

Chapter 20

Maintaining the Cable Management System, Cables, and Connectors

You maintain the router cables in the cable management system to ensure that fiber-optic cables have the proper bend radius and to ensure that all cables are organized and securely in place.

You maintain the Physical Interface Card (PIC) cables and connectors to ensure that they transport incoming packets from the network and transmit outgoing packets to the network.

You maintain the power cables and connectors to ensure that power is supplied to the router.

You maintain the Routing Engine external cables and connectors to ensure that you can connect external devices to the router. (See Table 70.)

Table 70: Checklist for Maintaining Cables and Connectors

Maintain Cable and Connector Tasks	Command or Action
Understanding the Cable Management System, Cables, and Connectors on page 276	
M5 and M10 Router Cable Management System on page 277	
M10i Router Cable Management System on page 277	
M20 Router Cable Management System on page 278	
M40 Router Cable Management System on page 279	
M40e and M160 Router Cable Management System on page 280	
M320 Router Cable Management System on page 280	
T320 Router and T640 Routing Node Cable Management System on page 281	
Maintaining the PIC Cables on page 281	Use only specified cables and connectors.
Maintaining the PIC Fiber-Optic Cable on page 282	Follow all guidelines to ensure that fiber-optic cables transmit packets to and from the network.
Cleaning the Transceivers on page 282	Follow all procedures in the cleaning kit you use. See the appropriate router hardware guide and the PIC hardware guide.

Maintain Cable and Connector Tasks	Command or Action
Checking the PIC Port Status on page 283	
1. Check the PIC or FPC LED Status on page 283	Check the PIC LEDs.
2. Display the PIC Media Type on page 284	show chassis fpc pic-status show chassis pic pic-slot <i>number</i> fpc-slot <i>number</i>
Maintaining the Power Cables on page 285	Use the specified cables and connectors. Turn power off to the router, then reconnect power using the replacement cables.
Maintaining Routing Engine External Cables on page 285	Turn off the power switch, if necessary. Use the specified cable and connector.
Replacing the Cable Management System on page 285	See “Return the Failed Component” on page 86, or follow the procedure in the appropriate router hardware guide.

Understanding the Cable Management System, Cables, and Connectors

Purpose Inspect the router cables in the cable management system to ensure that fiber-optic cables have the proper bend radius and that all cables are organized and securely in place.

Inspect the PIC cables and connectors to ensure that they transport incoming packets from the network and transmit outgoing packets to the network.

Inspect the power cables and connectors to ensure that power is supplied to the router.

Inspect the Routing Engine external cables and connectors to ensure that you can connect external devices to the router.

What Is the Cable Management System All Juniper Networks routers have a method of cable management. Although you are not required to use the cable management system, we recommend that you do so. The cable management system maintains the proper bend radius for fiber-optic PIC cables. It keeps installed cables organized, securely in place, and tangle free.

The following sections describe the location of the cable management system on each routing platform.

M5 and M10 Router Cable Management System on page 277

M10i Router Cable Management System on page 277

M20 Router Cable Management System on page 278

M40 Router Cable Management System on page 279

M40e and M160 Router Cable Management System on page 280

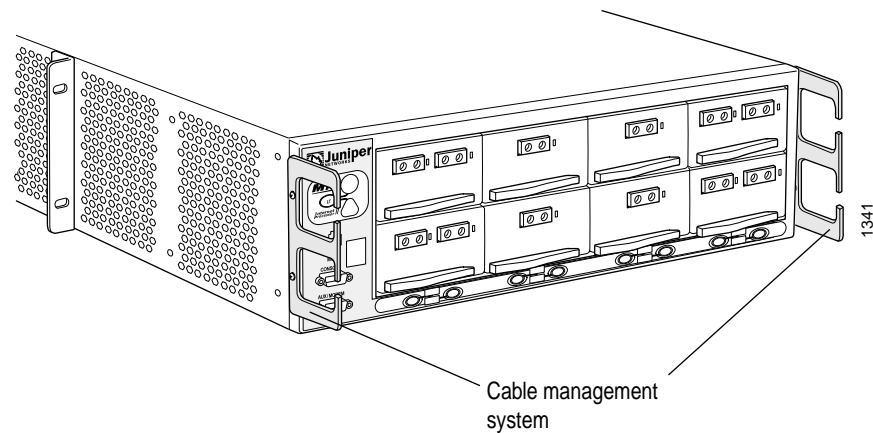
M320 Router Cable Management System on page 280

T320 Router and T640 Routing Node Cable Management System on page 281

M5 and M10 Router Cable Management System

The M5 and M10 router cable management system consists of two vertical pieces, each with a pair of metal hooks draped in a plastic shield, that attach to each side of the front of the chassis. (See Figure 121.)

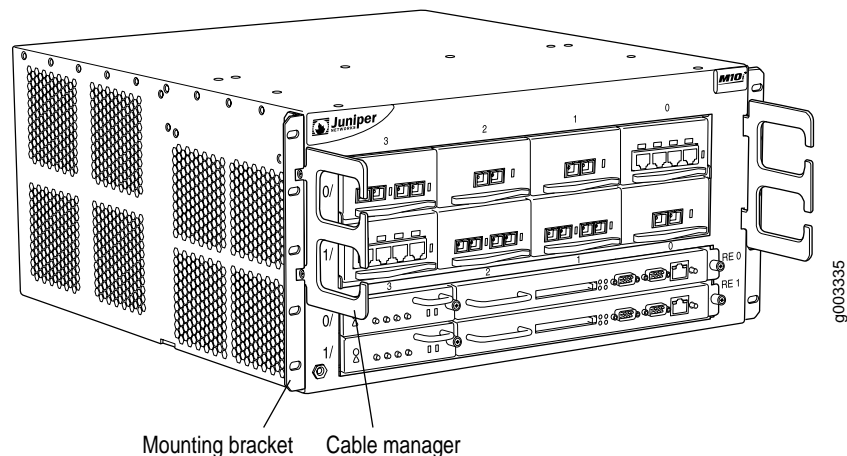
Figure 121: M5 and M10 Router Cable Management System



M10i Router Cable Management System

The M10 router cable management system consists of racks that attach vertically to each side of the chassis at the front, as shown in Figure 122. Pass PIC cables through the slots in the racks to keep the cables organized and securely in place, and to avoid bending optical cables beyond the proper bend radius. The cable management system evenly distributes the weight of a cable, so that it is not subjected to undue stress at the connector.

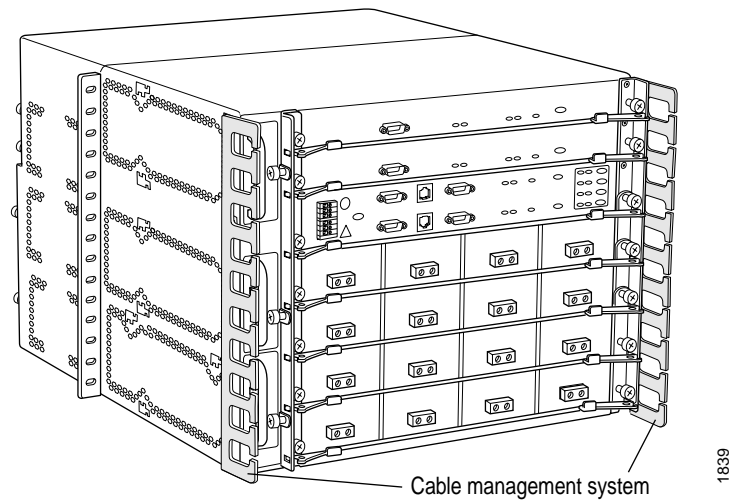
Figure 122: M10i Router Cable Management System



M20 Router Cable Management System

The M20 router cable management system consists of two vertical pieces that attach to each side of the front of the chassis. Each piece consists of a row of staggered metal hooks, each draped with a rounded plastic shield. (See Figure 123.)

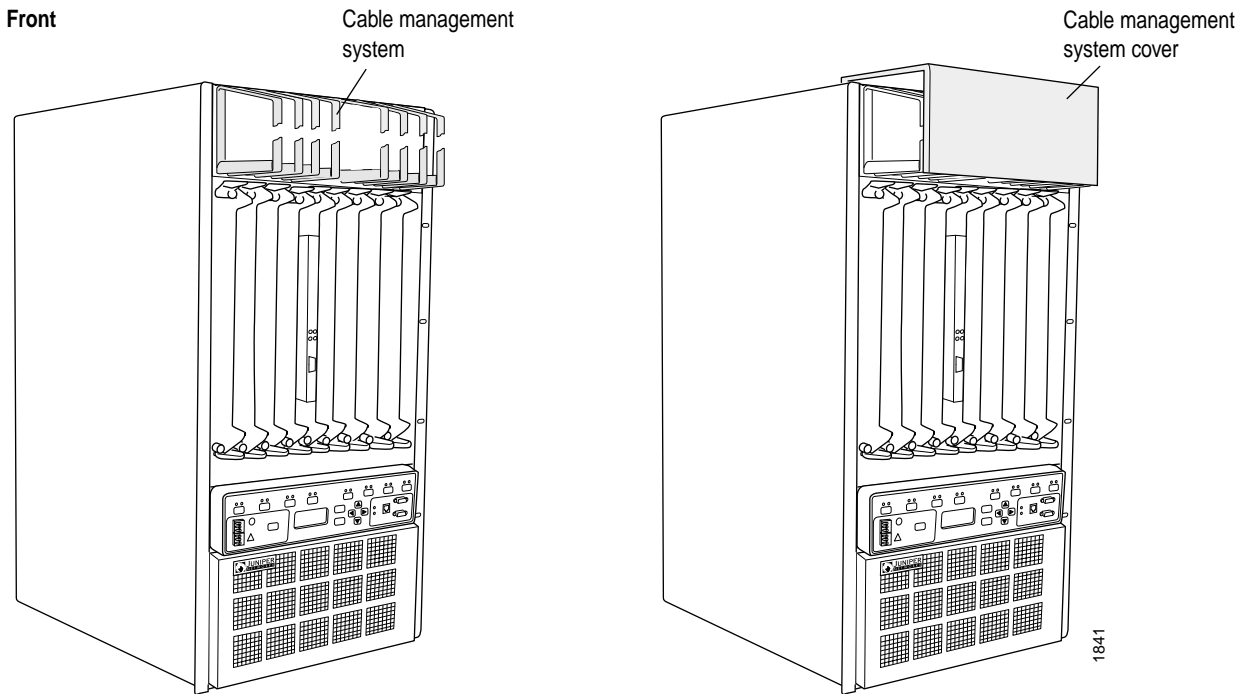
Figure 123: M20 Router Cable Management System



M40 Router Cable Management System

The M40 router cable management system consists of a row of staggered metal hooks, each draped with a rounded plastic shield. The row of hooks is shielded by a removable cable management system cover. (See Figure 124.)

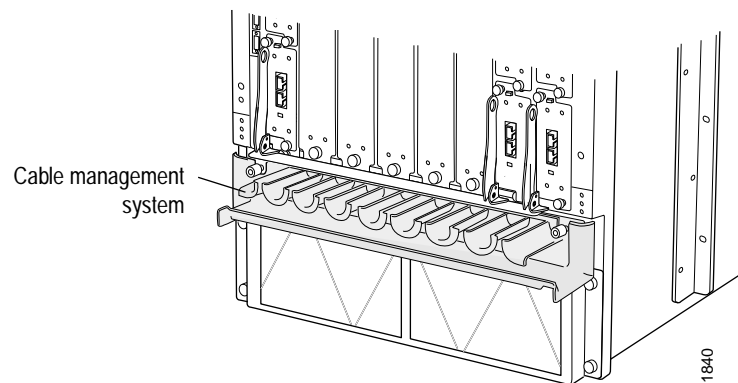
Figure 124: M40 Router Cable Management System and Cover



M40e and M160 Router Cable Management System

The M40e and M160 router cable management system consists of a row of nine semicircular plastic bobbins mounted on the front of the chassis below the Flexible PIC Concentrator (FPC) card cage. PIC cables wrap around the bobbins, keeping the cables organized and securely in place. (See Figure 125.)

Figure 125: M40e and M160 Routers Cable Management System

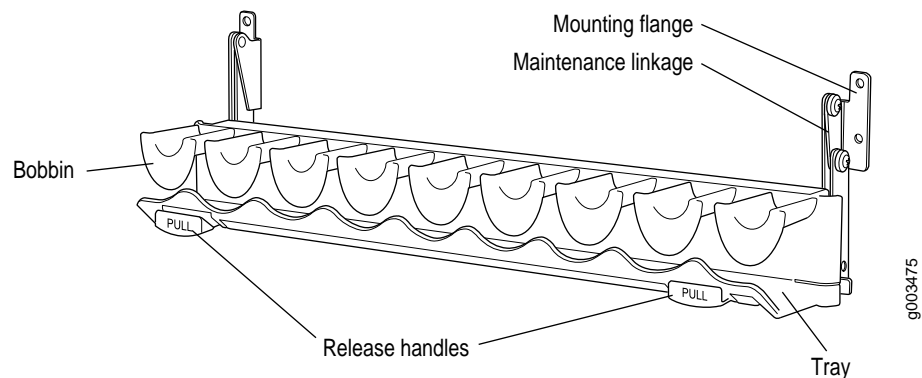


M320 Router Cable Management System

The M320 router cable management system consists of a row of nine semicircular plastic bobbins mounted on the front of the router below the FPC card cage (see Figure 126). The PIC cables pass between the bobbins and into the tray, keeping the cables organized and securely in place. The curvature of the bobbins also helps maintain the proper bend radius for optical PIC cables.

You can pull the cable management system up and outward to lock it into the maintenance position. This allows you to access the lower fan tray and the front air filter.

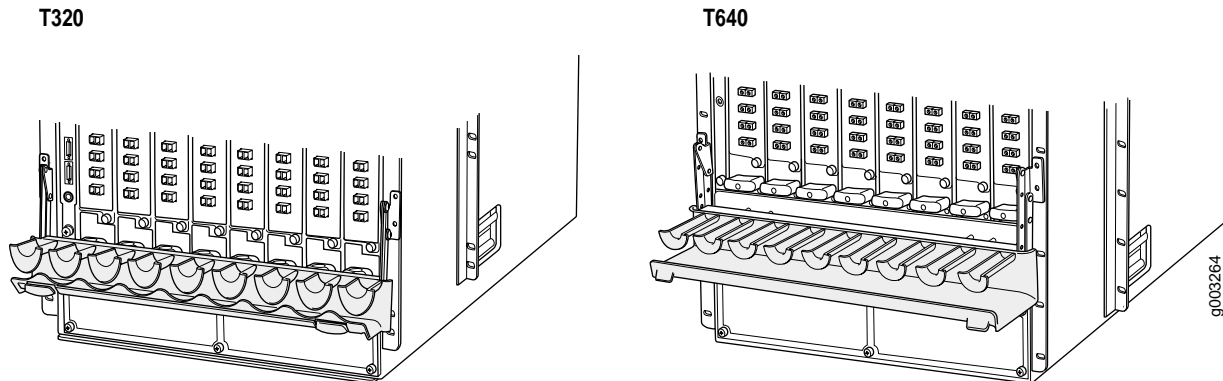
Figure 126: M320 Router Cable Management System



T320 Router and T640 Routing Node Cable Management System

The T320 router and T640 routing node cable management system consists of a row of nine semicircular plastic bobbins mounted on the front of the chassis below the FPC card cage. PIC cables wrap around the bobbins, keeping the cables organized and securely in place. (See Figure 127.)

Figure 127: T320 Router and T640 Routing Node Cable Management System



Maintaining the PIC Cables

Action To maintain the PIC cables, follow these guidelines:

Make sure that you use the cable and connector type that is specified in the appropriate router hardware guide, especially for the cable and connectors that are not supplied, such as the single-mode interface (fiber) and multimode interface (fiber).

Make sure that all cable connectors are securely connected. Securely screw in the cable connector screws.

Use the cable management system to support cables and prevent them from being dislodged or developing stress points.

Place excess cable out of the way in the cable management system and place fasteners on the loop to help to maintain the shape of the cables. Do not allow fastened loops of cable to dangle from the system, as this stresses the cable at the fastening point.

Keep the cable connections clean and free of dust and other particles which can cause drops in the received power level. Always inspect cables and clean them if necessary before connecting an interface.

Label all PIC cables to identify them. Label each end of the cable the same way.

Maintaining the PIC Fiber-Optic Cable

Action To maintain the PIC fiber-optic cable, follow these guidelines:

Avoid bending fiber-optic cable beyond its bend radius. An arc smaller than a few inches can damage the cable and cause problems that are difficult to diagnose.

Anchor fiber-optic cable to avoid stress on the connectors. When attaching fiber to a PIC, secure the fiber so it is not supporting its own weight as it dangles to the floor. Never let fiber-optic cable hang free from the connector.

When you unplug a fiber-optic cable from a PIC, always place a rubber safety plug over the connector.

Keep fiber-optic cable connections clean using an appropriate fiber-cleaning device, such as the RIFOCS 945/946 Fiber-Optic Connector Cleaning System. Follow the guidelines in the appropriate router hardware guide.

Frequent plugging and unplugging of fibers into or out of optical instruments, such as SONET or Asynchronous Transfer Mode (ATM) analyzers, can damage the instruments, which are expensive to repair. We recommend attaching a short fiber extension to the optical equipment. Any wear and tear due to frequent plugging and unplugging is then absorbed by the short fiber extension, which is easy and inexpensive to replace.

If a fiber-optic cable is damaged, replace it as described in the appropriate router hardware guide.



CAUTION: If you do not have a replacement rubber plug in your hand, do not unplug the fiber-optic cable from a PIC. The safety plug keeps the connection clean and prevents accidental exposure to light that might be emitted, which can damage your eyes.



CAUTION: Do not look directly into the PICs installed in the FPC or into the ends of fiber-optic cable. PICs that use SONET/SDH or ATM single-mode fiber-optic cable contain laser light sources that can damage your eyes.

Cleaning the Transceivers

To clean the transceivers, use an appropriate fiber-cleaning device, such as RIFOCS Fiber Optic Adaptor Cleaning Wands (part number 946). Follow the directions for the cleaning kit you use.

After you have cleaned the transceiver on the fiber-optic PIC, make sure that the connector tip of the fiber-optic cable is clean. Use only an approved alcohol-free fiber-optic cable cleaning kit, such as the Optex Cletop-S® Fiber Cleaner. Follow the directions for the cleaning kit you use.

Checking the PIC Port Status

Steps To Take To check the PIC port status, follow these steps:

1. Check the PIC or FPC LED Status on page 283
2. Display the PIC Media Type on page 284

Step 1: Check the PIC or FPC LED Status

Action To view the PIC port status, look at the PIC or FPC LEDs. You can also use the `show chassis fpc pic-status fpc-slot` or the `show chassis pic pic-slot number fpc-slot number` CLI commands.

For M5, M10, and M20 routers, each port on each PIC has one LED, which is located on the PIC faceplate above the optical transceiver. Each LED has four different states, described in Table 71. If the cable is installed properly, the PIC port LED is green.

For M5 and M10 routers, if the Forwarding Engine Board (FEB) detects a PIC failure, it sends an alarm to the Routing Engine.

Table 71: M5, M10, and M20 Router PIC LEDs

Color	State	Description
Red	Fail	PIC is online but the link has failed.
Green	Normal	Port is functioning normally.
Yellow	Problem detected; still functioning	To track the problem, use the command-line interface (CLI).
None	Not enabled	Port is not enabled.

For M7i and M10i routers, check the LEDs on the PIC faceplates. Most PIC faceplates have an LED labeled STATUS. Some PICs have additional LEDs, often one per port. The meaning of the LED states differs for various PICs. Each PIC has an LED on the PIC labeled PICS ON/OFF that shows whether the PIC is online.

For M20 routers, if the FPC that houses the PIC detects a PIC failure, the FPC informs the System and Switch Board (SSB), which in turn sends an alarm to the Routing Engine.

For M40 routers, each FPC has two LEDs that report its status as OK or Fail. The LEDs are located below each FPC, on the craft interface. If there is a PIC failure, the FPC Fail LED lights.

For M40e, M160, and T320 routers and T640 routing nodes, each of the eight FPC slots in the router has two LEDs and an offline button located directly above it on the craft interface. The green LED labeled OK and the red LED labeled FAIL indicate the FPC status, as described in Table 72 on page 284. The offline button, labeled with the FPC slot number (for example, FPC4), prepares the FPC for removal from the router when pressed. Press and hold the button for about 3 seconds until the FAIL LED lights.

Each FPC slot has two LEDs that indicate its status. The FPC LEDs, labeled FPC0 through FPC7, are located along the bottom of the craft interface. Table 72 describes the functions of the FPC LEDs. Each FPC also has a button that you use to take the FPC offline and bring it online. The button is located next to the FPC LEDs on the bottom of the craft interface.

Table 72: M40e, M160, and T320 Routers and T640 Routing Node FPC LEDs

Label	Color	State	Description
OK	Green	On steadily	FPC is functioning normally.
		Blinking	FPC is starting up.
FAIL	Red	On steadily	FPC has failed.

Step 2: Display the PIC Media Type

Action To display the PIC media type, use the following JUNOS operational mode CLI command:

```
user@host> show chassis fpc pic-status
```

Sample Output user@host> show chassis fpc pic-status

```
Slot 0 Online
  PIC 0  1x OC-12 SONET, MM
  PIC 1  4x OC-3 SONET, SMIR
  PIC 2  4x E1, BNC
  PIC 3  1x CSTM1, SMIR
Slot 1 Online
  PIC 0  4x CT3
Slot 2 Online
  PIC 0  1x Tunnel
Slot 4 Online
Slot 5 Offline
Slot 6 Online
  PIC 0  1x OC-192 12xMM VSR
```

What It Means The command output displays the status for all FPCs installed in the router and a description of the PICs installed in each FPC, including the number of ports, media type, mode, and reach. The FPCs in slots 0, 1, 2, 4, and 6 are online. The FPC in slot 5 is offline. The PICs installed in the router include SONET, E1, Channelized STM1, CT3, Tunnel, and OC192 media PICs.

PIC 0 is one-port, SONET, OC12, and multimedia.

For more detailed information about PIC types, see the appropriate PIC guide.

Alternative Action To view a particular PIC status, use the show chassis pic pic-slot *number* fpc-slot *number* CLI command:

```
user@host> show chassis pic pic-slot 0 fpc-slot 1
PIC fpc slot 1 pic slot 0 information:
Type                1x Tunnel
ASIC type           Tunnel FPGA
State               Online
PIC version         1.2
Uptime              4 hours, 40 minutes, 53 seconds
```

Maintaining the Power Cables

Action To maintain the power cables, follow these guidelines:

Make sure that the power and ground cables on each DC power supply are arranged so that they do not obstruct access to the other power supply or to other router components.

Periodically inspect the site to ensure that the cables connected to the power supply are securely in place and are properly insulated.

If power cables are damaged, replace them. To replace power cables, you must disconnect power to the router, then reconnect power using the replacement cables. Follow the guidelines in the appropriate router hardware guide.

Maintaining Routing Engine External Cables

The CIP contains connectors for connecting the Routing Engines to a console, a network, an external management device, or an external alarm device.

Action To maintain the Console or Auxiliary Port cable, the Ethernet Management cable, or the alarm relay cables, see the appropriate router hardware guide.

Replacing the Cable Management System

The cable management system is hot-removable and hot-insertable. You can remove or replace the cable management system without powering down the system and disrupting routing functions.

Action To replace the cable management system, see the appropriate router hardware guide.

