

Cisco ASR 920-10SZ-PD and Cisco ASR-920-8S4Z-PD Routers Overview

The Cisco ASR 920 Series Aggregation Services Routers are a family of fixed configuration routers that enables Service Providers to provide business, residential, and mobile access services to their users. It is the Carrier Ethernet access platform providing Ethernet services.

The Cisco ASR 920 routers complement and extend Cisco's current and planned Carrier Ethernet routing portfolio providing a cost optimized, and extended temperature range access platform.

The Cisco ASR 920 routers do not have high availability features.

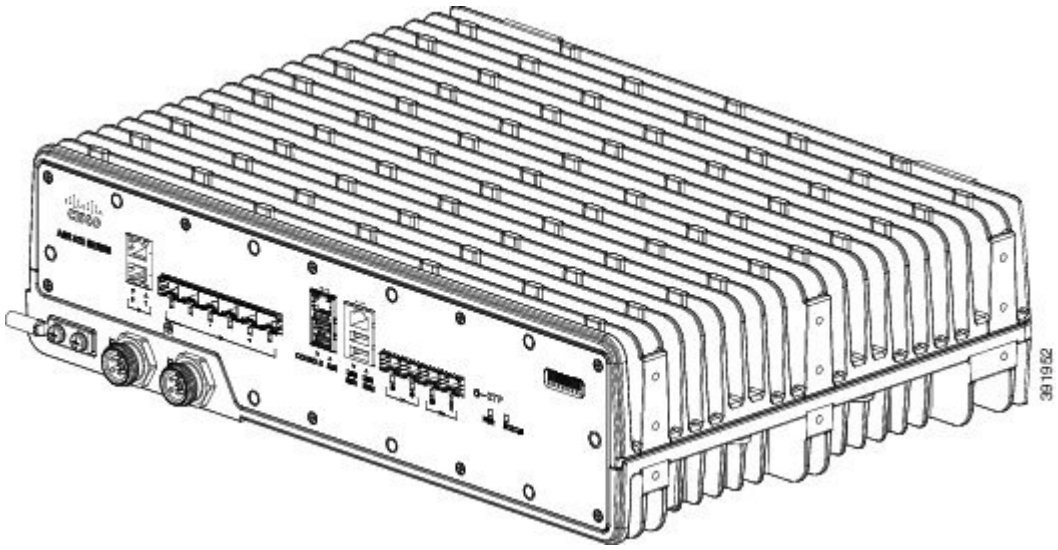
The Cisco ASR 920-10SZ-PD and Cisco ASR-920-8S4Z-PD routers are designed for deployment in an environment protected from rain and direct sunlight.

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Cisco ASR 920-10SZ-PD and Cisco ASR-920-8S4Z-PD Routers Feature

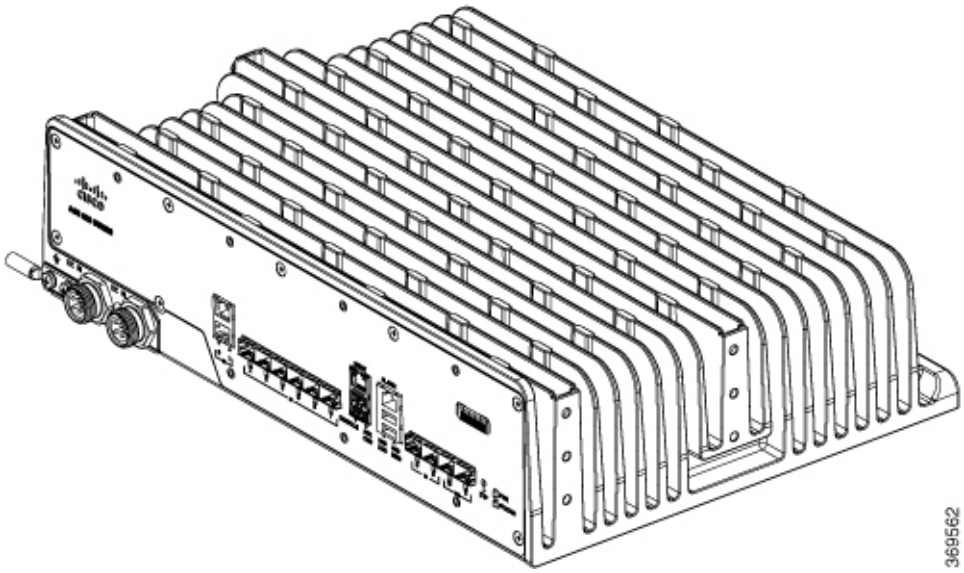
The following figure shows the Cisco ASR 920-10SZ-PD Router.

Figure 1: Cisco ASR 920-10SZ-PD Router



Effective July 2018, the Cisco ASR 920-10SZ-PD front panel and case are remodeled. All installation procedures, however, remain the same. The following figure shows the remodeled Cisco ASR 920-10SZ-PD and the Cisco ASR-920-8S4Z-PD router.

Figure 2: Cisco ASR 920-10SZ-PD Router - Remodeled and Cisco ASR-920-8S4Z-PD



The Cisco ASR 920-10SZ-PD Router has the following:

- 10x1 Gigabit Ethernet ports and 2x10 Gigabit Ethernet ports for an uplink.

1 GE Port	10 GE Port	Type of 1 GE Port	Type of 10 GE Port
10	2	10x1G (2 Copper Ports + 8x1G SFP)	Built-in 2 SFP+ (Dual Rate)

The Cisco ASR-920-8S4Z-PD Router has the following:

- 4x10 Gigabit Ethernet ports and 8x1 Gigabit Ethernet ports for an uplink.

1 GE Port	10 GE Port	Type of 1 GE Port	Type of 10 GE Port
8	4	8x1G (2 Copper Ports + 6x1G SFP)	Built-in 4 SFP+ (Dual Rate)

GigabitEthernet Copper Ports

Fixed copper GigabitEthernet (GE) interfaces are provided through standard RJ-45 connectors. These ports support the following features:

- Standard 10/100/1000Base-T/TX operation with forced or auto-negotiation for speed and duplex.
- Automatic crossover (auto-MDIX) for straight-through and crossover connections.
- Pause flow control as defined by the 802.3x standard.
- Frame size of 9216 bytes.
- Synchronous ENET operation that provides its recovered receive clock as an input clock source for the SETS as well as uses the system-wide reference clock to derive its transmit clock.

GE SFP Ports

The GE SFP ports support the following features:

- 100Base-FX and 1000Base-X SFP modules.
- Digital optical monitoring as specified by the SFP.
- Any mix of SFPs is supported unless specifically noted.
- Pause flow control as defined by the 802.3x standard.
- Frame size of 9216 bytes.
- Synchronous ENET operation that provides its recovered receive clock as an input clock source for the SETS as well as uses the system-wide reference clock to derive its transmit clock.



Note Copper SFPs do not support synchronous ENET operations.

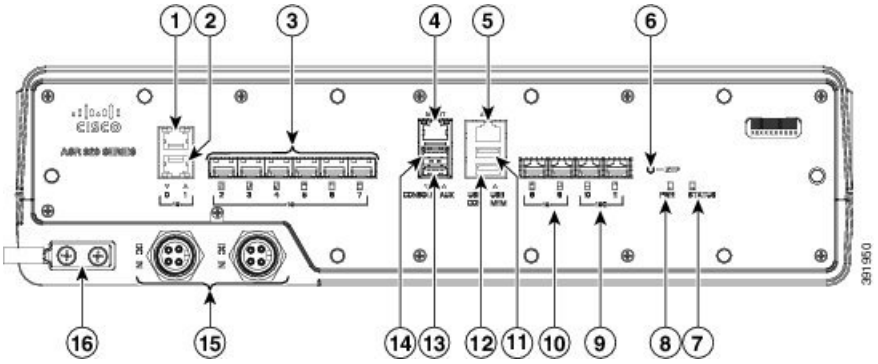
SFP+ Ports

The SFP+ ports support the following features:

- Any mix of SFPs is supported unless specifically noted.
- Pause flow control as defined by the 802.3x standard.
- Frame size of 9216 bytes.

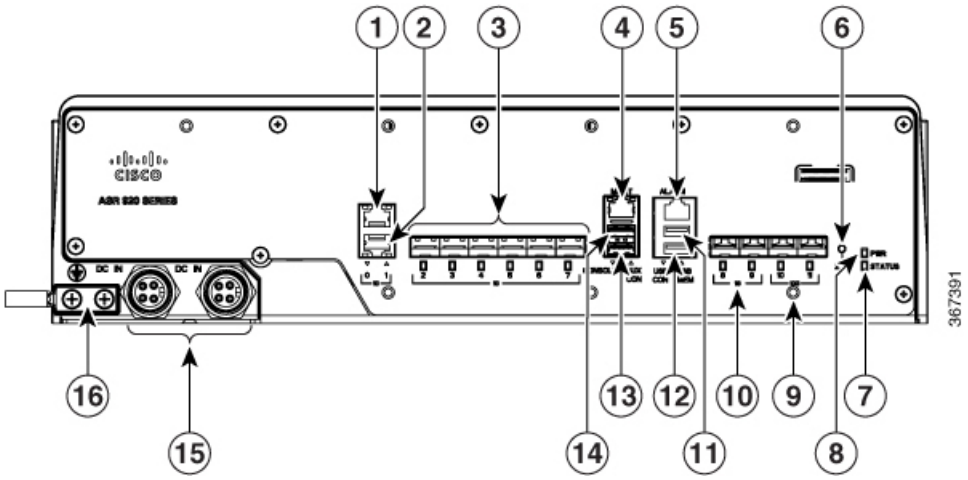
The following figures describe the front panel for the Cisco ASR 920-10SZ-PD Router.

Figure 3: Front Panel of Cisco ASR 920-10SZ-PD Router



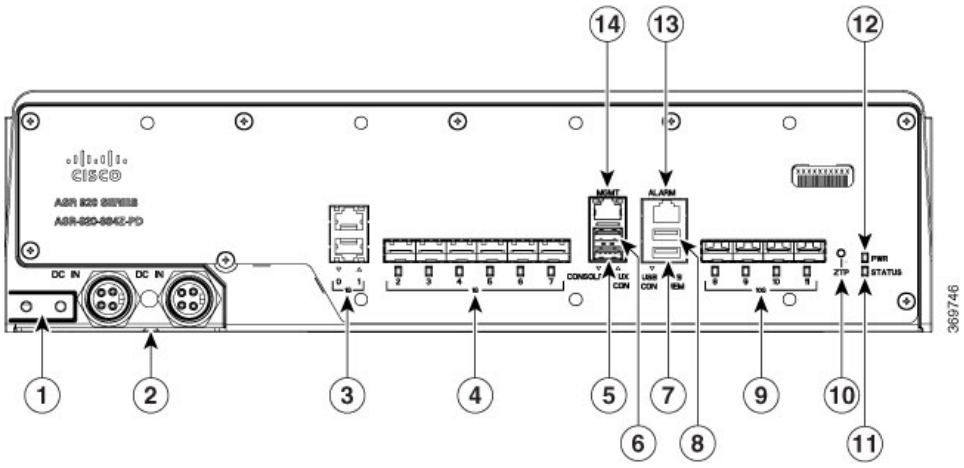
Effective July 2018, the Cisco ASR 920-10SZ-PD front panel and case are remodeled. All installation procedures, however, remain the same. The following figure shows the remodeled Cisco ASR 920-10SZ-PD and the Cisco ASR-920-8S4Z-PD router.

Figure 4: Front Panel of Cisco ASR 920-10SZ-PD Router - Remodeled



1	1 GE Copper Interface	9	2x1G/10G (Dual Rate) SFP/SFP+ ports
2	1 GE Copper Interface	10	2x1GE fiber ports
3	6x 1GE SFP ports	11	USB Memory port
4	Management port	12	USB Console port
5	Alarm input connector port	13	Console port (TIA/EIA-232F)
6	Zero Touch Provisioning (ZTP) button	14	Auxiliary console port
7	System Status LED	15	2xDC power supply input connector
8	Board power LED	16	Grounding lug

Figure 5: Front Panel of Cisco ASR-920-8S4Z-PD



1	Ground	8	USB Memory port
2	2xDC power supply input connector	9	4x10GE SFP+ ports
3	2x1GE Copper Interface	10	Zero Touch Provisioning (ZTP) button
4	6x1GE SFP ports	11	Status LED
5	Console port (TIA/EIA-232F)	12	Power LED
6	Auxiliary console port	13	Alarm input connector port
7	USB Console port	14	Management port

For more information on the router specifications, see Cisco ASR 920 Series Aggregation Services Routers Data Sheet.

External Interfaces

The Cisco ASR 920 routers have these external physical interfaces on the front panel:

Network Interfaces

The network interfaces are provided through fixed ports.

- GE SFP ports—supports 100/1000 modes

Note Ports 8 and 9 do not support 100M and copper SFPs.

- GE Copper RJ-45 ports—supports 10/100/1000 operation
- Dual rate ports—supports 1G/10G mode depending on the SFP+/SFP in the network interface slot.

External Alarm Inputs

The Cisco ASR 920 router supports four dry contact alarm inputs through an RJ-45 jack on the front panel.

- Normally Open—indicates that no current flows through the alarm circuit and the alarm is generated when the current is flowing.

Management Interfaces

The Cisco ASR 920 routers have the following management interfaces:

Management ENET Port

A single management copper ENET port supporting 10/100/1000Base-T operation is provided on the front panel. It uses a standard RJ-45 jack.

Note This is not a data plane port.

Note This interface does not support Synchronous Ethernet Clocking.

TIA/EIA RS232 Console Port

The RS232 console port provides transmission (Tx), reception (Rx), and ground (Gnd).

Note The RS232 console port is enabled only through the Cisco-designed cable adapter USB type A cable to RJ-45 adapter cable. To use this port, disable the flow control on the terminal.

USB Console

A single USB 2.0 Type-A receptacle is provided on the front panel of the Cisco ASR 920 router for providing console access to ROMMON, Cisco IOS-XE and diagnostics. While it uses the Type-A connector, it operates as a USB peripheral only for connection to an external host computer. This interface requires the use of a Type-A (male) to Type-A (male) connector instead of a standard USB cable.

Note Use of the USB console is mutually exclusive of the RS232 console port. This interface requires the use of a Type-A (male) to Type-A (male) USB cable.

USB Mass Storage

A single USB 2.0 Type-A receptacle is provided on the front panel of the Cisco ASR 920 router for inserting external USB mass storage devices, such as standard USB flash drives. This interface is used to load images, load or store configurations, write logs, and so on. It supports operation up to 12Mbps.

Maximum memory supported in ROMmon is 8GB and in Cisco IOS is 16GB.

Zero Touch Provisioning (ZTP) Button

The ZTP button on the front panel initiates the ZTP process on a short press of less than eight seconds. Pressing the ZTP button for more than eight seconds causes a board reset.

For more information on ZTP, see Power and STAT LED section.

RS232 Auxiliary Console Port

The RS232 Aux console port provides transmission (Tx), reception (Rx), and ground (Gnd).

Note The RS232 Aux console port is enabled only through the Cisco-designed cable adapter from USB type A cable to RJ-45 adapter cable.

Note This is a debug-only port. it is recommended that this port be used by field service engineers only.

Power Supply

The Cisco ASR 920-10SZ-PD and ASR-920-8S4Z-PD Routers support DC power supplies in a 1+1 redundant configuration.

Note The power supply units are built-in and are not modular.

Table 1: Power Supply Specification

Specification	Value
Voltage (DC only)	24 V – 60 V
Current	4A through a four-position connector
Input Power	80 W

Note If a surge of more than 500 V is expected, add an appropriate external surge protective device.

Caution In case of power supply failure, it is highly recommended to let a Cisco technician replace the router.

LED Indicators

This section describes the different types of LEDs and their behavior.

PWR and STAT LEDs

The PWR and STAT LEDs are available on the front panel. These LEDs provide power on the board (PWR) and overall router health (STAT) status. During power up state, these LEDs provide booting status and report errors.

Note The digital code signing functionality validates the integrity and authenticity of the ROMMON image before booting it.

Table 2: PWR and STAT LED Indications

PWR LED State	STAT LED state	Indication	Comment
Amber	Off	Power in the system is all right and FPGA configuration is taking place.	Permanent Amber/Off indicates FPGA configuration failure.
Amber	Red	FPGA Image Validation Error.	System is in unresponsive state.
Flashing Amber and Green alternatively	Amber	Upgrade FPGA image error, continuing with Golden FPGA image.	—
Flashing Amber and Green alternatively	Off	FPGA configuration successful and Digital code signing successfully validated FPGA image. Digital code signing passed the control to Microloader to boot ROMMON.	—
Flashing Amber and Green alternatively	Red	Digital code signing reported failure in ROMMON image validation.	—
Green	Flashing Amber	ZTP process has begun. **Note** A short press of the ZTP button triggers the provisioning. A longer press of more than eight seconds, resets the board.	Both LEDs turn Green once provisioning is complete.
Green	Off	IOS-XE image is booting.	
Green	Green	Successfully booted and system is operating normally.	—
Green	Amber	A minor alarm or synchronization is in Holdover or free-running mode	—
Green	Red	A major or critical alarm (high temperature reported for any sensor).	—

CPU Management Port LEDs

The LED for the 10/100/1000 Management port is integrated on the connector itself. There are two LEDs in the connector—the LED on the left indicates the Link/Activity status and the LED on the right is non-functional.

Note The CPU management port LED on the right is non-functional and hence doesn't indicate any port status.

Table 3: CPU Management Port LED Indication

LED	LED State	Indication
Left	Green	Link up in 1000 Mbps
	Blinking Green	Activity in 1000 Mbps
	Amber	Link up in 100 Mbps
	Blinking Amber	Activity in 100 Mbps
	Orange	Link up in 10 Mbps
	Blinking Orange	Activity in 10 Mbps
	Off	Link down

SFP LEDs

Each SFP port has an LED indicator.

Table 4: SFP Port LED Indication

LED	LED State	Indication
Labeled same as the SFP port number	Green	Link up in 1000Base-X/100Base-FX
	Blinking Green	Activity in 1000 Base-X/100Base-FX
	Yellow	Link down/Fault/Error
	Off	Administratively down

SFP+ LEDs

Each SFP+ port has an LED indicator.

Table 5: SFP+ Port LED Indication

LED	LED State	Indication
Labeled same as the SFP port number	Green	Link up in 10G/1G
	Blinking Green	Activity in 10G/1G
	Yellow	Link down/Fault/Error
	Off	Administratively down

RJ-45 LEDs

Each RJ-45 port has two LED indicators. Left LED indicates the Link status; right LED indicates the status of the duplex LED.

Table 6: RJ-45 LED Indication

LED	LED State	Indication
Left	Green	Link up in 10/100/1000 Mbps
	Blinking Green	Activity in 10/100/1000 Mbps
	Yellow	Link down/Fault/Error
	Off	Administratively down
Right	Green	Link up in full duplex
	Off	Link up in half duplex

System–Interface LED Behavior

Table 7: 1G Copper and 1G SFP LED Indication

Event	1G Copper Port LEDs (Link/Duplex)	1G SFP Port LEDs
ROMMON	Off/Off	Off
IOS Shut	Off/Off	Off
IOS No shut (cable disconnect)	Yellow/Off	Yellow
IOS No shut (cable connect) (media-type RJ-45)	Green/Green	Off
IOS No shut (cable connect) (media-type SFP)	Off/Off	Green
IOS No shut (cable connect) (media-type auto)	Off/Off	Green

Table 8: Dual Rate and Management Port LED Indication

Event	Dual Rate (1G/10G) Port LEDs	Management Port LEDs (Link/Duplex)
ROMMON (cable connect)	Off	Green/Green (1000 Mbps, Full Duplex) Amber/Green (100 Mbps, Full Duplex) Orange/Green (10 Mbps, Full Duplex)
ROMMON (cable connect)	Off	Off/Off
IOS Shut	Off	Off/Off
IOS No shut (cable disconnect)	Yellow	Off/Off
IOS No shut (cable connect)	Green	Green/Green in 1G mode Amber/Green in 100M mode Orange/Green in 10M mode

Online Insertion and Removal

The Cisco ASR 920 router supports the following OIR operations:

- When an SFP/SFP+ is removed, there is no effect on traffic flowing on other ports.
- When an SFP/SFP+ is installed, the system initializes that port for operation in 1G/10G based on the license.
- Power supplies are redundant and non-modular. When both power supplies are active, they may or may not share the load equally. When a power supply is not working or the input cable is removed, the other power supply takes the entire load without disruption. If the power supply needs repair, the whole system must be replaced.

Licensing the Cisco ASR 920 Router

The Cisco ASR 920 Series Routers support the following types of licenses:

- Port Licensing—Port Upgrade license is available as a "Pay as you Grow" model.
  - 1G upgrade license
  - 10G upgrade license
- Bulk licensing—Bulk port licensing allows you to enable all the ports with a single license.
- Timing license (1588)—Timing license is required if the router is used as a master clock.
- Advanced Metro IP Access
- Metro IP Access
- Metro Access (default)

The following methods are used to activate the above licenses:

- Cisco Software Licensing—The Cisco Software License Activation feature is a set of processes and components to activate Cisco software feature sets by obtaining and validating fee-based Cisco software licenses.



Note Licenses generated by the Cisco Software Licensing are tied to the UDI of the chassis and a corresponding watchtower device certificate (WDC) is stored in the system.

- Cisco Smart Licensing—Smart Licensing is usage-based licensing where devices register with the Cisco Secure server.