



# Router Recovery with ROM Monitor

This chapter describes the router recovery methods in ROM Monitor (ROMMON) mode of the router.

**Table 1: Feature History for Router Recovery with the ROM Monitor**

Release	Modification
Release 4.2.0	A new board, RSP3 was introduced.

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## Information About Router Recovery

The standard way to install new software on the RSP card of a Cisco ASR 9000 Series Aggregation Services Router is by using the **install** command in administration EXEC mode. However, if the RSP card is unable to boot the Cisco IOS XR software or you want to completely replace the existing software, you can reinstall the software while the RSP card is in ROM Monitor mode. When you install the Cisco IOS XR software from ROM Monitor mode, you must use a special software installation file with a vm file extension. These files are called vm files. You cannot install software in package installation envelope (PIE) files from ROM Monitor mode.



**Note** Installation using a vm file in ROM Monitor mode should be performed only from the RSP card of the system.



**Caution** Reinstalling the Cisco IOS XR software from ROM Monitor mode replaces the currently installed router software and causes substantial router downtime. We recommend installing or upgrading software packages from administration EXEC mode using PIE files, as described in the *Upgrading and Managing Cisco IOS XR Software* module of the *System Management Configuration Guide for Cisco ASR 9000 Series Routers*.

# About ROMMON Installation Files

This section includes the following topics:

## Locating Installable Files

To obtain Cisco IOS XR software and version information, use the Cisco Software Delivery System (SDS), available at the following URL:

<http://www.cisco.com/cisco/software/navigator.html?mdfid=279844343&flowid=2130>

To locate Cisco IOS XR software images:

- Select any entry under Cisco ASR 9000 Series Aggregation Services Routers.
- Select IOS XR software to see the image tar files, or choose any of the other categories to see the other files.

The table below lists the software packages that you can install from ROMMON.

**Table 2: Downloadable Software for Installation from ROM Monitor**

Software Package Name	Description
Cisco IOS XR IP/MPLS Core Software	This package contains two copies of the Cisco IOS XR Unicast Routing Core Bundle. One copy is in the Package Installation Envelope (PIE) file format and can be installed while Cisco IOS XR is running, as described in the <i>Upgrading and Managing Cisco IOS XR Software</i> module of the <i>System Management Configuration Guide for Cisco ASR 9000 Series Routers</i> . The other copy is in a vm file that can be installed from ROM Monitor. This package also includes Cisco IOS XR MPLS, Manageability, and Multicast packages (in PIE files).
Cisco IOS XR IP/MPLS Core Software 3DES	This package contains everything in the Cisco IOS XR IP/MPLS Core Software package in addition to Cisco IOS XR Security package (in a PIE file).

The table above lists packages that are distributed in files with tar filename extensions (tar files are assembled with the UNIX tar utility). When you download a tar file, you must unpack the tar file with a software program before you can install any of the files in the package.

The files that you can install from ROM Monitor have a vm filename extension. These files contain the software included in the Cisco IOS XR Unicast Routing Core Bundle. The other files in the packages are PIE files.



**Note** The tar files contain both PIE files and vm files. If the router is operating properly, you can install the software using the appropriate PIE file with little or no interruption to router traffic, as described in the *Upgrading and Managing Cisco IOS XR Software* module of the *System Management Configuration Guide for Cisco ASR 9000 Series Routers*. If the router is not booted with the Cisco IOS XR software, install the core software using the vm file first, and then install any additional packages using the PIE files after the router enters EXEC mode.

## tar Filenames and Version Numbers

The format for a tar filename is:

*platform-bundle\_name-major.minor.maintenance.tar*

**Table 3: tar Filename Components**

Component	Description
platform	Identifies the platform for which the software package is designed. For packages designed for the Cisco ASR 9000 Series Aggregation Services Routers, the platform designation is "ASR9k."
bundle_name	Identifies a specific bundle. <ul style="list-style-type: none"> <li>• <i>IOS XR</i> bundle name indicates a file that includes all packages in the Cisco IOS XR Unicast Routing Core Bundle and the Management, MPLS, and Multicast packages. These packages are described in the <i>Upgrading and Managing Cisco IOS XR Software</i> module of <i>System Management Configuration Guide for Cisco ASR 9000 Series Routers</i>.</li> <li>• <i>IOS XR-k9</i> bundle name indicates a file that includes all packages in the iosxr bundle file plus the security package.</li> </ul>
major	Identifies the major release of this package. <ul style="list-style-type: none"> <li>• Major releases occur when there is a major architectural change to the product (for example, a major new capability is introduced).</li> <li>• All packages operating on the router must be at the same major release level.</li> <li>• Major release is the least frequent release and may require a router reboot.</li> </ul>

Component	Description
minor	<p>Identifies the minor release of this package.</p> <ul style="list-style-type: none"> <li>• Minor releases contain one or more of the following: <ul style="list-style-type: none"> <li>• New features</li> <li>• Bug fixes</li> </ul> </li> <li>• Minor release versions do not have to be identical for all software packages operating on the router, but the operating packages must be certified by Cisco as compatible with each other.</li> <li>• Minor releases may require a router reboot.</li> </ul>
maintenance	<p>Identifies the maintenance release of this package.</p> <ul style="list-style-type: none"> <li>• Maintenance releases contain a collection of bug fixes for a package.</li> <li>• Maintenance release versions do not have to be identical for all software packages operating on the router, but the major and minor versions of the maintenance release must match the those of the package being updated.</li> <li>• Maintenance releases usually do not require a router reboot.</li> </ul>

## vm Filenames and Version Numbers

The format for a vm filename for Cisco ASR 9000 Series Aggregation Services Routers is:

*platform-package\_name.vm-major.minor.maintenance*

The table below describes the other filename components.

**Table 4: vm Filename Components**

Component	Description
platform	<p>Identifies the platform for which the software package is designed.</p> <p>For packages designed for Cisco ASR 9000 Series Aggregation Services Routers, the platform designation is “asr9k”.</p>
package_name	<p>Identifies a specific package.</p> <ul style="list-style-type: none"> <li>• Mini package names indicate a composite package that includes all packages in the Cisco IOS XR Unicast Routing Core Bundle, which is described in the <i>Upgrading and Managing Cisco IOS XR Software</i> module of <i>System Management Configuration Guide for Cisco ASR 9000 Series Routers</i>.</li> </ul>

Component	Description
major	<p>Identifies the major release of this package.</p> <ul style="list-style-type: none"> <li>• A major release occurs when there is a major architectural change to the product (for example, a major new capability is introduced).</li> <li>• All packages operating on the router must be at the same major release level.</li> <li>• A major release is the least frequent release and may require a router reboot.</li> </ul>
minor	<p>Identifies the minor release of this package.</p> <ul style="list-style-type: none"> <li>• A minor release contains one or more of the following: <ul style="list-style-type: none"> <li>• New features</li> <li>• Bug fixes</li> </ul> </li> <li>• The minor release version does not have to be identical for all software packages operating on the router, but the operating packages must be certified by Cisco as compatible with each other.</li> <li>• A minor release may require a router reboot.</li> </ul>
maintenance	<p>Identifies the maintenance release of this package.</p> <ul style="list-style-type: none"> <li>• A maintenance release contains a collection of bug fixes for a package.</li> <li>• The maintenance release version does not have to be identical for all software packages operating on the router, but the major and minor versions of the maintenance release must match the those of the package being updated.</li> <li>• A maintenance release usually does not require a router reboot.</li> </ul>

The following example shows a composite of multiple mini packages:

```
comp-asr9k-mini.vm-4.2.0
comp-asr9k-mini.vm-4.3.0
comp-asr9k-mini.vm-5.1.0
comp-asr9k-mini.vm-5.2.0
comp-asr9k-mini.vm-5.3.0
```

## About the TURBOBOOT Variable

The TURBOBOOT environmental variable automates the software installation process in the ROM Monitor mode and determines the installation settings, such as the boot device (destination disk) for software installation.




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**Note** Running TURBOBOOT from harddisk: with the TURBOBOOT file located on harddisk: is not supported. Save the TURBOBOOT file on TFTP server or on USB drive to successfully install the package.

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The following is the syntax for the TURBOBOOT environmental variable:

**TURBOBOOT=on**,{*boot-device*},{**format** | **clean**},{**nodisablebreak**}

In the preceding example, the TURBOBOOT variable is set to **on**, the boot device (destination disk) is the flash disk in **disk0:**, the installation process formats the disk, and the installation process can be terminated prematurely.

```
TURBOBOOT=on,disk0,format,nodisablebreak
```

There are four main arguments and keywords for the TURBOBOOT variable:

- **on**—Installs and activates the Cisco IOS XR software packages when the RSP is booted with the *vm* image.
- *boot-device*—Selects the destination disk for software installation.
- [**format** | **clean**]: When the **clean** option is selected, the Cisco IOS XR software is completely replaced, but all other files on the disk are preserved, including configuration files. When the **format** option is selected, the Cisco IOS XR software is completely replaced, and only the administration configuration is preserved. All other files on the disk, including all configuration files and all user files, are deleted. The administration configuration contains the configuration that determines default- SDR name and inventory.
- [**nodisablebreak**]: When the **nodisablebreak** flag is added, the installation process using the TURBOBOOT variable can be prematurely terminated by sending a break from the terminal. The default is to ignore breaks from the terminal.




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**Note**

- Each argument is separated by a comma.
- The default boot device disk is disk0:.

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## About the Boot Device (Destination Disk)

The boot device determines the location where the Cisco IOS XR software is installed on all RSPs. The system uses the boot-device to install the software to the other RSP card in the system. Any additional software or software upgrades are automatically saved to the same boot device.

When you install Cisco IOS XR software using the Turboboot method in ROM Monitor mode, you must specify a *boot-device* for the router. The boot device is the local disk on the RSP card where the Cisco IOS XR software is installed.

The Cisco IOS XR package is installed on the boot device (disk0: or disk1:) and the minimal boot image (MBI) is installed on the bootflash: device. The MBI contains the low level Cisco IOS XR drivers and

subsequently makes the full Cisco IOS XR software environment available on the router. The ROM Monitor software loads the MBI from the bootflash: device.

- MBI is always installed on the boot device.
- On the Cisco ASR 9000 Series Router, the supported boot devices are disk0: and disk1:.



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**Note** On the RSP3 card, the Cisco IOS XR software is installed directly on either disk0 or disk1.

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After the Cisco IOS XR software is installed to the boot device using the TURBOBOOT method, all additional software and software upgrades are automatically installed and synchronized to that same boot device and cannot be changed. For example:

- If the Cisco IOS XR software is installed in the RSP card using the TURBOBOOT variable, with disk0 (TURBOBOOT=on,disk0), all packages are installed to disk0: and the boot device is disk0:.
- If the Cisco IOS XR software is installed in the RSP card using the TURBOBOOT variable, with disk1 (TURBOBOOT=on,disk1), all packages are installed to disk1: and the boot device is “disk1:”.
- After you boot the Cisco IOS XR software, you are not allowed to add packages to anywhere other than the boot-device. For example, you cannot boot the DSC to disk1: and decide to add your packages to disk0: or vice versa.



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**Note** We recommend using disk0: as the boot device. Disk0: is pre-installed in most RSPs, which ensures that the correct disk is used to store the software packages on the entire system.

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## Reinstalling Cisco IOS XR Software on Cisco ASR 9000 Series Router



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**Caution** Reinstalling Cisco IOS XR software from ROM Monitor mode replaces the currently installed router software and causes substantial router downtime. We recommend that you install or upgrade software packages from the Administration EXEC mode using package installation envelope (PIE) files, as described in the *Upgrading and Managing Cisco IOS XR Software* module of *System Management Configuration Guide for Cisco ASR 9000 Series Routers*.

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This section includes the following topics:

### Cisco ASR 9000 Series Router Router Installation Overview

When you reinstall the software from ROM Monitor mode, you can perform either of the following procedures:

- Load the Cisco IOS XR software from a vm file on a TFTP server to the RSP.

- Transfer the *vm* file to a local storage device and then load the Cisco IOS XR software from that storage device to the RSP.

## Installation from a TFTP Server

When you install Cisco IOS XR software from a TFTP server to the RSP, you must perform the following tasks:

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system using the **cfs check** command.
3. Place all RSPs in ROM Monitor mode.
4. From the ROM Monitor mode, clear BOOT and TFTP\_FILE ROM Monitor environmental variables on all RSP cards. If disk mirroring is enabled, disable disk mirroring by clearing BOOT\_DEV\_SEQ\_OPER and MIRROR\_ENABLE ROM Monitor environment variables.




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**Note** Restore disk mirroring after the Cisco IOS XR installation is complete using the TURBOBOOT variable. To restore disk mirroring, use the **mirror** command in the global configuration mode. For more information on the **mirror** command, see the “Boot Commands on Cisco IOS XR Software” module in Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference.

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5. Use the **confreg** command in the ROM Monitor mode to set all the RSP cards to MBI Validation Boot Mode or the EXEC mode.
6. On the active RSP, configure the IP parameters (**IP\_ADDRESS**, **DEFAULT\_GATEWAY**, **IP\_SUBNET\_MASK**) for the Management Ethernet interface. These variables are set in ROM Monitor, and are required to access the TFTP server.
7. On the active RSP, configure the TURBOBOOT environment variable to either clean or format the boot disk during the installation. The recommended boot device is disk0:.
8. On the active RSP, boot the Cisco IOS XR software from a *vm* file on the TFTP server.
9. Reset all other RSPs to boot the Cisco IOS XR software.




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**Note** After you boot the Cisco IOS XR software, the TURBOBOOT process either cleans or formats the boot device, based on the TURBOBOOT environment variable setting.

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10. Restore disk mirroring if it was disabled in "Step 4". To restore disk mirroring, use the **mirror** command in the global configuration mode. For more information on the **mirror** command, see the *Boot Commands on Cisco IOS XR Software* module in *Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference*.




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**Caution** If the TURBOBOOT variable is set to format the boot device, the default-SDR configuration is deleted and only the admin configuration is preserved.

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## Reinstalling to a CiscoASR 9000 SeriesRouter from a TFTP Server Image

Cisco IOS XR software can be reinstalled directly from a vm file located on a TFTP server. Complete the instructions in this section exactly as described.

### Reinstalling to a Cisco ASR 9000 Series Router from a TFTP Server Image

#### Before you begin

Before reinstalling Cisco IOS XR software from a TFTP server image, verify that the following prerequisites have been met:

- ROM Monitor firmware on the Cisco ASR 9000 Series Router is compatible with the Cisco IOS XR software image that you are installing.
- The following information is available:
  - IP address of the Management Ethernet interface on the RSP
  - Subnet mask of the Management Ethernet interface on the RSP
  - IP address of the default gateway that serves your router
  - IP address of the TFTP server from which the software will be downloaded
  - The filename and directory of the vm installation file that will be installed on the router
  - Boot device for your system.




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**Note** On the RSP3 card, the ROMMON variable **TFTP\_MGMT\_INTF=port\_no** is not required for a TFTP boot.

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#### SUMMARY STEPS

1. Back up the router configuration while still in EXEC mode.
2. Verify the sanity of the configuration file system. Use **cfs check**
3. **admin**
4. Place all RSP cards in ROM Monitor mode. Use **config-register boot-mode rom-monitor location all** and **reload location all** commands.
5. Clear the ROM Monitor environmental variables on all RSP cards. Use **unset BOOT** command, **unset TFTP\_FILE** command and **sync** command.
6. Clear the ROM Monitor environment variables **BOOT\_DEV\_SEQ\_OPER** and **MIRROR\_ENABLE**, if disk mirroring is enabled. Use **unset BOOT\_DEV\_SEQ\_OPER** command, **unset MIRROR\_ENABLE** command and **sync** command.
7. On the RSP card , set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode. Use **IP\_ADDRESS=ip\_address** command, **IP\_SUBNET\_MASK=mask** command and **DEFAULT\_GATEWAY=ip\_address** command.
8. On the RSP card , set the TFTP environment variables. Use **TFTP\_VERBOSE=print\_setting** command, **TFTP\_RETRY\_COUNT=retry\_count** command, **TFTP\_TIMEOUT=timeout** command, **TFTP\_CHECKSUM=0** command, **TFTP\_SERVER=server\_ip\_addr** command, **TFTP\_MGMT\_INTF=port\_no** command

9. On the RSP card, set the TURBOBOOT variables. Use **TURBOBOOT=on,boot-device,options** command and **sync** command.
10. On the RSP card, boot the vm image located on the tftp server. Use **boot tftp://server/directory/filename**
11. Reset all other RSP cards to boot the Cisco IOS XR software. Use **confreg** and **reset** commands.
12. Restore disk mirroring, if it was disabled in “Step 5”.

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	Back up the router configuration while still in EXEC mode.	(Optional) To preserve the current router configuration, copy it to another disk while still in EXEC mode.
<b>Step 2</b>	<p>Verify the sanity of the configuration file system. Use <b>cfs check</b></p> <p><b>Example:</b></p> <pre>RP/0/RSP0/CPU0:router# cfs check</pre>	<p>(Optional) Verifies the sanity of the router configuration, and resolves any internal inconsistencies.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• This step is necessary only to preserve the router configurations (if TURBOBOOT variable is set to <b>clean</b>). If TURBOBOOT variable is set to <b>format</b>, then the disk is erased and the existing configurations are deleted. The default option is <b>clean</b>.</li> </ul>
<b>Step 3</b>	<p><b>admin</b></p> <p><b>Example:</b></p> <pre>RP/0/RSP0/CPU0:router# admin</pre>	Enters the admin EXEC mode.
<b>Step 4</b>	<p>Place all RSP cards in ROM Monitor mode. Use <b>config-register boot-mode rom-monitor location all</b> and <b>reload location all</b> commands.</p> <p><b>Example:</b></p> <pre>RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor location all RP/0/RSP0/CPU0:router(admin)# reload location all</pre>	
<b>Step 5</b>	<p>Clear the ROM Monitor environmental variables on all RSP cards. Use <b>unset BOOT</b> command, <b>unset TFTP_FILE</b> command and <b>sync</b> command.</p> <p><b>Example:</b></p> <pre>rommon B1&gt; unset BOOT rommon B2&gt; unset TFTP_FILE rommon B3&gt; sync</pre>	<p>Ensures that all RSP cards in the system are prepared for installation using the TURBOBOOT variable. Repeat for each RSP card in the system (LCC).</p> <p>Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.</p> <p>All variable names are case sensitive.</p> <ul style="list-style-type: none"> <li>• Clears the BOOT variable.</li> <li>• Clears the TFTP_FILE variable.</li> <li>• Saves the changes.</li> </ul>

	Command or Action	Purpose
		<p><b>Note</b></p> <ul style="list-style-type: none"> <li>If the <b>unset</b> command displays an error message, it is most likely because the variable you are trying to change is not set. If this is the case, ignore the message and continue.</li> </ul>
<b>Step 6</b>	<p>Clear the ROM Monitor environment variables <b>BOOT_DEV_SEQ_OPER</b> and <b>MIRROR_ENABLE</b>, if disk mirroring is enabled. Use <b>unset BOOT_DEV_SEQ_OPER</b> command, <b>unset MIRROR_ENABLE</b> command and <b>sync</b> command.</p> <p><b>Example:</b> Example</p> <pre>rommon B1&gt; unset BOOT_DEV_SEQ_OPER rommon B2&gt; unset MIRROR_ENABLE rommon B3&gt; sync</pre>	<p>If disk mirroring is enabled, clear the <b>BOOT_DEV_SEQ_OPER</b> and <b>MIRROR_ENABLE</b> ROM Monitor environment variables to disable disk mirroring.</p> <p>All variable names are case sensitive.</p> <ul style="list-style-type: none"> <li>Clears the <b>BOOT_DEV_SEQ_OPER</b> variable.</li> <li>Clears the <b>MIRROR_ENABLE</b> variable.</li> <li>Saves the changes.</li> </ul> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>Restore the disk mirroring settings once the installation is complete using the <b>TURBOBOOT</b> variable. Disk mirroring is restored in the global configuration mode using the <b>mirror</b> command.</li> </ul>
<b>Step 7</b>	<p>On the RSP card , set the environment variables that configure the Management Ethernet interface for use in ROM Monitor mode. Use <b>IP_ADDRESS=ip_address</b> command, <b>IP_SUBNET_MASK=mask</b> command and <b>DEFAULT_GATEWAY=ip_address</b> command.</p> <p><b>Example:</b></p> <pre>rommon B4&gt; IP_ADDRESS=1.1.1.1 rommon B5&gt; IP_SUBNET_MASK=255.255.254.0 rommon B6&gt; DEFAULT_GATEWAY=1.1.0.1</pre>	<p>Enter these settings exactly as shown. All variable names are case sensitive.</p> <ul style="list-style-type: none"> <li>Sets the IP address for the Management Ethernet interface on the RSP card .</li> <li>Sets the subnet mask for the Management Ethernet interface on the RSP card .</li> <li>Identifies the default gateway that serves the RSP card .</li> </ul>
<b>Step 8</b>	<p>On the RSP card , set the TFTP environment variables. Use <b>TFTP_VERBOSE=print_setting</b> command, <b>TFTP_RETRY_COUNT=retry_count</b> command, <b>TFTP_TIMEOUT=timeout</b> command, <b>TFTP_CHECKSUM=0</b> command, <b>TFTP_SERVER=server_ip_addr</b> command, <b>TFTP_MGMT_INTF=port_no</b> command</p> <p><b>Example:</b> Example</p>	<p>(Optional) Enter these settings exactly as shown. All variable names are case sensitive.</p> <ul style="list-style-type: none"> <li><b>TFTP_VERBOSE</b> sets the printer setting: <b>0</b>=quiet, <b>1</b>=progress (default), <b>2</b>=verbose.</li> <li><b>TFTP_RETRY_COUNT</b> sets the retry count for ARP and TFTP (default=18).</li> <li><b>TFTP_TIMEOUT</b> sets the overall timeout of the operation in seconds (default=7200).</li> </ul>

	Command or Action	Purpose
	<pre>rommon B4&gt; TFTP_VERBOSE=0 rommon B5&gt; TFTP_RETRY_COUNT=4 rommon B6&gt; TFTP_TIMEOUT=6000 rommon B7&gt; TFTP_CHECKSUM=0 rommon B8&gt; TFTP_SERVER=223.255.255.254 rommon B9&gt; TFTP_MGMT_INTF=0</pre>	<ul style="list-style-type: none"> <li>• <b>TFTP_CHECKSUM</b> specifies whether or not to perform a checksum test on the image: <b>0</b>=no, <b>1</b>=yes.</li> <li>• <b>TFTP_SERVER</b> sets the IP address of the TFTP server where a bootable software image is located.</li> <li>• <b>TFTP_MGMT_INTF</b> determines the RSP card Management LAN port to use for TFTP. The default value is port <b>0</b>.</li> </ul>
<b>Step 9</b>	<p>On the RSP card , set the TURBOBOOT variables. Use <b>TURBOBOOT=on,boot-device,options</b> command and <b>sync</b> command.</p> <p><b>Example:</b></p> <pre>rommon B9&gt; TURBOBOOT=on,disk0,format rommon B10&gt; sync</pre>	<p>Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (.). These parameters are:</p> <ul style="list-style-type: none"> <li>• To enable the installation process using the TURBOBOOT variable, specify on.</li> <li>• Specify a boot device where all software is installed on the RSP cards. We recommend disk0.</li> <li>• To replace the existing software without formatting the boot device, replace options with clean.</li> <li>• To replace the existing software and format the boot device, replace options with format.</li> <li>• Default option is clean.</li> <li>• Any existing configuration is preserved.</li> </ul>
<b>Step 10</b>	<p>On the RSP card , boot the vm image located on the tftp server. Use <b>boot tftp://server/directory/filename</b></p> <p><b>Example:</b></p> <pre>rommon B11&gt; boot tftp://223.255.254.254/softdir/comp-asr9k-mini.vm</pre>	<p>Retrieves the file from the TFTP server and installs it on the boot disk.</p> <ul style="list-style-type: none"> <li>• Run this command on the RSP card and specify the vm installation file from the TFTP server.</li> <li>• This process removes any existing software packages, resets the configuration register to 0x2, and boots the RSP card .</li> <li>• Allow the system to fully boot. The installation process using the TURBOBOOT variable takes some time. Do not enter any commands until you are prompted to enter a username or until the CLI prompt appears.</li> <li>• “Press RETURN to get started” appears twice. The first occurrence appears when the software is loaded into memory. The second occurrence happens after the software has been installed on the disk.</li> <li>• RSP card is fully booted when the following message appears:  SYSTEM CONFIGURATION COMPLETED</li> </ul>

	Command or Action	Purpose
<b>Step 11</b>	Reset all other RSP cards to boot the Cisco IOS XR software. Use <b>confreg</b> and <b>reset</b> commands.  <b>Example:</b>  <pre>rommon B4&gt; confreg rommon B5&gt; reset</pre>	<ul style="list-style-type: none"> <li>• The <b>confreg</b> command displays a series of prompts to change the configuration register. To reset to EXEC mode, select the boot type as <b>2</b> when prompted.</li> <li>• Sets the configuration register to automatically start the boot process instead of staying in ROM Monitor mode.</li> <li>• Resets the RSP card and starts the boot process.</li> </ul>
<b>Step 12</b>	Restore disk mirroring, if it was disabled in “ <a href="#">Step 5</a> ”.  <b>Example:</b>  <pre>rommon B6 <b>mirror</b></pre>	To restore disk mirroring, use the <b>mirror</b> command in the global configuration mode.

### Reinstalling to a Cisco ASR 9000 Series Router from a TFTP Server Image: Example

The following example shows how to install the Cisco IOS XR software from the TFTP server:

Place all RSPs in ROM Monitor mode:

```
RP/0/RSP0/CPU0:router# admin
RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor
RP/0/RSP0/CPU0:router(admin)# location all
RP/0/RSP0/CPU0:router(admin)# reload location all
```

Clear the ROM Monitor environmental variables on all RSPs:

```
rommon B1 > unset BOOT
rommon B2 > unset TFTP_FILE
rommon B3 > sync
```

Clear the ROM Monitor environment variables for disk mirroring:

```
rommon B1 > unset BOOT_DEV_SEQ_OPER
rommon B2 > unset MIRROR_ENABLE
rommon B3 > sync
```



**Note** Restore disk mirroring settings after the installation is complete using the TURBOBOOT variable. Disk mirroring is restored using the **mirror** command in the global configuration mode. For more information on the **mirror** command, see the “Boot Commands on Cisco IOS XR Software” module in Cisco ASR 9000 Series Aggregation Services Router System Management Command Reference.

Set the IP environment variables to configure the ROM Monitor Management Ethernet interface on the RSP:

```
rommon B4 > IP_ADDRESS=10.1.1.1
rommon B5 > IP_SUBNET_MASK=255.255.254.0
rommon B6 > DEFAULT_GATEWAY=10.1.0.1
```

Enable installation process using the TURBOBOOT variable on the RSP. The following example shows how to boot the router using the specified vm file on the specified TFTP server:

```
rommon B7 > TURBOBOOT=on,disk0,format
rommon B8 > sync
rommon B9 > boot tftp://10.10.10.10/software/comp-asr9k-mini.vm
```

Reset all other RSPs to boot the Cisco IOS XR software:

Respond to the prompts as instructed. Set the boot type as **2** to boot the RSP card in EXEC mode:

```
rommon B11 > reset
```

## Installing Cisco IOS XR Software on Cisco ASR 9000 Series Router from a USB Drive

### Before you begin

Verify that the following prerequisites are met:

- Cisco IOS XR 4.2.0-px4.3.0-px5.1.0-px 5.2.0-px 5.3.0-px file is available in the USB drive.
- RSP 440 is installed.
- Console access to active RSP 440 is available.

### SUMMARY STEPS

1. Verify that the router is in a steady state.
2. Connect a terminal to the RSP card console port and log in to the router.
3. Place all the PSP cards in ROM Monitor mode. Use the **config-register boot-mode rom-monitor location all** command.
4. Insert the USB into the slot on the RSP. Use the **reload location all** command.
5. Use **dir usb**
6. Clear the ROM Monitor environmental variables on all RSP cards. Use **unset BOOT** and **sync** commands.
7. Set the TURBOBOOT variables on the RSP card. Use **TURBOBOOT=on ,disk 0,format** and **sync** commands.
8. Install Cisco IOS XR 4.2.0-px4.3.0-px5.1.0-px 5.2.0-px5.3.0-px from the USB. Use **mediaboot usb:\filename**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	Verify that the router is in a steady state.	Ensures that all configurations are saved and that no installation processes are running.
<b>Step 2</b>	Connect a terminal to the RSP card console port and log in to the router.  <b>Example:</b>	Connects a terminal or PC to the RSP card console port and establishes a router management session.

	Command or Action	Purpose
	rommon B1>	
<b>Step 3</b>	Place all the PSP cards in ROM Monitor mode. Use the <b>config-register boot-mode rom-monitor location all</b> command.  <b>Example:</b>  RP/0/RSP0/CPU0:router(admin)# config-register boot-mode rom-monitor location all	
<b>Step 4</b>	Insert the USB into the slot on the RSP. Use the <b>reload location all</b> command.  <b>Example:</b>  RP/0/RSP0/CPU0:router(admin)# reload location all	Reboots into the ROMMON mode and detects the newly inserted USB drive.  <b>Note</b> After the RSP reboots into ROMMON, use the <b>dev</b> command to list the devices connected to the RSP. Ensure that the device of type <b>compactflash</b> is mounted.
<b>Step 5</b>	Use <b>dir usb</b>  <b>Example:</b>  rommon B1> dir usb	Displays the contents of the USB drive.
<b>Step 6</b>	Clear the ROM Monitor environmental variables on all RSP cards. Use <b>unset BOOT</b> and <b>sync</b> commands.  <b>Example:</b>  rommon B2> unset BOOT rommon B3> sync	Ensures that all RSP cards in the system are prepared for installation using the TURBOBOOT variable. Repeat for each RSP card in the system (LCC). Enter the settings exactly as shown. You must attach a terminal to each card for this procedure.  All variable names are case sensitive.  <ul style="list-style-type: none"> <li>• Clears the BOOT variable.</li> <li>• Saves the changes.</li> </ul> <b>Note</b> If the <b>unset</b> command displays an error message, it is most likely because the variable you are trying to change is not set. If this is the case, ignore the message and continue.
<b>Step 7</b>	Set the TURBOBOOT variables on the RSP card. Use <b>TURBOBOOT=on ,disk 0,format</b> and <b>sync</b> commands.  <b>Example:</b>  rommon B4> TURBOBOOT=on,disk0,format rommon B5> sync	Sets the TURBOBOOT parameters and saves the configuration. Separate each parameter with a comma (.). These parameters are:  <ul style="list-style-type: none"> <li>• To enable the installation process using the TURBOBOOT variable, specify <b>on</b>.</li> <li>• Specify a boot device where all software is installed on the RSP cards. We recommend <b>disk0</b>.</li> <li>• The default option is clean. To replace the existing software without formatting the boot device, replace options with <i>clean</i>.</li> <li>• To replace the existing software and format the boot device, replace options with <i>format</i>.</li> </ul>

	Command or Action	Purpose
<b>Step 8</b>	<p>Install Cisco IOS XR 4.2.0-px4.3.0-px5.1.0-px5.2.0-px5.3.0-px from the USB. Use <b>mediaboot usb:\filename</b></p> <p><b>Example:</b></p> <pre>rommon B6&gt; mediaboot usb:\asr9k-mini-px.vm-4.2.0asr9k-mini-px.vm-4.3.0asr9k-mini-px.vm-5.1.0 asr9k-mini-px.vm-5.2.0asr9k-mini-px.vm-5.3.0</pre>	Starts the boot process for the Cisco IOS XR Software on Cisco ASR 9000 Series Router. With the turboboot option set, all the files are installed on disk0.

## What to Do Next

After the system is up and in EXEC mode, you can execute the full range of CLI commands from the RSP card.



**Note** If there was no previous router configuration, you must enter a root-system username and password when the boot process is complete.

After reinstalling the software, you might want to verify interfaces, install additional packages or perform other configuration tasks:

- For instructions on how to verify that the interfaces are up and properly configured, see Verifying the System Interfaces in the
- Install additional software from the PIE files, as necessary. For more information, see the *Upgrading and Managing Cisco IOS XR Software* module of *Cisco ASR 9000 Series Aggregation Services Router System Management Configuration Guide*.

## Additional References

The following sections provide references related to the ROM Monitor.

## Related Documents

Related Topic	Document Title
Contact a Cisco representative	“Obtaining Additional Publications and Information” in <i>What’s New</i> in Cisco Product Documentation located at: <a href="http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html">http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html</a>
Save current router configuration Verify that interfaces are up and properly configured Install or upgrade software packages from PIE files	<i>Upgrading and Managing Cisco IOS XR Software</i> module of <i>Cisco ASR 9000 Series Aggregation Services Router Getting Started</i>



Related Topic	Document Title
Redundancy slot pairs	<i>Managing the Router Hardware</i> module of <i>Cisco ASR 9000 Series Aggregation Services Router Getting</i>

## Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/support">http://www.cisco.com/support</a>

