C H A P T E R 1

Cisco ASR1000-RP3 Module Overview

This chapter contains the following sections:
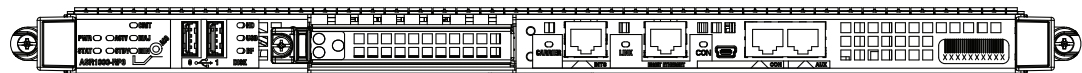
Overview

The Cisco ASR 1000 Series Route Processor 3 (Cisco ASR1000-RP3) module runs the network operating system, BINOS kernel, and the IOSD (IOS daemon). The Cisco ASR1000-RP3 module is supported on the Cisco ASR 1013, Cisco ASR 1006-X, and Cisco ASR 1009-X routers.

Figure 1-1 shows the front panel of the Cisco ASR1000-RP3 module.

Figure 1-1   Cisco ASR1000-RP3 Front Panel

The Cisco ASR1000-RP3 module supports:

- the running of the router control plane, including network control packets, and connection setup
- the synchronization of the active and standby Cisco ASR1000-RP3 and Cisco ASR 1000 Series ESP master and standby (tasks include switchover from failing master to standby)
- code storage, management, and upgrade
- On-board failure logging (OBFL) with 2 MB of memory
- the downloading of operational code for SPA interface processors (SIPs), modular interface processors (MIPs), and Cisco ASR 1000 Series ESP over Ethernet out of band channel (EOBC), which is used for communication between the control processors on the Cisco ASR 1000 Series Routers
- command line interface (CLI), alarm, network management, logging, and statistics aggregation

- punt path processing of packets not supported by the embedded services processors

- configuration repository along with a solid-state drive (SSD) for logging system statistics, records, events, errors, and dump

- the management interfaces of the platform including Dual Asynchronous Receiver/Transmitter (DUART) that is used for the CON and AUX serial ports. The MGMT Ethernet (ENET) management ports, CLI, status indicators, BITS interface, reset switch, Audible Cutoff (ACO) button, USB ports for secure key distribution, and a mini-USB Console port to connect to a USB host (laptop)

- field-replaceable unit (FRU) with online insertion and removal (OIR)

- the chassis management including activation and initialization of the other cards, selection or switchover of active versus standby cards, image management and distribution, logging facilities, distribution of user configuration information, and alarm control

- the control signals for monitoring the health of power entry modules, shutting down the power and driving alarm relays located on the power entry modules

- redundancy

> **Note** Although the Cisco ASR1000-RP3 and Cisco ASR1000-RP2 modules can coexist in the same chassis for a short time when you are installing the Cisco ASR1000-RP3 module, you can only have one type of RP in a chassis. For detailed information on the software upgrade procedures, see Software Upgrade Process chapter of the Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide.

Understanding Redundancy

The Cisco ASR1000-RP3 module, the Cisco ASR1000 ESPs, and power supplies support redundancy. Only one RP and one ESP are considered active at a time and no load sharing is performed. However, the non-active RP or ESP is maintained in a warm standby state so that it can take over the active role as quickly as possible if necessary.

The following combination of components are supported:

- Single RP—Single or Dual ESPs

- Dual RP—Single or Dual ESPs

In a fully redundant chassis, each RP is separately connected to each FP and I/O card slot over separate point-to-point connections of the system interconnect over the midplane. The selection of the active RP is made separately from the selection of the active ESP.

Supported and Unsupported Platforms, ESPs and Line Cards

Table 1-1 lists the platforms in which the Cisco ASR1000-RP3 module is supported or unsupported, the ESPs and line cards that are supported or unsupported.

Table 1-1   *Cisco ASR1000-RP3 Platform Support*

	Supported	Unsupported
Platforms	ASR 1006-X ASR 1009-X ASR 1013	ASR 1001 ASR 1001-X ASR 1002 ASR 1002-X ASR 1002-HX ASR 1004 ASR 1006 ASR 1001-HX
ESPs	ASR1000-ESP40 ASR1000-ESP100 ASR1000-ESP200	ASR1000-ESP20 ASR1000-ESP5 ASR1000-ESP10
Line Cards	ASR 1000-SIP40 ASR 1000-MIP100 ASR 1000-2T+20X1GE ASR 1000-6TGE	ASR 1000-SIP10

Cisco ASR 1000 Series Route Processor Differences

The Cisco ASR 1000 RPs receive and transmit network packets through active embedded services processors. Table 1-2 describes the differences between the Cisco ASR1000-RP1, Cisco ASR1000-RP2, and Cisco ASR1000-RP3 modules.

Table 1-2   *Differences Between the Cisco ASR 1000 Series RP Modules*

Feature	Cisco ASR1000-RP1	Cisco ASR1000-RP2	Cisco ASR1000-RP3
CPU	Single 1.5 GHz PowerPC	Dual 2.66 GHz Intel x86	Quad 2.2 GHz Intel
DRAM Memory	Supports 4 GB default	Supports up to 8 GB of field-replaceable memory	8 GB default; supports up to 64 GB of field-replaceable memory
Bulk Storage Hard Disk	Internal 40 GB hard-disk drive	Front-mounted 80 GB hard-disk (field-replaceable)	100 GB SSD default; 200 GB and 400 GB upgrade options (field-replaceable)
Bootflash/ NVRAM	512 MB eUSB	2 GB eUSB	8 GB eUSB

Hardware Features

The Cisco ASR1000-RP3 module provides the following enhancements compared to Cisco ASR1000-RP2 module:

- Supports up to 64 GB of memory with error detection and correction
- Provides Enhanced Serdes Interconnect (ESI) at 25 Gbps
- Contains 100 GB SSD bulk storage
- Provides 8 GB bootflash
- Comes with 8 GB of DRAM memory and can be upgraded to 16 GB, 32 GB, or 64 GB

In addition, the Cisco ASR1000-RP3 module supports the following functionalities:

- On-board Failure Logging (OBFL) with 2MB of memory
- Cisco ASR 1000 Series Router system architecture and midplane
- Gigibit Ethernet switches for Ethernet Out-of-Band Channel (EOBC) communication and boot-up of the SIPs, MIPs, and Cisco ASR 1000 Series ESP
- Runs Cisco IOS network control plane (routing protocol, connections setup)
- Cisco IOS punt packet forwarding
- Active/Standby Cisco ASR1000-RP3 module and Cisco ASR 1000 Series ESP selection
- Code storage and download operational code to Cisco ASR 1000 Series ESP and Cisco ASR 1000 SIP
- Front panel support: Console, 10/100 Management port, two USB ports, mini-USB port, CON port, and AUX port.
  The Cisco ASR 1000 Series Routers have one Gigabit Ethernet Management Ethernet interface on each RP. The purpose of this interface is to allow users to perform management tasks on the router; it is an interface that does not forward network traffic but can otherwise access the router, often through Telnet and SSH, and perform most management tasks on the router. The interface is useful before a router has begun routing, or in troubleshooting scenarios when the SPA interfaces are inactive

  Note the following aspects of the Management Ethernet interface:

  – Each RP has a Management Ethernet interface, but only the active RP has an accessible Management Ethernet interface (the standby RP can be accessed using the console port, however).

  – IPv4, IPv6, and ARP are the only routed protocols supported for the interface.

  – The interface provides a method of access to the router even if the SPA interfaces or the IOS processes are down.

- A console port that can run up to 115.2 kbps with hardware flow control. One port is used as the CONSOLE port for secure configuration and status display. The default BAUD rate for the CONSOLE port should be set at 9600 BAUD. Both console and auxiliary ports are asynchronous serial ports.
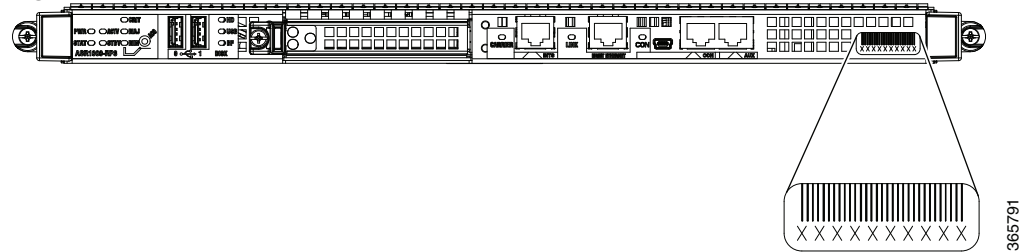
Note   In Cisco IOS XE Denali 16.3.1 release, BITS T1/E1 is not supported on RP3. This support will be provided in future releases.

Model Number Location

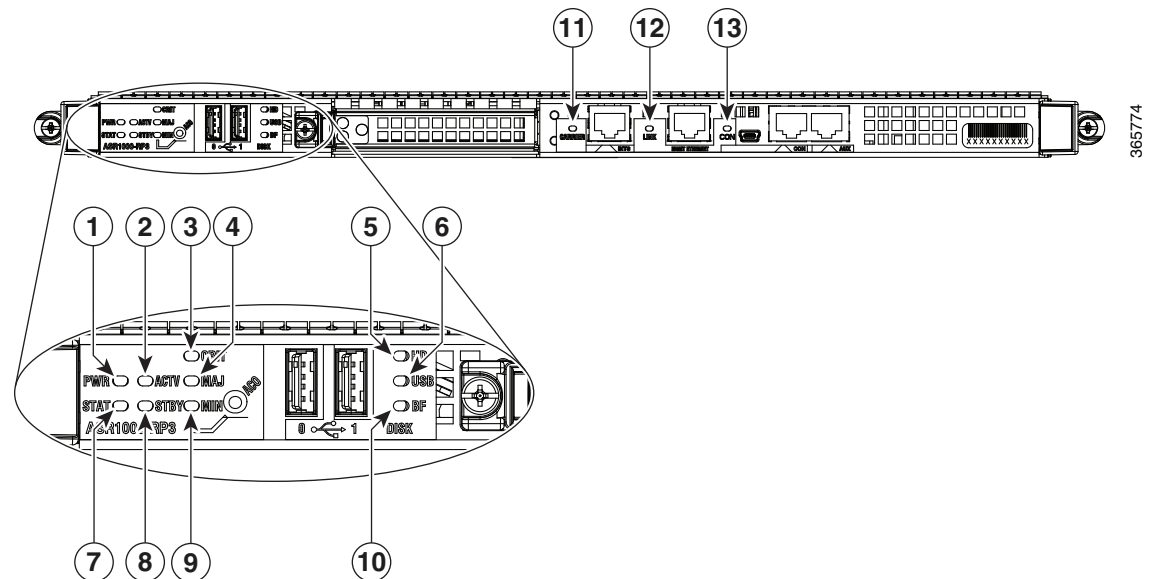Figure 1-2 shows the location of the model number on the Cisco ASR1000-RP3 module.

Figure 1-2   *Cisco ASR1000-RP3 Model Number Location*

LEDs

Figure 1-3 shows the Cisco ASR1000-RP3 LEDs.

Figure 1-3   *Cisco ASR1000-RP3 LEDs*

| No.	LED Label	LED	Color —State	Behavior
1	PWR	Power	Solid green	All power requirements are within specification.
			Off	Router is in standby mode.
2	ACTV	Active	Green	RP is active.

No.	LED Label	LED	Color —State	Behavior
3	CRIT	Critical	Solid Red	Critical alarm indicator or during boot process.
				Example: The ambient air temperature is above 60ºC and will start shutting down in five minutes.
4	MAJ	Major	Solid Red	Major alarm indicator.
				Example: The ambient air temperature is beyond short term operating range of 55ºC. System will shut down above 60ºC.
5	HD	Internal hard drive LED	Flashing Green	Activity indicator.
			Off	No activity.
6	USB	External USB Flash LED	Flashing Green	Activity indicator.
			Off	No activity.
7	STAT	System status	Solid green	Cisco IOS software has successfully booted.
			Yellow	ROMMON has successfully loaded.
			Red, Flashing Red	System failure or during boot process.
8	STBY	Standby	Yellow	RP is the standby processor.
9	MIN	Minor	Amber	Minor alarm indicator. Ambient air temperature is beyond normal operating range of 40ºC.
				Example: If the RP software determines that an unknown card has been installed or if the card has failed, the card powers it off or sets a minor alarm.
10	BF	Internal USB bootflash LED	Flashing Green	Activity indicator.
			Off	No activity.
11	CARRIER	LED	Off	Out of service or not configured.
			Solid Green	In frame and working properly.
			Amber	Fault or loop condition exists.
12	LINK	10/100/1000 RJ-45 Interface LED	Solid Green	Link with no activity.
			Flashing Green	Link with activity.
			Off	Not connected.
13	CON	Active console indicator	Solid Green	Mini-USB console is active.
			Off	RJ45 console is active.

Management and Storage Connections

Figure 1-4 shows the Cisco ASR1000-RP3 management and storage connections.

Figure 1-4   Cisco ASR1000-RP3 Connectors
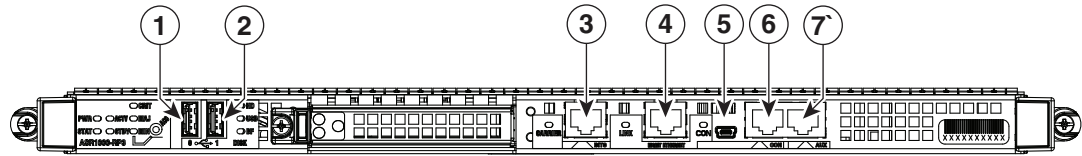
No.	Label	Type	Description
1	0	USB0 interface	Side-by-side USB connector used with memory sticks or smart cards for secure key distribution.
2	1	USB1 interface	Side-by-side USB connector used with memory sticks or smart cards for secure key distribution
3	BITS	RJ-45 connector	Indicates BITS timing reference.
4	MGMT ETHERNET	RJ-45 jack for copper Ethernet Management Port	RP has an ENET port with a RJ-45 connector to attach a management device or network for network management.
5	CON	Mini-USB console connector	Console port to connect to a USB host (laptop).
6	CON	RJ-45 for CON	Console port used to connect to a terminal.
7	AUX	RJ-45 for AUX	Auxiliary port used for remote management purposes.

Management and Storage Connections