



Verifying and Troubleshooting the Line Card Installation

This chapter contains information about the following topics:

- [Verifying and Troubleshooting Line Card Installation, on page 1](#)
- [Configuring and Troubleshooting Line Card Interface Cards, on page 4](#)

Verifying and Troubleshooting Line Card Installation

The following sections provide information about how to verify and troubleshoot line card installations:

Troubleshooting using Cisco IOS XR commands is briefly described in [Configuring and Troubleshooting Line Card Interface Cards, on page 4](#).

Initial Boot Process



Note All new line cards are designated as administratively down by default. Port Status LEDs are off until you configure the interfaces and use the no shutdown command.

During a typical line card boot process, the following events occur:

1. The line card receives power and begins executing initialization software.
2. The 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 line card is working properly:

1. Check that the Card Status LED is on (green) to verify that the card is operating normally.
2. Check that the Port Status LED for the port of interest is on (green or blinking) to verify that the port is active. If the Port Status LED is not on, verify that the associated interface is not shut down.
3. If one of the conditions above is not met, see [Advanced Line Card Troubleshooting, on page 9](#) to identify any possible problems.

Line Card LEDs

You can use the Line Card Status LED or the Port Status LEDs on the line card front panels to verify proper operation or troubleshoot a failure. The following table describes the port and card status LEDs.

Table 1: Port Status and Line Card Status LEDs

Port Status LEDs (one per port)	
Green	Port state is up and a valid physical layer link is established.
Blinking	Line activity is occurring. The LED blinks green-amber-green.
Red	Port is enabled, but there is a link loss or SFP/XFP failure.
Off	Port is administratively shut down.
Card Status LED (one per card)	
Green	Line card has booted properly, and is ready to pass or is passing traffic.
Steady Amber	Line card boot process is underway. When the Cisco IOS XR software finishes loading, the LED turns green.
Blinking Amber	Software configuration error has occurred that prevents the line card from passing traffic. It is possible that the line card is still passing traffic, but there is some degradation.
Red	Line card has encountered a hardware error, and is not passing traffic.
Off	Line card is powered off. The LED might turn off momentarily when switching between the states described above, although the line card has not powered off.

Modular Port Adapter LEDs

The modular port adapters have two types of LEDs: an A/L LED for each individual port and a STATUS LED for the modular port adapter. The following table describes the modular port adapter LEDs.

Table 2: Modular Port Adapter LEDs

Color	State	Meaning
A/L LED (one per port)		
Off	Off	Port is administratively shut down.
Green	On	Port is administratively enabled and the link is up.
Red	On	Port is administratively enabled and the link is down.
Blinking	On	Line activity is occurring. The LED blinks green-amber-green.
STATUS LED (one per card)		

Color	State	Meaning
Off	Off	Modular port adapter power is not enabled.
Red	On	Modular port adapter has encountered a hardware error.
Amber	On	Modular port adapter power is on and there is activity.
Green	On	Modular port adapter is ready and operational, there is no activity.

Troubleshooting the Installation



Note All new line cards are designated as administratively down by default. Status LEDs are off until you configure the interfaces and use the no shutdown command.

If the Card Status LED or a Port Status LED does not go on, 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:

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.
2. If the Card Status LED fails to go on, check the router connections as follows:
 - a. 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 front panel. Tighten the captive installation screws.
 - b. Verify that all power cords and data cables are firmly connected at both ends.
 - c. Verify that all components on the card are fully seated and secured to their sockets.

After the line card reinitializes, 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.

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.
4. 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.
5. 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.
6. 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.



Note If you perform online insertion or removal of the SFP or XFP module without shutting down the interface, a warning message is displayed on the console device.

Configuring and Troubleshooting Line Card Interface Cards

After the person who installed the hardware verifies that the new line card is installed correctly by examining the LEDs, the network administrator can configure the new interface. The following sections provide information on configuring and troubleshooting the line cards:

Configuration Parameters

The following table lists the default interface configuration parameters that are present when an interface is enabled on a Gigabit Ethernet or 10-Gigabit Ethernet line card. See Cisco IOS XR software documentation for complete information about these parameters.

Table 3: Default Interface Configuration Parameters

Parameter	Configuration File Entry	Default Value
Flow control	flow-control	egress on ingress off
MTU	mtu	1514 bytes for normal frames 1518 bytes for IEEE 802.1Q tagged frames 1522 bytes for Q-in-Q 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 it is always 0 (zero) for the Cisco ASR 9000 Series. The line card slots are numbered from 0 to 7 (Cisco ASR 9010 Router) or 0 to 3 (Cisco ASR 9006 Router).

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:

1. Enter EXEC mode:

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

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

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

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
```

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.

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
```

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.

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
```

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
```

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
```

10. Enter **Ctrl-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).

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.

Configuring the Dual-Rate Line Cards



Note Oversubscription will be supported on these line cards in a future release of IOS XR 6.2.x train.

The 24-port and 48-port dual-rate line cards support GE and 10GE speeds.



Note See *24-Port 10-Gigabit Ethernet/Gigabit Ethernet Line Card with SFP+ or SFP* and *48-Port 10-Gigabit Ethernet/Gigabit Ethernet Line Card with SFP+ or SFP* sections in the *Cisco ASR 9000 Series Aggregation Services Router Ethernet Line Card Installation Guide* for information on the line cards.



Note The 24-port line card has a single Network Processor Unit (NPU). The 48-port line card has two NPUs (one for each group of 24 ports). Configuring more than 20x10GE ports per NPU could result in line drops across all ports, depending on the packet size and traffic type.

To configure the port mode for either GE or 10GE, use the **hw-module location location port-mode run-lengthxspeed[,run-lengthxspeed]** command, where:

- *run-length* – The number of consecutive same-speed ports, divisible by 4. Valid values are:
 - 24-port line card: 4, 8, 12, 16, 20, 24
 - 48-port line card: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48
- *speed* – Valid values are 1 (for GE) or 10 (for 10GE)



Note Observe the following restrictions:

- The total for *run-length* must equal the total number of ports (either 24 or 48).
- If you configure the speed of the first port in a set of 12 ports to 1 (GE), then all 12 ports in that set must be 1G (for example: 12x1). If you configure the speed of the first port in a set of 12 ports to 10 (10G), then ports can be mixed in groups of 4 (for example: 4x10,4x1,4x10; or 8x10,4x1; or 12x10).
 - The following example is a valid port-mode configuration on the 48-port line card:

```
port-mode 4x10,8x1,12x10,12x1,12x10
```

- The following example is not a valid port-mode configuration on the 48-port line card:

```
port-mode 4x1,8x10,12x10,12x1,12x10
```

The following procedure is for configuring the port speed on the 48-port 10-Gigabit Ethernet/Gigabit Ethernet Line Cards:

1. 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
```

2. Specify the port mode:

```
RP/0/RSP0/CPU0:router(config)# hw-module location 0/5/CPU0 port-mode 4x10,8x1,12x10,12x1,12x10
```

3. Enter the **commit** command to commit all changes you made to the running configuration:

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

Verifying the Transceiver Modules

Use the **show inventory all** command to display SFP or XFP module information for all transceiver modules currently installed in the router. To display SFP or XFP module information for a particular module, use the **show inventory location slot ID** command.

The output of these commands lists such information as the slot ID, transceiver type, description, product ID, version, and serial number.

For example, to list module information for all modules in the router:

```
RP/0/RSP0/CPU0:router# show inventory all
NAME: "module 0/RSP0/CPU0", DESCR: "ASR9K Fabric, Controller, 4G memory"
PID: A9K-RSP-4G          , VID: V01, SN: P3B-2
NAME: "module compact-Flash 0/RSP0/CPU0", DESCR: " CompactFlash"
PID: cFLASH             , VID: N/A, SN: 000000000301
NAME: "module 0/1/CPU0", DESCR: "40-Port GE Line Card, Requires SFPs"
PID: A9K-40GE-B         , VID: V01, SN: FOC123081J6
NAME: "module mau 0/1/CPU0/2", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS12210HLY
NAME: "module mau 0/1/CPU0/3", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS12210HMJ
NAME: "module mau 0/1/CPU0/7", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS12210HM4
NAME: "module mau 0/1/CPU0/8", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS12210HML
NAME: "module mau 0/1/CPU0/18", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS123605YZ

NAME: "module mau 0/1/CPU0/23", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS12210HM6
NAME: "module mau 0/1/CPU0/30", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS123605ZX
NAME: "module mau 0/1/CPU0/31", DESCR: "1000BASE-SX SFP (DOM), MMF, 550/220m"
PID: SFP-GE-S           , VID: V01 , SN: FNS123605YW
NAME: "module 0/4/CPU0", DESCR: "8-Port 10GE DX Line Card, Requires XFPs"
PID: A9K-8T/4-B         , VID: V1D, SN: FOC123081JA
NAME: "module mau 0/4/CPU0/0", DESCR: "Multirate 10GBASE-LR and OC-192/STM-64 S"
PID: XFP-10GLR-OC192SR , VID: V02, SN: ONT1207108S
NAME: "module mau 0/4/CPU0/1", DESCR: "Multirate 10GBASE-LR and OC-192/STM-64 S"
PID: XFP-10GLR-OC192SR , VID: V02, SN: ONT1211104V
NAME: "module mau 0/4/CPU0/3", DESCR: "Multirate 10GBASE-LR and OC-192/STM-64 S"
PID: XFP-10GLR-OC192SR , VID: V02, SN: ONT121110NF
NAME: "module mau 0/4/CPU0/5", DESCR: "Multirate 10GBASE-LR and OC-192/STM-64 S"
PID: XFP-10GLR-OC192SR , VID: V02, SN: ONT121110LW
RP/0/RSP0/CPU0:router#
```

To list module information for a single transceiver module:

```
RP/0/RSP0/CPU0:router# show inventory location 0/4/CPU0/0
NAME: "module 0/4/CPU0", DESCR: "8-Port 10GE DX Line Card, Requires XFPs"
PID: A9K-8T/4-B         , VID: V1D, SN: FOC123081JA
NAME: "module mau 0/4/CPU0/0", DESCR: "Multirate 10GBASE-LR and OC-192/STM-64 S"
PID: XFP-10GLR-OC192SR , VID: V02, SN: ONT1207108S
RP/0/RSP0/CPU0:router#
```

The following example lists SFP+ module information for two 16-Port 10GE line cards:

```
RP/0/RSP0/CPU0:router# show inventory all
```

```

Tue Mar 23 18:10:17.401 UTC
NAME: "module 0/RSP0/CPU0", DESCR: "ASR9K Fabric, Controller, 4G memory"
PID: A9K-RSP-4G          , VID: V01, SN: FOC1319825E
NAME: "module compact-Flash 0/RSP0/CPU0", DESCR: " CompactFlash"
PID: cFLASH             , VID: N/A, SN: 000000000301
NAME: "module 0/0/CPU0", DESCR: "16-Port 10GE DX Medium Queue Line Card, Requires SFPs"
PID: A9K-16T/8-B        , VID: V01, SN: FOC135180R6
NAME: "module mau GigabitEthernet0/0/CPU0/5", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900JA
NAME: "module mau GigabitEthernet0/0/CPU0/13", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: V01 , SN: ECL1338022R
NAME: "module 0/2/CPU0", DESCR: "16-Port 10GE DX Medium Queue Line Card, Requires SFPs"
PID: A9K-16T/8-B        , VID: V01, SN: FOC135180R9
NAME: "module mau GigabitEthernet0/2/CPU0/0", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900JZ
NAME: "module mau GigabitEthernet0/2/CPU0/1", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900JY
NAME: "module mau GigabitEthernet0/2/CPU0/3", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: V01 , SN: ONT132600B5
NAME: "module mau GigabitEthernet0/2/CPU0/5", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: V01 , SN: ECL132603DM
NAME: "module mau GigabitEthernet0/2/CPU0/7", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900JM
NAME: "module mau GigabitEthernet0/2/CPU0/8", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900KS
NAME: "module mau GigabitEthernet0/2/CPU0/9", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900KN
NAME: "module mau GigabitEthernet0/2/CPU0/10", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900JJ
NAME: "module mau GigabitEthernet0/2/CPU0/14", DESCR: "10GBASE-LR SFP+ Module for SMF"
PID: SFP-10G-LR         , VID: N/A, SN: ECL121900JR
RP/0/RSP0/CPU0:router#

```

Advanced Line Card Troubleshooting

This section briefly describes advanced troubleshooting commands that can be used if a line card fails.



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, **show tech ethernet**, **show tech pfi**, 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, see the Cisco ASR 9000 Series Troubleshooting Guide.



Note It is important to collect the show tech-support command data before doing a reload or power cycle. Failure to do so can cause all information about the problem to be lost. Output from these commands varies slightly depending on which line card you are using, but the basic information is the same.
