M320 and T-series Internet Routing Platforms FPC DRAM Field Upgrade Installation Instructions

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This document describes the procedures for upgrading DRAM on the Flexible PIC Concentrator (FPC) on Juniper Networks M320 and T-series routing platforms.

You can also find these upgrade instructions and complete hardware documentation on the Juniper Networks technical documentation Web page, which is located at http://www.juniper.net/.

Contents

Overview

Juniper Networks M320 and T-series routing platforms are highly scalable. Upgrading your DRAM from 256 MB to 512 MB enables you to increase the number of Layer 3 virtual private network routes with unique next hops and to eliminate multicast next-hop limits.

NOTE: The DRAM upgrade is supported by JUNOS Release 6.3 and later. If you attempt to upgrade the DRAM on a platform using JUNOS Release 6.2 or earlier, the FPC will not function.

WARNING: A ROM monitor version of 7.3 or higher is required to upgrade the DRAM. If you upgrade the DRAM and your ROM monitor version is lower than 7.3, a system halt may occur.

To determine the ROM monitor version, from the CLI, use the show chassis firmware command. If the version of ROM monitor is lower than 7.3, arrange console access and contact customer support. See “Requesting Support” on page 13. Customer support will guide you through the upgrade.

NOTE: You must install the new DRAM in the same slot as the original DRAM. If you install it in any other slot, the memory upgrade will not be recognized.

Upgrading the DRAM

To upgrade the DRAM, follow this general process:

1. Confirm the ROM monitor version.
2. Save the running configuration (optional).
3. Remove the FPC.
4. Remove the old DRAM.
5. Install the DRAM upgrade.
6. Reinstall the FPC.
7. Restore the saved JUNOS software configuration or perform a fresh configuration.
8. Verify the upgrade.

Tools and Parts Required

To upgrade the DRAM, you need the following tools and parts:

- An electrostatic bag or antistatic mat
- Electrostatic discharge (ESD) grounding wrist strap
- Phillips (+) screwdrivers, numbers 1 and 2
- Flat-blade (–) screwdrivers, 3/16-in. and 1/4-in
- The DRAM upgrade kit

Confirming the ROM Monitor Version

A ROM monitor version of 7.3 or higher is required before you can upgrade the DRAM. To determine the ROM monitor version, from the CLI, use the show chassis firmware command. If the version of ROM monitor is lower than 7.3, arrange console access and contact customer support. See "Requesting Support" on page 13. Customer support will guide you through the upgrade.

WARNING: A ROM monitor version of 7.3 or higher is required to upgrade the DRAM. If you upgrade the DRAM and your ROM monitor version is lower than 7.3, a system halt may occur.

Saving the Running Configuration

To save the running configuration to a file, use the save *filename* command. For additional information, see the *JUNOS System Basics and Services Command Reference*.

Removing an FPC

The FPCs are hot-insertable and hot-removable. When you remove an FPC, the router continues to function, although the PIC interfaces installed on the FPC you removed no longer function.

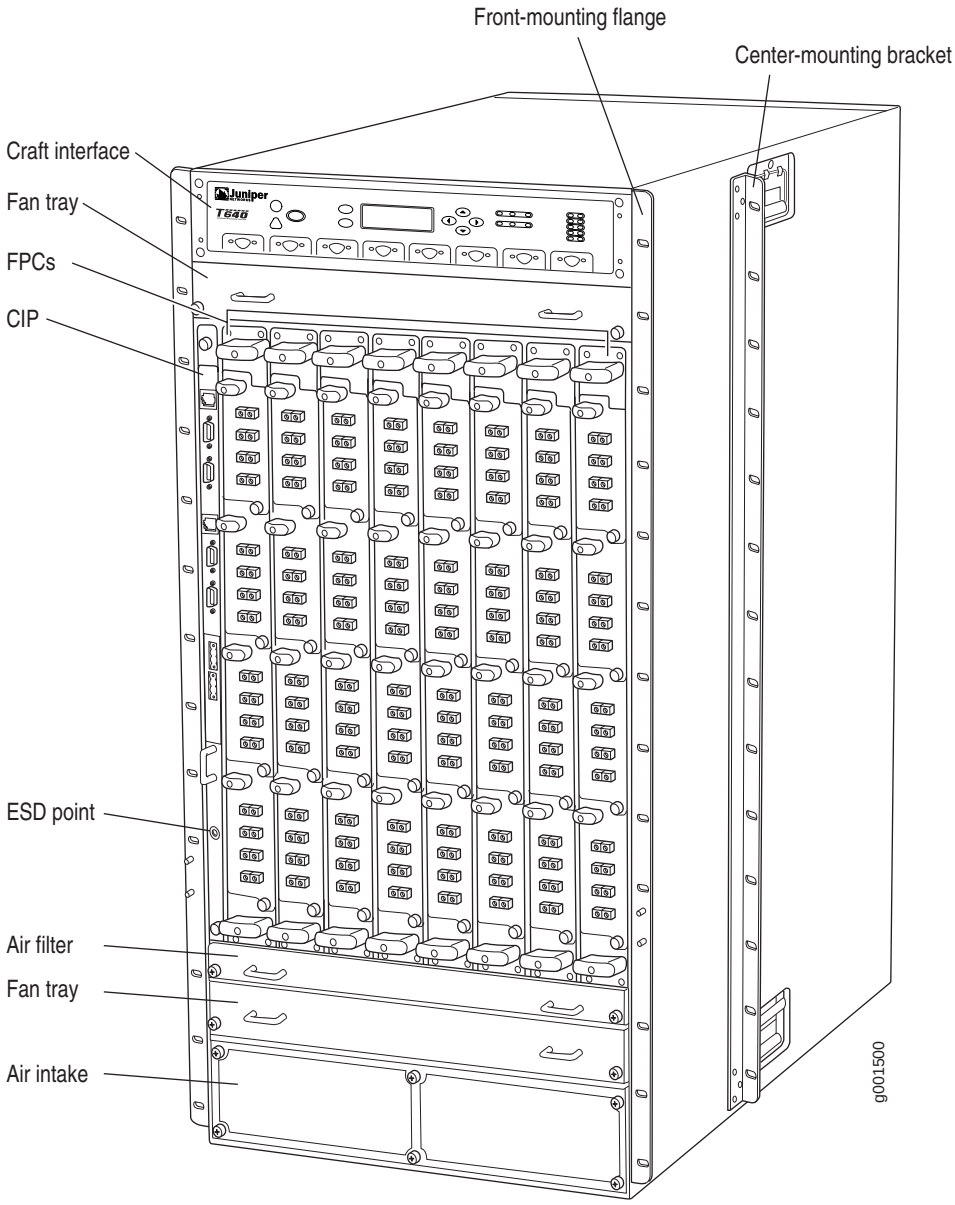
The M320 and T-series routing platforms hold up to eight FPCs, which are installed vertically in the front of the chassis. The following table provides weights for empty an FPC1 or FPC2, an empty FPC3 and a fully configured FPC.

Table 1: M320 and T-series FPC Weights

	M320	T320	T640
An empty FPC1 or FPC2	15 lb (6.8 kg)	14.3 lb (6.5 kg)	25 lb (11.3 kg)
An empty FPC3	16 lb (7.3 kg)	14.8 lb (6.7 kg)	25 lb (11.3 kg)
A fully configured FPC	29 lb (13.2 kg)	19 lb (8.6 kg)	31.7 lb (14.4 kg)

CAUTION: Do not operate the router with any empty FPC slots. When you remove an FPC, immediately install a replacement FPC or FPC blank panel to prevent router components from overheating.

Figure 1: Front View of an M-series Router



To remove an FPC, follow this procedure (see Figure 1and Figure 2):

1. Have ready a replacement FPC or FPC blank panel and an antistatic mat for the FPC. Also have ready rubber safety caps for each PIC using an optical interface on the FPC that you are removing.

2. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

3. Label the cables connected to each PIC on the FPC so that you can later reconnect each cable to the correct PIC.

4. Use one of the following methods to take the FPC offline:

   - Press and hold the FPC online/offline button. The green OK LED next to the button begins to blink. Hold the button down until the LED goes out. The LEDs and online/offline button for each FPC are located directly above it on the craft interface.

   - Issue the following CLI command: user@host>request chassis fpc slot *slot-number* offline. For more information about the command, see the *JUNOS System Basics and Services Command Reference*.

5. Disconnect the cables from the PICs installed in the FPC. If a PIC uses fiber-optic cable, immediately cover each transceiver and the end of each cable with a rubber safety cap. Arrange the disconnected cables in the cable management system, to prevent the cables from developing stress points.

WARNING: Do not look directly into the ends of fiber-optic cables or into the transceivers on the PIC faceplate. Single-mode fiber-optic cable and the PICs that use it (such as ATM and SONET/SDH interfaces) emit laser light that can damage your eyes.

CAUTION: Do not leave a fiber-optic transceiver uncovered except when inserting or removing cable. The safety cap keeps the port clean and prevents accidental exposure to laser light.

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

6. If you are removing an FPC2 or FPC3, loosen the screws inside the ejector handles at the top and bottom of the FPC faceplate.

7. Simultaneously turn both the ejector handles counterclockwise to unseat the FPC.

8. Grasp the handles and slide the FPC straight out of the card cage halfway.

9. Place one hand around the front of the FPC (the PIC housing) and the other hand under it to support it. Slide the FPC completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.

CAUTION: The weight of the FPC is concentrated in the back end. Be prepared to accept the full weight—up to 31.7 lb (14.4 kg)—as you slide the FPC out of the chassis.

When the FPC is out of the chassis, do not hold it by the ejector handles or edge connectors. They cannot support its weight.

Do not stack FPCs on top of one another after removal. Place each one individually in an electrostatic bag or on its own antistatic mat on a flat, stable surface.

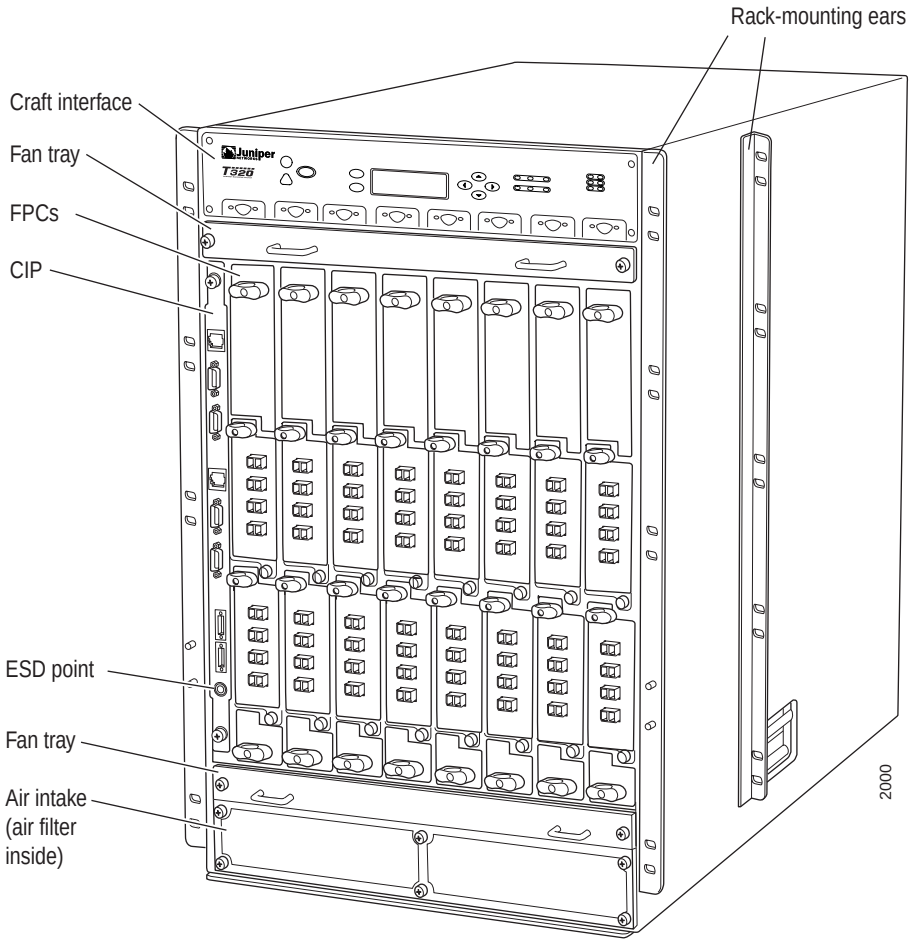
10. If necessary, remove each installed PIC from the FPC. For information on removing a PIC, see "Removing a PIC" in the *PIC Guide* that corresponds to your routing platform.

11. After you remove each PIC, immediately place it on an antistatic mat or in an electrostatic bag.

12. If you are not reinstalling an FPC into the empty FPC slot within a short time, install a blank FPC panel over the slot to maintain proper airflow in the FPC card cage.

CAUTION: After removing an FPC from the chassis, wait at least 30 seconds before reinserting it, removing an FPC from a different slot, or inserting an FPC into a different slot.

Figure 2: Front View of a T-Series Routing Platform



Upgrading the DRAM

To upgrade the DRAM, perform the following steps (see Figure 3):

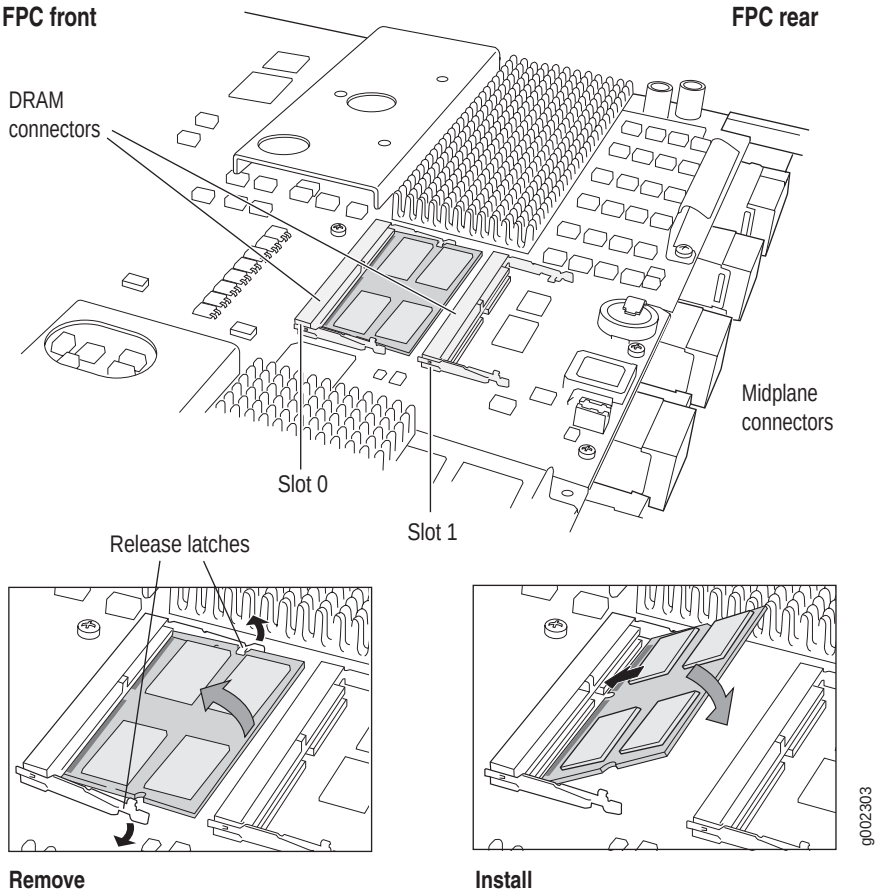
1. Locate the existing DRAM in Slot 0, which is located in the socket nearest the faceplate. Slot 1 cannot be used for the upgrade.
2. Grasp both release latches and move them to the sides.
3. Grasp the DRAM module on both sides and gently lift the module.
4. To install the new DRAM, insert the DRAM, at a 45-degree angle into the connector.

   You must install the new DRAM in the same slot as the original DRAM. If you install it in any other slot, the memory upgrade will not be recognized.

5. Press the top surface of the DRAM downward into the socket until the release latches snap into place and secures the DRAM.

6. Attach the red 512MB upgrade sticker to the FPC.

Figure 3: Removing and Replacing DRAM



Reinstalling the FPC

To reinstall an FPC, follow this procedure (see Figure 1and Figure 2):

1. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist and connect the strap to one of the ESD points on the chassis.

2. Place the FPC on an antistatic mat.

3. Take each PIC to be reinstalled on the FPC out of its electrostatic bag and identify the slot on the FPC where it will be connected.

4. Verify that each fiber-optic PIC has a rubber safety cap covering the PIC transceiver. If it does not, cover the transceiver with a safety cap.

5. Install each PIC into the appropriate slot on the FPC. For information on installing a PIC, see "Installing a PIC" in the PIC Guide for your platform.

6. Locate the slot in the FPC card cage in which you plan to install the FPC.

7. Lift the FPC into place and carefully align first the bottom, then the top of the FPC with the guides inside the card cage. Be sure the FPC is right-side up, with the components on the right of the FPC.

CAUTION: When the FPC is out of the chassis, do not hold it by the ejector handles, bus bars, or edge connectors. They cannot support its weight.

8. Slide the FPC all the way into the card cage until you feel resistance.

9. Starting with the ejector handles on the FPC faceplate nearly horizontal, simultaneously turn both ejector handles clockwise to seat the FPC.

10. If any of the PICs on the FPC connect to fiber-optic cable, remove the rubber safety cap from each transceiver and cable.

WARNING: Do not look directly into the ends of fiber-optic cables or into the transceivers on the interface faceplate. Single-mode fiber-optic cable and the interfaces that use it (such as ATM and SONET/SDH interfaces) emit laser light that can damage your eyes.

11. Insert the appropriate cable into the cable connector ports on each PIC on the FPC. Secure the cables so that they are not supporting their own weight. Place excess cable out of the way in a neatly coiled loop, using the cable management system. Placing fasteners on a loop helps to maintain its shape.

CAUTION: Do not let fiber-optic cable hang free from the connector. Do not allow fastened loops of cable to dangle, which stresses the cable at the fastening point.

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

12. Use one of the following methods to bring the FPC online:

    - Press and hold the FPC online/offline button until the green OK LED next to the button lights steadily, in about 5 seconds. The LEDs and online/offline button for each FPC are located directly above it on the craft interface.

    - Issue the following CLI command: user@host>request chassis fpc slot *slot-number* online. For more information about the command, see the JUNOS System Basics and Services Command Reference.

    As the FPC comes online, the green FPC LED labeled OK begins to blink. It continues to blink while the Routing Engine downloads software to the FPC, the FPC runs its diagnostics, and the PICs housed in the FPC are enabled. Packet forwarding then halts for about 200 ms while the Packet Forwarding Engine incorporates the memory on the new FPC into the memory buffers shared by all FPCs. When the FPC is online, the OK LED lights steadily.

CAUTION: After the OK LED lights steadily, wait at least 30 seconds before removing the FPC again, removing a FPC from a different slot, or inserting an FPC in a different slot.

You can also verify correct FPC and PIC functioning by issuing the show chassis fpc and show chassis fpc pic-status commands.

Verifying the DRAM Upgrade

To verify how much memory is installed on the FPC, use the show chassis fpc command:

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user@host>show chassis fpc
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List of Technical Publications

Table 2 lists the software and hardware guides and release notes for Juniper Networks routing platforms that use the JUNOS Internet software and describes the contents of each book.

Table 2: Juniper Networks Technical Documentation

Book	Description
JUNOS for J-series, M-series, and T-series Routing Platforms Configuration Guides	
Feature Guide	Provides a detailed explanation and configuration examples for several of the most complex features in the JUNOS software.

Book	Description
JUNOS-FIPS Configuration Guide	(M-series and T-series routing platforms only) Provides an overview of JUNOS-FIPS 140-2 concepts and describes how to install and configure the JUNOS-FIPS software. Describes FIPS-related commands and how to configure, authorize, and zeroize the AS II FIPS PIC.
System Basics	Provides an overview of the JUNOS software and describes how to install and upgrade the software. This manual also describes how to configure system management functions and how to configure the chassis, including user accounts, passwords, and redundancy.
Network Interfaces and Class of Service	Provides an overview of the network interface and class-of-service functions of the JUNOS software and describes how to configure the network interfaces on the router.
MPLS Applications	Provides an overview of traffic engineering concepts and describes how to configure traffic engineering protocols.
Multicast Protocols	Provides an overview of multicast concepts and describes how to configure multicast routing protocols.
Network Management	Provides an overview of network management concepts and describes how to configure various network management features, such as SNMP, accounting options, and cflowd.
Policy Framework	Provides an overview of policy concepts and describes how to configure routing policy, firewall filters, and forwarding options.
Routing Protocols	Provides an overview of routing concepts and describes how to configure routing, routing instances, and unicast routing protocols.
Services Interfaces	Provides an overview of the services interfaces functions of the JUNOS software and describes how to configure the services interfaces on the router.
VPNs	Provides an overview and describes how to configure Layer 2 and Layer 3 virtual private networks (VPNs), virtual private LAN service (VPLS), and Layer 2 circuits. Provides configuration examples.
JUNOS References	
Interfaces Command Reference	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot interfaces.
Routing Protocols and Policies Command Reference	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot routing policies and protocols, including firewall filters.
System Basics and Services Command Reference	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot system basics, including commands for real-time monitoring and route (or path) tracing, system software management, and chassis management. Also describes commands for monitoring and troubleshooting services such as class of service (CoS), IP Security (IPSec), stateful firewalls, flow collection, and monitoring.
System Log Messages Reference	Describes how to access and interpret system log messages generated by JUNOS software modules and provides a reference page for each message.
J-Web User Guide	

Book	Description
J-Web Interface User Guide	Describes how to use the J-Web graphical user interface (GUI) to configure, monitor, and manage Juniper Networks routing platforms.
JUNOScript API Documentation	
JUNOScript API Guide	Describes how to use the JUNOScript application programming interface (API) to monitor and configure Juniper Networks routers.
JUNOScript API Configuration Reference	Provides reference pages for the configuration tags in the JUNOScript API.
JUNOScript API Operational Reference	Provides reference pages for the operational tags in the JUNOScript API.
JUNOS Comprehensive Index and Glossary	
Comprehensive Index and Glossary	Provides a complete index of all JUNOS Internet software books and the *JUNOScript API Guide*. Also provides a comprehensive glossary.
Hardware Documentation	
Hardware Guide	Describes how to install, maintain, and troubleshoot routers and router components. Each platform has its own hardware guide.
PIC Guide	Describes the router Physical Interface Cards (PICs). Each router platform has its own PIC guide.
JUNOScope Documentation	
JUNOScope Software User Guide	Describes the JUNOScope software graphical user interface (GUI), how to install and administer the software, and how to use the software to manage router configuration files and monitor router operations.
J-series Services Router Documentation	
J-series Services Router Getting Started Guide	Provides an overview, basic instructions, and specifications for J-series Services Routers. The guide explains how to prepare your site for installation, unpack and install the router and its components, install licenses, and establish basic connectivity.
J-series Services Router Configuration Guide	Explains how to configure the interfaces on J-series Services Routers for basic IP routing with standard routing protocols. The guide also shows how to configure virtual private networks (VPNs), configure and manage multicast networks, and apply routing techniques such as policies, firewall filters, IP Security (IPSec) tunnels, and service classification for safer, more efficient routing.
J-series Services Router Administration Guide	Shows how to manage users and operations, monitor network performance, upgrade software, and diagnose common problems on J-series Services Routers.
Release Notes	
JUNOS Internet Software Release Notes	Provide a summary of new features for a particular software release. Software release notes also contain corrections and updates to published JUNOS and JUNOScript manuals, provide information that might have been omitted from the manuals, and describe upgrade and downgrade procedures.
Hardware Release Notes	Describe the available documentation for the router platform and summarize known problems with the hardware and accompanying software. Each platform has its own release notes.

Book	Description
JUNOScope Software Release Notes	Contain corrections and updates to the published JUNOScope manual, provide information that might have been omitted from the manual, and describe upgrade and downgrade procedures.
J-series Services Router Release Notes	Briefly describe Services Router features, identify known hardware problems, and provide upgrade and downgrade instructions

Requesting Support

For technical support, open a support case with the Case Manager link at http://www.juniper.net/support/ or call 1-888-314-JTAC (from the United States, Canada, or Mexico) or 1-408-745-9500 (from elsewhere).

Revision History

27 June 2005—530-012981-01 Revision 2. Added ROM monitor and JUNOS version restrictions.

13 June 2005—530-012981-01 Revision 1. Document created.