Installing the Cisco ASR 903 Router

This chapter describes how to install the Cisco ASR 903 Router.

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- Installing the Chassis Ground Connection, on page 16
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- Connecting the Cisco ASR 903 Router to the Network, on page 47

Prerequisites

Before installing the Cisco ASR 903 Router, it is important to prepare for the installation by:

- Preparing the site (site planning) and reviewing the installation plans or method of procedures (MOP)
- Unpacking and inspecting the Cisco ASR 903 Router
- Gathering the tools and test equipment required to properly install the Cisco ASR 903 Router

For more instructions on how to prepare for the installation of the Cisco ASR 903 Router, see Preparing for Installation.

Installing the Router in a Rack

The following sections describe how to install the Cisco ASR 903 Router in a rack:

Installing the Chassis Brackets

The chassis is shipped with mounting brackets that can be installed on the front or rear of the chassis. To install the brackets on the front of the chassis, perform these steps:

Step 1  Remove the rack-mount brackets from the accessory kit and position them beside the router chassis. The figure below shows how to attach the brackets on the Cisco ASR 903 Router for a 19-inch EIA rack.
Figure 1: Attaching Mounting Brackets for a 19-inch EIA Rack

The figure below shows how to attach the brackets on the Cisco ASR 903 Router for a 300 mm ETSI cabinet.

Figure 2: Attaching Mounting Brackets for a 300 mm ETSI Cabinet

Step 2
Position one of the brackets against the chassis side, and align the screw holes.

Step 3
Secure the bracket to the chassis with the screws removed when performing Step 1. The recommended maximum torque is 28 in.-lb (3.16 N-m).

The A903-FAN-E fan tray with filter (A903-FAN-F) cannot be mounted using the mounting screws that are supported for A903-FAN fan tray. This is not an issue with the FAN tray filter blank panel (A903-FAN-F-B). We recommend that you use the short screws provided in the following rack mount kits to avoid interference of the air filter during rack mounting and while replacing the fan tray (A903-FAN) with the fan tray (A903-FAN-E):

- 19” rack mount kit (A903-RCKMT-19IN)
- ETSI rack mount kit (A903-RCKMT-ETSI)

What to do next
Repeat Step 2 and Step 3 for the other bracket.

Installing the Router Chassis in the Rack

The procedures in this section apply to both horizontal and vertical mounting of the router in a rack.

To install the router chassis in the equipment rack, perform these steps:
Step 1
Position the chassis in the rack as follows:
- If the front of the chassis (front panel) is at the front of the rack, insert the rear of the chassis between the mounting posts.
- If the rear of the chassis is at the front of the rack, insert the front of the chassis between the mounting posts.

Step 2
Align the mounting holes in the bracket (and optional cable guide) with the mounting holes in the equipment rack.

**Caution**
Do not use interface module and power supply ejector handles to lift the chassis; using the handles to lift the chassis can deform or damage the handles.

*Figure 3: Installing the Chassis in a 19-inch EIA Rack*

*Figure 4: Installing the Chassis to support the Japanese JIS Rack Standard*
The router can be mounted in an ETSI rack but the required bend radius for the cables and fibers within the 300 mm ETSI specification cannot be maintained.

If you want to mount the router in ETSI cabinets, you need to have a custom-made cabinet front door to meet the fiber bend radius requirement.
Figure 6: Vertical Mounting Installation

During vertical installation of the router, ensure that the equipment is mounted only on concrete or other non-combustible surfaces.

**Step 3**
Install the 8 or 12 (4 or 6 per side) 12-24 x 3/4-inch or 10-32 x 3/4-inch screws through the holes in the bracket and into the threaded holes in the equipment rack posts.

**Step 4**
Use a tape measure and level to verify that the chassis is installed straight and level.

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**Installing Plenum A903-F2B-AIR-U Assembly and Chassis in the Rack**

Following steps help you to install the plenum assembly irrespective of the chassis and rack size.
**Note**  The 19-inches bracket (A903-RCKMNT-19IN3) is an integral part of the plenum base. Ensure to select the 21-inches or 23-inches adapter for your plenum based on your rack size.

*Figure 7: Different Adapters*

<table>
<thead>
<tr>
<th>21 Inch</th>
<th>23 Inch</th>
</tr>
</thead>
</table>

**Step 1**  Position the air baffle and the side plate to the plenum. See figure below.
Figure 8: Securing the Air Baffle Tray

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Air baffle</td>
</tr>
<tr>
<td>2</td>
<td>Side plate</td>
</tr>
<tr>
<td>3</td>
<td>Plenum base</td>
</tr>
<tr>
<td>4</td>
<td>Secure screw to Plenum base</td>
</tr>
</tbody>
</table>
Figure 9: Securing the Side Plate

1 Securing side plate to plenum base
1 Air baffle
2 Side plate
3 Secure screw to Plenum base
Step 2  Secure the air baffle and the side plate using a maximum torque of 11.5 in.-lb (1.3 N-m). See figure below.

Step 3  Repeat Step-1 and Step-2 to complete the plenum assembly on the other side of the plenum base.

Step 4  Position the air filter (A903-F2B-AIR-F or A903-S2B-AIR) assembly on the plenum deflector. Secure the front cover using a recommended torque of 11.5 in.-lb (1.3 N-m). See figure below.
The filter is applicable only when fans A903-FAN and A903-FAN-H are used and the filter is not applicable for A903-FAN-E.

**Step 5** Using a crimping tool (as specified by the ground lug manufacturer), crimp the ground lug to the ground wire and connect the other end of the ground wire to a suitable grounding point at your site. See figure below.
Step 6  Position the plenum assembly to the rack and secure the cable brackets to the rack using a torque of 11.5 in.-lb (1.3 N-m). See figure below.

Note  For a 19-inch rack installation, the rack has to have a flat post.
Installing the Cisco ASR 903 Router

Figure 12: Plenum Assembly to 21-inch Rack
Figure 13: Plenum Assembly to 23-inch Rack

1 Secure screws to rack
Installing the Chassis in the Air Plenum

Note

Ensure that the router is not installed in the air plenum while mounting it on the rack.

For instructions on mounting the air plenum on the rack, (see Table A-2).

Step 1
Position the chassis so that the rear of the chassis is at the front of the plenum. See the figure below.

Step 2
Slide the chassis into the plenum so that the front of the chassis is in flush with the mounting rails and brackets.

Figure 14: Cisco ASR 903 Chassis with Air Plenum

Attaching the Cable Management Brackets

The router supports the following brackets:

• A903-CABLE-GUIDE
• A903-CAB-BRACKET—This bracket helps in routing the cables from the interface modules; therefore enabling a proper cable bending radius.

Note

The mounting brackets and cable mounting brackets are assembled together. We recommend that the brackets are installed before the chassis is installed in the Air Plenum.

To install the optional cable management brackets, perform these steps:

Step 1
Position the cable management brackets against the front of the chassis and align the four screw holes, as shown in the figure below.
Step 2

Secure the cable management brackets with four M4 screws. The recommended maximum torque is 10 in.-lb (1.12 N-m).

---

**Installing the Chassis Ground Connection**

Before you connect the power or turn on the power to the Cisco ASR 903 Router, you must provide an adequate chassis ground (earth) connection to your router.

This section describes how to ground the Cisco ASR 903 Router chassis. The router provides two locations for attaching a 2-hole grounding lug according to the rack-mounting brackets you use to install the router. The Cisco ASR 903 Router supports the following rack-mounting types:

- EIA 19-inch rack—Attach the grounding lug to the rear of the router, as shown in the figure below.
**Figure 17: Attaching a Grounding Lug to the Rear of the Router**

1. Grounding lug (19-inch EIA rack)

   - 300 mm ETSI cabinet—Attach the grounding lug on the rack-mount bracket on the front of the router, as shown in the figure below.

**Figure 18: Attaching a Grounding Lug to the Rack-Mount Bracket**

1. Grounding lug (300 mm ETSI cabinet)

To ensure that the chassis ground connection that you provide is adequate, you need the following parts and tools:

- Ratcheting torque screwdriver with Phillips head that exerts up to 15 in.-lb (1.69 N-m) of pressure for attaching the ground wire to the router
- Crimping tool as specified by the ground lug manufacturer
- 18 AWG copper wire for the power cord
- 6 AWG or larger copper wire for the ground wire
- Wire-stripping tools appropriate to the wire you are using

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**Caution**

Before making connections to the Cisco ASR 903 Router, ensure that you disconnect the power at the circuit breaker. Otherwise, severe injury to you or damage to the router may occur.

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**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

Use copper conductors only. Statement 1025

Warning

When installing the unit, the ground connection must always be made first and disconnected last. Statement 42

This unit is to be installed in a restrictive access location and must be permanently grounded to minimum 6 AWG copper ground wire.

Perform the following procedure to ground the Cisco ASR 903 Router using a 2-hole lug and the corresponding mounting point. Most carriers require a minimum 6 AWG ground connection. Verify your carrier’s requirements for the ground connection.

Step 1
If your ground wire is insulated, use a wire-stripping tool to strip the ground wire to 0.5 inch ± 0.02 inch (12.7 mm ±0.5 mm) (as shown in the figure below).

*Figure 19: Stripping a Ground Wire*

Step 2
Slide the open end of your 2-hole ground lug over the exposed area of the ground wire.

Step 3
Using a crimping tool (as specified by the ground lug manufacturer), crimp the ground lug to the ground wire as shown in the figure below.

*Figure 20: Crimping a Ground Lug onto the Ground Wire*

Step 4
Use a Phillips head screwdriver to attach the 2-hole ground lug and wire assembly to the router with the 2 pan-head Phillips head screws. For a 19-inch EIA rack, attach the 2-hole ground lug to the rear of the router.

Step 5
Connect the other end of the ground wire to a suitable grounding point at your site.
Installing the Fan Tray

The fan tray is a modular unit that provides cooling to the Cisco ASR 903 Router. Follow these steps to install the fan tray in the chassis:

**Step 1**
Orient the fan tray so that the captive screws are on the left side of the fan tray’s front panel. The figure below shows how to orient the fan tray.

*Figure 21: Installing the Fan Tray*

**Step 2**
Guide the fan tray into the chassis until it is fully seated.

*Caution* The fans are exposed on the left side of the fan tray. Keep your fingers, clothing, and jewelry away from the fans. Always handle the fan tray by the handle.

*Note* When installing the cabling to the RSPs, we recommend that you leave a service loop of extra cabling sufficient to allow for fan tray removal.

**Step 3**
Secure the fan tray to the chassis using the attached captive installation screws. The recommended maximum torque is 5.5 in.-lb (.62 N-m).

This completes the procedure for installing or replacing the fan tray in a Cisco ASR 903 Router.

For information about connecting cables to the fan tray alarm port, see Connecting the Fan Tray Alarm Port. For a summary of the LEDs on the fan tray, see LED Summary. For more information about air flow guidelines, see Air Flow Guidelines.

Installing the Dust Filter

**Step 1**
Follow the steps for removing the fan tray (if installed) from the chassis. See Removing and Replacing the Fan Tray, on page 20.

**Step 2**
Remove the dummy cover from the fan tray. See the figure in section Fan Tray (A903-FAN-E).

**Step 3**
Slide the dust filter onto the fan tray. See the figure in section Fan Tray (A903-FAN-E).

**Step 4**
Insert the dummy cover on the fan tray to secure the filter within the chassis.
Removing the Dust Filter

Remove the dust filter for a replacement.

Note

- The dust filter is a single-use component.
- Use the dust filter (A903-FAN-F) within 6 months of buying as the shelf or storage life is less than 6 months. The ideal storage condition for a filter is a cool, dry, and dark environment. Surroundings that adversely affect the dust filter are high heat, humidity at high temperatures, and ultraviolet light.

Dust Filter Maintenance

A periodic health check of the filter, every three months based on the level of dust in the environment, helps in avoiding over clogging of the filters and provide a better life. This product’s filter is used as a single-use component. If the product is installed in a controlled environment, check and replace the filter every three months, otherwise replace the filter every month with PID (A903-FAN-F=) or equivalent.

Step 1
Remove the dummy cover from the fan tray.

Step 2
Remove the dust filter from the fan.

Note

- The filter can be accessed by pulling the pull tab by using fingers or pliers. See the figure in section Fan Tray (A903-FAN-E).

Step 3
Slide the replacement dust filter onto the fan tray

Step 4
Insert the dummy cover onto the fan tray to secure the filter within the chassis.

Removing and Replacing the Fan Tray

The fan tray supports online insertion and removal (OIR). There is no need to power down the Cisco ASR 903 Router to remove or replace the fan tray. However, there is a finite time to replace the fan tray. This time depends upon the specific RSP and fan tray combination and also the ambient temperature. The following table provides the time interval for replacing the fan tray. At higher ambient temperatures, the replacement time is lower.

Note

- If a fan tray is removed, and not replaced within the stipulated time the system will automatically power-off. The actual shutdown time depends on few parameters like the total traffic load, ambient temperature, type of fan tray that is used and the dust filter condition (if a filter is present). If the system is powered with PSUs other than 900W DC or 1200W AC and if the system is powered off, then the system should be completely powered off for 30 seconds with all the PSU in the system simultaneously, and then turned on for the system to power on.
Table 1: Fan Tray Replacement Time

<table>
<thead>
<tr>
<th>RSP Module</th>
<th>Fan Tray</th>
<th>Replacement Time at 25°C Ambient</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSP1, RSP2</td>
<td>A903-FAN, A903-FAN-E</td>
<td>5 minutes</td>
</tr>
<tr>
<td>RSP3-200</td>
<td>A903-FAN</td>
<td>2 minutes 15 seconds</td>
</tr>
<tr>
<td>RSP3-200</td>
<td>A903-FAN-E</td>
<td>2 minutes 15 seconds</td>
</tr>
<tr>
<td>RSP3-200</td>
<td>A903-FAN-H</td>
<td>3 minutes 30 seconds</td>
</tr>
<tr>
<td>RSP3-400</td>
<td>A903-FAN</td>
<td>1 minute</td>
</tr>
<tr>
<td>RSP3-400</td>
<td>A903-FAN-E</td>
<td>35 seconds</td>
</tr>
<tr>
<td>RSP3-400</td>
<td>A903-FAN-H</td>
<td>2 minutes</td>
</tr>
</tbody>
</table>

To avoid erroneous failure messages, allow at least 2 minutes for the system to reinitialize, after the fan tray has been removed or replaced. This is applicable when the RSP1 and RSP2 modules are installed in the chassis.

Caution

Follow these steps to remove and replace the fan tray on the Cisco ASR 903 Router:

**Step 1**
Using a No. 2 Phillips screwdriver or your fingers, loosen the captive installation screw that secures the fan tray to the chassis. The following figure shows the front of the fan tray, including the handle and the captive installation screws.

*Figure 22: Detaching the Fan Tray*

**Step 2**
Grasp the fan tray handle with one hand and the outside of the chassis with the other hand.

Caution

The fans are exposed on the left side of the fan tray. Keep your fingers, clothing, and jewelry away from the fans. Always handle the fan tray by the handle.

**Step 3**
Pull the fan tray backward toward you no more than 1 inch to disengage it from the power receptacle on the midplane, as shown in the following figure.
When removing the fan tray, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you remove the fan tray. **Statement 258**

**Step 4**

Wait at least 5 seconds to allow the fans to stop spinning. Then, pull the fan tray backward toward you and out of the chassis.

**Note**

As the fan tray slides out of the chassis, support the bottom of the fan tray with one hand and keep your other hand on the fan tray handle.

This completes the steps for removing the fan tray from the chassis.

To install the new fan tray, follow the steps in [Installing the Fan Tray](#).

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### RSP Installation

Follow these steps on handling an RSP module in the Cisco ASR 903 Router:

#### Installing an RSP Module

To install an RSP module in the router chassis, perform the following steps:

**Step 1**

Choose a slot for the module. Make sure that there is enough clearance to accommodate any equipment that will be connected to the ports on the module. If a blank module filler plate is installed in the slot in which you plan to install the module, remove the plate by removing its 2 Phillips pan-head screws.

**Step 2**

Fully open both the ejector levers on the new module, as shown in the figure below.

**Caution**

To prevent ESD damage, handle modules by carrier edges only.

**Step 3**

Position the module in the slot. Make sure that you align the sides of the module with the guides on each side of the slot, as shown in the figure below.
Step 4  Carefully slide the module into the slot until the EMI gasket on the module makes contact with the module in the adjacent slot and both the ejector levers have closed to approximately 45 degrees with respect to the module faceplate.

Caution  If the top slot already has an RSP module installed, and you install a second RSP module in the slot below it, be careful not to damage the EMI gasket of the bottom RSP module against the ejector levers of the top RSP during insertion.

Step 5  While pressing down, simultaneously close both the ejector levers to fully seat the module in the backplane connector. The ejector levers are fully closed when they are flush with the module faceplate.

Step 6  Tighten the two captive installation screws on the module. The recommended maximum torque is 5.5 in.-lb (.62 N-m).

Note  Make sure that the ejector levers are fully closed before tightening the captive installation screws.

Step 7  Verify that the captive installation screws are tightened on all of the modules installed in the chassis. This step ensures that the EMI gaskets on all the modules are fully compressed in order to maximize the opening space for the new or replacement module.

Note  If the captive installation screws are loose, the EMI gaskets on the installed modules will push adjacent modules toward the open slot, which reduces the size of the opening and makes it difficult to install the new module.

Note  Blank module filler plates (Cisco part number A900-RSPA-BLANK) should be installed in any empty chassis slots to keep dust out of the chassis and to maintain consistent airflow through the chassis.

Note  When installing the cabling to an RSP, we recommend that you leave a service loop of extra cabling sufficient to allow for fan tray removal.

Note  Close all unused RJ-45 and USB ports on the RSP module using the appropriate dust caps to prevent dust from accumulating inside the cage. For information on dust caps, see Installing Dust Caps.

Removing an RSP Module

Before you remove an RSP from the router, you should save the current configuration using the write {host file | network | terminal} command. This saves you time when bringing the module back online.

If the module is running Cisco IOS software, save the current running configuration by entering the copy running-config startup-config command.
Hot-Swapping an RSP Module

The Cisco ASR 903 Router provides a feature that allows you to remove and replace a redundant RSP module without powering down the router. This feature, called hot-swapping or OIR, allows you to remove and replace a redundant module without disrupting router operation.

When two redundant modules are installed in the router, only one of the modules is active. The other one runs in standby mode, ready to take over processing if the active module fails.

When you remove or insert a redundant module while the router is powered on and running, the router does the following:

1. Determines if there is sufficient power for the module.
2. Scans the backplane for configuration changes.
3. Initializes the newly inserted module. In addition, the system notes any removed modules and places those modules in the administratively shutdown state.

4. Places any previously configured interfaces on the module back to the state they were in when they were removed. Any newly inserted interfaces are put in the administratively shutdown state as if they were present (but unconfigured) at boot time. If you insert the same type of module into a slot, its ports are configured and brought online up to the port count of the original module.

The router runs diagnostic tests on any new interfaces and the test results indicate the following:

- If the tests pass, the router is operating normally.
- If the new module is faulty, the router resumes normal operation but leaves the new interfaces disabled.
- If the diagnostic tests fail, the router stops operating, which usually indicates that the new module has a problem in the bus and should be removed.

## Interface Module Installation

The following sections describe the various tasks of associated with interface module installation on the Cisco ASR 903 Router:

### Installing an Interface Module

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Before inserting an interface module, make sure that the chassis is grounded.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2</td>
<td>To insert the interface module, carefully align the edges of the interface module between the upper and lower edges of the router slot.</td>
</tr>
<tr>
<td>Step 3</td>
<td>Carefully slide the interface module into the router slot until the interface module makes contact with the backplane. The figure below shows how to install the interface module.</td>
</tr>
</tbody>
</table>

*Figure 25: Inserting an Interface Module*

<table>
<thead>
<tr>
<th>Step 4</th>
<th>Tighten the locking thumbscrews on both sides of the interface module. The recommended maximum torque is 5.5 in.-lb (.62 N-m).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 5</td>
<td>Connect all the cables to each interface module.</td>
</tr>
</tbody>
</table>

**Note** Close all unused SFP ports using SFP dust caps to prevent dust from accumulating inside the cage. The dust caps (Cisco part number A900-DCAP-SFP-S= (24 caps per package) or Cisco part number A900-DCAP-SFP-L= (240 caps per package)) can be ordered from Cisco.
Removing an Interface Module

**Step 1**
To remove an interface module, disconnect all the cables from each interface module.

**Step 2**
Loosen the locking thumbscrews on both sides of the interface module.

**Step 3**
Slide the interface module out of the router slot by pulling on the handles. If you are removing a blank filler plate, pull the blank filler plate completely out of the router slot using the captive screws.

Hot-Swapping an Interface Module

The Cisco ASR 903 Router provides a feature that allows you to remove and replace an interface module without powering down the router. This feature, called hot-swapping or OIR, allows you to remove and replace a redundant module without disrupting router operation.

Use the following guidelines when performing an OIR on an IM:

- Allow at least 2 minutes for the system to reinitialize before inserting a new IM.
- Avoid inserting a new IM during bootup until the active and standby RSPs have reached an OK state.
- When inserting multiple IMs into the chassis, wait until each IM reaches an OK state before inserting the next IM.

The following interface modules take around 60 to 70 seconds to reach OK state after a soft OIR is performed:

- Copper Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet Interface Module(1X10GE) (PN:A900-IMA8T1Z)
- SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE) (PN:A900-IMA8S1Z)
- 2-port 10 Gigabit Ethernet Interface Module(2X10GE) (PN:A900-IMA2Z). A900-IMA2Z IM supports SFP+ and XFP on ports 0 and 1. Either SFP+ or XFP can be connected on each port. If both are connected on the same port, the port will go down.

The A900-RSP1 RSP module does not support hot-swapping an interface module with another module of a different type. For example, you cannot swap an SFP Gigabit Ethernet module with a copper Gigabit Ethernet module without disrupting router operation.

- The router does not support swapping of the TDM interface modules to Gigabit Ethernet modules on the Cisco ASR 900 Series Router and vice-versa.
- If the TDM interface module is swapped with the Gigabit Ethernet module in the same slot or vice-versa, the router must be reloaded.
If you perform OIR on an interface module and move the module to a different slot, the router does not retain the module configuration; you must reconfigure the interface module.

Replacing a configured interface module with a different interface module in the same slot is not supported on the router.

When you remove or insert a redundant module while the router is powered on and running, the router does the following:

1. Determines if there is sufficient power for the module.
2. Scans the backplane for configuration changes.
3. Initializes the newly inserted module. In addition, the system notes any removed modules and places those modules in the administratively shutdown state.
4. Places any previously configured interfaces on the module back to the state they were in when they were removed.

The router runs diagnostic tests on any new interfaces and the test results indicate the following:

- If the tests pass, the router is operating normally.
- If the new module is faulty, the router resumes normal operation but leaves the new interfaces disabled.
- If the diagnostic tests fail, the router stops operating, which usually indicates that the new module has a problem in the bus and should be removed.

To avoid erroneous failure messages, note the current configuration of all interfaces before you remove or replace an interface module, and allow at least 2 minutes for the system to reinitialize after a module has been removed or replaced. This time is recommended in order to allow for synchronization between components within the interface module and for synchronization with the standby RSP.

**Swapping of Interface Modules**

The Ethernet interface modules support swapping on the Cisco A900-RSP2A module.

- 8-port Gigabit Ethernet SFP Interface Module (8X1GE)
- 8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8X1GE)
- 1-port 10 Gigabit Ethernet XFP Interface Module (1X10GE)
- SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)
- Copper Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet Interface Module(1X10GE)
- 2-port 10 Gigabit Ethernet Interface Module(2X10GE)

Use the `hw-module subslot default` command before performing a swap of the modules. To default the interfaces on the interface module.

**Caution**

Swapping of Interface Modules

The `hw-module subslot default` command is **not** supported on the TDM and OC-3 interface modules.
Always refer to Interface Module compatibility matrix tables in the Data Sheet before you swap any IM.

Table 2: Supported Hot Swapping Combinations

<table>
<thead>
<tr>
<th>Interface Module</th>
<th>A900-RSP1</th>
<th>A900-RSP2A-64 and A900-RSP2A-128</th>
<th>A900-RSP3C-400-S</th>
</tr>
</thead>
</table>
### Swapping of Interface Modules

<table>
<thead>
<tr>
<th>Interface Module</th>
<th>A900-RSP1</th>
<th>A900-RSP2A-64 and A900-RSP2A-128</th>
<th>A900-RSP3C-400-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-port Gigabit Ethernet SFP Interface Module (8X1GE)</td>
<td>1-port 10 Gigabit Ethernet XFP Interface Module (1X10GE)</td>
<td>Swapping allowed on all Ethernet Interface Modules</td>
<td>Swapping allowed on all Ethernet Interface Modules</td>
</tr>
<tr>
<td>8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8X1GE)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SFP Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet (1X10GE)</td>
<td></td>
<td>No support</td>
<td></td>
</tr>
<tr>
<td>Copper Combo IM—8-port Gigabit Ethernet (8X1GE) + 1-port 10 Gigabit Ethernet Interface Module (1X10GE)</td>
<td></td>
<td>No support</td>
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<tr>
<td>1-port 10 Gigabit Ethernet XFP Interface Module (1X10GE)</td>
<td>8-port Gigabit Ethernet SFP Interface Module (8X1GE)</td>
<td></td>
<td></td>
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<tr>
<td>8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8X1GE)</td>
<td>8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8X1GE)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-port 10 Gigabit Ethernet Interface Module (2X10GE)</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>8-port 10 Gigabit Ethernet Interface Module (8X10GE)</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>1-port 100 Gigabit Ethernet Interface Module (1X100GE)</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>2-port 100 Gigabit Ethernet (QSFP) Interface Module (2X100GE)</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>2-port 40 Gigabit Ethernet QSFP Interface Module (2X40GE)</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>48-port T1/E1 Interface Module</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>48-port T3/E3 Interface Module</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>1-port OC-192 Interface Module + 8-port Low Rate Interface Module</td>
<td></td>
<td>No support</td>
<td>No support</td>
</tr>
<tr>
<td>16 x T1/E1 Interface Module</td>
<td>16 T1/E1</td>
<td>16 T1/E1</td>
<td>No support</td>
</tr>
<tr>
<td>32 x T1/E1 Interface Module</td>
<td>No support</td>
<td>32 T1/E1</td>
<td></td>
</tr>
<tr>
<td>8 X T1/E1 Interface Module</td>
<td>No support</td>
<td>8 T1/E1</td>
<td></td>
</tr>
<tr>
<td>Interface Module</td>
<td>A900-RSP1</td>
<td>A900-RSP2A-64 and A900-RSP2A-128</td>
<td>A900-RSP3C-400-S</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module</td>
<td>No support</td>
<td>No support</td>
<td>Swapping allowed on all Ethernet Interface Modules</td>
</tr>
<tr>
<td>1-port OC48 / STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-port T1/E1 + 4-Port T3/E3 CEM Interface Module</td>
<td>No support</td>
<td>Swapping allowed on all Ethernet Interface Modules</td>
<td></td>
</tr>
</tbody>
</table>

1. Only QSFP28 (Port0) is enabled and other ports remain disabled.
2. Any of the 4 ports can be used as an OC48, but if a port is configured as OC48, then the remaining 3 ports are disabled.
3. Supported only on ASR900-RSP2A-128 with FAN-H and not FAN-E.

Failure in executing the command may cause the interface to enter the Out of Service state. To recover from out of service state, perform the following:

- Insert the original IM and execute the `hw-module subslot 0/bay default` command. Swap the module.
  - For more information, see Cisco IOS Interface and Hardware Component Command Reference.
- If the module does not come up, perform a reload of the router.

## Installing the Power Supply

The Cisco ASR 903 Router provides the choice of following power supplies:

The DC power supply provides option to connect with two different sources (dual feed); positive (+) and negative (-) are marked on the PSU terminals.

The DC power supply uses 3 position terminal block-style connector with positive latching/securing and labeled connections for +24/48V, GRD, -24/48V. The terminal block connector is of suitable size to carry the appropriate AWG wire size to handle the input current of the power supply. No ON/OFF switch is provided.

- **DC power supply**
  - 900 W power: –40VDC to –72VDC
  - 550 W power: 19.2VDC to -72VDC
  - 1200 W power: 19.2VDC to -72VDC

The AC power supply has an IEC 320-type power receptacle and a 15 Amp service connector. You can use standard right angle power cords with the AC power supply. The power supply includes a power cord retainer. No ON/OFF switch is provided.

Each power supply provides a dual primary input power connection.

- **AC power supply**
  - 550 W power: 85VAC to -264VAC
• 1200 W power: 85VAC to -264VAC

Caution
The power supply must be wired before plugging the power supply in the chassis. Ensure the branch circuit breaker is turned off. Only after installing the power supply in the chassis, should the branch circuit breaker be turned on. The branch circuit breaker must be turned off before unplugging the power supply. Read the installation instructions before connecting the system to the power source. Statement 10

Caution
Do not use interface module and power supply ejector handles to lift the chassis; using the handles to lift the chassis can deform or damage the handles.

Preventing Power Loss

Use the following guidelines to prevent power loss to the router.

• To prevent loss of input power, ensure that the total maximum load on each circuit supplying the power supplies is within the current ratings of the wiring and breakers.

• In some systems, you can use an UPS to protect against power failures at your site. Avoid UPS types that use ferroresonant technology. These UPS types can become unstable with systems like the Cisco ASR 903 Router, which can have substantial current draw fluctuations due to bursty data traffic patterns.

Use the information in the DC Power Specifications to estimate the power requirements and heat dissipation of a Cisco ASR 903 Router based on a given configuration of the router. Determining power requirements is useful for planning the power distribution system needed to support the router.

Power Connection Guidelines

This section provides guidelines for connecting the Cisco ASR 903 Router power supplies to the site power source.

Warning
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 213

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

Warning
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
Guidelines for DC-Powered Systems

Basic guidelines for DC-powered systems include the following:

- Each chassis power supply should have its own dedicated input power source. The source must comply with the safety extra-low voltage (SELV) requirements in the UL 60950, CSA 60950, EN 60950, and IEC 60950 standards.
- The circuit must be protected by a dedicated two-pole circuit breaker. The circuit breaker should be sized according to the power supply input rating and local or national code requirements.
- The circuit breaker is considered the disconnect device and should be easily accessible.
- The system ground is the power supply and chassis ground.
- Do not connect the DC return wire to the system frame or to the system grounding equipment.
- Use the grounding lug to attach a wrist strap for ESD protection during servicing.

Guidelines for AC-Powered Systems

Basic guidelines for AC-powered systems include the following:

- Each chassis power supply should have its own dedicated branch circuit.
- The circuit breaker should be sized according to the power supply input rating and local or national code requirements.
- The AC power receptacles used to plug in the chassis must be the grounding type. The grounding conductors that connect to the receptacles should connect to protective earth ground at the service equipment.

Installing the DC Power Supply

This equipment is suitable for installation in Network Telecommunications Facilities and locations where the NEC applies.

This equipment is suitable for installations utilizing the Common Bonding Network (CBN).

The grounding architecture of this product is DC-Isolated (DC-I) for DC-powered products. DC-powered products have a nominal operating DC voltage of 48 VDC.

Installing the DC Power Supply Module

Perform the following procedure to install the power supply module:

Step 1  Ensure that the system (earth) ground connection has been made. For ground connection installation instructions, see Installing the Chassis Ground Connection.
Step 2 If necessary, remove the blank power supply filler plate from the chassis power supply bay opening by loosening the captive installation screws.

Step 3 Verify that power to the DC circuit connected to the power supply you are installing is off. To ensure that power has been removed from the DC circuits, locate the circuit breakers for the DC circuits, switch the circuit breakers to the OFF position, and tape the circuit-breaker switches in the OFF position.

Step 4 Grasp the power supply handle with one hand. Place your other hand underneath the power supply, as shown in the figure below. Slide the power supply into the power supply bay. Make sure that the power supply is fully seated in the bay.

![Figure 26: Installing the DC Power Supply](image)

Step 5 Tighten the captive installation screws of the power supply. The recommended maximum torque is 25 in.-lb (2.82 N-m). If you are installing a redundant DC power supply, repeat these steps for the second power source.

---

**Connecting DC Power Supply Unit (A900-PWR900-D2)**

The DC power supply accepts a dual-hole type lug. The lug must be a UL Listed, CSA certified and rated to accept the 8 AWG cable. The lug is assembled on the unit with two nuts.

**Warning** Before performing any of the following procedures, ensure that power is removed from the DC circuit.

**Installing DC Power Supply Unit (A900-PWR550-D)**

Perform the following procedure to install the terminal block.

Step 1 Locate the terminal block plug.

Step 2 Use a wire-stripping tool to strip the ends of each of the two wires coming from the DC-input power source to 0.27 inch (6.6 mm) ± 0.02 inch (0.5 mm) and the wire for grounding. Do not strip more than 0.29 inch (7.4 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave behind exposed wire from the terminal block plug after installation.

Step 3 Identify the ground, positive, and negative feed positions for the terminal block connection. The recommended wiring sequence is (see the figure below):

a) Ground lead wire (left)

b) Negative (-) lead wire (middle)
c) Positive (+) lead wire (right)

Figure 27: DC Power Supply with Lead Wires

| 1 | Ground lead wire |
| 2 | Negative (–) lead wire |
| 3 | Positive (+) lead wire |

Step 4
Insert the exposed wire of one of the three DC-input power source wires into the terminal block plug. Make sure that you cannot see any wire lead. Only wire with insulation should extend from the terminal block.

Caution
Do not overtorque the plug captive screws of the terminal block. The recommended maximum torque is from 4.425 in.-lb (.5 N-m) to 5.310 in-lb (.6 N-m).

Step 5
Use a ratcheting torque screwdriver to torque the terminal block plug captive screw (above the installed wire lead) from 4.425 in.-lb (.5 N-m) to 5.310 in-lb (.6 N-m) as shown in the figure below.

Figure 28: Torquing the DC Power Supply Terminal Block Plug Screws

1 Torque is from 4.425 in.-lb (.5 N-m) to 5.310 in-lb (.6 N-m).

Step 6
Repeat Step 4 through Step 5 for the remaining DC input power source wire and the ground wire. The figure below shows the wiring completed for a terminal block plug.
Secure the wires coming in from the terminal block plug so that they cannot be disturbed by casual contact.

**Step 7**
Ensure that the terminal block plug is fully seated in the terminal block header on the DC power supply panel. The plug has a locking feature. You should hear a snap or click when it is installed properly.

**Step 8**
Use a tie wrap to secure the wires to the rack, so that the wires are not pulled from the terminal block plug by casual contact. Make sure the tie wrap allows for some slack in the ground wire, as shown in the figure below.

**Figure 30: Complete DC Terminal Block Plug Insertion and Secure Tie Wrap**

**Step 9**
Use a tie wrap to secure the wires to the handle. Leave a service loop on the ground wire between the handle and the connector such that it is the last to receive strain if the wires are pulled.

This completes the procedure for connecting the DC power supply in the Cisco ASR 903 Router.

If you are installing a redundant DC power supply, repeat these steps for the second power source.
Installing DC Power Supply Unit (A900-PWR550-D-E and A900-PWR1200-D)

The following tools are required:

- Cables of suitable gauge required for each type of PSU
  - 10 AWG to 16 AWG for 550 W PSU
  - 8 AWG to 10 AWG for 1200 W PSU

- Lugs fork-type or ring-type (Burndy, see Table A-2)—TP10-6 or TP10-8F (recommended)

---

**Note**

Fork type lug can be used with A900-PWR550-D-E and A900-PWR1200-D PSUs.

---

**Step 1**

Follow the steps to remove the power supply unit if installed in the chassis. See Removing and Replacing the DC Power Supply.

**Step 2**

Locate the T-shaped terminal block plug on the DC power supply unit. See the figure below.
Step 3  Use a wire-stripping tool to strip the ends of each of the two wires coming from the DC-input power source to 0.27 inch (6.6 mm) ± 0.02 inch (0.5 mm) and the wire for grounding. Do not strip more than 0.29 inch (7.4 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave behind exposed wire from the terminal block after installation.

Step 4  Prepare the cables by attaching the lugs to the cables.

Step 5  Identify the ground, positive, and negative feed positions for the terminal block connection (see the figure below). The recommended wiring sequence is:

  - Negative (-) lead wire (top)
  - Ground lead wire (left)
  - Positive (+) lead wire (right)
**Step 6**  
Insert the lugged end of the cables to the connector and secure the cables using the captive screws.  

**Note**  
The recommended torque for securing the captive screws is 0.7 N-m.

**Step 7**  
Ensure that the terminal block plug is fully seated in the terminal block header (see the figure below) on the DC power supply panel. See Installing the DC Power Supply for installing the power supply unit into the chassis.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DC power supply ground lead wire</td>
<td>3</td>
<td>DC power supply positive (+) lead wire</td>
</tr>
<tr>
<td>2</td>
<td>DC power supply negative (-) lead wire</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Tools and Equipment

- Dual-hole lugs
- Double barrel with inspection hole
- Hole spacing is 5/8 in.
- Lug tab width max 0.46 in.
- Nuts
- PSU can accommodate 10 – 6 AWG
- Number 2 Phillips Screwdriver
- 7 mm nut driver or 7 mm socket on a torque wrench

Step 1  Locate the terminal block on the power supply unit.
Step 2  Flap open the front protective cover on the power supply unit.
Step 3  Use a wire-stripping tool to strip the ends of each of the two wires coming from the DC-input power source as recommended by the lug manufacturer.
**Note**  Stripping more than the recommended amount of wire can leave behind exposed wire from the terminal block after installation.

**Step 4**  Identify the positive and negative feed positions for the terminal block. The recommended wiring sequence is as in the figure below.

**Step 5**  Attach the lugs on the terminal block, see the figure below.

*Figure 34: Power Supply with Lead Wires*

<table>
<thead>
<tr>
<th></th>
<th>1, 3 Negative (-) lead wire</th>
<th>2, 4 Positive (+) lead wire</th>
</tr>
</thead>
</table>

**Caution**  Do not overtorque the fasteners of the terminal block. The recommended maximum torque is from 25 in.-lb (2.82 N-m).

**Step 6**  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. Make sure the tie wrap allows for some slack in the wire.

---

**Activating the DC Power Supply**

Perform the following procedure to activate the DC power supply:
Step 1 Remove the tape from the circuit-breaker switch handle, and restore power by moving the circuit-breaker switch handle to the On (|) position.

Step 2 Verify power supply operation by checking if the power supply front panel LEDs are in the following states:
- INPUT OK LED is green
- OUTPUT FAIL LED is red

If the LEDs indicate a power problem, see Troubleshooting.

If you are installing a redundant DC power supply, ensure that each power supply is connected to a separate power source in order to prevent power loss in the event of a power failure.

If you are installing a redundant DC power supply, repeat these steps for the second power source.

Removing and Replacing the DC Power Supply

This section provides information about removing and replacing the DC power supply in the Cisco ASR 903 Router.

**Note**
The Cisco ASR 903 Router power supplies are hot-swappable. If you have installed redundant power supply modules, you can replace a single power supply without interrupting power to the router.

**Caution**
To avoid erroneous failure messages, allow at least 2 minutes for the system to reinitialize after a power supply has been removed or replaced.

Follow these steps to remove and replace the DC power supply on the Cisco ASR 903 Router:

**Step 1** Verify the circuit breaker connected to the power supply that has to be replaced.

**Step 2** Before servicing the power supply, switch off the circuit breaker in your equipment area. As an additional precaution, tape the circuit-breaker switch in the Off position.

**Step 3** Slip on the ESD-preventive wrist strap that was included in the accessory kit.

**Note** The power supplies are not fed by both power units. Shutting off the incorrect power supply may cause a traffic outage.

**Step 4** Measure the DC voltage on the failed power supply input, thus ensuring that the correct unit has been powered off.

**Step 5** Loosen the captive screws on the DC power supply.

**Step 6** Grasping the power supply handle with one hand, pull the power supply out from the chassis while supporting it with the other hand.

**Step 7** Remove the lugs from the PSU.

**Step 8** Replace the new DC PSU and connect the DC leads to the power supply as before

**Step 9** Turn on the circuit breaker or the reinstall the fuse.
Step 10 Verify the power supply by checking if the front panel LEDs are as below:

- Input OK LED is green
- Output FAIL LED is green

**Note** Replace the DC power supply within 5 minutes. If the power supply bay is to remain empty, install a blank filler plate (Cisco part number A900-PWR-BLANK) over the opening, and secure it with the captive installation screws.

---

### Installing the AC power Supply

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

### Installing the AC Power Supply Module for A900-PWR550-A (550 W) and A900-PWR1200-A (1200 W)

Follow these steps to install the power supply module:

#### Step 1
Ensure that the system (earth) ground connection has been made. For ground connection installation instructions, see the [Installing the Chassis Ground Connection](#).

#### Step 2
If necessary, remove the blank power supply filler plate from the chassis power supply bay opening by loosening the captive installation screws.

#### Step 3
Grasp the power supply handle with one hand. Place your other hand underneath the power supply, as shown in the figure below. Slide the power supply into the power supply bay. Make sure that the power supply is fully seated in the bay.

*Figure 35: Installing the A900-PWR550-A AC Power Supply*
Step 4  Tighten the captive installation screws of the power supply. The recommended maximum torque is 25 in.-lb (2.82 N-m).

Warning  Power supply captive installation screws must be tight to ensure protective grounding continuity.

---

**Recommended Power Cables**

We recommend the following power cables for Cisco ASR 903 routers:

*Table 3: Power Cable PIDs for A900-PWR550-A (550 W)*

<table>
<thead>
<tr>
<th>PID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAB-AC</td>
<td>AC POWER CORD, UNITED STATES, 125V, 10A, 2.5m, C13, NEMA, 5-15P</td>
</tr>
<tr>
<td>CAB-AC-RA</td>
<td>AC POWER CORD, UNITED STATES, 125V, 10A, 2.5m, RA-C13, NEMA, 5-15P</td>
</tr>
</tbody>
</table>
### Table 4: Power Cable PIDs for A900-PWR1200-A (1200 W)

<table>
<thead>
<tr>
<th>PID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAB-ACA</td>
<td>AC Power Cord (Australia), C13, AS 3112, 2.5m</td>
</tr>
<tr>
<td>CAB-ACA-RA</td>
<td>AC Power Cord, Australian, 10A, Right Angle</td>
</tr>
<tr>
<td>CAB-ACC</td>
<td>AC Power Cord (China), C13, GB15934, CCC, 2.5m</td>
</tr>
<tr>
<td>CAB-ACC-RA</td>
<td>AC Power Cord China, Right Angle</td>
</tr>
<tr>
<td>CAB-ACE</td>
<td>AC Power Cord (Europe), C13, CEE 7, 1.5M</td>
</tr>
<tr>
<td>CAB-ACE-RA</td>
<td>AC Power Cord Europe, Right Angle</td>
</tr>
<tr>
<td>CAB-ACI</td>
<td>AC Power Cord (Italy), C13, CEI 23-16, 2.5m</td>
</tr>
<tr>
<td>CAB-ACI-RA</td>
<td>AC Power Cord, Italian, Right Angle</td>
</tr>
<tr>
<td>CAB-ACR</td>
<td>AC Power Cord (Argentina), C13, EL 219 (IRAM 2073), 2.5m</td>
</tr>
<tr>
<td>CAB-ACR-RA</td>
<td>AC POWER CORD ARGENTINA, Right Angle</td>
</tr>
<tr>
<td>CAB-ACS</td>
<td>AC Power Cord (Switzerland), C13, IEC 60884-1, 2.5m</td>
</tr>
<tr>
<td>CAB-ACS-RA</td>
<td>AC Power Cord, Switzerland, Right Angle</td>
</tr>
<tr>
<td>CAB-ACU</td>
<td>AC Power Cord (UK), C13, BS 1363, 2.5m</td>
</tr>
<tr>
<td>CAB-ACU-RA</td>
<td>AC Power Cord UK, Right Angle</td>
</tr>
<tr>
<td>CAB-IND</td>
<td>AC Power Cord (India), C13</td>
</tr>
<tr>
<td>CAB-IND-RA</td>
<td>AC Power Cord (India), RA-C13</td>
</tr>
<tr>
<td>CAB-JPN</td>
<td>AC Power Cord (Japan), C13, JIS C 8303, 2.5m</td>
</tr>
<tr>
<td>CAB-JPN-RA</td>
<td>AC Power Cord (Japan), RA-C13, JIS C 8303, 2.5m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR-CAB-AC-USA520</td>
<td>US AC Power Cord for Cisco ASR 900, NEMA 5-20</td>
</tr>
<tr>
<td>PWR-CAB-AC-USA</td>
<td>Power Cord for AC V2 Power Module (USA), NEMA L6-20P</td>
</tr>
<tr>
<td>PWR-CAB-AC-AUS</td>
<td>Power Cord for AC V2 Power Module (Australia), AS 3112</td>
</tr>
<tr>
<td>PWR-CAB-AC-EU</td>
<td>Power Cord for AC V2 Power Module (Europe), CEE 7/7</td>
</tr>
<tr>
<td>PWR-CAB-AC-ITA</td>
<td>Power Cord for AC V2 Power Module (Italy), CEI-23-50</td>
</tr>
<tr>
<td>PWR-CAB-AC-SA</td>
<td>Power Cord for AC V2 Power Module (South Africa), SABS 164</td>
</tr>
<tr>
<td>PWR-CAB-AC-UK</td>
<td>Power Cord for AC V2 Power Module (UK), EN 60309-2</td>
</tr>
</tbody>
</table>
### Activating the AC Power Supply

Follow these steps to activate the AC power supply:

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plug the power cord into the power supply.</td>
</tr>
<tr>
<td>2</td>
<td>Connect the other end of the power cord to an AC-input power source.</td>
</tr>
</tbody>
</table>
| 3     | Verify power supply operation by checking that the power supply LEDs are in the following states:  
  - INPUT OK LED is green  
  - OUTPUT FAIL LED is red |
| 4     | If the LEDs indicate a power problem, see Troubleshooting for troubleshooting information. |
| 5     | If you are installing a redundant power supply, repeat these steps for the second power source. |

**Note**  
If you are installing a redundant AC power supply, ensure that each power supply is connected to a separate power source in order to prevent power loss in the event of a power failure.

### Removing and Replacing the AC Power Supply

This section describes how to remove and replace the AC power supply.

**Note**  
The Cisco ASR 903 Router power supplies are hot-swappable. If you have installed redundant power supply modules, you can replace a single power supply without interrupting power to the router.

**Caution**  
To avoid erroneous failure messages, allow at least 2 minutes for the system to reinitialize after a power supply has been removed or replaced.
Installing the Cisco ASR 903 Router

Installing Dust Caps

The following list provides the product IDs (PIDs) for the dust caps that are available for each port type:

- RJ-45—A900-DCAP-RJ45-S= (24 dust caps per package) or A900-DCAP-RJ45-L= (240 caps per package)
- SFP—A900-DCAP-SFP-S= (24 caps per package) or A900-DCAP-SFP-L= (240 caps per package)
- USB—A900-DCAP-USB-S= (12 dust caps per package) or A900-DCAP-USB-L= (120 dust caps per package)
- XFP/QSFP—A900-DCAP-XFP-S= (12 dust caps per package) or A900-DCAP-XFP-L= (120 dust caps per package)
Connecting the Cisco ASR 903 Router to the Network

When installing the cabling to the RSPs, we recommend that you leave a service loop of extra cabling sufficient to allow for fan tray removal.

Connecting Console Cables

You cannot use the USB and RS232 console ports at the same time; if you insert the USB cable into the router, the RS232 port is disabled.

Connecting to the Serial Port using Microsoft Windows

This procedure shows how to connect to the serial port using Microsoft Windows.

Note
Install the USB device driver before establishing a physical connection between the router and the PC, by using the USB Console cable plugged into the USB serial port. Otherwise, the connection will fail. For more information, see the Installing the Cisco Microsoft Windows USB Device Driver section in the Cisco ASR 903 and ASR 903U Aggregation Services Router Hardware Installation Guide.

To install the dust cap:

1. Hold the dust cap by its handle.
2. Insert the dust cap in to the appropriate unused ports (RJ-45, SFP, USB, or XFP/QSFP) on the chassis front panel.

Figure 37: Dust Cap

![Dust Cap Diagram]
Step 1  Connect the end of the console cable with the RJ45 connector to the light blue console port on the router, or Connect a USB Type A-to-Type A cable to the USB console port as shown in the figure below. If you are using the USB serial port for the first time on a Windows-based PC, install the USB driver now according to the instructions in the following sections.

Note   You cannot use the USB port and the EIA port concurrently. See the Connecting to the Auxiliary Port section in the Cisco ASR 903 and ASR 903U Aggregation Services Router Hardware Installation Guide. When the USB port is used it takes priority over the RJ45 EIA port.

Note   The USB Type A-to-Type A cable is not included with the Cisco ASR 903 Router; it is ordered separately.

Step 2  Connect the end of the cable with the DB-9 connector (or USB Type-A) to the terminal or PC. If your terminal or PC has a console port that does not accommodate a DB-9 connector, you must provide an appropriate adapter for that port.

Step 3  To communicate with the router, start a terminal emulator application, such as Microsoft Windows HyperTerminal. This software should be configured with the following parameters:

- 9600 baud
- 8 data bits
- no parity
- 1 stop-bit
- no flow control
Connecting to the Console Port using Mac OS X

This procedure describes how to connect a Mac OS X system USB port to the console using the built in OS X Terminal utility.

**Step 1**
Use the Finder to go to Applications > Utilities > Terminal.

**Step 2**
Connect the OS X USB port to the router.

**Step 3**
Enter the following commands to find the OS X USB port number:

```
macbook:user$ cd /dev
```
Connecting to the Console Port using Linux

This procedure shows how to connect a Linux system USB port to the console using the built in Linux Terminal utility.

Step 1  Open the Linux Terminal window.
Step 2  Connect the Linux USB port to the router.
Step 3  Enter the following commands to find the Linux USB port number
Example:

root@usb-suse# cd /dev
root@usb-suse /dev# ls -ltr *ACM*
crw-r--r-- 1 root  root  188, 0 Jan 14 18:02 ttyACM0
root@usb-suse /dev#

Step 4  Connect to the USB port with the following command followed by the router USB port speed
Example:

root@usb-suse /dev# screen /dev/ttyACM0 9600

To disconnect the Linux USB console from the Terminal window
Enter Ctrl-a followed by Ctrl-\.

Installing the Cisco Microsoft Windows USB Device Driver

A USB device driver must be installed the first time a Microsoft Windows-based PC is connected to the USB serial port on the router.

Installing the Cisco Microsoft Windows XP USB Driver

This procedure shows how to install the Microsoft Windows XP USB driver. Download the driver for your router model from the Tools and Resources Download Software site, USB Console Software category, at the following URL:

Step 1: Unzip the file Cisco_usbconsole_driver_X_0.zip (where X is a revision number).

Step 2: If using 32-bit Windows XP double-click the file setup.exe from the Windows_32 folder, or if using 64-bit Windows XP double-click the file setup(x64).exe from the Windows_64 folder.

Step 3: The Cisco Virtual Com InstallShield Wizard begins. Click Next.

Step 4: The Ready to Install the Program window appears, Click Install.

Step 5: The InstallShield Wizard Completed window appears. Click Finish.

Step 6: Connect the USB cable to the PC and router USB console ports. The EN LED for the USB console port turns green, and within a few moments the Found New Hardware Wizard appears. Following the instructions to complete the installation of the driver.

Step 7: The USB console is ready for use.

Installing the Cisco Microsoft Windows 2000 USB Driver

This procedure shows how to install the Microsoft Windows 2000 USB driver.

Step 1: Obtain the file Cisco_usbconsole_driver.zip from the Cisco.com web site and unzip it.

Step 2: Double-click the file setup.exe.

Step 3: The Cisco Virtual Com InstallShield Wizard begins. Click Next.

Step 4: The Ready to Install the Program window appears, Click Install.

Step 5: The InstallShield Wizard Completed window appears. Click Finish.

Step 6: Connect the USB cable to the PC and router USB console ports. The EN LED for the USB console port turns green, and within a few moments a series of Found New Hardware Wizard windows appear. Following the instructions to complete the installation of the driver.

Step 7: The USB console is ready for use.

Installing the Cisco Microsoft Windows Vista USB Driver

This procedure shows how to install the Microsoft Windows Vista USB driver.

Step 1: Obtain the file Cisco_usbconsole_driver.zip from the Cisco.com web site and unzip it.

Step 2: If using 32-bit Windows Vista double-click the file setup.exe from the Windows_32 folder, or if using 64-bit Windows Vista double-click the file setup(x64).exe from the Windows_64 folder.

Step 3: The Cisco Virtual Com InstallShield Wizard begins. Click Next.

Step 4: The Ready to Install the Program window appears, Click Install.

   Note: If a User Account Control warning appears, click “Allow - I trust this program...” to proceed.

Step 5: The InstallShield Wizard Completed window appears. Click Finish.

Step 6: Connect the USB cable to the PC and router USB console ports. The EN LED for the USB console port turns green, and within a few moments a pop up window stating “Installing device driver software” appears. Following the instructions to complete the installation of the driver.
Uninstalling the Cisco Microsoft Windows USB Driver

Uninstalling the Cisco Microsoft Windows XP and 2000 USB Driver Using the Add Remove Programs Utility

**Note** Disconnect the chassis console terminal before uninstalling the driver.

**Step 1** Click Start > Control Panel > Add or Remove Programs.
**Step 2** Scroll to Cisco Virtual Com and click Remove.
**Step 3** When the Program Maintenance window appears, select the Remove radio button. Click Next.

Uninstalling the Cisco Microsoft Windows XP and 2000 USB Driver Using the Setup.exe Program

**Note** Disconnect the chassis console terminal before uninstalling the driver.

**Step 1** Run the setup.exe for Windows 32-bit or setup(x64).exe for Windows-64bit. Click Next.
**Step 2** The InstallShield Wizard for Cisco Virtual Com appears. Click Next.
**Step 3** When the Program Maintenance window appears, select the Remove radio button. Click Next.
**Step 4** When the Remove the Program window appears, click Remove.
**Step 5** When the InstallShield Wizard Completed window appears click Finish.

Uninstalling the Cisco Microsoft Windows Vista USB Driver

This procedure shows you how to uninstall the Microsoft Windows Vista USB driver.

**Note** Disconnect the router console terminal before uninstalling the driver.

**Step 1** Run the setup.exe for Windows 32-bit or setup(x64).exe for Windows-64bit. Click Next.
**Step 2** The InstallShield Wizard for Cisco Virtual Com appears. Click Next.
**Step 3** When the Program Maintenance window appears, select the Remove radio button. Click Next.
**Step 4** When the Remove the Program window appears, click Remove.
**Note** If a User Account Control warning appears, click “Allow - I trust this program...” to proceed.
Step 5  When the InstallShield Wizard Completed window appears click Finish.

Connecting to the Auxiliary Port

When a modem is connected to the auxiliary port, a remote user can dial in to the router and configure it. Use a light blue console cable and the DB-9-to-DB-25 connector adapter.

---

**Note**

The console cable and DB-9-to-DB-25 connector are not included with the Cisco ASR 903 Router; they are ordered separately.

To connect a modem to the router, follow these steps:

---

**Step 1**  Connect the RJ45 end of the adapter cable to the black AUX port on the router, as shown in the figure below.

*Figure 39: Connecting a Modem to the Cisco ASR 903 Router*

---

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RJ45 AUX port</td>
</tr>
<tr>
<td>2</td>
<td>DB-9 to DB-25 adapter</td>
</tr>
<tr>
<td>3</td>
<td>RJ45 to DB-9</td>
</tr>
<tr>
<td>4</td>
<td>Modem</td>
</tr>
</tbody>
</table>
Step 2  Connect the DB-9 end of the console cable to the DB-9 end of the modem adapter.

Step 3  Connect the DB-25 end of the modem adapter to the modem.

Step 4  Make sure that your modem and the router auxiliary port are configured for the same transmission speed (up to 115200 bps is supported) and for mode control with data carrier detect (DCD) and data terminal ready (DTR) operations.

Connecting a Management Ethernet Cable

When using the Ethernet Management port in the default mode (speed-auto and duplex-auto) the port operates in auto-MDI/MDI-X mode. The port automatically provides the correct signal connectivity through the Auto-MDI/MDI-X feature. The port automatically senses a crossover or straight-through cable and adapts to it.

However, when the Ethernet Management port is configured to a fixed speed (10 or 100 Mbps) through command-line interface (CLI) commands, the port is forced to MDI mode.

When in a fixed-speed configuration and MDI mode:

• Use a crossover cable to connect to an MDI port

• Use a straight-through cable to connect to an MDI-X port

⚠️ Warning

To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the Management Ethernet ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) 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 as intra-building interfaces only (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 in order to connect these interfaces metallically to OSP wiring.

Installing and Removing SFP and XFP Modules

The Cisco ASR 903 Router supports a variety of SFP and XFP modules, including optical and Ethernet modules. For information on how to install and remove SFP and XFP modules, see the documentation for the SFP or XFP module at:


For information about inspecting and cleaning fiber-optic connections, see http://www.cisco.com/en/US/partner/tech/tk482/tk876/technologies_white_paper09186a0080254eba.shtml

⚠️ Caution

We recommend that you wait 30 seconds between removal and insertion of an SFP on an interface module. This time is recommended to allow the transceiver software to initialize and synchronize with the standby RSP. Changing an SFP more quickly could result in transceiver initialization issues that disable the SFP.
Connecting a USB Flash Device

To connect a USB flash device to the Cisco ASR 903 Router, insert the memory stick in the USB port labeled MEM. The Flash memory module can be inserted in only one way, and can be inserted or removed regardless of whether the router is powered up or not.

The figure below shows the USB port connector on the Cisco ASR 903 Router.

Figure 40: Cisco ASR 903 Router Flash Token Memory Stick

Removing a USB Flash Device

To remove and then replace a USB flash token memory stick from a Cisco ASR 903 Router, follow these steps:

**Step 1** Execute the `eject usb0:` command before removing the USB from the router.

**Example:**

```
rrommon 2 > eject usb0
rrommon 2 >
```

If you do not run this command before removing the USB, the following error message is displayed:

```
rrommon 2 > dir usb0:
    usb_stor_BBB_comdat:usb_bulk_msg error
    failed to send CBW status 34
    RESET:stall
    usb_stor_BBB_comdat:usb_bulk_msg error
    failed to send CBW status 34
    RESET:stall
    usb_stor_BBB_comdat:usb_bulk_msg error
```

**Step 2** Pull the memory stick from the USB port.

**Step 3** To replace a Cisco USB Flash memory stick, simply insert the module into the USB port labeled MEM as shown in the figure below. The Flash memory module can be inserted in only one way, and can be inserted or removed regardless of whether the router is powered up or not.

**Note** You can insert or remove the memory stick whether the router is powered on or not.
This completes the USB Flash memory installation procedure.

Connecting Timing Cables

When installing the cabling to the RSPs, we recommend that you leave a service loop of extra cabling sufficient to allow for fan tray removal.

Connecting Cables to the BITS Interface

The following steps describe how to connect a cable to the router BITS port:

Step 1 Confirm that the router is powered off.
Step 2 Connect one end of the cable to the BITS port using a straight-through, shielded RJ48C-to-RJ48C cable.
Step 3 Connect the other end to the BTS patch or demarcation panel at your site.
Step 4 Turn on power to the router.

For information about the BITS port pinouts, see Troubleshooting.

Note Use of two BITS sources or a Y-cable is optional. Each BITS input port is routed to both RSPs, so that SETS device on each RSP has visibility to both BITS inputs.

Warning To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the BITS ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) 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 as intra-building interfaces only (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 in order to connect these interfaces metallically to OSP wiring.

Connecting Cables to a GNSS Interface

A Y-cable is required to connect to a primary and backup RSP in order to ensure that the router continues to transmit timing signals in the event of a network failure. For a mini-coax connection, this Y-cable can be part number CAB-BNC-7INY (7 inch BNC Y-cable). For an Ethernet connection, this Y-cable can be a RJ45 Cat5 1-to-2 splitter (3 female port RJ45 connector).

When installing the cabling to the RSPs, we recommend that you leave a service loop of extra cabling sufficient to allow for fan tray removal.
Connecting Cables to the Input 10Mhz or 1PPS Interface

**Step 1** Connect one end of a mini-coax Y-cable to the GPS unit.

**Step 2** Connect one end of the split-side Y-cable mini-coax to the 10Mhz or 1PPS port on the primary RSP of the Cisco ASR 903 Router.

**Step 3** Connect the other end of the split-side Y-cable mini-coax to the 10Mhz or 1PPS port on the backup RSP of the Cisco ASR 903 Router.

Connecting Cables to the Output 10Mhz or 1PPS Interface

**Step 1** Connect one end of a mini-coax Y-cable to the Slave unit.

**Step 2** Connect one end of the split-side Y-cable mini-coax to the 10Mhz or 1PPS port on the primary RSP of the Cisco ASR 903 Router.

**Step 3** Connect the other end of the split-side Y-cable mini-coax to the 10Mhz or 1PPS port on the backup RSP of the Cisco ASR 903 Router.

Connecting Cables to the ToD Interface

**Step 1** Connect one end of a straight-through Ethernet cable to the GPS unit.

**Step 2** Connect one end of the split-side Y-cable Ethernet to the ToD port on the primary RSP of the Cisco ASR 903 Router.

**Step 3** Connect the other end of the split-side Y-cable Ethernet to the ToD port on the backup RSP of the Cisco ASR 903 Router.

**Note** For instructions on how to configure clocking, see the Cisco ASR 903 Router Software Configuration Guide.

**Warning** To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the ToD ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) 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 as intra-building interfaces only (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 in order to connect these interfaces metallically to OSP wiring.

**Note** For more information about GPS port pinouts, see Troubleshooting.

Connecting a Cable to the GNSS Antenna Interface

**Note** The GNSS module is not hot swappable.

**Step 1** Connect one end of a shielded coaxial cable to the GNSS RF IN port.
Step 2  Connect the other end of the shielded coaxial cable to the GNSS antenna after the primary protector.

Note  The GNSS RF In port should have a primary protector installed to meet the Local Safety guidelines.

- The GNSS RF In coaxial cable shield must be connected to the Facility Equipment Ground through the chassis. The chassis must have the ground wire connected to the Facility Equipment Ground.

![Figure 41: Installing the GNSS Module in the RSP](image)

1 Screw on the GNSS Module  
2 Inserting the GNSS Module

---

### Connecting Ethernet Cables

The Cisco ASR 903 Router interface modules support RJ45 or SFP Ethernet ports. For instructions on how to connect cables to Ethernet SFP ports, see Connecting Cables to SFP Modules.

The RJ45 port supports standard straight-through and crossover Category 5 unshielded twisted-pair (UTP) cables. Cisco Systems does not supply Category 5 UTP cables; these cables are available commercially.

---

**Warning**

To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the Gigabit Ethernet ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) of the equipment or subassembly must not be electrically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (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 in order to connect these interfaces electrically to OSP wiring.

---

**Note**

When installing the cabling to the RSPs, we recommend that you leave a service loop of extra cabling sufficient to allow for fan tray removal.

Follow these steps to connect the cable to a copper Gigabit Ethernet port:
Step 1  Confirm that the router is powered off.
Step 2  Connect one end of the cable to the Gigabit Ethernet port on the router.
Step 3  Connect the other end to the BTS patch or demarcation panel at your site.

Connecting Cables to SFP Modules

For information on connecting cables to Cisco optical and Ethernet SFP interfaces, see http://www.cisco.com/en/US/partner/products/hw/modules/ps5455/prod_installation_guides_list.html.

Connecting T1/E1 cables

The physical layer interface for the Cisco ASR 903 Router T1/E1 port is a customer-installed high-density connector. The high-density connector has thumbscrews which should be screwed into the interface when the cable is installed.

Note
Patch panels are required in order to connect the high-density interface connectors to individual T1/E1 lines.

Installing the Cable Connectors

16 x T1/E1 Cable Connectors

The 16 x T1/E1 interface module requires a patch cable (see Recommended Patch Panel). One end of the cable (see the figure below) has a 100-pin connector that plugs into the T1/E1 interface module. Use the thumbscrews on either side of the connector to secure the cable to the interface.

The other end of the cable has two 50-pin Telco connectors that attach to the rear of a 24-port RJ45 patch panel. Both connectors are identical: one is for Transmit (TX) and the other is for Receive (RX).
The figure below shows how the cable is connected between the 16 x T1/E1 interface module and the patch panel.

**Figure 43: Cable Installation between 16 x T1/E1 Interface and Patch Panel**

For information about the pinout of the cable connecting the T1/E1 interface to the rear of the patch panel, see the T1/E1 Port Pinout.

### 32 x T1/E1 Cable Connector

The 32 x T1/E1 interface module requires two patch cables (see Recommended Patch Panel). Each patch cable (see the figure below) has a 68-pin connectors that connects with each connector port on the front panel of the 32 x T1/E1 interface module.

Use the thumbscrews on either side of the connectors to secure the cable to the interface.
The other end of the cable has two 50-pin Telco connectors that attach to the rear of a 24-port RJ45 patch panel. Both connectors are identical: one is for Transmit (TX) and the other is for Receive (RX).

The figure below shows how the cable is connected between the 32 x T1/E1 interface module and the patch panel.

Figure 45: Cable Installation between 32 x T1/E1 Interface and Patch Panel

Patch panel interfaces
T1/E1 Cable Connectors

One end of the cable (see the figure above) has a 68-pin connector that plugs into the T1/E1 interface module and the other end of the cable with a 68-pin connector is connected to a RJ48, AMP64 or a DIN patch panel. Use the thumbscrews on either side of the connector to secure the cable to the interface.

For information about the pinout of the cable connecting the T1/E1 interface to the rear of the patch panel, see T1/E1 Port Pinout.

Patch Panel Cabling for Redundancy

You can connect the patch panels with the interface modules for redundancy, using the Y-cables. The Y-cable stub lengths are reduced, so that the cable does not exceed from the rack spacer. The Y-cables are numbered based on the different stub length. Cable lengths differ for even numbered and odd numbered slots in the chassis.

Table 5: Y-Cable for Redundancy

<table>
<thead>
<tr>
<th>Bundle PID</th>
<th>Cable Marking</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABLE-16TDM-R1EL1</td>
<td>T1/E1-Cable S-3</td>
<td>16-port cable for TDM CEM Interface Module, 42 inches cable length and 10 inches stub length, even slot</td>
</tr>
<tr>
<td></td>
<td>T1/E1 Cable S-2</td>
<td>16-port cable for TDM CEM Interface Module, 42 inches cable length and 7.5 inches stub length, even slot</td>
</tr>
<tr>
<td></td>
<td>T1/E1 Cable S-1</td>
<td>16-port cable for TDM CEM Interface Module, 42 inches cable length and 6.5 inches stub length, even slot</td>
</tr>
<tr>
<td>CABLE-16TDM-R1EL2</td>
<td>T3/E3-Cable M-3</td>
<td>16-port cable for TDM CEM Interface Module, 62 inches cable length and 10 inches stub length, even slot</td>
</tr>
<tr>
<td></td>
<td>T3/E3-Cable M-2</td>
<td>16-port cable for TDM CEM Interface Module, 62 inches cable length and 7.5 inches stub length, even slot</td>
</tr>
<tr>
<td></td>
<td>T3/E3-Cable M-1</td>
<td>16-port cable for TDM CEM Interface Module, 62 inches cable length and 6.5 inches stub length, even slot</td>
</tr>
<tr>
<td>Bundle PID</td>
<td>Cable Marking</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CABLE-16TDM-R1EL3</td>
<td>T1/E1-Cable L-3</td>
<td>16-port cable for TDM CEM Interface Module, 78 inches cable length and 10 inches stub length, even slot</td>
</tr>
<tr>
<td></td>
<td>T1/E1 Cable L-2</td>
<td>16-port cable for TDM CEM Interface Module, 78 inches cable length and 7.5 inches stub length, even slot</td>
</tr>
<tr>
<td></td>
<td>T1/E1 Cable L-1</td>
<td>16-port cable for TDM CEM Interface Module, 78 inches cable length and 6.5 inches stub length, even slot</td>
</tr>
<tr>
<td>CABLE-16TDM-R3EL1</td>
<td>T3/E3-Cable S-3</td>
<td>16-port cable for TDM CEM Interface Module, 42 inches cable length and 10 inches stub length, even slot</td>
</tr>
<tr>
<td></td>
<td>T3/E3-Cable S-2</td>
<td>16-port cable for TDM CEM Interface Module, 42 inches cable length and 7.5 inches stub length, even slot</td>
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<tr>
<td></td>
<td>T3/E3-Cable S-1</td>
<td>16-port cable for TDM CEM Interface Module, 42 inches cable length and 6.5 inches stub length, even slot</td>
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<td>T3/E3-Cable M-3</td>
<td>16-port cable for TDM CEM Interface Module, 62 inches cable length and 10 inches stub length, even slot</td>
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<td>T3/E3-Cable M-2</td>
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<td>T3/E3-Cable M-1</td>
<td>16-port cable for TDM CEM Interface Module, 62 inches cable length and 6.5 inches stub length, even slot</td>
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<tr>
<td>CABLE-16TDM-R3EL3</td>
<td>T3/E3-Cable L-3</td>
<td>16-port cable for TDM CEM Interface Module, 78 inches cable length and 10 inches stub length, even slot</td>
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<td>T3/E3-Cable L-2</td>
<td>16-port cable for TDM CEM Interface Module, 78 inches cable length and 7.5 inches stub length, even slot</td>
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<td></td>
<td>T3/E3-Cable L-1</td>
<td>16-port cable for TDM CEM Interface Module, 78 inches cable length and 6.5 inches stub length, even slot</td>
</tr>
</tbody>
</table>
RJ45 Cable Pinouts

T1 lines from individual subscribers are attached to RJ45 connectors on the front of the 24-port patch panel. Each RJ45 port accommodates an individual T1 subscriber line.

For the T1/E1 ports, see T1/E1 Port Pinout.

Connecting Cables to the Patch Panel

If you are connecting two T1/E1 interfaces to each other, you must cable both interfaces’ patch panels together using a T1 cross-over cable or a T1 straight-through cable. Use shielded cables. The type of cable you use (cross-over or straight-through) depends on how the T1/E1 interfaces are cabled to their patch panels:

- If both T1/E1 interfaces are connected to their patch panels in the same manner (TX to Transmit and RX to Receive, or TX to Receive and RX to Transmit), use a T1 cross-over cable to connect the patch panels.
- If both T1/E1 interfaces are connected to their patch panels in a different configuration (TX to Transmit and RX to Receive on one interface, and TX to Receive and RX to Transmit on the other interface), use a T1 straight-through cable (standard RJ45 patch cable) to connect the patch panels.
To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the T1/E1 ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) 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 as intra-building interfaces only (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 in order to connect these interfaces metallically to OSP wiring.

Patch Panel Connectors

The PANEL-48-1-DIN and PANEL-48-3-DIN provide 48 DIN 1.0/2.3 connectors on the front side of the patch panel. These connectors terminate to 75 ohm coaxial cable through the DIN plug.

The PANEL-48-1-RJ48 provide 48 RJ45 connector on the front side of the patch panel. These connectors terminate to 110 ohm T1/E1 cable through a RJ45 connector.

Recommended Patch Panel

We recommend using the following T1/E1 patch panels:

The following patch panels are introduced:

- CABLE-16T1E1—Cable for 16-Port T1/E1 Interface Module, 12 feet
- CABLE-32T1E1—Cable for 32-Port T1/E1 Interface Module
- PANEL-16-BNC—Breakout panel with 16 T1/E1 75-ohm BNC ports
- PANEL-32-RJ4—Breakout panel with 32 T1/E1 100/120- ohm RJ48 ports

Also, the following patch panels are available from Optical Cable Corporation (http://www.occfiber.com).

- 48-port T1 RJ45 patch panel (part number DCC4884/25T1-S)
- 16-port E1 BNC patch panel (part number DCC16BNC/25T1-S)

To order a patch panel, contact the Sales and Marketing Support staff at Optical Cable Corporation:
Installing Patch Panel

To install the brackets on the rear of the patch panel, perform these steps:

**Step 1** Remove the larger (M4) rack mount screws (as indicated in the Rack Mount Screws figure below) from both sides. To secure the brackets, follow the instructions in Step-3.

**Step 2** Remove the patch panel rack-mount brackets from the accessory kit and position them beside the patch panel.

**Step 3** Position the brackets against the patch panel sides, and align with the screw holes. Secure the rack mount bracket to patch panel using a torque of 13.2 in.-lb (1.5 N-m) see the figure below.

*Figure 51: Rack Mount Screws*
Step 4  Position the cable management guides against the mounting brackets on the patch panel, see the figure below.
Step 5  Secure the guides to the brackets with the screws. The recommended maximum torque is 28 in.-lb (3.16 N-m).

Step 6  Position the patch panel with brackets and guide onto the rack and secure with screws provided. The recommended maximum torque is 28 in.-lb (3.16 N-m), see the figure below.
Figure 56: Patch Panel Front View with Brackets and Guides Installed on Rack
Install 3G Patch Panel

You can choose to either set up the Cisco ASR 903 3G patch panel on a rack or wall mount it.
Install Rack Brackets

**Step 1** Connect the grounding lugs using a crimping tool (as specified by the ground lug manufacturer), crimp the ground lug to the ground wire.

**Step 2** Use a 6 AWG ground wire to connect the other end to a suitable grounding point at your site.

*Figure 58: Patch Panel Grounding - Single*
Step 3  Position the patch panel in the rack as follows:

- If the front of the patch panel is at the front of the rack, insert the rear of the chassis between the mounting posts.
- If the rear of the patch panel is at the front of the rack, insert the front of the chassis between the mounting posts.

Step 4  Align the mounting holes in the bracket with the mounting holes in the equipment rack.
Figure 60: Installing the Patch Panel - Single in a 19-inch Rack
Figure 61: Installing the Patch Panel - Dual in a 19-inch Rack
Figure 62: Installing the Patch Panel - Single in a 21-inch Rack
Figure 63: Installing the Patch Panel - Dual in a 21-inch Rack
Figure 64: Installing the Patch Panel - Single in a 23-inch Rack
Step 5  Secure the brackets to the chassis with the screws. The recommended maximum torque is 28 in.-lb (3.16 N-m).
  
  • EIA 19 and 23 inches mounting brackets for both single and double 3G interface module patch panels.
  
  • ETSI 21 inches mounting brackets for both single and double 3G interface module patch panels.

---

**Set up 3G Patch Panel on Rack**

To install the optional cable management brackets, perform these steps:

**Step 1**  Position the cable management brackets against the front of the chassis and align the screw holes, as shown in the figure.

**Step 2**  Secure the cable management brackets with the screws. The recommended maximum torque is 10 in.-lb (1.12 N-m).
Figure 66: Attaching 19-inch Brackets to Patch Panel - Single
Set up 3G Patch Panel on Rack

Figure 67: Installing 19-inch Brackets on to Rack - Single
Figure 68: Attaching 19-inch Brackets to Patch Panel - Dual
Figure 70: Attaching 21-inch Brackets to Patch Panel - Single

Front

Rear
Figure 71: Installing 21-inch Brackets on to Rack - Single

- Front
- Rear
Figure 72: Attaching 21-inch Brackets to Patch Panel - Dual

Front

Rear
Figure 73: Installing 21-inch Brackets on to Rack - Dual

Front

Rear
Figure 74: Attaching 23-inch Brackets to Patch Panel - Single
Figure 75: Installing 23-inch Brackets on to Rack - Single

Front

Rear
Figure 76: Attaching 23-inch Brackets to Patch Panel - Dual

Front

Rear
Wall Mount 3G Patch Panel

Before you begin

You must first install the mounting brackets and cable guides on to the patch panel before you mount it on the wall. You can use the same rack mount brackets (700-113653-01) for wall mount.

Step 1  Remove the mounting brackets from the accessory kit and position them beside the device.
Note: You can install the brackets as shown in the figure.

Figure 78: Wall Mount - Single
**Step 2**  Secure the bracket to the device with the recommended maximum torque of 10 inch-pounds (1.1 newton meters).

**Step 3**  Position the device vertically on the wall.

**Caution**  Before mounting the device, ensure that all unused holes at the sides of the device are protected with screws.

**Step 4**  Use a tape measure and level to verify that the device is installed straight and on level.

---

**Patch Panel Dimensions**

Following are the various patch panel dimensions.
Figure 80: Patch Panel Without Brackets

Patch Panel Dimensions:
- Width: 17.27 inches
- Height: 7.77 inches

Another dimension:
- Width: 17.27 inches
- Height: 3.47 inches
Figure 81: Patch Panel With Brackets

Patch Panel Dimensions

- Width: 22.96 in
- Height:
  - Top: 5.0 in
  - Middle: 16.87 in
  - Bottom: 13.0 in
- Depth: 3.47 in
Figure 82: AMP64 Patch Panel With Brackets

Dimensions:
- Width: 22.96 in
- Height:
  - Top: 5.0 in
  - Middle: 12.31 in
  - Bottom: 13.0 in
- Depth: 4.54 in, 7.77 in, 3.47 in
Figure 83: 3G Patch Panel Without Brackets - Single

Patch Panel Dimensions

185.8

218.5

44
Patch Panel Pinout

Given below are the pinout information for the regular crossover and the straight-through cable patch panel.

Table 6: Pinout Details

<table>
<thead>
<tr>
<th>Pin #</th>
<th>Crossover</th>
<th>Straight-through</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Receive Tip</td>
<td>Transmit Tip</td>
</tr>
<tr>
<td>2</td>
<td>Receive Ring</td>
<td>Transmit Ring</td>
</tr>
<tr>
<td>3</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>Transmit Tip</td>
<td>Receive Tip</td>
</tr>
<tr>
<td>5</td>
<td>Transmit Ring</td>
<td>Receive Ring</td>
</tr>
<tr>
<td>6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>7</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>8</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
Panel and Bracket

Table 7: Panel and Bracket Details

<table>
<thead>
<tr>
<th>Panel</th>
<th>Bracket Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PANEL-3G-COMBO-1</td>
<td>Single 12E1 + 4xDS3 patch panel for 3G CEM/IMSG IM (requires crossover cable)</td>
</tr>
<tr>
<td>PANEL-3G-COMBO-2</td>
<td>Double 12E1 + 4xDS3 patch panel for 3G CEM/IMSG IM (requires crossover cable)</td>
</tr>
<tr>
<td>PANEL-3G-COMBO-1S</td>
<td>Single 12E1 + 4xDS3 patch panel for 3G CEM/IMSG (requires a straight-through cable)</td>
</tr>
<tr>
<td>PANEL-3G-COMBO-2S</td>
<td>Double 12E1 + 4xDS3 patch panel for 3G CEM/IMSG IM (requires a straight-through cable)</td>
</tr>
<tr>
<td>P3G1-RCKMNT-19IN</td>
<td>EIA 19 inches mounting brackets for single 3G CEM/IMSG IM patch panel</td>
</tr>
<tr>
<td>P3G1-RCKMNT-ETSI</td>
<td>ETSI 21 inches mounting brackets for single 3G CEM/IMSG IM patch panel</td>
</tr>
<tr>
<td>P3G1-RCKMNT-23IN</td>
<td>EIA 23 inches mounting brackets for single 3G CEM/IMSG IM patch panel</td>
</tr>
<tr>
<td>P3G2-RCKMNT-19IN</td>
<td>EIA 19 inches mounting brackets for double 3G CEM/IMSG IM patch panel</td>
</tr>
<tr>
<td>P3G2-RCKMNT-ETSI</td>
<td>ETSI 21 inches mounting brackets for double 3G CEM/IMSG IM patch panel</td>
</tr>
<tr>
<td>P3G2-RCKMNT-23IN</td>
<td>EIA 23 inches mounting brackets for double 3G CEM/IMSG IM patch panel</td>
</tr>
</tbody>
</table>

Connecting Serial Cables

The tables below detail the supported cables with the Cisco ASR 903 Router.

Table 8: Interface Cables for 12-in-1 Connector

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Product Number</th>
<th>Length</th>
<th>Male/Female</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>V.35 DTE</td>
<td>CAB-SS-V35MT</td>
<td>10 ft.</td>
<td>Male</td>
<td>M34</td>
</tr>
<tr>
<td>V.35 DCE</td>
<td>CAB-SS-V35FC</td>
<td>10 ft.</td>
<td>Female</td>
<td>M34</td>
</tr>
</tbody>
</table>

The Cisco ASR 903 Router currently only supports the EIA/TIA-232 connector.
### Table 9: Interface Cables for 68-Pin Connector

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Product Number</th>
<th>Length</th>
<th>Male/Female</th>
<th>Connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIA/TIA-232 DTE</td>
<td>CAB-S2-232MT</td>
<td>10 ft.</td>
<td>Male</td>
<td>DB-25</td>
</tr>
<tr>
<td>EIA/TIA-232 DCE</td>
<td>CAB-S2-232FC</td>
<td>10 ft.</td>
<td>Female</td>
<td>DB-25</td>
</tr>
<tr>
<td>EIA/TIA-449 DTE</td>
<td>CAB-S4-449MT</td>
<td>10 ft.</td>
<td>Male</td>
<td>DB-37</td>
</tr>
<tr>
<td>EIA/TIA-449 DCE</td>
<td>CAB-S4-449FC</td>
<td>10 ft.</td>
<td>Female</td>
<td>DB-37</td>
</tr>
<tr>
<td>X.21 DTE</td>
<td>CAB-SS-X21MT</td>
<td>10 ft.</td>
<td>Male</td>
<td>DB-15</td>
</tr>
<tr>
<td>X.21 DCE</td>
<td>CAB-SS-X21FC</td>
<td>10 ft.</td>
<td>Female</td>
<td>DB-15</td>
</tr>
<tr>
<td>EIA/TIA-530 DTE</td>
<td>CAB-530MT</td>
<td>10 ft.</td>
<td>Male</td>
<td>DB-25</td>
</tr>
<tr>
<td>EIA/TIA-530 DTE</td>
<td>CAB-530FC</td>
<td>10 ft.</td>
<td>Female</td>
<td>DB-25</td>
</tr>
</tbody>
</table>

### Connecting the Fan Tray Alarm Port

The fan tray includes an alarm port that maps to 4 dry contact alarm inputs.

The pins on the alarm port are passive signals and can be configured as Normally Open (an alarm generated when current is interrupted) or Normally Closed (an alarm is generated when a circuit is established) alarms. You can configure each alarm input as critical, major, or minor. An alarm triggers alarm LEDs and alarm messages. The relay contacts can be controlled through any appropriate third-party relay controller. The open/close configuration is an option controlled in IOS.

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**Warning**

To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the alarm ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) 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 as intra-building interfaces only (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 in order to connect these interfaces metallically to OSP wiring.
Only Pins 1, 2, 4, 5, and 8 are available for customer use. The remaining pins are for Cisco manufacturing test, and should not be connected. Use a shielded cable for connection to this port for EMC protection. Table 5-6 summarizes the pinouts on the alarm port in Troubleshooting.

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**Step 1**  
Attach an RJ45 cable to the alarm port.

**Step 2**  
Attach the other end of the RJ45 cable to the relay controller.

---

**What to do next**

For information about how to map alarm inputs to critical, major, and minor alarm conditions, see the Cisco ASR 903 Router Software Configuration Guide.

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**Connector and Cable Specifications**

For more information on cable specifications and pinouts, see Troubleshooting.