Quick Start Guide

Cisco ASR 1002 Router

1 Documentation and Resources

Documentation for the Cisco 1000 Series Aggregation Services Routers documentation is online with the exception of the regulatory compliance and safety documentation and the *Cisco 1000 Series Aggregation Services Routers* documentation flyer. For detailed hardware installation instructions, refer to the online *Cisco Series 1000 Aggregation Services Routers Hardware Installation and Initial Configuration Guide*. Refer to the following documentation for installation and replacement of parts (including shared port adapters) and regulatory compliance information:

- Shared port adapter documentation—See the *Cisco ASR 1000 Series Aggregation Services Routers SIP and SPA Hardware Installation Guide*
- Configuration documentation—See the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide*

Document Revision History

The Document Revision History table below records technical changes to this document.

Document Version	Date	Change Summary
OL-15411-03	November 2008	Improved the two-minute window allotted time to replace a power supply. You now have up to a maximum of five minutes to replace a power supply.
OL-15411-02	October 2008	General updates
OL-15411-01	July 2008	First version of this document.

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2 Prepare for Installation

This section contains information about tools and parts, warnings, site preparation information, and information for rack-mount and equipment shelf or tabletop installation.

Warning **Only trained and qualified personnel should install, replace, or service this equipment.** Statement 1030

Caution The eUSB panel door on the side of the Cisco ASR 1002 Router must not be opened. If there is a problem with eUSB flash card, the chassis should be returned.

Before beginning this router installation, read the *Regulatory Compliance and Safety Information for the Cisco ASR 1000 Series Routers* document.

Site Preparation and Unpacking

- Lift the router safely out of the packing container.
- Ensure the power service at the site is suitable for the router you are installing.
- Check the packing slip to ensure that all the proper components are present.
- Locate and have accessible the Site Log for recording information about this installation.

Tools and Parts

Use the following list of tools and parts as a checklist for preparing to install the Cisco ASR 1002 Router:

- ESD-preventative wrist strap
- AC power cord
- Appropriate cables to connect the router to the network and to the console terminal
- Tape measure and level (optional)
- Screwdrivers: Number 2 Phillips screwdriver and 3.5 mm or 3/16 inch flat-blade screwdriver
- Two chassis ground lugs and four screws
- The rack-mount and cable-management kit:
  - Four 19-inch rack-mount brackets (front and rear rails) and two cable-management brackets
  - Three sets of screws: one set for front rack-mount brackets (packaged with several black screws), another set for rear rack-mount brackets (packaged with several screws), and a set for the cable-management brackets (packaged with four screws).

Prepare for Equipment Shelf or Tabletop Installation

For an equipment shelf or tabletop installation, verify the following before installing the router:

- The router is off the floor and has adequate ventilation.
- An adequate chassis ground (earth) connection exists for the router.
- The router needs at last 3 inches (7.62 cm) of clearance at the inlet and exhaust vents (front and rear of router).
- The router needs 19 inches (48.26 cm) of clearance at the front and rear to allow for installation or to access cables or equipment.

Prepare for Rack-Mount Installation

Before you begin the rack-mounting tasks:

- Decide whether or not you want to front-mount or rear-mount the chassis.
- Decide whether or not you want to attach cable-management brackets to your chassis.

Note If you install cable-management brackets, make certain that you use the specified rack-mount ear holes as stated in the procedure and install the brackets after the cassia is mounted in the equipment rack.

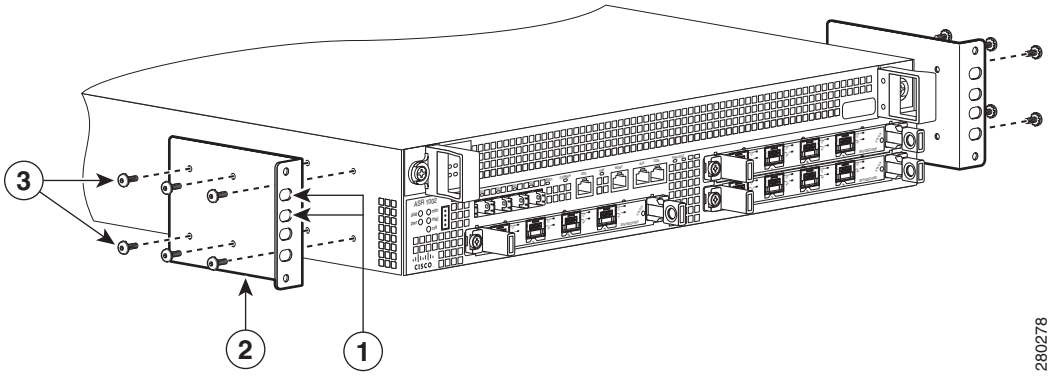
- Decide if two-post or four-post rack-mount equipment will be used.

3 Rack-Mount the Router

This section provides information for rack-mounting the router.

Attach the Rack-Mount Brackets—Chassis Front-Mounted

Figure 1 Front Rack-Mount Brackets for the Cisco ASR 1002 Router



1	Front rack-mount bracket ear and holes	**3**	Front rack-mount bracket screws
2	Front rack-mount bracket e		

To install the rack-mount brackets on a Cisco ASR 1002 Router for a front rack-mount configuration, follow these steps:

Step 1 Locate the threaded holes in the front sides of the chassis.

Step 2 Align the rack-mount bracket to the side of the router. Depending on which set of rack-mount bracket holes you choose to use to attach the rack-mount bracket to the router, the chassis will either be recessed in the rack or protrude from the rack.

Step 3 Position the front rack-mount bracket top hole with the chassis first top hole behind the side vent holes as shown in Figure 1.

Step 4 Insert and tighten the black screws on one side.

Step 5 Repeat Step 1 through Step 4 on the other side of the chassis. Use black screws to secure the rack-mount brackets to the chassis.

Step 6 To install the cable-management bracket, see "Attach the Cable-Management Bracket" section on page 8.

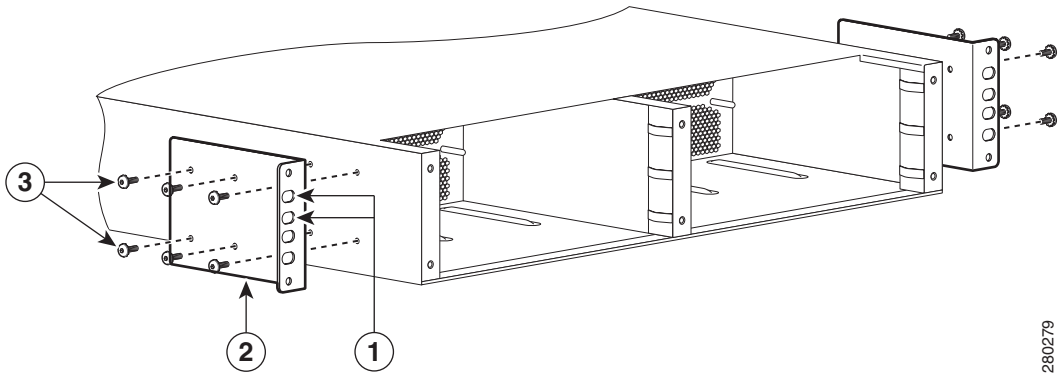
Attach the Rack-Mount Brackets—Chassis Rear-Mounted

To install the rack-mount on a Cisco ASR 1002 Router for a rear rack-mount configuration, follow these steps:

Step 1 Locate the threaded ear holes in the rear sides of the chassis.

Step 2 Position the rear rack-mount bracket top hole with the chassis from the back (See Figure 2).Make certain that you hold the rear rack-mount bracket with the ear holes facing outward and towards the rear of the chassis. Align the rack-mount bracket to the side of the router.

Figure 2 Installing the Cisco ASR 1002 Router Rear Rack-Mount Brackets



1	Rear rack-mount bracket ear and holes	**3**	Rear rack-mount bracket screws
2	Rear rack-mount bracket		

Step 3 Insert and tighten the screws.

Step 4 Repeat Step 1 through Step 3 on the other side of the chassis.

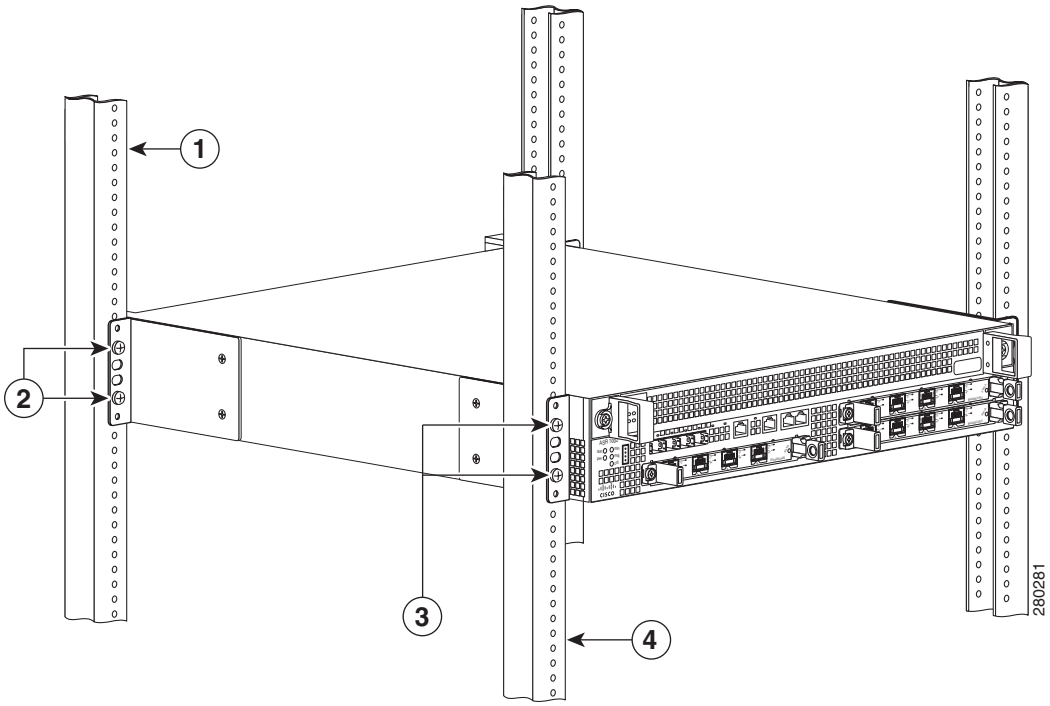
This completes the procedure for attaching rear rack-mount brackets to the chassis. Continue to Four-Post Rack Installation, page 5 or Two-Post Rack Installation, page 7.

Four-Post Rack Installation

Note We recommend that you allow at least 1 or 2 inches (2.54 or 5.08 cm) of vertical clearance between the router and any equipment directly above and below it.

Figure 3 shows the Cisco ASR 1002 Router in a four-post rack.

Figure 3 Installing the Cisco ASR 1002 Router in a Four-Post Rack - Front and Rear Rack-Mounting



1	Rear rack equipment rail	**3**	Front rack-mount bracket ear and holes
2	Rear rack-mount bracket ear and holes	**4**	Front rack equipment rail

Note Because the rack-mount brackets support the weight of the entire chassis, be sure to use all screws to fasten the two rack-mount brackets on the chassis to the rack posts.

Note Make certain that you attach the cable-management bracket to the chassis after you install the chassis in an equipment rack.

To install the chassis in the four-post rack, complete the following steps:

Step 1 Make sure the rack brakes are locked or the rack is stabilized.

Step 2 On the chassis, ensure that all screw fasteners on the installed components are securely tightened.

Step 3 Make sure that your path to the rack is unobstructed. If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.

Step 4 Lift the chassis into position between the rack posts (requires two people).

Step 5 Align the mounting bracket holes with the rack post holes and attach the chassis to the rack. At this point, if there is a third person, then that person can insert the screws while the other two people hold that chassis in place, unless the chassis is resting on a shelf).

Step 6 Position the chassis until the rack-mounting ears are flush against the mounting rails on the rack.

Step 7 Insert the bottom screw first and then the second screw at the top of the chassis diagonally from the bottom screw. This helps secure the chassis in place while you insert the other screws.

Tip To allow space to attach the cable-management brackets to the chassis in the rack easily, make certain that you use the rack-mount bracket ear holes specified in Step 9.

Step 8 Hold the chassis in position against the mounting rails and follow these steps:

a. Insert the bottom screw into the second ear hole from the bottom of the rack-mount ear and use a hand-held screwdriver to tighten the screw to the rack rail.

b. Insert the top screw into the second bracket hole from the top of the rack-mount bracket ear hole diagonally from the bottom screw and tighten the screw to the rack rail. See Figure 3.

c. Repeat these steps for the other side of the chassis.

Note As a result of using the specified rack-mount bracket ear holes, the cable-management bracket can be easily attached to the rack-mount bracket after the chassis is in the rack.

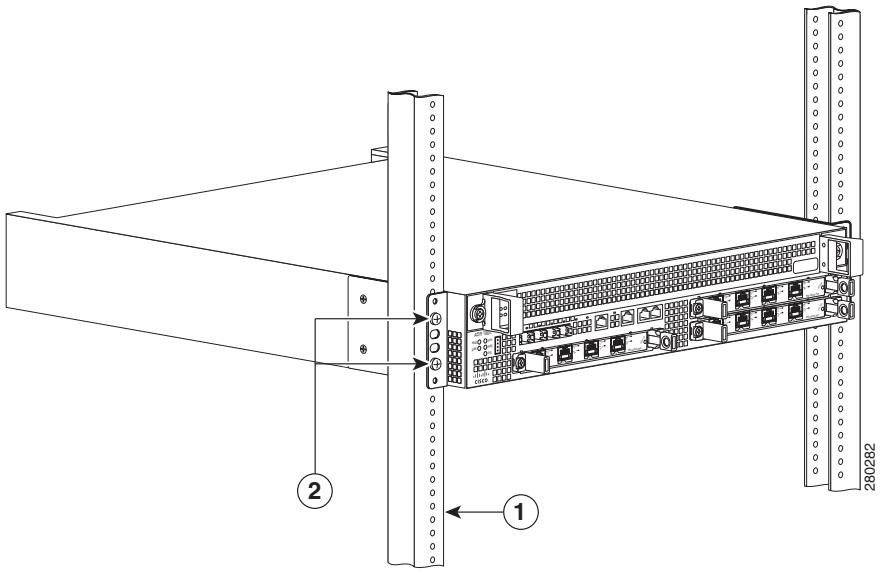
This completes the procedure for installing the chassis in a four-post rack. Proceed to the "Attach the Cable-Management Bracket" section on page 8 to continue the installation.

Two-Post Rack Installation

Note Make certain that you attach the cable-management bracket to the chassis after you install the chassis in an equipment rack.

Note Inner clearance (the width between the inner sides of the two posts or rails) must be at least 19 inches (48.26 cm). Airflow through the chassis is from front to back.

Figure 4 Installing a Cisco ASR 1002 Router in a Two-Post Rack



1	Rack equipment rail	**2**	Rack-mount bracket ear and holes

Caution If you are using a two-post rack, secure the rack to the floor surface to prevent tipping and avoid bodily injury and component damage.

Step 1 Position the chassis so the front is closest to you and lift it carefully into the rack. To prevent injury, avoid any sudden twists or moves.

Step 2 Slide the chassis into the rack, pushing it back until the rack-mount brackets meet the mounting strips or posts on both sides of the rack.

Step 3 Position the chassis until the rack-mounting ears are flush against the mounting rails on the rack.

Tip To allow space to attach the cable-management brackets to the chassis in the rack easily, make certain that you use the rack-mount bracket ear holes specified in Step 4.

Step 4 Hold the chassis in position against the mounting rails and follow these steps:

a. The Cisco ASR 1002 Router rack-mount bracket has 4 ear holes and two for the cable-management bracket. Insert the bottom screw into the fifth hole from the top of the rack-mount ear and use a hand-held screwdriver to tighten the screw to the rack rail.

b. Insert the top screw into the second hole from the top of the rack-mount bracket ear hole diagonally from the bottom screw and tighten the screw to the rack rail. See Figure 4.

Step 5 Repeat steps 3 and 4 for the other side of the chassis.

Note As a result of using the specified rack-mount bracket ear holes, the cable-management bracket can be easily attached to the rack-mount bracket after the chassis is in the rack.

This completes the procedure for installing the chassis in a two-post rack. Proceed to the "Attach the Cable-Management Bracket" section on page 8 to continue the installation.

Attach the Cable-Management Bracket

The cable-management bracket mount to each rack-mount bracket on the chassis to provide cable-management to both sides of the chassis.

The cable-management brackets for the Cisco ASR 1002 Router contain one independent cable-management "U" type feature with two screws for each bracket and provides cable dressing of each card module slots. For the ASR 1000 Series SPA interface, these brackets work in tandem with shared port adapter product feature cable-management device to allow installation and removal of adjacent cards without the need to remove cables.

Note Make certain that the cable-management bracket "U" type feature is facing upwards when you attach it to the chassis.

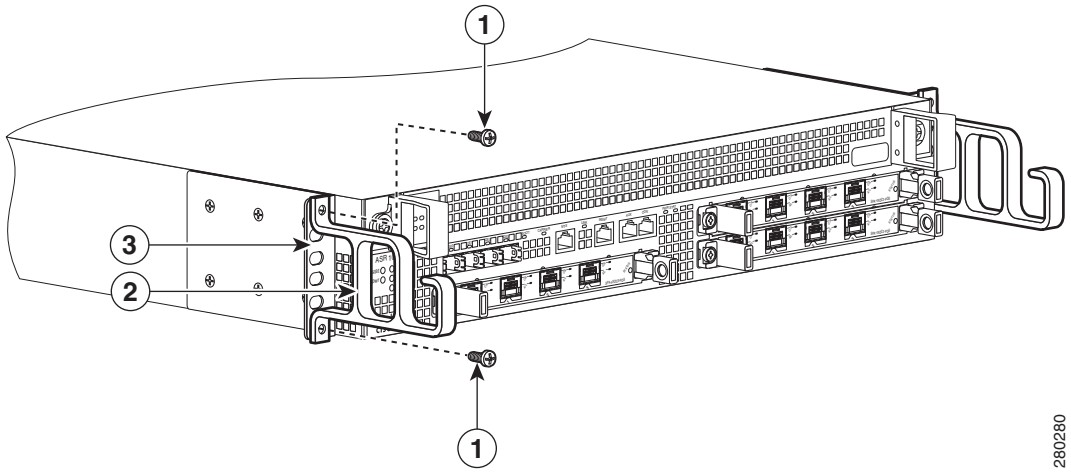
Follow these steps to attach the cable-management brackets to both sides of the Cisco ASR 1002 Router in the rack:

Step 1 Align the cable-management bracket to the rack-mount bracket on one side of the Cisco ASR 1002 Router. The cable-management bracket aligns to the top hole of the chassis rack-mount bracket.

Step 2 Using a Phillips screwdriver, insert one screw through the cable-management bracket and into the chassis rack-mount and tighten the screw.

Note Use the package of four screws that came with your Cisco ASR 1002 Router.

Figure 5 Attaching the Cable-Management Bracket to the Cisco ASR 1002 Router



1	Secure the cable-management bottom screw and top screw to this ear hole	**3**	Front rack-mount bracket
2	Cable-management U feature		

Step 3 Using the bottom rack-mount ear hole, insert the screw through cable-management bracket and into the chassis rack-mount bracket. Figure 5 shows the cable-management brackets attached to the chassis.

Step 4 Using a Phillips screwdriver and the cable-management screw, thread and tighten the screw to the cable-management bracket.

Step 5 Repeat Step1 through Step 4 for the other side of the Cisco ASR 1002 Router.

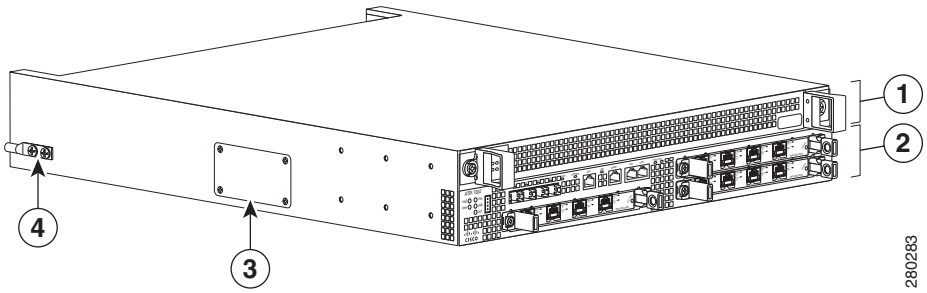
This completes the procedure for installing the cable-management bracket on a Cisco ASR 1002 Router for a chassis rack-mount configuration.

Chassis Ground Connection Installation

Before you connect power or turn on power to your router, you must provide an adequate chassis ground (earth) connection for the Cisco ASR 1002 Router. The chassis ground lugs (two) and the respective screws (4) are provided in the accessory kit that ships with your Cisco ASR 1002 Router.

See Figure 6 for the location of the chassis ground connector on the Cisco ASR 1002 Router.

Figure 6 Cisco ASR 1002 Router Ground Connector Location and eUSB Panel Door



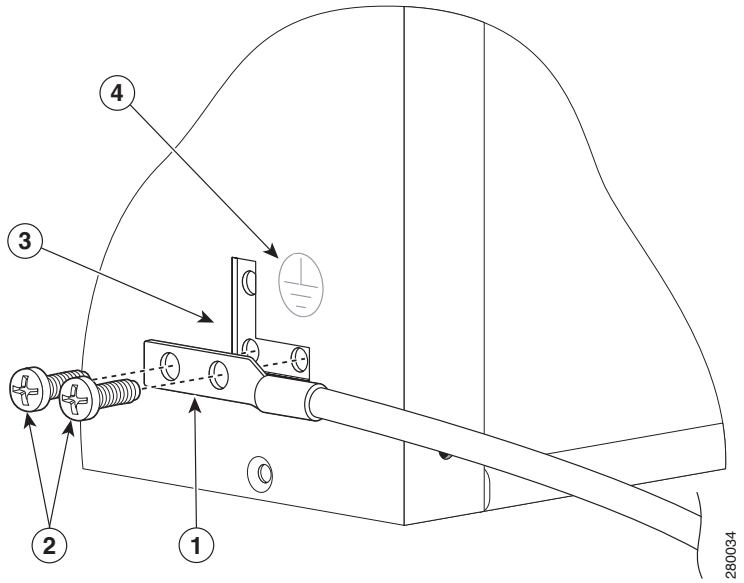
1	F0 with Cisco ASR1000-ESP5 or Cisco ASR1000-ESP10 **Note** The Cisco ASR10002 Router does not support the Cisco ASR1000-ESP20 module.	**3**	The eUSB panel door on the side of the Cisco ASR 1002 Router must not be opened. If there is a problem with eUSB flash card, the chassis should be returned.
2	R0 slot with embedded ASR1000-RP1 and embedded ASR1000-SIP10	**4**	Cisco ASR 1002 Router ground stud location

Step 1 Use the wire stripper to strip one end of the AWG #6 wire approximately 0.75 inches (19.05 mm).

Step 2 Insert the AWG #6 wire into the wire receptacle on the grounding lug.

Step 3 Use the manufacturer's recommended crimping tool to carefully crimp the wire receptacle around the wire; this step is required to ensure a proper mechanical connection.

Figure 7 Attaching a Ground Lug to the Chassis Ground Connector



1	Chassis ground lug	**3**	Chassis ground connector location
2	Ground lug screws	**4**	Earth ground symbol

Step 4 Attach the grounding lug with the wire on the left to avoid having the grounding wire overlapping the power supply.

Step 5 Locate the chassis ground connector on the side of your chassis.

Step 6 Insert the two screws through the holes in the grounding lug.

Step 7 Use the Number 2 Phillips screwdriver to carefully tighten the screws until the grounding lug is held firmly to the chassis. Do not overtighten the screws.

Step 8 Connect the opposite end of the grounding wire to the appropriate grounding point at your site to ensure an adequate chassis ground.

This completes the procedure for attaching a chassis ground connection. Go to the "Connect the Router to the Network" section on page 11 for information on attaching cables.

4 Connect the Router to the Network

This section provides information about cables and ports and attaching the router to the network.

Console and Auxiliary Port Cable Connections

This section describes how to attach a cable to the console or auxiliary ports on the Cisco ASR 1002 Router. The Cisco ASR 1002 Router uses RJ-45 ports for both the auxiliary port and console port to attach a modem or console terminal.

The console DCE-mode port connects a console terminal and a DTE-mode auxiliary port connects a modem or other DCE device to your router.

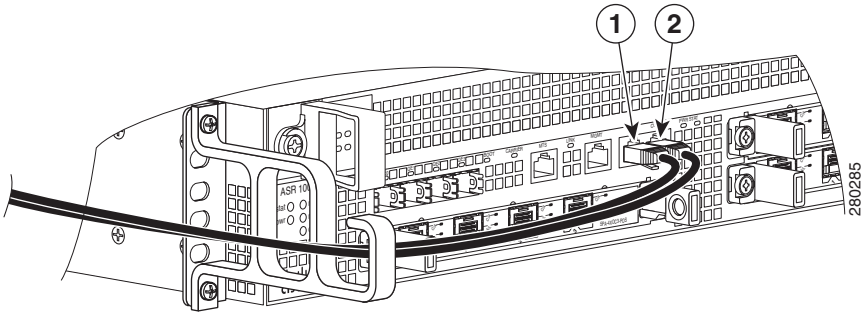
⚠

Caution Both the console and the auxiliary ports are asynchronous serial ports; any devices connected to these ports must be capable of asynchronous transmission. (Asynchronous is the most common type of serial device; for example, most modems are asynchronous devices.) To meet Class A emissions requirements on the Cisco ASR 1002 Router, shielded cables must be used for the console and auxiliary port connections.

Step 1 Before connecting a terminal to the console port, configure the terminal to match the router console port as follows: 9600 baud, 8 data bits, no parity, 1 stop bits. See Figure 8 for console and auxiliary port connector location.

Step 2 Connect to the port using the RJ-45-to-DB-9 cable.

Figure 8 Cisco ASR 1002 Integrated Route Processor Console and Auxiliary Port Connectors



1	CON—console port	**2**	AUX—auxiliary port

Step 3 After you establish normal router operation, you can disconnect the terminal.

Note For console and auxiliary port pinouts, see Cisco ASR 1002 router specifications in the *Cisco ASR 1000 Series Aggregation Services Routers Hardware Installation and Initial Configuration Guide*.

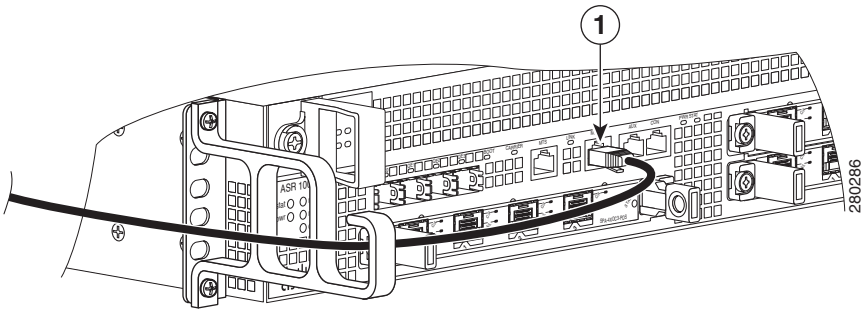
Management Ethernet Port Cable Connection

Caution To comply with Class A emissions requirements, a shielded Ethernet cable must be used.

To use the Management Ethernet interface on the router, perform the following steps:

Step 1 Insert an Ethernet RJ-45 cable into the MGMT ETHERNET port (see Figure 9).

Figure 9 Cisco ASR 1002 Integrated Route Processor Ethernet Management Port Connector



1	MGMT port and cable		

Step 2 Insert the other end of the RJ-45 cable to your management device or network.

Step 3 Configure to a fixed speed through the command-line interface (CLI) commands.

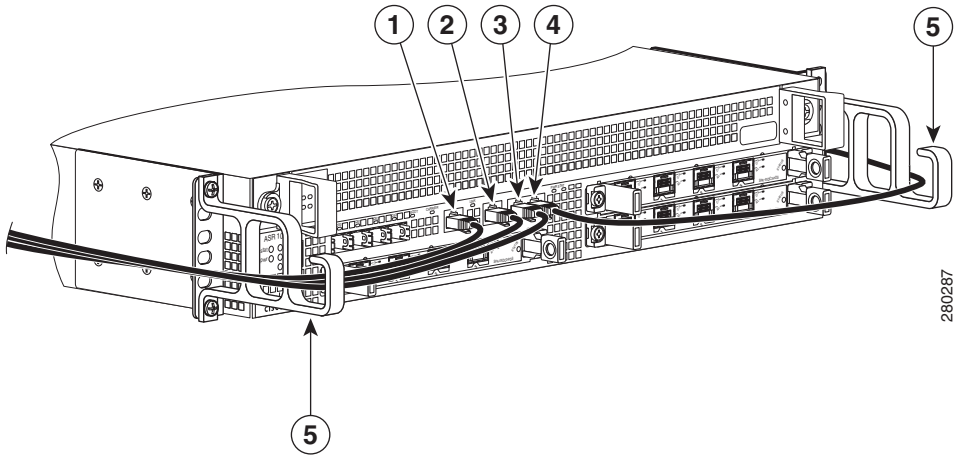
Connect the Shared Port Adapter Cables

The instructions for connecting the cables for the shared port adapters installed in the Cisco ASR 1002 Router are contained in the *Cisco ASR 1000 Series Aggregation Services Routers SPA and SIP Hardware Installation Guide*.

Install the Cables Using the Cable-Management Bracket

Cables coming off the front side of the Cisco ASR 1002 integrated route processor and SPAs utilize the chassis level cable-management brackets provided on the chassis rack-mount brackets (see Figure 10).

Figure 10 Cisco ASR 1002 Integrated Route Processor Cable-Management



1	BITS cable	**4**	AUX cable
2	MGMT cable	**5**	Cable-management U feature device
3	CON cable		

To secure shared port adapter interface cables and input or output cables connected to the Cisco ASR 1002 Router, follow these steps:

Step 1 When installing the network interface cables, route the cables up to and through the cable-management bracket 'U' device. If you are using very thin cables that slip through the bracket openings, insert nylon cable ties through the holes in the bracket and wrap them around the cables to secure them.

Step 2 Route the excess cable out through either end of the bracket, coil it, and secure it to the rack using nylon cable ties or some other mode of attachment.

Step 3 It might be necessary to bundle longer cables to avoid tangling them. Do this at the cable-management bracket or at the rack, but leave enough slack in the cables to remove a Cisco ASR 1000-ESP5 and change cables as required. Also, do not block the power supply air vents with cables.

This completes the procedure for installing the cables in the cable-management bracket.

Proceed to the "Start the System" section on page 14 to complete the installation.

5 Start the System

Before you start the system, you must connect power to it.

Connect AC Power to the Cisco ASR 1002 Router

This section provides instructions for installing the AC power supply into the Cisco ASR 1002 Router. Read the safety warnings before you begin.

Warning **Never install an AC power module and a DC power module in the same chassis.** Statement 1050

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

Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

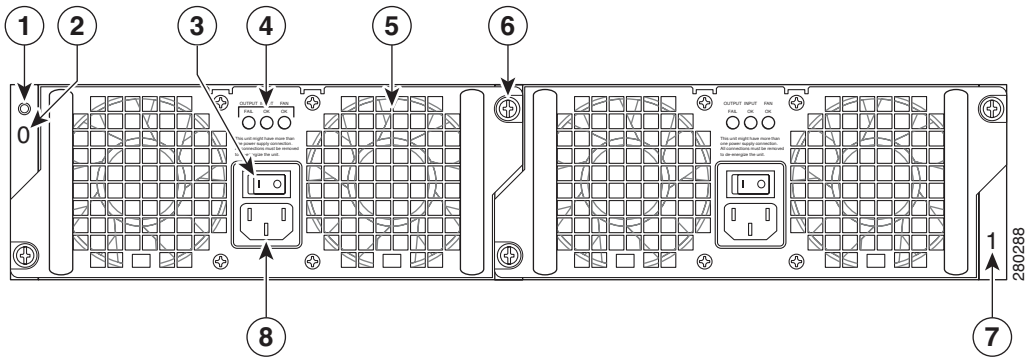
Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement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

Warning **This unit has two power supply connections. All connections must be removed to de-energize the unit.** Statement 1028

Warning **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 supplies 20 A and DC power supplies 30 A for Cisco ASR 1002 Routers.** Statement 1005

Figure 11 shows the AC power supply for the Cisco ASR 1002 Router.

Figure 11 AC Power Supply for the Cisco ASR 1002 Router



1	Chassis ESD socket	**5**	AC power supply fan
2	AC power supply slot number 0	**6**	AC power supply captive installation screw
3	AC power supply On (I) /Off (O) switch	**7**	AC power supply slot number 1
4	AC power supply LEDs	**8**	AC power inlet

Table 1 describes the AC power supply LEDs on the Cisco ASR 1002 Router.

Table 1 Cisco ASR 1002 Router AC Power Supply LEDs

LED Label	LED	Color	Description
INPUT OK	Power supply activity	Green	The AC power supply input voltage is greater than 85V.
		None	The AC input voltage is less than 70V or the power supply is turned off.
		Flashing	For an AC input voltage between 70V and 85V the INPUT OK LED can be either on, off, or flashing
FAN OK	Power supply fan activity A bi-color LED indicates fan status.	Green	When all fans are operational.
		Red	When a fan failure is detected.
OUTPUT FAIL	Power supply activity	Red	LED is off to signal that the DC output voltages are within the normal operating range. Output voltage between the minimum and maximum limits will not create an output fail alarm and output voltages below the minimum or above the maximum will create an output fail alarm.

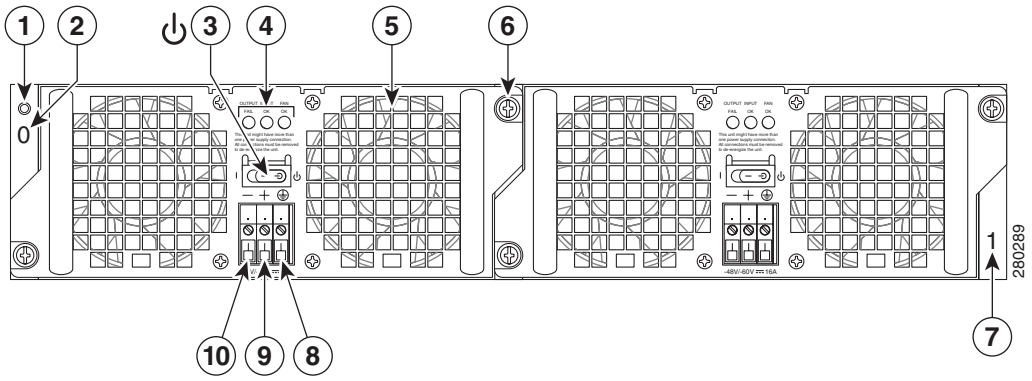
Note To connect an AC power supply to the Cisco ASR 1002 Router, follow the steps in Installing the AC Power Supply, page 31.

Connect DC Power to the Cisco ASR 1002 Router

The DC power supply input connector is a euro-style terminal block. A means to provide strain relief to the input wires is provided on the power supply. The connection order is negative (–), positive (+), and GND.

Figure 12 shows the DC power supply for the Cisco ASR 1002 Router.

Figure 12 DC Power Supply for the Cisco ASR 1002 Router



1	Chassis ESD socket	**6**	DC power supply captive installation screw
2	DC power supply slot 0 label	**7**	DC power supply slot 1 label
3	DC power supply switch Standby/On (I) (standby symbol is a broken circle with a vertical line through the top of it)	**8**	Negative ground lead
4	DC power supply LEDs	**9**	Positive ground lead
5	Fan	**10**	Earth ground lead

Table 2 describes the DC power supply LEDs on the Cisco ASR 1002 Router.

Table 2 Cisco ASR 1002 Router DC Power Supply LEDs

LED Label	LED	Color	Description
INPUT OK	A bi-color LED indicates presence of input voltage	Green	Signals that the DC power supply input voltage is greater than –43.5VDC at turn-on and remains green down to –39VDC.
		Amber	The power supply turns off due to low input voltage (falls below –39VDC) and indicates that there is still a voltage present (voltage on the terminal block). The LED remains amber and is active to around 20V +/-5V. The LED is not illuminated if the input is below 15V.
FAN OK	A bi-color LED indicates power supply fan status	Green	All fans are operational.
		Red	A fan failure is detected.
OUTPUT FAIL	Power supply activity	Red	It is off signals that the DC output voltage are within the normal operating range. Output voltage between the minimum and maximum limits will not create an output fail alarm, and output voltages below the minimum or above the maximum will create an Output Fail alarm. When you turn the power supply on, the red LED illuminates for two to three seconds to test LED operation before going off.

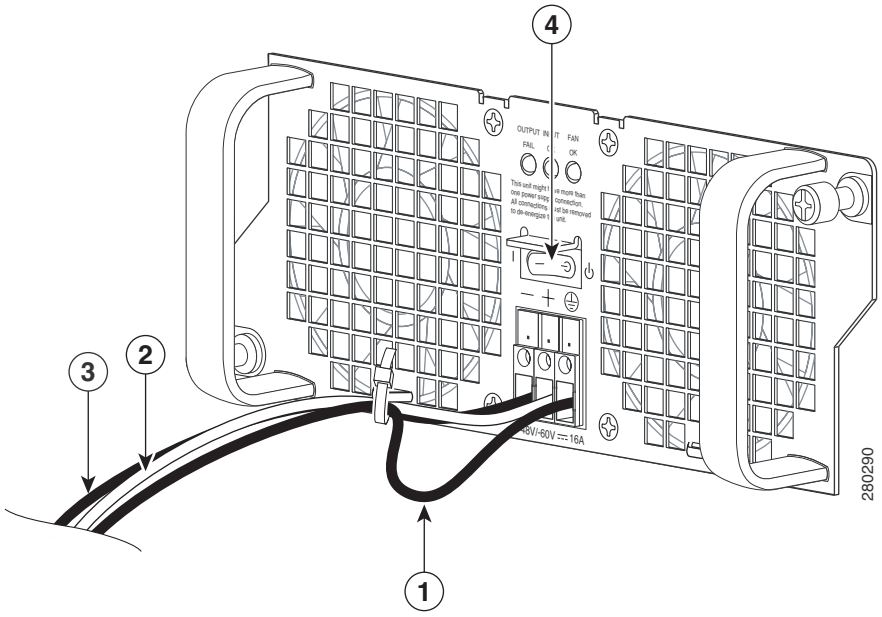
To connect the DC power supply to a Cisco ASR 1002 Router, follow these steps:

Step 1 At the rear of the router, check that the power switch is in the standby position.

Note The color coding of the DC-input power supply leads depends on the color coding of the DC power source at your site. Typically, green or green/yellow is used for ground. Make certain the lead color coding you choose for the DC-input power supply matches lead color coding used at the DC power source.

Warning **When you install the unit, the ground connection must always be made first and disconnected last.**

Figure 13 Cisco ASR 1002 Router DC Power Supply



1	Earth ground lead service loop area	**3**	DC power positive lead
2	DC power negative lead	**4**	Power supply standby switch

Step 2 Ensure that the negative and positive leads are disconnected from the site power source.

Step 3 Using a wire stripper, strip approximately 0.55 inch (14 mm) from the positive, negative, and ground lead.

Step 4 Insert the stripped end of the ground lead all the way into the ground lead receptacle on the DC-input power supply, and tighten the receptacle screw using a 3.5mm flat-blade screwdriver to a torque of 0.5 to 0.6Nm.

Step 5 Insert the stripped end of the positive lead all the way into the positive lead receptacle and tighten the receptacle screw using the same 3.5mm flat-blade screwdriver. Repeat this step for the negative lead.

Step 6 Make sure the entire stripped end of each lead is inserted all the way into its receptacle. If any exposed wire at the stripped end of a lead is visible after inserting the lead into its receptacle, remove the lead from the receptacle, use the wire stripper to cut the stripped end of the lead, and repeat Step 3 through Step 5.

Step 7 After tightening the receptacle screw for the ground, positive, and negative DC-input leads, use a cable tie to secure the three leads to the power supply faceplate.

Step 8 When securing the earth ground, positive, and negative DC-input leads to the power supply faceplate, leave a **service loop** in the ground lead to ensure that the ground lead is the last lead to disconnect from the power supply if a great deal of strain is placed on all three leads as shown in Figure 13.

Caution Leave a **service loop** in the earth ground lead to ensure that the earth ground lead is the last lead to disconnect from the power supply if a great deal of strain is placed on all three leads

Step 9 Connect the ground, positive, and negative leads to the power source.

Step 10 Turn the branch source breaker on.

Step 11 Turn the power supply switch to the On (I) position.

Step 12 Verify that the LEDs illuminate.

This completes the procedure for connecting DC-input power.

Verifying Power Supply operation

Follow this procedure to verify power supply is operating correctly.

Step 1 Check that the power supply LEDs are:

- INPUT OK is green
- FAN OK is green
- OUTPUT FAILED is not illuminated

Step 2 To ensure that the power supply state is OK, type the **show platform** command. This output sample is from a Cisco ASR1002 router.

```
MCP_SCAL_R1#sho env all
Chassis type: ASR1002

The following output displays:

Slot   Type             State      Insert Time
R0     ASR1000-RP1      ok,active  00:03:19
F0     ASR1000-ESP10    ok,active  00:03:19
P0     ASR1002-PWR-AC   ok         00:02:50
P1     ASR1002-PWR-AC   ps, fail   00:02:50



Slot   CPLD Version     Firmware Version
R0     08060301         12.2(0:0)
F0     08041102         12.2(33r)XN2
```

If the LEDs indicate a power problem or the power supply state is ps,fail, then contact a customer service representatives for assistance or additional instructions.

Start the Cisco ASR 1002 Router

After installing your Cisco ASR 1002 Router and connecting cables, start the router as follows.

Check the following conditions before you start the Cisco ASR 1002 Router:

- The Cisco ASR 1002 Router has one slot for FP0 with three subslots for SPAs, subslots 1, 2, and 3. Make certain that each shared port adapter is firmly seated in its subslot and its captive screws are securely tightened.
- The Cisco ASR1000-ESP5 or ASR1000-ESP10 forwarding processor in the Cisco ASR 1002 router is inserted in slot F0, is firmly seated in its slot, and its captive screws are securely tightened.
- All network interface cables are connected.
- The console terminal is turned on.

Step 1 Turn on power. The green OK LED on the power supply turns on. (Both power supplies are required in the Cisco ASR 1002 Router.)

Step 2 Listen for the fans; you should immediately hear them operating.

Step 3 During the boot process, observe the system LEDs. The power LED should be green. The STATUS LED lights yellow to indicate booting and then green when Cisco IOS is running.

Table 3 provides information about the LEDs as the system starts.

Table 3 Cisco ASR 1002 Router LED Activity

LED Label	LED	Color	In the Power Up State -Behavior Description
PWR	Power	Solid green	All power requirements are within specification.
		Off	The router is in standby mode.
STAT	System status	Solid green	Cisco IOS has successfully booted.
		Yellow	BOOT ROM has successfully loaded.
		Red	System failure.
CRIT	Critical	Solid red	Critical alarm indicator. On at power up
MAJ	Major	Solid red	Major alarm indicator.
MIN	Minor	Amber	Minor alarm indicator.
LINK	10/100/1000 RJ-45	Flashing green	Link activity indicator.
		Off	No link.
		Solid green	Link with no activity.
BOOT	eUSB FLASH BOOT (BootDisk)	Flashing green	Activity indicator.
		Off	No activity.
CARRIER	BITS	Green	In frame and working properly.
		Off	Out of service or not configured.
		Amber	Fault or loop condition.
**Built-in 4xGE SPA SFP Port Status	4 LEDs total, one for each SFP	Off	Port is not enabled.
		Amber	Port enabled. Problem with the Ethernet link.
		Green	Port enabled and the Ethernet link is valid.
CC - PWR	Embedded SIP power rail status	Green	If all power supplies within their tolerance specifications.
CC - STAT	Embedded SIP current status	Green	Green only when the SPA drivers have started and are running and all critical processes are running.
		Yellow	ROMMON is running and during the download and boot.
		Red	A fault is detected or the card is powering up.

**The built-in Gigabit Ethernet ports on the Cisco ASR1002 Router support the same small form-factor pluggable (SFP) optical transceivers as the 5x1 GE SPA. For specific shared port adapter SFP compatibility listings, go to Chapter 1 at:
http://cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/install_upgrade/ASR1000/ASRspahw.pdf
Note that the Cisco ASR1002 built-in GE ports support only the SFP-GE-T but not the SFP-GLC-T.

Table 4 provides information about the Cisco ASR1000-ESP5 LEDs in the Cisco ASR 1002 Router as the system starts.

Table 4 Cisco ASR1000-ESP5 and ASR1000-ESP10 LED Activity

LED Label	LED	Color	Behavior Description
PWR	Power	Solid green	All power supplies are within operational limits.
		Off	The router is in standby mode.
STAT	Status	Green	Code has successfully downloaded and is operational.
		Yellow	BOOT ROM has successfully loaded.
		Red	Not booted.
ACTV	Active	Green	The embedded services processor is green when active.
STBY	Standby	None	Will always be off.

During the boot process, observe the system LEDs. The STATUS LED comes on immediately as amber, then turns to green when the Cisco IOS is booted.

Note The system boots differently depending on the configuration that ships with your system. The display below is a snapshot of messages that are output on the console of the Cisco ASR 1002 Router system after power-up and during IOS booting. This is only an example of what you might see from any Cisco ASR 1000 Series Router.

Step 4 Observe the initialization process. When the system boot is complete (a few seconds), the Cisco ASR 1002iIntegrated route processor begins to initialize. The console screen displays a script and system banner similar to the following when booting flash or harddisk:

```
asr1002-16-rp0-rommon 2 >boot
bootflash:asr1000rp1-advipservicesk9.v122_33_xn_asr_rls0_throttle_20080114_045627.bin
Located asr1000rp1-advipservicesk9.v122_33_xn_asr_rls0_throttle_20080114_045627.bin
Image size 218869964 inode num 18, bks cnt 53436 blk size 8*512
################################################################################################################
##############
################################################################################################################
##############
################################################################################################################
############
Boot image size = 218869964 (0xd0bb0cc) bytes

Using midplane macaddr
Package header rev 0 structure detected
Calculating SHA-1 hash...done
validate_package: SHA-1 hash:
        calculated 9b448f06:3d34317f:54fa04b6:a5d8abae:321bb3f0
        expected   9b448f06:3d34317f:54fa04b6:a5d8abae:321bb3f0
Image validated


PPC/IOS XE loader version: 0.0.3
loaded at:     00800000 0D8BD004
zimage at:     00807673 009B8D97
initrd at:     009B9000 01041D66
isord at:      01042000 0D8BA800
avail ram:     00400000 00800000

Kernel load:
Uncompressing image... dst: 00000000 lim: 00400000 start: 00807673 size: 001B1724...done.
Now booting the IOS XE kernel
%IOSXEBOOT-4-BOOT_PARAMETER: (rp/0): Booting with custom BOOT_PARAM setting
%IOSXEBOOT-4-BOOT_PARAMETER: (rp/0): Hardware watchdog timer disabled in ROMMON
```

```
%IOSXEBOOT-4-DEBUG_CONF: (rp/0): Using DEBUG_CONF file /misc/scratch/debug.conf
Feb 13 13:00:38.546 R0/0: %PMAN-3-PROCFAIL_IGNORE: All process failures are being ignored due to debug
settings. FRU may not reset automatically

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12.2(20080114:101630) [BLD-v122_33_xn_asr_rls0_throttle.MCP_CRYPTO_THROTTLE_BLD_20080114 102]
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Compiled Mon 14-Jan-08 02:19 by mcpre
Image text-base: 0x100615D0, data-base: 0x132638F8


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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.

% Error! No serial number found for this platform.
cisco ASR1000 (RP1) processor with 753956K/6147K bytes of memory.
2 Packet over SONET interfaces
32768K bytes of non-volatile configuration memory.
1862368K bytes of physical memory.
439807K bytes of eUSB flash at bootflash:.
39004543K bytes of SATA hard disk at harddisk:.
1020584K bytes of USB flash at usb0:.

no ip http secure-server
             ^
% Invalid input detected at '^' marker.

SETUP: new interface POS0/1/0 placed in "shutdown" state
SETUP: new interface POS0/1/1 placed in "shutdown" state


Press RETURN to get started!


*Feb 13 13:01:28.579: %FMANRP-6-IPCSTATUS: IPC Channel BIPC is up
*Feb 13 13:01:28.649: %FMANFP-6-IPCSTATUS: IPC Channel stats-BIPC is up
*Feb 13 13:01:28.649: %FMANFP-6-IPCSTATUS: IPC Channel crypto-BIPC is up
*Feb 13 13:01:28.656: %NETCLK-5-NETCLK_MODE_CHANGE: Network clock source not available. The network clock
has changed to freerun
```

```
*Feb 13 13:01:28.701: %LINK-5-CHANGED: Interface GigabitEthernet0, changed state to administratively down
*Feb 13 13:01:29.728: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0, changed state to
down
*Feb 13 13:01:14.738: %CPPHA-7-SYSREADY: F0: cpp_ha:  CPP client process FMAN-FP (5 of 5) ready.
*Feb 13 13:01:14.895: %IOSXE-6-PLATFORM: F0: cpp_cp:  cpp_mlp_svr_client_bind: cpp_mlp_svr_ifm_init()
successful
*Feb 13 13:01:15.016: %CPPHA-7-START: F0: cpp_ha:  CPP 0 preparing image /usr/cpp/bin/cpp-mcplo-ucode
*Feb 13 13:01:15.756: %CPPHA-7-START: F0: cpp_ha:  CPP 0 startup init image /usr/cpp/bin/cpp-mcplo-ucode
*Feb 13 13:01:25.217: %CPPHA-7-START: F0: cpp_ha:  CPP 0 running init image /usr/cpp/bin/cpp-mcplo-ucode
*Feb 13 13:01:25.473: %CPPHA-7-READY: F0: cpp_ha:  CPP 0 loading and initialization complete
*Feb 13 13:01:25.473: %CPPHA-6-SYSINIT: F0: cpp_ha:  CPP HA system configuration start.
*Feb 13 13:01:26.752: %IOSXE-6-PLATFORM: F0: cpp_cp: Process CPP_PFILTER_EA_EVENT__API_CALL__REGISTER
*Feb 13 13:01:26.913: %CPPHA-6-SYSINIT: F0: cpp_ha:  CPP HA system enabled.
*Feb 13 13:01:26.920: %CPPHA-6-SYSINIT: F0: cpp_ha:  CPP HA system initializaton complete.
*Feb 13 13:01:33.990: %SYS-5-CONFIG_I: Configured from memory by console
*Feb 13 13:01:33.999: %ASR1000_OIR-2-REMSPA: SPA removed from subslot 0/1, interfaces disabled
*Feb 13 13:01:33.999: %ASR1000_OIR-2-REMSPA: SPA removed from subslot 0/2, interfaces disabled
*Feb 13 13:01:34.002: %ASR1000_OIR-2-INSCARD: Card (fp) inserted in slot F0
*Feb 13 13:01:34.002: %ASR1000_OIR-2-ONLINECARD: Card (fp) online in slot F0
*Feb 13 13:01:34.029: %ASR1000_OIR-2-INSCARD: Card (cc) inserted in slot 0
*Feb 13 13:01:34.029: %ASR1000_OIR-2-ONLINECARD: Card (cc) online in slot 0
*Feb 13 13:01:34.030: %ASR1000_OIR-2-INSSPA: SPA inserted in subslot 0/1
*Feb 13 13:01:34.034: %ASR1000_OIR-2-INSSPA: SPA inserted in subslot 0/2
*Feb 13 13:01:34.370: %SYS-5-RESTART: System restarted --
Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVIPSERVICESK9-M), Experimental Version
12.2(20080114:101630) [BLD-v122_33_xn_asr_rls0_throttle.MCP_CRYPTO_THROTTLE_BLD_20080114 102]
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Compiled Mon 14-Jan-08 02:19 by mcpre
*Feb 13 13:01:36.253: %DYNCMD-7-CMDSET_LOADED: The Dynamic Command set has been loaded from the Shell
Manager
*Feb 13 13:01:36.326: %CRYPTO-6-ISAKMP_ON_OFF: ISAKMP is OFF
Router>
```

Note You have the option of proceeding with the **setup** command facility to configure the interfaces or exiting from setup and using configuration commands to configure global (system-wide) and interface-specific parameters. You do not have to configure the interfaces immediately; however, you cannot enable the interfaces or connect them to any networks until you have configured them. For detailed software configuration information, see the *Cisco ASR 1000 series Aggregation Services Routers Software Configuration Guide*.

6 Configuring the Router

Use this section for information on configuring the Cisco ASR 1002 Router.

Using the Console to Access the CLI

To access the command-line interface using the console, follow these steps:

Your system is booting and if you answer No, at the prompt:

```
         --- System Configuration Dialog ---

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

Step 1 Press **Return** to enter user EXEC mode. The following prompt appears:

```
Router>
```

Step 2 From user EXEC configuration mode, enter the **enable** command as shown in the following example:

```
Router> enable
```

Step 3 At the password prompt, enter your system password. If an enable password has not been set on your system, this step may be skipped. The following example shows entry of the password called *enablepass*:

```
Password: enablepass
```

Step 4 When your enable password is accepted, the privileged EXEC configuration mode prompt appears:

```
Router#
```

Step 5 You now have access to the CLI in privileged EXEC mode and you can enter the necessary commands to complete your desired tasks.

Step 6 To exit the console session, enter the **quit** command as shown in the following example:

```
Router# quit
```

Configure Global Parameters Using the Set-up Facility

When you first start the setup program, you must configure the global parameters. These parameters are used for controlling system-wide settings. Complete the following steps to enter global parameters:

Step 1 Connect a console terminal to the console port. This is only an example of the output display; prompts may vary. When you see this information, you have successfully booted your router:

```
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.
         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: yes

Press RETURN to get started!
```

Step 2 The first sections of the configuration script appear only at an initial system startup. On subsequent uses of the setup facility, the script begins with a System Configuration Dialog as shown in the following example:

Step 3 When asked if you would like to enter the initial configuration dialog, enter **yes**.

```
Would you like to enter the initial configuration dialog? [yes/no] yes

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 '[]'.

Basic management setup configures only enough connectivity for management of the system, extended setup
will ask you to configure each interface on the system.
--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: y

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 '[]'.

Basic management setup configures only enough connectivity
```

```
for management of the system, extended setup will ask you
to configure each interface on the system

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

First, would you like to see the current interface summary? [yes]: y

Any interface listed with OK? value "NO" does not have a valid configuration

Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0/0   unassigned      NO  unset  down                  down
GigabitEthernet0/0/1   unassigned      NO  unset  down                  down
GigabitEthernet0/0/2   unassigned      NO  unset  down                  down
GigabitEthernet0/0/3   unassigned      NO  unset  down                  down
GigabitEthernet0       unassigned      YES unset  administratively down down

Configuring global parameters:

  Enter host name [Router]:

  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: test


 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: tests

  The virtual terminal password is used to protect
  access to the router over a network interface.
  Enter virtual terminal password: test
  Configure SNMP Network Management? [yes]: n
  Configure IP? [yes]: y
    Configure RIP routing? [no]:
  Configure bridging? [no]:
  Configure CLNS? [no]:

Configuring interface parameters:

Do you want to configure GigabitEthernet0/0/0  interface? [yes]: n

Do you want to configure GigabitEthernet0/0/1  interface? [yes]: n

Do you want to configure GigabitEthernet0/0/2  interface? [yes]: n

Do you want to configure GigabitEthernet0/0/3  interface? [yes]: n

Do you want to configure GigabitEthernet0  interface? [no]: n

The following configuration command script was created:

hostname Router
enable secret 5 $1$6r./$U5wHcV3uRWkKWK/fap474.
enable password tests
line vty 0 4
password test
no snmp-server
!
ip routing
no bridge 1
no clns routing
!
interface GigabitEthernet0/0/0
shutdown
```

```
no ip address
!

interface GigabitEthernet0/0/1
shutdown
no ip address
!
interface GigabitEthernet0/0/2
shutdown
no ip address
!
interface GigabitEthernet0/0/3
shutdown
no ip address
!
interface GigabitEthernet0/1/0
shutdown
no ip address
!
interface GigabitEthernet0/1/1
shutdown
no ip address
!
interface FastEthernet0/3/0
shutdown
no ip address
!
interface FastEthernet0/3/1
shutdown
no ip address
!
interface FastEthernet0/3/2
shutdown
no ip address
!
interface FastEthernet0/3/3
shutdown
no ip address
!
interface FastEthernet0/3/4
shutdown
no ip address
!
interface FastEthernet0/3/5
shutdown
no ip address
!
interface FastEthernet0/3/6
shutdown
no ip address
!
interface FastEthernet0/3/7
shutdown
no ip address
!
interface GigabitEthernet0
shutdown
no ip address
dialer-list 1 protocol ip permit
dialer-list 1 protocol ipx permit
!
end


[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]:

Router#reload
Proceed with reload? [confirm]

*Jan 11 06:59:29.476: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload command.


System Bootstrap, Version 12.2(20071105:235056) [gschnorr-mcp_rommon_rel_1_25 101], DEVELOPMENT SOFTWARE
Copyright (c) 1994-2007 by cisco Systems, Inc.
Compiled Mon 05-Nov-07 16:50 by gschnorr-mcp_rommon_rel_1_25


Current image running: Boot ROM1
Last reset cause: LocalSoft
SATA drive PCI config error

ASR1000-RP1 platform with 2097152 Kbytes of main memory

rommon 1 > b tftp:images/packages_crypto/asr1000rp1-advipservicesk9.mcp_dev_20080109_101550.bin

          IP_ADDRESS: 2.1.6.5
      IP_SUBNET_MASK: 255.255.0.0
     DEFAULT_GATEWAY: 2.1.0.1
         TFTP_SERVER: 2.0.0.2
           TFTP_FILE: images/packages_crypto/asr1000rp1-advipservicesk9.mcp_dev_20080109_101550.bin
Using midplane macaddr
        TFTP_MACADDR: 00:14:a8:ff:42:ff
        TFTP_VERBOSE: Progress
    TFTP_RETRY_COUNT: 18
        TFTP_TIMEOUT: 7200
       TFTP_CHECKSUM: Yes
          ETHER_PORT: 3
    ETHER_SPEED_MODE: Auto Detect
link up 1000Mbps/FD.......
Receiving images/packages_crypto/asr1000rp1-advipservicesk9.mcp_dev_20080109_101550.bin from 2.0.0.2
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!

File reception completed.
Boot image size = 206741708 (0xc52a0cc) bytes

Using midplane macaddr
Package header rev 0 structure detected
Calculating SHA-1 hash...done
validate_package: SHA-1 hash:
        calculated a8301e1e:17821e94:07654c49:4ca6fe49:518af2c2
        expected   a8301e1e:17821e94:07654c49:4ca6fe49:518af2c2
Image validated

PPC/IOS XE loader version: 0.0.3
loaded at:     00800000 0CD2C004
zimage at:     00807673 009B8E53
initrd at:     009B9000 01006E53
isord at:      01007000 0CD2A000
avail ram:     00400000 00800000

Kernel load:
Uncompressing image... dst: 00000000 lim: 00400000 start: 00807673 size: 001B17E0...done.
Now booting the IOS XE kernel

%IOSXEBOOT-4-BOOT_PARAMETER: (rp/0): Booting with custom BOOT_PARAM setting
%IOSXEBOOT-4-DEBUG_CONF: (rp/0): File /misc/scratch/debug.conf is absent, ignoring

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```

```
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Cisco IOS Software, IOS-XE Software (PPC_LINUX_IOSD-ADVIPSERVICESK9-M), Experimental Version
12.2(20080109:162316) [BLD-mcp_dev.MCP_CRYPTO_INCREMENTAL_BLD_20080109 103]

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Image text-base: 0x10062810, data-base: 0x132AED48

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cisco ASR1000 (RP1) processor with 548011K/6147K bytes of memory.
8 FastEthernet interfaces
6 Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
2097152K bytes of physical memory.
947711K bytes of eUSB flash at bootflash:.
253407K bytes of USB flash at usb0:.
         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]: n
```

Note Basic management setup configures enough connectivity for managing the system; extended setup will ask you to configure each interface on the system. For detailed information about setting global parameters, refer to the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide*.

Check the Running Configuration Settings

To check the value of the settings you have entered, enter the **show running-config** command at the `Router#` prompt:

```
Router# show running-config
```

To review changes you make to the configuration, use the EXEC mode **show startup-config** command to see the changes and **copy run-start** command stored in NVRAM.

Save the Running Configuration to NVRAM

To store the configuration or changes to your startup configuration in NVRAM, use the copy running-config startup-config command to save your configuration changes to the startup configuration so that the changes will not be lost if the software reloads or a power outage occurs. For example:

```
Router# copy running-config startup-config
Building configuration...
```

It might take a minute or two to save the configuration. After the configuration has been saved, the following output appears:

```
[OK]
Router#
```

This task saves the configuration to NVRAM.

To review changes you make to the configuration, use the EXEC mode **show startup-config** command to see the changes and **copy run-start** command stored in NVRAM.

Note Using the **copy run-start** command saves the configuration settings that you created in the router using configuration mode and the setup facility. If you fail to do this, your configuration will be lost the next time you reload the router.

Perform Other Configuration Tasks

To make advanced configuration changes after you establish the basic startup configuration for your router, refer to the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide* and 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. These publications contain additional information on using the **configure** command. The configuration publications also provide information about the following tasks:

- Understanding command modes
- Booting and rebooting the router
- Understanding software packages and architecture for the Cisco ASR 1002 Router
- Software Upgrades

7 After Installation

Follow the instructions in this section to replace field-replaceable units (FRUs) after installation. The Cisco ASR 1002 Router supports the following components as FRUs: Cisco ASR1000-ESP5, shared port adapters, and power supplies.

Note For a complete list of Cisco ASR 1000 Series Routers field replaceable units, go to the *Cisco ASR 1000 Series Aggregation Services Router Hardware Installation and Initial Configuration Guide, Chapter 8*.

The following topics are covered in this section:

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

Power Off the Cisco ASR 1002 Router

This section explains how to shut down the Cisco ASR 1002 Router. It is recommended that before turning off all power to the chassis, you issue the **reload** command. This insures that the operating system cleans up all the file systems. Once the reload operation is complete, then the Cisco ASR 1000 Series router can be powered off safely.

To remove power from the Cisco ASR 1002 Router, follow this procedure:

Step 1 Slip on the ESD-preventative wrist strap that was included in the accessory kit.

Step 2 Before you shutdown the router, issue the IOS **reload** command to halt the system and then wait for ROM Monitor to execute before proceeding to the next step. The following screen shot shows an example of the reload command:

```
Router#reload
Proceed with reload? [confirm]

*Jun 18 19:38:21.870: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload command.
```

Step 3 Remove any power cables from the Cisco ASR 1002 Router.

- **a.** For AC power supplies, switch the circuit breaker to the off (O) position and unplug the AC power cord from the power outlet.
- **b.** For DC power supplies, place the power switch in the Standby position. Then remove the terminal block plug from the DC power supply.

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

Replace the Cisco ASR1000-ESP5 or ASR1000-ESP10

This section provides instructions for removing the Cisco ASR1000-ESP5 or ASR1000-ESP10 from the Cisco ASR 1002 Router. The Cisco ESP5 and ESP10 are Cisco Quantum Flow Processors (QFP) for the Cisco ASR 1002 Router. The Cisco ESP5 and ESP10 are individual FRUs and support online insertion and removal operation. Before you begin, make certain the chassis is grounded.

To remove the Cisco ESP5 or ESP10 from the Cisco ASR 1002 Router, follow this procedure:

Step 1 Slip on the ESD-preventative wrist strap that was included in the accessory kit. Loosen the captive screws on the Cisco ESP5 or ESP10.

Step 2 Using the handles on both sides of the module, with two hands, gently slide the Cisco ESP5 or ESP10 out of the chassis slot.

Note Handle the Cisco ESP5 and ESP10 by the carrier edges only; never touch the printed circuit board components or connector pins.

Step 3 Place the Cisco ESP5 or the ESP10 on an antistatic surface with its printed circuit board components facing upward or in a static shielding bag.

You have completed the procedure for removing the Cisco ESP5 or ESP10.

To install the Cisco ESP5 or ESP10 in the Cisco ASR 1002 Router, follow this procedure:

Step 1 Slip on the ESD-preventative wrist strap that was included in the accessory kit.

Step 2 Using the handles on both sides of the module, with two hands, gently insert the Cisco ESP5 or -ESP10 into the top chassis slot.

Note Handle the Cisco ESP5 and ESP10 by the carrier edges only; never touch the printed circuit board components or connector pins.

Step 3 Once the board is seated, tighten the captive screws.

Step 4 Place the Cisco ESP5 or Cisco ESP10 on an antistatic surface with its printed circuit board components facing upward or in a static shielding bag.

You have completed the procedure for replacing the Cisco ESP5 or ESP10.

Replace the Shared Port Adapters

The shared port adapters (SPAs) on the embedded Cisco ASR1000-SIP10 in the Cisco ASR 1002 Router support online insertion and removal (OIR); but the embedded Cisco ASR1000-SIP10 does not support OIR and is not field-upgradeable.

Note Cabling information is included with the specific shared port adapter documentation.

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

Caution Removing a shared port adapter while traffic is flowing through the ports can cause system disruption.

Step 2 Shut down the interface so that there is no traffic running through the shared port adapter when it is removed. For example, to shut down the interface "FastEthernet0/1/0" on the 8-Port Fast Ethernet Shared Port Adapter (SPA-8X1FE-TX-V2), perform these steps:

a. At the Router# prompt, type
configure terminal and press Enter. The global configuration mode prompt Router(config)# appears.

b. At the Router(config)# prompt, type:
interface FastEthernet0/1/0 and press Enter. The interface configuration mode prompt Router(config-if)# appears.

c. At the Router(config-if)# prompt, type:
shutdown and press Enter. This disables the interface FastEthernet0/1/0.

d. At the Router(config-if)# prompt, type:
end and press Enter. The privileged EXEC mode prompt Router# appears.

Step 3 Disconnect all cables from the shared port adapter.

Step 4 Remove the shared port adapter from the chassis subslot. Grasp the handle and pull the shared port adapter or blank panel from the router.

Step 5 Locate the shared port adapter slot guides inside the Cisco ASR 1002 Router.

Caution The shared port adapter must slide into the slot guides under the chassis lid. Do not allow the shared port adapter components to come in contact with the system board or the shared port adapter could be damaged.

Step 6 Carefully slide the shared port adapter into the shared port adapter slot until it is firmly seated and then securely tightened the captive screws. When installed, the shared port adapter input/output panel should be flush with the face of the router.

Step 7 Reconnect any cables and place the cables through the cable-management brackets.

Step 8 If the shared port adapter fails to come up, reseat or reinsert the shared port adapter; do not use excessive force.

Step 9 Power on the router by turning the power switch to the on (I) position.

Replace a Power Supply in the Cisco ASR 1002 Router

This section provides instructions for removing and replacing the AC power supply and the DC power supply in a Cisco ASR 1002 Router. Before you begin, make certain the chassis is grounded. Two power supplies must be installed in the chassis at all times to ensure sufficient cooling. The system fans are inside the power supply units and must spin for cooling. Because all the system fans can be powered by one power supply, the second power supply unit does not have to be powered on, but it must be installed.

If a power supply is removed, the system can run with only one power supply for a maximum of five minutes. The router waits five minutes before shutting down. This five-minute window allows time to replace a failed power supply.

Note Two power supplies must be installed in the chassis at all times to ensure sufficient cooling. The system fans are inside the power supply units and must spin for cooling. Because all the system fans can be powered by one power supply, the second power supply unit does not have to be powered on, but it must be installed.

Caution If you remove a power supply, the system can run for a maximum of five minutes before the system shuts down. The fans and power elements are independent within the power supply. Therefore, it is not required that the replacement power supply be energized within five minutes. The only requirement is that the power supply be installed in the chassis, which energizes the fans and maintains proper system cooling.

Removing an AC Power Supply

To remove a Cisco ASR 1002 Router AC power supply that is not operating normally (and then replace the AC power supply within five minutes), follow this procedure:

Step 1 Slip on the ESD-preventative wrist strap that was included in the accessory kit.

Step 2 Turn the switch to the off (O) position and unplug the AC power cord.

Step 3 Unscrew all of the power supply captive screws.

Step 4 Grasping the power supply handles, pull the power supply from the chassis.

Step 5 Replace the AC power supply within five minutes or the system will shutdown

You have removed an AC power supply from the Cisco ASR 1002 Router and now must replace the AC power supply within five minutes.

Installing the AC Power Supply

Step 1 Insert an AC power supply in power supply Slot 0 or power supply Slot 1 until it is full seated.

Step 2 Tighten the captive installation screws.

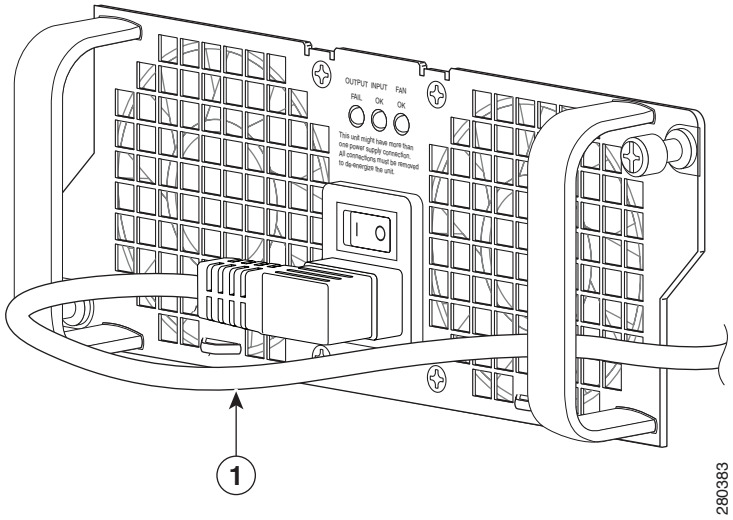
Step 3 At the rear of the router, check that the power switch is in the Off (O) position.

Step 4 Insert the AC power cord into the power inlet and then turn it On (I).

Step 5 To ensure that the AC power cord does not interfere with other cables or wires, dress the AC power cable in one of the following ways.

a. Leave a small service loop in the AC power cord from the inlet and then secure the power cord through the AC power supply handle as shown in Figure 14. Or go to 5b.

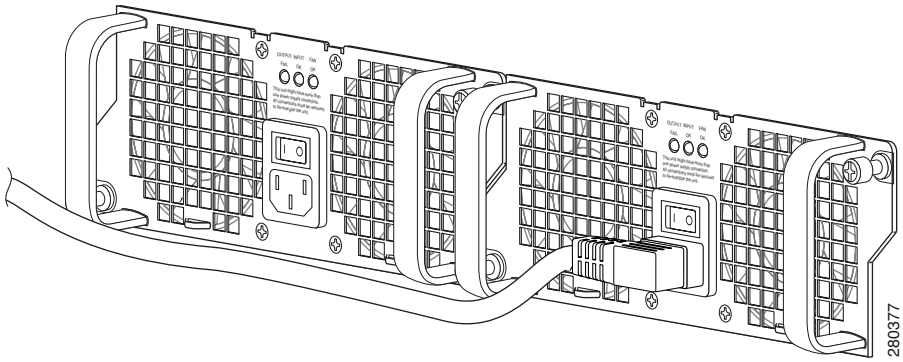
Figure 14 Cisco ASR 1002 Router AC Power Cord



1	AC power cord and service loop		

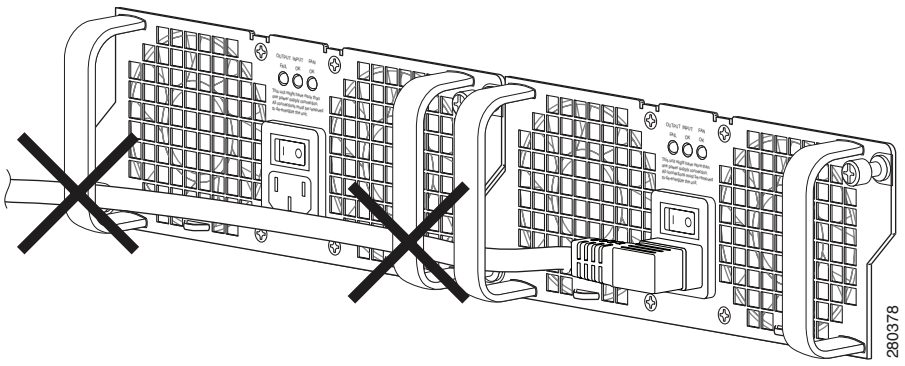
b. Take the power cord and run it below the handles of the power supply in slot 1 (the power supply you are connecting) and the power supply in slot 0 (left) as shown in Figure 15. Make sure the power cord is hanging loosely so that it cannot be disconnected from the AC power inlet.

Figure 15 Cisco ASR 1002 Router AC Power Cord - Left and Right



Caution Do not run the AC power cord through the power supply handles as shown in Figure 16.

Figure 16 AC Power Supply Cord Cabling for the Cisco ASR 1002 Router



Note Using a tie wrap for the AC power cable is optional and not necessary. However, if you do attach the AC power cable to a power supply tab and then you remove the AC power cable for some reason, check for any damage to the cable after you cut the tie wrap off. If the power cord is damaged, replace it immediately.

Note Turn the power supply switch to On (I) after both sides of the power cord are connected.

Step 6 Plug the AC power supply cable into the AC power source.

Step 7 Place the AC power supply switch to the On (I) position.

Step 8 The power supply LEDs light when power is supplied to the router.

This completes the procedure for connecting an AC power supply in the Cisco ASR 1002 Router. You have completed a live change-out procedure (that is, removing and replacing an AC power supply) for an AC power supply not operating properly in the Cisco ASR 1002 Router within five minutes.

Removing the DC Power Supply

Before you can remove a DC power supply from the Cisco ASR 1002 Router, you must remove power from the power supply.

Caution Make certain that the chassis ground is connected before you begin removing and installing the power supply.

To remove the DC power supply from the Cisco ASR 1002 Router, follow this procedure:

Step 1 Slip on the ESD-preventative wrist strap that was included in the accessory kit.

Step 2 Place the power supply switch in the Standby position.

Step 3 Turn off the branch circuit breaker before touching terminal screws. Then start loosening terminal block screws to remove wires.

Step 4 Remove the ground leads from the terminal block in this order.

- **a.** Negative ground lead
- **b.** Positive ground lead
- **c.** Ground lead

Step 5 Unscrew all of the power supply captive installation screws.

Note Two power supplies must be installed in the chassis at all times to ensure sufficient cooling. The system fans are inside the power supply units and must spin for cooling. Because all the system fans can be powered by one power supply, the second power supply unit does not have to be powered on, but it must be installed.

Caution If you remove a power supply, the system can run for a maximum of five minutes before the system shuts down. The fans and power elements are independent within the power supply. Therefore, it is not required that the replacement power supply be energized within five minutes. The only requirement is that the power supply be installed in the chassis, which energizes the fans and maintains proper system cooling.

Step 6 Grasping the power supply handles, pull the power supply from the chassis.

Step 7 Replace the DC power supply within five minutes or the system will shutdown.

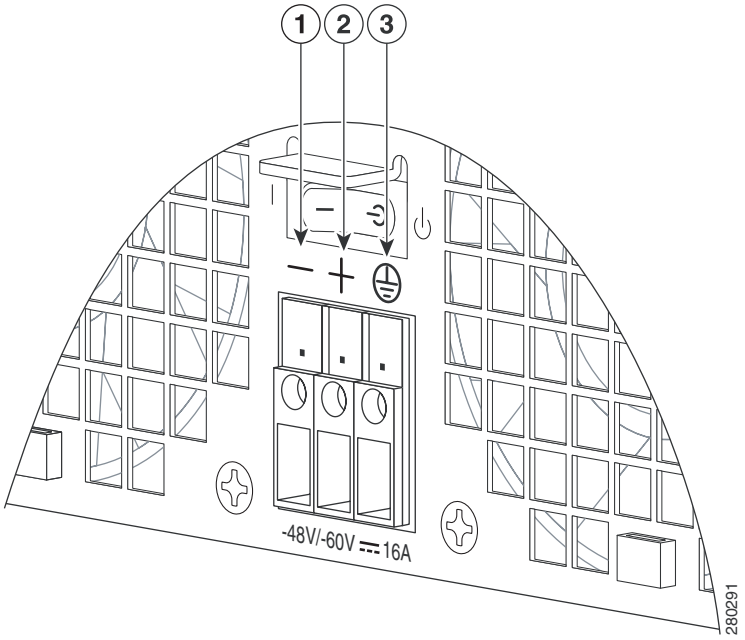
You have completed the procedure for removing a DC power supply from the Cisco ASR 1002 Router.

Installing the DC Power Supply

This section provides information about replacing a DC power supply in the Cisco ASR 1002 Router.

Note The color coding of the DC-input power supply leads depends on the color coding of the DC power source at your site. Typically, green or green/yellow is used for ground. Make certain the lead color coding you choose for the DC-input power supply matches lead color coding used at the DC power source.

Figure 17 Cisco ASR 1002 Router Terminal Block



1	Negative lead	**3**	Earth ground symbol
2	Positive lead		

Warning **Never install an AC power module and a DC power module in the same chassis.** Statement 1050

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

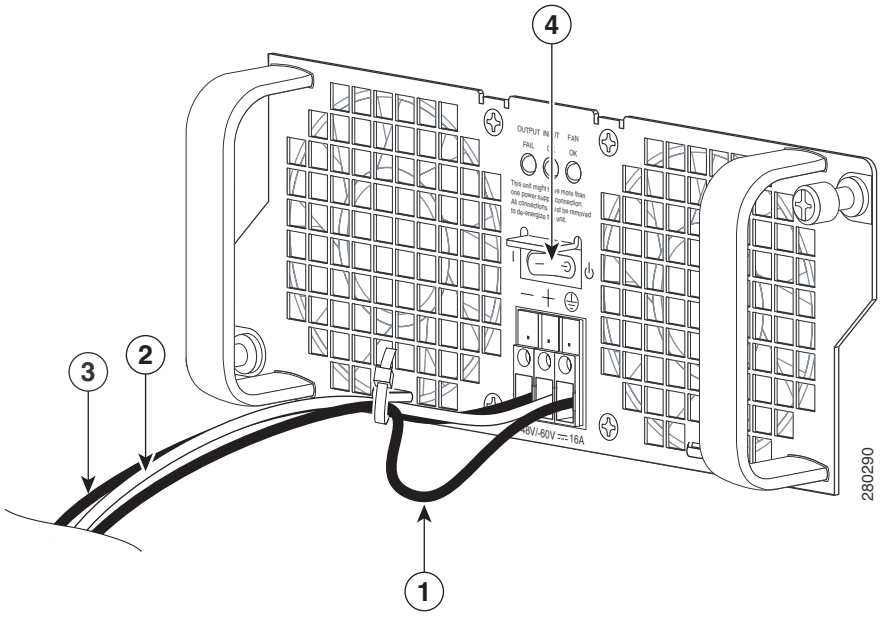
Step 1 At the rear of the router, check that the power supply Standby switch is in the Standby position.

Step 2 Ensure that the negative and positive leads are disconnected from the site power source and the circuit breaker is turned off.

Step 3 Insert a DC power supply in power supply slot 0 or power supply slot 1 until it is full seated.

Step 4 Using a wire stripper, strip approximately 0.55 inch (14 mm) from the negative, positive, and ground lead.

Figure 18 Cisco ASR 1002 Router DC Power Supply



1	Ground lead wire	**3**	Positive lead wire
2	Negative lead wire	**4**	DC power supply Standby switch

Step 5 Insert the stripped end of the ground lead all the way into the ground lead receptacle on the DC-input power supply, and tighten the receptacle screw using a 3.5 mm flat-blade screwdriver to a torque of 0.5 to 0.6Nm.

Step 6 Insert the stripped end of the positive lead all the way into the positive lead receptacle and tighten the receptacle screw using the same 3.5 mm flat-blade screwdriver. Repeat this step for the negative lead.

Note Make sure the entire stripped end of each lead is inserted all the way into its receptacle. If any exposed wire at the stripped end of a lead is visible after inserting the lead into its receptacle, remove the lead from the receptacle, use the wire stripper to cut the stripped end of the lead, and repeat Step 4 through Step 6.

Step 7 After tightening the receptacle screw for the ground, positive, and negative DC-input leads, use a cable tie to secure the three leads to the power supply faceplate.

Note When securing the ground, positive, and negative DC-input leads to the power supply faceplate, leave extra service loop in the ground lead to ensure that the ground lead is the last lead to disconnect from the power supply if a great deal of strain is placed on all three leads.

Step 8 Turn the branch circuit breaker on at your site and the turn the Standby switch to the On (I) position.

Step 9 Check that the power supply LEDs light when power is supplied to the router.

You have completed the procedure for installing a DC power supply in the Cisco ASR 1002 Router.

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