single-mode fiber optic interface (MDA or base configuration)

RJ-45 connector for network administration (ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP switch modules)

Mini DIN 8 serial connector for network administration (ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP switch modules)

Performance Specifications

Cell switching rates (64-byte packets):	350,000 packets per second per port maximum, full-duplex mode 1.4 million packets per second per module maximum with four ports, local or backplane switched

Optical specifications (multimode fiber)

155.52 Mb/s NRZ line code

1310 nm LED

Duplex 62.5/125 micron fiber, 500 Mhz km minimum bandwidth

Duplex SC connector

Mean launched power:	–20 to –14 dBm
Minimum receive sensitivity:	–30 dBm
Link budget:	10 dB
Maximum run length:	2 km

Optical specifications (single-model fiber)

155.52 Mb/s, NRZ line code

1310 nm Class 1 Laser

Duplex 9/125 micron fiber

Mean launched power:	–15 to –8 dBm
Minimum receive sensitivity:	.28 dBm

Unshielded twisted pair specifications

155.52 Mb/s, NRZ line code

Category 5 unshielded twisted pair; two pairs

RJ-45 connector

Up to 100 meters

Electromagnetic Emissions

Meets requirements of:	FCC Part 15, Subpart B, Class A VCCI Class 1 ITE EN 55022 (CISPR22:1985), Class A

Safety Agency Approvals

UL listed (UL 1950)
CSA certified (CSA 22.2 #950)
TUV licensed (EN 60 950)
UL-94-V1 flammability requirements for all PC boards

The following section provides technical specifications information for the 5720-14 ATM MDA, 5720-15 ATM MDA, and 5720-17 ATM MDA.

5720-14 ATM media dependent adapter

Port connector type:	SC duplex interface
Cable type:	62.5/125 µm multimode fiber
Transmit average power range:	Minimum –20 dBm Maximum –14 dBm
Receiver average power range:	Minimum –30 dBm
Optical power budget:	10 dB

5720-17 ATM media dependent adapter

Port connector type:	SC duplex interface
Cable type:	8.5/125 µm single-mode fiber
Transmit average power range:	Minimum –15 dBm Maximum –8 dBm
Receiver average power range:	Minimum –28 dBm
Optical power budget:	13 dB

5720-15 ATM media dependent adapter

Port connector type:	Shielded RJ-45 modular jack
Cable type:	EIA Category 5 UTP
Maximum cable run:	328 ft (100 m) including all patch cables, panels, and connectors

Appendix B
Cables

This appendix provides cable wiring information for ATMSpeed/155 MCP and ATMSpeed/155 MDA MCP module port connections. The following connections are described:

- 10BASE-T Ethernet MCP connections: UTP crossover cable
- Serial MCP connections: male Mini DIN 8 to male DB-25 cable and female DB-25 to female DB-9 adapter

Either port can be used to manage a Centillion 100 switch.

10BASE-T Ethernet MCP Connections

Figure B-1 provides pin numbers for an RJ-45 connector.

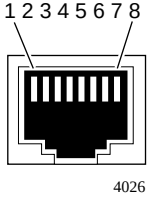


Figure B-1. RJ-45 connector pin numbers

Figure B-2 shows a 10BASE-T Ethernet UTP crossover cable used for a direct Ethernet connection to the MCP modules.

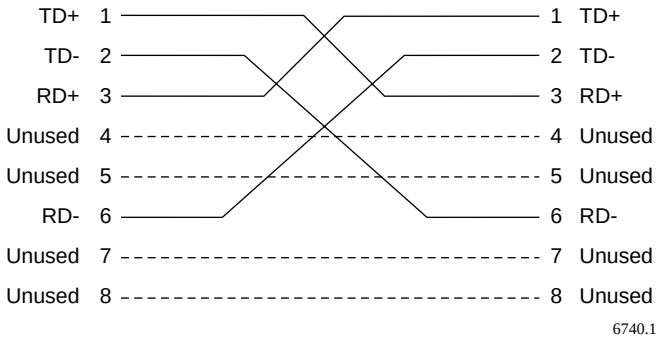


Figure B-2. 10BASE-T Ethernet UTP crossover cable

Serial MCP Connections

The Centillion 100 chassis package includes a male Mini DIN 8 to male DB-25 cable and a female DB-25 to female DB-9 adapter for serial MCP connections. These cables are described in this section.

Male Mini DIN 8 to Male DB-25 Cable

Figure B-3 shows the pin numbers for a Mini DIN 8 connector.

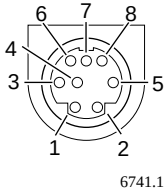


Figure B-3. Mini DIN 8 connector pin numbers

Table B-1 shows the connections for a male Mini DIN 8 to male DB-25 cable.

Table B-1. Male Mini DIN 8 to male DB-25 cable

Male Mini DIN 8 pin numbers	Signal	Male DB-25 pin numbers
1 - Not connected		
2	Data terminal ready	20
3	Transmit data	3
4	Signal ground	7
5	Receive data	2
6 - Not connected		
7 - Not connected		
8	Signal ground	7

Female DB-25 to Female DB-9 Adapter

Table B-2 shows the connections for a female DB-25 to female DB-9 adapter.

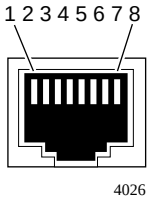
Table B-2. Female DB-25 to female DB-9 adapter

Female DB-25 pin numbers	Signal	Female DB-9 pin numbers
8	Data carrier detect	1
3	Receive data	2
2	Transmit data	3
20	Data terminal ready	4
7	Signal ground	5
6	Data set ready	6
4	Request to send	7
5	Clear to send	8
22	Ring indicator	9

Model 5720-x MDA Connections

The connector and pin assignments for an MDA 10BASE-T port are listed in Table B-3.

Table B-3. Model 5720-x 10BASE-T port pin assignments*

RJ-45 connector port	Pin #	Signal
	1	RX +
	2	RX –
	3	Not used
	4	Not used
	5	Not used
	6	Not used
	7	TX +
	8	TX -

* Legend:RX = Receive Data InputTX = Transmit Data Output

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