

2 The Omni Switch/Router MPX

Omni Switch/Router Management Processor Module (MPX) Features

The MPX provides such system services as maintenance of user configuration information, downloading of switching module software, basic bridge management functions, basic routing functions, the SNMP management agent, access to the User Interface software, and Advanced Routing. In addition, the MPX can operate in a redundant configuration with another MPX.

◆ Important Note ◆

If you have a single MPX in your chassis, it *must* be installed in Slot 1.

With the optional HRE-X, which is described in Chapter 1, “Omni Switch/Router Chassis and Power Supplies,” you can increase routing performance to 1.5 million packets per second.

MPX Technical Specifications	
Flash Memory	8 MB (expandable to 32 MB)
SIMM (DRAM) Memory	32 MB (expandable to 128 MB)
SDRAM Memory	16 MB
MAC Addresses Supported	4096
Switching Backplane	Up to 22 Gbps (aggregate) switching fabric capacity
Serial Ports	2 (1 male DB9 modem connector and 1 female DB9 console connector)
Ethernet (10 Mbps) Switch Management Ports	1 copper RJ-45 or fiber (ST) port for switch management functions.
Current Draw	3.75 amps without an HRE-X 5.25 amps with an HRE-X

◆ Warning ◆

Do *not* install any version of the MPM (i.e., MPM-C, MPM 1G, MPM II, MPM III, or original MPM) in a chassis with an MPX or any OmniSwitch switching module. Installing an MPM in a chassis with an MPX can cause physical damage.

Warning Label. This label indicates that the module contains an optical transceiver (on the MPXs with fiber ST Ethernet ports only).

OK1 (Hardware Status). This dual-state LED is on Green when the MPX has passed power-on hardware diagnostics successfully. On Amber when the hardware has failed diagnostic tests. If the **OK1** LED is alternating Green and Amber, then file system compaction is in progress.

Caution

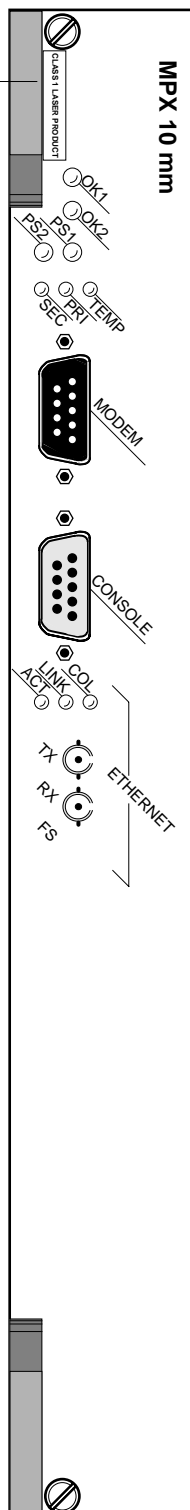
Do not power down the Omni Switch/Router or insert any modules while the **OK1** LED is alternating Green and Amber. If you do, file corruption may result and you will not be able to restart the switch.

OK2 (Software Status). Blinking Green when the MPX has successfully loaded software to the switching modules. Blinking Amber when the MPX is in a transitional state, such as when it first boots up. If the **OK2** LED blinks Amber for an extended period of time (i.e., more than a minute), then you should reboot the switch.

Caution

Do not insert or remove any modules while the MPX **OK2** LED is blinking Amber. If you do, file corruption may result and you will not be able to restart the switch.

Module Status LEDs



Label. This label will indicate the Ethernet management port type. It will read either **MPX 10 mm** (multimode fiber Ethernet port) or **MPX 10** (copper RJ-45 Ethernet port).

PS1 (Power Supply 1 Status). This dual-state LED is on Green when the switch is receiving the proper voltage from Power Supply 1. It is on Amber when Power Supply 1 is on, but not supplying the correct amount of voltage to power the switch, or is installed and turned off. The **PS1** LED is Off when the Power Supply 1 is not present.

PS2 (Power Supply 2 Status). This dual-state LED is on Green when the Omni Switch/Router is receiving the proper voltage from Power Supply 2. It is on Amber when Power Supply 2 is on, but not supplying the correct amount of voltage to power the switch, or is installed and turned off. The **PS2** LED is Off when Power Supply 2 is not present.

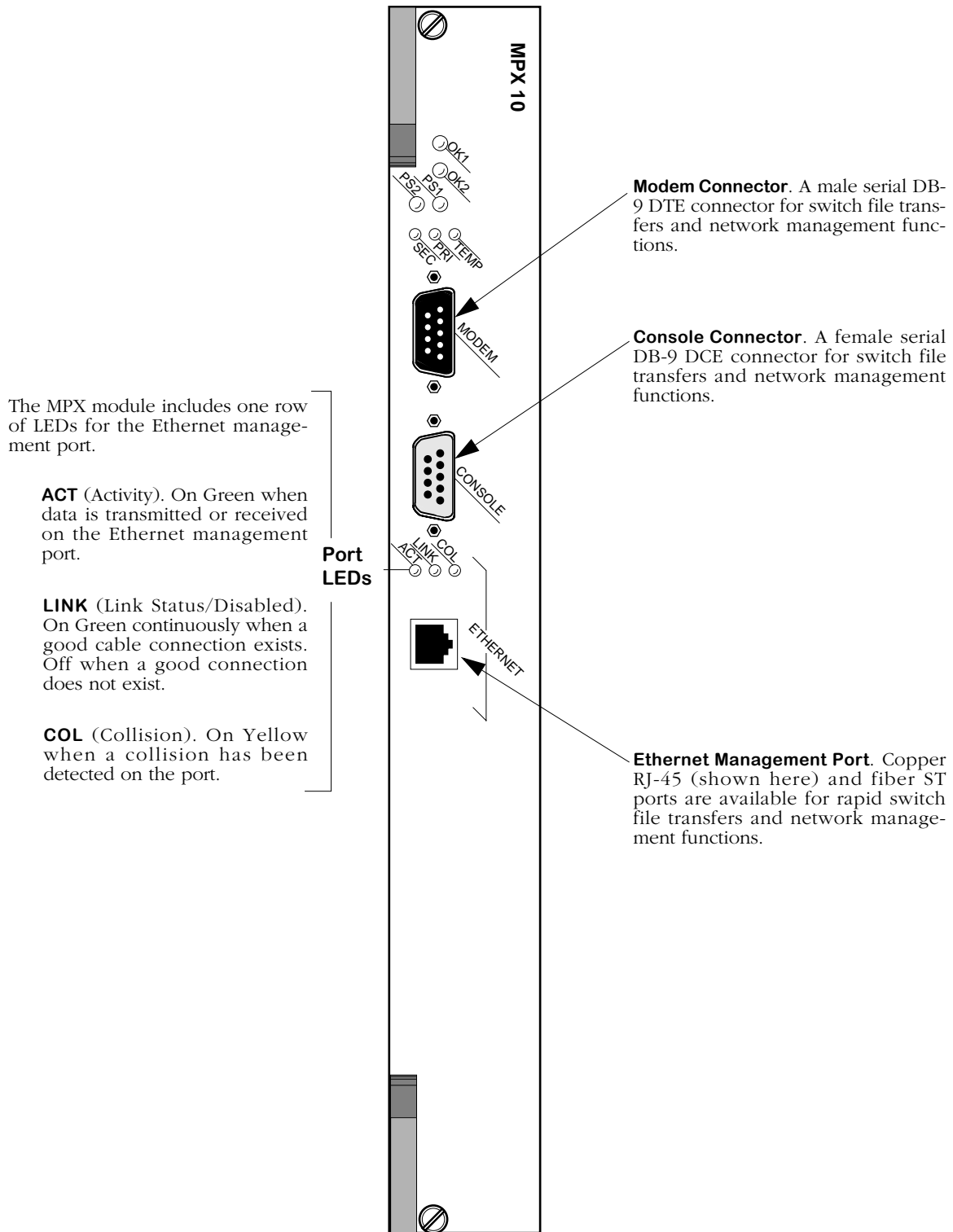
TEMP (Temperature). On Yellow to warn that the internal switch temperature is approaching maximum operating limits. Note that this LED comes on *before* the temperature limit is reached.

PRI (Primary MPX). On Green when this MPX is the active, or controlling, MPX. It is also on Green when this is the only MPX installed in the switch.

SEC (Secondary MPX). On Green when this MPX is the secondary MPX in a redundant MPX configuration. As the secondary MPX, this module is in hot standby mode.

Module Status LEDs

Omni Switch/Router Management Processor Module (MPX) Status LEDs



MPX Management Connectors

MPX Serial and Ethernet Management Ports

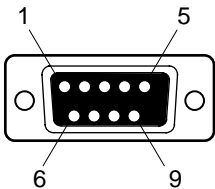
You can gain access to switch management software through one of the two serial (RS-232) ports on the MPX or the Ethernet management port. The two serial ports are configured with 9-pin “D” connectors (DB-9) per the IBM AT serial port specification. One port, called the “modem” port, is male and the other, called the “console” port, is female. See *MPX Management Connectors* on page 2-3 for illustrations of these ports.

The modem port is a Data Terminal Equipment (DTE) connector, which is typically connected to a modem. You can also connect directly from this port to a PC or terminal with a standard null-modem cable available in most computer equipment stores.

◆ **Note** ◆

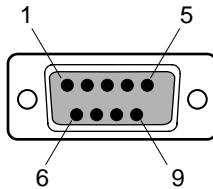
The modem port is hard-wired for DTE communication; you do not need to set any jumpers.

The console port is a Data Communication Equipment (DCE) connector, which can be directly connected to a PC, terminal, or printer.



MPX Console Port Specifications		
Pin Number	Standard Signal Name	Direction
1	Not Used	
2	RD	From MPX
3	TD	To MPX
4,	Not Used	
5	GND	
6	Not Used	
7	Not Used	
8	Not Used	
9	Not Used	
Shell	Shield GND	

MPX Console Port



MPX Modem Port Specifications		
Pin Number	Standard Signal Name	Direction
1	Not Used	
2	RD	To MPX
3	TD	From MPX
4,	DTR	From MPX
5	GND	
6	DSR	To MPX
7	RTS	From MPX
8	CTS	To MPX
9	Not used	
Shell	Shield GND	

MPX Modem Port

Ethernet Management Port

The MPX also supports an out-of-band Ethernet port for high-speed uploads and switch management functions. With this port, you can access the Omni Switch/Router over a network via Telnet or FTP.

Before you can access the Omni Switch/Router through the Ethernet management port, you must assign an IP address to it first. You can use the Boot prompt to configure an IP address for the Ethernet management port or you can use the **ethernetc** command, which is described in Chapter 10, “Configuring Management Processor Modules.” After you have assigned an IP address to the Ethernet management port, you can use it to Telnet into the UI.

See Appendix A, “The Boot Line Prompt,” for documentation on configuring the Ethernet management port with the boot prompt.

See the table below for available Ethernet management port types.

MPX Model	Ethernet Management Port Type (Cable Type)	Max. Cable Distance
MPX-T	RJ-45 (UTP)	100 meters
MPX-FL	ST (Multimode fiber)	2 kilometers

Configuring MPX Serial Ports

The serial communications parameters for the two MPX serial ports are set by default to the following:

- 9600 bits per second (bps)
- 8 data bits
- 1 stop bit
- no parity
- no hardware flow control (Windows 95)

Each serial port supports serial data rates of 1200, 9600, 19200, and 38400 bps. However, you must remove the default baud rate shunt (E1), which fixes the baud rate at 9600 bps, before you can change the baud rate. This shunt is located near the front end of the MPX's circuit board, just to the right of the Ethernet management port.

To change the serial port configuration parameters, use the **ser** command, which is described in detail in Chapter 10, "Configuring Management Processor Modules."

Flash Memory and Omni Switch/Router Software

Flash memory on the MPX holds the Omni Switch/Router's executable images and configuration data. When a switching module comes online, the MPX downloads the appropriate image file for that module to that module's memory. Image files (those with the **img** extension) contain executable code for different switching modules and software features.

The following table lists Omni Switch/Router image files that may be present in MPX flash memory along with the module(s) or feature with which the file is used.

File Name	Modules/Function Used With
mpx.img mpx.cmd mpm.cfg mpm.cnf	MPX
asm.img	All ASX modules
desx.img	Ethernet port stress test software
diagx.img	Diagnostics software
ds3e3drv.img	ASX-DS3, ASX-E3
esx.img	All GSX and ESX modules
fsm.img	All FSX modules
fpx.img	IP Fastpath routing
fwx.img	IP Fastpath and firewall extensions
gated.img	Advanced Routing software
ipcntl.img	IP control software
ipms.img	IPMS software
isdn.img	WSX-BRI-SC
m013x.img	WSX-M013
mpcx.img	Multi-Protocol Over ATM (MPOA) software
mrd.img	Advanced Routing software

continued on next page...

File Name	Modules/Function Used With (cont.)
ntp.img	Network Time Protocol (NTP) software
policy.img	PolicyView software
qos.img	Quality of Service (QOS) software
rav.img	RADIUS authentication software
sec.img	SONET error collection software
t1e1drv.img	WSX-FT1/E1-SC
text_cfg.img	Text-based configuration software
tsx.img	TSX-C-32W, TSX-CD-16W
vrrp.img	VRRP software
wsx.img	WSX-S-2W, WSX-SC-4W, WSX-SC-8W (Frame Relay and PPP software)

Flash Memory Guidelines

The switch alters flash memory contents when a software command requests a configuration change, when a remote administrator downloads a new executable image, or when the switch fails and a record of the failure is written to flash memory. These operations require available space in flash memory.

In general the flash memory on the switch should always have at least 75000 bytes available at all times. In a switch with 8 MB of flash memory, for example, the images in flash should never exceed 7.45 MB. (You can view how much flash memory is available through the **ls** command.) This will allow enough room in flash for booting and configuration file expansions. If your flash memory exceeds this amount, then you need to delete some images from flash.

In addition, the flash file system has a limit of 256 files, including configuration, logging, and other files. When this 256-file limit is reached, configuration file expansions will cease and new files will not be able to be loaded. This file limit applies even if there is enough memory available in flash.

Not all image files in flash memory are required—only those that must be used with the switching modules in your Omni Switch/Router. You can remove any files that are not required for your Omni Switch/Router configuration by using the **rm** command. For example, if you did not have any Token Ring modules, you could remove the **tsx.img** file.

MPX Redundancy

In order to provide greater reliability, Omni Switch/Router supports two MPXs in a primary/secondary redundant configuration. If the primary MPX fails, the secondary MPX takes over without any operator intervention.

◆ Warning ◆

Do *not* install any version of the MPM (i.e., MPM-C, MPM 1G, MPM II, or original MPM) in a chassis with an MPX. Installing an MPM in a chassis with an MPX can cause physical damage. If you want to configure an Omni Switch/Router chassis in a redundant configuration, you *must* use two MPXs.

When you have two MPXs in one chassis, they must be installed in Slots 1 and 2, and only one can be active. MPXs will assume one of the following roles.

- **Primary** - The MPX that is currently active and processing commands. It is also the MPX that is communicating via Telnet, FTP, etc.
- **Secondary** - An MPX that is currently not the primary. It has sufficient software to communicate with the primary MPX. (For full redundancy, the secondary MPX should also have the same software version as the primary and its configuration should be in sync with the primary.) In this state, it is capable at any time of assuming the primary role.

The LEDs on each MPX reflect the same status with the exception that the primary's **PRI** LED is on whereas the secondary's **SEC** LED is on. Also, the secondary MPX's **OK2** LED will not flash amber during board transitions. See *Omni Switch/Router Management Processor Module (MPX) Status LEDs* on page 2-2 for locations of the LEDs.

◆ Important Note ◆

To support redundancy, your MPX *must* be Revision A14 or higher.

Change-Over Procedure

The secondary MPX continuously monitors the primary MPX. This monitoring serves two purposes: 1) to notify the secondary MPX that the primary is alive and processing, and 2) to update the configuration and thus keep the two MPXs in sync. If the secondary MPX detects that the primary is no longer operational, it will begin to take over as primary. When a secondary MPX becomes primary it resets all the other modules in the chassis and performs a primary MPX initialization.

There are four states for an MPX configuration. You can view the current MPX state through the **slot** command. These states are described in the table below. Note that for a primary/secondary configuration to be in a “redundant” state, the relationship between the two MPXs must meet the conditions shown in the table.

MPX State	Requirement for State
Redundant	Both MPXs are running the same version of software and the configurations are in sync.
Configuration Fallback	Both MPXs are running the same version of software but the configurations are different.
Software Fallback	The MPXs are running different versions of software, and their configurations may be the same or different.
None	There is only one MPX installed in the chassis.

The primary MPX has the ability to transfer files to and from the secondary MPX. In the condition where the secondary MPX has an older version of software (Software Fallback), it is not desirable to update the configuration file of the secondary. It is therefore the default not to update the configuration file on the secondary if the secondary is running an earlier version of software. You can force the update using appropriate commands in the **mpm** menu. (See Chapter 10, “Configuring Management Processor Modules,” for more information on commands in the mpm menu.)

◆ **Note** ◆

Do *not* remove a primary MPX without performing a **renounce** command (described in Chapter 10, “Configuring Management Processor Modules”) first.

MPX Redundancy Commands

A set of commands exists to monitor the primary and secondary MPXs. These commands are covered in detail in Chapter 10, “Configuring Management Processor Modules.” Note that you can attach a terminal to both MPXs in a chassis; however, you will see a different responses depending on which is primary and which is secondary. You should execute all UI commands from the primary MPX except for those commands specifically addressing the secondary MPX. For example, commands are available to control and monitor the secondary MPX from the primary MPX (e.g., the **sls** command lists files on the secondary MPX from the primary MPX).