

SDRAM Installation Instructions

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This document describes how to remove and install a new DIMM module in a Juniper Networks Routing Engine.

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Routing Engine Description

The Routing Engine is an Intel-based PCI platform that runs JUNOS Internet software. Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the router, control the router's interfaces, control some chassis components, and provide the interface for system management and user access to the router.

Routing Engine Components

The Routing Engine includes the following components:

- CPU—Runs JUNOS Internet software to maintain the router's routing tables and routing protocols. It has a Pentium-class processor.
- SDRAM—Provides storage for the routing and forwarding tables and for other Routing Engine processes.
- Compact flash disk—This disk provides primary storage. It can accommodate two software images, two configuration files, and microcode.
- Hard disk—If no compact flash disk is installed, provides primary storage for software images, configuration files, and microcode. If a compact flash disk is installed, the hard disk provides secondary storage for log files and memory dumps, and can reboot the system if the flash disk fails.
- I2C/EEPROM—Stores the serial number of the Routing Engine.



NOTE: The appearance and position of electronic components on your Routing Engine might differ from figures in this document. These differences do not affect Routing Engine functionality or installation procedures.

Tools and Parts Required

To replace hardware components, you need the following tools and parts:

- 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.

Remove and Insert DIMM Modules

The SDRAM installed on the Routing Engine provides storage for the routing and forwarding tables and for other Routing Engine processes. The design of the Routing Engine allows you to modify the SDRAM configuration by adding DIMM memory modules to or removing modules from the Routing Engine board. The Routing Engine contains from one to three 168-pin DIMMs.

To modify the SDRAM configuration, use the following procedures:

- Manually Switch from Master to Backup Routing Engine on page 3
- Remove a Routing Engine on page 4
- Remove a DIMM Module on page 5
- Insert a DIMM Module on page 5
- Install the Routing Engine on page 6

Manually Switch from Master to Backup Routing Engine

For routers with two Routing Engines, one Routing Engine is the master and one is the backup. By default, the Routing Engine in slot 0 is the master and the one in slot 1 is the backup. If you are changing the SDRAM configuration of the master Routing Engine, you can switch mastership so that routing can continue during the upgrade.

To switch Routing Engine mastership, follow this procedure:

1. To determine which Routing Engine is master, issue the following CLI command. The master Routing Engine is marked as **Master** in the **Current state** field:

```
user@host> show chassis routing-engine
```

2. If the Routing Engine you are removing is the master, issue the following CLI command to switch mastership to the standby host module:

```
user@host> request chassis routing-engine master switch
```

If the Routing Engines are running JUNOS Release 6.0 or later and are configured for graceful switchover, the standby Routing Engine immediately assumes Routing Engine functions and there is no interruption to packet forwarding. Otherwise, packet forwarding halts while the standby Routing Engine becomes the master and the Packet Forwarding Engine components reset and connect to the new master Routing Engine. For information about configuring graceful switchover, see the section about Routing Engine redundancy in the *JUNOS Internet Software Configuration Guide: Getting Started*.



NOTE: Router performance might change if the standby Routing Engine's configuration differs from the former master's configuration. For the most

predictable performance, configure the two Routing Engines identically, except for parameters unique to a Routing Engine, such as the hostname defined at the [edit system] hierarchy level and the management interface (fxp0 or equivalent) defined at the [edit interfaces] hierarchy level.

To configure Routing Engine-specific parameters and still use the same configuration on both Routing Engines, include the appropriate configuration statements under the re0 and re1 statements at the [edit groups] hierarchy level and use the apply-groups statement. For instructions, see the *JUNOS Internet Software Configuration Guide: Getting Started*.

Remove a Routing Engine

To remove a Routing Engine, follow this procedure:

1. Place an electrostatic bag or antistatic mat on a flat, stable surface.
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. Make sure the router is attached to a proper earth ground.
3. On the console or other management device connected to the Routing Engine you are removing, enter CLI operational mode and issue the following command. The command shuts down the Routing Engine cleanly, so its state information is preserved:

```
user@host> request system halt
```



NOTE: Wait until a message appears on the console confirming that the operating system has halted.

For more information about the command, see the *JUNOS System Basics and Services Command Reference*.

4. If there is a cover over the Routing Engine, unscrew the screws holding the cover in place and remove the cover.
5. The procedure for removing the Routing Engine depends on which Routing Engine you have:
 - If the Routing Engine has extractor clips, use a screwdriver to loosen and remove the screws in the clips at each end of the Routing Engine faceplate. Push the ends of the extractor clips outward to unseat the Routing Engine from the chassis.
 - If the Routing Engine has thumbscrews, loosen the thumbscrews securing the Routing Engine, using a screwdriver if necessary.

6. Grasp the handle or, if the Routing Engine does not have a handle, grasp the extractor clips and slide the unit about halfway out of the chassis.



CAUTION: Be careful to slide the Routing Engine straight out of the chassis. Damage can result if it gets lodged because of uneven movement.

7. Place one hand under the Routing Engine to support it, slide it completely out of the chassis, and place it on the antistatic mat or in the electrostatic bag.

Remove a DIMM Module

The DIMM modules are located on the top of the Routing Engine. To remove a DIMM module, follow this procedure:

1. Place an electrostatic bag or antistatic mat on a flat, stable surface.
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. Make sure the router is attached to a proper earth ground.
3. Remove the Routing Engine as described in “Remove a Routing Engine” on page 4.
4. Depending on which Routing Engine you are using, there are two different procedures for ejecting the DIMMs:
 - For Routing Engines with an ejector on one side of the DIMM, press the plastic ejector of the DIMM module. The edge of the module raises upward.
 - For Routing Engines with ejectors on each side of the DIMM, press the plastic ejectors on both sides of the DIMM module.
5. Grasp the DIMM module, being careful not to touch any electrical components on the module, and firmly pull it out of the slot on the Routing Engine.
6. Place the DIMM module on the antistatic mat or in the electrostatic bag.
7. Push the plastic ejectors to close the empty DIMM module slot.

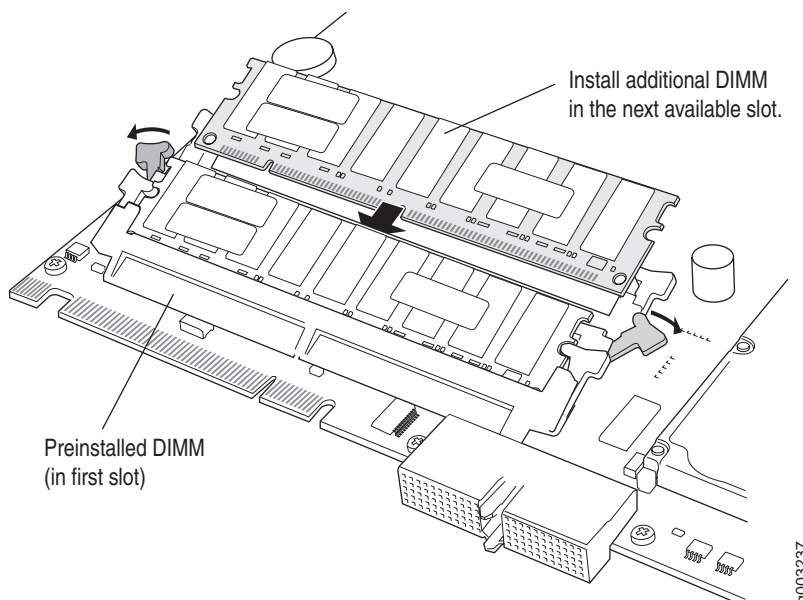
Insert a DIMM Module

To insert a DIMM module into the Routing Engine, follow this procedure (see Figure 1):

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. Make sure the router is attached to a proper earth ground.
2. Remove the DIMM module from its electrostatic bag.
3. To open the empty DIMM slot, press the plastic ejectors open.
4. Grasp the DIMM module by the edges, being careful not to touch any electrical components.
5. Pressing firmly on both ends, push the module into the slot until the ejectors return completely to the closed position.
6. Install the Routing Engine as described in “Install the Routing Engine” on page 6 .

You can view the the SDRAM configuration and verify the DIMM was installed correctly by issuing the `show chassis routing-engine` command.

Figure 1: Install the DIMM Module



Install the Routing Engine

To install the Routing Engine, follow this procedure:

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. Make sure the router is attached to a proper earth ground.

2. If the Routing Engine has extractor clips, verify that the extractor clip at each end of the Routing Engine is flipped toward the outer edge of the unit. If necessary, use your thumbs to push and hold the red tab on each extractor clip toward the outer edge, then push the ends of the extractor clips outward.
3. Place one hand under the Routing Engine to support it and grasp the handle on the faceplate with the other hand.
4. Align the rear of the Routing Engine with the guide rails inside the chassis and slide it in completely.



CAUTION: Be careful to align the Routing Engine correctly with the guide rails and push it in evenly. Damage can result if it gets lodged in the rails because of uneven movement.

5. The procedure for securing the Routing Engine depends on which Routing Engine you have:
 - If the Routing Engine has extractor clips, press the extractor clip at each end of the Routing Engine inward to seat the unit firmly in the chassis. If you removed screws from the extractor clips when you removed the Routing Engine, replace them and use a screwdriver to tighten them.
 - If the Routing Engine has thumbscrews, tighten the thumbscrews securing the Routing Engine, using a screwdriver if necessary.
6. If there was a cover over the Routing Engine that you removed, reinstall the cover and tighten the screws to secure it to the chassis.
7. You can verify correct Routing Engine functioning by issuing the `show chassis routing-engine` command.

List of Technical Publications

Table 1 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 1: Juniper Networks Technical Documentation

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

Book	Description
<i>JUNOS-FIPS Configuration Guide</i>	(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.
<i>System Basics</i>	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.
<i>Network Interfaces and Class of Service</i>	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.
<i>MPLS Applications</i>	Provides an overview of traffic engineering concepts and describes how to configure traffic engineering protocols.
<i>Multicast Protocols</i>	Provides an overview of multicast concepts and describes how to configure multicast routing protocols.
<i>Network Management</i>	Provides an overview of network management concepts and describes how to configure various network management features, such as SNMP, accounting options, and cflowd.
<i>Policy Framework</i>	Provides an overview of policy concepts and describes how to configure routing policy, firewall filters, and forwarding options.
<i>Routing Protocols</i>	Provides an overview of routing concepts and describes how to configure routing, routing instances, and unicast routing protocols.
<i>Services Interfaces</i>	Provides an overview of the services interfaces functions of the JUNOS software and describes how to configure the services interfaces on the router.
<i>VPNs</i>	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	
<i>Interfaces Command Reference</i>	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot interfaces.
<i>Routing Protocols and Policies Command Reference</i>	Describes the JUNOS software operational mode commands you use to monitor and troubleshoot routing policies and protocols, including firewall filters.
<i>System Basics and Services Command Reference</i>	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.
<i>System Log Messages Reference</i>	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
<i>J-Web Interface User Guide</i>	Describes how to use the J-Web graphical user interface (GUI) to configure, monitor, and manage Juniper Networks routing platforms.
JUNOScript API Documentation	
<i>JUNOScript API Guide</i>	Describes how to use the JUNOScript application programming interface (API) to monitor and configure Juniper Networks routers.
<i>JUNOScript API Configuration Reference</i>	Provides reference pages for the configuration tags in the JUNOScript API.
<i>JUNOScript API Operational Reference</i>	Provides reference pages for the operational tags in the JUNOScript API.
JUNOS Comprehensive Index and Glossary	
<i>Comprehensive Index and Glossary</i>	Provides a complete index of all JUNOS Internet software books and the <i>JUNOScript API Guide</i> . Also provides a comprehensive glossary.
Hardware Documentation	
<i>Hardware Guide</i>	Describes how to install, maintain, and troubleshoot routers and router components. Each platform has its own hardware guide.
<i>PIC Guide</i>	Describes the router Physical Interface Cards (PICs). Each router platform has its own PIC guide.
JUNOScope Documentation	
<i>JUNOScope Software User Guide</i>	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	
<i>J-series Services Router Getting Started Guide</i>	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.
<i>J-series Services Router Configuration Guide</i>	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.
<i>J-series Services Router Administration Guide</i>	Shows how to manage users and operations, monitor network performance, upgrade software, and diagnose common problems on J-series Services Routers.
Release Notes	
<i>JUNOS Internet Software Release Notes</i>	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.
<i>Hardware Release Notes</i>	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
<i>JUNOScope Software Release Notes</i>	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.
<i>J-series Services Router Release Notes</i>	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).

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