



Verifying and Troubleshooting the Line Card Installation

This chapter contains information about the following topics:

- [Verifying and Troubleshooting ISM Line Card and SAM Installation, page 2-1](#)
- [Configuring and Troubleshooting the Service Acceleration Modules \(SAMs\), page 2-4](#)
- [Collecting SAM Information, page 2-7](#)
- [Regulatory, Compliance, and Safety Information, page 2-11](#)

Verifying and Troubleshooting ISM Line Card and SAM Installation

After installing the hardware, you need to look at the LEDs on the Flashback Service Acceleration Modules (SAMs) to verify that the ISM (Integrated Service Module) line card and the Service Acceleration Modules (SAMs) were installed correctly. If they were not, you need to troubleshoot to find the problem. The following sections provide information about how to verify and troubleshoot ISM (Integrated Service Module) line card and Service Acceleration Modules (SAMs) installations:

- [Initial Boot Process, page 2-1](#)
- [Status LEDs, page 2-2](#)
- [Troubleshooting the Installation, page 2-3](#)

Troubleshooting using Cisco IOS XR commands is briefly described in the “[Configuring and Troubleshooting the Service Acceleration Modules \(SAMs\)](#)” section on page 2-4.

Initial Boot Process

During a typical ISM (Integrated Service Module) line card boot process, the following events occur:

1. The ISM (Integrated Service Module) line card receives power and begins executing initialization software.
2. The ISM (Integrated Service Module) line card performs internal checks, and prepares to accept the Cisco IOS XR software from the RSP.
3. The RSP loads the line card with its Cisco IOS XR software.

To verify that the ISM (Integrated Service Module) line card and Service Acceleration Modules (SAMs) are working properly:

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- Step 1** Check that the SAM Status LED is on (green) to verify that the card is operating normally.
 - Step 2** Check that the SAM Attention LED for the SAM you're troubleshooting is off (not lit red) to verify that there is no SAM error and that the SAM does not need attention. If the SAM Attention LED is lit red, there may be an error. If the SAM Attention LED is flashing, someone has pressed the Shutdown Button.
 - Step 3** Check that the SAM Flash Module Fault LED for the SAM you're troubleshooting is off (not lit red) to verify that there is no SAM Flash Module Fault error and that the SAM does not need attention. If the SAM Flash Module Fault LED is lit red, there may be an error.
 - Step 4** Check that the SAM Attention LED for the SAM you're troubleshooting is off (not lit red) to verify that there is no SAM error and that the SAM does not need attention. If the SAM Attention LED is lit red, there may be an error. If the SAM Attention LED is flashing, someone has pressed the Shutdown Button.
 - Step 5** If one of the conditions above is not met, refer to the [“Advanced ISM \(Integrated Service Module\) Line Card and Service Acceleration Modules \(SAMs\) Troubleshooting”](#) section on page 2-6 to identify any possible problems.
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Status LEDs

You can use the SAM Status LED, the SAM Attention LED, the SAM Flash Module Fault LED, or the SAM Flash Module Active LED on the Service Acceleration Modules (SAMs) front panels to verify proper operation or troubleshoot a failure (Refer to [Table 2-1](#) through [Table 2-4](#)).

Table 2-1 SAM Status LED

LED Color	Description
Off	Indicates that the SAM is powered off. SAM main power has been removed.
Green	Indicates that the SAM is ready and operational.
Amber	Indicates that the SAM is in power transition. An amber LED during power up indicates that the SAM is being configured. An amber LED during power down indicates that hot plug circuitry and software are in the process of removing power to the SAM.

Table 2-2 SAM Attention LED

LED Color	Description
Off	No attention needed.

Table 2-2 SAM Attention LED (continued)

LED Color	Description
Red	Indicates that there is a SAM error and that the SAM needs attention.
Blinking Red	Indicates that someone has pressed the Shutdown Button.

Table 2-3 SAM Flash Module Fault LED

LED Color	Description
Off	Indicates that the SAM is powered off or that no flash module fault is present.
Red	Indicates that the SAM has one or more flash module faults present.

Table 2-4 SAM Flash Module Active LED

LED Color	Description
Off	Indicates that the SAM is powered off or that there are no activities on flash module and ASIC.
Green	Indicates that the SAM is powered up and that the SAM flash module and ASIC are active.
Blinking Green	Indicates that the SAM is in the process of powering up and/or that activity is occurring on the SAM flash module and ASIC.

Troubleshooting the Installation

If the the SAM Status LED , the SAM Attention LED , the SAM Flash Module Fault LED, or the SAM Flash Module Active LED on the Service Acceleration Modules (SAMs) front panels indicates some issue, there is either a problem with the line card installation or a hardware failure. To verify that the line card is installed correctly, follow these steps:

- Step 1** If a Port Status LED fails to go on (no activity), but the Card Status LED is on, verify that the initialization sequence has completed successfully. If this is the case, verify that the interface is not shut down. If the interface is not shut down, suspect a circuitry problem with the Port Status LED and contact a service representative for further assistance.
- Step 2** If the Card Status LED fails to go on, check the router connections as follows:
- Verify that the line card board connector is fully seated in the backplane. Loosen the captive installation screws and firmly pivot the ejector levers toward each other until both are parallel to the line card faceplate. Tighten the captive installation screws.
 - Verify that all power cords and data cables are firmly connected at both ends.
 - Verify that all components on the card are fully seated and secured to their sockets.

After the line card re initializes, the Card Status LED on the line card should go on. If the Card Status LED goes on, the installation is complete; if the Card Status LED does not go on, proceed to the next step.

- Step 3** If the Card Status LED still fails to go on, remove the line card and try installing it in another available line card slot.
- If the Card Status LED goes on when the line card is installed in the new slot, suspect a failed backplane port in the original line card slot.
 - If the Card Status LED still does not go on, halt the installation. Contact a service representative to report the faulty equipment and obtain further instructions.

- Step 4** If an error message displays on the console terminal during the line card initialization, see the appropriate reference publication for error message definitions.

If you experience other problems that you cannot solve, contact a Cisco service representative for assistance.

Configuring and Troubleshooting the Service Acceleration Modules (SAMs)

After the person who installed the hardware verifies that the new Service Acceleration Modules (SAMs) are installed correctly by examining the LEDs, the network administrator can configure the Service Acceleration Modules (SAMs). The following sections provide information on configuring and troubleshooting the Service Acceleration Modules (SAMs):

- [Configuration Parameters, page 2-4](#)
- [Line Card Interface Address, page 2-5](#)
- [Using Configuration Commands, page 2-5](#)
- [Basic Line Card Configuration, page 2-5](#)
- [Advanced ISM \(Integrated Service Module\) Line Card and Service Acceleration Modules \(SAMs\) Troubleshooting, page 2-6](#)

Configuration Parameters

[Table 2-5](#) lists the default configuration parameters that are present on the the ISM (Integrated Service Module) line card and Service Acceleration Modules (SAMs). Refer to Cisco IOS XR software documentation for complete information about these parameters.

Table 2-5 *ISM (Integrated Service Module) Line Card and Service Acceleration Modules (SAMs) Configuration Default Values*

Parameter	Configuration File Entry	Default Value
Flow control	flow-control	egress on ingress off
MTU	mtu	9014 bytes for normal frames
MAC address	mac address	Hardware burned-in address (BIA)

Line Card Interface Address

A Cisco ASR 9000 Series Router identifies an interface address by its rack number, line card slot number, instance number, and port number, in the format *rack/slot/instance/port*. The *rack* parameter is reserved for multirack systems, so is always 0 (zero) for the Cisco ASR 9000 Series. The line card slots are numbered from 0 to 7.

Instance numbers are reserved for cards that have subslots. This parameter is currently always 0 (zero) for line cards in the Cisco ASR 9000 Series. The ports on the line card are numbered 0, 1, 2, and so on. For example, the *rack/slot/instance/port* address of the fourth port of a line card installed in line card slot 1 is 0/1/0/3. Even if the line card contains only one port, you must use the *rack/slot/instance/port* notation.

Using Configuration Commands

The command line interface (CLI) for Cisco IOS XR software is divided into different command modes. To configure a line card, you enter the correct mode and then enter the commands you need.

When you first log in, you are automatically in EXEC mode. Next, enter the **configure** command to access configuration mode. Then, enter the **interface** command to enter interface configuration mode and specify the interface. You are now in the command mode where you can configure the new interface. Be prepared with the information you will need, such as the interface IP address.

Basic Line Card Configuration

The following procedure is for creating a basic configuration—enabling an interface and specifying IP routing. You might also need to enter other configuration subcommands, depending on the requirements for your system configuration.

The following example shows one way to configure the basic parameters of a line card:

Step 1 Enter EXEC mode:

```
Username: username
Password: password
RP/0/RSP0/CPU0:router#
```

Step 2 Check the status of each port by entering the **show interface** command:

```
RP/0/RSP0/CPU0:router# show interface
```

Step 3 Enter global configuration mode and specify that the console terminal will be the source of the configuration commands:

```
RP/0/RSP0/CPU0:router# configure terminal
```

Step 4 At the prompt, specify the new interface to configure by entering the **interface** command, followed by the *type* (for example, **gigabitethernet** or **tengige**) and *rack/slot/instance/port* (line card rack, slot number, subslot number, port number). Remember that Cisco ASR 9000 Series rack and subslot values are always 0 (zero). For example, to configure port 4 on an 8-Port 10 Gigabit Ethernet line card in line card slot 1:

```
RP/0/RSP0/CPU0:router# interface tengige 0/1/0/3
```

You are now in interface configuration mode.

- Step 5** Assign an IP address and subnet mask to the interface with the **ipv4 address** configuration subcommand, as in the following example:

```
RP/0/RSP0/CPU0:router(config-if)# ipv4 address 10.1.2.3 255.255.255.0
```

- Step 6** Change the shutdown state to up and enable the interface:

```
RP/0/RSP0/CPU0:router(config-if)# no shutdown
```

The **no shutdown** command passes an **enable** command to the line card. It also causes the line card to configure itself based on the most recent configuration commands received by the line card.

- Step 7** If you want to disable the Cisco Discovery Protocol (CDP), which is not required, use this command:

```
RP/0/RSP0/CPU0:router(config-if)# no cdp
```

- Step 8** Add any other configuration subcommands required to enable routing protocols and adjust the interface characteristics. Examples of such subcommands are:

```
RP/0/RSP0/CPU0:router(config-if)# flow-control ingress
RP/0/RSP0/CPU0:router(config-if)# mtu 1448
RP/0/RSP0/CPU0:router(config-if)# mac-address 0001.2468.ABCD
```

- Step 9** When you have included all the configuration subcommands to complete the configuration, enter the **commit command to commit all changes you made to the running configuration**.

```
RP/0/RSP0/CPU0:router(config-if)# commit
```

- Step 10** Enter **Ctrl-Z** (hold down the **Control** key while you press **Z**) to exit configuration mode. If you did not enter the commit command, you will be prompted to do so:

```
RP/0/RSP0/CPU0:router(config-if)#
Uncommitted changes found, commit them before exiting(yes/no/cancel)? [cancel]:
```

Answer **yes** to commit, **no** to exit without a commit, or **cancel** to cancel the exit (default).

- Step 11** Write the new configuration to memory:

```
RP/0/RSP0/CPU0:router# copy run disk0:/config/running/alternate_cfg:/router.cfg
Destination file name (control-c to abort): [/router.cfg]?
The destination file already exists. Do you want to overwrite? [no]: yes
Building configuration.
223 lines built in 1 second
[OK]
```

The system displays an OK message when the configuration has been stored.

Advanced ISM (Integrated Service Module) Line Card and Service Acceleration Modules (SAMs) Troubleshooting

This section briefly describes advanced troubleshooting commands that can be used in the event of an ISM (Integrated Service Module) line card and/or Service Acceleration Module (SAM) failure.



Note

This section assumes that you possess basic proficiency in the use of Cisco IOS XR software commands.

By using the commands listed in this section, you should be able to determine the nature of the problems you are having with your line card. The first step is to identify the cause of the line card failure or console errors that you are seeing.

To discover which card may be at fault, it is essential to collect the output from the following commands:

- **show logging**
- **show diag slot**
- **show context location slot**

Along with these **show** commands, you should also gather the following information:

- **Console Logs and Syslog Information**—This information is crucial if multiple symptoms are occurring. If the router is configured to send logs to a Syslog server, you may see some information on what has occurred. For console logs, it is best to be directly connected to the router on the console port with logging enabled.
- **Additional Data**—The **show tech-support** command is a compilation of many different commands, including **show version**, **show running-config**, and **show stacks**. This information is required when working on issues with the Cisco Technical Assistance Center (Cisco TAC).

For examples of how to use these commands and the resulting output, refer to the *Cisco ASR 9000 Series Troubleshooting Guide*.



Note

It is important to collect the **show tech-support** data before doing a reload or power cycle. Failure to do so can cause all information about the problem to be lost.



Note

Output from these commands will vary slightly depending on which line card you are using, but the basic information will be the same.

Collecting SAM Information

Here is the example output for the **show platform** command:

RP/0/RSP0/CPU0:VKG-2#sh platform			
Node	Type	State	Config State
0/RSP0/CPU0	A9K-RSP-4G(Active)	IOS XR RUN	PWR, NSHUT, MON
0/RSP1/CPU0	A9K-RSP-4G(Standby)	IOS XR RUN	PWR, NSHUT, MON
0/0/CPU0	A9K-2T20GE-E	IOS XR RUN	PWR, NSHUT, MON
0/1/CPU0	A9K-ISM-100 (LCP)	IOS XR RUN	PWR, NSHUT, MON
0/1/CPU1	A9K-ISM-100 (SE)	SEOS-READY	
0/1/SAM0	A9K-SAM-2TB	OK	PWR, NSHUT, NMON
0/1/SAM1	A9K-SAM-2TB	OK	PWR, NSHUT, NMON
0/3/CPU0	A9K-4T-B	IOS XR RUN	PWR, NSHUT, MON
0/5/CPU0	A9K-8T-L	IOS XR RUN	PWR, NSHUT, MON
0/6/CPU0	A9K-8T-L	IOS XR RUN	PWR, NSHUT, MON
0/7/CPU0	A9K-SIP-700	IOS XR RUN	PWR, NSHUT, MON
0/7/0	SPA-8XOC3-POS	OK	PWR, NSHUT, MON
0/7/1	SPA-4XT3/E3	OK	PWR, NSHUT, MON
0/7/3	SPA-1XCHSTM1/OC3	OK	PWR, NSHUT, MON

Here is the example output for the **show platform summary location** command:

```
RP/0/RSP0/CPU0:ios#show platform summary location 0/1/CPU0
```

```
-----
Platform Node : 0/1/CPU0 (slot 1)
  PID : A9K-SIM-100
  Card Type : Integrated Services Module
  VID/SN : N/A / FHH144500K4
  Oper State : IOS XR RUN
  Last Reset : Shutdown due to unknown reason
               : Wed Apr 13 10:32:59 2011
Configuration : Power is enabled
                  Bootup enabled.
                  Monitoring enabled
  Rommon Ver : Version 1.2(20091201:235620)
  IOS SW Ver : 4.1.0.35I
  Main Power : Power state Enabled. Estimate power 630 Watts of power required.
  Faults : N/A
-----
```

```
Platform Node : 0/1/CPU1 (slot 1)
  Card Type : Integrated Services Module (Service Engine)
  Oper State : SEOS-READY
  Last Reset : Unknown
  Last Failure : Unknown
  Last Start Time : Wed Apr 13 10:35:07 2011
  Last Ready Time : Wed Apr 13 10:36:16 2011
  Uptime : 02:33:49
  BIOS Ver : 0.17 (Thurley.3.60.18.0033)
  SW Ver : cdstv-2.4.1-riobravo-b35
  App Status : (For detailed CDS health, refers to CDSM Monitoring screen)
                  File System: Ok
                  CServer Cache: Ok
                  CDS Application Services: Ok
                  SAM1: Ok
                  SAM2: Ok
                  AVS stream count: 1000
-----
```

Here is the example output for the **show inventory** command:

```
RP/0/RSP0/CPU0:ios#show inventory
Wed Sep  2 23:59:02.054 UTC
NAME: "module 0/RSP0/CPU0", DESCR: "ASR9K Fabric, Controller, 4G memory"
PID: A9K-RSP-4G      , VID: V01, SN: FOC132981P4

NAME: "module compact-Flash 0/RSP0/CPU0", DESCR: " CompactFlash"
PID: cFLASH         , VID: N/A, SN: 000000000301

NAME: "module 0/1/CPU0", DESCR: "ASR9K Advanced Video Streaming Module"
PID: A9K-SIM-100     , VID: V01, SN: FHH1234009J

NAME: "module 0/1/1", DESCR: "1.6TB Flash Memory Services Acceleration Module"
PID: A9K-SIM-100, VID: V01, SN: PRTA6404148
```

Below is a description of fields for the **show hw-module fpd location all** command.

- Location: Location of the LC.

- Card Type: Type of the AVSM or SAM card, “TBD”.
- Type: LC or SAM.
- Subtype: FPGA, ROMMON, BIOS or FW.
- Instance: A unique ID used by the FPD process.
- Current SW Version: Currently running FPD image.
- HW Version: Hardware version of the card.
- Upg/Dng: Specifies whether an FPD upgrade or downgrade is required. For BIOS and SAM upgrades this is dependent on the underlying hardware version.

Here is the example output for the **show hw-module fpd location all** command:

```
RP/0/RSP1/CPU0:ios(admin)#show hw-module fpd location all
```

```
===== Existing Field Programmable Devices =====
=====
Location      Card Type      HW      Current SW Upg/
                Version Type Subtype Inst  Version  Dng?
=====
0/2/CPU0      AVSM-TYPE      1.0      lc      fpga      0      0.21      No
                lc      rommon      0      0.52      Yes1
                lc      bios      0      1.3      Yes
-----
0/2/0         SAM-TYPE      1.0      SAM      FW      0      0.8      No
0/2/1         SAM-TYPE      1.0      SAM      FW      0      0.8      No
-----
```

Here is the example output for the **show hw-module fpd location 0/1/CPU0** command:

```
RP/0/RSP0/CPU0:VKG-2#show hw-module fpd location 0/1/CPU0
```

```
===== Existing Field Programmable Devices =====
=====
Location      Card Type      HW      Description      Type Subtype Inst  Current SW Upg/
                Version                                     Version  Dng?
=====
0/1/CPU0      A9K-ISM-100    1.00    Amistad LC6      lc      fpga1      0      0.25      No
                1.00    Can Bus Ctrl (CBC) LC6  lc      cbc      0      18.05      No
                1.00    CPUCtrl LC6      lc      cp1d1      0      0.01      No
                1.00    ROMMONB LC6      lc      rommon      0      1.02      No
                1.00    ISM BIOS      lc      fpga7      0      0.17      No
                1.00    ISM WESSON CPLD      lc      cp1d3      0      0.16      No
                0.1     Maintenance LC6      lc      fpga2      0      0.06      No
-----
```

If the upg/dng? column says Yes, it means that one or more FPD needs an upgrade or a downgrade. This can be accomplished using the **admin upgrade hw-module fpd** command.

Here is the example output for the **show hw-module fpd location 0/1/SAM0** command:

```
RP/0/RSP0/CPU0:VKG-2#show hw-module fpd location 0/1/SAM0
```

```
===== Existing Field Programmable Devices =====
=====
```

1. One or more FPD needs an upgrade or a downgrade. This can be accomplished using the **admin upgrade hw-module fpd** command.

Location	Card Type	HW Version	Description	Type	Subtype	Inst	Current SW Version	Upg/ Dng?
0/1/SAM0	A9K-SAM-2TB	1.0	SAM ADM1066	SAM	fpga4	0	0.09	No
		1.0	SAM Control CPLD	SAM	cpld4	0	0.145	No
		1.0	SAM Host Bus Adaptor	SAM	fpga5	0	0.01	No
		1.0	SAM Flash Controller	SAM	fpga6	0	1.65	No

Here is the example output for the **show hw-module fpd location 0/1/SAM1** command:

```
RP/0/RSP0/CPU0:VKG-2#show hw-module fpd location 0/1/SAM1
```

Existing Field Programmable Devices								
Location	Card Type	HW Version	Description	Type	Subtype	Inst	Current SW Version	Upg/ Dng?
0/1/SAM1	A9K-SAM-2TB	1.0	SAM ADM1066	SAM	fpga4	1	0.09	No
		1.0	SAM Control CPLD	SAM	cpld4	1	0.145	No
		1.0	SAM Host Bus Adaptor	SAM	fpga5	1	0.01	No
		1.0	SAM Flash Controller	SAM	fpga6	1	1.65	No

Similarly for the **show fpd package** command the output fields are:

- Card Type: Type of the ISM or SAM card, “TBD”.
- FPD Description: Description of all available FPD packages for the card.
- Type: LC or SAM.
- Subtype: FPGA or ROMMON, BIOS or FW image names, these are the values used in the **upgrade hw-module fpd** command.
- SW Version: FPD software version required.
- Min Req HW Version: Minimum Hardware version for the associated FPD image

Here is the example output for the **show fpd package** command:

```
RP/0/RSP0/CPU0:ios(admin)#show fpd package
```

Field Programmable Device Package							
Card Type	FPD Description	Type	Subtype	SW Version	Min Req SW Ver	Min Req HW Vers	
A9K-ISM-100	Can Bus Ctrl1 (CBC) LC6	lc	cbc	18.05	0.0	0.1	
	CPUCtrl1 LC6	lc	cpld1	0.01	0.0	0.1	
	Maintenance LC6	lc	fpga2	0.06	0.0	0.1	
	Amistad LC6	lc	fpga1	0.25	0.0	0.20	
	ROMMONA LC6	lc	rommonA	1.02	0.0	0.1	
	ROMMONB LC6	lc	rommon	1.02	0.0	0.1	
Externally Managed FPD images at node node0_1_CPU0							
A9K-SAM-2TB	SAM Host Bus Adaptor	SAM	fpga5	0.01	0.0	0.0	
A9K-SAM-2TB	SAM Flash Controller	SAM	fpga6	1.65	0.0	0.0	
A9K-ISM-100	ISM BIOS	lc	fpga7	0.17	0.0	0.1	

A9K-SAM-2TB	SAM Control CPLD	SAM	cpld4	0.145	0.0	0.0
A9K-SAM-2TB	SAM ADM1066	SAM	fpga4	0.09	0.0	0.0
A9K-ISM-100	ISM WESSON CPLD	lc	cpld3	0.16	0.0	0.1

Regulatory, Compliance, and Safety Information

This section contains information on laser safety.

For other regulatory, compliance, and safety information, including translated safety warnings, refer to the *Cisco ASR 9000 Series Aggregation Services Router Regulatory Compliance and Safety Information* publication.

Laser Safety

Single-mode Ethernet line cards (all of the line cards) are equipped with a Class 1 laser. Multimode Ethernet line cards (Gigabit Ethernet) are equipped with a Class 1 LED. These devices emit invisible radiation. Do not stare into operational line card ports. The following laser warnings apply to the line cards:

- [General Laser Warning](#)
- [Class 1 Laser Product Warning \(Single-mode\)](#)
- [Class 1 LED Product Warning \(Multimode\)](#)

Class 1 Laser Product Warning (Single-mode)



Warning

Class 1 laser product. Statement 1008

Class 1 LED Product Warning (Multimode)



Warning

Class 1 LED product. Statement 1027

General Laser Warning



Warning

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051

