

Cisco ASR 1001-X Router Hardware Installation Guide

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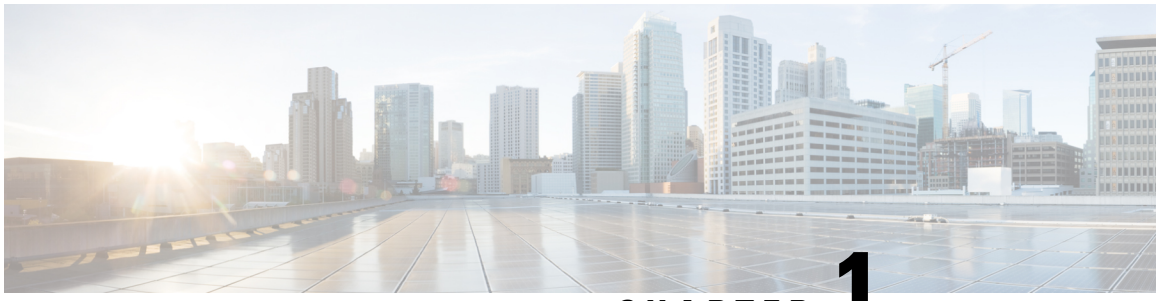
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CHAPTER 1

Cisco ASR 1001-X Router Overview

The Cisco ASR 1000 Series Aggregation Services Routers are mid-range edge routers that establish a new price-to-performance class offering benefits to both enterprise and service providers alike. The Cisco ASR 1000 Series Aggregation Services Routers portfolio is based on an innovative custom-built ASIC called Quantum Flow Processor that aggregates services at scale.

The Cisco ASR 1001-X Router is a part of the Cisco ASR 1000 Series and offers a compact form factor that consumes less rack space and power while offering 20 Gbps forwarding throughput. The Cisco ASR 1001-X Router supports all the general-purpose routing and security features of the Cisco ASR 1000 Series Aggregation Services Routers.

- Hardware Features of the Cisco ASR 1001-X Router, on page 1
- Field-Replaceable Units for the Cisco ASR 1001-X Router, on page 5
- Cisco Product Identification Standard, on page 5
- SPA Slot Numbering, on page 7
- Serial Number and PID/VID Label Location, on page 7

Hardware Features of the Cisco ASR 1001-X Router

The Cisco ASR 1001-X Router supports:

- Up to 16 GB (8 GB in the base configuration) of DDR3 error-correcting code-protected field- replaceable memory, with single-bit error correction and multi-bit error detection.
- A nonmodular and fixed Embedded Services Processor (ESP) with a default throughput of 2.5 Gbps that is upgradable with a software-activated performance license of 5 Gbps, 10 Gbps, or 20 Gbps.
- Up to 8 Gbps security and crypto processing through a dedicated security processor.
- RJ-45 console ports and auxiliary ports, and a mini USB console port.
- One copper Ethernet 10/100/1000 Mbps network management port.
- An embedded USB (eUSB) flash module that supports 8 GB of nonvolatile Flash storage.
- Two USB 2.0 ports for USB flash sticks or USB secure tokens (secure key distribution).
- Stratum 3E network clocking per GR-1244-CORE, using 1588, 10 GE, GE, SPA, or Network Interface Module (NIM) interfaces as timing sources.
- Six built-in 1 GE SFP-only interfaces (do not support SFP+), and two built-in 10 GE SFP+ interfaces (support only 10-GE rate) that support SyncE.
- One half-height SPA bay.
- Software redundancy using Dual IOS, similar to all the other nonhardware redundant routers from the Cisco ASR 1000 Series Aggregation Services Router family.

- LED indicators for Ethernet and console status, as well as visual system state indications.
- Command-line interface (CLI), alarm, network management, logging, statistics aggregation, and on-board failure logging (OBFL).
- Environmental chassis management.
- 10 MB ternary content-addressable memory (TCAM).
- Up to 20 Gbps sustained forwarding data traffic through the chassis.
- One Network Interface Module (NIM) bay.

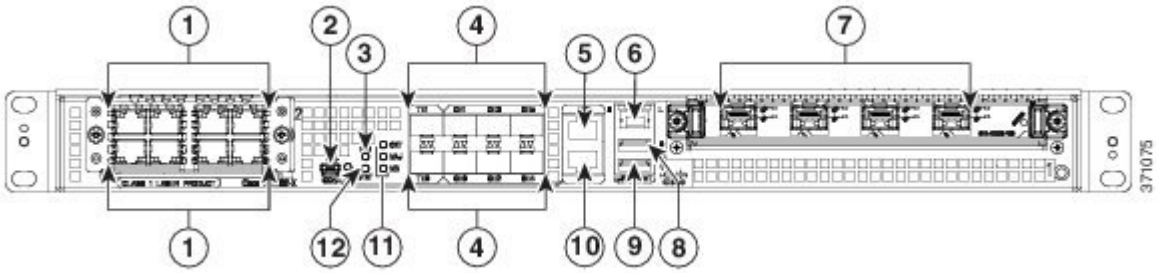
Note The NIM bay supports the T1/E1 NIMs and the Solid State Device (SSD) NIM assembly and drive.

- Field-replaceable units (FRU) with online insertion and removal (OIR).

Cisco ASR 1001-X Overall Chassis Front View

The following figure shows the front of the Cisco ASR 1001-X Router.

Figure 1: Cisco ASR 1001-X Router Front View

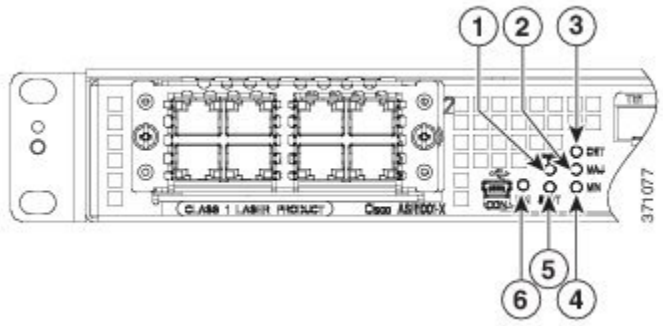


1	NIM slots	7	Shared port adapter slot
2	CON—One mini eUSB por	8	USB port 0
3	PWR—Power LED	9	USB port 1
4	Six built-in 1 GE SFP-only interfaces (do not support SFP+), and two built-in 10 GE SFP+ interfaces (support only 10-GE rate)	10	CON—One RJ-45/RS-232 compatible console port
5	AUX—One RJ-45/RS-232 compatible auxiliary port	11	CRIT LED—Critical alarm indicator MAJ LED—Major alarm indicator MIN LED—Minor alarm indicator
6	MGMT—One RJ-45 10/100/1000 management Ethernet port. The management port has two LEDs, L and S. L green indicates Link operations. S blinks the negotiated Ethernet speed (1 blink equals 10 Mbps, 2 blinks equals 100 Mbps, 3 blinks equals 1 000 Mbps).	12	STAT—Status LED

Cisco ASR 1001-X Router LEDs

The following figure shows the front panel of the Cisco ASR 1001-X Router.

Figure 2: Common LEDs for the Cisco ASR 1001-X Router

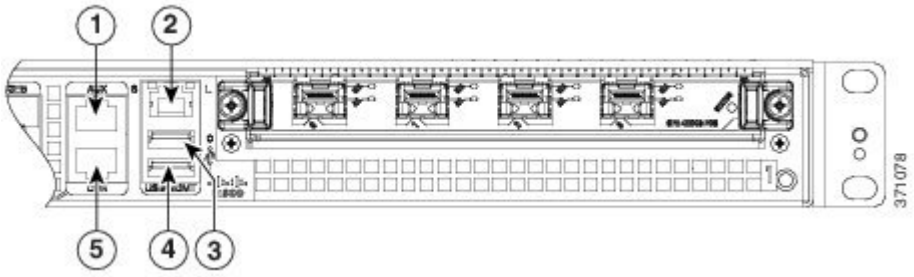


No.	LED Label	LED	Color	Behavior in the Power-Up State
1	PWR	Power	Green	All the power supplies are within operational limits.
2	MAJ	MAJOR	Red	Major alarm indicator.
3	CRIT	CRITICAL	Red	Critical alarm indicator. Will be off when the router is initially powered up and all the configured components are available.
4	MIN	MINOR	Amber	Minor alarm indicator
5	STAT	STATUS	Green	Cisco IOS has successfully booted.
			Yellow	The system is at ROMMON.
			Red	System failure. Will be off when the router is powered up.
6	EN	USB Console Enable	Green	Indicates that the mini eUSB connector is used as the console.
			Off	Indicates that the RJ-45 connector is being used as the console.

Cisco ASR 1001-X Management Storage Connections

The following figure shows the Cisco ASR1001-X Router’s management storage connections.

Figure 3: Management Storage Connections for the Cisco ASR 1001-X Router



1	AUX—One RJ-45/RS-232 compatible auxiliary port.	4	USB port 1
2	MGMT —one RJ-45 10/100/1000 management Ethernet port. The Management Port has two LEDs, L and S. L green indicates Link operations. S blinks the negotiated Ethernet speed (1 blink 10 Mbps, 2 blinks 100 Mbps, 3 blinks, 1 000 Mbps).	5	CON—One RJ-45/RS-232 compatible console port
3	USB port 0		—

Cisco ASR 1001-X Chassis Rear View

The following figure shows the rear of the Cisco ASR 1001-X Router with four fans and two AC or DC power supplies.



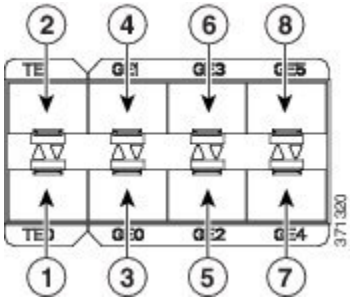
Four internal fans draw cooling air into the chassis and across internal components to maintain an acceptable operating temperature. The fans are located in the center of the chassis. The fans are numbered from 0 to 3, right to left.

Two power supplies, either two AC power supplies or two DC power supplies are accessed from the rear of the router and are hot-swappable.

Note The Cisco ASR 1001-X Router can support two AC or two DC power supplies. Do not install mixed AC and DC power supply units in the same chassis.

Cisco ASR 1001-X SPA GE and TE Ports

The 10 GE SFP+ ports are indicated in the front bezel with orange highlights, and the GE SFP ports are indicated with yellow highlights. The following figure shows the port numbering for the 10 GE SFP+ and GE SFP ports.



1	10 GE SFP+ Port 0/0/0	5	GE SFP Port 0/0/2
2	10 GE SFP+ Port 0/0/1	6	GE SFP Port 0/0/3
3	GE SFP Port 0/0/0	7	GE SFP Port 0/0/4
4	GE SFP Port 0/0/1	8	GE SFP Port 0/0/5

Field-Replaceable Units for the Cisco ASR 1001-X Router

The Cisco ASR 1001-X Router has a number of FRUs. These include:

- SPAs
- Dual In-line Memory Modules (DIMMs)
- NIMs
- SSD and SSD NIM assembly
- USB flash or secure token memory stick
- AC and DC power supplies

For more information, see "Removing and Replacing FRUs from the Cisco ASR 1001-X Router" .

Cisco Product Identification Standard

This section describes the Cisco products and services product identification standard. This feature provides you with the ability to effectively integrate and manage Cisco products in your network and business operations.

Unique Device Identifier

The Unique Device Identifier (UDI) is the Cisco product identification standard for hardware products. A product identification standard removes barriers to enterprise automation and can help you reduce operating expenses.

The UDI provides a consistent electronic, physical, and associated business-to-business information product identification standard.

The UDI is a combination of five data elements. The below table lists the UDI elements.

Table 1: UDI Elements

UDI Data Element	Electronic Visibility	Physical Visibility	Description
PID	Yes	Yes	Product ID, also known as product name, model name, product number
VID	Yes	Yes	Version ID
SN	Yes	Yes	Serial number, the unique instance of the PID
Entity Name	Yes	—	Type, such as chassis, slot, or power supply
Product Description	Yes	—	Additional product information

The combination of serial number and product ID (PID) is unique and consistent across all Cisco products. The PID that is coded on hardware is called a base product identifier.

Additional orderable PIDs can be associated to a base PID. For instance, an orderable PID may describe a packaging configuration for a product or a bundled group of products sold, tested, and shipped together. Specific unique device identifier (UDI) benefits include the following:

- Identifies:
  - Individual Cisco products in your networks
  - PIDs and serial numbers for service and replaceable products
  - Version IDs (VIDs) for product version visibility
- Facilitates discovery of products subject to recall or upgrade
- Enhances inventory automation of Cisco products

The Cisco product identification standard provides the following features:

- Version visibility—Cisco continuously improves products through feature additions. Product changes are indicated by incrementing the VID, which provides version visibility to help you understand and manage product changes. VID management ensures consistency of changes from product to product.
- Operating expense reduction—Cisco UDIs provide accurate and detailed network inventory information; identifying each Cisco product in a network element through a standard interface. Cisco operating systems can view and use this data, allowing you to automate your electronic inventory.
- Consistency across product layers—The UDIs are embedded in the hardware products and cannot be overwritten. Operating and management systems discover UDIs through standard interfaces and display UDIs in standard outputs. Standard interfaces include the IETF standard ENTITY-MIB.

show diag subslot eeprom Command

The **show diag subslot eeprom** command displays the PID, VID, PCB serial number, hardware revision, and other such information.

The following is sample output from the **show diag subslot eeprom** command:

```
Router# show diag subslot 0/0 eeprom
MIDPLANE EEPROM data:
        Product Identifier (PID) : ASR1001-X
        Version Identifier (VID) : V00
        PCB Serial Number        : JAE17450EUV
        Top Assy. Part Number    : 68-4703-06
        Hardware Revision        : 0.1
```

```
Asset ID                  :
CLEI Code                 : CMMP410DRA
```

Note Common Language Equipment Identification (CLEI) code is a ten-digit character code that identifies a specific product. A CLEI code is applied to each part within a Cisco ASR1001-X Router as they are programmed in manufacturing for shipment to customers.

show license udi Command

The **show license udi** command displays UDI information.

The following is sample output from the **show license udi** command:

```
Router# show license udi
SlotID   PID                    SN                      UDI
-------------------------------------------------------------------------------
*6       ASR1001-X              JAE17190302     ASR1001-X:JAE17190302
```

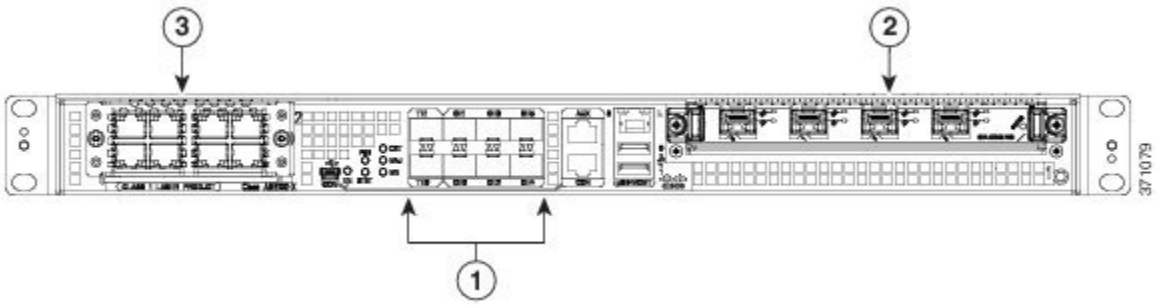
Note For complete information on the product identification standard, see http://www.cisco.com/go/udi/

SPA Slot Numbering

A shared port adapter (SPA) is a modular type of port adapter that can be inserted into a subslot to provide network connectivity and increased interface port density. The Cisco ASR 1001-X Router supports one flexible integrated NIM slot and one half-height SPA bay.

The following figure shows slot numbering on the Cisco ASR 1001-X Router.

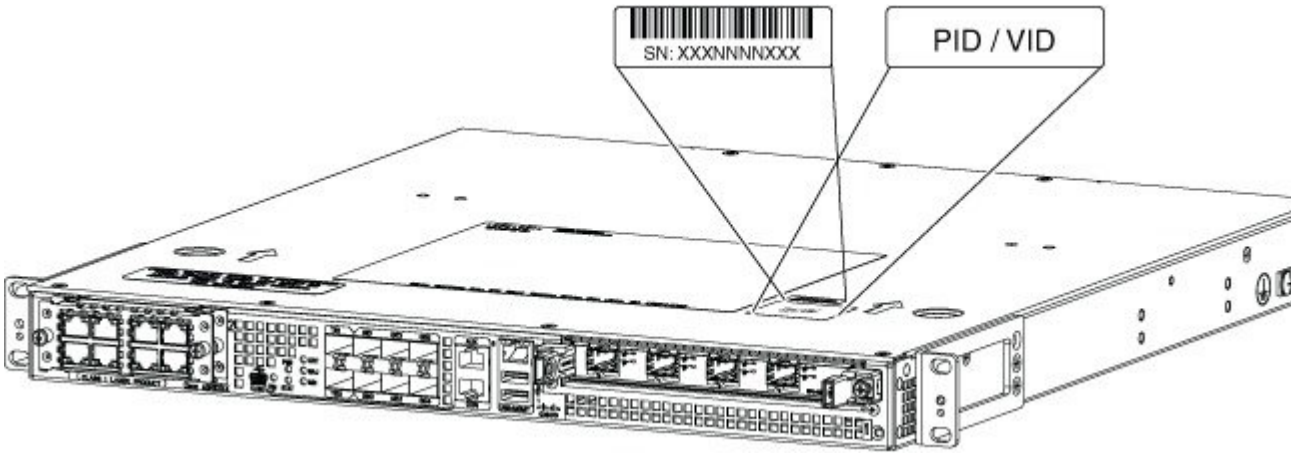
Figure 4: Cisco ASR 1001-X Router Slot Numbering

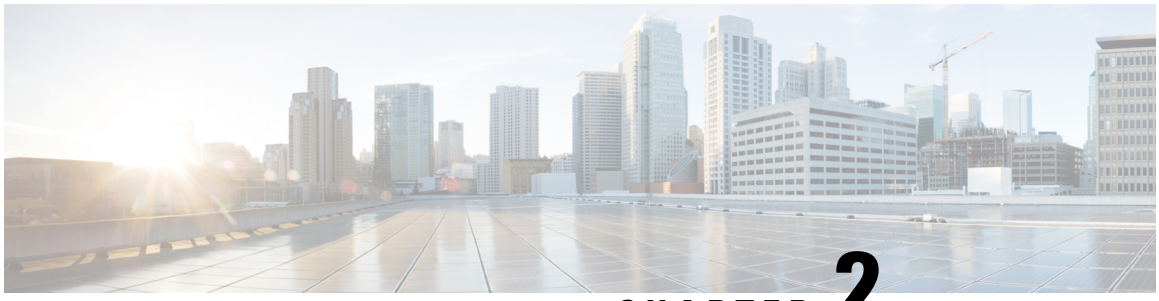


Serial Number and PID/VID Label Location

The following figure shows a Cisco ASR 1001-X Router chassis along with the location of the serial number and the PID/VID label.

Figure 5: Cisco ASR 1001-X Router Serial Number and PID/VID Label Location





CHAPTER 2

Cisco ASR 1001-X Router Supported Hardware Components

This chapter contains information about the supported hardware components on the Cisco ASR 1001-X Router, and contains the following sections:

- Supported Hardware Components, on page 9
- Supported Half-Height SPAs, on page 10
- Supported Small Form-Factor Pluggable (SFP and SFP+) Transceivers, on page 11
- Supported NIMs, on page 13
- Cisco ASR 1001-X Router Power Supplies, on page 14

Supported Hardware Components

The following table lists the hardware components supported on the Cisco ASR 1001-X Router.

Table 2: Supported Hardware Components

Component	Description
Chassis	1 RU form factor
Ethernet Ports	Six built-in Gigabit Ethernet and two built-in 10-Gigabit Ethernet ports
ESP	A nonmodular, fixed ESP with a default throughput of 2.5 Gbps, which is upgradable with a software-activated performance license of 5 Gbps, 10 Gbps, or 20 Gbps.
Route Processor	Single integrated route processor
SIP	Integrated SIP
SPA Slots	1 half-height (HH) SPA bay
NIM Slots	1
USB Slots	2

Supported Half-Height SPAs

The following table lists the supported half-height SPAs on the Cisco ASR 1001-X Router.Supported Half-Height SPAs

Table 3: Supported Half-Height SPAs

PID	Description
SPA-1X10GE-L-V2	Cisco 1-Port 10GE LAN-PHY
SPA-1XCHSTM1/OC3	1-port Channelized STM-1/OC-3c to DS0
SPA-1XOC12-POS	1-port OC12/STM4 POS
SPA-2XOC12-POS	2-port OC12/STM4 POS
SPA-4XOC12-POS	4-port OC-12/STM-4 POS
SPA-8XOC12-POS	8-port OC12/STM4
SPA-1XOC3-ATM-V2	1-port OC-3c/STM-1 ATM
SPA-2X1GE-V2	Cisco 2-Port Gigabit Ethernet
SPA-2XCT3/DS0	2-port Channelized T3 to DS0
SPA-2XOC3-POS	2-port OC3/STM1 POS
SPA-8XOC3-POS	8-port OC-3/STM-1 POS
SPA-1XOC48POS/RPR	1-port OC48/STM16 POS/RPR
SPA-2XOC48POS/RPR	2-port OC48/STM16 POS/RPR
SPA-2XT3/E3	2-port Clear Channel T3/E3
SPA-3XOC3-ATM-V2	3-port OC-3c/STM-1 ATM
SPA-4X1FE-TX-V2	Cisco 4-Port Fast Ethernet (TX)
SPA-4XCT3/DS0	4-port Channelized T3 to DS0
SPA-4XOC3-POS	4-port OC3/STM1 POS
SPA-4XOC48POS/RPR	4-port OC48/STM16 POS/RPR Shared Port Adapters
SPA-OC192POS-XFP	1-port OC192/STM64 POS/RPR XFP Optics
SPA-4XT-SERIAL	Cisco 4-port serial SPA
SPA-4XT3/E3	4-port Clear Channel T3/E3
SPA-5X1GE-V2	Cisco 5-Port Gigabit Ethernet

PID	Description
SPA-8X1FE-TX-V2	Cisco 8-Port Fast Ethernet (TX)
SPA-8X1GE-V2	Cisco 8-Port Gigabit Ethernet
SPA-8XCHT1/E1	8-port Channelized T1/E1 to DS0
SPA-1XOC12-ATM-V2	1-port OC12 STM
SPA-DSP	Digital Signal Processor SPA
SPA-1X10GE-WL-V2	Cisco 1-port 10GE LAN/WAN-PHY
SPA-2CHT3-CE-ATM	2-Port Channelized T3/E3 ATM and Circuit Emulation SPA
SPA-4XOC3-POS-V2	4-port OC-3/STM-1 POS
SPA-2X1GE-SYNCE[1]	Cisco Synchronous Ethernet SPA
SPA-8XT3/E3	Cisco 8-Port Clear Channel T3/E3 Shared Port Adapter
SPA-24CHT1-CE-ATM	Cisco 24 Port T1/E1/J1 Circuit Emulation SPA
SPA-1CHSTM1/OC3V2	1-Port Channelized OC-3/STM-1 SPA, Version 2
SPA-1XOC12-POS-V2	1-Port OC-12C/STM-4 Multirate POS SPA (license)
SPA-2XOC3-POS-V2	2-Port OC-3C/STM-1 POS SPA (license)
SPA-2XCT3/DS0-V2	2-Port Channelized T3 SPA, Version 2
SPA-4XCT3/DS0-V2	4-Port Channelized T3 SPA, Version 2
SPA-2XT3/E3-V2	2-Port Clear Channel T3/E3 SPA, Version 2
SPA-4XT3/E3-V2	4-Port Clear Channel T3/E3 SPA, Version 2
SPA-8XCHT1/E1-V2	8-Port Channelized T1/E1 SPA, Version 2

[1] There is a limitation for clock switchover scenarios between the Cisco ASR 1001-X Router's built-in ports and the SPA-2X1GE-SYNCE. All the other functionalities on the SPA-2X1GE-SYNCE are supported.

Supported Small Form-Factor Pluggable (SFP and SFP+) Transceivers

The tables below list the supported SFP optics and SFP copper interfaces on the Cisco ASR 1001-X Router.

Table 4: Supported 1 GE SFP Optics and SFP Copper Interfaces

PID	Description
SFP-GE-S	1000BASE-SX SFP (DOM)
GLC-SX-MMD	1000BASE-SX SFP transceiver module, MMF, 850nm, DOM
SFP-GE-L	1000BASE-LX/LH SFP (DOM)
GLC-LH-SMD	1000BASE-LX/LH SFP transceiver module, MMF/SMF, 1310nm, DOM
SFP-GE-Z	1000BASE-ZX Gigabit Ethernet SFP (DOM)
SFP-GE-T	1000BASE-T SFP (NEBS 3 ESD)
GLC-BX-U	1000BASE-BX SFP, 1310NM
GLC-BX-D	1000BASE-BX SFP, 1490NM
GLC-TE	1000BASE-T SFP transceiver module for category 5 copper wire
GLC-EX-SMD	GE SFP, LC Connector, EX transceiver
GLC-ZX-SMD	1000BASE-ZX SFP transceiver module, SMF, 1550nm, DOM
DWDM-SFP	1000BASE DWDM
CWDM-SFP	1000BASE CWDM
GLC-BX40-D-I	1000BASE BX40-D
GLC-BX40-DA-I	1000BASE BX40-DA
GLC-BX40-U-I	1000BASE BX40-U
GLC-BX80-D-I	1000BASE BX80-D
GLC-BX80-U-I	1000BASE BX80-U
GLC-GE-100FX	100BASE-FX



Note ASR1001-X does not support GLC-SX-MM and GLC-LH-SM. You can use GLC-SX-MMD instead of GLC-SX-MM and GLC-LH-SMD instead of GLC-LH-SM.

Table 5: Supported 10 GE SFP Optics and SFP Copper Interface

PID	Description
SFP-10G-SR	10GBASE-SR SFP+ Module for MMF
SFP-10G-SR-X	10GBASE-SR SFP Module for Extended Temp range

PID	Description
SFP-10G-LR	10GBASE-LR SFP+ Module for SMF
SFP-10G-LR-X	10GBASE-LR SFP Module for Extended Temp range
SFP-10G-ER	10GBASE-ER SFP+ Module for SMF

Supported NIMs

The Cisco ASR 1001-X Router supports the following NIM form factors:

NIM-SSD

The following table lists the supported NIM with Solid State Disk (SSD) on the Cisco ASR 1001-X Router:

Table 6: Supported NIM SSDs

Part Number	Description
NIM-SSD	NIM Carrier Card for SSD drives
SSD-SATA-200G	200 GB, SATA Solid State Disk
SSD-SATA-400G	400 GB, SATA Solid State Disk

NIM-T1/E1

The following table lists the supported T1/E1 NIMs on the Cisco ASR 1001-X Router:

Table 7: Supported NIM-T1/E1s

Part Number	Number of Ports	Clear-Channel Data	MFT Packet Voice	Unstructured E1 (G.703) Support	Channelized Data
NIM-1MFT-T1/E1	1	Yes	No	No	No
NIM-2MFT-T1/E1	2	Yes	No	No	No
NIM-4MFT-T1/E1	4	Yes	No	No	No
NIM-8MFT-T1/E1	8	Yes	No	No	No
NIM-1CE1T1-PRI	1	Yes	No	Yes	Yes
NIM-2CE1T1-PRI	2	Yes	No	Yes	Yes
NIM-8CE1T1-PRI	8	Yes	No	Yes	Yes

Note Each port of NIM-8CE1T1-PRI supports only 15 channel groups. If any additional channel groups are created, the following error is displayed:

Insufficient resources to create channel group.

Cisco ASR 1001-X Router Power Supplies

The Cisco ASR 1001-X Router supports AC and DC power supply options. The modular chassis configurations support the installation of two power supplies for redundancy. When an external power supply fails or is removed, the other power supply provides power requirements for the chassis. This allows you to hot-swap the power supply without impacting the functionality of the router.

Power Supplies for the Cisco ASR 1001-X Router

Each Cisco ASR 1001-X Router power supply provides 250 W of output power. The power supplies are used in a 1 + 1 redundant configuration. There is no input switch on the faceplate of the power supplies. A power supply is switched from Standby to On by way of a system chassis STANDBY/ON switch. When facing the rear of the chassis, power supply slot 0 (PS0) is to the left (next to the power supply standby switch) and power supply slot 1(PS1) is to the right.

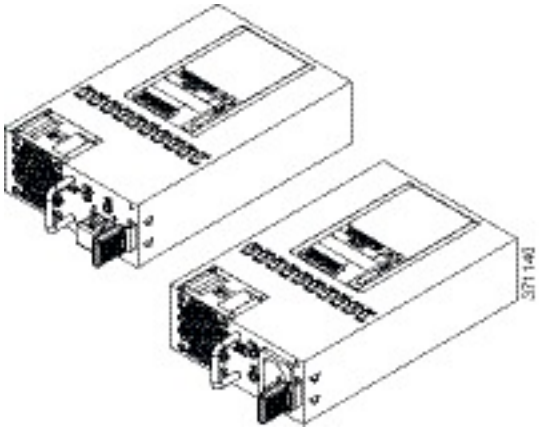
The Cisco ASR 1001-X Router supports the following power supplies:

- Cisco ASR 1001-X Router AC power supply—Provides 250 W output power with DC voltage output of +12 V. The AC power supply operates between +85 and +264 VAC. The AC power supply current shares on the 12 V output and is used in a dual hot pluggable configuration.
- Cisco ASR 1001-X Router DC power supply—Provides 242 W output power with DC voltage output of +12 V. The power supply operates between –40 and –72 VDC. The DC power supply current shares on the 12 V output and is used in a dual hot-pluggable configuration.

Note The Cisco ASR 1001-X Router can support two AC or two DC power supplies. Do not install mixed AC and DC power supply units in the same chassis.

The following figure shows both the DC and AC power supplies for the Cisco ASR 1001-X Router.

Figure 6: Cisco ASR 1001-X Router DC Power Supply and AC Power Supply



Cisco ASR 1001-X Power Supply Fans

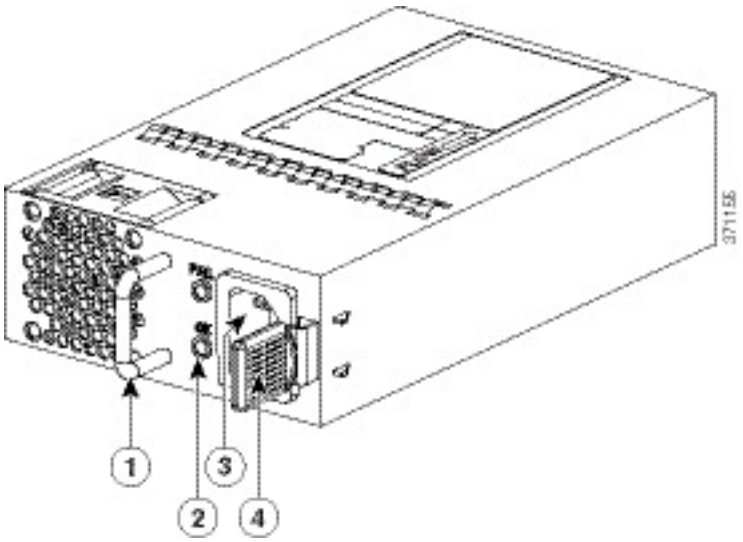
The fans in the power supply module of the Cisco ASR 1001-X Router are used for cooling the power supply module itself while system-level cooling is provided by four fans within the chassis. The power supplies do not depend on the system-level fans for cooling. Fan failure is determined by fan-rotation sensors.

Note The fans in the power supply modules will run as soon as the power supply is plugged in, even if the Standby switch is in the Standby position.

Cisco ASR 1001-X Router AC Power Supply

The Cisco ASR 1001-X Router has two AC power supplies in the rear of the chassis. The input receptacle is an IEC60320 C14 type of filtered AC inlet. The current rating on the connector is 10 A. The following figure shows the Cisco ASR 1001-X Router AC power supply.

Figure 7: Cisco ASR 1001-X Router AC Power Supply



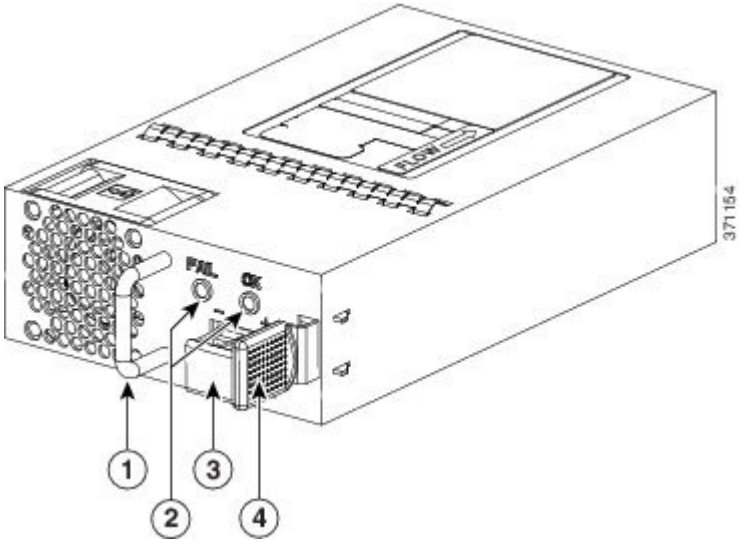
1	Handle	3	AC power connector
2	FAIL and OK LEDs	4	Retaining latch

Cisco ASR 1001-X Router DC Power Supply

The Cisco ASR 1001-X Router DC input connector is a two-wire connector with connection polarity from left to right (when facing the unit) of negative (–) positive (+).

The power supply has a handle to be used for insertion and extraction. The module must be supported with one hand because of its length. The following figure shows the Cisco ASR 1001-X Router DC power supply.

Figure 8: Cisco ASR 1001-X Router DC Power Supply



1	Handle	3	DC power connector
2	FAIL and OK LEDs		Retaining latch

AC/DC Power System Input Range and Voltage for the Cisco ASR 1001-X Router

The power supply DC Input Range is –40 to –72 VDC, and the AC Input Range is +85 to +264 VAC. The following table describes the Cisco ASR 1001-X Router power supply LEDs.

Table 8: Cisco ASR 1001-X Router—AC and DC Power Supply LEDs

LED Color and State	Description
OK - (Solid green)	Input power is on and within the normal operating range. On the AC unit, the LED is solid green when the system in powered on. When the system is powered off, the LED will blink until the AC power is removed.
OK - (Blinking Green at the rate of one blink per second)	Input power that is within the normal operating range is being supplied, but the Standby switch is in the Standby position (and not in the On position).
Fail - (Red)	Power output has failed.
Off	Power supply is shut down.

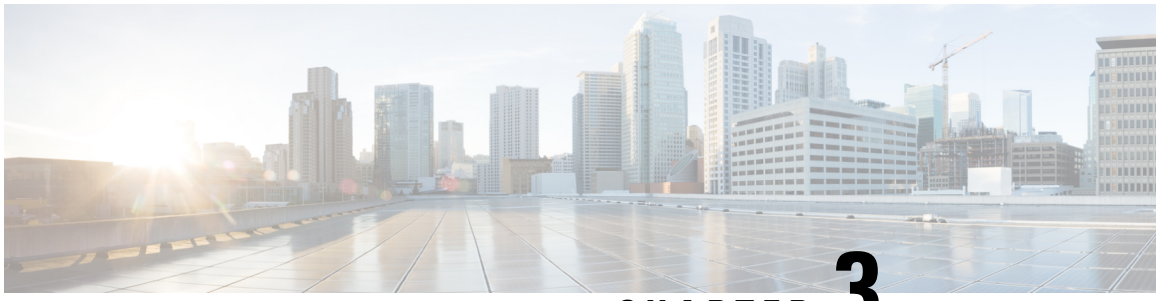
Power Cords Supported by the Cisco ASR 1001-X Router

The following table lists the power cords that are supported by the Cisco ASR 1001-X Router.

Table 9: Power Cords Supported by the Cisco ASR 1001-X Router

Power Cord Item Number	Description
CAB-AC	Power Cord, 110 V
CAB-ACA Plug	Power Cord, Australia, 10 A
CAB-ACC	Power Cord, China
CAB-ACE AC	Power Cord, Europe, C13, CEE 7, 1.5 M
CAB-ACI AC	Power Cord, Italy, C13, CEI 23-16, 2.5 m
CAB-ACR AC	Power Cord, Argentina, C13, EL 219 (IRAM 2073), 2.5m
CAB-ACS AC	Power Cord, Switzerland, C13, IEC 60884-1, 2.5 m
CAB-ACU AC	Power Cord, UK, C13, BS 1363, 2.5 m
CAB-IND AC	Power Cord, India

Power Cord Item Number	Description
CAB-JPN AC	Power Cord, Japan, C13, JIS C 8303, 2.5 m
CAB-L620P-C13-US	Power Cord, 250 VAC, 15A, NEMA L6-20 to C13, U.S.
CAB-L620P-C13-JPN	Power Cord, 250 VAC, 15A, NEMA L6-20 to C13, Japan
CAB-C13-CBN Cabinet Jumper	Power Cord, 250 VAC 10 A, C14-C13 Connectors
CAB-C13-C14-JMPR Cabinet Jumper	Power Cord, 250 VAC 13 A, C14-C15 Connector
CAB-C13-C14-2M	Power Cord Jumper, C13-C14 Connectors, 2-Meter Length
CAB-C13-C14-AC	Power Cord Jumper, C13-C14 Connectors, 3-Meter Length



CHAPTER 3

Preparing Your Site for Installation

This chapter contains important safety information you should know before working with the Cisco ASR 1001-X Router, and guides you through the process of preparing your site for router installation.

This chapter contains the following sections:

- Prerequisites and Preparation , on page 19
- Safety Guidelines , on page 20
- Compliance Requirements, on page 21
- Cautions and Regulatory Compliance Statements for NEBS , on page 22
- Standard Warning Statements, on page 23
- Site Planning, on page 26
- Preventing Electrostatic Discharge Damage, on page 35
- Electrical Safety, on page 35
- Chassis-Lifting Guidelines, on page 36
- Tools and Equipment, on page 36
- Checking the Shipping Container Contents, on page 37
- Cisco ASR 1001-X Router Installation Checklist, on page 38

Prerequisites and Preparation

Before you perform the procedures in this guide, we recommend that you:

- Read the safety guidelines in the next section and review the electrical safety and ESD-prevention guidelines in this guide.
- Ensure that you have all of the necessary tools and equipment (see the “Tools and Equipment”section).
- Ensure that you have access to the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide* (an online document that is available for viewing or download at Cisco.com) during the installation.
- Ensure that the power and cabling requirements are in place at your installation site.
- Ensure that the equipment required to install the router is available.
- Ensure that your installation site meets the environmental conditions to maintain normal operation.

Before installing the Cisco ASR 1001-X Router, you must consider power and cabling requirements that must be in place at your installation site, special equipment for installing the router, and the environmental conditions your installation site must meet to maintain normal operation.

The shipping package for the router is engineered to reduce the chances of product damage associated with routine material handling experienced during shipment:

- Router should always be transported or stored in its shipping package in the upright position.
- Keep the router in the shipping container until you have determined the installation site.



Note Inspect all items for shipping damage. If an item appears damaged, contact a Cisco customer service representative immediately.

Site Planning Checklist

Use the following checklist to perform and account for all the site-planning tasks described in this chapter:

- The site air conditioning system can compensate for the heat dissipation of the Cisco ASR 1001-X Router.
- Electrical service to the site complies with the requirements.
- The electrical circuit servicing the Cisco ASR 1001-X Router complies with the requirements.
- Consideration has been given to console port wiring and limitations of the cabling involved, according to TIA/EIA-232F.
- The Cisco ASR 1001-X Router Ethernet cabling distances are within limitations.
- The equipment rack in which you plan to install the Cisco ASR 1001-X Router chassis complies with requirements. Careful consideration has be given to safety, ease of maintenance, and proper airflow in selecting the location of the rack.

Safety Guidelines

Before you begin the installation or replacement procedure, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment.



Note This section contains guidelines, and do not include every potentially hazardous situation. When you install a router, always use common sense and caution.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement.

Before you install, configure, or perform maintenance on the router, review the documentation for the procedure you are about to perform, paying special attention to the safety warnings.



Note Do not unpack the system until you are ready to install it. Keep the chassis in the shipping container to prevent accidental damage until you determine an installation site. Use the appropriate unpacking documentation included with the system.

Read the installation instructions in this document before you connect the system to its power source. Failure to read and follow these guidelines could lead to an unsuccessful installation and possibly damage the system and components.

Safety Recommendations

The following guidelines will help to ensure your own safety and protect your Cisco equipment. This list does not cover all potentially hazardous situations, so *be alert* .

- Cisco safety policy mandates that all its routers must conform to the requirements of IEC 60950, with appropriate national deviations, as a minimum. In addition, Cisco routers must also meet the requirements of any other normative documents, for example, standards, technical specifications, laws or regulations.
- Review the safety warnings listed in Regulatory Compliance and Safety Information for the Cisco ASR 1000 Series Aggregation Services Routers that accompanies your Cisco ASR 1001-X Router, before installing, configuring, or maintaining the router.
- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Always turn all power supplies off and unplug all power cables before opening the chassis.
- Always unplug the power cable before installing or removing a chassis.
- Keep the chassis area clear and dust free during and after installation.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis. Fasten your tie or scarf and sleeves.
- The Cisco ASR 1001-X Router operates safely when it is used in accordance with its marked electrical ratings and product-usage instructions.

Compliance Requirements

This section includes Safety Compliance and Network Equipment Building Systems (NEBS) standards. The Cisco ASR 1001-X Router is in compliance with national and international standards, as described in the below table.

You must observe the following safety guidelines when working with any equipment that connects to electrical power or telephone wiring. These guidelines help you avoid injuring yourself or damaging the devices.



Note The NEBS information is for reference. The Cisco ASR 1001-X Router is not NEBS certified.

Table 10: Compliance Requirements

EMC/Safety Compliance and NEBS Requirements	
Specification	Description

EMC/Safety Compliance and NEBS Requirements	
EMC/Safety	**Caution** Shielded twisted pair T1/E1 cables must be used with the 8-port channelized T1/E1 SPA interfaces in any Cisco ASR 1000 chassis. This is required for compliance with Class A emission requirements for EMC. **Caution** Shielded twisted pair T1/E1 cables must be used with any of the T1/E1 NIM interfaces in any Cisco ASR 1000 chassis. This is required for compliance with Class A emission requirements for EMC.
Telcordia NEBS GR-1089-Core Statement	**Caution** To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, for Ethernet RJ-45 ports, use only shielded Ethernet cables that are grounded on both ends. In a NEBS installation, all Ethernet ports are limited to intrabuilding wiring.

Note The English warnings in this document are followed by a statement number. To see the translations of a warning in other languages, look up its statement number in Regulatory, Compliance, and Safety Information for the Cisco Aggregation Services Router 1000 Series .

Cautions and Regulatory Compliance Statements for NEBS

The following table lists cautions, regulatory compliance statements, and requirements for the Network Equipment-Building System (NEBS) certification from the Telcordia Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment (A Module of LSSGR, FR-64; TSGR, FR-440; and NEBSFR, FR-2063) Telcordia Technologies Generic Requirements, GR-1089-CORE.

Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.
Caution To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, for Ethernet RJ-45 ports, use only shielded Ethernet cables that are grounded on both ends. In a NEBS installation, all Ethernet ports are limited to intrabuilding wiring.
Caution The intrabuilding ports of the equipment or subassembly are only suitable for connection to intrabuilding or unexposed wiring or cabling. The intrabuilding ports of the equipment or subassembly *must not* be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use only as intrabuilding interfaces (Type 2 or Type 4 ports as described in GR-1089-CORE), and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

Products that have an AC power connection are intended for deployments where an external surge protective device (SPD) is used at the AC power service equipment as defined by the National Electric Code (NEC).
This product is designed for a common bonding network (CBN) installation.
This product can be installed in a network telecommunication facility or location where the NEC applies.
An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or nonconductive coatings and establish a metal-to-metal contact. Any paint or other nonconductive coatings shall be removed on the surfaces between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before installation.
The grounding architecture of this product is DC-isolated (DC-I).
DC-powered products have a nominal operating DC voltage of 48 VDC. Minimal steady-state DC operating voltage is 40.5 VDC. Reference American National Standards Institute (ANSI) T1.315, Table 1.

Standard Warning Statements

This section describes the warning definition and then lists core safety warnings grouped by topic.



Danger This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.Note: SAVE THESE INSTRUCTIONSStatement 1071

General Safety Warnings



Danger Read the installation instructions before you connect the system to its power source. Statement 1004



Danger Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040



Danger No user-serviceable parts inside Do not open. Statement 1040

Danger Installation of the equipment must comply with local and national electrical codes. Statement 1074

Danger Shielded twisted pair T1/E1 cables must be used with the 8-port channelized T1/E1 SPA interfaces in any Cisco ASR 1000 chassis. This is required for compliance with Class A emission requirements for EMC.

Danger Shielded twisted pair T1/E1 cables must be used with any of the T1/E1 NIM interfaces in any Cisco ASR 1000 chassis. This is required for compliance with Class A emission requirements for EMC.

Danger To comply with Class A emissions requirements- shielded management Ethernet, CON, and AUX cables on the Cisco ASR 1001-X Router must be used.

Danger Power cable and AC adapter - When installing the product, please use the provided or designated connection cables/power cables/AC adapters. Using any other cables or adapters could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of certified cables (that have the 'UL' shown on the code) for any other electrical devices than products designated by Cisco. The use of cables that are certified by Electrical Appliance and Material Safety Law (that have 'PSE' shown on the code) is not limited to Cisco-designated products. Statement 371

Danger Only trained and qualified personnel should be allowed to install or replace this equipmentStatement 1030

Danger This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: AC power supply for the Cisco ASR 1001-X Router: 120 VAC, 30A U.S. maximum. DC power supply for the Cisco ASR 1001-X Router: 30A U.S. maximum. Statement 1005

Danger This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045

Danger This unit may have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028



Danger This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



Danger The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device. Statement 1019



Danger Hazardous voltage or energy may be present on the DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place. Statement 1075



Danger Use copper conductors only. Statement 1025



Danger This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024



Danger Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing. Statement 1034



Danger Class 1 laser product. Statement 1008



Danger Class 1 LED product. Statement 1027



Danger Laser radiation is present when the system is open. Statement 1009



Danger Do not stare into the laser beam. Statement 1010



Danger Class I(CDRH) and Class 1M (IEC) laser products. Statement 1055



Danger Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard. Statement 1056



Danger There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Statement 1015



Danger Do not touch or bridge the metal contacts on the battery. Unintentional discharge of the batteries can cause serious burns. Statement 341



Danger To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit. Statement 1032



Danger To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 40 degrees C. Statement 1047



Danger This equipment must be externally grounded using a customer-supplied ground wire before power is applied. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 366



Danger Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029

Site Planning

This section contains site-planning information, and will help you plan for the installation of the Cisco ASR 1001-X Router.

General Precautions

Observe the following general precautions when using and working with your Cisco ASR 1001-X Router:

- Keep your system components away from radiators and heat sources and do not block cooling vents.
- Do not spill food or liquids on your system components and never operate the product in a wet environment.
- Do not push any objects into the openings of your system components. Doing so can cause fire or electric shock by shorting out interior components.
- Position system cables and power supply cable carefully. Route system cables and power supply cable and plug such that they cannot be stepped on or tripped over. Be sure that nothing else rests on your system component cables or power cable.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local and national wiring rules.
- If you turn off your system, wait at least 30 seconds before turning it on again to avoid system component damage.

Site Selection Guidelines

The Cisco ASR 1001-X Router requires specific environmental operating conditions. Temperature, humidity, altitude, and vibration can affect the performance and reliability of the router. The following sections provide specific information to help you plan for a proper operating environment.

The Cisco ASR 1001-X Router is designed to meet the industry EMC, safety, and environmental standards described in the Regulatory, Safety, and Compliance Information for Cisco ASR 1000 Series Aggregation Services Routers document.

Site Environmental Requirements

Environmental monitoring protects the system and components from damage caused by excessive voltage and temperature conditions. To ensure normal operation and avoid unnecessary maintenance, plan and prepare your site configuration *before* installation. After installation, make sure the site maintains the environmental characteristics, as shown in the below table.

Table 11: Cisco ASR 1001-X Router Environmental Tolerance

Environmental Characteristic	Minimum	Maximum
Operating temperature (nominal)	0° C	40° C (40° C up to 10,000 feet)
Operating temperature (short term)	0° C	50° C
Storage temperature	–20° C	+70° C
Operative humidity (nominal) (relative humidity)	10%	90%
Operative humidity (short term)	5%	90%
Storage humidity (relative humidity)	5%	95%

Environmental Characteristic	Minimum	Maximum
Altitude, operating: over allowable temperature range (0 to 50 degrees C)	–500 feet	10,000 feet
Altitude, nonoperating: over allowable temperature range	–1000 feet	50,000 feet
Thermal shock nonoperating with change over time of 3 minutes	–25° C	+70° C
Thermal Shock - Operating at 2.5 degree C per minute	0° C	+50° C

Physical Characteristics

Be familiar with the physical characteristics of the Cisco ASR 1001-X Router to assist you in placing the system at a proper location.

For information regarding rack widths supported for the Cisco ASR 1001-X Router, see the following sections:

The below table shows the weight and dimensions of the Cisco ASR 1001-X Routers.

Table 12: Physical Characteristics of Cisco ASR 1001-X Router

Characteristic	Cisco ASR 1001-X
Height	1.71 in. (43.43 mm) —1RU; rack-mount per EIA RS-310
Width	17.3 in. (439.42 mm)
Depth	22.50 in. (571.5 mm) Depth includes cable-management brackets; card and power-supply handles for mounting in a 600 mm enclosed cabinet.
Weight	25 lb (11.35 kg) fully loaded

The following list describes additional Cisco ASR 1001-X Router characteristics:

- Chassis height meets EIA-310 rack spacing 1RU (1.71 in. or 43.43 mm), universal rack mount
- Chassis width meets EIA-310 19 in. (17.3 in. or 439.42 mm) wide with rack brackets
- Cable-management brackets allow a bend radius of 1.5 in. (38.1 mm) for cables
- Ships with forward rack-mount brackets installed and an extra set included in the accessory kit

Site Power Guidelines

The Cisco ASR 1001-X Router has specific power and electrical wiring requirements. Adhering to these requirements ensures reliable operation of the system. Follow these precautions and recommendations when planning your site for the Cisco ASR 1001-X Router:

- The redundant power option provides a second, identical power supply to ensure that power to the chassis continues uninterrupted if one power supply fails or input power on one line fails.
- In systems configured with the redundant power option, connect each of the two power supplies to a separate input power source. If you fail to do this, your system might be susceptible to total power failure due to a fault in the external wiring or a tripped circuit breaker.
- To prevent a loss of input power, be sure the total maximum load on each circuit supplying the power supplies is within the current ratings of the wiring and breakers.

- Check the power at your site before installation, and periodically after installation, to ensure that you are receiving clean power. Install a power conditioner if necessary.
- Provide proper grounding to avoid personal injury and damage to the equipment due to lightning striking power lines or due to power surges. The chassis ground must be attached to a central office or other interior ground system.

Caution This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.

Note The Cisco ASR 1001-X Router installation must comply with all applicable codes and is approved for use with copper conductors only. The ground bond fastening hardware should be of compatible material and preclude loosening, deterioration, and electrochemical corrosion of hardware and joined material. Attachment of the chassis ground to a central office or other interior ground system must be made with an AWG #6 gauge wire, copper ground conductor at a minimum.

Electrical Circuit Requirements

Each Cisco ASR 1001-X Router requires a dedicated electrical circuit. If you equip it with dual-power feeds, you must provide a separate circuit for each power supply to avoid compromising the power redundancy feature.

The Cisco ASR 1001-X Router can be powered by a DC or AC source. Ensure that equipment grounding is present and observe power-strip ratings. Make sure that the total ampere rating of all the products plugged into the power strip does not exceed 80 percent of the rating.

Note The Cisco ASR 1001-X Router can support two AC or two DC power supplies. Do not install mixed AC and DC power supply units in the same chassis.

The below table contains specifications for DC-powered systems for the Cisco ASR 1001-X Routers.

Table 13: Cisco ASR 1001-X Router DC Power Supply System Input Requirements

System Input Rating (Amps)	Circuit Breaker Amps	AWG # Wire		
	Minimum	Maximum	Minimum	Maximum
15	20	30	18	14

Note The Cisco ASR 1001-X Router AC power supply requires a 20 A circuit breaker.

The following table lists AC and DC power supply system rating requirements for the Cisco ASR 1001-X Router.

Table 14: AC and DC Power Supply System Rating Specifications for the Cisco ASR 1001-X Router

Description	Specification
Power supply declared ratings	AC = 85–264 VAC DC = –40–72 VDC
Line frequency rating	50/60 Hz for AC power supplies

Site Cabling Guidelines

This section contains guidelines for wiring and cabling at your site. When preparing your site for network connections to the Cisco ASR 1001-X Router, consider the type of cable required for each component, and the cable limitations. Consider the distance limitations for signaling, EMI, and connector compatibility. Possible cable types are fiber, thick or thin coaxial, foil twisted-pair cabling, or unshielded twisted-pair cabling.

Also consider any additional interface equipment you need, such as transceivers, hubs, switches, modems, channel service units (CSUs), or data service units (DSUs).

Before you begin, read this important note about cabling:

The E1 interface on the Cisco 8-Port Channelized T1/E1 SPA interface uses RJ-48c receptacles for E1 (120-ohm) cables with RJ-45 connectors. You can use all the ports simultaneously. Each E1 connection supports interfaces that meet the G.703 standards. The RJ-45 connection does not require an external transceiver. The E1 ports are E1 interfaces that use 120 ohm-shielded twisted-pair (STP) cables.

Danger Shielded-twisted pair T1/E1 cables must be used with the 8-port channelized T1/E1 SPA interfaces in any Cisco ASR 1000 chassis. This is required for Compliance with Class A emissions requirements for EMC.

Danger Shielded-twisted pair T1/E1 cables must be used with any of the T1/E1 NIM interfaces in any Cisco ASR 1000 chassis. This is required for Compliance with Class A emissions requirements for EMC.

Before you install the Cisco ASR 1001-X Router, have all the additional external equipment and cables at hand. For ordering information, contact a Cisco customer service representative.

The extent of your network and the distances between network interface connections depend in part on the following factors:

- Signal type
- Signal speed
- Transmission medium

The distance and rate limits referenced in the following sections are the IEEE-recommended maximum speeds and distances for signaling purposes. Use this information as guidelines when planning your network connections >*prior to* installing the Cisco ASR 1001-X Router.

If wires exceed recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. If you

have had problems of this sort in the past, you may want to consult experts in electrical surge suppression and shielding.

Console Port Connections

The Cisco ASR 1001-X Router provides console and auxiliary ports to connect a terminal or computer for local console access.

Both ports have RJ-45 connectors, support RS-232 asynchronous data, and have distance recommendations specified in the IEEE RS-232 standard.

USB Serial Console

The USB serial console port connects directly to the USB connector of a PC using a USB Type A to 5-pin mini USB Type-B cable. The USB Console supports full speed (12Mbps) operation. The console port does not support hardware flow control.



Note Always use shielded USB cables with a properly terminated shield. The USB serial console interface cable must not exceed 3 meters in length.

- Only one console port can be active at a time. When a cable is plugged into the USB console port, the RJ-45 port becomes inactive. Conversely, when the USB cable is removed from the USB port, the RJ-45 port becomes active.
- 4-pin mini USB Type-B connectors are easily confused with 5-pin mini USB Type-B connectors. Only 5-pin mini USB Type-B is supported.

Interference Considerations

When wires are run for a significant distance, there is a risk that stray signals will be induced on the wires as interference. If interference signals are strong, they can cause data errors or damage to the equipment.

The following sections describe sources of interference and how to minimize its effects on the Cisco ASR 1001-X Router.

Electromagnetic Interference

All the equipment powered by AC current can propagate electrical energy that can cause electromagnetic interference (EMI) and possibly affect the operation of other equipment. The typical sources of EMI are equipment power cords and power service cables from electric utility companies.

Strong EMI can destroy the signal drivers and receivers in the Cisco ASR 1001-X Router and even create an electrical hazard by causing power surges through power lines into installed equipment. These problems are rare, but could be catastrophic.

To resolve these problems, you need specialized knowledge and equipment, which could consume substantial time and money. However, you should ensure that you have a properly grounded and shielded electrical environment, paying special attention to the need for electrical surge suppression.

Table 15: EMC and Safety Standards , on page 32 lists electrode magnetic compliance standards for the Cisco ASR 1001-X Router.

Table 15: EMC and Safety Standards

EMC Standards	FCC 47 CFR Part 15 Class A
	VCCI Class A
	AS/NSZ Class A
	ICES-003 Class A
	EN55022/CISPR 22 Information Technology Equipment (Emissions)
	EN55024/CISPR 24 Information Technology Equipment (Immunity)
	EN300 386 Telecommunications Network Equipment (EMC)
	EN50082-1/EN61000-6-1 Generic Immunity Standard
Safety Standards	UL60950-1
	CSA C22.2 No. 60950-1-03
	EN 60950-1
	IEC 60950-1
	AS/NZS 60950.1

Radio Frequency Interference

When electromagnetic fields act over a long distance, radio frequency interference (RFI) can be propagated. Building wiring can often act as an antenna, receiving the RFI signals and creating more EMI on the wiring.

If you use twisted-pair cable in your plant wiring with a good distribution of grounding conductors, the plant wiring is unlikely to emit radio interference. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal.

Lightning and AC Power Fault Interference

If signal wires exceed recommended cabling distances, or if signal wires pass between buildings, you should consider the effect that a lightning strike in your vicinity might have on the Cisco ASR 1001-X Router.

The electromagnetic pulse (EMP) generated by lightning or other high-energy phenomena can couple enough energy into unshielded conductors to damage or destroy electronic equipment. If you have previously experienced such problems, you should consult with RFI/EMI experts to ensure that you have adequate electrical surge suppression and shielding of signal cables in your Cisco ASR 1001-X Router operating environment.

Rack-Mounting Guidelines

This section describes guidelines on rack-mounting.

Precautions for Rack-Mounting

The following rack-mounting guidelines are provided to ensure your safety:

- Do not move large racks by yourself. Due to the height and weight of a rack, a minimum of two people are required to accomplish this task.
- Ensure that the rack is level and stable before extending a component from the rack.
- Ensure that proper airflow is provided to the components in the rack.
- Do not step or stand on any component or system when servicing other systems or components in a rack.
- When mounting the Cisco ASR 1001-X Router in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

General Rack-Selection Guidelines

The Cisco ASR 1001-X Router can be mounted in most two-post or four-post, 19-in. equipment racks that comply with the Electronics Industries Association (EIA) standard for equipment racks (EIA-310-D 19-in.). The rack must have at least two posts with mounting flanges to mount the chassis.

Caution When mounting a chassis in any type of rack equipment, ensure that the inlet air to the chassis does not exceed 131°F (55°C).

The distance between the center lines of the mounting holes on the two mounting posts must be 18.31 in. ± 0.06 in. (46.50 cm ± 0.15 cm). The rack-mounting hardware included with the chassis is suitable for most 19-in. (48.3-cm) equipment racks.

Consider installing the Cisco ASR 1001-X Router in a rack with the following features:

- NEBS-compliant, 19-in. (48.3-cm) wide rack.
- EIA or ETSI hole patterns in the mounting rails. Required mounting hardware is shipped with the Cisco ASR 1001-X Router. If the rack that you plan to install the system in has metric-threaded rails, you must provide your own metric-mounting hardware.
- Perforated top and open bottom for ventilation to prevent overheating.
- Leveling feet for stability.

Note The Cisco ASR 1001-X Router should *not* be installed in an enclosed rack because the chassis requires an unobstructed flow of cooling air to maintain acceptable operating temperatures for its internal components. Installing the router in any type of enclosed rack—*even with the front and back doors removed* —could disrupt the air flow, trap heat next to the chassis, and cause an overtemperature condition inside the router. If you use an enclosed rack, make certain that there are air vents on all sides of the rack and there is proper ventilation.

Guidelines for 23-in. (Telco) Racks

If needed, you can also install the Cisco ASR 1001-X Router in 23-in. (Telco) racks. For information on the adapters needed for 23 in. racks, contact the Newton Instrument Company:

http://www.enewton.com

111 East A Street, Butner NC, USA, 27509

919 575-6426

Equipment Rack Guidelines

The placement of racks can affect personnel safety, system maintenance, and the system's ability to operate within the environmental characteristics described in the above tables. Choose a proper location for the Cisco ASR 1001-X Router by following the guidelines below.

Locating for Safety

If the Cisco ASR 1001-X Router is the heaviest or the only piece of equipment in the rack, consider installing it at or near the bottom to ensure that the rack's center of gravity is as low as possible.

For additional information about the proper placement of electronic equipment, see the document GR-63-CORE, Network Equipment Building System (NEBS) Requirements: Physical Protection.

Locating for Easy Maintenance

Keep at least 3 feet of clear space in front of and behind the rack. This space ensures that you can remove the Cisco ASR 1001-X Router components and perform routine maintenance and upgrades easily.

Avoid installing the Cisco ASR 1001-X Router in a congested rack and consider how the routing of cables from other pieces of equipment in the same rack might affect access to the routers cards.

The front and top of the chassis must remain unobstructed to ensure adequate airflow and prevent overheating inside the chassis.

Allow the following clearances for normal system maintenance:

- At the top of the chassis—At least 3 in. (7.6 cm)
- In front of the chassis—3 to 4 ft (91.44 cm to 121.92 cm)

To avoid problems during installation and ongoing operation, follow these general precautions when you plan the equipment locations and connections:

- Use the **show environment all** and the **show facility-alarm status** command regularly to check the internal system status. The environmental monitor continually checks the interior chassis environment; it provides warnings for high temperature and creates reports on any occurrences. If warning messages are displayed, take immediate action to identify the cause and correct the problem. For more information on these commands, see the "Environmental Monitoring and Reporting Functions" section on page 5-15 .
- Keep the Cisco ASR 1001-X Router off the floor and out of the areas that collect dust.
- Follow ESD-prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

Locating for Proper Airflow

Ensure that the location of the Cisco ASR 1001-X Router has enough airflow to keep the system operating within the environmental characteristics, and the air temperature is sufficient to compensate for the heat dissipated by the system.

Avoid locating the Cisco ASR 1001-X Router in a location in which the chassis air intake vents could draw in the exhaust air from adjacent equipment. Consider how the air flows through the router. The airflow direction is front to back with ambient air drawn in from the venting located on the chassis' front sides.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage occurs when electronic cards or components are improperly handled resulting in complete or intermittent failures. Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of your system components, such as a microprocessor. As you continue to work on your system, periodically touch an unpainted metal surface on the computer chassis.

The following are guidelines for preventing ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Before removing a card from the chassis, connect the equipment end of the strap to the ESD plug at the bottom of the chassis below the power entry modules.
- Handle line cards by faceplates and carrier edges only; avoid touching the card components or connector pins.
- When removing a card, place the removed module component-side-up on an antistatic surface or in a static-shielding bag. If the module id to be returned to the factory, immediately place it in a static-shielding bag.
- Avoid contact between the modules and clothing. The wrist strap protects the card from ESD voltages only on the body; ESD voltages on clothing can still cause damage.
- When transporting a sensitive component, place it in an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.



Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 ohms.



Caution Always tighten the captive installation screws on all the system components when you are installing them. These screws prevent accidental removal of the module, provide proper grounding for the system, and help ensure that the bus connectors are properly seated in the backplane.

Electrical Safety

All the system components are hot-swappable. They are designed to be removed and replaced while the system is operating, without presenting an electrical hazard or damage to the system.

Follow these basic guidelines when you are working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before installing or removing a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe. Never install equipment that appears damaged.

- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source, but is still connected to telephone wiring or other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.



Danger Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1006

Chassis-Lifting Guidelines

The chassis is not intended to be moved frequently. Before you install the system, ensure that your site is properly prepared so that you can avoid having to move the chassis later to accommodate power sources and network connections.

Each time you lift the chassis or any heavy object, follow these guidelines:

- Ensure that your footing is solid, and balance the weight of the chassis between your feet.
- Lift the chassis slowly; never move suddenly or twist your body as you lift.
- Keep your back straight and lift with your legs, not your back. If you must bend down to lift the chassis, bend at the knees, not at the waist, to reduce the strain on your back muscles.
- Do not remove installed components from the chassis.
- Always disconnect all external cables before lifting or moving the chassis.

Tools and Equipment

The following tools and equipment are recommended as the minimum necessary equipment to install the Cisco ASR 1001-X Router. You may need additional tools and equipment to install associated equipment and cables. You may also require test equipment to check electronic and optical signal levels, power levels, and communications links.

- Phillips hand screwdriver
- 3.5-mm flat-blade screwdriver
- Tape measure (optional)
- Level (optional)
- Power drill
- 8-gauge wire
- Rack-mount brackets
- Cable-management brackets

Unpacking and Verifying Shipping Contents

When you receive your chassis, perform the following steps and use the shipping contents checklist from Checking the Shipping Container Contents, on page 37.

SUMMARY STEPS

1. Inspect the box for any shipping damage. (If there is damage, contact your Cisco service representative).
2. Unpack the Cisco ASR 1001-X Router.
3. Perform a visual inspection of the chassis.
4. After you have unpacked the system, verify that you have received all of the required components, including all the accessory items. Using the packing list as a guide, verify that you have received all the equipment listed in your order, and ensure that the configuration matches the packing list.

DETAILED STEPS

Procedure

Step 1 Inspect the box for any shipping damage. (If there is damage, contact your Cisco service representative).

Step 2 Unpack the Cisco ASR 1001-X Router.

Step 3 Perform a visual inspection of the chassis.

Step 4 After you have unpacked the system, verify that you have received all of the required components, including all the accessory items. Using the packing list as a guide, verify that you have received all the equipment listed in your order, and ensure that the configuration matches the packing list.

Checking the Shipping Container Contents

Use the components list shown in Table 16: Cisco ASR 1001-X Router Shipping Container Contents , on page 37 to check the contents of the Cisco ASR 1001-X Router shipping container. Do not discard the shipping container. You need the container if you move or have to ship the Cisco ASR 1001-X Router in the future.

Table 16: Cisco ASR 1001-X Router Shipping Container Contents

Component	Description
Chassis	Cisco ASR 1001-X Routers are configured with dual AC or dual DC power supplies and a shared port adapter and NIM blank panel if a shared port adapter or NIM has not been ordered.

Component	Description
Accessories Kit **Note** You must order the Accessories Kit separately if you order the Cisco ASR 1001-X Router chassis as a spare.	Front and rear chassis rack-mount brackets that you will attach to the chassis with the respective screws
	Three sets of screws, one each for: • Front rack-mount brackets (use the black screws) • Rear rack-mount brackets (use the package with the 5 screws) • Cable-management brackets (use the package with the 4 screws)
	Two cable-management brackets with U-feature design devices attached.
	1 RJ-45 to RJ-45 crossover cable 1 RJ-45 to DB-9 (female) adapter
ESD, Wrist Strap (disposable)	One disposable wrist strap
Documentation	Regulatory Compliance and Safety Information for the Cisco ASR 1000 Series Aggregation Services Routers
Optional Equipment	Power cord if an AC power supply was shipped. There are none for the DC power supply units.

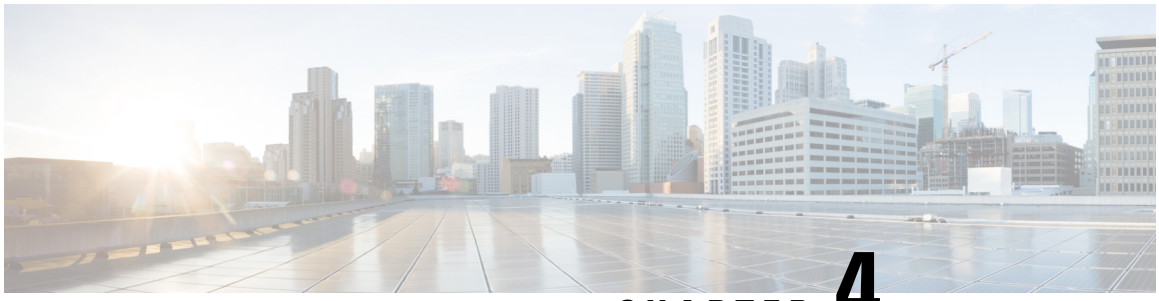
Cisco ASR 1001-X Router Installation Checklist

To assist you with your installation and to provide a historical record of what was done by whom, photocopy the Cisco ASR 1001-X Router Installation Checklist shown in Table 3-8. Use this to record when each procedure or verification is completed. When the checklist is completed, place it in your site log along with the other records for your new router.

Table 17: Cisco ASR 1001-X Router Installation Checklist

Task	Verified By	Date
Date chassis received		
Chassis and all accessories unpacked		
Types and numbers of interfaces verified		
Safety recommendations and guidelines reviewed		
Installation Checklist copied		
Site log established and background information entered		
Site power voltages verified		
Site environmental specifications verified		

Task	Verified By	Date
Required passwords, IP addresses, device names, and so on, available		
Required tools available		
Network connection equipment available		
Cable-management brackets installed (optional, but recommended)		
AC power cable(s) connected to AC source(s) and router		
DC power cable(s) connected to DC source(s) and router		
Network interface cables and devices connected		
System power turned on		
System boot complete (STATUS LED is on)		
Shared port adapters and NIMs (where applicable) are operational		
Correct hardware configuration displayed after system banner appears		
Correct licenses installed on the router		



CHAPTER 4

Cisco ASR 1001-X Router Power Up and Initial Configuration

This chapter guides you through a basic router configuration, which is sufficient for you to access your network. Complex configuration procedures are beyond the scope of this publication and can be found in the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.

This chapter contains the following sections:

- Checking Conditions Prior to System Startup, on page 41
- Powering Up the Cisco ASR 1001-X Router, on page 42
- Performing the Initial Configuration on the Router, on page 43
- Saving Your Router Configuration, on page 54
- Verifying the Initial Configuration, on page 55
- Powering Off the Cisco ASR 1001-X Router Safely, on page 56
- Environmental Monitoring and Reporting Functions, on page 57

Checking Conditions Prior to System Startup

Ensure that all the card slots and compartments are closed. Install blank faceplates on empty slots. Always have power supply slots filled. If you leave a power supply slot uncovered, then you risk exposure to hazardous voltages on the power pins on the midplane.

Danger Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place. Statement 1029

Note To view the boot sequence, you must have a console connection to the Cisco ASR 1001-X Router before it powers up.

Ensure that the following conditions are addressed before starting up the router:

- The network interface cable or the optional Fast Ethernet Management port cable is connected.
- The chassis is securely mounted and grounded.
- The power and interface cables are connected.
- Your PC with terminal emulation program (hyperTerminal or equivalent) is connected to the console port, powered up, and is configured for 9600 baud, 8 data bits, 1 stop bit, no parity, with flow control set to none.
- You have selected passwords for access control.
- Captive installation screws are tight on all removable components.
- The console terminal is turned on.
- You have determined the IP addresses for the network interfaces.
- The shared port adapter and the NIM is inserted in its slot, if applicable.
- Empty card slots are filled with card blanks. This ensures proper air flow through the chassis and electromagnetic compatibility (EMC).

Powering Up the Cisco ASR 1001-X Router

Prerequisites

Before you power on, make sure that:

- The power supply cord is plugged into the power supply inlet.
- All cables are connected.
- Your computer is powered up and connected.

You are now ready to power on the system for the first time. Follow these steps.

Move the power switch to the ON position. Listen for the fans; you should immediately hear them operating. Ensure that the power supply LED OK is green and the FAIL LED is not illuminated.

The front-panel indicator LEDs provide power, activity, and status information useful during bootup. For more detailed information about the LEDs, see *Cisco ASR 1001-X Router LEDs* section.

Observe the initialization process. When the system boot is complete (the process takes a few seconds), the Cisco ASR 1001-X Router begins to initialize.

The following is an example of what is displayed during the system boot process:

Loading from ROMMON with a System Image in Bootflash

```
Initializing Hardware ...
System integrity status: 00000610
System Bootstrap, Version 15.4(2r)S, RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2014  by cisco Systems, Inc.
Current image running: Boot ROM0
Last reset cause: PowerOn
ASR1001-X platform with 8388608 Kbytes of main memory
File size is 0x1c103d44
Located
asr1001x-universalk9.BLD_V154_2_S0A_XE3120A_THROTTLE_LATEST_20140427_042227-std.SPA.bin
Image size 470826308 inode num 81931, bks cnt 114948 blk size 8*512
################################################################################################
################################################################################################
Validating dev_mode signature
done
Boot image size = 470826308 (0x1c103d44) bytes
ROM:RSA Self Test Passed
```

```
ROM:Sha512 Self Test Passed
Self Tests Latency: 58 mSec
Package header rev 1 structure detected
Calculating SHA-1 hash...done
validate_package_cs: SHA-1 hash:
        calculated ef1e9e3f:519cec63:1f14c20f:c3b39303:dbb4c3c5
        expected   ef1e9e3f:519cec63:1f14c20f:c3b39303:dbb4c3c5
RSA Signed RELEASE Image Signature Verification Successful.
Package Load Test Latency : 5070 mSec
Image validated
Validating dev_mode signature
done
             Restricted Rights Legend
Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
           cisco Systems, Inc.
           170 West Tasman Drive
           San Jose, California 95134-1706
Cisco IOS Software, ASR1000 Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Experimental Version
 15.4(20140427:063816)
[v154_2_s0a_xe3120a_throttle-BLD-BLD_V154_2_S0A_XE3120A_THROTTLE_LATEST_20140427_042227-ios
 106]
Copyright (c) 1986-2014 by Cisco Systems, Inc.
Compiled Sun 27-Apr-14 00:02 by mcpre
cisco ASR1001-X (1NG) processor with 3765392K/6147K bytes of memory.
Processor board ID P4A-17
6 Gigabit Ethernet interfaces
3 Ten Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
8388608K bytes of physical memory.
6684671K bytes of eUSB flash at bootflash:.
Press RETURN to get started!
*May 13 15:17:59.791: %SMART_LIC-6-AGENT_READY: Smart Agent for Licensing is initialized
*May 13 15:18:00.810: %IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Module name = asr1001x
 Next reboot level = adventerprise and License = adventerprise
*May 13 15:18:03.504: %IOSXE_THROUGHPUT-6-LEVEL: Throughput level has been set to 20000000
 kbps
*May 13 15:18:14.767: %SPANTREE-5-EXTENDED_SYSID: Extended SysId enabled for type vlan
*May 13 15:18:17.981: VOIPHA: removing default handlers
*May 13 15:18:18.838: %LINK-3-UPDOWN: Interface Lsmpi0, changed state to up
*May 13 15:18:18.838: %LINK-3-UPDOWN: Interface EOBC0, changed state to up
*May 13 15:18:18.839: %LINEPROTO-5-UPDOWN: Line protocol on Interface VoIP-Null0, changed
state to up
*May 13 15:18:18.839: %LINEPROTO-5-UPDOWN: Line protocol on Interface LI-Null0, changed
state to up
*May 13 15:18:18.839: %LINK-3-UPDOWN: Interface GigabitEthernet0, changed state to down
.
.
.
```

Performing the Initial Configuration on the Router

You can perform initial configuration on the router using the procedure described in the following sections:

Using the Cisco setup Command Facility

The setup command facility prompts you to enter the information that is needed to configure a router quickly. The facility takes you through an initial configuration, including LAN and WAN interfaces.

Note The setup command facility is entered automatically if there is no configuration on the router when it is booted into Cisco IOS-XE.

For information on modifying the configuration after you create it, see the Cisco IOS XE Configuration Guide and the Cisco IOS XE Command References .

This section explains how to configure a host name for the router, set passwords, and configure an interface to communicate with the management network.

Note If you make a mistake while using the setup command facility, you can exit and run the setup command facility again. Press **Ctrl-C**, and enter the **setup** command in privileged EXEC mode (Router#).

SUMMARY STEPS

1. From the Cisco IOS-XE CLI, enter the **setup** command in privileged EXEC mode:
2. To proceed using the setup command facility, enter **yes**.
3. Basic management setup configures only enough connectivity.
4. Enter a hostname for the router (this example uses myrouter):
5. Enter an enable secret password. This password is encrypted (for more security) and cannot be seen when viewing the configuration.
6. Enter an enable password that is different from the enable secret password. This password is *not* encrypted (and is less secure) and can be seen when viewing the configuration.
7. Enter the virtual terminal password, which prevents unauthenticated access to the router through ports other than the console port:
8. Respond to the following prompts as appropriate for your network:
9. Respond to the following prompts as appropriate for your network:
10. Respond to the following prompts. Select [2] to save the initial configuration.

DETAILED STEPS

Procedure

Step 1 From the Cisco IOS-XE CLI, enter the **setup** command in privileged EXEC mode:

Example:

```
Router> enable
Password: <password>
```

```
Router# setup

         --- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]:
```

The prompts in the setup command facility vary depending on your router model, on the installed interface modules, and on the software image. The following steps and the user entries (in bold) are shown as examples only.

Step 2 To proceed using the setup command facility, enter **yes**.

Example:

```
Continue with configuration dialog? [yes/no]:
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.
```

Step 3 Basic management setup configures only enough connectivity.

Example:

```
Would you like to enter basic management setup? [yes/no]: yes
```

Step 4 Enter a hostname for the router (this example uses myrouter):

Example:

```
Configuring global parameters:
Enter host name [Router]: myrouter
```

Step 5 Enter an enable secret password. This password is encrypted (for more security) and cannot be seen when viewing the configuration.

Example:

```
The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: cisco
```

Step 6 Enter an enable password that is different from the enable secret password. This password is *not* encrypted (and is less secure) and can be seen when viewing the configuration.

Example:

```
The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images.
Enter enable password: cisco123
```

Step 7 Enter the virtual terminal password, which prevents unauthenticated access to the router through ports other than the console port:

Example:

```
The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: cisco
```

Step 8 Respond to the following prompts as appropriate for your network:

Example:

```
Configure SNMP Network Management? [no]: yes
    Community string [public]:
```

A summary of the available interfaces is displayed. The interface summary includes interface numbering, which is dependent on the router model and the installed modules and interface cards.

Example:

```
Current interface summary
Interface              IP-Address      OK? Method Status                Protocol
Te0/0/0                20.1.1.1        YES NVRAM  administratively down down
Te0/0/1                21.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/0   11.1.1.1        YES NVRAM  down                  down
GigabitEthernet0/0/1   12.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/2   13.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/3   14.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/4   15.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0/0/5   200.1.1.1       YES NVRAM  administratively down down
Te0/1/0                22.1.1.1        YES NVRAM  administratively down down
GigabitEthernet0       2.1.12.233      YES NVRAM  up                    up
Any interface listed with OK? value "NO" does not have a valid configuration
```

Step 9 Respond to the following prompts as appropriate for your network:

Example:

```
Configuring interface GigabitEthernet0/0/1
:
  Configure IP on this interface? [yes]: yes
    IP address for this interface [10.10.10.12
]:
    Subnet mask for this interface [255.0.0.0] : 255.255.255.0
    Class A network is 10.0.0.0, 24 subnet bits; mask is /24
```

The following configuration command script is created:

Example:

```
hostname myrouter
enable secret 5 $1$t/Dj$yAeGKviLLZNOBX0b9eifO0
enable password cisco123
line vty 0 4 password cisco snmp-server community public !
no ip routing
!
interface GigabitEthernet0/0/0
shutdown
no ip address
!
interface GigabitEthernet0/0/1
no shutdown
ip address 10.10.10.12 255.255.255.0
!
interface GigabitEthernet0/0/2
shutdown
no ip address
!
.
.
.
end
```

Step 10 Respond to the following prompts. Select [2] to save the initial configuration.

Example:

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.
Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.
Press RETURN to get started! RETURN
```

The following user prompt is displayed:

Example:

```
myrouter>
```

Completing the Configuration

When using the Cisco setup command facility, and after you have provided all the information requested by the facility as described in Using the Cisco setup Command Facility, on page 44, the final configuration appears. To complete your router configuration, follow these steps:

SUMMARY STEPS

1. The facility prompts you to save the configuration.
2. When messages stop appearing on your screen, press **Return** to get the Router> prompt.
3. The Router> prompt indicates that you are now at the command-line interface (CLI) and you have just completed an initial router configuration. Note that this is not a complete configuration. At this point, you have two choices:

DETAILED STEPS

Procedure

Step 1 The facility prompts you to save the configuration.

- If you answer no, the configuration information you entered is *not* saved, and you return to the router enable prompt (Router#). Enter setup to return to the System Configuration dialog box.
- If you answer yes, the configuration is saved, and you are returned to the user EXEC prompt (Router>).

Example:

```
Use this configuration? {yes/no} : yes
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.
%LINK-3-UPDOWN: Interface GigabitEthernet0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1/0, changed state to up
<Additional messages omitted.>
```

Step 2 When messages stop appearing on your screen, press **Return** to get the Router> prompt.

Step 3 The Router> prompt indicates that you are now at the command-line interface (CLI) and you have just completed an initial router configuration. Note that this is not a complete configuration. At this point, you have two choices:

- Run the setup command facility again, and create another configuration:

Example:

```
Router> enable
Password: password
Router# setup
```

- Modify the existing configuration or configure additional features by using the CLI:

Example:

```
Router> enable
Password: password
Router# configure terminal
Router(config)#
```

Using the Cisco IOS-XE CLI--Manual Configuration

This section shows you how to access the CLI to perform the initial configuration on the router.

If the system configuration message does not appear, it means a default configuration file was installed on the router prior to shipping. Follow these steps to configure the router.

SUMMARY STEPS

1. Enter no when the following system message appears on the router:
2. Press Return and continue with the manual configuration:
3. Press Return to bring up the Router> prompt.
4. Type enable to enter privileged EXEC mode:

DETAILED STEPS

Procedure

Step 1 Enter no when the following system message appears on the router:

Example:

```
--- System Configuration Dialog ---
Would you like to enter the initial configuration dialog? [yes/no]: no
```

Step 2 Press Return and continue with the manual configuration:

Several log messages are displayed.

Step 3 Press Return to bring up the Router> prompt.

Step 4 Type enable to enter privileged EXEC mode:

Example:

```
Router> enable
Router#
```

Configuring the Router Hostname

The hostname is used in CLI prompts and default configuration filenames. If you do not configure the router hostname, the router uses the factory-assigned default hostname Router.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **hostname** *name*
4. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**hostname** *name* **Example:** `Router(config)# hostname myrouter`	Specifies or modifies the hostname for the network server.
Step 4	**end** **Example:** `myrouter# end`	(Optional) Returns to privileged EXEC mode.

Configuring the Enable and Enable Secret Passwords

To provide an additional layer of security, particularly for passwords that cross the network or are stored on a TFTP server, you can use either the **enable password** command or **enable secret** command. Both commands

accomplish the same thing—they allow you to establish an encrypted password that users must enter to access privileged EXEC (enable) mode.

We recommend that you use the **enable secret** command because it uses an improved encryption algorithm.

For more information, see the "Configuring Passwords and Privileges" chapter in the Cisco IOS Security Configuration Guide . Also see the Cisco IOS Password Encryption Facts tech note and the Improving Security on Cisco Routers tech note.



Note If you configure the **enable secret** command, it takes precedence over the **enable password** command; the two commands cannot be in effect simultaneously.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **enable secret** *password*
4. **end**
5. **enable**
6. **end**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**enable secret** *password* **Example:** `Router(config)# enable secret greentree`	Specifies an additional layer of security over the **enable password** command.
Step 4	**end** **Example:** `Router(config)# end`	Returns to privileged EXEC mode.
Step 5	**enable**	Enables privileged EXEC mode.

	Command or Action	Purpose
	Example: `Router> enable`	Verify that your new enable or enable secret password works.
Step 6	**end** **Example:** `Router(config)# end`	(Optional) Returns to privileged EXEC mode.

Configuring the Console Idle Privileged EXEC Timeout

This section describes how to configure the console line's idle privileged EXEC timeout. By default, the privileged EXEC command interpreter waits 10 minutes to detect user input before timing out.

When you configure the console line, you can also set communication parameters, specify autobaud connections, and configure terminal operating parameters for the terminal that you are using. For more information on configuring the console line, see the Cisco IOS Configuration Fundamentals and Network Management Configuration Guide . In particular, see the "Configuring Operating Characteristics for Terminals" and "Troubleshooting and Fault Management" chapters.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **line console 0**
4. **exec-timeout** *minutes* [*seconds*]
5. **end**
6. **show running-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**line console 0** **Example:**	Configures the console line and starts the line configuration command collection mode.

	Command or Action	Purpose
	`Router(config)# line console 0`	
Step 4	**exec-timeout** *minutes* [*seconds*] **Example:** `Router(config-line)# exec-timeout 0 0`	Sets the idle privileged EXEC timeout, which is the interval that the privileged EXEC command interpreter waits until user input is detected. The example shows how to specify no timeout. Setting the exec-timeout value to 0 will cause the router to never log out once logged in. This could have security implications if you leave the console without manually logging out using the **disable** command.
Step 5	**end** **Example:** `Router(config)# end`	Returns to privileged EXEC mode.
Step 6	**show running-config** **Example:** `Router# show running-config`	Displays the running configuration file. Verify that you have configured the idle privileged EXEC timeout correctly.

Examples

The following example shows how to set the console idle privileged EXEC timeout to 2 minutes 30 seconds:

```
line console
 exec-timeout 2 30
```

The following example shows how to set the console idle privileged EXEC timeout to 30 seconds:

```
line console
 exec-timeout 0 30
```

Gigabit Ethernet Management Interface Overview

The router provides an Ethernet management port named GigabitEthernet0.

The purpose of this interface is to allow users to perform management tasks on the router; it is an interface that should not, and often cannot, forward network traffic, but can be used to access the router via Telnet and SSH to perform management tasks on the router. The interface is most useful before a router has begun routing, or in troubleshooting scenarios when other forwarding interfaces are inactive.

The following aspects of the management Ethernet interface should be noted:

- The router has one management Ethernet interface named GigabitEthernet0.
- IPv4, IPv6, and ARP are the only routed protocols supported for the interface.
- The interface provides a way to access the router even if forwarding interfaces are not functional, or the Cisco IOS is down.
- The management Ethernet interface is part of its own VRF. See the Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide for more details.

Default Gigabit Ethernet Configuration

By default, a forwarding VRF is configured for the interface with a special group named Mgmt-intf. This cannot be changed. This isolates the traffic on the management interface away from the forwarding plane. Otherwise, the interface can be configured like other Gigabit Ethernet interfaces for most functions.

For example, the default configuration is as follows

```
interface GigabitEthernet0
vrf forwarding Mgmt-intf
ip address 172.18.77.212 255.255.255.240
negotiation auto
```

Configuring Gigabit Ethernet Interfaces

This sections shows how to assign an IP address and interface description to an Ethernet interface on your router.

For comprehensive configuration information on Gigabit Ethernet interfaces, see the "Configuring LAN Interfaces" chapter of the Cisco IOS Interface and Hardware Component Configuration Guide .

For information on interface numbering, see the software configuration guide pertaining to your router.

SUMMARY STEPS

1. **enable**
2. **show ip interface brief**
3. **configure terminal**
4. **interface gigabitethernet 0**
5. **ip address** *ip-address mask*
6. **no shutdown**
7. **end**
8. **show ip interface brief**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**show ip interface brief** **Example:** `Router# show ip interface brief`	Displays a brief status of the interfaces that are configured for IP. Learn which type of Ethernet interface is on your router.

	Command or Action	Purpose
Step 3	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 4	**interface gigabitethernet 0** **Example:** `Router(config)# interface gigabitethernet 0`	Specifies the Ethernet interface and enters interface configuration mode.
Step 5	**ip address** *ip-address mask* **Example:** `Router(config-if)# ip address 172.16.74.3 255.255.255.0`	Sets a primary IP address for an interface.
Step 6	**no shutdown** **Example:** `Router(config-if)# no shutdown`	Enables an interface.
Step 7	**end** **Example:** `Router(config)# end`	Returns to privileged EXEC mode.
Step 8	**show ip interface brief** **Example:** `Router# show ip interface brief`	Displays a brief status of the interfaces that are configured for IP. Verify that the interfaces are up and configured correctly.

What to do next

Note For comprehensive configuration information about IP routing and IP routing protocols, see the Configuring IP Routing Protocol-Independent Feature on Cisco.com.

Saving Your Router Configuration

This section describes how to avoid losing your configuration at the next system reload or power cycle by saving the running configuration to the startup configuration in NVRAM. The NVRAM provides 32 MB of storage on the router.

SUMMARY STEPS

1. **enable**
2. **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	**copy running-config startup-config** **Example:** `Router# copy running-config startup-config`	Saves the running configuration to the startup configuration.

What to do next

Note To aid file recovery and minimize downtime in case of file corruption, we recommend that you save backup copies of the startup configuration file and the Cisco IOS-XE software system image file on a server.

Note To avoid losing work you have completed, be sure to save your configuration occasionally as you proceed. Use the **copy running-config startup-config** command to save the configuration to NVRAM.

Verifying the Initial Configuration

Enter the following commands in Cisco IOS-XE to verify the initial configuration on the router:

- **show version**—Displays the system hardware version, the installed software version, the names and sources of configuration files, the boot images, and the amount of installed DRAM, NVRAM, and flash memory.
- **show diag**—Lists and displays diagnostic information about the installed controllers, interface processors, and port adapters.
- **show interfaces**— Shows if interfaces are operating correctly and if interfaces and line protocols are in the correct state, either up or down
- **show ip interface brief**—Displays a summary of the interfaces configured for IP protocol.
- **show configuration**—Helps verify if you have configured the correct hostname and password.

After you have completed and verified the initial configuration, the specific features and functions are ready to be configured. See the Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide .

Powering Off the Cisco ASR 1001-X Router Safely

This section explains how to shut down the Cisco ASR 1001-X Router. We recommend that before turning off all power to the chassis, you issue the **reload** command. This ensures that the operating system cleans up all the file systems.

To remove power from the Cisco ASR 1001-X Router safely, follow this procedure:

SUMMARY STEPS

1. Slip on the ESD-preventive wrist strap included in the accessory kit.
2. Enter the **reload** command.
3. Confirm the **reload** command:
4. After confirming the **reload** command, wait until the system bootstrap message is displayed before powering off the system:
5. Place the Standby switch in the Standby position.

DETAILED STEPS

Procedure

Step 1 Slip on the ESD-preventive wrist strap included in the accessory kit.

Step 2 Enter the **reload** command.

Step 3 Confirm the **reload** command:

Example:

```
Router# reload
Proceed with reload? [confirm]
Apr 21 03:42:45.619 EDT: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload Command.Apr
 21 03:42:59.920 R0/0: %PMAN-5-EXITACTION: Process manager is exiting: process exit with reload
chassis code
```

Step 4 After confirming the **reload** command, wait until the system bootstrap message is displayed before powering off the system:

Example:

```
System Bootstrap, Version 15.4(2r)S, RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2014  by cisco Systems, Inc.
Current image running: Boot ROM0
Last reset cause: LocalSoft
ASR1001-X platform with 16777216 Kbytes of main memory
rommon 1 >
```

Step 5 Place the Standby switch in the Standby position.

Note
The fans in the power supply modules will continue to run even if the Standby switch is in the Standby position.

Note
After powering off the router, wait for a minimum of 30 seconds before powering it on again.

Environmental Monitoring and Reporting Functions

Environmental monitoring and reporting functions allow you to maintain normal system operation by identifying and resolving adverse conditions prior to loss of operation.



Caution To prevent overheating of the chassis, ensure that your system is drawing cool inlet air. Over temperature conditions may occur if the system is drawing in the exhaust air of other equipment. Ensure adequate clearance around the sides of the chassis so that cooling air can flow through the chassis interior unimpeded and exhaust air exits the chassis and is not drawn into the inlet vent of another device.

Cisco ASR1001-X Router Alarm Monitoring

The Cisco ASR 1001-X Router displays the CRIT, MAJ, and MIN alarm indicator LEDs. The three system alarm LEDs on the Cisco ASR 1001-X Router provide visual alarm notification in the router. These LEDs indicate router status at all times, but you must directly observe these LEDs to become aware of a router alarm condition. Additionally, you can use the **show facility-alarm status** command to view the alarms.

```
Router# show facility-alarm status
System Totals  Critical: 4  Major: 0  Minor: 0
Source                    Time                   Severity      Description [Index]
------                    ------                 --------      -------------------
Power Supply Module 1     Mar 12 2014 09:05:21   CRITICAL      Power Supply Failure [0]
xcvr container 0/0/0      Mar 12 2014 09:05:42   CRITICAL      Transceiver Missing - Link
 Down [1]
xcvr container 0/0/1      Mar 12 2014 09:05:42   INFO          Transceiver Missing [0]
xcvr container 0/0/2      Mar 12 2014 09:05:42   CRITICAL      Transceiver Missing - Link
 Down [1]
xcvr container 0/0/3      Mar 12 2014 09:05:42   CRITICAL      Transceiver Missing - Link
 Down [1]
xcvr container 0/0/4      Mar 12 2014 09:05:42   INFO          Transceiver Missing [0]
xcvr container 0/0/5      Mar 12 2014 09:05:42   INFO          Transceiver Missing [0]
xcvr container 0/0/6      Mar 12 2014 09:05:42   INFO          Transceiver Missing [0]
xcvr container 0/0/7      Mar 12 2014 09:05:42   INFO          Transceiver Missing [0]
```



Note There is no external alarm monitoring facility on the Cisco ASR 1001-X Router.

To clear a visual alarm, you must resolve the alarm condition. The **clear facility-alarm** command does not clear an alarm LED on the Cisco ASR 1001-X Router. For example, if a critical alarm LED is illuminated because an active SPA was removed without a graceful deactivation of the SPA, the only way to resolve that alarm is to replace the SPA.

Environmental Monitoring

The environmental monitoring functions use sensors to monitor the temperature of the cooling air as it moves through the chassis.

The local power supplies provide the ability to monitor:

- Input and output voltage
- Output current
- Outlet temperature

The Cisco ASR 1001-X Router is expected to meet the following environmental operating conditions:

- Operating Temperature Nominal: 0° to 40°C
- Operating Temperature Short Term: 0° to +55°C
- Operating Humidity Nominal (relative humidity): 10 to 90% relative
- Operating Humidity Short Term: 5 to 90% relative
- Operating Altitude: –500 to 10,000 feet
- DC Input Range: –40 to –72 VDC
- AC Input Range: 85 to 264 VAC

In addition, the power supplies monitor internal power supply temperatures and voltages. A power supply is either within tolerance (normal) or out of tolerance (critical). If an internal power supply temperature or voltage reaches a critical level, the power supply shuts down without any interaction with the system processor.

The environmental monitoring functions use the following levels of status conditions to monitor the system:

- Normal—All monitored parameters are within normal tolerances.
- Warning—The system has exceeded a specified threshold. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
- Critical—An out-of-tolerance temperature or voltage condition exists. The system continues to operate, but the system is approaching shutdown. Immediate operator action is required.
- Shutdown—Before any shutdown, the system logs the status of monitored parameters in NVRAM so that you can retrieve it later to help determine the cause of the problem.
- Power supply shutdown—The power supply detected an internal out-of-tolerance overvoltage, overcurrent, or temperature condition and shut itself down. All DC power remains disabled until you toggle the power switch.

The Cisco ASR 1001-X Router does not shut down automatically during an over-temperature condition. The router will remain active irrespective of what the ambient temperature is, if the router is exposed to an extremely hot environment for a prolonged period of time, it will remain active until the hardware fails.

The **facility-alarm critical exceed-action shutdown** command is disabled on the Cisco ASR 1001-X Router.

The console terminal displays the following error message if you execute the **facility-alarm critical exceed-action shutdown** command:

Router(config)# **facility-alarm critical exceed-action shutdown**

Router(config)# **end**

Router#

*Apr 22 15:27:26.939: %CMANRPCHAIN-6-NOSHUTWARN: Shutdown not supported on this platform

*Apr 22 15:27:27.974: %SYS-5-CONFIG_I: Configured from console by console

Router#

If the air temperature exceeds a defined threshold, the system controller displays the following warning message on the console terminal:

Router#

*Apr 22 15:30:37.749: %CMRP_ENVMON-3-TEMP_WARN_CRITICAL: R0/0: cmand: WARNING: Temp: Inlet temperature sensor on R0 is in a critical state reading 81

Router#

The console terminal displays the following status if you execute the **show facility-alarm status** command:

Router# **show facility-alarm status**

System Totals Critical: 2 Major: 0 Minor: 0

Source Time Severity Description [Index]

------ ------ -------- -------------------

xcvr container 0/0/1 Apr 22 2014 15:25:57 CRITICAL Transceiver Missing - Link Down [1]

Temp: Inlet R0/30 Apr 22 2014 15:30:37 CRITICAL Temp Above Normal (Shutdown) [1]

GigabitEthernet0 Apr 22 2014 15:25:42 INFO Physical Port Administrative State Down [2]

Router#

Fan Failures

Four internal fans draw cooling air into the chassis and across internal components to maintain an acceptable operating temperature. The fans are located in the center of the chassis. The fans are numbered from 0 to 3, right to left. When the system power is on, all fans should be operational. However, the system continues to operate even if a fan fails.

Use the **show platform hardware slot** <*slot*> **fan status** command to view the status of the fans, for example:

Router# **show platform hardware slot P2 fan status**

Fan group 1 speed: 60%

Fan 0: Normal

Fan 1: Normal

Fan 2: Normal

Fan 3: Fail

Reporting Functions

The chassis manager on the forwarding engine control processor manages the local resources of the forwarding processor. The Cisco ASR 1001-X Router displays warning messages on the console if the chassis interface-monitored parameters exceed a threshold. You can also retrieve and display environmental status reports with the following commands:

- **show environment all**
- **show version**
- **show inventory**
- **show platform**

- **show platform software status control-processor**
- **show diag**

Parameters are measured and reporting functions are updated every 60 seconds. A brief description of each of these commands follows.

The **show environment all** command displays temperature, voltage, fan, and power supply information.

The following is sample output from the **show environment all** command.

show environment all Command

```
Router# show environment all
Sensor List:  Environmental Monitoring
 Sensor           Location          State             Reading
 PEM Iout         P0                Normal            6 A
 PEM Vout         P0                Normal            12 V DC
 PEM Vin          P0                Normal            117 V AC
 Temp: PEM In     P0                Normal            35 Celsius
 Temp: PEM Out    P0                Normal            32 Celsius
 Temp: PEM Int    P0                Normal            37 Celsius
 PEM Iout         P1                Normal            6 A
 PEM Vout         P1                Normal            12 V DC
 PEM Vin          P1                Normal            117 V AC
 Temp: PEM In     P1                Normal            31 Celsius
 Temp: PEM Out    P1                Normal            27 Celsius
 Temp: PEM Int    P1                Normal            31 Celsius
 VVM 0: VX1       R0                Normal            1502 mV
 VVM 0: VX2       R0                Normal            751 mV
 VVM 0: VX3       R0                Normal            1004 mV
 VVM 0: VX4       R0                Normal            1055 mV
 VVM 0: VX5       R0                Normal            901 mV
 VVM 0: VP1       R0                Normal            5096 mV
 VVM 0: VP3       R0                Normal            1505 mV
 VVM 0: VP4       R0                Normal            1792 mV
 VVM 0: VH        R0                Normal            11940 mV
 VVM 1: VX1       R0                Normal            1203 mV
 VVM 1: VX2       R0                Normal            859 mV
 VVM 1: VX3       R0                Normal            857 mV
 VVM 1: VX4       R0                Normal            999 mV
 VVM 1: VX5       R0                Normal            950 mV
 VVM 1: VP2       R0                Normal            3320 mV
 VVM 1: VP3       R0                Normal            1787 mV
 VVM 1: VP4       R0                Normal            997 mV
 VVM 1: VH        R0                Normal            11945 mV
 VVM 2: VX1       R0                Normal            1112 mV
 VVM 2: VX2       R0                Normal            1102 mV
 VVM 2: VX3       R0                Normal            1216 mV
 VVM 2: VX4       R0                Normal            2516 mV
 VVM 2: VX5       R0                Normal            910 mV
 VVM 2: VP2       R0                Normal            1526 mV
 VVM 2: VP3       R0                Normal            1508 mV
 VVM 2: VP4       R0                Normal            2481 mV
 VVM 2: VH        R0                Normal            11935 mV
 VVM 2: AUX1      R0                Normal            747 mV
 VVM 2: AUX2      R0                Normal            752 mV
 Temp: sTCAM      R0                Normal            31 Celsius
 Temp: Inlet      R0                Normal            22 Celsius
 Temp: Outlet     R0                Normal            36 Celsius
 Temp: QFP Die    R0                Normal            58 Celsius
 Temp: Center     R0                Normal            37 Celsius
 Temp: Oct Die    R0                Normal            41 Celsius
 Temp: CPU Inlt   R0                Normal            26 Celsius
```

```
 Temp: CPU VRM    R0               Normal           24 Celsius
 Temp: CPU Die    R0               Normal           37 Celsius
 Temp: FC FANS    R0               Fan Speed 60%    21 Celsius
```

The **show version** command displays the system hardware configuration, software version, and names and sources of configuration files and boot images.

The following is sample output from the **show version** command:

show version Command

```
Router# show version
Cisco IOS XE Software, Version BLD_V154_2_S_XE312_THROTTLE_LATEST_20140709_150034-std
Cisco IOS Software, ASR1000 Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Experimental Version
 15.4(20140709:163658)
[v154_2_s_xe312_throttle-BLD-BLD_V154_2_S_XE312_THROTTLE_LATEST_20140709_150034-ios 159]
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All rights reserved.  Certain components of Cisco IOS-XE software are
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software code licensed under GPL Version 2.0 is free software that comes
with ABSOLUTELY NO WARRANTY.  You can redistribute and/or modify such
GPL code under the terms of GPL Version 2.0.  For more details, see the
documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.
ROM: IOS-XE ROMMON
Router uptime is 21 hours, 43 minutes
Uptime for this control processor is 21 hours, 44 minutes
System returned to ROM by reload
System image file is "tftp:images/rls_3_12_nightster/asr1001x-universalk9.BLD_V154_2_"
Last reload reason: Reload Command
This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.
A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html
If you require further assistance please contact us by sending email to
export@cisco.com.
License Level: adventerprise
License Type: Permanent
Next reload license Level: adventerprise
cisco ASR1001-X (1NG) processor with 6837243K/6147K bytes of memory.
Processor board ID JAE17460APT
6 Gigabit Ethernet interfaces
3 Ten Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
16777216K bytes of physical memory.
6684671K bytes of eUSB flash at bootflash:.
Configuration register is 0x0
Router#
```

The sh**ow inventory** command displays an extended report that includes the product inventory listing of all the Cisco products installed in the networking device.

The following is sample output from the **show inventory** command:

show inventory Command

```
Router# show inventory
NAME: "Chassis", DESCR: "Cisco ASR1001-X Chassis"
PID: ASR1001-X , VID: V00, SN: P3A-9
NAME: "Power Supply Module 0", DESCR: "Cisco ASR1001-X AC Power Supply"
PID: ASR1001X-PWR-AC , VID: V00, SN: LIT171616HJ
NAME: "Power Supply Module 1", DESCR: "Cisco ASR1001-X AC Power Supply"
PID: ASR1001X-PWR-AC , VID: V00, SN: LIT171616GG
NAME: "Fan Tray 0", DESCR: "Cisco ASR1001-X Fan Tray"
PID: ASR1001-X-FANTRAY , VID: , SN:
NAME: "module 0", DESCR: "Cisco ASR1001-X SPA Interface Processor"
PID: ASR1001-X , VID: , SN:
NAME: "SPA subslot 0/1", DESCR: "4-port Serial Shared Port Adapter"
PID: SPA-4XT-SERIAL , VID: V01, SN: JAB111105M4
NAME: "NIM subslot 0/2", DESCR: "NIM SSD Module"
PID: NIM-SSD , VID: V01, SN: FOC18071SNN
NAME: "subslot 0/2 disk0", DESCR: "harddisk"
PID: Micron P400m-MTFDDAK400MAN , VID: 0225 , SN: MSA1802019A
NAME: "subslot 0/2 disk1", DESCR: "harddisk"
PID: UB88RTB400HE6-NTH-EID , VID: 5.2.4 , SN: 11000302418
NAME: "SPA subslot 0/0", DESCR: "8-port Built-in GE SPA"
PID: BUILT-IN-2T+6X1GE , VID: , SN:
NAME: "module R0", DESCR: "Cisco ASR1001-X Route Processor"
PID: ASR1001-X , VID: V00, SN: JAE1719030S
NAME: "module F0", DESCR: "Cisco ASR1001-X Embedded Services Processor"
PID: ASR1001-X , VID: , SN:
Router#
```

The sh**ow platform** command displays platform information.

The following is sample output from the **show platform** command:

show platform Command

```
Router# show platform
Chassis type: ASR1001-X
Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1001-X           ok                    00:34:05
 0/0      BUILT-IN-2T+6X1GE   ok                    00:33:14
 0/1      SPA-4XT-SERIAL      ok                    00:33:14
 0/2      NIM-SSD             ok                    00:33:11
R0        ASR1001-X           ok                    00:34:05
 R0/0                         ok, active            00:34:05
 R0/1                         ok, standby           00:32:47
F0        ASR1001-X           ok, active            00:34:05
P0        ASR1001X-PWR-AC     ps, fail              00:33:44
P1        ASR1001X-PWR-AC     ok                    00:33:42
P2        ASR1001-X-FANTRAY   ok                    00:33:47
Slot      CPLD Version        Firmware Version
--------- ------------------- ---------------------------------------
0         14041015            15.4(2r)S
R0        14041015            15.4(2r)S
F0        14041015            15.4(2r)S
```

The **show platform software status control-processor** command displays the average load, memory usage, and CPU utilization levels at which the router is running. The output also specifies whether the levels of these system health parameters are within defined thresholds.

Note The output does not display SIP-related information on a monolithic router.

The following is sample output from the **show platform software status control-processor** command:

show platform software status control-processor Command

```
Router# show platform software status control-processor
RP0: online, statistics updated 1 seconds ago
Load Average: healthy
  1-Min: 0.00, status: healthy, under 8.00
  5-Min: 0.03, status: healthy, under 8.00
  15-Min: 0.07, status: healthy, under 10.00
Memory (kb): healthy
  Total: 8092776
  Used: 3491556 (43%)
  Free: 4601220 (57%)
  Committed: 3566404 (44%), status: healthy, under 95%
Per-core Statistics
CPU0: CPU Utilization (percentage of time spent)
  User:  0.00, System:  0.00, Nice:  0.00, Idle:100.00
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU1: CPU Utilization (percentage of time spent)
  User:  1.30, System:  0.40, Nice:  0.00, Idle: 98.30
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU2: CPU Utilization (percentage of time spent)
  User:  0.49, System:  8.89, Nice:  0.00, Idle: 90.60
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU3: CPU Utilization (percentage of time spent)
  User:  2.00, System:  0.40, Nice:  0.00, Idle: 97.60
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU4: CPU Utilization (percentage of time spent)
  User:  0.00, System:  0.30, Nice:  0.00, Idle: 99.69
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU5: CPU Utilization (percentage of time spent)
  User:  0.40, System:  0.10, Nice:  0.00, Idle: 99.50
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU6: CPU Utilization (percentage of time spent)
  User:  0.40, System:  0.40, Nice:  0.00, Idle: 99.19
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
CPU7: CPU Utilization (percentage of time spent)
  User:  0.80, System:  1.30, Nice:  0.00, Idle: 97.90
  IRQ:  0.00, SIRQ:  0.00, IOwait:  0.00
```

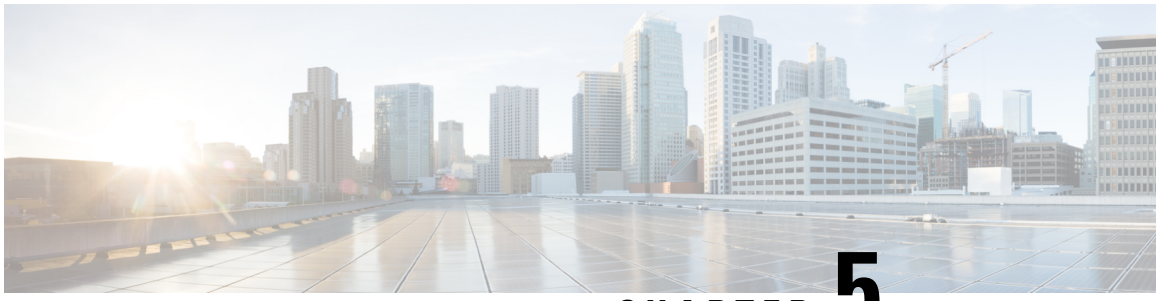
The **show diag chassis eeprom detail** command displays the configuration hardware information, including DRAM and Static RAM (SRAM) on line cards.

The following is sample output from the **show diag chassis eeprom detail** command:

show diag chassis eeprom detail Command

```
Router#: show diag chassis eeprom detail
MIDPLANE EEPROM data:
        EEPROM version           : 4
        Compatible Type          : 0xFF
        Controller Type          : 2030
        Hardware Revision        : 1.0
        PCB Part Number          : 73-14409-07
        Board Revision           : A0
        Deviation Number         : 0-0
        Fab Version              : 07
        PCB Serial Number        : JAE1817044D
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Top Assy. Part Number    : 68-4703-07
```

```
        CLEI Code                : CMMP410DRA
        Product Identifier (PID) : ASR1001-X
        Version Identifier (VID) : V01
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Chassis MAC Address      : a80c.0dee.c600
        MAC Address block size   : 128
        Chassis Serial Number    : FXS1814Q2K0
        Environment Monitor Data : 00 06 00 FA Asset ID                 :
Power/Fan Module P0 EEPROM data:
        EEPROM version           : 4
        Compatible Type          : 0xFF
        Hardware Revision        : 0.3
        Version Identifier (VID) : V00
        Product Identifier (PID) : ASR1001X-PWR-AC
        PCB Serial Number        : LIT171616GE
        Top Assy. Part Number    : 341-0608-01
        Board Revision           : 01
        Deviation Number         : 0
        Power Supply Type        : AC
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        CLEI Code                : UNASSIGNED
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Unknown Field (type 00DA): 00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
        Platform features        : 00 01 01 DE 15 F4 07 C6
                                   00 00 00 00 00 00 00 00
                                   4A
        Environment Monitor Data : 00 06 00 FA
        Asset ID                 :
Power/Fan Module P1 EEPROM data:
        EEPROM version           : 4
        Compatible Type          : 0xFF
        Hardware Revision        : 0.3
        Version Identifier (VID) : V00
        Product Identifier (PID) : ASR1001X-PWR-AC
        PCB Serial Number        : LIT171616GX
        Top Assy. Part Number    : 341-0608-01
        Board Revision           : 01
        Deviation Number         : 0
        Power Supply Type        : AC
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        CLEI Code                : UNASSIGNED
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Unknown Field (type 00DA): 00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
        Platform features        : 00 01 01 DE 15 F4 07 C6
                                   00 00 00 00 00 00 00 00
                                   4A
        Environment Monitor Data : 00 06 00 FA
        Asset ID                 :
Power/Fan Module P2 EEPROM data is not initialized
```



CHAPTER 5

Upgrading the ROMMON and CPLD

This chapter describes the procedures to upgrade the ROMMON on the Cisco ASR 1001-X Router.

This chapter contains the following sections:

- Upgrading the ROMMON, on page 65
- Compatible ROMMON Releases, on page 69
- Resolved Caveats, on page 69
- Hardware the Require a CPLD Upgrade, on page 70
- Checking Hardware and Software Compatibility, on page 71

Upgrading the ROMMON

The ROMMON must be upgraded on the Cisco ASR 1001-X Router if the system message on the router indicates that the ROMMON requires an upgrade, or when a Cisco technical support representative suggests a ROMMON upgrade.

Compatibility Requirements

Note For information about the compatibility between the ROMMON releases and the Cisco ASR 1001-X Router, see the " ROMMON Release Requirements " section in the Cisco ASR 1000 Series Aggregation Services Routers Release Notes .

To upgrade the ROMMON image, you must have access to the privileged EXEC mode prompt or the diagnostic mode prompt on the router.

Checking the Current ROMMON Version

If you are unsure whether a ROMMON upgrade is required, follow the instructions provided in this section.

Run the **show rom-monitor** command or the **show platform** command to display the version of ROMMON running on your router. If the output shows that the release to which you plan to upgrade is already installed, you need not upgrade the ROMMON.

For a single form-factor platform such as the Cisco ASR 1001-X Router, all of the following commands display the same output:

- **show rom-monitor 0**
- **show rom-monitor F0**
- **show rom-monitor FP**
- **show rom-monitor R0**
- **show rom-monitor RP**

In the following example, the output of the **show rom-monitor** command indicates that an upgrade to Release 15.4(2r)S is not required:

```
Router# show rom-monitor 0
System Bootstrap, Version 15.4(2r)S, RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2014  by cisco Systems, Inc.
```

Upgrading the ROMMON for the Cisco ASR 1001-X Router

Use this procedure to upgrade the ROMMON for the Cisco ASR 1001-X Router:

SUMMARY STEPS

1. (Optional) Run the **show platform** command or the **show rom-monitor** *slot* command to see the current release number of ROMMON on the hardware.
2. If the ROMMON image has not been copied onto the router, copy the PKG file that is made available as part of this ROMMON release onto the bootflash: or usb[0-1]: file system using the **copy** *source-location destination-location* command. For example, if you are upgrading to Release 15.4(2r)S, copy the asr1000-rommon.154-2r.S.pkg file.
3. Run the **dir** *file-system* command to verify that the ROMMON file is copied into the specified directory.
4. Run the **upgrade rom-monitor filename** *location* **all** command to begin the ROMMON image upgrade, where *location* is the path to the ROMMON file.
5. Messages pertaining to the upgrade are displayed on the console. After the display of these messages stops and the router prompt is available, run the **reload** command to reload the router.
6. If autoboot has not been enabled by using the **config-register 0x2102** command, run the **boot** *filesystem:/file-location* command at the ROMMON prompt to boot the Cisco IOS XE image, where *filesystem:/file-location* is the path to the consolidated package file. The ROMMON upgrade is not permanent for any piece of hardware until the Cisco IOS XE image is booted.
7. Run the **enable** command at the user prompt to enter the privileged EXEC mode after the boot is complete.
8. Run the **show platform** command or the **show rom-monitor** *slot* command to verify whether the ROMMON has been upgraded.

DETAILED STEPS

Procedure

Step 1 (Optional) Run the **show platform** command or the **show rom-monitor** *slot* command to see the current release number of ROMMON on the hardware.

Step 2 If the ROMMON image has not been copied onto the router, copy the PKG file that is made available as part of this ROMMON release onto the bootflash: or usb[0-1]: file system using the **copy** *source-location destination-location* command. For example, if you are upgrading to Release 15.4(2r)S, copy the asr1000-rommon.154-2r.S.pkg file.

Step 3 Run the **dir** *file-system* command to verify that the ROMMON file is copied into the specified directory.

Step 4 Run the **upgrade rom-monitor filename** *location* **all** command to begin the ROMMON image upgrade, where *location* is the path to the ROMMON file.

Caution
Do not remove hardware, turn off power, or interrupt the router in any way during the ROMMON upgrade. Although the router should be able to recover from most interruptions during the ROMMON upgrade, certain scenarios may cause unpredictable problems.

Step 5 Messages pertaining to the upgrade are displayed on the console. After the display of these messages stops and the router prompt is available, run the **reload** command to reload the router.

Note
If you change the configuration register setting through Cisco IOS after initiating a ROMMON upgrade, but before reloading the router, the configuration register setting will not be applied. Reload the router and allow the ROMMON upgrade to be applied prior to changing the configuration register in Cisco IOS.

Step 6 If autoboot has not been enabled by using the **config-register 0x2102** command, run the **boot** *filesystem:/file-location* command at the ROMMON prompt to boot the Cisco IOS XE image, where *filesystem:/file-location* is the path to the consolidated package file. The ROMMON upgrade is not permanent for any piece of hardware until the Cisco IOS XE image is booted.

Note
If you enter the **reset** command twice when booting from the ROMMON prompt, the ROMMON upgrade will automatically fall back to the previous ROMMON image. The following message appears after you enter the reset command the second time, and the earlier version of the ROMMON image is installed: Rommon upgrade requestedMaximum upgrade attempts exceeded, continuing with old Rommon...

Step 7 Run the **enable** command at the user prompt to enter the privileged EXEC mode after the boot is complete.

Step 8 Run the **show platform** command or the **show rom-monitor** *slot* command to verify whether the ROMMON has been upgraded.

Example: Upgrading a ROMMON

The following sequence of commands is an example of the procedure to upgrade the ROMMON on a Cisco ASR 1001-X Router:

```
Router# copy tftp boot
Address or name of remote host []? 2.0.0.2
Source filename []? images/nightster/asr1000-rommon.154-2r.S.pkg
Destination filename [asr1000-rommon.154-2r.S.pkg]?
Accessing tftp://2.0.0.2/images/nightster/asr1000-rommon.154-2r.S.pkg...
Loading images/nightster/asr1000-rommon.154-2r.S.pkg from 2.0.0.2 (via GigabitEthernet0):
!
[OK - 3832112 bytes]
3832112 bytes copied in 1.206 secs (3177539 bytes/sec)
Router# upgrade rom-monitor filename bootflash:asr1000-rommon.154-2r.S.pkg all
Chassis model ASR1001-X has a single rom-monitor.
Upgrade rom-monitor
```

```
Target copying rom-monitor image file
File size : //tmp/rommon_upgrade/latest.bin
File size is : 3211264
FIPS File size is : 3211264
ROMMON Image Type : X86
File /tmp/rommon_upgrade/latest.bin is a FIPS ROMMON image
FIPS-140-3 Load Test on /tmp/rommon_upgrade/latest.bin has PASSED.
Authenticity of the image has been verified.
4259840+0 records in
4259840+0 records out
131072+0 records in
131072+0 records out
655360+0 records in
655360+0 records out
Checking upgrade image...
3211264+0 records in
6272+0 records out
Upgrade image MD5 signature is b806b4bffb47e9be24d26ecd976212e8
Burning upgrade partition...
3211264+0 records in
3211264+0 records out
Checking upgrade partition...
3211264+0 records in
3211264+0 records out
Copying ROMMON environment
4259840+0 records in
4259840+0 records out
131072+0 records in
131072+0 records out
131072+0 records in
131072+0 records out
655360+0 records in
655360+0 records out
Upgrade flash partition MD5 signature is b806b4bffb47e9be24d26ecd976212e8
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the RP.
Router# reload
Proceed with reload? [confirm]
*Mar 24 17:39:33.712 EDT: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload
 Command.Mar 24 17:39:48.058 R0/0: %PMAN-5-EXITACTION: P rocess manager is exiting: process
 exit with reload chassis code
Initializing Hardware ...
System integrity status: 00000610
System Bootstrap, Version 12.2(20140222:162915) [rommon_release_1_49 101], DEVELOPMENT
SOFTWARE
Copyright (c) 1994-2014  by cisco Systems, Inc.
Compiled Sat 02/22/2014  9:10:52.81
Current image running: Boot ROM1
Last reset cause: LocalSoft
ASR1001-X platform with 8388608 Kbytes of main memory
Rommon upgrade requested
Flash upgrade reset 1 in progress
.......
Initializing Hardware ...
System integrity status: 00000610
System Bootstrap, Version 15.4(2r)S, RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2014  by cisco Systems, Inc.
Current image running: *Upgrade in progress* Boot ROM0
Last reset cause: BootRomUpgrade
***          Incorrect BIOS parameters           ***
*** Correcting the BIOS parameters and rebooting ***
Initializing Hardware ...
System integrity status: 00000610
System Bootstrap, Version 12.2(20140222:162915) [rommon_release_1_49 101], DEVELOPMENT
```

```
SOFTWARE
Copyright (c) 1994-2014  by cisco Systems, Inc.
Compiled Sat 02/22/2014  9:10:52.81
Current image running: Boot ROM1
Last reset cause: LocalSoft
ASR1001-X platform with 8388608 Kbytes of main memory
Rommon upgrade requested
Flash upgrade reset 2 in progress
.......
Initializing Hardware ...
System integrity status: 00000610
System Bootstrap, Version 15.4(2r)S, RELEASE SOFTWARE (fc1)
Copyright (c) 1994-2014  by cisco Systems, Inc.
Current image running: *Upgrade in progress* Boot ROM0
Last reset cause: BootRomUpgrade
ASR1001-X platform with 8388608 Kbytes of main memory
```



Note From here, you can manually reload from the ROMMON prompt, or let the router auto boot directly to Cisco IOS.

The **show platform** command displays the upgraded version of the ROMMON:

```
Router# show platform
Chassis type: ASR1001-X
Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1001-X           ok                    17:51:08
0/0      BUILT-IN-2T+6X1GE   ok                   17:50:18
0/1      SPA-1X10GE-L-V2     ok                   17:50:18
R0        ASR1001-X           ok                    17:51:08
R0/0                         ok, active           17:51:08
R0/1                         ok, standby          17:49:51
F0        ASR1001-X           ok, active            17:51:08
P0        ASR1001X-PWR-AC     ok                    17:50:44
P1        ASR1001X-PWR-AC     ok                    17:50:42
P2        ASR1001-X-FANTRAY   ok                    17:50:45
Slot      CPLD Version        Firmware Version
--------- ------------------- ---------------------------------------
0         14022717            15.4(2r)S << New ROMmon is confirmed
R0        14022717            15.4(2r)S
F0        14022717            15.4(2r)S
```

Compatible ROMMON Releases

For information about the compatibility between ROMMON releases and the Cisco ASR 1001-X Router, see the " ROMMON Release Requirements " section in the Cisco ASR 1000 Series Aggregation Services Routers Release Notes .

Resolved Caveats

For information about the resolved caveats in each ROMMON release, see the " Resolved Caveats " section in the Cisco ASR 1000 Series Aggregation Services Routers Release Notes .

Hardware the Require a CPLD Upgrade

The Cisco ASR 1001-X Router has the capability to allow users to perform Complex Programmable Logic Device (CPLD) upgrades in the field.

For details about Cisco ASR 1000 Series Aggregation Services Router hardware configuration combinations that require a CPLD field-programmable upgrade for components, see Upgrading Field Programmable Hardware Devices for Cisco ASR 1000 Series Routers .

Upgrading the CPLD

To upgrade the CPLD, follow these steps:

SUMMARY STEPS

1. Copy the **.pkg** file to your bootflash directory.
2. Execute the **upgrade hw-programmable cpld filename bootflash:**<*cpld.pkg*> **RP active** command:
3. Press **Enter**.
4. To confirm if the upgrade is complete, execute the **show platform** command:

DETAILED STEPS

Procedure

Step 1 Copy the **.pkg** file to your bootflash directory.

Step 2 Execute the **upgrade hw-programmable cpld filename bootflash:**<*cpld.pkg*> **RP active** command:

Router# upgrade hw-programmable cpld filename bootflash:nightster_cpld_14041015.pkg RP active

Upgrade CPLD on Route-Processor 0 from current version 13081317 to 14041015 [Press Enter to confirm]

This command could take up to 10 minutes, please wait and do not power-cycle the chassis or the card. Otherwise, hardware may be unrecoverable. The system will be automatically power-cycled upon completion. [Press Enter to confirm]

Note
If you decide not to upgrade the CPLD after step 2, press **Ctrl-C** to abort.

Step 3 Press **Enter**.

The router upgrades the CPLD, and information will be displayed on the screen. The router then power cycles and returns to your configuration register-based setting (Cisco IOS boot or ROMMON prompt).

Step 4 To confirm if the upgrade is complete, execute the **show platform** command:

Router# show platform

Chassis type: ASR1001-X

Slot Type State Insert time (ago)

--------- ------------------- ---------- -----------------

0 ASR1001-X ok 2d22h

0/0 BUILT-IN-2T+6X1GE ok 2d20h

R0 ASR1001-X ok, active 2d22h

F0 ASR1001-X ok, active 2d22h

P0 ASR1001X-PWR-AC ok 2d22h

P1 ASR1001X-PWR-AC ps, fail 2d22h

P2 ASR1001-X-FANTRAY f1, fail 2d22h

Slot CPLD Version Firmware Version

--------- ------------------- --

0 **14041015** 15.4(2r)S

R0 **14041015** 15.4(2r)S

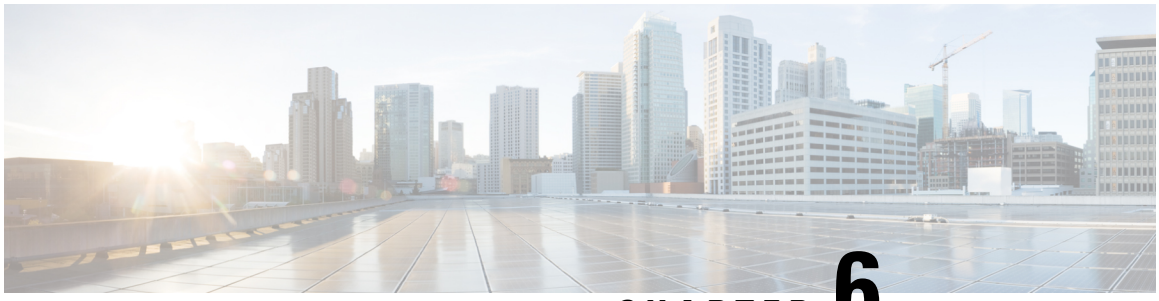
F0 **14041015** 15.4(2r)S

Checking Hardware and Software Compatibility

Cisco software is packaged in feature sets consisting of software images that support specific platforms. The feature sets that are available for a specific platform depend on which Cisco software images are included in a release. To identify the set of software images available in a specific release or to find out if a feature is available in a given Cisco IOS XE software image, use Cisco Feature Navigator or the corresponding software release notes.

Using Cisco Feature Navigator

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco IOS XE software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn . An account on Cisco.com is not required.



CHAPTER 6

Cisco ASR 1001-X Router License Verification

This chapter provides information about verifying the Cisco IOS license level, viewing the Cisco ASR 1001-X Router license, and configuring the throughput level.

This chapter contains the following sections:

- Viewing the Cisco IOS License Level, on page 73
- Configuring the Throughput Level, on page 74
- Viewing License Information, on page 75
- Per Port Counted License (10-GE Interfaces), on page 81

Viewing the Cisco IOS License Level

Use the **show version** command to determine the Cisco IOS license level in the router. For example:

Router# **show version**

.

.

.

License Level: adventerprise

License Type: RightToUse

Next reload license Level: adventerprise

.

Table 18: show version Command Output Description

Field Name	Description
License Level: adventerprise	Indicates the current Cisco IOS license code level.
License Type: RightToUse	Indicates whether you are utilizing a permanent (purchased) license, an evaluation 60-day license, or a Right-to-Use license that would indicate that the purchase of a license is required.
Next reload license Level: adventerprise	Indicates the startup configuration definition that will be used for the next reload instance.

Use the **show running-config** command or the **show startup-config** command to view the license-level information. The following example displays sample output from the **show running-config** command:

Router# **show running-config**

.

.

.

license boot level adventerprise

.

.

Table 19: show running-config Command Output Description

Field Name	Description
license boot level adventerprise	Indicates the current requested Cisco lOS license level to boot.

Configuring the Throughput Level

The built-in embedded service processor of the Cisco ASR 1001-X Router supports throughputs of 2.5 Gbps (default), 5 Gbps, 10 Gbps, and 20 Gbps depending upon the software license.

You can upgrade the throughput of the ESP from 2.5 Gbps (default) to 5 Gbps, 10 Gbps, or 20 Gbps by applying a software-activated performance upgrade license and then reloading the router. You can upgrade the throughput of the ESP from any license level to another.

To determine the current throughput level of the ESP, run the **show platform hardware throughput level** command. The following example shows the output from this command after you apply the 20 Gbps performance upgrade license and reload the router:

```
Router# show platform hardware throughput level
The current throughput level is 2000000 kb/s
```

After the router is reloaded, the log messages at the router startup will display the license-level and throughput-level information, for example:

%IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Module name = asr1001x Next reboot level = adventerprise and License = adventerprise

%IOSXE_THROUGHPUT-6-LEVEL: Throughput level has been set to 20000000 kbps

The following message will be displayed once every 24 hours if the traffic handled by the system-forwarding plane approaches or exceeds the configured throughput license level. The configured throughput level in this example is 20 Gbps:

1. Approached

   Sep 9 14:54:56: %BW_LICENSE-4-THROUGHPUT_MAX_LEVEL: SIP0: cpp_ha: Average throughput rate approached the licensed bandwidth of 2000000000 bps during 1 sampling periods in the last 24 hours, sampling period is 300 seconds

Note This is a warning message and does not lead to any packet drop.

2. Exceeding 95% threshold

   *May 24 09:42:41.687 EDT: %BW_LICENSE-5-THROUGHPUT_THRESHOLD_LEVEL: F0: cpp_ha: Average throughput rate exceeded 95 percent of licensed bandwidth 20000000000 bps 25 times, sample period 300 seconds, in last 24 hours

Note This is a warning message and does not lead to any packet drop.

3. Exceeded

   *May 24 09:42:41.687 EDT: %BW_LICENSE-4-THROUGHPUT_MAX_LEVEL: F0: cpp_ha: Average throughput rate exceeded the total licensed bandwidth 20000000000 bps and dropped 8 times, sample period 300 seconds, in last 24 hours

Warning When this message is displayed, it is an indication that the router has started dropping packets.

For more information about the software-activated performance upgrade license, see the Software Activation Configuration Guide, Cisco IOS XE Release 3S .

Viewing License Information

Use the **show license udi** command to determine the Universal Device Identifier (UDI) information of your chassis. This may be required at the time of purchasing a new license. The following example displays sample output from the **show license udi** command:

router# **show license udi**

SlotID PID SN UDI

---

*6 ASR1001-X JAE17450EUZ ASR1001-X:JAE17450EUZ

router#

You can also determine the UDI information using the **show running-config** command, for example:

Router# **show running-config**

.

.

.

license udi pid ASR1001-X sn myroutersn123

Table 20: show running-config Command Output Description

Field Name	Description
license udi pid ASR1001-X sn myroutersn123	License identifier information (also displayed with the **show license udi** command).

Use the **show license all** command to display all the applicable licenses in both Primary License Storage and Built In License Storage.



Note Primary License Storage stores the currently purchased and installed licenses.

The following example displays sample output from the **show license all** command:

router# **show license all**

License Store: Primary License Storage

StoreIndex: 0 Feature: interface_10g Version: 1.0

License Type: Permanent

License State: Active, In Use

Lock type: Node locked

Vendor info: <UDI><PID>ASR1001-X</PID><SN>JAE17450EUZ</SN></UDI>

License Addition: Exclusive

License Generation version: 0x8100000

License Count: 2/0/0 (Active/In-use/Violation)

License Priority: Medium

License Store: Built-In License Storage

StoreIndex: 0 Feature: adventerprise Version: 1.0

License Type: RightToUse

License State: Active, In Use

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: Low

StoreIndex: 1 Feature: advipservices Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 2 Feature: avc Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 3 Feature: fwnat_red Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 4 Feature: ipsec Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 5 Feature: lawful_intr Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 6 Feature: lisp Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 7 Feature: otv Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 8 Feature: sw_redundancy Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 7 weeks 5 days

Period used: 5 days 2 hours

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: Low

StoreIndex: 9 Feature: throughput_5g Version: 1.0

License Type: RightToUse

License State: Active, In Use

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: Low

StoreIndex: 10 Feature: throughput_10g Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 11 Feature: throughput_20g Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 12 Feature: vpls Version: 1.0

License Type: EvalRightToUse

License State: Active, Not in Use, EULA not accepted

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 4 days

Period used: 0 minute 0 second

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: Non-Counted

License Priority: None

StoreIndex: 13 Feature: interface_10g Version: 1.0

License Type: EvalRightToUse

License State: Inactive

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 1 day

Period used: 2 days 8 hours

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: 0/0 (In-use/Violation)

License Priority: Low

router#

Table 21: show license all Command Output Description

Field Name	Description
License Store: Primary License Storage	Primary license storage.
License Store: Built-In License Storage	Built-in license storage.

Per Port Counted License (10-GE Interfaces)

The 10-GE interfaces on the Cisco ASR 1001-X Router use a per port counted license, which has the following features:

- Count-based licenses will be used for 10-GE ports, 1 count per port.
- An End-User License Agreement (EULA) will be displayed for each port if there is no permanent license present to support these ports.
- The image carries 2-count 10-GE port EvalRTU (Evaluation) licenses. If the EvalRTU license expires, it becomes a Right-To-Use (RTU) license.
- The **no shut** command on a 10-GE interface requests one count of the license, and the In-use count increases by 1.
- The **shut** command on a 10-GE interface releases one count of the license, and the In-use count decreases by 1.

The following EvalRTU license example displays the EvalRTU licenses used on the 10-GE ports. A Permanent license would work similarly:

StoreIndex: 13 Feature: interface_10g Version: 1.0

License Type: EvalRightToUse

License State: Inactive

Evaluation total period: 8 weeks 4 days

Evaluation period left: 8 weeks 1 day

Period used: 2 days 8 hours

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: 0/0 (In-use/Violation)

License Priority: Low

StoreIndex: 13 Feature: interface_10g Version: 1.0

License Type: EvalRightToUse

License State: Active, In Use

Evaluation total period: 8 weeks 4 days

Evaluation period left: 2 weeks 6 days

Period used: 5 weeks 4 days

Transition date: Jun 09 2014 05:14:47

Lock type: Non Node locked

Vendor info: <UDI><PID>NOTLOCKED</PID><SN>NOTLOCKED</SN></UDI><T>RTU</T>

License Addition: Additive

License Generation version: 0x8200000

License Count: 2/0 (In-use/Violation)

License Priority: Low

Table 22: show license all Command Output Description

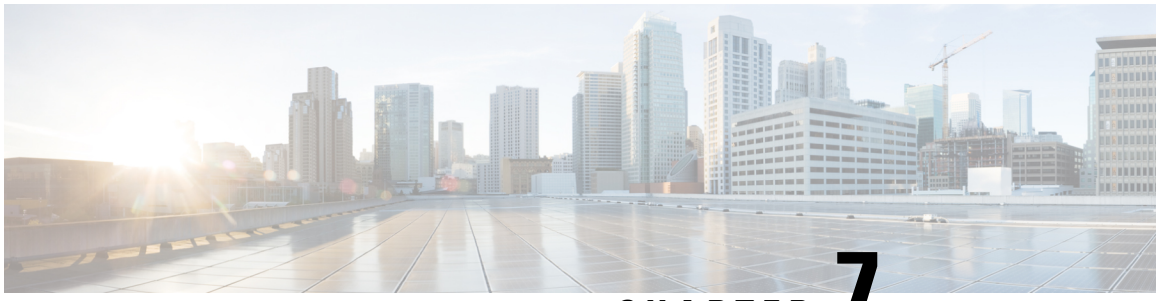
Field Name	Description
License Count: 0/0 (In-use/Violation)	No 10-GE ports in use for the evaluation license.
License Count: 2/0 (In-use/Violation)	Two 10-GE ports in use for the evaluation license (a EULA was accepted for each prior to use).

10-GE Interface Evaluation License Features

The following are the features of the 10-GE Interface Evaluation license:

- There is only one 60-Day Evaluation Period countdown timer for both 10-GE ports. The timer is initiated as soon as the first of the two ports is enabled.

- A EULA will be presented, and must be accepted, the first time you enable either of the two ports in order to utilize the requested port.
- When the 60-Day Evaluation Period expires, the license automatically changes to an RTU license. As with all other RTU licenses, there is no functionality disruption or accessibility concerns following this transition.
- There can be only one active interface_10g license. Either the Permanent License or the EvalRTU License can be Active, but not both.
- As with past license implementations, the Permanent license is of higher precedence than the built-in EvalRTU license. However, when the Permanent license does not have enough port-count (that is, when the user requests both built-in 10GE ports but the Permanent License only allows for one port), the license priority changes between the Permanent and Evaluation licenses. In this case, the Evaluation License becomes Active since it can accommodate both ports. The Permanent License will automatically become Active if and when its port-count meets the user's desired configuration.



CHAPTER 7

Removing and Replacing FRUs from the Cisco ASR 1001-X Router

This chapter describes procedures for removing and replacing field-replaceable units (FRUs) from Cisco ASR 1001-X Routers.

This chapter contains the following sections:

- Removing and Replacing the Cisco ASR 1001-X Router Power Supplies, on page 85
- Removing and Replacing Cisco ASR 1001-X Router USB Flash Memory Stick or Secure Token, on page 93
- Removing and Replacing the Cisco ASR 1001-X Router DIMM, on page 94
- Removing and Replacing a Cisco ASR 1001-X Router SPA , on page 100
- Removing and Replacing a NIM on the Cisco ASR 1001-X Router, on page 104
- Removing and Replacing an SSD from the NIM-SSD Module, on page 106
- Repacking the Router, on page 110

Removing and Replacing the Cisco ASR 1001-X Router Power Supplies

The following sections describes the procedures for removing and replacing the Cisco ASR 1001-X Router power supplies.

Note The Cisco ASR 1001-X Router has redundant power supplies that can be hot-swapped.

Danger The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed. Statement 1077

Danger When you install the unit, the ground connection must always be made first and disconnected last. Statement 1046

Danger Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003

Danger Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

Removing AC Power Supplies from the Cisco ASR 1001-X Router

This section describes how to remove an AC power supply from the Cisco ASR 1001-X Router. The Cisco ASR 1001-X Router has two power supply slots, power supply slot 0 (PS0) next to the Standby switch and power supply slot 1 (PS1) to the right, as shown in the below figures.

Note The Cisco ASR 1001-X Router has redundant power supplies that can be hot-swapped.

Follow these steps to remove an AC power supply from the Cisco ASR 1001-X Router:

SUMMARY STEPS

1. At the rear of the router, ensure that the power switch is in the Standby position.
2. Unplug the power cable from the power supply as shown in the below figure.
3. Press the retaining latch towards the pull handle, grasp the handle with one hand, and pull the power supply out of the slot while supporting the weight of the power supply with the other hand, as shown in the below figure.
4. Repeat these steps if it is required to remove the other AC power supply.

DETAILED STEPS

Procedure

Step 1 At the rear of the router, ensure that the power switch is in the Standby position.

Note
It is not required to place the power switch in the Standby position if you want to hot-swap a single power supply.

Step 2 Unplug the power cable from the power supply as shown in the below figure.

Step 3 Press the retaining latch towards the pull handle, grasp the handle with one hand, and pull the power supply out of the slot while supporting the weight of the power supply with the other hand, as shown in the below figure.

Figure 9: Removing the AC Power Supply Cable in Slot PS1

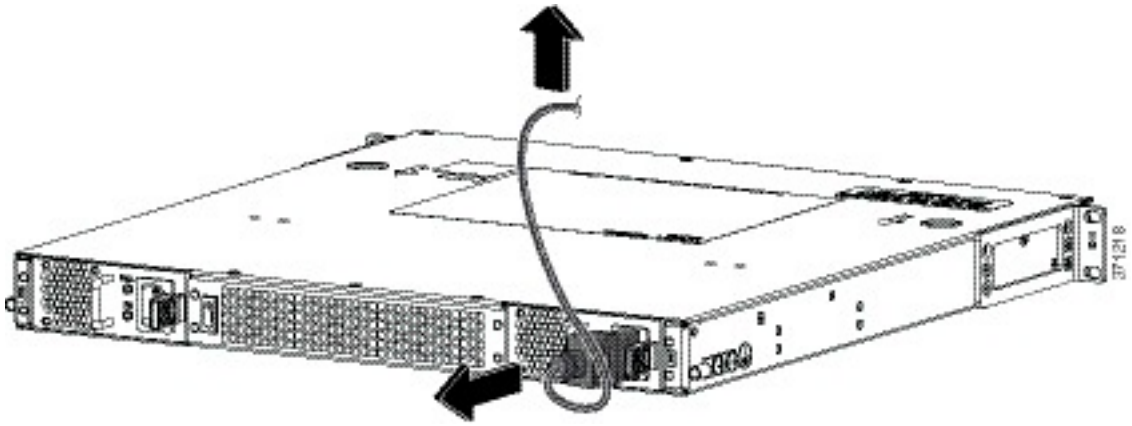
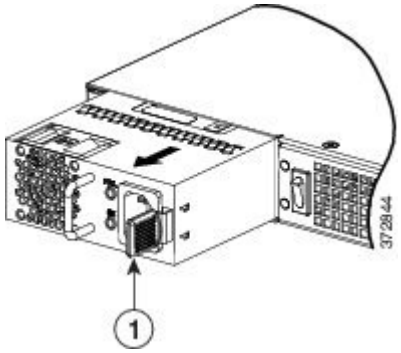


Figure 10: Removing the AC Power Supply



1	Retaining latch

Step 4 Repeat these steps if it is required to remove the other AC power supply.

What to do next

This completes the procedure for removing the AC power supplies from the Cisco ASR 1001-X Router.

Installing AC Power Supplies in the Cisco ASR 1001-X Router

Note Do not install the power supplies with the chassis cover off.

Follow these steps to install AC power supplies to the Cisco ASR 1001-X Router.

SUMMARY STEPS

1. At the rear of the chassis, ensure that the power switch on the chassis is in the Standby position.

2. Insert the power supply module into the appropriate slot(s), making sure that the retention latch is firmly placed. You can verify that the power supply module is firmly latched by gently pulling the power supply handle.
3. Insert the power supply cables firmly into the power supplies.
4. Ensure that the AC power cords are positioned, as shown in the below figure.
5. If you have changed the Standby switch to the standby position in step 1, turn the Standby switch to the On position.

DETAILED STEPS

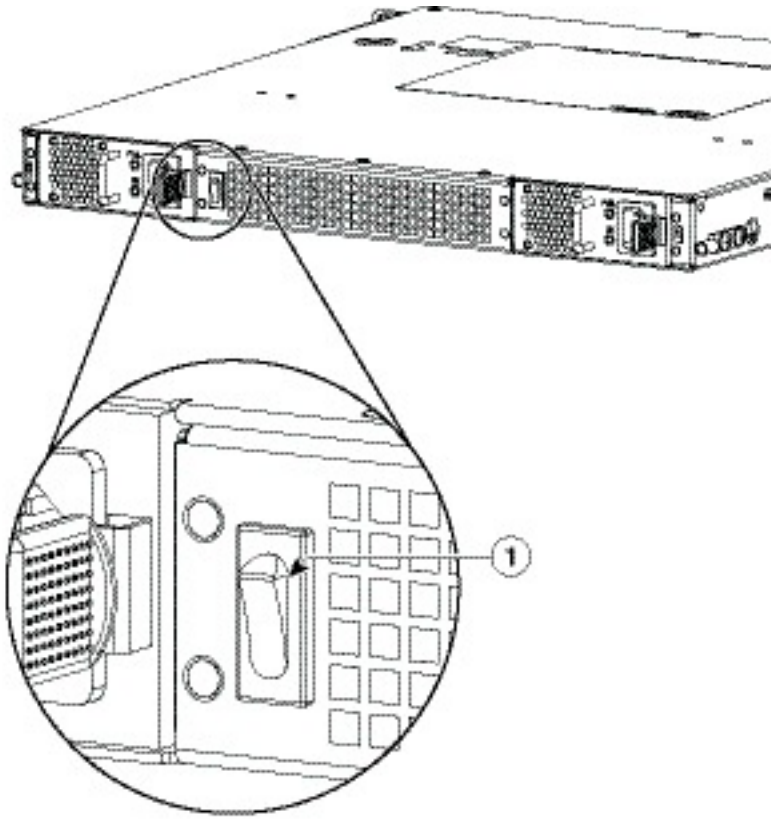
Procedure

Step 1 At the rear of the chassis, ensure that the power switch on the chassis is in the Standby position.

The below figure shows the Cisco ASR 1001-X Router AC power supply Standby switch.

Note
It is not required to place the power switch in the Standby position if you want to hot-swap a single power supply.

Figure 11: Cisco ASR 1001-X Router AC Power Supply Standby Switch



1	Cisco ASR 1001-X Router Standby switch, which does not disconnect power from the power source.

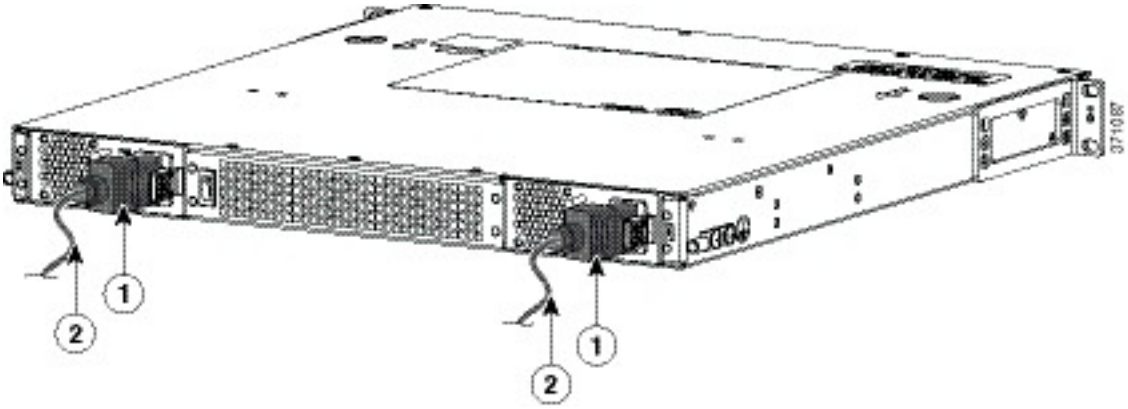
Step 2 Insert the power supply module into the appropriate slot(s), making sure that the retention latch is firmly placed. You can verify that the power supply module is firmly latched by gently pulling the power supply handle.

Step 3 Insert the power supply cables firmly into the power supplies.

Note
Ensure that both power supplies are inserted firmly and the power cords are in place.

Step 4 Ensure that the AC power cords are positioned, as shown in the below figure.

Figure 12: Correct Position of the Cisco ASR 1001-X Router AC Power Supply Cables



1	AC power supply	2	Position of power supply cable

Step 5 If you have changed the Standby switch to the standby position in step 1, turn the Standby switch to the On position.

The power supply LEDs are illuminated (green).

What to do next

This completes the procedure for connecting AC input power.

Removing DC Input Power from the Cisco ASR 1001-X Router

Note The Cisco ASR 1001-X Router has redundant power supplies that can be hot-swapped.

This section describes how to remove a DC power supply from the Cisco ASR 1001-X Router. Follow these steps:

SUMMARY STEPS

1. Turn off the circuit breaker from the power source.
2. At the rear of the router, ensure that the power switch is in the Standby position.

3. Unscrew the two terminal block wire connectors (negative and positive) on the unit. See the below figure.
4. Press the retaining latch towards the pull handle, grasp the handle with one hand, and pull the power supply out of the slot while supporting the weight of the power supply with the other hand. See the below figure.

DETAILED STEPS

Procedure

Step 1 Turn off the circuit breaker from the power source.

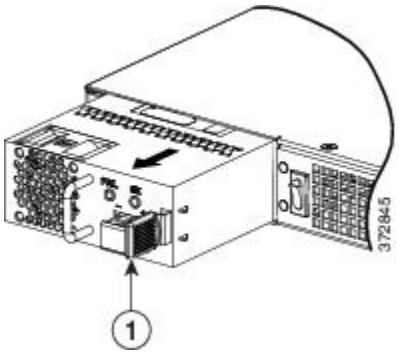
Step 2 At the rear of the router, ensure that the power switch is in the Standby position.

Note
It is not required to place the power switch in the Standby position if you want to hot-swap a single power supply.

Step 3 Unscrew the two terminal block wire connectors (negative and positive) on the unit. See the below figure.

Step 4 Press the retaining latch towards the pull handle, grasp the handle with one hand, and pull the power supply out of the slot while supporting the weight of the power supply with the other hand. See the below figure.

Figure 13: Removing DC Power Supply



1	Retaining latch

This completes the procedure for removing a DC power supply from the Cisco ASR 1001-X Router.

Installing DC Input Power on the Cisco ASR 1001-X Router

Danger Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003

Danger Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030

This section describes how to install the DC power supply input power leads to the Cisco ASR 1001-X Router DC input power supply. Before you begin, read these important notices:

- The color coding of the DC input power supply leads depends on the color coding of the DC power source at your site. Ensure that the lead color coding you choose for the DC input power supply matches the lead color coding used at the DC power source and verify that the power source is connected to the negative (–) terminal and to the positive (+) terminal on the power supply.
- Ensure that the chassis ground is connected on the chassis before you begin installing the DC power supply. Follow the steps provided in the "Attaching a Chassis Ground Connection" section on page 4-10 .

Wiring the DC Input Power Source

The Cisco ASR 1001-X Router DC power supply has a terminal block that is installed into the power supply terminal block header.

Use the following steps to wire the DC input power source:

SUMMARY STEPS

1. Turn off the circuit breaker from the power source.
2. At the rear of the router, ensure that the power switch is in the Standby position.
3. Use a wire-stripping tool to strip each of the two wires coming from the DC input power source and strip the wires to approximately 0.39 inch (10 mm) + 0.02 inch (0.5 mm). Do not strip more than the recommended length of wire because doing so could leave the wire exposed from the terminal block. The below figure shows a stripped DC input power source wire.
4. Identify the positive and negative feed positions for the terminal block connection. The wiring sequence is:
5. Insert the exposed wire into the terminal block. Ensure that you cannot see any wire lead outside the plastic cover. Only wires with insulation should extend from the terminal block.
6. Use a screwdriver to tighten the terminal block captive screws, as shown in the below figure.
7. Repeat these steps for the remaining DC input power source wire as applicable.
8. Use a tie wrap to secure the wires to the rack, so that the wires are not pulled from the terminal block by casual contact.
9. Turn on the circuit breaker at the power source.
10. If you have changed the Standby switch to the standby position in step 1, turn the Standby switch to the On position.

DETAILED STEPS

Procedure

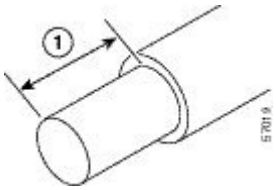
Step 1 Turn off the circuit breaker from the power source.

Step 2 At the rear of the router, ensure that the power switch is in the Standby position.

Note
It is not required to place the power switch in the Standby position if you want to hot-swap a single power supply.

Step 3 Use a wire-stripping tool to strip each of the two wires coming from the DC input power source and strip the wires to approximately 0.39 inch (10 mm) + 0.02 inch (0.5 mm). Do not strip more than the recommended length of wire because doing so could leave the wire exposed from the terminal block. The below figure shows a stripped DC input power source wire.

Figure 14: Stripped DC Input Power Source Wire



1	0.39 inch (10 mm) is the recommended wire-strip length for the terminal block.

Danger
An exposed wire lead from a DC input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC input power source wire extends from the terminal block. Statement 122

Step 4 Identify the positive and negative feed positions for the terminal block connection. The wiring sequence is:

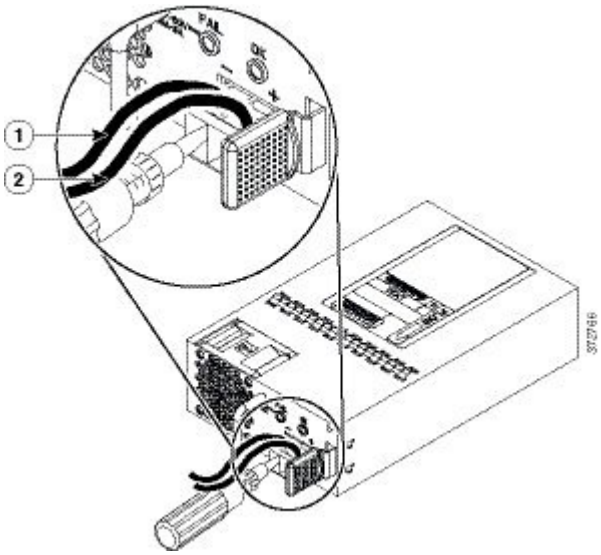
a. Positive (+) lead wire (right)
b. Negative (–) lead wire (left)

Step 5 Insert the exposed wire into the terminal block. Ensure that you cannot see any wire lead outside the plastic cover. Only wires with insulation should extend from the terminal block.

Caution
Do not overtorque the terminal block captive screws. Ensure that the connection is snug, but the wire is not crushed. Verify by tugging lightly on each wire to ensure that they do not move.

Step 6 Use a screwdriver to tighten the terminal block captive screws, as shown in the below figure.

Figure 15: DC Power Supply with Lead Wires



1	Negative (–) lead wire	2	Positive (+) lead wire

Step 7 Repeat these steps for the remaining DC input power source wire as applicable.

Step 8 Use a tie wrap to secure the wires to the rack, so that the wires are not pulled from the terminal block by casual contact.

Step 9 Turn on the circuit breaker at the power source.

Step 10 If you have changed the Standby switch to the standby position in step 1, turn the Standby switch to the On position.

The power supply LEDs illuminate green.

What to do next

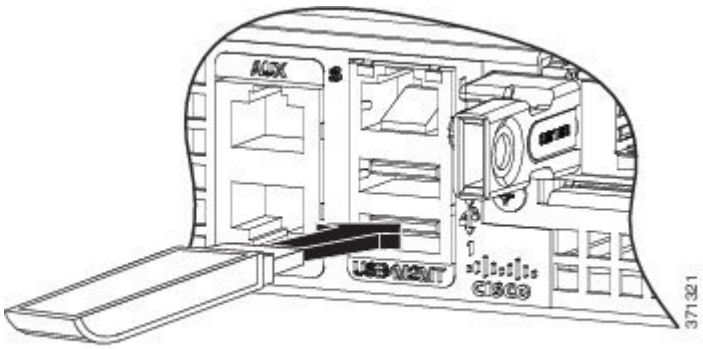
This completes the procedure for connecting the DC power supply in the Cisco ASR 1001-X Router.

Removing and Replacing Cisco ASR 1001-X Router USB Flash Memory Stick or Secure Token

The Cisco ASR 1001-X Router contains ports for a flash memory stick or a secure token, to store configurations or Cisco IOS XE consolidated packages.

The below figure shows USB port 0 or 1 connector on the Cisco ASR 1001-X Router for the flash memory stick or secure token.

Figure 16: Cisco ASR 1001-X Router FlashToken Memory Stick Port



Caution Do not remove a USB Flash memory stick or secure token when issuing a file access command or a read/write operation to the Flash memory stick or secure token when it is processing. The router might reload or the USB Flash memory stick or secure token may get damaged. Prior to the removal of the USB device, check to see if the USB activity LED on the front panel is flashing.

To remove and then replace a USB flash token memory stick from a Cisco ASR1001-X Router, follow these steps:

SUMMARY STEPS

1. Pull the flash memory stick or secure token from the USB port.
2. To replace a Cisco USB Flash memory stick or secure token, insert the module into USB port 0 or 1, as shown in the above figure. The Flash memory stick or secure token can be inserted only in one way, and can be inserted or removed regardless of whether the router is powered up or not.

DETAILED STEPS

Procedure

Step 1 Pull the flash memory stick or secure token from the USB port.

Step 2 To replace a Cisco USB Flash memory stick or secure token, insert the module into USB port 0 or 1, as shown in the above figure. The Flash memory stick or secure token can be inserted only in one way, and can be inserted or removed regardless of whether the router is powered up or not.

This completes the USB Flash memory installation procedure.

Removing and Replacing the Cisco ASR 1001-X Router DIMM

This section describes how to replace the DIMMs on the Cisco ASR 1001-X Router.

Note The Cisco ASR 1001-X Router supports an 8-GB and 16-GB configuration.

You might have to upgrade a DIMM for the following reasons:

- You have upgraded to a new Cisco IOS feature set or release that requires more memory.
- You are using very large routing tables or many protocols.

Removing and Replacing the Cisco ASR 1001-X Router DIMM Memory Module

Perform the following steps before you begin the process of removing and replacing a DIMM memory module:

- Use an ESD-preventive wrist strap.
- Back up the data that you want to save.
- Remove the power supplies before you remove the chassis top cover.

Caution The top cover cannot be removed until the power supplies are removed from the chassis. The chassis has a safety mechanism built in to prevent the removal of the top cover until the power supplies are removed.

- The DIMM component is keyed and slotted for easier connection.
- The Cisco ASR 1001-X Router has two DIMM slots.

The below table shows the slots that are supported for inserting the memory DIMMs in the Cisco ASR1001-X Router.

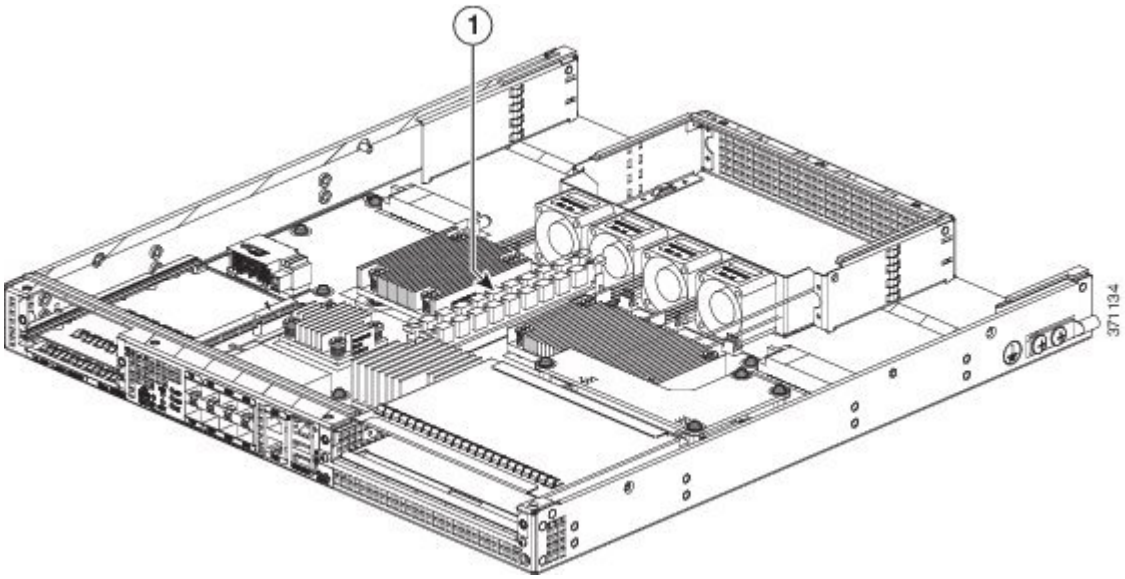
Table 23: Supported Slots for Inserting the DIMMs

Memory PID Option	Slot 0 (U101D)	Slot 1 (U103D)
U1D0	4 GB	4 GB
U1D1	8 GB	8 GB

This section describes how to remove the chassis cover and then remove and replace the Cisco ASR 1001-X Router DIMMs.

The below figure shows the location of the DIMM slots in the Cisco ASR 1001-X Router.

Figure 17: Cisco ASR 1001-X Router Internal Component Location



1	Cisco ASR 1001-X Router DIMM location (two slots)

Removing a Cisco ASR 1001-X Router DIMM

Follow these steps to remove a Cisco ASR 1001-X Router DIMM:

SUMMARY STEPS

1. With an ESD wrist strap on, remove the power supplies from the chassis.
2. After the power supplies are removed, remove the chassis top cover by performing the following steps:
3. Position the chassis so that you have the most comfortable access to the chassis to remove the DIMM.
4. Locate the DIMMs on the Cisco ASR 1001-X Router. See the following figure.
5. Pull down the DIMM module spring latches to release the corresponding DIMM from the socket. See the following figure.
6. When both ends of the DIMM are released from the socket, grasp each end of the DIMM with your thumb and forefinger and pull the DIMM completely out of the socket. Handle only the edges of the DIMM; avoid touching the memory module, pins, and the metal traces (the metal fingers along the connector edge of the DIMM) along the socket edge.
7. Place the DIMM in an antistatic bag to protect it from ESD damage.
8. Repeat Step 5 through Step 7 for the remaining DIMMs, if required, for your upgrade.

DETAILED STEPS

Procedure

Step 1 With an ESD wrist strap on, remove the power supplies from the chassis.

Note

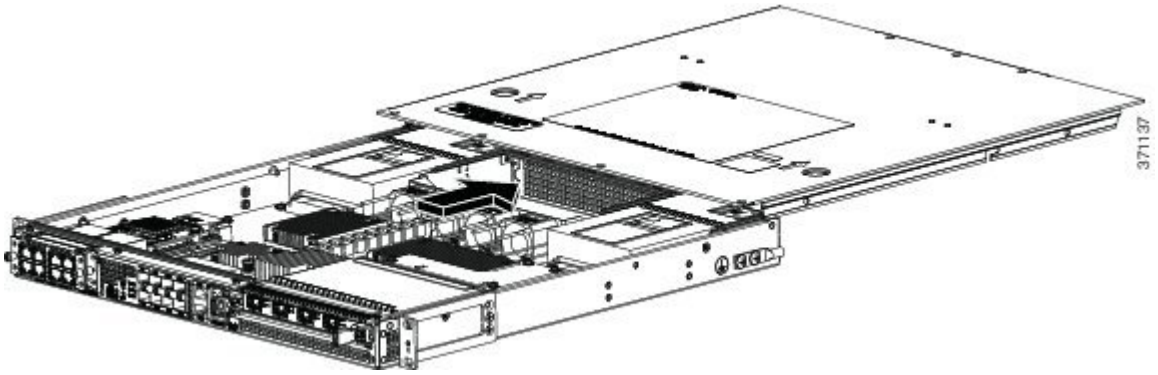
The chassis cover cannot be removed until the power supplies are removed from the chassis.

For instructions about how to remove the AC and DC power supplies from the Cisco ASR 1001-X Router, see:

Step 2 After the power supplies are removed, remove the chassis top cover by performing the following steps:

a) Remove all the top surface screws on the chassis cover.
b) Remove the two side screws from the left and the right side of the chassis.
c) Using both hands, gently slide the cover slightly backward and off of the chassis.

Figure 18: Removing the Cisco ASR 1001-X Router Cover



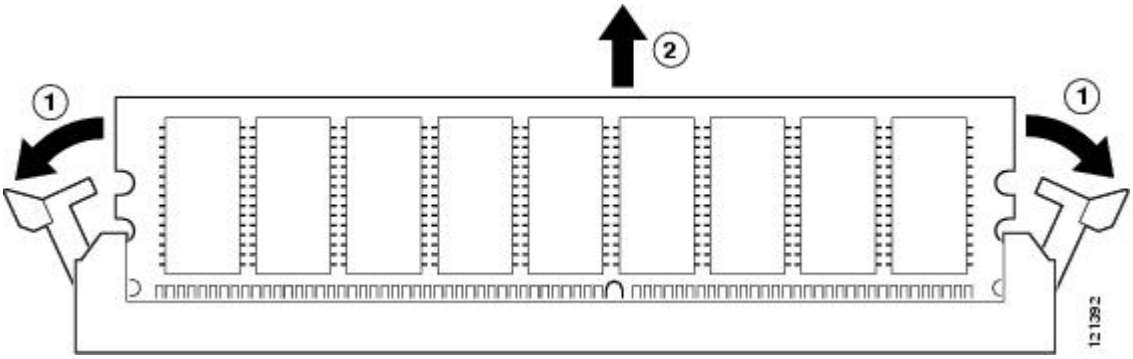
Note
The cover will not come off the chassis if the power supplies are present in the chassis.

Step 3 Position the chassis so that you have the most comfortable access to the chassis to remove the DIMM.

Step 4 Locate the DIMMs on the Cisco ASR 1001-X Router. See the following figure.

Step 5 Pull down the DIMM module spring latches to release the corresponding DIMM from the socket. See the following figure.

Figure 19: DIMM Module Spring Latches to Remove the DIMMs from the Cisco ASR 1001-X Router



Step 6 When both ends of the DIMM are released from the socket, grasp each end of the DIMM with your thumb and forefinger and pull the DIMM completely out of the socket. Handle only the edges of the DIMM; avoid touching the memory module, pins, and the metal traces (the metal fingers along the connector edge of the DIMM) along the socket edge.

Step 7 Place the DIMM in an antistatic bag to protect it from ESD damage.

Step 8 Repeat Step 5 through Step 7 for the remaining DIMMs, if required, for your upgrade.

What to do next

This completes the steps for removing the Cisco ASR 1001-X Router DIMMs from the chassis.

Replacing a Cisco ASR 1001-X Router DIMM

This section lists the steps to replace a DIMM in the Cisco ASR 1001-X Router.

SUMMARY STEPS

1. Place the DIMM on an antistatic mat or pad while wearing an antistatic device, such as a wrist strap.
2. Remove the new DIMM from the antistatic bag.
3. Locate the polarization notch and align the DIMM with the socket before inserting it. See the below figure.
4. Gently insert the new DIMM, taking care not to damage the pins on the edge of the DIMM. Using two hands, hold both sides of DIMM's top edges with your index fingers and thumbs and gently slide the DIMM straight in to the socket. Press the top of the DIMM towards the socket, being careful to apply force only on the DIMM that is parallel with the plane of the DIMM.
5. Use light insertion force and insert smoothly, but ensure that the DIMM is inserted straight. If necessary, rock the DIMM gently back and forth to seat it properly. The following figure shows how to install the DIMM in the socket for the Cisco ASR 1001-X Router.
6. After the DIMM is installed, check whether the release levers are flush against the sides of the DIMM socket. If they are not, the DIMM might not be seated properly. If the DIMM appears misaligned, carefully remove it according to the removal procedure and then reseat it in the socket. Push the DIMM firmly back into the socket until the release levers are flush against the sides of the DIMM socket.
7. Repeat Step 4 through Step 6 for the remaining DIMM.
8. Replace the Cisco ASR 1001-X Router top cover:
9. Install the power supplies into the chassis. See:

DETAILED STEPS

Procedure

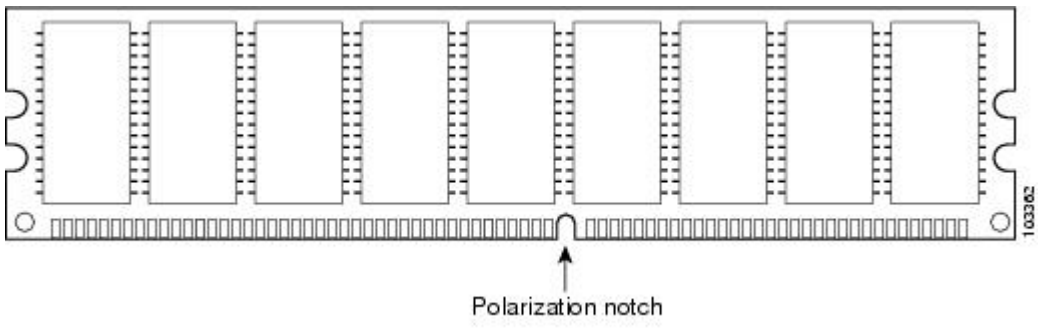
Step 1 Place the DIMM on an antistatic mat or pad while wearing an antistatic device, such as a wrist strap.

Caution
DIMMs are sensitive components that can be shorted by mishandling; they are susceptible to ESD damage. Handle the DIMM by the edges only, and avoid touching the pins.

Step 2 Remove the new DIMM from the antistatic bag.

Step 3 Locate the polarization notch and align the DIMM with the socket before inserting it. See the below figure.

Figure 20: Cisco ASR 1001-X Router DIMM Polarization Notch

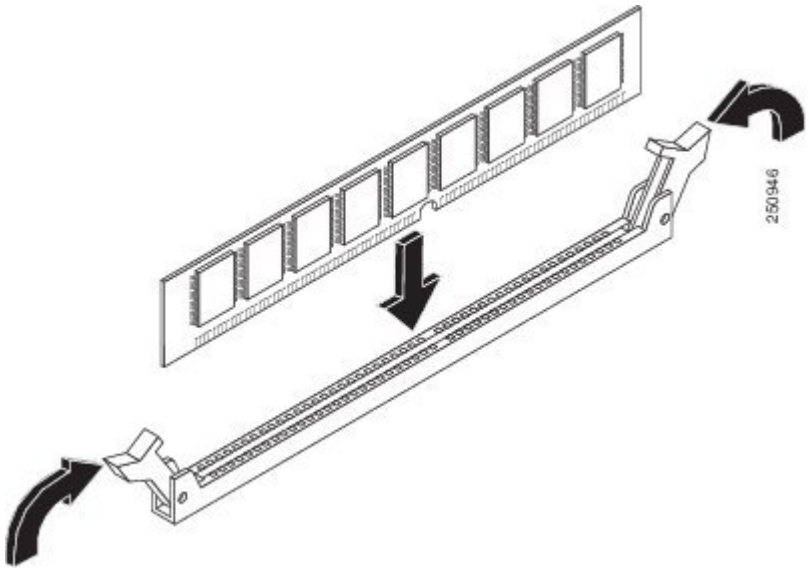


Step 4 Gently insert the new DIMM, taking care not to damage the pins on the edge of the DIMM. Using two hands, hold both sides of DIMM's top edges with your index fingers and thumbs and gently slide the DIMM straight in to the socket. Press the top of the DIMM towards the socket, being careful to apply force only on the DIMM that is parallel with the plane of the DIMM.

Caution
When inserting DIMMs, use firm but not excessive pressure. If you damage a socket, you will have to return the router to the factory for repair.

Step 5 Use light insertion force and insert smoothly, but ensure that the DIMM is inserted straight. If necessary, rock the DIMM gently back and forth to seat it properly. The following figure shows how to install the DIMM in the socket for the Cisco ASR 1001-X Router.

Figure 21: Installing a DIMM in the Socket of the Cisco ASR 1001-X Router



Step 6 After the DIMM is installed, check whether the release levers are flush against the sides of the DIMM socket. If they are not, the DIMM might not be seated properly. If the DIMM appears misaligned, carefully remove it according to the removal procedure and then reseat it in the socket. Push the DIMM firmly back into the socket until the release levers are flush against the sides of the DIMM socket.

Step 7 Repeat Step 4 through Step 6 for the remaining DIMM.

Step 8 Replace the Cisco ASR 1001-X Router top cover:

a) Slide the cover onto the chassis ensuring that the interlock hook feature fits on the chassis cover and base.

b) Install the top surface screws and the side screws and tighten them slightly.

Step 9 Install the power supplies into the chassis. See:

What to do next

This completes the procedure for replacing the Cisco ASR 1001-X Router DIMM.

After you have correctly installed the Cisco ASR 1001-X Router DIMMs, the system should reboot properly.

If the system fails to reboot properly or if the console terminal displays a checksum or memory error after you have installed the new DIMMs, check the following:

Ensure that both the DIMMs are installed correctly. If necessary, shut down the system and remove the chassis cover. Check the DIMMs by looking straight down on them to inspect them at eye level. The DIMMs should be aligned at the same angle and the same height when properly installed. If a DIMM appears to stick out or rest in the socket at a different angle from the other, remove the DIMM and reinsert it. Replace the top chassis cover, and reboot the system for another installation check.

Note After several attempts, if the system fails to restart properly, contact a Cisco service representative for assistance. Before you call, make note of any error messages, unusual LED states, or other indications that might help solve the problem.

Removing and Replacing a Cisco ASR 1001-X Router SPA

The online insertion and removal (OIR) feature allows you to install and replace shared port adapters (SPAs) while the router is operating, you do not have to shut down the system's power, although you should not run traffic through the shared port adapter while it is being removed. OIR is a method that is seamless to end users on the network, maintains all routing information, and preserves sessions.

Note As you disengage the SPA from the router, OIR shuts down all the active interfaces in the SPA.

Note For detailed information about SPA software commands, such as preparing for OIR of SPAs, and activating and deactivating configuration examples, see the Cisco ASR 1000 Series Aggregation Services Routers SIP and SPA Hardware Installation Guide .

We suggest you have the following tools and parts readily available for installing a SPA:

- Number 2 Phillips or a 3/16-inch flat-blade screwdriver
- SPA
- Cables

- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, field-replaceable units (FRUs), and spares
- Antistatic mat or surface, or static shielding bag

If you need additional equipment, contact a service representative for ordering information.

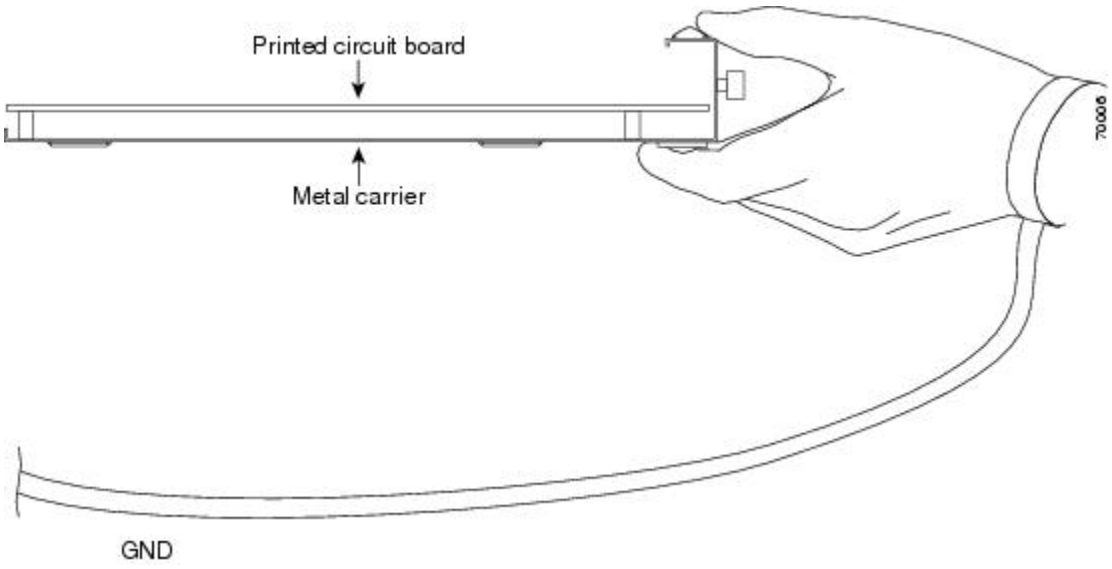
Electrostatic Discharge Prevention

Electrostatic discharge (ESD) damages equipment and impairs electrical circuitry. ESD occurs when printed circuit boards are improperly handled and results in complete or intermittent failures.

Each SPA circuit board is mounted to a metal carrier and is sensitive to ESD damage. A SPA consists of a printed circuit board that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding, connectors, and a handle are integral components of the carrier.

When the subslot is not in use, a SPA blank filler plate must fill the empty subslot to allow the router to conform to EMI emission requirements and to allow proper airflow across the installed modules. If you plan to install the SPA in the subslot that is not in use, you must first remove the SPA blank filler plate.

Figure 22: Handling the Cisco ASR 1001-X Router SPA



1	Printed circuit board	2	Metal carrier

Although the metal carrier helps to protect the SPA from ESD, wear a preventive antistatic strap whenever you handle the SPA. Ensure that the strap makes good skin contact and connect the strap's clip to an unpainted chassis surface to safely channel unwanted ESD voltages to ground.

If no wrist strap is available, ground yourself by touching the metal part of the chassis.

The following are the guidelines for preventing ESD damage:

- Always use an ESD wrist strap or ankle strap when installing or replacing a Cisco ASR 1001-X SPA. Ensure that the ESD strap makes contact with your skin.
- Handle the Cisco ASR 1001-X SPA by its metal carrier edges and handles; avoid touching the printed circuit board or any connector pins.

- When removing the Cisco ASR 1001-X SPA, place it on an antistatic surface with the printed circuit board components facing upward, or in a static shielding bag.

Removing a Shared Port Adapter

To remove a SPA, follow these steps.

SUMMARY STEPS

1. Attach an ESD wrist strap between you and an unpainted chassis surface.
2. Stop the SPA so that there is no traffic running through the SPA when it is removed.
3. Disconnect all the cables from the SPA.
4. Unscrew the captive installation screws on either side of the SPA.
5. Grasp the handles with both hands and pull the SPA.

DETAILED STEPS

Procedure

Step 1 Attach an ESD wrist strap between you and an unpainted chassis surface.

Step 2 Stop the SPA so that there is no traffic running through the SPA when it is removed.

Caution
Removing a SPA while traffic is flowing through the ports may cause system disruption.

Refer to the following example to stop the SPA in the SPA bay 0/1:

a) At the router# prompt, enter **hw-module subslot 0/1 stop** and press **Enter**.
b) At the router# prompt, enter **end** and press **Enter**.

Step 3 Disconnect all the cables from the SPA.

Step 4 Unscrew the captive installation screws on either side of the SPA.

Step 5 Grasp the handles with both hands and pull the SPA.

What to do next

You have completed the Cisco ASR 1001-X Router SPA removal procedure.

Replacing a Shared Port Adapter

To replace a SPA, follow these steps:

SUMMARY STEPS

1. To insert a SPA, locate the guide rails that hold the SPA in place. They are at the top left and top right of the SPA slot and are recessed about an inch.

2. Carefully slide the SPA all the way in using both hands until the SPA is firmly seated in the SPA interface connector. When fully seated, the SPA might be slightly behind the faceplate.
3. After the SPA is properly seated, fasten the SPA in place with the captive installation screws on either side of the SPA.
4. Restart the SPA using the following steps:
5. Use the **show platform** command to verify whether the status of subslot 0/1 is OK.

DETAILED STEPS

Procedure

Step 1 To insert a SPA, locate the guide rails that hold the SPA in place. They are at the top left and top right of the SPA slot and are recessed about an inch.

Step 2 Carefully slide the SPA all the way in using both hands until the SPA is firmly seated in the SPA interface connector. When fully seated, the SPA might be slightly behind the faceplate.

Step 3 After the SPA is properly seated, fasten the SPA in place with the captive installation screws on either side of the SPA.

Note
Ensure that you fasten the captive installation screws to provide appropriate connectivity.

Step 4 Restart the SPA using the following steps:

a) At the router# prompt, enter **hw-module subslot 0/1 start** and press **Enter.**
b) At the router# prompt, enter **end** and press **Enter**.

Step 5 Use the **show platform** command to verify whether the status of subslot 0/1 is OK.

show platform Command

Example:

```
Router# show platform
Chassis type: ASR1001-X
Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1001-X           ok                    00:34:05
 0/0      BUILT-IN-2T+6X1GE   ok                    00:33:14
 0/1      SPA-4XT-SERIAL      ok                    00:33:14
 0/2      NIM-SSD             ok                    00:33:11
R0        ASR1001-X           ok                    00:34:05
 R0/0                         ok, active            00:34:05
 R0/1                         ok, standby           00:32:47
F0        ASR1001-X           ok, active            00:34:05
P0        ASR1001X-PWR-AC     ps, fail              00:33:44
P1        ASR1001X-PWR-AC     ok                    00:33:42
P2        ASR1001-X-FANTRAY   ok                    00:33:47
Slot      CPLD Version        Firmware Version
--------- ------------------- ----------------------------------------
0         14041015            15.4(2r)S
R0        14041015            15.4(2r)S
F0        14041015            15.4(2r)S
```

You have completed the Cisco ASR 1001-X Router SPA replacement procedure.

Removing and Replacing a NIM on the Cisco ASR 1001-X Router

The OIR feature allows you to install and replace a NIM while the router is operating. You do not have to shut down the system's power although you should not run traffic through the NIM while it is being removed. OIR is a method that is seamless to end users on the network, and maintains all routing information and preserves sessions.

Note As you disengage the NIM from the router, OIR shuts down all the active interfaces in the NIM.

We recommend that you have the following tools and parts readily available for installing a NIM:

- Number 2 Phillips or a 3/16-inch flat-blade screwdriver
- NIM
- Cables
- Your own ESD-prevention equipment or the disposable grounding wrist strap included with all upgrade kits, FRUs, and spares
- Antistatic mat or surface, or static shielding bag

If you need additional equipment, contact a Cisco service representative for ordering information.

Note For information about electrostatic discharge prevention, see the Electrostatic Discharge Prevention, on page 101.

Removing a NIM

To remove a NIM, follow these steps.

SUMMARY STEPS

1. Attach an ESD wrist strap between you and an unpainted chassis surface.
2. Stop the NIM so that there is no traffic running through the NIM when it is removed, using the following steps:
3. Disconnect all the cables from the NIM.
4. Unscrew the captive installation screws on either side of the NIM.
5. Grasp the handles using both hands and pull out the NIM.

DETAILED STEPS

Procedure

Step 1 Attach an ESD wrist strap between you and an unpainted chassis surface.

Step 2 Stop the NIM so that there is no traffic running through the NIM when it is removed, using the following steps:

Caution
Removing a NIM while traffic is flowing through the ports may cause system disruption.

a) At the router# prompt, enter **hw-module subslot 0/2 stop** and press **Enter**.
b) At the router# prompt, enter **end** and press **Enter**.

Step 3 Disconnect all the cables from the NIM.

Step 4 Unscrew the captive installation screws on either side of the NIM.

Step 5 Grasp the handles using both hands and pull out the NIM.

You have completed the NIM removal procedure.

Replacing a NIM

To replace a NIM, follow these steps:

SUMMARY STEPS

1. To insert a NIM, locate the guide rails that hold the NIM in place. They are at the top left and top right of the NIM slot and are recessed about an inch.
2. Carefully slide the NIM all the way in using both hands until the NIM is firmly seated in the NIM interface connector. When fully seated, the NIM might be slightly behind the faceplate.
3. After the NIM is properly seated, fasten the NIM in place with the captive installation screws on either side of the NIM.
4. Use the **show platform** command to verify whether the status of subslot 0/2 is OK.

DETAILED STEPS

Procedure

Step 1 To insert a NIM, locate the guide rails that hold the NIM in place. They are at the top left and top right of the NIM slot and are recessed about an inch.

Step 2 Carefully slide the NIM all the way in using both hands until the NIM is firmly seated in the NIM interface connector. When fully seated, the NIM might be slightly behind the faceplate.

Step 3 After the NIM is properly seated, fasten the NIM in place with the captive installation screws on either side of the NIM.

Note
Ensure that you screw down the captive installation screws to provide appropriate connectivity.

The NIM should power up after installation.

Step 4 Use the **show platform** command to verify whether the status of subslot 0/2 is OK.

You have completed the NIM replacement procedure.

Removing and Replacing an SSD from the NIM-SSD Module

This section explains how to remove a solid state drive (SSD) from the NIM-SSD module.

Caution The Cisco 4400 Series Integrated Services Routers (ISR) that support NIM-SSD and the Cisco ASR 1000 Series Aggregated Services Routers that support NIM-SSD do not utilize the NIM in the same format.

Caution The NIM-SSD module of the Cisco ASR 1001-X Router recognizes both hard drives as one partition. For example, two 200 GB hard drives are treated as one 400 GB hard drive. Since there is no data backup capability in the NIM-SSD module, replacing any SSD will cause complete data loss. Ensure that you clean up and back up all important data before replacing any SSD.

Restrictions

- The Cisco ASR 1001-X Router does not support dynamic removal and shutdown of SSD drives while the NIM-SSD module is still powered on. Such ungraceful actions may cause disk corruption and you will see kernel messages indicating that the module did not shutdown gracefully. Power down the NIM-SSD module and wait for the power LED to turn off before removing and replacing the SSD.
- Cisco SSD Carrier Card NIM without SSD drives is not supported.

Removing an SSD from the NIM-SSD Module

To remove an SSD from the NIM-SSD module, follow these steps:

SUMMARY STEPS

1. Access the NIM-SSD slot.
2. Stop the SSD module using the following steps:
3. Unscrew the captive installation screws on either side of the NIM-SSD to remove the front faceplate of the NIM, as shown in the following figure.
4. Pull the NIM-SSD card slot cover down, exposing the SSD slot, as shown in the following figure.
5. Pull the NIM-SSD out of the connector on the motherboard using both hands, as shown in the below figure. While pulling, keep the NIM-SSD parallel with the motherboard to prevent damage to the slot and the standoff.
6. Place the NIM-SSD in an antistatic bag to protect it from ESD damage.

DETAILED STEPS

Procedure

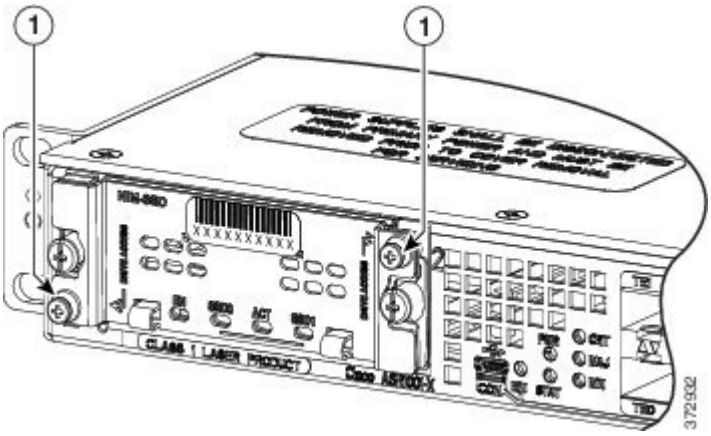
Step 1 Access the NIM-SSD slot.

Step 2 Stop the SSD module using the following steps:

a) At the router# prompt, enter **hw-module subslot 0/2 stop** and press **Enter**.
b) At the router# prompt, enter **end** and press **Enter**.

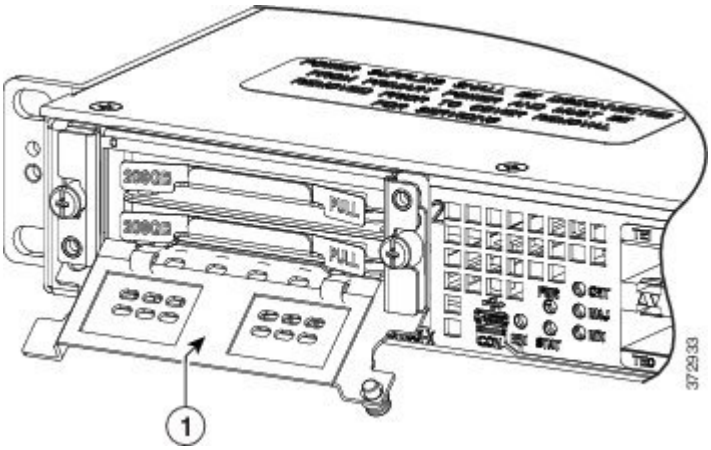
Step 3 Unscrew the captive installation screws on either side of the NIM-SSD to remove the front faceplate of the NIM, as shown in the following figure.

Figure 23: Captive Installation Screws Location



1. Captive screws on the SSD slot cover attaching the SSD drive to the NIM carrier card

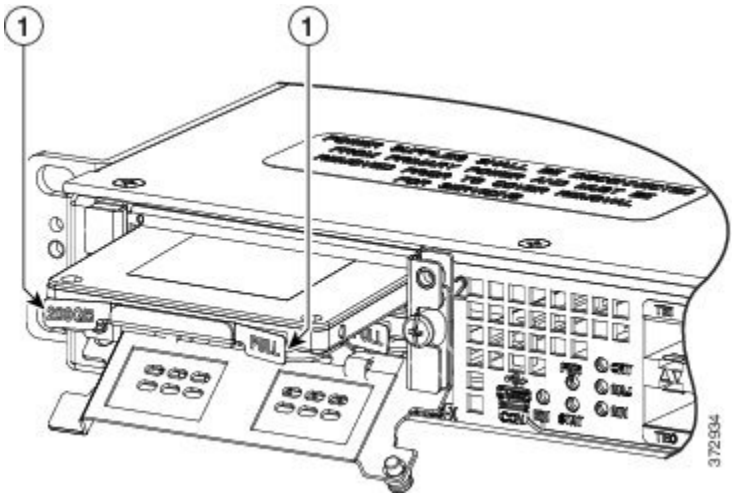
Step 4 Pull the NIM-SSD card slot cover down, exposing the SSD slot, as shown in the following figure.



1. Carrier card slot cover

Step 5 Pull the NIM-SSD out of the connector on the motherboard using both hands, as shown in the below figure. While pulling, keep the NIM-SSD parallel with the motherboard to prevent damage to the slot and the standoff.

Figure 24: Pulling Out the SSD



1. Tabs to pull out the SSD drive

Step 6 Place the NIM-SSD in an antistatic bag to protect it from ESD damage.

The completes the removal of the NIM-SSD.

Installing an SSD into the NIM-SSD Module

To install an SSD into the NIM-SSD module, follow these steps:

SUMMARY STEPS

1. On the NIM-SSD, loosen the captive screws that retain the SSD card slot cover.
2. Pull the NIM-SSD card slot cover down, exposing the SSD slot.
3. Insert an SSD into the appropriate slot.
4. The SSD(s) connector end should be inserted first, with the connector side facing down and the serial number facing up.
5. Pull the NIM-SSD card slot cover up and into place over the SSD.
6. Verify that the NIM-SSD is installed correctly.
7. Start the NIM-SSD module using the following steps:
8. Use the **show platform** command and the **show inventory** command to verify whether the status of subslot 0/2 is OK.
9. Use the **dir hardisk:** command to verify whether the total file size of the hard disk partitions are correct. For example:

DETAILED STEPS

Procedure

Step 1 On the NIM-SSD, loosen the captive screws that retain the SSD card slot cover.

Step 2 Pull the NIM-SSD card slot cover down, exposing the SSD slot.

Step 3 Insert an SSD into the appropriate slot.

Step 4 The SSD(s) connector end should be inserted first, with the connector side facing down and the serial number facing up.

Step 5 Pull the NIM-SSD card slot cover up and into place over the SSD.

Step 6 Verify that the NIM-SSD is installed correctly.

Step 7 Start the NIM-SSD module using the following steps:

a) At the router# prompt, enter **hw-module subslot 0/2 start** and press **Enter**.

b) At the router# prompt, enter **end** and press **Enter**.

Step 8 Use the **show platform** command and the **show inventory** command to verify whether the status of subslot 0/2 is OK.

show inventory Command

Example:

```
Router# show inventory
NAME: "Chassis", DESCR: "Cisco ASR1001-X Chassis"
PID: ASR1001-X , VID: V00, SN: P3A-9
NAME: "Power Supply Module 0", DESCR: "Cisco ASR1001-X AC Power Supply"
PID: ASR1001X-PWR-AC , VID: V00, SN: LIT171616HJ
NAME: "Power Supply Module 1", DESCR: "Cisco ASR1001-X AC Power Supply"
PID: ASR1001X-PWR-AC , VID: V00, SN: LIT171616GG
NAME: "Fan Tray 0", DESCR: "Cisco ASR1001-X Fan Tray"
PID: ASR1001-X-FANTRAY , VID: , SN:
NAME: "module 0", DESCR: "Cisco ASR1001-X SPA Interface Processor"
PID: ASR1001-X , VID: , SN:
NAME: "SPA subslot 0/1", DESCR: "4-port Serial Shared Port Adapter"
PID: SPA-4XT-SERIAL , VID: V01, SN: JAB111105M4
NAME: "NIM subslot 0/2", DESCR: "NIM SSD Module"
PID: NIM-SSD , VID: V01, SN: FOC18071SNN
NAME: "subslot 0/2 disk0", DESCR: "harddisk"
PID: Micron P400m-MTFDDAK400MAN , VID: 0225 , SN: MSA1802019A
NAME: "subslot 0/2 disk1", DESCR: "harddisk"
PID: UB88RTB400HE6-NTH-EID , VID: 5.2.4 , SN: 11000302418
NAME: "SPA subslot 0/0", DESCR: "8-port Built-in GE SPA"
PID: BUILT-IN-2T+6X1GE , VID: , SN:
NAME: "module R0", DESCR: "Cisco ASR1001-X Route Processor"
PID: ASR1001-X , VID: V00, SN: JAE1719030S
NAME: "module F0", DESCR: "Cisco ASR1001-X Embedded Services Processor"
PID: ASR1001-X , VID: , SN:
Router#
```

Step 9 Use the **dir hardisk:** command to verify whether the total file size of the hard disk partitions are correct. For example:

Example:

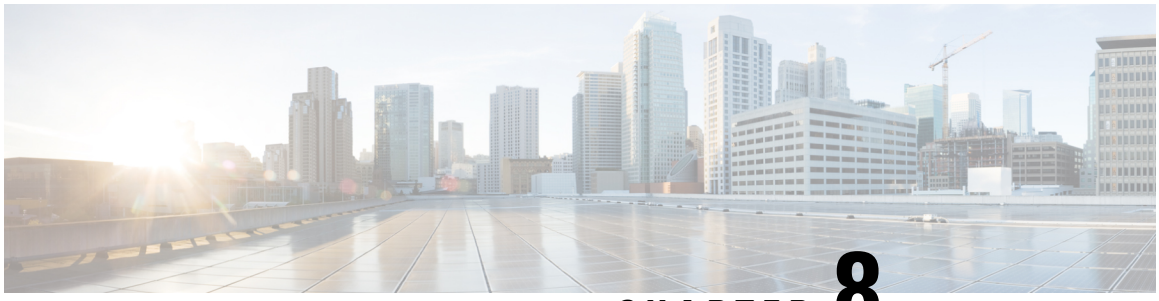
```
Router# dir harddisk:
Directory of harddisk:
11 drwx 16384 Jul 16 2014 11:30:24 -03:00 lost+found
787616940032 bytes total (747608293376 bytes free)
Router#
```

You have completed the NIM-SSD replacement procedure.

Repacking the Router

If your system is damaged, you must repack it for return shipment.

Before you return the router or move the router to a different location, repack the system using the original packaging material.



CHAPTER 8

Cisco ASR 1001-X Router Specifications

This appendix provides the Cisco ASR 1001-X Router specifications.

- Cisco ASR 1001-X Router Specifications, on page 111

Cisco ASR 1001-X Router Specifications

Table 24: Cisco ASR 1001-X Router Specifications , on page 111 lists the Cisco ASR 1001-X Router physical specifications.

Note The Cisco ASR 1001-X Router has the route processor, embedded services processor, and **SIP** integrated in the chassis.

Table 24: Cisco ASR 1001-X Router Specifications

Description	Specification
Dimensions (H x W x D)	Height—1.71 in. (43.43 mm) Width—17.3 in. (439.42 mm) Depth—22.50 in. (571.5 mm) including card handles, cable-management brackets, and power supply handles)
Weight	25 lb fully loaded
Nominal operating temperature	0° to 40° C
Short-term operating temperature	0° to 50° C
Nominal operating humidity	10 to 90% relative humidity
Short-term operating humidity	5 to 90%
Storage temperature	–20° to +70° C

Description	Specification
Power consumption	• Maximum (DC): 242 W • Maximum (AC): 250 W • Maximum (Out): 250 W

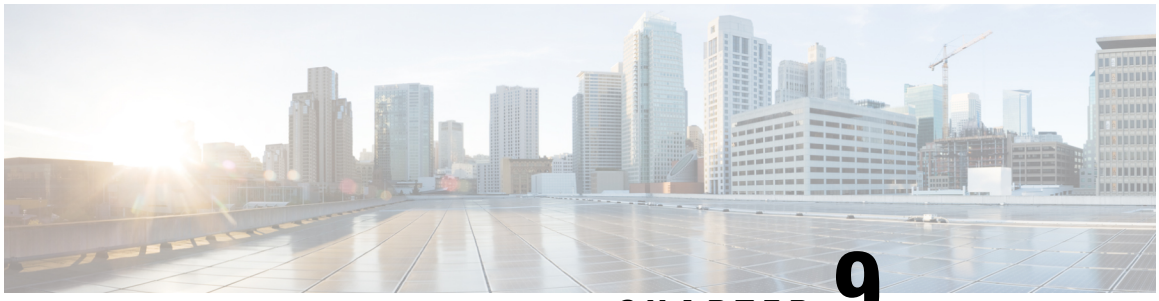
Cisco ASR 1001-X Router Memory and Storage Options

Table 25: Memory and Storage Options for Cisco ASR 1001-X Router , on page 112 lists the hardware memory and storage options supported on the Cisco ASR 1001-X Router.

Table 25: Memory and Storage Options for Cisco ASR 1001-X Router

Memory Type	Default	Maximum System Support
ESP	4 GB DRAM	4 GB DRAM
Route Processor	The Cisco ASR 1001-X Router comes with 8 GB DRAM (default)	16 GB DRAM maximum
External USB flash memory	The Cisco ASR 1001-X Router supports two USB flash memory secure tokens	—
SSD[2]	Two 400-GB SATA SSD	—

[2] Solid State Drive



CHAPTER 9

Cisco ASR 1001-X Router Signals and Pinouts

This appendix provides the Cisco ASR 1001-X Router signals and pinout specifications.

- Management Ethernet Port Signals and Pinouts, on page 113
- Console Port Signals and Pinouts, on page 114
- Auxiliary Port Signals and Pinouts, on page 114

Management Ethernet Port Signals and Pinouts

Table 26: RJ-45 Management Ethernet Port Pinouts , on page 113 lists the Management Ethernet 10/100 RJ-45 port pinouts.

Table 26: RJ-45 Management Ethernet Port Pinouts

Pin	Signal	Direction	Description
1	TX/RX AData +	I/O	T/R data +
2	TX/RX AData -	I/Ot	T/R data -
3	TX/RX BData +	I/O	T/R Data +
4	TX/RX CData +	I/O	T/R Data + (Unused for 10/100)
5	TX/RX CData -	I/O	T/R Data - (Unused for 10/100)
6	TX/RX BData -	I/O	T/R Data -
7	TX/RX DData +	I/O	T/R Data + (Unused for 10/100)
8	TX/RX DData -	I/O	T/R Data - (Unused for 10/100)

Console Port Signals and Pinouts

Table 27: Console Port Pinout for Cisco ASR 1001-X Router , on page 114 lists the pinouts of the dual RJ-45 ports for the front panel console port.

Table 27: Console Port Pinout for Cisco ASR 1001-X Router

Pin	Signal	Direction	Description
1	RTS	Output	Request to Send (tied to pin 8, CTS)
2	DTR	Output	Data Terminal Ready (always On)
3	TXD	Output	Transmit Data
4	GND	—	Ring Indicator
5	GND	—	—
6	RXD	Input	Receive Data
7	DSR	Input	Unused
8	CTS	Input	Clear to Send (tied to pin 1, RTS)

Auxiliary Port Signals and Pinouts

Table 28: Auxiliary Port Pinouts for Cisco ASR 1001-X Router , on page 114 lists the pinouts of the dual RJ-45 ports for the auxiliary port.

Table 28: Auxiliary Port Pinouts for Cisco ASR 1001-X Router

Pin	Signal	Direction	Description
1	RTS	Output	Request to Send
2	DTR	Output	Data Terminal Ready (always On)
3	TXD	Output	Transmit Data
4	RI	Input	Ring Indicator
5	GND	—	—
6	RXD	Input	Receive Data
7	DSR/DCD	Input	Data Set Ready/Data Carrier Detect
8	CTS	Input	Clear to Send