

Overview

Note The Cisco ASR 903 Router and the Cisco ASR 903U Router are collectively referred to as the Cisco ASR 903 Router in this document. Any differences between the routers are specifically called out.

The Cisco ASR 903 Router is a fully-featured aggregation platform designed for the cost-effective delivery of converged mobile and business services. With shallow depth, low power consumption, and an extended temperature range, this compact 3-rack-unit (RU) router provides high service scale, full redundancy, and flexible hardware configuration.

The Cisco ASR 903 Router expands the Cisco service provider product portfolio by providing a rich and scalable feature set of Layer 2 VPN (L2VPN) and Layer 3 VPN (L3VPN) services in a compact package. It also supports a variety of software features, including Carrier Ethernet features, Timing over Packet, and pseudowire.

The Cisco ASR 903 Router is positioned as a pre-aggregation router in IP RAN (GSM, UMTS, iMAX, CDMA, and LTE) networks or an aggregation router in Carrier Ethernet networks.

- Cisco ASR 903 Router Features, on page 1
- Interface Numbering, on page 47
- Regulatory Compliance, on page 48

Cisco ASR 903 Router Features

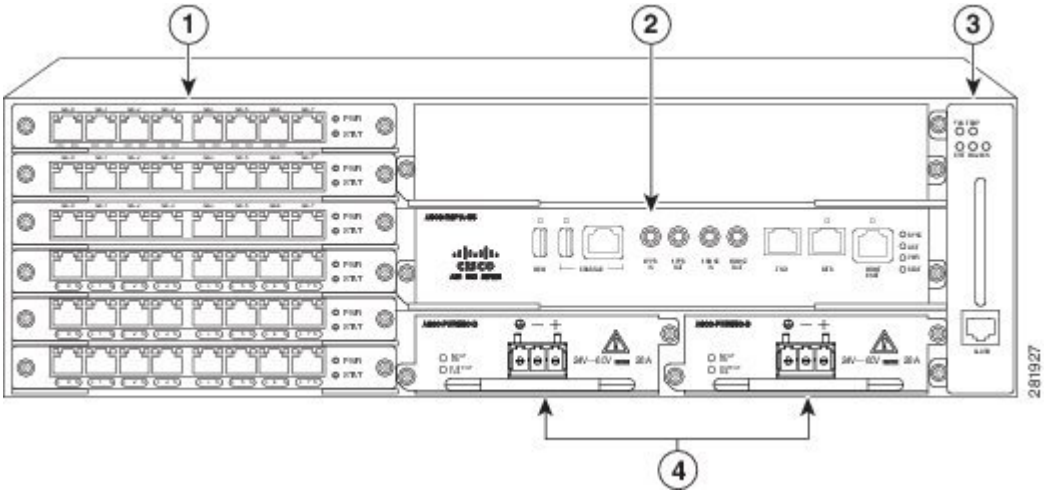
The Cisco ASR 903 Router has the following hardware features:

- 3-RU modular chassis designed for installation in a 300 mm European Telecommunications Standards Institute (ETSI) cabinet
- Dedicated slots in the chassis that support the following:
  - Up to six interface modules
  - Up to two Route Switch Processors (RSP)
  - Up to two AC or DC power supply units
  - One fan tray
- Network frequency, phase, and time inputs and outputs for network interfaces (SyncE and TDM), BITS, 1 PPS or 10 MHz and Timing over Packet (IEEE 1588-2008)
- Adjustable front and rear rail mounting locations

- Front panel access to power supplies, fan tray, RSPs, and interface modules
- Online insertion and removal (OIR) of RSP, interface modules, power supplies, and fan tray
- Discrete status LEDs on power supply, interface module, RSP, and fan tray units
- Four alarm dry contact inputs (either normally open or normally closed)
- Environmental monitoring and reporting functions
- LED indicators for critical, major, and minor alarms
- Side-to-side forced air cooling
- Temperature range, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

The figure below illustrates the Cisco ASR 903 Router chassis design.

Figure 1: Cisco ASR 903 Router Chassis Design



1	Interface modules
2	RSP unit (with active and standby RSP slots)
3	Fan tray
4	Redundant power units (two DC power units are shown)

Power Supply Features

The Cisco ASR 903 Router support AC and DC power supplies. For more information about installing the Cisco ASR 903 Router power supplies, see the Installing the Power Supply.

To estimate the required power supply, use the Cisco Power Calculator.

The power sections provide more information about the power supply:

Redundancy

The Cisco ASR 903 Router chassis includes a slot for an optional redundant power supply. The redundant power supply option provides a second power supply to ensure that power to the chassis continues uninterrupted if one power supply fails or input power on one line fails. Redundancy is supported either with identical power

supplies or a combination of AC and DC power supply. The Cisco ASR 903 Router supports current sharing between the power supplies.

A redundant power supply on the Cisco ASR 903 Router is recommended. Each power supply should be connected to separate independent power sources to ensure that the router maintains power in the event of a power interruption caused by an electrical failure, a wiring fault, or a tripped circuit breaker.

Caution To comply with IEC 61850-3 (voltage interruptions), redundant power supplies with separately derived power feeds are required.

Dying Gasp

The Cisco ASR 903 Router DC power supply supports the Dying Gasp feature, which allows the router to provide an input power loss notification to the RSP so that the RSP can send appropriate SNMP traps or OAM messages and update log files on the router. With the DC power supply, the router supports a minimum input power loss detection time of 2 milliseconds (DC) and continued operation of at least 6 milliseconds (DC) after the notification.

Note Continued DC power supply operation may vary for voltages other than +24/-48V.

Note Dying Gasp is not supported on the ASR 900 RSP3 module for 1200W DC power supply.

Table 1: Dying GASP Support on PSU

PSU PID	Dying GASP Support
A900-PWR550-D	Yes
A900-PWR550-D-E	Yes
A900-PWR550-A	Yes
A900-PWR900-D2	No
A900-PWR1200-D	No
A900-PWR1200-A	Yes

Status LEDs

LEDs are also provided on each power supply to indicate the status of the input power and the health of the power supply. For more information about the LEDs on the Cisco ASR 903 Router, see Troubleshooting.

DC Power Specifications

The power supply is field replaceable, hot-swappable, and operates separately from the fan tray. The power supply contains a front panel with mounting screws, a handle for insertion and removal, and two status LEDs. No ON/OFF switch is provided.

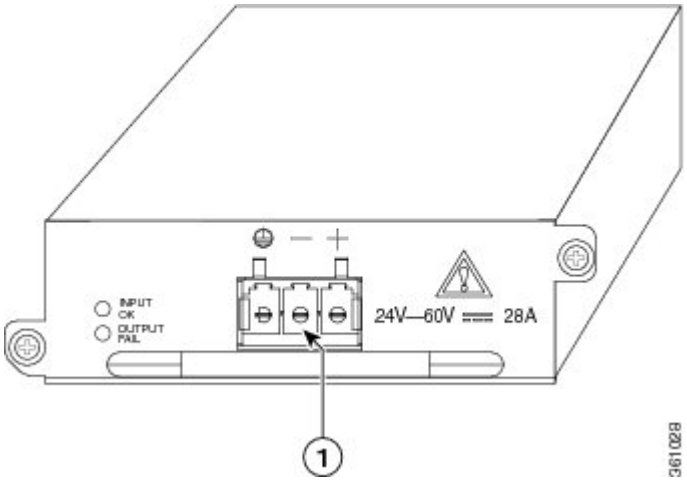
The DC PSU models supported on the router are:

- A900-PWR550-D—Provides 550 W output power for system 12 V power. Uses a euro-style three-position terminal block connector.
- A900-PWR550-D-E—Provides 550 W output power for system 12 V power. Uses a T-shaped connector.

Note The A900-PWR550-D and the A900-PWR550-E power supply can be used with the A900-RSP3C-400-S RSP modules only if the power consumption is within 550 W. However, A900-PWR1200-D is recommended.

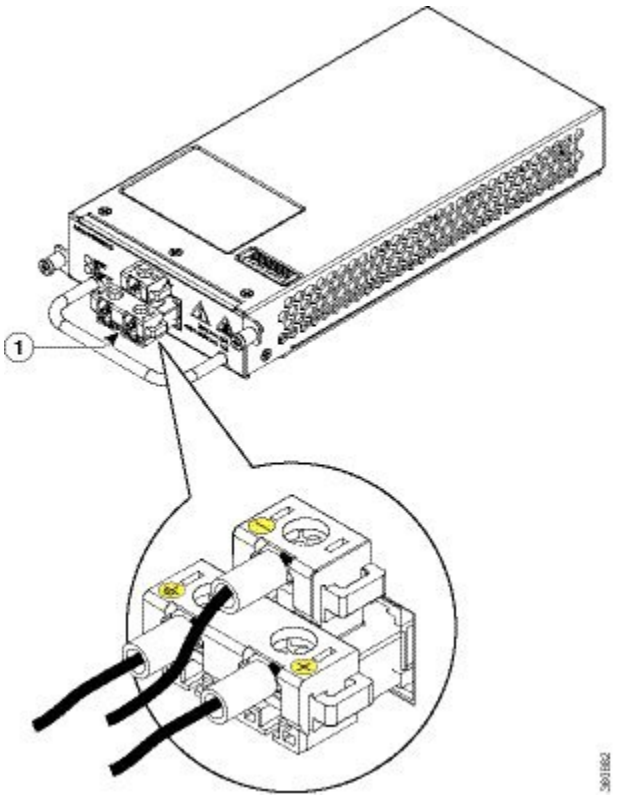
- A900-PWR1200-D—Provides 975 W output power for system 12 V power with the A903-FAN module. As most of the system configurations using A900-RSP3C-400-S RSP modules require power exceeding 550 W, we recommend using the A900-PWR1200-D power supply with A900-RSP3C-400-S RSP modules.

Figure 2: DC PSU Module (A900-PWR550-D) with Euro-style Connector



1	Euro-style connector	—

Figure 3: DC PSU Module (A900-PWR550-D-E) with T-Shaped Connector

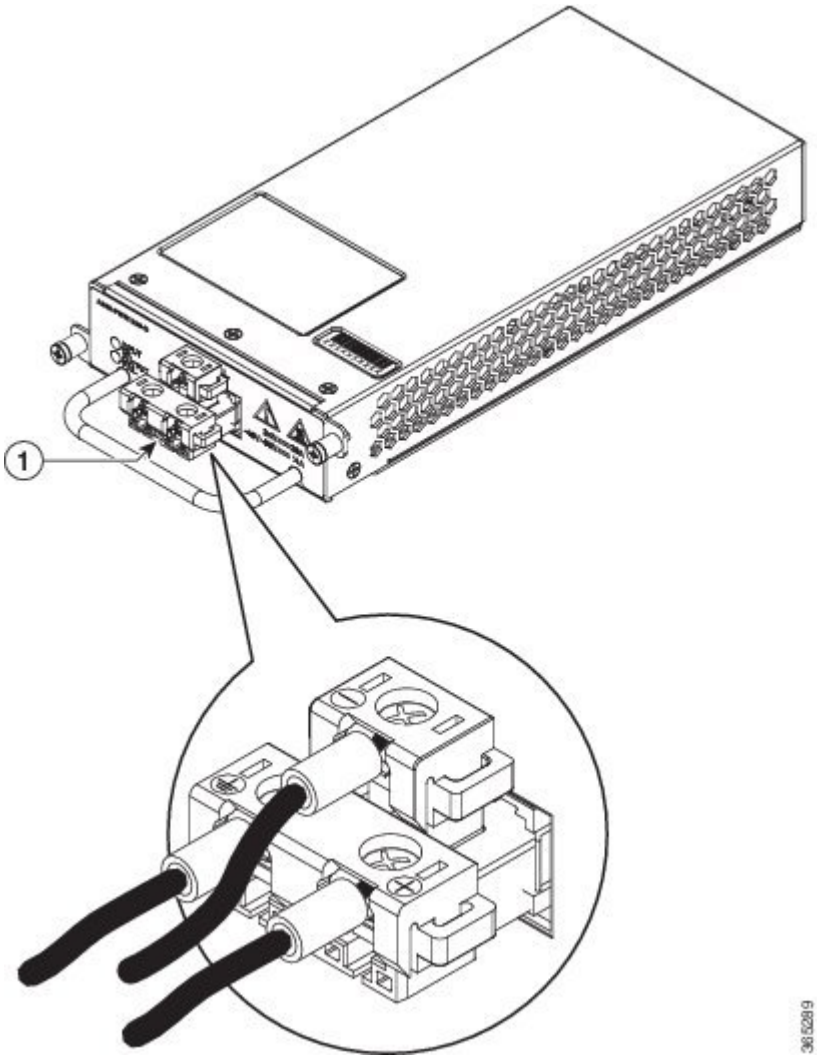


1	T-shaped connector	—

Table 2: DC Power Supply Specifications (550 W)

Part numbers	A900-PWR550-D, A900-PWR550-D-E
Input power specification	+24V/-48V or -60V VDC
Minimum input voltage	19.2 VDC
Maximum input voltage	72 VDC
Output voltage	+12 VDC
Wire gauge for DC input power connections	10 AWG minimum for –48/–60 VDC. 8 AWG minimum for 24 VDC. Connector accepts 8 AWG maximum.
Maximum power output	550 W

Figure 4: DC PSU Module (A900-PWR1200-D)



Label	Component
1	T-shaped connector

Table 3: DC Power Supply Specifications (A900-PWR1200-D)

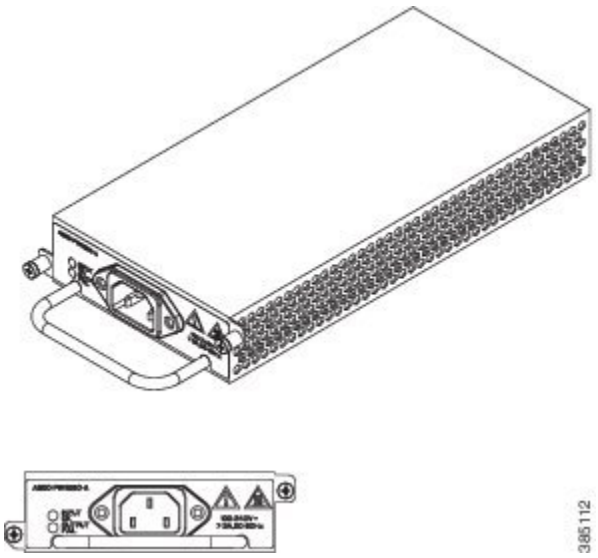
Part numbers	A900-PWR1200-D
Input power specification	48V, GRD, -48V
Minimum input voltage	-40.8 VDC
Maximum input voltage	-72 VDC
Output voltage	+12 VDC

Wire gauge for DC input power connections	8–10 AWG minimum for –48/–60 VDC. Connector accepts 8 AWG maximum.
Maximum power output	1200 W 975W with A903-FAN-E

AC Power Specifications

The AC PSU models supported on the router are:

- A900-PWR550-A—Provides 550 W output power for system 12 V power. Uses an IEC 320 C14 type 15 Amp power receptacle connector.



The A900-PWR550-A power supply can be used with the A900-RSP3C-400-S RSP modules only if the power consumption is within 550 W. However, A900-PWR1200-A is recommended.

Table 4: AC Power Supply Specifications (A900-PWR550-A)

Part number	A900-PWR550-A
Input power specification	115VAC/ 230VAC
Input voltage	85/264 VAC
Minimum input voltage	85 VAC
Maximum input voltage	264 VAC
Minimum output voltage	12V
Maximum output voltage	12.4V
Maximum power output	550 W

- A900-PWR1200-A—Provides 975 W output power for system 12 V power with the A903-FAN module. As most of the system configurations using A900-RSP3C-400-S RSP modules require power exceeding 550 W, we recommend using the A900-PWR1200-A power supply with A900-RSP3C-400-S RSP modules. See the figure below.

Figure 5: AC Power Supply (A900-PWR1200-A)

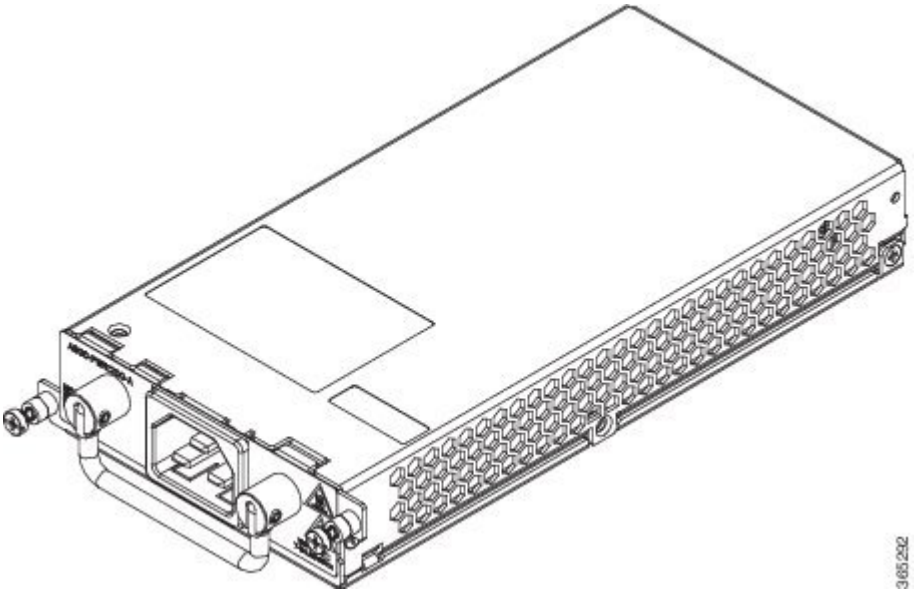


Table 5: AC Power Supply Specifications (A900-PWR1200-A)

Part number	A900-PWR1200-A
Input power specification	115VAC/ 230VAC
Input voltage	85/264 VAC
Minimum input voltage	85 VAC
Maximum input voltage	264 VAC
Minimum output voltage	12V
Maximum output voltage	12.4V
Maximum power output	1200 W

Fan Tray

The fan tray has the following hardware features:

- It provides side-to-side forced air cooling
- It provides redundant fans
- It is field replaceable

- It contains status LEDs
- It contains an alarm port with four external alarm inputs

The fan tray modules that are supported on the router are:

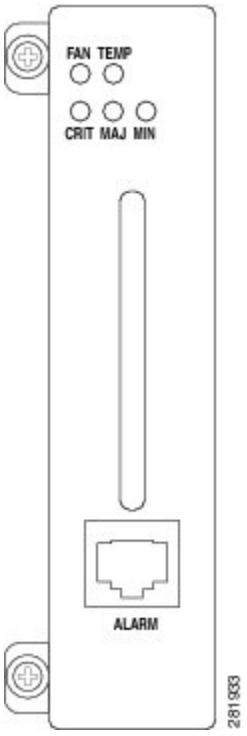
- A903-FAN
- A903-FAN-H
- A903-FAN-E

Attention Always use the correct fan trays or it may result in damaging the interface module due to overheating. For more information on the Interface Module Compatibility Matrix, see Cisco ASR 900 Series Interface Modules Data Sheet.

Fan Tray (A903-FAN)

The Cisco ASR 903 Router uses a modular fan tray that is separate from the power supply. The fan tray contains twelve fans and provides sufficient capacity to maintain operation indefinitely in the event of an individual fan failure.

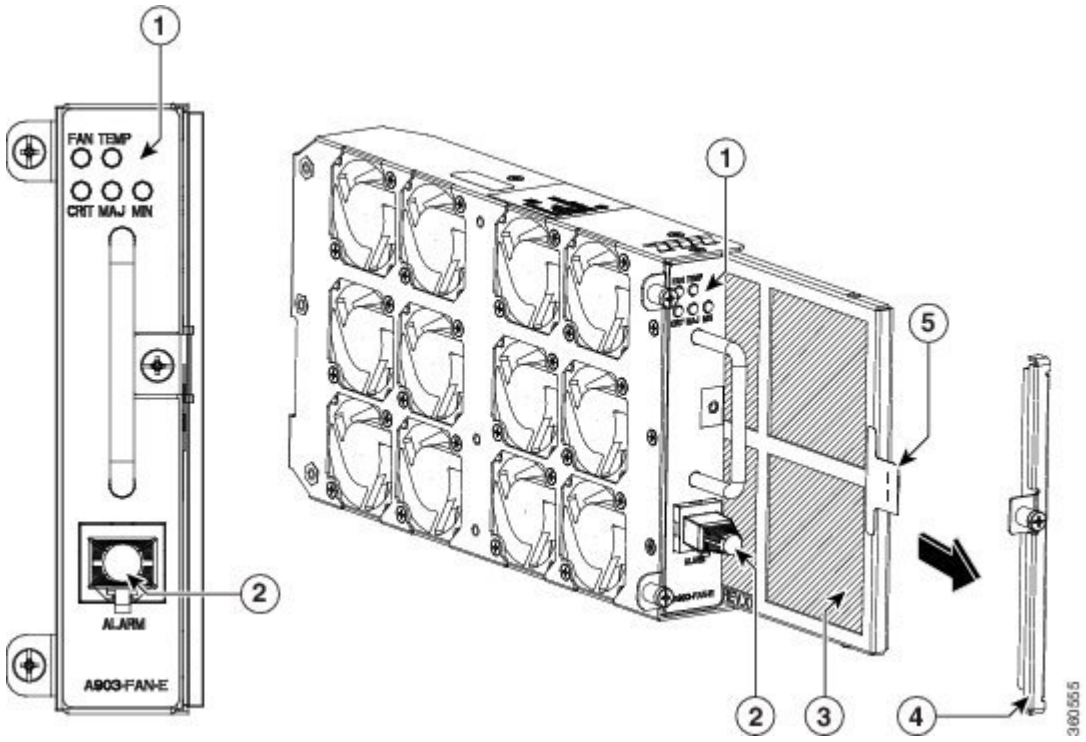
Figure 6: Cisco ASR 903 Router Fan Tray (A903-FAN)



Fan Tray (A903-FAN-E)

The A903-FAN-E is a fan tray containing twelve (40 x 40 x 20 mm) fans and provides sufficient capacity to maintain operation indefinitely in the event of an individual fan failure. It has a 8 mm fan dust filter that prevents dust from entering the unit and avoids possible damage to the components. The fan tray is IEC60950-1 compliant.

Figure 7: Cisco ASR 903 Fan Tray with Dust Filter and Dummy Cover (A903-FAN-E)



1	LEDs	4	Dummy cover
2	Alarm	5	Pull tab
3	Dust filter		—

Dust Filter (A903-FAN-F)

The dust filter on the fan tray is a quadrafoam 45PPI filter which is 85 percent dust resistant. A dummy cover (A903-FAN-F-B) secures the dust filter in the chassis.

Note Use the pull tab provided to easily access the filter.

Air Plenum

Air Plenum or air baffle assembly is used change the air flow pattern of the unit. When the router is installed with the plenum, the air flow pattern is changed from side-side to front-back. The air flow front-back pattern

provides a rack installation bay with a cool front zone and hot rear zone. For installing the plenum, see Installing the Chassis in the Air Plenum.

Note When the air plenum and the fan filter are installed in the chassis, the system operating temperature is limited to 55 degrees Celsius.

The air plenum is available from GAW. To order an air plenum, contact the Sales and Marketing support staff at GAW (see Table A-2).

RSP Modules

The Cisco ASR 903 Router is designed to use up to two RSP modules to handle the data plane, network timing, and control plane functionalities for the router. The RSP configuration allows you to use Cisco IOS software to control chassis management, redundancy, external management, and system status indications on the router.

RSP features include:

- Loading software onto processor-based interface modules
- Redundant RSP management—The RSP manages detection of RSPs, exchange of health and status information, role negotiation, function for detection, health and status exchange, role negotiation
- Packet processing
- Traffic management, including buffering, queuing, and scheduling, Ethernet MAC functions
- Network clocking functions including phase and time-of-day for BITS, 1 PPS, 10 MHz, and 1588 PTP clock references.
- Storage of software images, system configuration, OBFL, SysLog
- PTP packet processing including IEEE 1588-2008 for recovering network timing (frequency, phase, and time) from upstream PTP clocks, for generating PTP frequency and phase references as inputs to the SETS, and for distributing them to downstream PTP clocks
- External management interfaces (RS232 console, management ENET, USB console, USB storage) and system status LED indicators

Supported RSPs

The Cisco ASR 903 Router supports the following RSPs:

- A900-RSP2A-128—Provides 4 GB double data rate type three (DDR3) memory, 128 Gbps aggregate throughput.
- A900-RSP2A-64—Provides 4 GB double data rate type three (DDR3) memory, 64 Gbps aggregate throughput.
- A900-RSP3C-400-S—Provides 8 GB of SDRAM and non-volatile memory, 64MB flash memory, 40 Mb of TCAM memory, 400Gbps throughput.
- A900-RSP3C-200-S—Provides 8 GB of SDRAM and non-volatile memory, 64MB flash memory, 20 Mb of TCAM memory, 200Gbps throughput.

The Cisco ASR 903U Router supports the following RSPs:

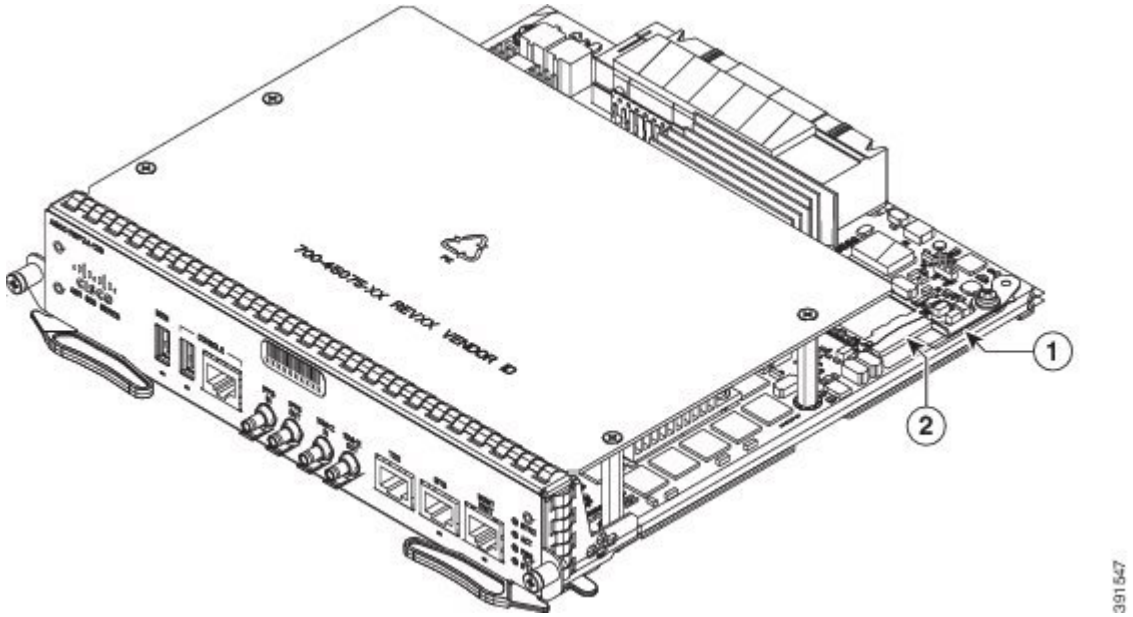
- A900U-RSP2A-128—Provides 4-GB double data rate type three (DDR3) memory and 128-Gbps aggregate throughput.

- A900U-RSP2A-64—Provides 4-GB double data rate type three (DDR3) memory and 64-Gbps aggregate throughput.

Note The supported RSPs have different memory capacities, but they have the same interfaces and functionality.

Caution The SD memory card is not field replaceable. Do not try to remove or replace it.

Figure 8: A900-RSP2A-128 Module



1	SD memory card	2	SD memory card slot

Note Installing a mix of RSP modules in the chassis is *not* supported.

The RSPs do not provide external network interfaces for user traffic. All network interfaces are provided via separate IMs.

Figure 9: A900-RSP3C-400-S RSP Module

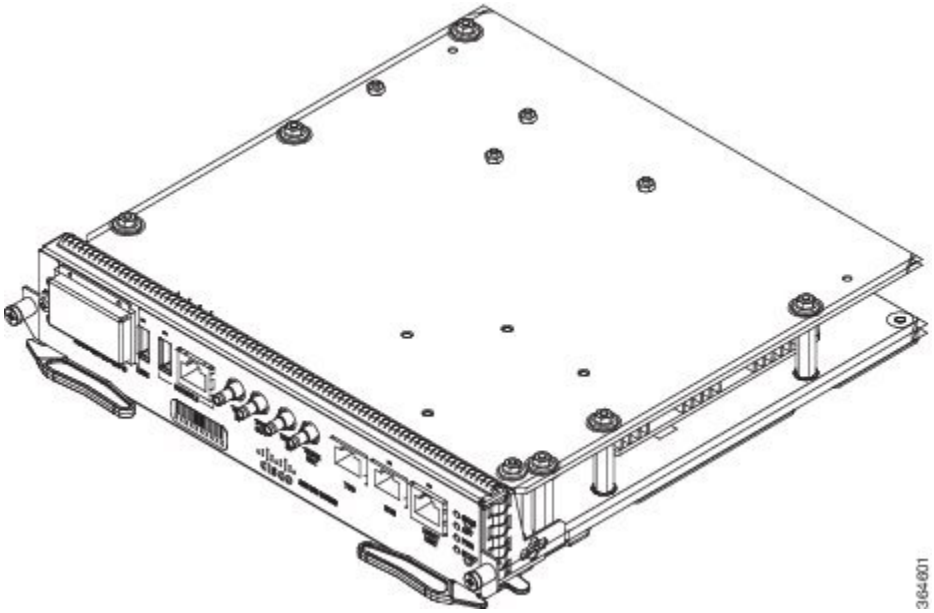
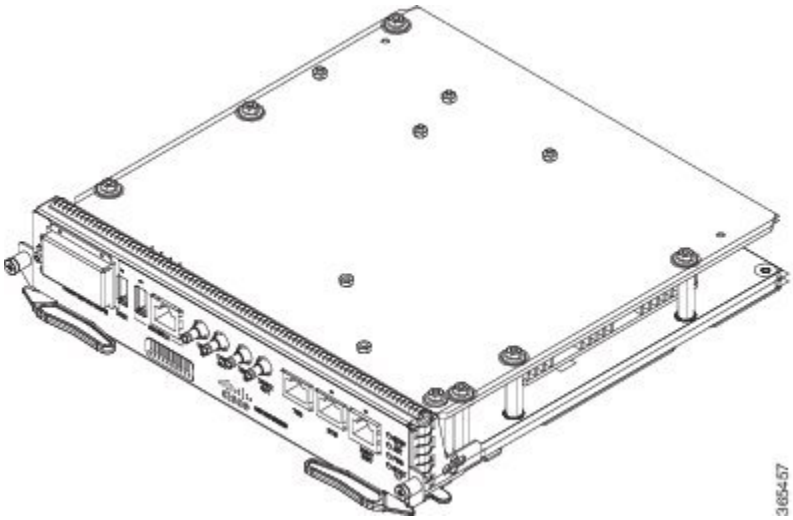


Figure 10: A900-RSP3C-200-S RSP Module



A900-RSP2 Supported Interface Modules

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 combination IMs (A900-IMA8S1Z, A900-IMA8T1Z) are not supported on the A900-RSP2-64 RSP module on the Cisco ASR 903 Router.

The table below is applicable for A900-RSP2A-128 and A900U-RSP2A-128 RSP modules.

Table 6: A900-RSP2A-128 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
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	A900-IMA3G-IMSG	2,3,4,5
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	
16-port T1/E1 Interface Module	A900-IMA16D	
32-port T1/E1 Interface Module	A900-IMA32D	
8-portT1/E1 Interface Module	A900-IMA8D	
4-port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) Interface Module	A900-IMA4OS	
SFP Combo IM—8-port SFP Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	
Copper Combo IM—8-port 10/100/1000 Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
6-port E & M Interface Module	A900-IMA6EM	
14-port Serial Interface Module	A900-IMASER14A/S	
4-port C37.94 Interface Module	A900-IMA4C3794	

The table below is applicable for A900-RSP2A-64 and A900U-RSP2A-64 RSP modules.

Table 7: A900-RSP2A-64 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	0-2
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
4-port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) Interface Module	A900-IMA4OS	

Supported Interface Modules	Part Numbers	Slot
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	3-5
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
16-port T1/E1 Interface Module	A900-IMA16D	
32-port T1/E1 Interface Module	A900-IMA32D	
8-port T1/E1 Interface Module	A900-IMA8D	
6-port E & M Interface Module	A900-IMA6EM	
14-port Serial Interface Module	A900-IMASER14A/S	
4-port C37.94 Interface Module	A900-IMA4C3794	

A900-RSP3C-400-S Supported Interface Modules

The table below is applicable for A900-RSP3C-400-S RSP module.

Note If the **license feature service-offload enable** command is configured, then the following IMs are not supported in the router for RSP3:

- A900-IMA8S
- A900-IMA8T
- A900-IMA8S1Z
- A900-IMA8T1Z

Note There are certain restrictions in using the interface modules on different slots with RSP3 module. Contact Cisco Sales/Support for the valid combinations.

Note If there is any silicon oil leakage from the thermal pad of the RSP card, use a lint-free cloth moistened with IsoPropyl Alcohol (IPA) to thoroughly clean the affected area. Silicon oil leakage is an expected behaviour due to the material's properties. It is non-conductive, non-electrical, and poses no hazard to human health. The presence of silicon oil on the card is harmless and will not impact the card's functionality or system performance.

Table 8: A900-RSP3C-400 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
6-port E & M Interface Module	A900-IMA6EM	All

Supported Interface Modules	Part Numbers	Slot
4-port C37.94 Interface Module	A900-IMA4C3794	All
14-port Serial Interface Module	A900-IMASER14A/S	All
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	All
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	All
SFP Combo IM—8-port SFP Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	All
Copper Combo IM—8-port 10/100/1000 Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	All
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	All
8-port 10 Gigabit Ethernet Interface Module (8x10GE)	A900-IMA8Z	All
1-port 100 Gigabit Ethernet Interface Module (1x100GE)	A900-IMA1C	4 or 5
2-port 100 Gigabit Ethernet (QSFP) Interface Module (2x100GE)	N560-IMA2C/A900-IMA2C	4 and 5[1]
2-port 40 Gigabit Ethernet QSFP Interface Module (2x40GE)	A900-IMA2F	4 or 5
8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module	A900-IMA8CS1Z-M	0,3,4 or 5
48-port T1/E1 Interface module	A900-IMA48D-C	All
48-port T3/E3 Interface module	A900-IMA48T-C	All
1-port OC-192 or 8-Port Low Rate CEM Interface Module	A900-IMA8S1Z-CX	2,3,4,5
4-port OC-48/OC-12/OC-3 + 12-Port A900-IMA3G-IMSG T1/E1 + 4-Port T3/E3 CEM Interface Module	A900-IMA3G-IMSG	2,3,4,5

Supported Interface Modules	Part Numbers	Slot

ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module	A900-IMA1Z8S-CXMS	2, 3, 4, 5[2]
		Note To enable this IM on slot 0 or slot 1, do the following and reload the router:
		`Router# configure t`
		`Router(config)# license feature service-offload enable`

[1] IM supports only one port of 100G with RSP3 as QSFP28 on Port 0 in both slots 4 and 5.
[2] These slots are supported on 10G or 20G mode.

A900-RSP3C-200-S Supported Interface Modules

The table below is applicable for A900-RSP3C-200-S RSP module.

Note If the **license feature service-offload enable** command is configured, then the following IMs are not supported in the router for RSP3:

- A900-IMA8S
- A900-IMA8T
- A900-IMA8S1Z
- A900-IMA8T1Z

Note There are certain restrictions in using the interface modules on different slots with RSP3 module. Contact Cisco Sales/Support for the valid combinations.

Note FAN OIR is applicable every time the IM based fan speed profile is switched to the IMA1C and IMA2F interface modules. Even though the IMs remain in the Out-of-Service state, they are still considered as present in the chassis.

Note If there is any silicon oil leakage from the thermal pad of the RSP card, use a lint-free cloth moistened with IsoPropyl Alcohol (IPA) to thoroughly clean the affected area. Silicon oil leakage is an expected behaviour due to the material's properties. It is non-conductive, non-electrical, and poses no hazard to human health. The presence of silicon oil on the card is harmless and will not impact the card's functionality or system performance.

Table 9: A900-RSP3C-200 Supported Interface Modules and Part Numbers

Supported Interface Modules	Part Numbers	Slot
8-port Gigabit Ethernet SFP Interface Module (8x1GE)	A900-IMA8S	All
8-port Gigabit Ethernet RJ45 (Copper) Interface Module (8x1GE)	A900-IMA8T	
1-port 10 Gigabit Ethernet XFP Interface Module (1x10GE)	A900-IMA1X	0, 2 or 4
SFP Combo IM—8-port SFP Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet (1x10GE)	A900-IMA8S1Z	1-5[3]
Copper Combo IM—8-port 10/100/1000 Gigabit Ethernet (8x1GE) + 1-port 10 Gigabit Ethernet Interface Module (1x10GE)	A900-IMA8T1Z	0-4
2-port 10 Gigabit Ethernet Interface Module (2x10GE)	A900-IMA2Z	
8-port 10 Gigabit Ethernet Interface Module (8x10GE)	A900-IMA8Z	4
2-port 40 Gigabit Ethernet QSFP Interface Module (2x40GE)	A900-IMA2F	4
4-port OC-48/OC-12/OC-3 + 12-Port A900-IMA3G-IMSG T1/E1 + 4-Port T3/E3 CEM Interface Module	A900-IMA3G-IMSG	2-5[4]
8-Port 10 Gigabit Ethernet (8x10GE) SFP+ Interface Module with Conformal Coating	[5]ASR900-IMA8Z-CC	0

[3] If you have a 1-port 10G IM in slot 0, then SFP combo may not be supported in slot 5.
[4] If slot 0 has 8X10G IM and you want to insert IMA-3G-IMSG to slot 5, then insert 8X10G IM on slot 6, by using the **hw-module subslot 0/0 A900-IMA8Z mode 6-Port** command.
[5] Supported only from release XE-17.13.1 onwards.

Supported RSP Features

The RSP provides the following features on the Cisco router:

- Centralized data plane, timing, and control plane functions for the system
- High-level control of interface modules
- Management functionalities for the router
- Control plane (host) CPU and associated memory in which IOS-XE and platform control software runs
- Nonvolatile memory for storage of software images, configurations, and system files
- Enabling and monitoring the health and presence of fan trays, interface modules, and power supplies
- Field replacement and hot-swap capabilities

RSP Redundancy

The Cisco ASR 903 Router chassis includes two RSP slots to allow for redundant RSPs. When the router uses redundant RSPs, one RSP operates in the active mode and the other operates in the hot standby mode. Removal or failure of the active RSP results in an automatic switchover to the standby RSP.

Note If you are using redundant RSPs, both the RSPs must be of the same type because a mixed configuration of two different RSP types is not supported.

Network Timing Interfaces

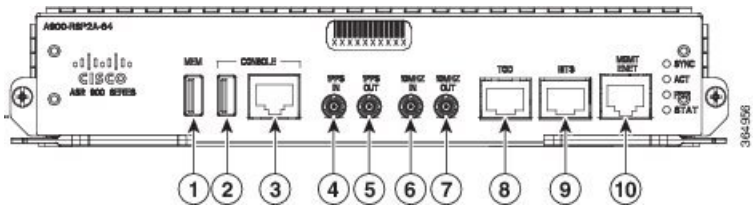
The RSP supports the following network timing interfaces:

- BITS input/output port—RJ48 jack
- 1 PPS input and output—Mini coax connectors
- 2.048 or 10 MHz input and output—Mini coax connectors
- Time of Day (ToD) input/output port and 1 PPS input port—Shielded RJ45 jack

Network timing interfaces support redundancy in a redundant RSP configuration. Network timing interfaces on a redundant RSP remain in operation while the RSP is in hot standby mode.

RSP Interfaces

Figure 11: Cisco A900-RSP2A Interface Summary



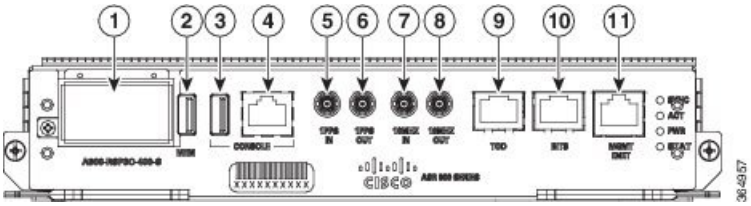
Label	Interface
1	USB memory port

Label	Interface
2	USB console port
3	Console port
4	1 PPS input timing port
5	1 PPS output timing port
6	10 MHz input timing port
7	10 MHz output timing port
8	Time of Day (ToD) timing port
9	BITS timing port
10	Ethernet management port

The Cisco A900-RSP2A module has the following front panel interfaces. For information on cable pinout, see Pinouts.

- 1 USB Type-A Connector for USB-flash (Label = “MEM”)
- 1 USB Type-A Connector for alternate console port (Label = “CONSOLE”)
- RJ45 Connecter for Con/Aux (Label = “CONSOLE”)
- RJ48 Jack for BITS interface. (Label = “BITS”)
- RJ48 Jack for Time-of-Day interface. (Label= “TOD”)
- RJ45 Connecter for Con/Aux (Label = “MGMT ENET”)
- 4 Mini-Coax connectors (Label = “1PPS IN”, “1PPS OUT”, “10MHZ IN”, “10MHZ OUT”)

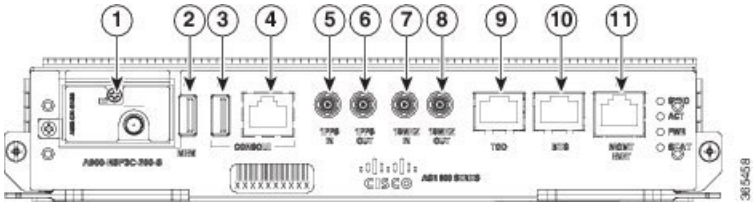
Figure 12: Cisco A900-RSP3C-400-S Interfaces



Label	Interface
1	GNSS module slot (optional)
2	USB memory port
3	USB console port
4	Console port
5	1 PPS input timing port
6	1 PPS output timing port
7	10 MHz input timing port

Label	Interface
8	10 MHz output timing port
9	Time of Day (ToD) timing port
10	BITS timing port
11	Ethernet management port

Figure 13: Cisco A900-RSP3C-200-S Interfaces



Label	Interface
1	GNSS module slot (optional)
2	USB memory port
3	USB console port
4	Console port
5	1 PPS input timing port
6	1 PPS output timing port
7	10 MHz input timing port
8	10 MHz output timing port
9	Time of Day (ToD) timing port
10	BITS timing port
11	Ethernet management port

For more information about installing the RSP, see RSP Installation. For more information about the RSP LEDs, see RSP LEDs.

GNSS Module (A900-CM-GNSS)

The GNSS module is present on the RSP3 modules. It is a pluggable module that allows direct interface with the external antenna.

Note Using a single GPS antenna input for both RSPs requires usage of external splitters.

Warning To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023

Note The GNSS module is not hot swappable.

GNSS Module RF Input Requirements

- The GNSS module requires an active GPS/GNSS antenna with built-in Low-Noise Amplifier (LNA) for optimal performance. The antenna LNA amplifies the received satellite signals for two purposes:
  - Compensation of losses on the cable
  - Lifting the signal amplitude in the suitable range for the receiver frontend

The Amplification required is 22dB gain + cable/connector loss + Splitter signal loss.

The recommended range of LNA gain (LNA gain minus all cable and connector losses) at the connector of the receiver module is 22dB to 30dB with a minimum of 20dB and a maximum of 35dB.

- GNSS module provides 5V to the active antenna through the same RF input.
- Surge requirement:

GNSS modules have built-in ESD protections on all pins, including the RF-input pin. However, additional surge protection may be required if rooftop antennas are being connected, to meet the regulations and standards for lightning protection in the countries where the end-product is installed.

A lightning protection must be mounted at the place where the antenna cable enters the building. The primary lightning protection must be capable of conducting all potentially dangerous electrical energy to PE (Protective Earth).

Surge arrestors should support DC-pass and suitable for the GPS frequency range (1.575GHz) with low attenuation.

- Antenna Sky visibility:

GPS signals can only be received on a direct line of sight between antenna and satellite. The antenna should see as much as possible from the total sky. For proper timing, minimum of four satellites should be locked.

Note The antenna terminal should be earthed at the building entrance in accordance with the ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of Outer Conductive Shield of a Coaxial Cable.

- Use a passive splitter if more than one GNSS modules are fed from a single antenna.

For information on pinout, see GPS Port Pinout.

Interface Modules

The Cisco ASR 903 Router interface modules are a field-replaceable units. In addition to the ports provided on an RSP, the Cisco ASR 903 Router supports the following interface modules:

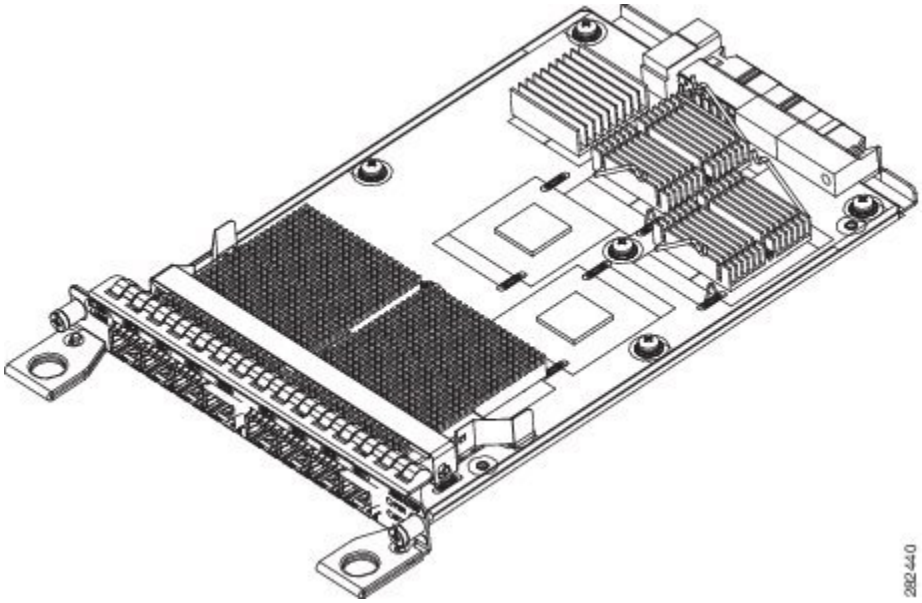
Note For information about supported interface modules, see the *Release Notes for the Cisco ASR 903 Series Aggregation Services Router*.

For more information about installing, see the Interface Module Installation.

8-Port 1 Gigabit Ethernet SFP Interface Module (A900-IMA8S)

The Gigabit Ethernet Small Form-Factor Pluggable (SFP) interface module provides eight Gigabit Ethernet SFP modules. The figure below shows the 8-port 1 GE Gigabit Ethernet SFP interface module.

Figure 14: 8-port 1 GE Gigabit Ethernet SFP Interface Module

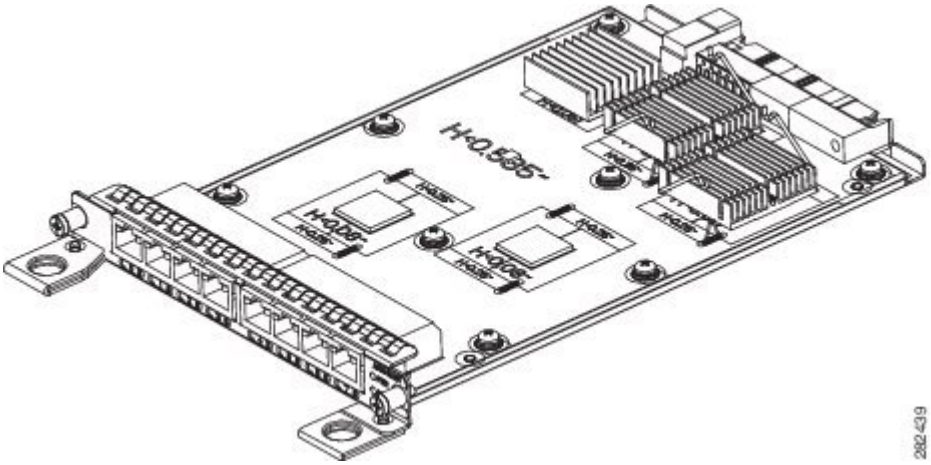


For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

8-Port 1 Gigabit Ethernet RJ45 Interface Module (A900-IMA8T)

The 8-port 1 Gigabit Ethernet RJ45 interface module provides eight Gigabit Ethernet copper ports. The figure below shows the interface module.

Figure 15: 8-port 1 GE Gigabit Ethernet RJ45 (Copper) Interface Module

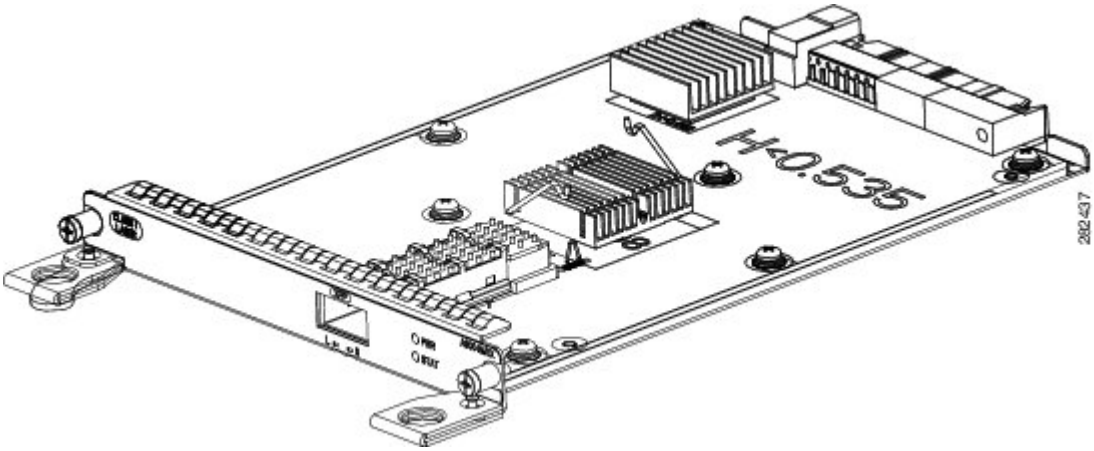


For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

1-Port 10 Gigabit Ethernet XFP Interface Module (A900-IMA1X)

The 10-Port Gigabit Ethernet XFP interface module provides a single port supporting a 10 Gigabit Ethernet XFP module. The figure below shows the interface module.

Figure 16: 1-port 10 Gigabit Ethernet XFP Interface Module

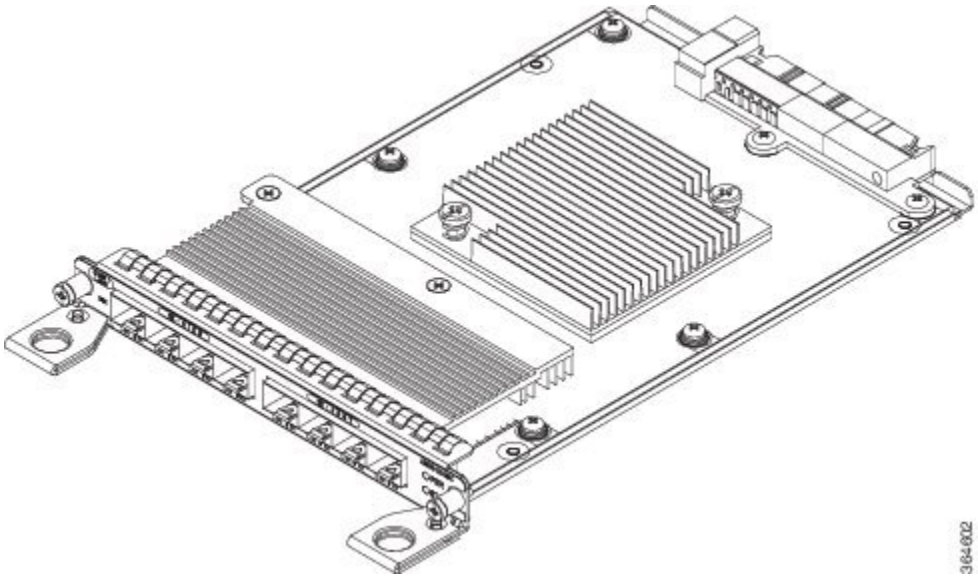


Note 1-port 10 Gigabit Ethernet interface modules are not supported in slots 4 and 5.

For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

8-port 10 Gigabit Ethernet Interface Module (8x10GE) (A900-IMA8Z)

Figure 17: 8-port 10 Gigabit Ethernet Interface Module



The high density 8-port 10 Gigabit Ethernet interface module supports eight 10 Gigabit Ethernet ports using SFP+ transceivers cages on the faceplate.

Note It does not support XFP transceivers on the ports.

The 8-port 10 Gigabit Ethernet interface module is supported in slot 0 on the router with the A900-RSP3C-200-S RSP module. Only 6 ports of the 8 are enabled. The ports enabled are 0, 1, 4, 5, 6, and 7.

Use the **hw-module subslot** command to enable the interface module in slot 0 of the router. Save the configuration and reload the router to activate the interface module.

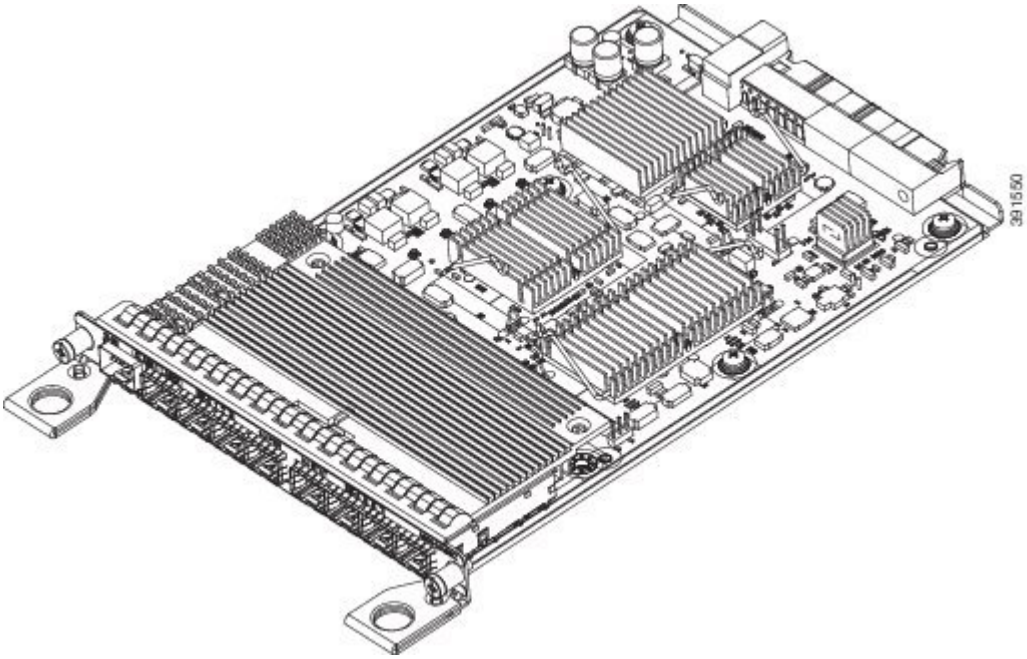
To remove the configuration, use **no hw-module subslot** command.

For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

8-Port 1 Gigabit Ethernet SFP with 1-Port 10 Gigabit Ethernet Combination Interface Module (A900-IMA8S1Z)

The 8-port 1 Gigabit Ethernet SFP interface module with the 1-port 10 Gigabit Ethernet interface module is a high density combination interface module. This module supports 8 Gigabit Ethernet SFP ports and 1 10 Gigabit Ethernet SFP+ port.

Figure 18: 8-port 1 GE SFP + 1-port 10 GE SFP+ Interface Module

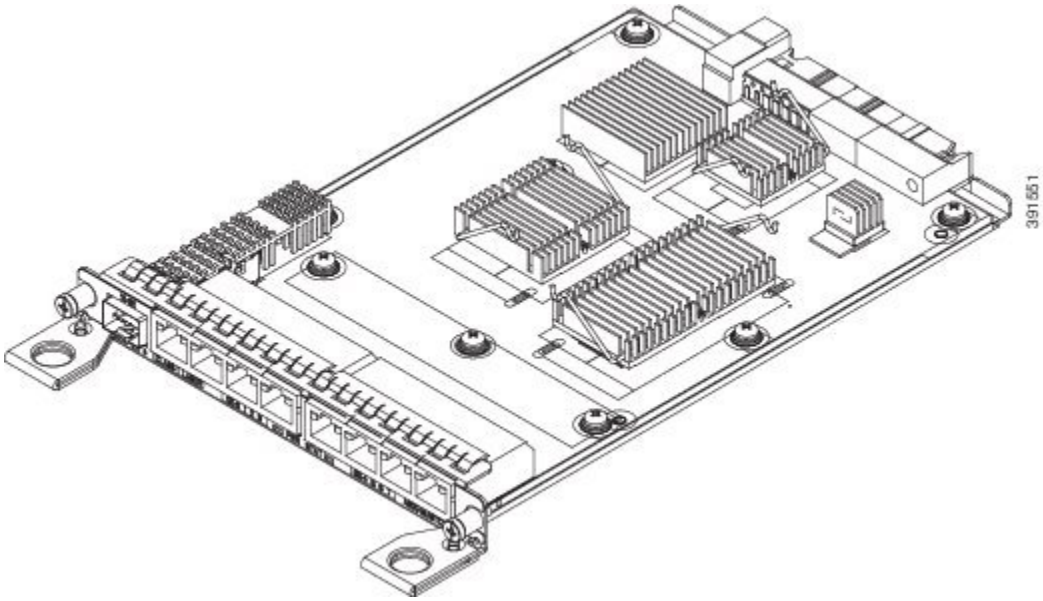


For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

8-Port 1 Gigabit Ethernet + 1-Port 10 Gigabit Ethernet SFP+ Combination Interface Module (A900-IMA8T1Z)

This 8-port 1 Gigabit Ethernet (RJ45 Copper) interface module with the 1-port 10 Gigabit Ethernet interface module is a high density combination interface module. This module supports 8 Gigabit Ethernet Copper ports and 1 10 Gigabit Ethernet SFP+ port.

Figure 19: 8-port 1 GE (RJ45) + 1-port 10 GE SFP+ Interface Module

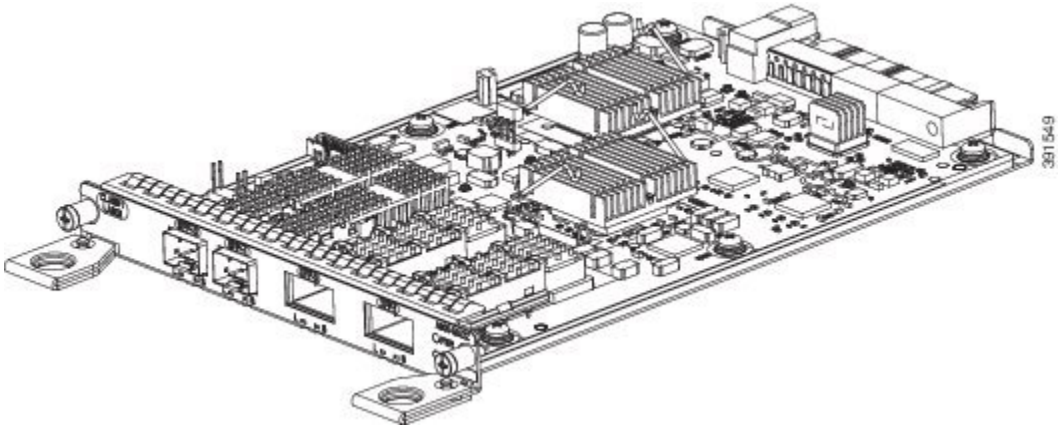


For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

2-Port 10 Gigabit Ethernet SFP+ Interface Module (A900-IMA2Z)

The 2-port 10 Gigabit Ethernet interface module provides a dual port supporting a 10 Gigabit Ethernet SFP+ and XFP module.

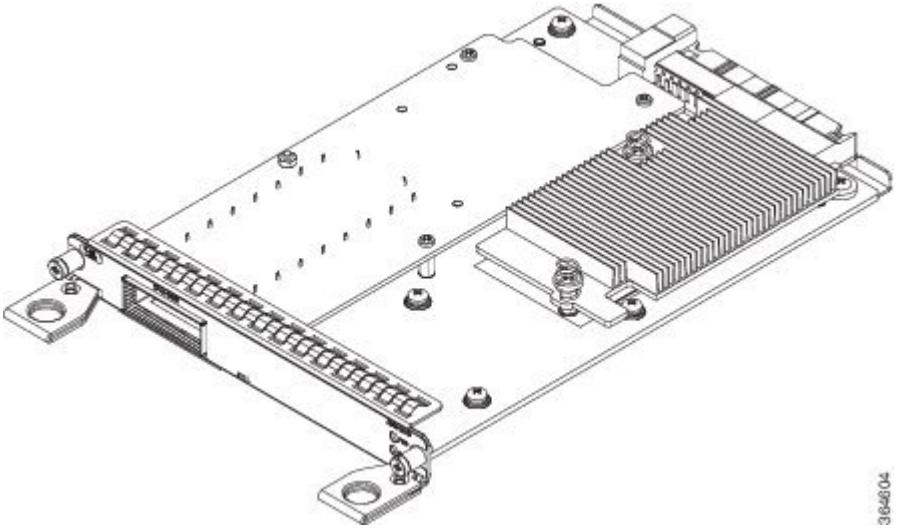
Figure 20: 2-port10 Gigabit Ethernet Interface Module



For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

1-Port 100 Gigabit Ethernet Interface Module (1x100GE) (A900-IMA1C)

Figure 21: 1-port 100 Gigabit Ethernet Interface Module



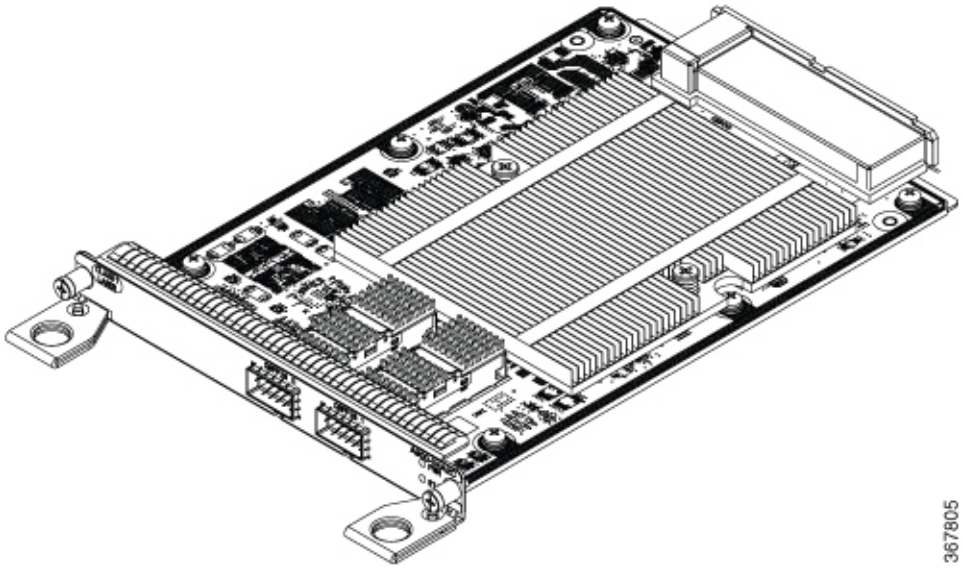
The 1-port 100 Gigabit Ethernet interface module supports one CPAK optics port.

For information on supported CPAK modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

2-Port 100 Gigabit Ethernet Interface Module (2X100GE) (N560-IMA2C)

The 2-port 100 Gigabit Ethernet Interface Module (N560-IMA2C) design supports only one 100G QSFP28 optics on Port 0. Port 1 is disabled with RSP3. It currently supports only one mode of operation with 100Gbps of traffic with RSP3.

Figure 22: 2-Port 100 Gigabit Ethernet Interface Module (2X100GE)



For information on supported QSFP modules, see Cisco ASR 900 Series Interface Modules Data Sheet.

Limitations of 2X100 GE IM

After any QSFP28 100G optics is inserted, it takes approximately 10 seconds for the optics to be detected and the link to come up. We recommend this time delay for complete initialization and operation.

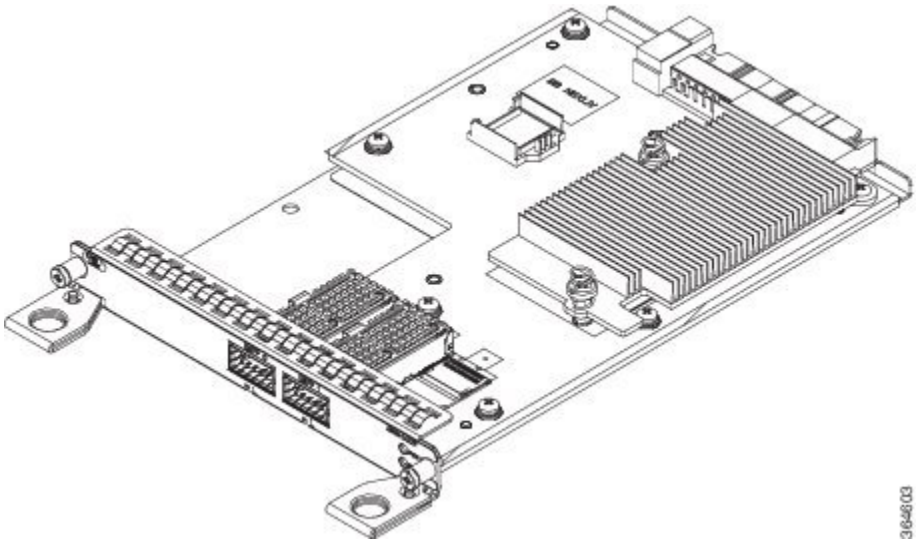
After inserting the cable or after unshutting the 100G interface, the 100G link may take approximately about 2 seconds to come up.

Note QSFP-100G-SR4-S and QSFP-100G-LR4-S are the supported optics for 2X100GE IM for the release 16.11.1.

2-Port 40 Gigabit Ethernet QSFP Interface Module (2x40GE) (A900-IMA2F)

The dual port 40 Gigabit Ethernet interface module supports the 40 Gigabit Ethernet port. The 40GE interface is supported using QSFP+ optics. The figure below shows the interface module.

Figure 23: 2-port 40 Gigabit Ethernet Interface Module



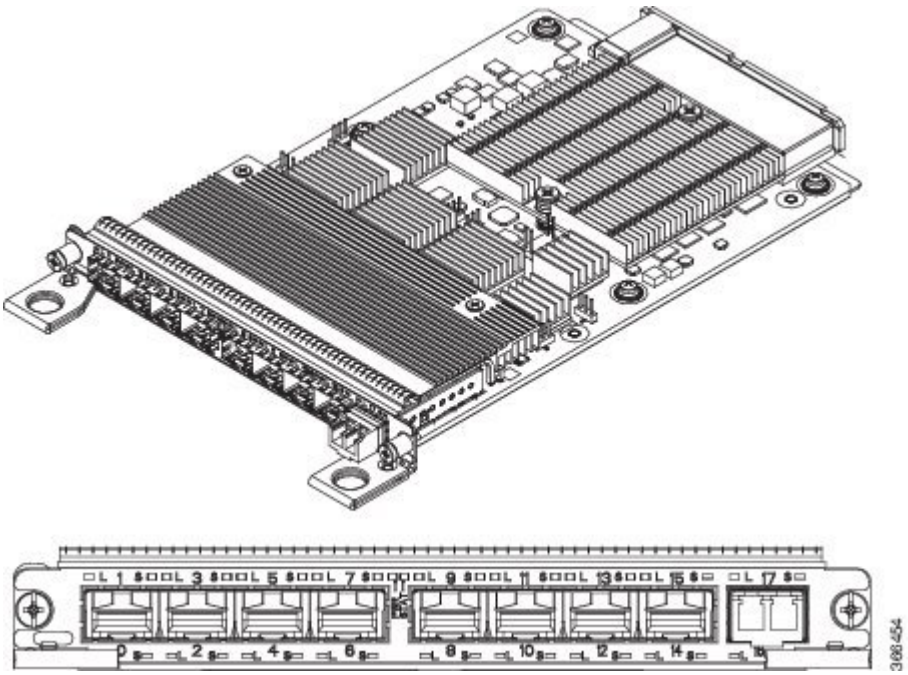
For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

8/16-Port 1 Gigabit Ethernet (SFP / SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module (A900-IMA8CS1Z-M)

The A900-IMA8CS1Z-M interface module has the flexibility to support SFP+/SFP/CSFP on the modules as mentioned below:

- The 8-port 1 Gigabit Ethernet ports can also be used as 16-port 1 Gigabit Ethernet ports Small Form-Factor Pluggable (SFP) .
- The 1-port 10 Gigabit Ethernet port can also be used as 2-port 1 Gigabit Ethernet ports with Small Form-Factor Pluggable (SFP+).

Figure 24: A900-IMA8CS1Z-M Gigabit Ethernet Interface Module



The following modes are supported for the Interface Module, based on slot capacity:

- 8 x 1GigE (SFP) Fully subscribed mode (FS)
- 8 x 1GigE (SFP) + 1 x 10GigE (SFP+) Fully subscribed mode (FS)
- 16 x 1GigE (C-SFP) + 1 x 10GigE (SFP+) Fully subscribed mode (FS)
- 16 or 18 x 1GigE (C-SFP) Oversubscribed mode (OS)
- 16 x 1GigE (C-SFP) + 1 x 10GigE (SFP+) Oversubscribed mode (OS)
- 8 or 9 x 1GigE (SFP) Fully subscribed mode (FS)
- 1 x 10GigE (SFP+) Fully subscribed mode (FS)

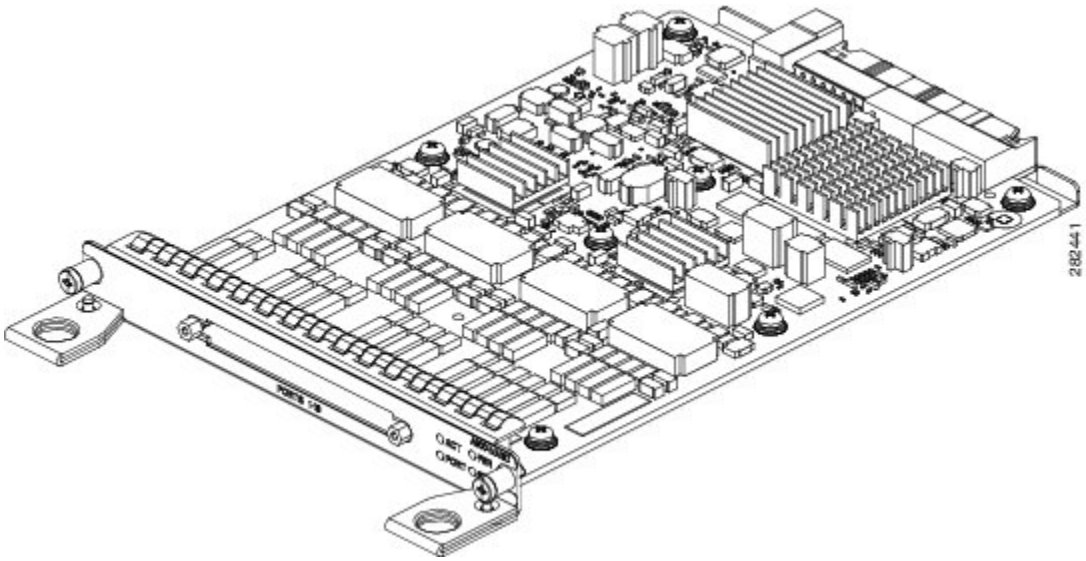
For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

For more information on port numbering, see *Configuring 1-port 10 Gigabit Ethernet (1 X SFP+) / 1-port Gigabit Ethernet (1 X SFP) / 2-port Gigabit Ethernet (1 X CSFP) and 16-port Gigabit Ethernet (8 X CSFP) / 8-port Gigabit Ethernet (8 X SFP) Interface Module* chapter of the *Cisco ASR 900 Router Series Configuration Guide, Cisco IOS XE Everest 16.6.1*.

16-Port T1/E1 Interface Module (A900-IMA16D)

The 16-port T1/E1 interface module provides connectivity for up to 16 T1/E1 ports through a 100-pin Amplimite connector. The 16-port T1/E1 interface module requires the use of a patch panel to provide RJ48 (T1) or BNC (E1) connectors. The figure below shows the interface module.

Figure 25: 16-port T1/E1 Interface Module

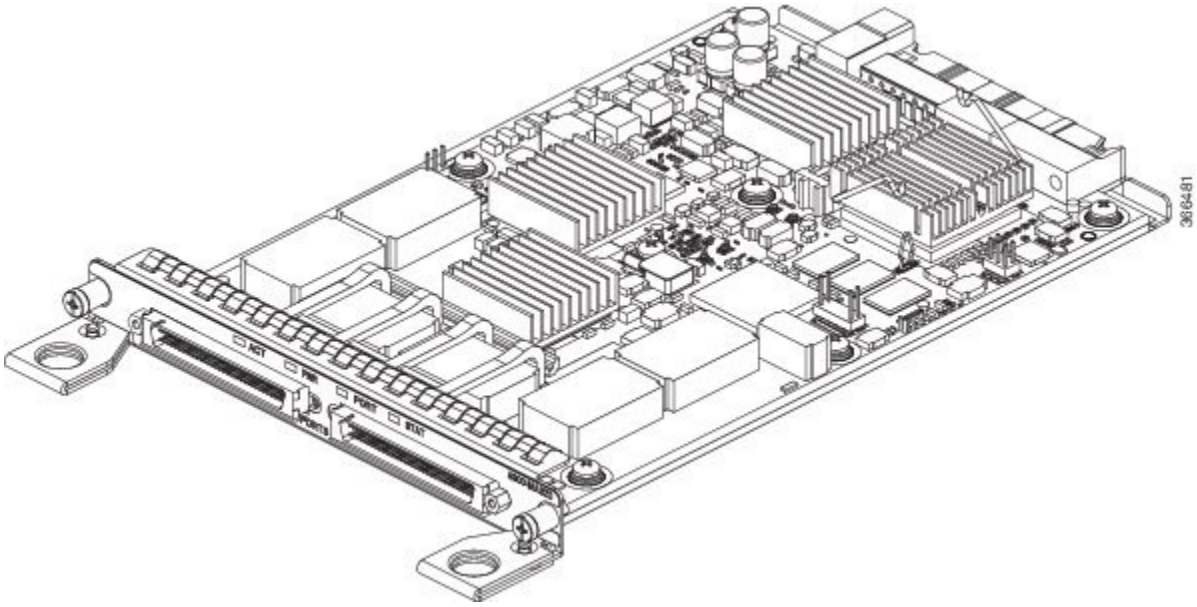


32-Port T1/E1 Interface Module (A900-IMA32D)

The 32-port T1/E1 interface module provides connectivity for up to 32 T1/E1 ports through two 68-pin Tyco connectors. It is supported on the A900-RSP2A-64 module in slots 3, 4 and 5, and on the A900-RSP2A-128 on all slots.

The 32-port T1/E1 interface module requires the use of a patch panel to provide RJ48 or BNC connectors.

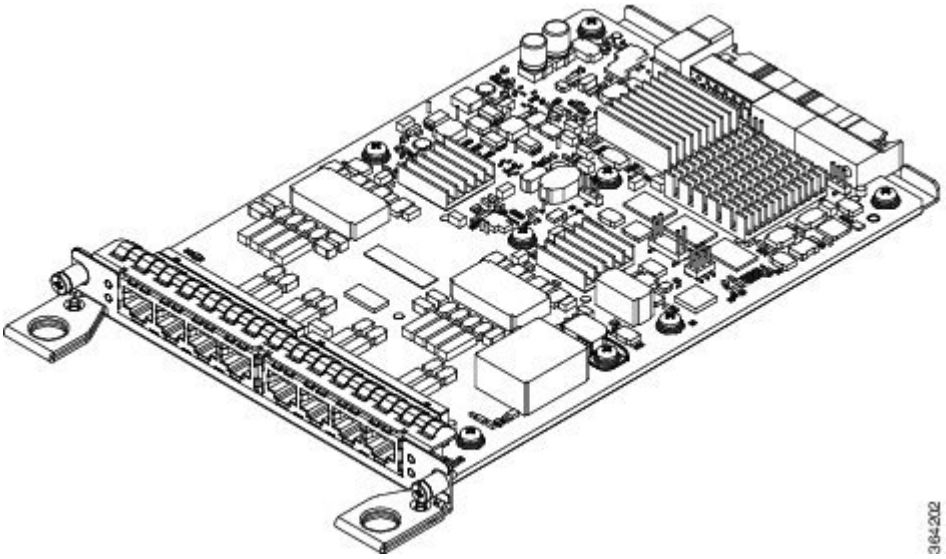
Figure 26: 32-portT1/E1 Interface Module



8-port T1/E1 Interface Module (A900-IMA8D)

The 8-port T1/E1 interface module provides connectivity for up to 8 T1/E1 ports through RJ48C port connectors on the front panel. The figure below shows the interface module. For information on supported slots, see *Supported RSPs*.

Figure 27: 8-portT1/E1 Interface Module



48-Port T1/E1 CEM Interface Module (A900-IMA48D-C)

The 48-port T1/E1 interface module provides connectivity for up to 48 T1/E1 ports through 3 high-density connectors on the front panel (as shown in figure 48-port T1/E1 Faceplate). Each port supports 16 TX and RX ports.

Figure 28: 48-port T1/E1 Interface Module

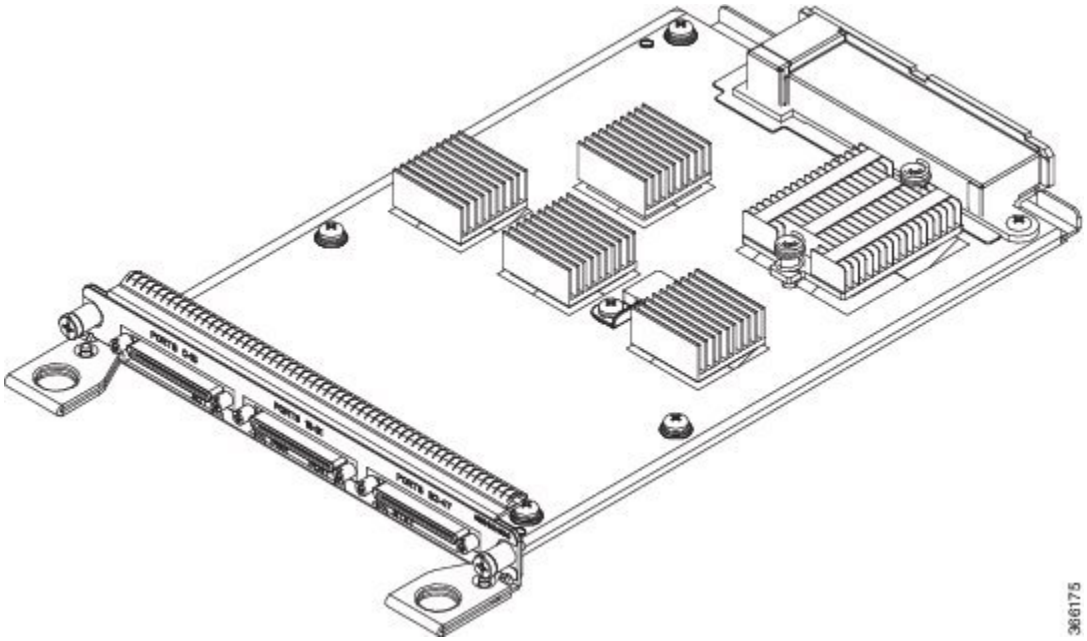
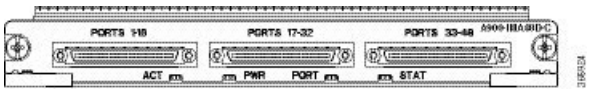


Figure 29: 48-port T1/E1 Faceplate



48-Port T3/E3 CEM Interface Module (A900-IMA48T-C)

The 48-port T3/E3 interface module provides connectivity for up to 48 T3/E3 ports through 3 high-density connectors on the front panel (see the figure below). Each port supports 16 TX and RX ports.

Figure 30: 48 x T3/E3 Interface Module

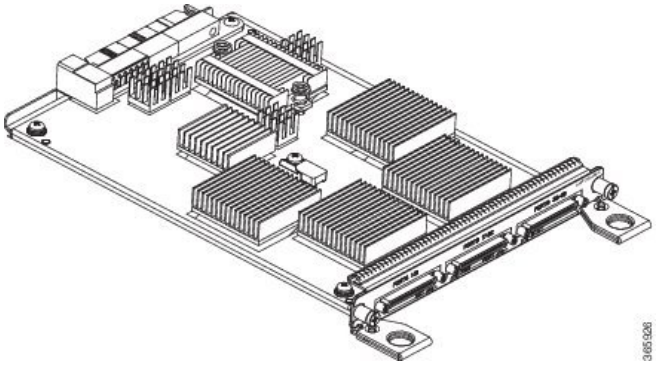
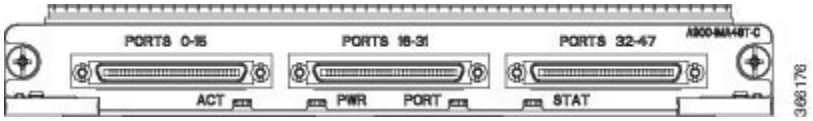


Figure 31: 48-port T3/E3 Faceplate

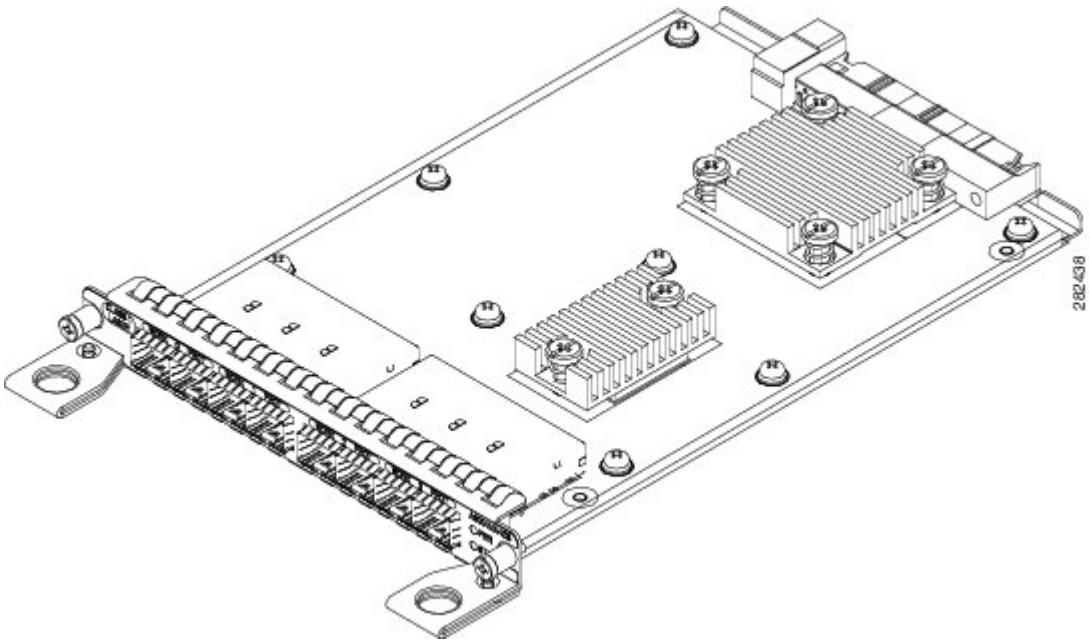


4-Port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) Interface Module (A900-IMA4OS)

The 4-port OC3/STM-1 (OC-3) or 1-port OC12/STM-4 (OC-12) interface module can operate as up to four STM-1 interfaces. The figure below shows the interface module.

Note The optical interface module is designed for OC-3 and OC-12 traffic.

Figure 32: 4-port OC-3 Interface Module



For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

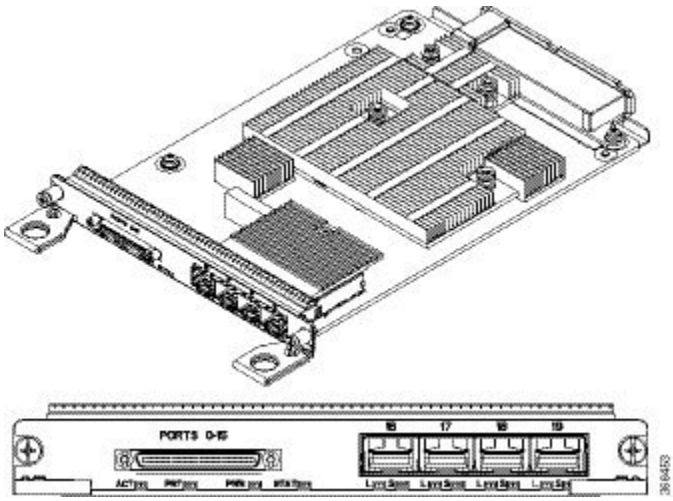
1-port OC-48/STM-16 or 4-port OC-12/OC-3 / STM-1/STM-4 + 12-Port T1/E1 + 4-Port T3/E3 CEM Interface Module (A900-IMA3G-IMSG)

The A900-IMA3G-IMSG interface module supports:

- 12xDS1/E1 + 4xDS3/E3 interface over the high-density port.
- 1xOC48/12/3 Gigabit interface and 3xOC12/3 Gigabit interface.

Note If OC48 is enabled, then the remaining 3 ports are disabled.

Figure 33: A900-IMA3G-IMSG Gigabit Ethernet Interface Module



For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

1-Port OC-192 or 8-Port Low Rate CEM Interface Module (10G HO / 10G LO) (A900-IMA8S1Z-CX)

The 1-port OC-192 interface module with 8-port low rate CEM interface module is a high density combination interface module. This module supports 1 OC-192 port or 8 low rate CEM or 1 Gigabit Ethernet port.

Figure 34: OC-192 Interface Module

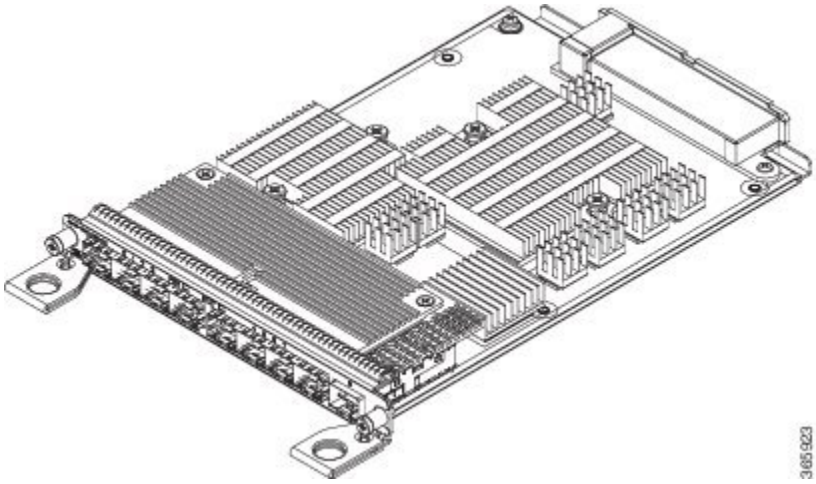
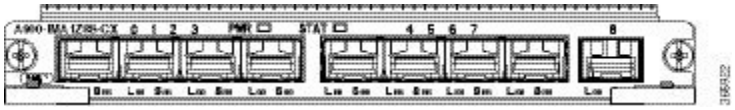


Figure 35: OC-192 Interface Module Faceplate



The OC-192 interface modules are supported on slots 2, 3, 4 and 5 on the chassis.

Ports on the OC-192 are numbered from 1 to 8.

- Ports 0 to 7 are multi-rate ports, that support OC-3, OC-12, OC-48, Fast Ethernet interfaces, and the 1 Gigabit Ethernet interfaces.
- Port 8 is the 10 Gigabit Ethernet port that supports the OC-192 interfaces.

Port Restrictions

- The SFP+ port configuration is supported only on OC-192 interfaces port. If this port is enabled, other SFP ports cannot be used (see the table given in Port Combinations Usage Guidelines section).
- Each SFP port can be configured for SONET or Ethernet.
- SFP ports configuration parameter, (see the table given in Port Combinations Usage Guidelines section):
  - Maximum of 4 x OC-48 interfaces are supported per interface module
  - For each OC-48 port enabled, neighboring SFP ports cannot be configured
  - OC-3 and OC-12 port configuration is supported on all ports simultaneously
  - 1 Gigabit Ethernet port configuration is supported on all ports simultaneously



Note 1 Gigabit Ethernet port configuration is not supported.

- Seamless migration from SONET to 1 Gigabit Ethernet interfaces is supported on all SFP ports

Port Combinations Usage Guidelines

SFP+ Port	SFP+ Port 8	OC-192	Or	SFP+ Port	SFP+ Port 8	—	Or	SFP+ Port	SFP+ Port 8	—	Or	SFP+ Port	SFP+ Port 8	—
SPF Port	7	—		SPF Port	7	OC-48		SPF Port	7	OC-3		SPF Port	7	1 GE
	6	—			6	—			6	OC-12			6	1 GE
	5	—			5	OC-48			5	OC-12			5	1 GE
	4	—			4	—			4	OC-3			4	1 GE
	3	—			3	OC-48			3	OC-3			3	1 GE
	2	—			2	—			2	OC-12			2	1 GE
	1	—			1	OC-48			1	OC-12			1	1 GE
	0	—			0	—			0	OC-3			0	1 GE

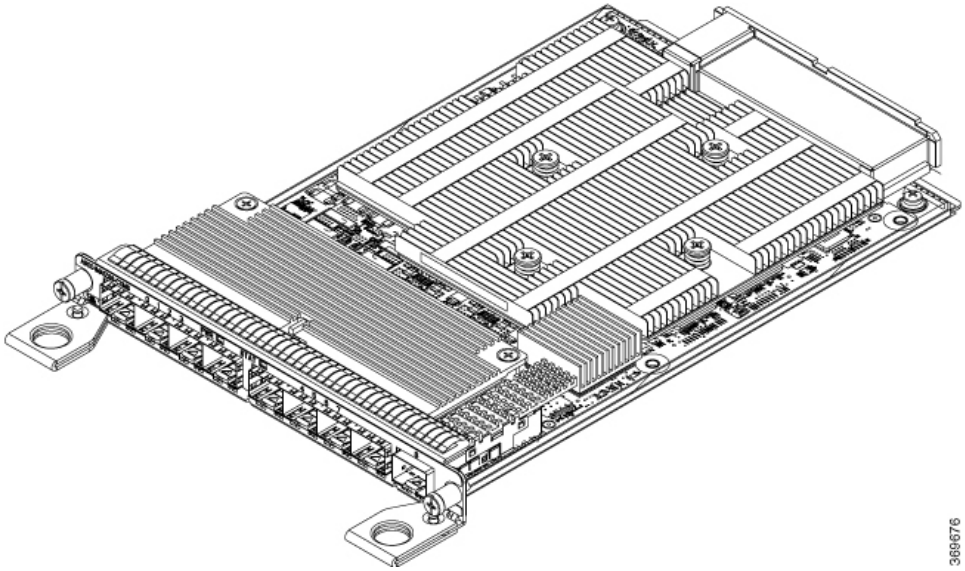
For information on supported SFP modules, see Cisco ASR 900 Series Aggregation Services Routers Data Sheet.

ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module (A900-IMA1Z8S-CXMS)

The ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module is a cost-effective interface module (IM) that supports CEM and Multiservice Gateway features on the OCn interfaces.

Note The Multiservice Gateway features are not supported on this IM on Cisco IOS XE Release 16.12.1.

Figure 36: CEM and iMSG Interface Module



The ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module, 20G IM supports eight SFP optical interfaces supporting at OC-3/OC-12/OC-48/1G rates and a single SFP+ optical interface supporting at OC-192/10G.

This IM operates in two modes:

- 20G mode; uses two XFI lanes towards the system
- 10G mode; uses single XFI lane towards the system

The benefits of this IM are:

- Improves backplane efficiency
- Increases system capacity
- Increases client flexibility

The most important feature of the ASR 900 1-Port OC-192 or 8-Port Low Rate CEM 20G Bandwidth Interface Module, 20G IM is it provides more flexibility from the interface, which allows you to configure any interface speed on the OCn port irrespective of the IM bandwidth. The bandwidth restriction comes into effect only when the circuit is configured.

For example, you can configure the SFP+ port as an OC-192 and the other eight optical ports as OC-48 to have the total interface speed of 30G. However, if you configure only one STS-1 HO CEP on each port that will take only 9xSTS-1, which is equivalent to 500 Mbps (9 x 52Mbps x1.06) of the backplane traffic.

Restrictions

- On the port capable of OC-192 speed, lower speed such as, OC-3, OC-12, or OC-48 are not supported.

- Separate licenses are required for every OC-3, OC-12 ports, OC-48, and OC-192 ports.

14-Port Serial Interface Module (A900-IMASER14A/S)

The Cisco (A900-IMASER14A/S) is a 14-port serial interface module for the router. The router module has the following interfaces:

- 12-in-1 Connector (6)-Supports synchronous and asynchronous RS-232 interfaces using EIA/TIA-232 DB-25 connectors
- 68-Pin Connector (2)-Supports up to 8 RS-232 interfaces in full or half duplex mode using 4 RS-232 connectors (DB-25, DB-9, or RJ-45)

Figure 37: Serial Interface Module

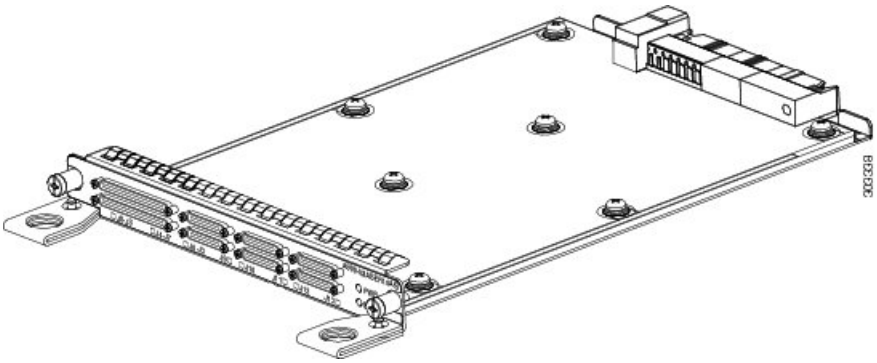
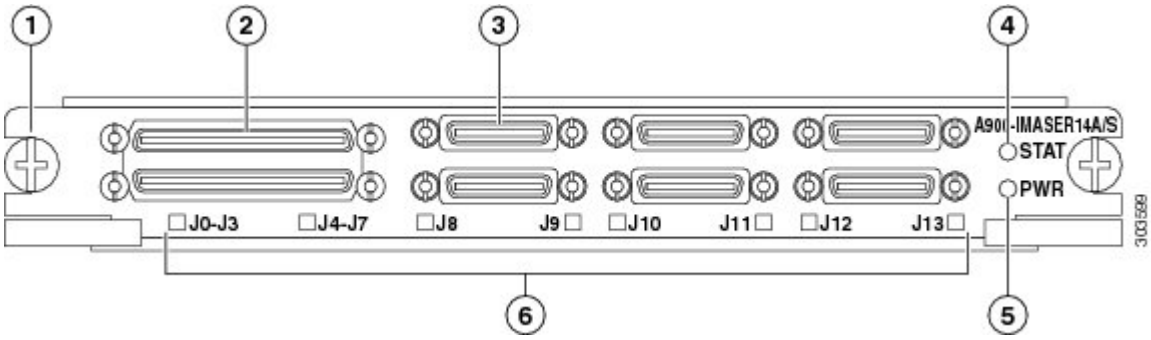


Figure 38: 14-port Serial Interfacce Module Front Panel



1	Captive screws (2)	2	68-Pin Connector (2)
3	12-in-1 Connector (6)	4	Status (STAT) LED
5	Power (PWR) LED	6	LEDs-The LEDs are as follows: • J0-J3 and J4-J7-Indicate the function of the 68-pin connectors • J8-J13-Indicate the status of the 12-in-1 connectors

For more information about using the LEDs to troubleshoot the router, see *LED Summary*.

Supported Standards

The 14-port serial interface module supports the following standards:

Standard	Definition
IEEE 1613 2009	IEEE Standard for Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations
IEC 61850-3	IEC standard specifying general requirements for substation automation systems (SAS) communications and related system requirements
IEC 60870-2-1:1995	IEC standard for substation environmental conditions
IEC 60870-2-2:1996	IEC standard for substation environmental conditions
IEC 61000-6-5:2001	IEC standard defining immunity for power station and substation environments

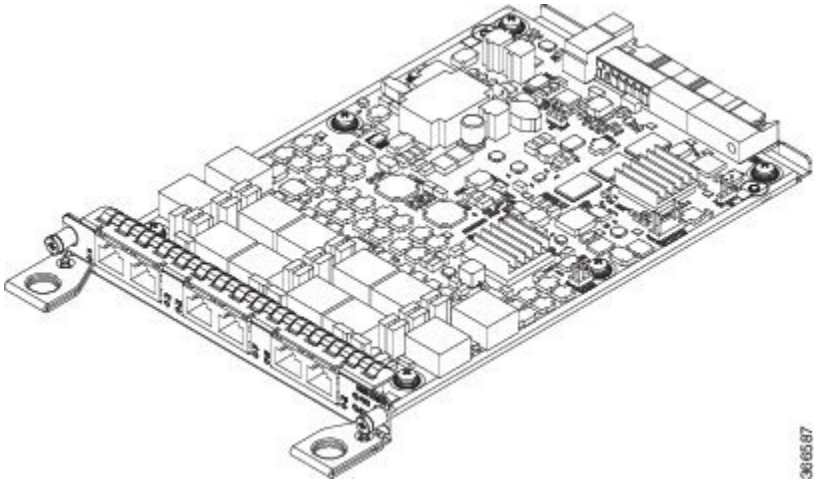
The serial interface module supports several cable types. For more information, see *Connecting Serial Cables and Serial Cable Pinouts*.

6-Port E and M Interface Module (A900-IMA6EM)

The Cisco (A900-IMA6EM) is a 6-port Ear and Mouth (E&M) interface module for the Cisco ASR 903 router. The interface module provides the router with connectivity to tele-protection equipments. The front panel of the module consists of:

- six port RJ45 connectors
- two LED that display Power and Status
- one LED per RJ45 port

Figure 39: E and M Interface Module



For information on LEDs, see E & M Interface Module LEDs.

For more information about installing the module, see the Interface Module Installation.

For more information, see Connecting Serial Cables and Serial Cable Pinouts.

4-Port C37.94 Interface Module (A900-IMA4C3794)

The Cisco (A900-IMA4C3794) is a 4-port interface module that provides IEEE C37.94-2002 compliant Nx64 kbps optical interface ports to the router. The interfaces support 50/62.5 multimode fiber at 850nm. The physical interfaces use 2.5mm ST connectors.

The front panel of the module consists of four ports of IEEE C37.94 interfaces.

Figure 40: C37.94 Interface Module

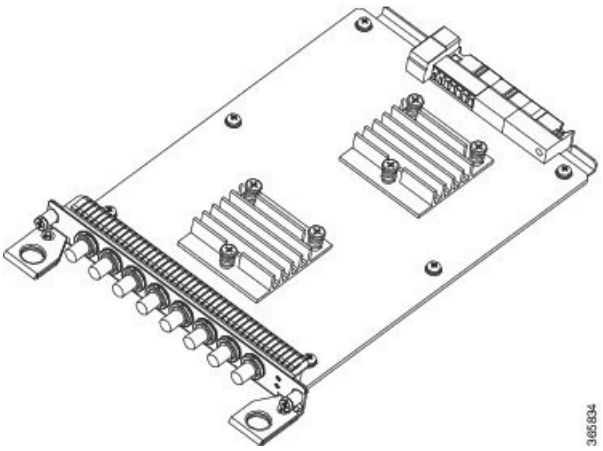
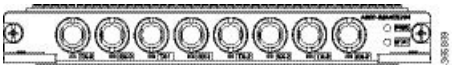


Figure 41: C37.94 Interface Module Front Panel



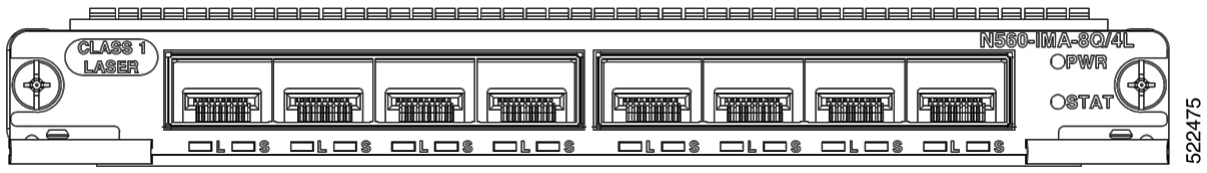
For information on LEDs, see 4-Port C37.94 Interface Module LEDs.

8-Port 10G SFP+ Single-Rate Interface Module (N560-IMA-8Q/4L)

The 8-Port 10G SFP+ Single-Rate Interface Module (N560-IMA-8Q/4L) is a single-width-single-height IM. The 8 ports of the IM are split into two modes of 4 ports each called as quads.

The single-rate optic is supported and can support on 10G.

Figure 42: Cisco N560-IMA-8Q/4L Interface Module



The interface module has a maximum power draw value of 50 W.

Blank Deflector (A900-IMA-BLNK-DEF)

The A900-IMA-BLNK-DEF is a special type of blank filler plate that can be used in empty interface module slots. In addition to just acting as a filler for the empty slots in the router, this blank deflects additional air towards the interface modules in the slot below it, thereby enhancing the cooling for the interface module.

Caution The A900-IMA-BLNK-DEF is module should not be used in slot 0 in the Cisco ASR 903 Router.

For slot 0, always use the filler blank (A900-IMA-BLANK) when a blank filler needs to be used.

For more information on operating temperature, see Example: Configuration with A900-RSP3-200-S with Blank Deflector (A900-IMA-BLNK-DEF).

Maximum Operating Ambient Temperature Support for RSP3 Modules

The router supports multiple fan trays with different cooling capacities. The maximum operating temperature of the router using the RSP3 modules, depends on the fan tray and the interface modules used in the router.

The tables below provide and overview of the operating ambient temperature limits for different fan tray and interface module combinations. These values are specified for side-to-side airflow configuration.

Note The temperature range could further be restricted by the optical modules are used in the router.

Note If you remove the fan tray from the system, the node thermal shut down is based on ASIC temperature and not based on the timer value, from release 16.6.x and later.

Table 10: Operating Temperature for A900-RSP3C-400-S Module

Interface Modules	Fan Tray	Operating Temerature Limit (°C)					
-	-	Side to side airflow (without air plenum)			Front to back airflow (with air plenum: A903-F2B-AIR-U)		
-	-	COM	EXT	IND	COM	EXT	IND
A900-IMA1X	A903-FAN	0 to 50	-5 to 55	-40 to 55	NA		
A900-IMA8T	A903-FAN-E	0 to 45[6]	-5 to 50	-40 to 50	0 to 45[1]	-5 to 45	-40 to 45
A900-IMA8S A900-IMA2Z A900-IMA8T1Z A900-IMA8S1Z	A903-FAN-H	0 to 55[1]	-5 to 60 [1]	-40 to 60[1]	0 to 55[1]	-5 to 55	-40 to 55

Interface Modules	Fan Tray	Operating Temerature Limit (°C)					
A900-IMA8Z[7]	A903-FAN	0 to 50	-5 to 55	NA			
	A903-FAN-E	0 to 40	-5 to 50	NA	0 to 40	-5 to 45	NA
	A903-FAN-H	0 to 50	-5 to 55	NA	0 to 45	-5 to 50	NA
A900-IMA2F A900-IMA1C[8]	A903-FAN	0 to 45	NA		NA		
	A903-FAN-H	0 to 50	NA		0 to 45	NA	
A900-IMA1Z8S-C A900-IMA48D-C A900-IMA48T-C A900-IMA8CS1Z A900-IMA8CT1Z A900-IMA3G-IMSG	A903-FAN-H	0 to 50	-5 to 60	-40 to 60	0 to 45	-5 to 55	-40 to 55
N560-IMA2C		0 to 50 (SR, LR) 0 to 45 (ER)	NA	NA	0 to 50 (SR, LR) 0 to 45 (ER)	NA	NA

[6] For 10 SFP + optics max allowable ambient temperature will reduce by 5°C
[7] Will operate 5°C lesser only in slot 0 and slot 1 if used with 1200W AC PSUs
[8] Values are based on CPAK SR10 Module

Legend:

- NA - Not Applicable or Supported
- COM - Commercial Optics
- EXT - Extended Range Optics
- IND - Industrial Grade optics

Table 11: Operating Temperature for A900-RSP3C-200-S Module

Interface Modules	Fan Tray	Operating Temerature Limit (°C)					
-	-	**Side to side airflow (without air plenum)**			**Front to back airflow (with air plenum: A903-F2B-AIR-U)**		
-	-	**COM**	**EXT**	**IND**	**COM**	**EXT**	**IND**

Interface Modules	Fan Tray	Operating Temerature Limit (°C)					
A900-IMA1X A900-IMA8T A900-IMA8S A900-IMA2Z A900-IMA8T1Z A900-IMA8S1Z	A903-FAN	0 to 50	-5 to 65	-40 to 65	NA		
	A903-FAN-E				0 to 50	-5 to 60	-40 to 60
	A903-FAN-H					-5 to 65	-40 to 65
A900-IMA8Z[9]	A903-FAN	0 to 45	-5 to 60	NA	NA		
	A903-FAN-E	0 to 40	-5 to 55	NA	NA	-5 to 50	NA
	A903-FAN-H	0 to 50	-5 to 65	NA	0 to 40	-5 to 55	NA
A900-IMA1C	A903-FAN	0 to 50	NA		NA		
	A903-FAN-E		NA		0 to 45	NA	
	A903-FAN-H	0 to 55	NA		0 to 50	NA	
A900-IMA2F	A903-FAN	0 to 55	NA		NA		
	A903-FAN-E	0 to 50	NA		0 to 45	NA	
	A903-FAN-H	0 to 60	NA		0 to 50	NA	

[9] Supports a maximum temperature of 65°C with A903-FAN or A903-FAN-E if A900-IMA-BLNK-DEF is used in the slot above the interface module with EXT/RGD/IND modules.

Example: Configuration with A900-RSP3-200-S with Blank Deflector (A900-IMA-BLNK-DEF)

In the below configuration, the overall operating temperature of the router is enhanced by using A900-IMA-BLNK-DEF in the slots above A900-IMA8Z interface module. The maximum operating temperature of the router is enhanced from 55°C to 65°C by using A900-IMA-BLNK-DEF in slots 1 and 5 (above A900-IMA8Z).

Note To support 65°C ambient temperature, EXT optics need to be used for 10G ports.

A900-IMA-BLNK-DEF	A900-RSP3C-200		A903-FAN-E
A900-IMA8Z			
A900-IMA-8T1Z	A900-RSP3C-200		
A900-IMA-8T1Z			
A900-IMA-BLNK-DEF	PSU	PSU	
A900-IMA8Z			

Temperature Sensor

The Cisco ASR 903 Router has a temperature sensor to detect overtemperature conditions inside the chassis.

Temperature Sensors on the A900 RSP2 modules

The overtemperature detection trips at 75 degrees C +/- 5% with the ambient (inlet) trip point at 67 degrees C. This condition is reported to the processor as an interrupt, and the software takes action to generate the appropriate alarms.

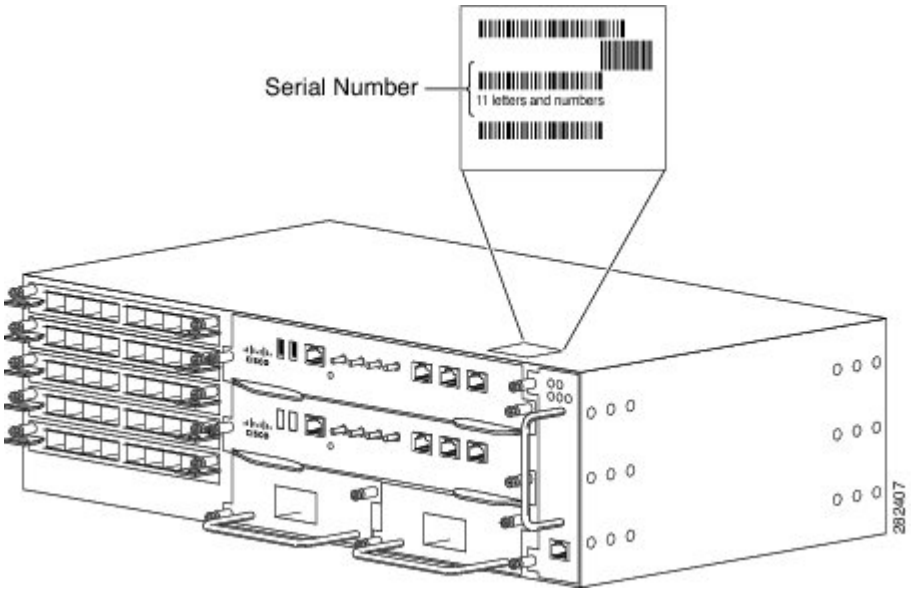
Temperature Sensors on the A900 RSP3 modules

The maximum operating temperature of RSP3 module and the interface modules is less than the maximum operating temperature of the Cisco ASR 903 router. The IOS software decides the appropriate temperature thresholds to generate warnings, and shuts down the system when abnormally high temperature is detected. For more information, see Maximum Operating Ambient Temperature Support for RSP3 Modules.

Serial Number Label Location

The figure below shows the serial number label location on the Cisco ASR 903 Router.

Figure 43: Cisco ASR 903 Router Serial Number Location



Patch Panels

The Cisco router has patch panels modules that provide interconnections with the interface modules.

The following table shows different types of patch panel:

Table 12: T1/E1 Patch Panel

Patch Panel	Description
PANEL-48-1-DIN	48X75 ohm E1/DS1 termination, through DIN 1.0/2.3 connectors
PANEL-48-1-RJ48	48X120 ohm E1/110 ohm DS1 termination, through RJ 48C connector
PANEL-48-1-AMP64	48X120 ohm E1/110 ohm DS1 termination, through 4xAMP 64-pin
PANEL-144-1-AMP64	144X120 ohm E1/110 ohm DS1 termination, through 12XAMP64-pin

Table 13: T3/E3 Patch Panel

Patch Panel	Description
PANEL-48-3-DIN	48X75 ohm E3/DS3 termination, through DIN 1.0/2.3 connectors
PANEL-48-3-HDBNC	48X75 ohm E3/DS3 termination, through HDBNC connectors

The 48 X T1/E1 TDM interface modules and 48 X T3/E3 TDM interface modules supports a maximum of 48 TDM ports. These ports are available on the interface modules through three Very-High-Density Cable Interconnect (VHDCI) 16-port connectors. The patch panels listed above make these 48 ports available to the user via different port densities (48- or 144-port patch panels) with standard Telco connectors (DIN, RJ48, and AMP64 for T1/E1 and DIN, HDBNC for T3/E3).

Figure 44: VHDCI 16-port Connectors Interface View

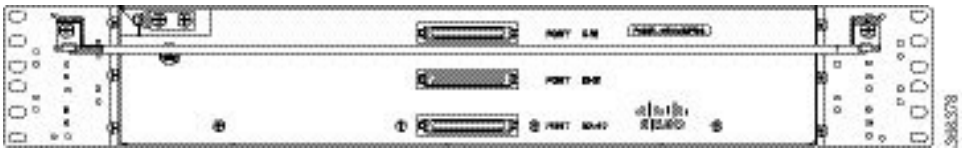


Figure 45: PANEL-48-1-RJ48 Interface View

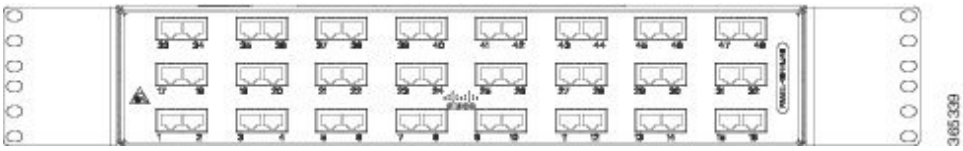


Figure 46: PANEL-48-1-AMP64 Interface View



Figure 47: PANEL-48-1-DIN or PANEL-48-3-DIN Interface View

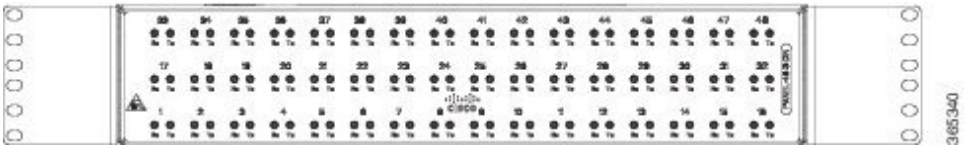


Figure 48: PANEL-144-1-AMP64 Interface View

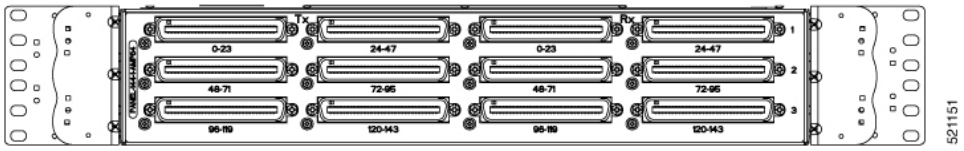


Figure 49: PANEL-48-3-HDBNC InterfaceView

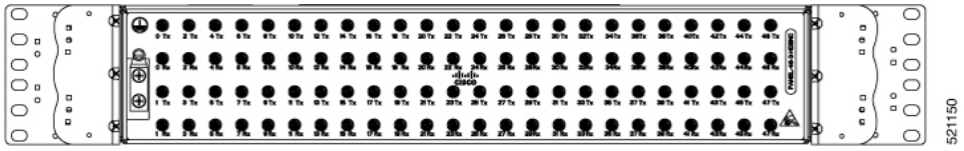


Figure 50: Patch Panel System Interface View

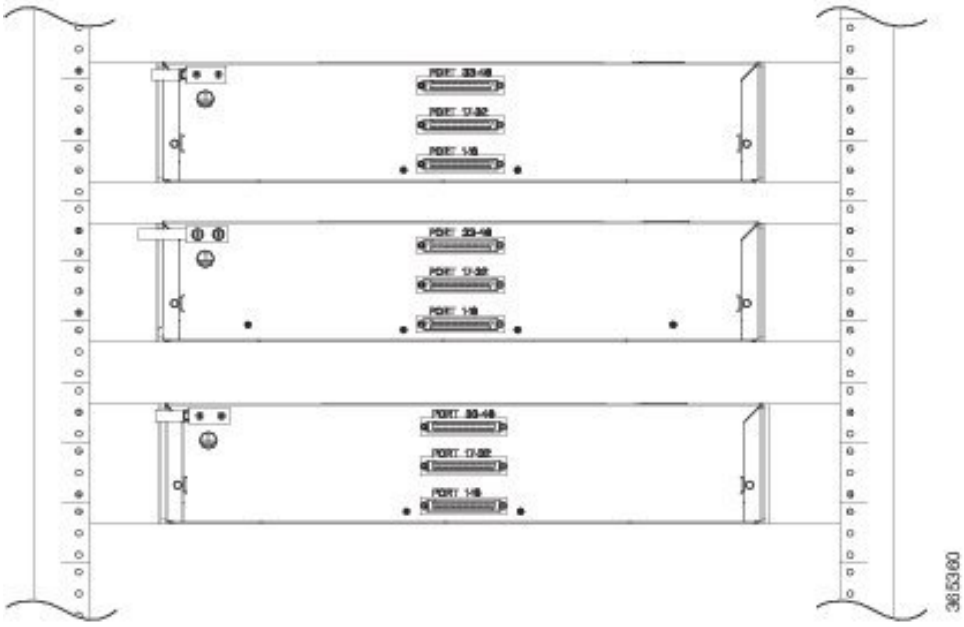
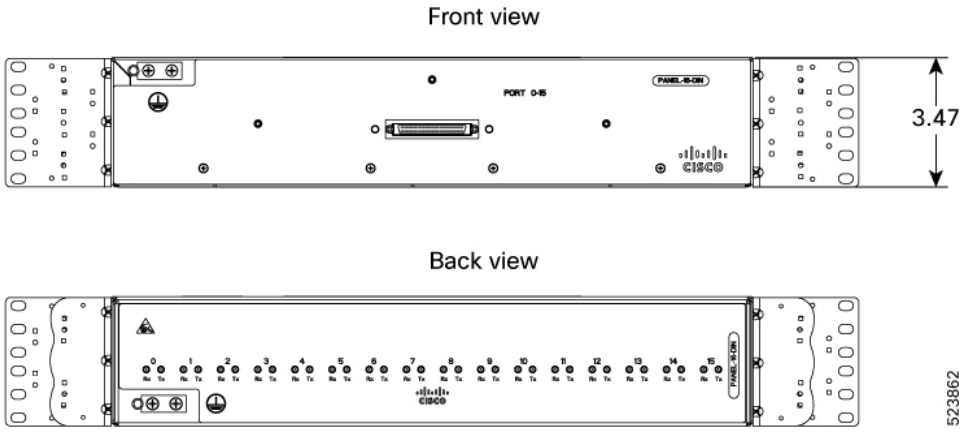


Table 14: PANEL-16-DIN

Patch Panel	Description
PANEL-16-DIN	16X75 ohm E1 termination, through DIN 1.0/2.3 connectors

The 48 X T1/E1 TDM interface modules and the 48 X T3/E3 TDM interface modules support a maximum of 48 TDM ports. These ports are available on the interface modules through three Very-High-Density Cable Interconnect (VHDCI) 16-port connectors. The patch panels listed above make these 48 ports available to the user via different port densities (48- or 144-port patch panels) with standard Telco connectors (DIN, RJ48, and AMP64 for T1/E1 and DIN, HDBNC for T3/E3).

Figure 51: PANEL-16-DIN Interface View



Interface Numbering

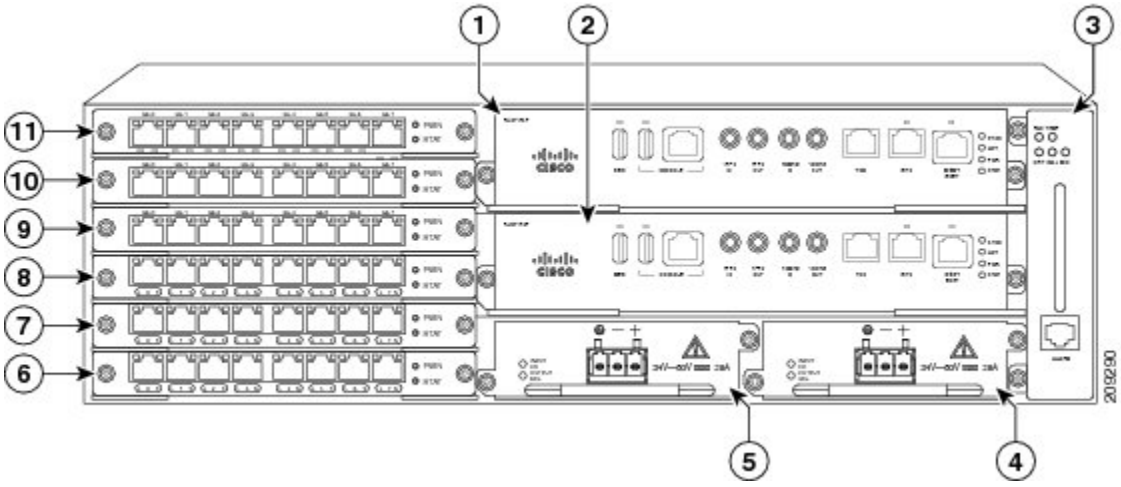
The Cisco ASR 903 Router chassis includes:

- Six interface module slots
- Two RSP module slots
- Two power supply slots
- One fan tray slot

Each network interface on a Cisco ASR 903 Router is identified by a slot number and a port number.

The figure below shows interface numbering in a Cisco ASR 903 Router.

Figure 52: Cisco ASR 903 Router Slot Numbers



1	RSP slot 1
2	RSP slot 0
3	Fan tray slot
4	Power supply slot 1
5	Power supply slot 0
6	Interface module slot 0
7	Interface module slot 1
8	Interface module slot 2
9	Interface module slot 3
10	Interface module slot 4
11	Interface module slot 5

Following is an explanation of the slot or port numbering:

- The numbering format is **Interface type slot or interface number**. Interface (port) numbers begin at logical 0 for each interface type.
- Interface module slots are numbered from bottom to top, with logical interfaces on each module numbered from left to right. Interfaces are hard-wired. Therefore, port 0 is always logical interface 0/0, port 1 is always logical interface 0/1, and so on.

The input parameter for the following commands changes based on the active RSP slot number. The active RSP in slot 0 is refereed to as "0/ slot_num", else if the active RSP is slot 1, it is refereed as 1/"slot_num". The output for the command is displayed accordingly:

- **show diag all eeprom detail**
- **show platform software trace message iomd**
- **show platform software agent iomd**
- **show platform software peer shell-manager brief**
- **show platform software peer chassis-manager**
- **show platform software memory iomd**
- **set platform software trace iomd**

Regulatory Compliance

For regulatory compliance and safety information, see the Product Documentation and Compliance for the Cisco ASR 900 Series Aggregation Services Routers document.