Cisco ASR 1000 Series Fixed Ethernet Line Card Hardware Installation Guide

July 28, 2014

Cisco Systems, Inc.
www.cisco.com

Cisco has more than 200 offices worldwide.
Addresses, phone numbers, and fax numbers
are listed on the Cisco website at
www.cisco.com/go/offices.

CONTENTS

Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

Objectives

This document describes the Cisco ASR 1000 Series Fixed Ethernet Line Cards that are supported on the Cisco ASR 1000 Series Aggregation Services Routers. This document also describes how to install the Cisco ASR 1000 Series Fixed Ethernet Line Cards and how to troubleshoot the installation.

Note Unless otherwise noted in this document, the term Cisco ASR 1000 Series Fixed Ethernet Line Cards represents both the ASR1000-2T+20X1GE line card and the ASR1000-6TGE line card.

Document Revision History

The Document Revision History records changes made to this document. The table shows the Cisco IOS XE software release number and document revision number pertaining to the change, the date of the change, and a brief summary of the change.

Release No.	Revision No.	Date	Change Summary
Cisco IOS XE Release 3.10.S	OL-29623-01	October 15, 2013	First version of the document. Information about support for the Cisco ASR1000-2T+20X1GE line card included.

| Cisco IOS XE Release 3.12S | OL-29623-02 | March 31, 2014 | Information about support for the Cisco ASR 1000-6TGE line card included. |
| Cisco IOS XE Release 3.13S | OL-29623-03 | July 28, 2014 | Information about support for the GLC-GE-100FX SFP module included. |

Organization

This document contains the following chapters:

Chapter	Title	Description
Chapter 1	Overview of the Cisco ASR 1000 Series Fixed Ethernet Line Card	Provides an introduction to the Cisco ASR 1000 Series Fixed Ethernet Line Cards. Also provides a compatibility summary for the Cisco ASR 1000 Series Fixed Ethernet Line Cards, characteristics of the cards, and overview.
Chapter 2	Preparing to Install the Cisco ASR 1000 Series Fixed Ethernet Line Cards	Describes the required tools, equipment, and safety guidelines for installing the Cisco ASR 1000 Series Fixed Ethernet Line Cards.
Chapter 3	Installing and Removing the Cisco ASR 1000 Series Fixed Ethernet Line Cards	Describes the procedures for installing and removing the Cisco ASR 1000 Series Fixed Ethernet Line Cards on a Cisco ASR 1000 Series Aggregation Services Router.
Chapter 4	Installing and Removing the SFP and XFP Modules	Describes the procedures for installing and removing the small form-factor pluggables (SFP and XFP modules) on the Cisco ASR 1000 Series Fixed Ethernet Line Cards.
Chapter 5	Troubleshooting	Provides information about troubleshooting the installation of the Cisco ASR 1000 Series Fixed Ethernet Line Cards. It also describes the debug commands and provides packing instructions.

Related Documentation

This section refers you to other documentation that might be useful as you configure your Cisco ASR 1000 Series Ethernet Line Card.

Cisco IOS XE Features and Software Configuration

- Information about supported features and their configuration on the Cisco ASR 1000 Series Aggregation Services Routers are available in the Cisco IOS XE software configuration guides at:

  http://www.cisco.com/en/US/products/ps9587/products_installation_and_configuration_guides_list.html

- A summary of the new features in a particular release can be found at:

  http://www.cisco.com/en/US/products/ps9587/products_feature_guides_list.html

- Command documentation for the Cisco ASR 1000 Series Aggregation Services Routers is available at:

    http://www.cisco.com/en/US/products/ps9587/prod_command_reference_list.html

Cisco ASR 1000 Series Aggregation Services Routers Documentation

Some of the other publications pertaining to the Cisco ASR 1000 Series Aggregation Services Routers might be useful to you as you configure your Cisco ASR 1000 Series Aggregation Services Router:

- *Cisco ASR 1000 Series Aggregation Services Routers Hardware Installation Guide*
  http://www.cisco.com/en/US/partner/docs/routers/asr1000/install/guide/asr1routers/asr1higV8.html

- Quick Start Guides:

    – *Cisco ASR 1013 Router Quick Start Guide*
      http://www.cisco.com/en/US/partner/docs/routers/asr1000/quick/start/guide/asr1_qs13.html

    – *Cisco ASR 1004 Router Quick Start Guide*
      http://www.cisco.com/en/US/partner/docs/routers/asr1000/quick/start/guide/asr1_qs4.html

    – *Cisco ASR 1006 Router Quick Start Guide*
      http://www.cisco.com/en/US/partner/docs/routers/asr1000/quick/start/guide/asr1_qs6.html

- Command Reference Guide:

    – *Cisco IOS Quality of Service Solutions Command Reference guide at the URL:*
      http://www.cisco.com/en/US/docs/ios/qos/command/reference/qos_book.html

- *Regulatory Compliance and Safety Information for the Cisco ASR 1000 Series Aggregation Services Routers*
  http://www.cisco.com/en/US/partner/docs/routers/asr1000/rcsi/asr1rcsi.html

- *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide*
  http://www.cisco.com/en/US/partner/docs/routers/asr1000/configuration/guide/chassis/asrswcfg.html

- *Cisco ASR 1000 Series Aggregation Services Routers MIB Specifications Guide*
  http://www.cisco.com/en/US/partner/docs/routers/asr1000/mib/guide/asr1kmib.html

- *Release Notes for Cisco ASR 1000 Series Aggregation Services Routers*
  http://www.cisco.com/en/US/docs/routers/asr1000/release/notes/asr1k_rn_rel_notes.html

Several other publications are also related to the Cisco ASR 1000 Series Aggregation Services Routers. For a complete reference of related documentation, see the *Cisco ASR 1000 Series Aggregation Services Router Documentation Roadmap* located at the following URL:
http://www.cisco.com/en/US/products/ps9343/products_documentation_roadmaps_list.html

Your router and the Cisco IOS software running on it contain extensive features. You can find documentation for Cisco products at the following URL:

http://www.cisco.com/cisco/web/psa/default.html?mode=prod

Document Conventions

Within the guide, the term *router* is generally used to refer to a variety of Cisco products (for example, routers, access servers, and switches). Routers, access servers, and other networking devices that support Cisco IOS software are shown interchangeably within examples. These products are used only for illustrative purposes, that is, an example that shows one product does not necessarily indicate that other products are not supported.

This documentation uses the following conventions:

Convention	Description
^ or **Ctrl**	The **^** and **Ctrl** symbols represent the Control key. For example, the key combination **^D** or **Ctrl-D** means hold down the **Control** key while you press the **D** key. Keys are indicated in capital letters, but are not case sensitive.
string	A string is a nonquoted set of characters shown in italics. For example, when setting a Simple Network Management Protocol (SNMP) *community* string to *public*, do not use quotation marks around the string. If you do, the string will include the quotation marks.

Command syntax descriptions use the following conventions:

Convention	Description
bold	Bold text indicates commands and keywords that you enter exactly as shown.
italics	Italic text indicates arguments for which you supply values.
[x]	Square brackets enclose an optional element (keyword or argument).
		A vertical line indicates a choice within an optional or required set of keywords or arguments.
[x	y]	Square brackets enclosing keywords or arguments separated by a vertical line indicate an optional choice.
{x	y}	Braces enclosing keywords or arguments separated by a vertical line indicate a required choice.

Nested sets of square brackets or braces indicate optional or required choices within optional or required elements. For example:

Convention	Description
[x {y	z}]	Braces and a vertical line within square brackets indicate a required choice within an optional element.

Examples use the following conventions:

Convention	Description
screen	Examples of information displayed on the screen are set in Courier font.
bold screen	Examples of text that you must enter are set in Courier bold font.
< >	Angle brackets enclose text that is not printed to the screen, such as passwords.

Convention	Description
!	An exclamation point at the beginning of a line indicates a comment line. (Exclamation points are also displayed by the Cisco IOS software for certain processes.)
[ ]	Square brackets enclose default responses to system prompts.

The following conventions are used to attract the attention of the reader:

⚠️

Caution   Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

✎

Note   Means *reader take note*. Notes contain helpful suggestions or references to materials that may not be contained in this manual.

🔍

Tip   Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation, as an RSS feed and deliver content directly to your desktop using a reader application. The RSS feeds are a free service.

Cisco ASR 1000 Fixed Ethernet Line Card Hardware Installation Guide

C H A P T E R 1

Overview of the Cisco ASR 1000 Series Fixed Ethernet Line Card

This chapter provides an introduction to the Cisco ASR 1000 Series Fixed Ethernet Line Cards. It includes the following sections:

Introduction to the Cisco ASR 1000 Series Fixed Ethernet Line Cards

This section lists and describes the line cards that are supported by the Cisco ASR 1000 Series Routers:

ASR1000-2T+20X1GE

The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-2T+20X1GE is a fixed-port Ethernet line card for the Cisco ASR 1000 Series Aggregation Services Routers. This line card is capable of 40-Gbps full-duplex traffic forwarding using a fixed-port interface design. This line card has twenty 1-GE ports and two 10-GE ports.

The small form-factor pluggables (SFP and XFP modules) allow the line card to be configured for different media types (copper or fiber) and different optical requirements (single-mode fiber or multimode fiber), as available. There is one power LED, one line card status LED, and 22 port or link status LEDs, as shown in Figure 1-1.

Figure 1-1   *Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-2T+20X1GE Faceplate*
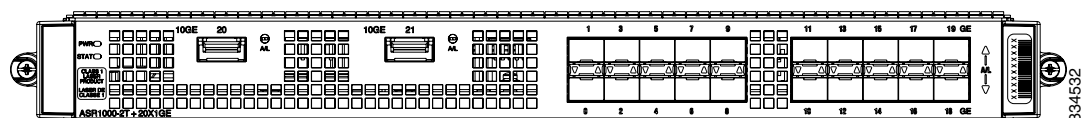
ASR1000-6TGE

The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-6TGE is a fixed-port Ethernet line card for the Cisco ASR 1000 Series Aggregation Services Routers. This line card is capable of 60-Gbps input traffic and 40-Gbps output traffic forwarding using a fixed-port interface design. This line card has six 10-GE ports.

The small form-factor pluggables (XFP modules) allow the line card to be configured for different optical requirements (single-mode fiber or multimode fiber), as available. There is one power LED, one line card status LED, and six port or link status LEDs, as shown in Figure 1-2.

Figure 1-2   Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-6TGE Faceplate
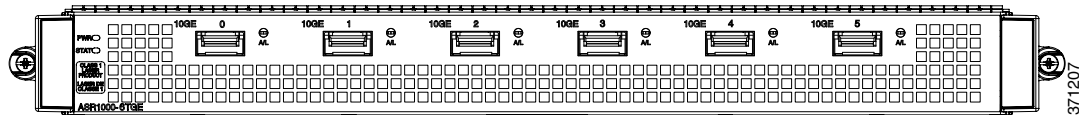
Product Overview

The system features listed here specify some of the key performance metrics and capabilities of the Cisco ASR 1000 Series Fixed Ethernet Line Card.

- Virtual Local Area Network (VLAN) support
    - Number of VLANs per port: 4096
    - Number of VLANs per line card: 49152
- Ethernet Virtual Connection (EVC) support
    - Number of EVCs per port: 4096
- Number of HSRPDA MAC addresses per line card: 8192
- Number of MAC ACLs per line card: 20480
- Number of Connectivity Fault Management (CFM)/Y.1731 sessions: 480
- Supports Quality of Service (QoS) and over-subscription handling
- Supports interframe gap of 5 bytes for 1 GE (ASR1000-2T+20X1GE), and 8 bytes for 10 GE
- Supports Synchronous Ethernet (SyncE). Defined by ITU-T standards, such as G.8261, G.8262, G.8264, and G.781

Displaying the Cisco ASR 1000 Series Fixed Ethernet Line Card Details

To display the details about a Cisco ASR 1000 Series Fixed Ethernet Line Card, execute the **show platform** command in the EXEC mode:

```
Router# show platform

Chassis type: ASR1013

Slot Type State Insert time (ago)
--------- ------------------ -------------------- ----------------
0 ASR1000-SIP10 ok 06:21:54
```

```
0/0 SPA-8XCHT1/E1 ok 06:19:52
0/1 SPA-8XCHT1/E1-V2 ok 06:19:45
0/2 SPA-4XOC48POS/RPR ok 06:19:37
0/3 SPA-8XCHT1/E1-V2 ok 06:19:29
1 ASR1000-2T+20X1GE ok 06:21:54
1/0 BUILT-IN-2T+20X1GE ok 06:19:54
2 ASR1000-SIP40 ok 06:21:54
2/1 SPA-1XOC48POS/RPR ok 06:20:05
2/2 SPA-1X10GE-L-V2 ok 06:20:01
2/3 SPA-1XOC48POS/RPR ok 06:19:56
3 ASR1000-6TGE ok 06:21:54
3/0 BUILT-IN-6TGE ok 06:19:51
4 ASR1000-SIP10 ok 06:21:54
5 ASR1000-SIP10 ok 06:21:54
R0 ASR1000-RP2 ok, active 06:21:54
R1 ASR1000-RP2 ok, standby 06:21:54
F0 ASR1000-ESP40 ok, active 06:21:54
F1 ASR1000-ESP40 ok, standby 02:53:41
P0 ASR1013/06-PWR-AC ok 06:20:29
P1 ASR1013/06-PWR-AC ok 06:20:28
P2 ASR1013/06-PWR-AC ok 06:20:28
P3 ASR1013/06-PWR-AC ok 06:20:28


Slot CPLD Version Firmware Version
--------- ------------------ --------------------------------------
0 09111601 15.3(3r)S
1 00010000 12.2(20120809:045831) [lokbuild 114]
2 00200800 15.3(3r)S
3 13091900 12.2(20130822:115630) [alaxmina-mcp0...
4 09111601 15.3(3r)S
5 09111601 15.3(3r)S
R0 10021901 15.3(3r)S
R1 10021901 15.3(3r)S
F0 1003190E 15.2(1r)S
F1 1003190E 15.2(1r)S
```

To display the operation status of a line card, execute the **show platform diag** command:

```
Router# show platform diag

Chassis type: ASR1013

Slot: 0, ASR1000-SIP10
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:02:24 (06:22:17 ago)
CPLD version : 09111601
Firmware version : 15.3(3r)S

Sub-slot: 0/0, SPA-8XCHT1/E1
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:02:55 (06:21:46 ago)
Logical insert detect time : 00:02:55 (06:21:46 ago)

Sub-slot: 0/1, SPA-8XCHT1/E1-V2
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:03:02 (06:21:38 ago)
Logical insert detect time : 00:03:02 (06:21:38 ago)

Sub-slot: 0/2, SPA-4XOC48POS/RPR
```

```
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:03:10 (06:21:31 ago)
Logical insert detect time : 00:03:10 (06:21:31 ago)

Sub-slot: 0/3, SPA-8XCHT1/E1-V2
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:03:18 (06:21:23 ago)
Logical insert detect time : 00:03:18 (06:21:23 ago)

Slot: 1, ASR1000-2T+20X1GE
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:02:25 (06:22:15 ago)
CPLD version : 00010000
Firmware version : 12.2(20120809:045831) [lokbuild 114]

Sub-slot: 1/0, BUILT-IN-2T+20X1GE
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:02:53 (06:21:48 ago)
Logical insert detect time : 00:02:53 (06:21:48 ago)

Slot: 2, ASR1000-SIP40
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:02:20 (06:22:21 ago)
CPLD version : 00200800
Firmware version : 15.3(3r)S

Sub-slot: 2/1, SPA-1XOC48POS/RPR
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:02:42 (06:21:59 ago)
Logical insert detect time : 00:02:42 (06:21:59 ago)

Sub-slot: 2/2, SPA-1X10GE-L-V2
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:02:46 (06:21:55 ago)
Logical insert detect time : 00:02:46 (06:21:55 ago)

Sub-slot: 2/3, SPA-1XOC48POS/RPR
Operational status : ok
Internal state : inserted
Physical insert detect time : 00:02:51 (06:21:50 ago)
Logical insert detect time : 00:02:51 (06:21:50 ago)

Slot: 3, ASR1000-6TGE
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:02:24 (06:22:17 ago)
CPLD version : 13091900
Firmware version : 12.2(20130822:115630) [alaxmina-mcp0822 114]

Sub-slot: 3/0, BUILT-IN-6TGE
Operational status : ok
```

```
Internal state : inserted
Physical insert detect time : 00:02:56 (06:21:45 ago)
Logical insert detect time : 00:02:56 (06:21:45 ago)

Slot: 4, ASR1000-SIP10
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:02:22 (06:22:19 ago)
CPLD version : 09111601
Firmware version : 15.3(3r)S

Slot: 5, ASR1000-SIP10
Running state : ok
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:02:23 (06:22:18 ago)
CPLD version : 09111601
Firmware version : 15.3(3r)S

Slot: R0, ASR1000-RP2
Running state : ok, active
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:00:53 (06:23:47 ago)
Became HA Active time : 02:56:18 (03:28:23 ago)
CPLD version : 10021901
Firmware version : 15.3(3r)S

Slot: R1, ASR1000-RP2
Running state : ok, standby
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 02:54:41 (03:29:59 ago)
CPLD version : 10021901
Firmware version : 15.3(3r)S

Slot: F0, ASR1000-ESP40
Running state : ok, active
Internal state : online
Internal operational state : ok
Physical insert detect time : 00:00:53 (06:23:47 ago)
Software declared up time : 00:03:34 (06:21:07 ago)
Hardware ready signal time : 00:02:17 (06:22:24 ago)
Packet ready signal time : 00:03:39 (06:21:02 ago)
Became HA Active time : 03:31:08 (02:53:33 ago)
CPLD version : 1003190E
Firmware version : 15.2(1r)S

Slot: F1, ASR1000-ESP40
Running state : ok, standby
Internal state : online
Internal operational state : ok
Physical insert detect time : 03:29:05 (02:55:35 ago)
Software declared up time : 03:30:59 (02:53:42 ago)
Hardware ready signal time : 03:29:51 (02:54:50 ago)
Packet ready signal time : 03:31:06 (02:53:35 ago)
CPLD version : 1003190E
Firmware version : 15.2(1r)S
```

```
Slot: P0, ASR1013/06-PWR-AC
State : ok
Physical insert detect time : 00:02:18 (06:22:23 ago)

Slot: P1, ASR1013/06-PWR-AC
State : ok
Physical insert detect time : 00:02:19 (06:22:22 ago)

Slot: P2, ASR1013/06-PWR-AC
State : ok
Physical insert detect time : 00:02:19 (06:22:22 ago)

Slot: P3, ASR1013/06-PWR-AC
State : ok
Physical insert detect time : 00:02:19 (06:22:22 ago)
```

To display the voltage margin information of a line card, execute the **show environment location 3** command:

```
Router# show environment location 3

Sensors by Location: Environmental Monitoring

Location: 3

Sensor Location State Reading
VMB01: VSENSE0 3 Normal 1050 mV
VMB01: VSENSE1 3 Normal 1000 mV
VMB01: VSENSE2 3 Normal 900 mV
VMB01: VSENSE3 3 Normal 1500 mV
VMB01: VSENSE4 3 Normal 1799 mV
VMB01: VSENSE5 3 Normal 1199 mV
VMB01: VSENSE6 3 Normal 1500 mV
VMB01: VSENSE7 3 Normal 1500 mV
VMB01: VIN 3 Normal 11984 mV
VMB02: VSENSE0 3 Normal 1050 mV
VMB02: VSENSE1 3 Normal 3299 mV
VMB02: VSENSE2 3 Normal 2499 mV
VMB02: VSENSE3 3 Normal 749 mV
VMB02: VSENSE4 3 Normal 751 mV
VMB02: VSENSE5 3 Normal 1200 mV
VMB02: VSENSE6 3 Normal 3288 mV
VMB02: VSENSE7 3 Normal 900 mV
VMB02: VIN 3 Normal 11984 mV
Temp: Left In 3 Normal 25 Celsius
Temp: Exit L 3 Normal 34 Celsius
Temp: Exit R 3 Normal 29 Celsius
```

To display the subslot-level sensor listings, execute the **show hw-module subslot 3/0 sensor** command:

```
Router# show hw-module subslot 3/0 sensors

BUILT-IN-6TGE[3/0] temperature sensor 0, reading: 28C
BUILT-IN-6TGE[3/0] nominal: 1.200V, reading: 1.199V
BUILT-IN-6TGE[3/0] nominal: 3.300V, reading: 3.299V
BUILT-IN-6TGE[3/0] nominal: 2.500V, reading: 2.499V
BUILT-IN-6TGE[3/0] nominal: 1.800V, reading: 1.799V
BUILT-IN-6TGE[3/0] nominal: 5.000V, reading: 4.999V
BUILT-IN-6TGE[3/0] nominal: 1.800V, reading: 1.776V
BUILT-IN-6TGE[3/0] nominal: 1.200V, reading: 1.197V
BUILT-IN-6TGE[3/0] nominal: 12.000V, reading: 11.984V
```

To display the temperature sensors of a line card, execute the **show hw-module subslot 3/0 sensor limit** command:

```
Router# show hw-module subslot 130 sensor limit

Temperature sensors for BUILT-IN-6TGE[3/0]:
Sensor Reading Low Warning Critical Shutdown
0 28C -5C 70C 80C 90C
Voltage sensors for BUILT-IN-6TGE[3/0]:
Nominal Reading LowShut LowWarn HighWarn HighShut
1.200V 1.200V 1.116V 1.140V 1.260V 1.284V
3.300V 3.299V 3.069V 3.135V 3.465V 3.531V
2.500V 2.500V 2.325V 2.375V 2.625V 2.675V
1.800V 1.799V 1.674V 1.710V 1.890V 1.926V
5.000V 5.000V 4.650V 4.750V 5.250V 5.350V
1.800V 1.776V 1.674V 1.710V 1.890V 1.926V
1.200V 1.197V 1.116V 1.140V 1.260V 1.284V
12.000V 11.984V 11.160V 11.400V 12.600V 12.840V
```

Cisco ASR 1000 Series Fixed Ethernet Line Card Slot, Bay, and Port Locations

ASR1000-2T+20x1GE

The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-2T+20x1GE uses a *<slot, subslot, port>* numbering scheme. The slot refers to whichever slot the line card occupies in the router.

Port numbering ranges from 0 to 21. This physical port numbering is reflected in CLI messages and all the references to port numbers that are visible to the user. (See Figure 1-3 and Figure 1-4.)

Figure 1-3   A Section of the Cisco ASR1000-2T+20x1GE Ethernet Line Card Showing Multiple Ports
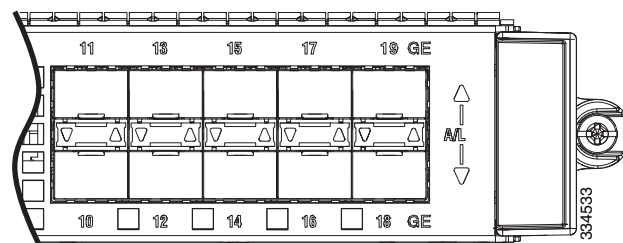
Figure 1-4   A Section of the Cisco ASR1000-2T+20x1GE Ethernet Line Card Showing One of the Two 10-GE Ports
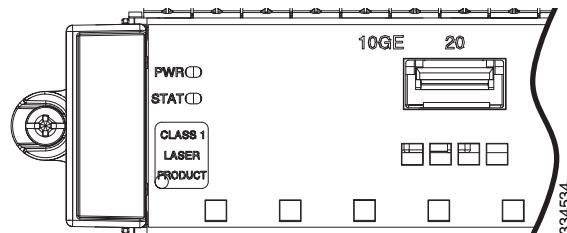
ASR1000-6TGE

The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-6TGE uses a *<slot, subslot, port>* numbering scheme. The slot refers to whichever slot the line card occupies in the router.

Port numbering ranges from 0 to 5. This physical port numbering is reflected in CLI messages and all the references to port numbers that are visible to the user. (Figure 1-5)

Figure 1-5   *A Section of the Cisco ASR1000-6TGE Ethernet Line Card Showing One of the Six 10-GE Ports*
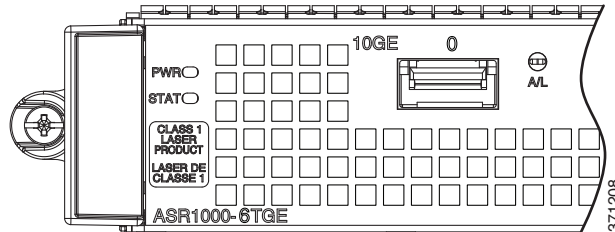
The following is a sample output from the **show interface** command for the line card located in slot 1 of a Cisco ASR 1000 Series Aggregation Services Router chassis:

```
Router# show interface gigabitEthernet 1/0/2

GigabitEthernet1/0/2 is up, line protocol is up
  Hardware is BUILT-IN-2T+20X1GE, address is badb.adbb.7942 (bia badb.adbb.7942)
  MTU 9216 bytes, BW 1000000 Kbit/sec, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation 802.1Q Virtual LAN, Vlan ID  1., loopback not set
  Keepalive not supported
  Full Duplex, 1000Mbps, link type is auto, media type is SX
  output flow-control is off, input flow-control is off
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 02:57:03, output 00:08:59, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     1953 packets input, 126224 bytes, 0 no buffer
     Received 1915 broadcasts (0 IP multicasts)
     0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 watchdog, 20 multicast, 0 pause input
     4132 packets output, 282195 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 unknown protocol drops
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier, 0 pause output
     0 output buffer failures, 0 output buffers swapped out
13RU#

13RU#sh int ten1/0/20
TenGigabitEthernet1/0/20 is up, line protocol is up
  Hardware is BUILT-IN-2T+20X1GE, address is badb.adbb.7954 (bia badb.adbb.7954)
  MTU 1500 bytes, BW 10000000 Kbit/sec, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive not supported
  Full Duplex, 10000Mbps, link type is force-up, media type is 10GBase-SR/SW
```

```
output flow-control is off, input flow-control is off
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output 00:09:56, output hang never
Last clearing of "show interface" counters never
Input queue: 0/375/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
   0 packets input, 0 bytes, 0 no buffer
   Received 0 broadcasts (0 IP multicasts)
   0 runts, 0 giants, 0 throttles
   0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
   0 watchdog, 0 multicast, 0 pause input
   18 packets output, 1458 bytes, 0 underruns
   0 output errors, 0 collisions, 1 interface resets
   0 unknown protocol drops
   0 babbles, 0 late collision, 0 deferred
   0 lost carrier, 0 no carrier, 0 pause output
   0 output buffer failures, 0 output buffers swapped out
```

Supported Platforms

The Cisco ASR 1000 Series Fixed Ethernet Line Cards are supported on the Cisco ASR 1004, Cisco ASR 1006, and Cisco ASR 1013 Router with RP2+ESP40, RP2+ESP100, and RP2+ESP200.

Note   The Cisco ASR 1000 Series Fixed Ethernet Line Cards are not supported in slot 4 and slot 5 of the Cisco ASR 1013 Router when the line card is used with the RP2+ESP40 combination.

Cisco IOS Software Release and Hardware Revision Requirements

The Cisco ASR 1000 Series Fixed Ethernet Line Cards have certain Cisco IOS software requirements. Also, to ensure compatibility with the Cisco IOS software, the Cisco ASR 1000 Series Fixed Ethernet Line Cards have a specific hardware revision number, which are printed on labels affixed to the component side of the cards and can be displayed using the **show diag slot** *slot number* **eeprom** command.

Table 1-1 lists the hardware and software requirements for the Cisco ASR 1000 Series Fixed Ethernet Line Cards.

Table 1-1   Cisco ASR 1000 Series Fixed Ethernet Line Card and Cisco IOS Release and Hardware Version Compatibility

Cisco ASR 1000 Series Fixed Ethernet Line Card	Cisco Product Number	Required Hardware Version	Minimum Cisco IOS Software Release
ASR1000 2-port 10GE, 20-port GE Line Card	ASR1000-2T+20X1GE	Mother board—73-13704-02 Daughter board—73-13705-02	Cisco IOS XE 3.10.0
ASR1000 6-port 10GE Line Card	ASR1000-6TGE	Daughter board—73-13934-01	Cisco IOS XE 3.12.0

The **show diag slot** *slot number* **eeprom** and the **show version** commands display the current hardware configuration of the router, including the system software version that is currently loaded and running, and the hardware revision number.

Checking Hardware and Software Compatibility

To check the minimum software requirements of Cisco IOS software with the hardware installed on your router, Cisco maintains the Software Advisor tool on Cisco.com. This tool does not verify whether the Cisco ASR 1000 Series Fixed Ethernet Line Cards and the system within which they are installed are compatible, but it does provide the minimum Cisco IOS requirements for individual hardware modules or components.

Note   Access to this tool is limited to users with Cisco.com login accounts.

To access the Software Advisor tool, click **Log In** at Cisco.com. In the log in page, enter your Cisco username and password and click **Log In**. Type Software Advisor in the SEARCH box, and click the search icon. Click the link for the Software Advisor tool.

Choose a product family or enter a specific product number to search for the minimum supported software release needed for your hardware.

Modular Optics Compatibility

The Cisco ASR 1000 Series Fixed Ethernet Line Cards use SFP or XFP optical transceivers to provide network connectivity.

The external interfaces support the following optical modules.

SFP Modules

Note   This section is only applicable to the Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-2T+20x1GE. The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-6TGE does not support SFP modules.

The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-2T+20x1GE supports the SFP optical transceiver modules. SFPs are integrated fiber-optic transceivers that provide high-speed serial links from a port or a slot to the network. Various latching mechanisms can be used on the SFPs. There is no correlation between the latch type and the model type (such as SX, LX, or LH) or technology type (such as Gigabit Ethernet). See the label on the SFP for the technology type and model.

Accepted SFP dimensions are:

- Height 0.03 in. (8.5 mm)
- Width 0.53 in. (13.4 mm)
- Depth 2.22 in. (56.5 mm)

Accepted SFP temperature ranges are:

- COM—Commercial operating temperature range from -5 to 70 degrees C (23 to 158 degrees F)

- EXT—Extended operating temperature range from -5 to 85 degrees C (23 to 185 degrees F)
- IND—Industrial operating temperature range from -40 to 85 degrees C (-40 to 85 degrees F)

The following SFP modules are supported:

- SFP-GE-S
- SFP-GE-L
- SFP-GE-Z
- SFP-GE-T

✎

Note   For Cisco IOS XE Release 3.10, SFP-GE-T= is supported only in the 1 Gbps mode.

- GLC-BX-D
- GLC-BX-U
- GLC-LH-SMD
- GLC-SX-MMD
- GLC-EX-SMD
- GLC-ZX-SMD
- GLC-GE-100FX, supported effective from Cisco IOS XE Release 3.13S
- GLC-TE, supported effective from Cisco IOS XE Release 3.15S
- DWDM
- CWDM
- GLC-GE-100FX

Connectors and Cabling for SFP Modules

The SFP optical transceiver module on the Cisco ASR 1000 Series Fixed Ethernet Line Card requires dual or single LC and PC connectors. Only connections with patch cords having PC or UPC connectors are supported. Patch cords with APC connectors are not supported. All cables and cable assemblies used must be compliant with the standards specified here:

- GR-20-CORE—Generic Requirements for Optical Fiber and Optical Fiber Cable
- GR-326-CORE—Generic Requirements for Single-mode Optical Connectors and Jumper Assemblies
- GR-1435-CORE—Generic Requirements for Multi-Fiber Optical Connectors

For single-mode and multimode optical fiber connections, you can use either a Duplex LC-Type Cable and Connector or two simplex LC-type cables, one for transmit (TX) and one for receive (RX).

Figure 1-6   Duplex LC-Type Cable and Connector
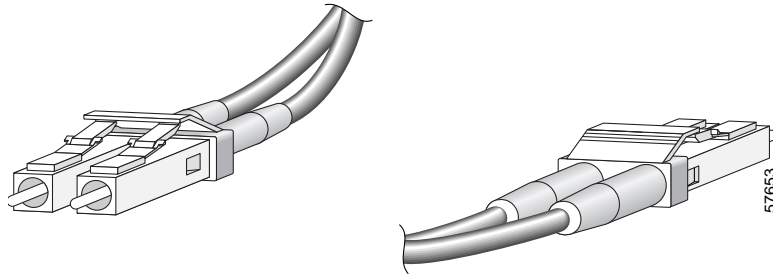
Coarse Wavelength-Division Multiplexing Optics Compatibility

The following Coarse Wavelength-Division Multiplexing (CWDM) modules (Cisco part numbers) are supported:

- CWDM-SFP-1470=
- CWDM-SFP-1490=
- CWDM-SFP-1510=
- CWDM-SFP-1530=
- CWDM-SFP-1550=
- CWDM-SFP-1570=
- CWDM-SFP-1590=
- CWDM-SFP-1610=

Dense Wavelength-Division Multiplexing Optics Compatibility

The following Dense Wavelength-Division Multiplexing (DWDM) modules (Cisco part numbers) are supported:

- DWDM-SFP-3033=
- DWDM-SFP-3112=
- DWDM-SFP-3190=
- DWDM-SFP-3268=
- DWDM-SFP-3425=
- DWDM-SFP-3504=
- DWDM-SFP-3582=
- DWDM-SFP-3661=
- DWDM-SFP-3819=
- DWDM-SFP-3898=
- DWDM-SFP-3977=
- DWDM-SFP-4056=
- DWDM-SFP-4214=
- DWDM-SFP-4294=

- DWDM-SFP-4373=
- DWDM-SFP-4453=
- DWDM-SFP-4612=
- DWDM-SFP-4692=
- DWDM-SFP-4772=
- DWDM-SFP-4851=
- DWDM-SFP-5012=
- DWDM-SFP-5092=
- DWDM-SFP-5172=
- DWDM-SFP-5252=
- DWDM-SFP-5413=
- DWDM-SFP-5494=
- DWDM-SFP-5575=
- DWDM-SFP-5655=
- DWDM-SFP-5817=
- DWDM-SFP-5898=
- DWDM-SFP-5979=
- DWDM-SFP-6061=

XFP Modules

The XFP modules provide high-speed serial links at the following rates: 9.95 Gbps (OC-192) and 10.3125 Gbps (10 Gigabit Ethernet) on single-mode optical fiber (SMF). The transmit side recovers and retimes the 10-Gbps serial data and passes it to a laser driver. The laser driver biases and modulates a 1310-nm or 1550-nm laser, enabling data transmission over SMF through an LC connector. The receive side recovers and retimes the 10-Gbps optical data stream from a photodetector transimpedance amplifier and passes it to an output driver. See the label on the XFP module for technology type and model.

XFP module dimensions are:

- Height: 12.5 mm
- Width: 18.35 mm
- Length: 71.1mm

The XFP module temperature range is 0 degree C to 70 degree C.

The following XFP modules are supported:

- XFP-10GER-192IR+
- XFP10GER-192IR-L
- XFP10GLR-192SR-L
- XFP-10GLR-OC192SR
- XFP-10GZR-OC192LR
- XFP-10G-MM-SR

- XFP-DWDM-C

Connectors and Cabling for XFP Modules

The XFP optical transceiver module on the Cisco ASR 1000 Series Fixed Ethernet Line Cards require dual LC and PC connectors. Only connections with patch cords having PC or UPC connectors are supported. Patch cords with APC connectors are not supported. All the cables and cable assemblies that are used must be compliant with the following standards:

- GR-20-CORE—Generic Requirements for Optical Fiber and Optical Fiber Cable
- GR-326-CORE—Generic Requirements for Single-Mode Optical Connectors and Jumper Assemblies
- GR-1435-CORE—Generic Requirements for Multi-Fiber Optical Connectors

Figure 1-7 shows the cable type to be used with the XFP optical transceiver module on the Cisco ASR 1000 Series Fixed Ethernet Line Cards.

Figure 1-7   *Duplex LC-Type Cable and Connector*
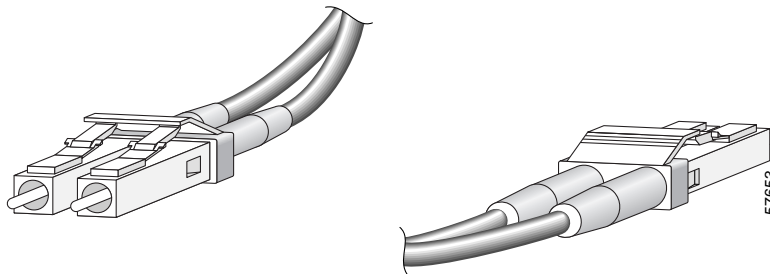
Power Management

A Cisco ASR 1000 Series Fixed Ethernet Line Card consumes chassis power. You must, therefore, ensure that the chassis is within the power budget on the Cisco ASR 1000 Series Aggregation Services Routers.

The current power requirement for a Cisco ASR 1000 Series Fixed Ethernet Line Card is a maximum of 145 W.

Line Card LED Details

This section provides information about the LEDs on the line card. The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-2T+20x1GE has one power LED, one line card status LED, and 22 port or link status LEDs.

The Cisco ASR 1000 Series Fixed Ethernet Line Card ASR1000-6TGE has one power LED, one line card status LED, and six port or link status LEDs.

Power and Status LEDs

The line cards have two LEDs on the front panel to show the status of the card. Table 1-2 describes the details of the LEDs.

Table 1-2   Power and Status LEDs

Function	Color or State	Description
Power	Green	All power rails match the specifications.
Status	Green	The OS has booted.
	Amber	BOOTROM has successfully loaded.
	Red	Line card failure has occured.

SFP Status LEDs

Each SFP port has a single bicolor LED to indicate the status. Table 1-3 describes the details of the LEDs.

Table 1-3   SFP Status LEDs

Function	Color or State	Description
SFP Status	Green	The link is active.
	Amber	There is a problem with the link.
	OFF	The link is off.

XFP Status LEDs

Each XFP port has a single bicolor LED to indicate the status. Table 1-4 describes the details of the LEDs.

Table 1-4   XFP Status LEDs

Function	Color or State	Description
XFP Status	Green	The link is active.
	Amber	There is a problem with the link.
	OFF	The link is off.

C H A P T E R **2**

Preparing to Install the Cisco ASR 1000 Series Fixed Ethernet Line Cards

This chapter describes the general equipment, safety, and site preparation requirements for installing the Cisco ASR 1000 Series Fixed Ethernet Line Cards. This chapter contains the following sections:

Required Tools and Equipment

You need the following tools and parts to remove and install the Cisco ASR 1000 Fixed Ethernet Line Card. If you need additional equipment, contact a Cisco service representative.

- The Cisco ASR 1000 Fixed Ethernet Line Card
- Interface cables to connect the Cisco ASR 1000 Fixed Ethernet Line Card with another router or switch
- Any small form-factor pluggables (SFP or XFP modules) that you have to install (and have not already installed)
- Number 1 Phillips screwdriver and a 3/16-inch flat-blade screwdriver
- Number 2 Phillips screwdriver
- Your own electrostatic discharge (ESD)-prevention equipment or ESD-preventive wrist strap or ankle strap along with instructions (supplied with your line card)
- Antistatic mat
- Antistatic container
- Fiber-optic end-face cleaning tools and inspection equipment. For complete information on inspecting and cleaning fiber-optic connections, refer to the white paper at: http://www.cisco.com/en/US/tech/tk482/tk607/technologies_white_paper09186a0080254eba.shtml

■ **Safety Guidelines**

Safety Guidelines

This section provides safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement.

Warning Definition

Warning   **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing   **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus   **TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention   **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung   **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza   **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel   **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso   **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia!   INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning!   VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение   ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告   重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告　安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を
行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、
各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의　중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다.
장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고
를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는
번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

تحذير　إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل،
احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم
رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز.
قم بحفظ هذه الإرشادات

Upozorenje　VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti
tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz
električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U
prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se
nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění　DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit
nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související
s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům.
Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených
bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

■ **Safety Guidelines**

Προειδοποίηση | ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה | **הוראות בטיחות חשובות**

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Ostrzeżenie | **WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA**

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie | **DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power off switch for the room in which you are working.

- Disconnect power and all the external cables before moving a chassis.

Cisco ASR 1000 Fixed Ethernet Line Card Hardware Installation Guide

- Do not work alone when potentially hazardous conditions exist.

- Never assume that power has been disconnected from a circuit; always check.

- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe; carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Telephone Wiring Guidelines

Use the following guidelines when working with any equipment that is connected to telephone wiring or to other network cabling:

- Never install telephone wiring during a lightning storm.

- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic cards or components are improperly handled, results in complete or intermittent failures. The Cisco ASR 1000 Series Fixed Ethernet Line Cards comprise printed circuit boards that are fixed to metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of these carriers. Although the metal carriers help to protect the boards from ESD, use a preventive antistatic strap when handling the line cards.

The following are the guidelines for preventing ESD damage:

- Always use an ESD wrist strap or ankle strap and ensure that it is touching the skin.

- Connect the equipment end of the strap to an unfinished chassis surface.

- When installing a component, use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that the bus connectors are properly seated.

- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.

- Handle the carriers using the available handles or edges only; avoid touching the printed circuit boards or connectors.

- Place a removed board component-side-up on an antistatic surface or on a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.

- Avoid contact between the printed circuit boards and clothing. The wrist strap protects only components from ESD voltages on the body; ESD voltages on clothing can still cause damage.

- Never attempt to remove the printed circuit board from the metal carrier.

⚠

Caution   For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms (Mohms).

Laser and LED Safety

An optical single-mode transmitter uses a small laser to transmit the light signal to the network ring. Keep the transmit port covered whenever a cable is not connected to it. Although multimode transceivers typically use LEDs for transmission, it is a good practice to keep open ports covered and avoid staring into open ports or apertures. The single-mode aperture port contains a laser warning label, as shown in Figure 2-1. The multimode aperture contains a Class 1 LED warning label, as shown in Figure 2-1. These warnings apply to SFP and XFP modules that transmit signals via an optical carrier signal.

Figure 2-1   *Class 1 Laser Warning Labels for Single-Mode Port*

CLASS 1 LASER PRODUCT
LASERPRODUKT DER KLASSE 1

PRODUIT LASER DE CLASSE 1
クラス１　レーザ製品
PRODUCTO LASER CLASE 1

H6655

⚠

Warning   **Class 1 laser product.** Statement 1008

Waarschuwing   **Klasse-1 laser produkt.**

Varoitus   **Luokan 1 lasertuote.**

Attention   **Produit laser de classe 1.**

Warnung   **Laserprodukt der Klasse 1.**

Avvertenza   **Prodotto laser di Classe 1.**

Advarsel   **Laserprodukt av klasse 1.**

Aviso   **Produto laser de classe 1.**

¡Advertencia! **Producto láser Clase I.**

Varning!   **Laserprodukt av klass 1.**

Figyelem   **Class 1 besorolású lézeres termék.**

Предупреждение   Лазерное устройство класса 1.

警告   这是 1 类激光产品。

警告   クラス1レーザー製品です。

주의   클래스 1 레이저 제품.

Aviso   **Produto a laser de classe 1.**

Advarsel   **Klasse 1 laserprodukt.**

تحذير   Class 1 Laser   منتج ١

Upozorenje   **Laserski proizvod klase 1**

Upozornění   **Laserový výrobek třídy 1.**

Προειδοποίηση   **Προϊόν λέιζερ κατηγορίας 1.**

אזהרה   .Class 1 מוצר לייזר

Ласерски производ од класа 1.

Ostrzeżenie   **Produkt laserowy klasy 1.**

Upozornenie   **Laserový výrobok triedy 1.**

Opozorilo   **Laserski izdelek 1. razreda.**

警告   **類別 1 雷射產品。**

Предупреждение   **Лазерен продукт от клас 1.**

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

Waarschuwing   Losgekoppelde of losgeraakte glasvezels of aansluitingen kunnen onzichtbare laserstraling produceren. Kijk niet rechtstreeks in de straling en gebruik geen optische instrumenten rond deze glasvezels of aansluitingen.

Varoitus   Irrotetuista kuiduista tai liittimistä voi tulla näkymätöntä lasersäteilyä. Älä tuijota säteitä tai katso niitä suoraan optisilla välineillä.

Attention   Les fibres ou connecteurs débranchés risquent d'émettre des rayonnements laser invisibles à l'œil. Ne regardez jamais directement les faisceaux laser à l'œil nu, ni d'ailleurs avec des instruments optiques.

Warnung   Unterbrochene Fasern oder Steckerverbindungenkönnen unsichtbare Laserstrahlung abgeben. Blicken Sie weder mit bloßem Auge noch mit optischen Instrumenten direkt in Laserstrahlen.

Avvertenza   Le fibre ottiche ed i relativi connettori possono emettere radiazioni laser. I fasci di luce non devono mai essere osservati direttamente o attraverso strumenti ottici.

Advarsel   Det kan forekomme usynlig laserstråling fra fiber eller kontakter som er frakoblet. Stirr ikke direkte inn i strålene eller se på dem direkte gjennom et optisk instrument.

Aviso   Radiação laser invisível pode ser emitida de conectores ou fibras desconectadas. Não olhe diretamente para os feixes ou com instrumentos ópticos.

¡Advertencia!   Es posible que las fibras desconectadas emitan radiación láser invisible. No fije la vista en los rayos ni examine éstos con instrumentos ópticos.

Varning!   Osynlig laserstrålning kan avges från frånkopplade fibrer eller kontaktdon. Rikta inte blicken in i strålar och titta aldrig direkt på dem med hjälp av optiska instrument.

A nem csatlakoztatott üvegszálak és csatlakozók láthatatlan lézersugárzást bocsáthatnak ki. Ne nézzen bele a sugárba, és ne nézze közvetlenül, optikai berendezések segítségével!

Предупреждение   Отключенные световоды и разъемы могут испускать невидимое лазерное излучение. Не допускайте попадания лазерного луча в глаза и не смотрите на него через оптические приборы.

警告   断开的光纤或接头有可能发出不可见的激光辐射。请勿直视光束或直接用光学仪器观看光束。

警告   光ファイバ ケーブルまたはコネクタを取り外した状態では、目に見えないレーザー光が放射されていることがあります。光線をのぞきこんだり、光学機器を使用して光線を直接見たりしないでください。

주의   연결이 해제된 섬유나 커넥터에서 눈에 보이지 않는 레이저 방사열이 방출될 수 있습니다. 레이저 빔을 눈으로 쳐다 보거나 광학 기구를 사용하여 직접 보지 마십시오.

Aviso   **Radiação laser invisível pode ser emitida a partir de fibras ou conectores desconectados. Não fixe o olhar nos feixes e nem olhe diretamente com instrumentos ópticos.**

Advarsel   **Usynlig laserstråling kan forekomme fra brugte fibre eller stik. Stir ikke ind i stråler eller direkte med optiske instrumenter.**

تحذير   من المحتمل انبعاث أشعة الليزر من الألياف غير المتصلة أو التوصيلات. لا تحدق النظر في الشعاع أو النظر مباشرة بدون أي أداة بصرية.

Upozornění   **Odpojená vlákna kabelů či konektory mohou vyzařovat neviditelné laserové záření. Nedívejte se do paprsků ani nepozorujte přímo pomocí optických přístrojů.**

Προειδοποίηση   Από αποσυνδεδεμένες ίνες ή υποδοχές μπορεί να εκπέμπεται αόρατη ακτινοβολία λέιζερ. Μην κοιτάτε απευθείας τις δέσμες φωτός και μην τις απεικονίζετε απευθείας με οπτικά όργανα.

אזהרה   תתיכן פליטה של קרינת לייזר בלתי-נראית מסיבים או ממחברים מנותקים. אל תביט ישירות לתוך קרני אור ואל תביט באמצעות במכשירים אופטיים.

Opomena   Невидливо ласерско зрачење може да зрачи од исклучените влакна или приклучоци. Не гледајте во зраци и не прегледувајте ги директно со оптички инструменти.

Ostrzeżenie   **Odłączone światłowody lub złącza mogą emitować niewidzialne promieniowanie laserowe. Nie należy patrzeć prosto w wiązkę lasera ani bezpośrednio obserwować jej przy użyciu przyrządów optycznych.**

Upozornenie   **Odpojené vlákna káblov alebo konektory môžu vyžarovať neviditeľné laserové žiarenie. Nepozerajte sa do lúčov ani ich nepozorujte priamo pomocou optických prístrojov.**

⚠

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

⚠

Warning   Class 1 LED product. Statement 1027

Installing and Removing the Cisco ASR 1000 Series Fixed Ethernet Line Cards

This chapter describes how to install and remove the Cisco ASR 1000 Series Fixed Ethernet Line Cards on the Cisco ASR 1000 Series Aggregation Services Routers. This chapter contains the following sections:

- Handling the Cisco ASR 1000 Series Fixed Ethernet Line Card, page 3-29
- Online Insertion and Removal, page 3-29

Handling the Cisco ASR 1000 Series Fixed Ethernet Line Card

Each Cisco ASR 1000 Series Fixed Ethernet Line Card circuit board is mounted on a metal carrier and is sensitive to electrostatic discharge (ESD) damage. Before you begin installation, read Chapter 2, "Preparing to Install the Cisco ASR 1000 Series Fixed Ethernet Line Cards" for a list of parts and tools required for installation.

⚠️

Caution Always handle the Cisco ASR 1000 Series Fixed Ethernet Line Card by the carrier edges and handles; never touch the line card components or connector pins.

When a slot is not in use, a blank filler plate must be installed in the empty slot to allow the router or switch to conform to electromagnetic interference (EMI) emission requirements and to allow proper airflow across the installed modules. If you plan to install the Cisco ASR 1000 Series Fixed Ethernet Line Card in a slot that is not in use, you must first remove the blank filler plate.

Online Insertion and Removal

The Cisco ASR 1000 Series Aggregation Services Routers support online insertion and removal (OIR) of the Cisco ASR 1000 Series Fixed Ethernet Line Card, as well as OIR for the small form-factor pluggables (SFP or XFP modules). Therefore, you can remove the Cisco ASR 1000 Series Fixed Ethernet Line Card with its SFP or XFP modules still intact, or you can remove SFP or XFP modules independently from the Cisco ASR 1000 Series Fixed Ethernet Line Card, leaving the line card installed in the router.

This section includes the following topics on OIR support:

Preparing for Online Removal of the Cisco ASR 1000 Series Fixed Ethernet Line Card

The Cisco ASR 1000 Series Aggregation Services Routers support OIR of the Cisco ASR 1000 Series Fixed Ethernet Line Card. If you plan to remove a Cisco ASR 1000 Series Fixed Ethernet Line Card, deactivate the line card first using the **hw-module slot** *slotnumber* **shutdown** global configuration command.

When you deactivate the Cisco ASR 1000 Series Fixed Ethernet Line Card using this command, it automatically deactivates each of the SFP or XFP modules that are installed in the Cisco ASR 1000 Series Fixed Ethernet Line Card. Therefore, it is not necessary to deactivate each of the SFP or XFP modules prior to deactivating the Cisco ASR 1000 Series Fixed Ethernet Line Card.

Although graceful deactivation of the Cisco ASR 1000 Series Fixed Ethernet Line Card is preferred using the **hw-module slot** *slotnumber* **shutdown** command, the Cisco ASR 1000 Series Aggregation Services Routers do support the removal of the Cisco ASR 1000 Series Fixed Ethernet Line Card without deactivating it first.

Note   It is recommended that you stop any traffic, and then stop the card using **hw-module slot <> stop** command in privileged EXEC mode and wait for at-least 60 sec before swapping carrier cards.

Deactivating a Cisco ASR 1000 Series Fixed Ethernet Line Card

To deactivate a Cisco ASR 1000 Series Fixed Ethernet Line Card and its installed SFPs or XFPs prior to the removal of the Cisco ASR 1000 Series Fixed Ethernet Line Card, use the following command in the global configuration mode:

Command	Purpose
Router(config)# **hw-module slot** *slotnumber* **shutdown**	Shuts down the installed interfaces and deactivates the Cisco ASR 1000 Series Fixed Ethernet Line Card in the specified slot. Here: *slotnumber*—Specifies the chassis slot number in which the Cisco ASR 1000 Series Fixed Ethernet Line Card is installed.

Reactivating a Cisco ASR 1000 Series Fixed Ethernet Line Card

After you deactivate the Cisco ASR 1000 Series Fixed Ethernet Line Card, whether or not you have performed an OIR, you must use the **no hw-module slot** *slotnumber* **shutdown** global configuration command to reactivate the Cisco ASR 1000 Series Fixed Ethernet Line Card.

The installed SFP or XFP modules automatically get reactivated upon reactivation of the Cisco ASR 1000 Series Fixed Ethernet Line Card in the router. For example, consider a scenario where you remove a Cisco ASR 1000 Series Fixed Ethernet Line Card from the router to replace it with another Cisco ASR 1000 Series Fixed Ethernet Line Card. You reinsert the same SFP or XFP modules into the new Cisco ASR 1000 Series Fixed Ethernet Line Card. When you enter the **no hw-module slot** *slotnumber* **shutdown** command on the router, the SFP or XFP modules will automatically get reactivated with the new Cisco ASR 1000 Series Fixed Ethernet Line Card.

To reactivate a Cisco ASR 1000 Series Fixed Ethernet Line Card and its installed SFP or XFP modules after the Cisco ASR 1000 Series Fixed Ethernet Line Card has been deactivated, use the following command in the global configuration mode:

Command	Purpose
Router(config)# **no hw-module slot** *slotnumber* **shutdown**	Reactivates the line card in the specified slot and its installed SFPs or XFPs. Here: *slotnumber*—Specifies the slot number of the chassis on which the line card is installed. This command is used only is this card was previously shut down using the **hw-module slot x shutdown** global configuration command. **Note**: A newly inserted line card does not require this command to activate the card.

Verifying the Deactivation and Activation of the Cisco ASR 1000 Series Fixed Ethernet Line Card

To verify the deactivation of the Cisco ASR 1000 Series Fixed Ethernet Line Card, enter the **show platform** command in the privileged EXEC configuration mode. Observe the State field associated with the Cisco ASR 1000 Series Fixed Ethernet Line Card that you want to verify.

The following example shows the Cisco ASR 1000 Series Fixed Ethernet Line Card located in slot 2. In this scenario, slot 2 is powered down. This is indicated by its disabled status.

```
Router1(config)#hw-module slot 2 shutdown
Router1# show platform
Chassis type: ASR1013

Slot      Type                State                Insert time (ago)
--------- ------------------- -------------------- ----------------
1         ASR1000-SIP40       ok                   22:02:07
 1/0      SPA-1X10GE-L-V2     ok                   22:00:57
 1/1      SPA-1X10GE-L-V2     ok                   22:00:57
 1/2      SPA-1X10GE-WL-V2    ok                   21:30:51
 1/3      SPA-1X10GE-L-V2     ok                   22:00:46
2         ASR1000-2T+20X1GE   disabled             22:02:07
3         ASR1000-SIP10       ok                   22:02:07
 3/1      SPA-5X1GE-V2        ok                   22:00:55
 3/2      SPA-5X1GE           ok                   22:00:48
```

```
R0        ASR1000-RP2          ok, active           22:02:07
R1        ASR1000-RP2          ok, standby          22:02:07
F0        ASR1000-ESP40        ok, active           22:02:07
F1        ASR1000-ESP40        ok, standby          22:02:07
P0        ASR1013/06-PWR-AC    ok                   22:01:16
P1        ASR1013/06-PWR-AC    ps, fail             22:01:15
P2        ASR1013/06-PWR-AC    ps, fail             22:01:15
P3        ASR1013/06-PWR-AC    ok                   22:01:14


Router# show platform diag
Chassis type: ASR1013

Slot: 1, ASR1000-2T+20X1GE
  Running state               : disabled
  Internal state              : offline
  Internal operational state  : disabled
  Physical insert detect time : 00:00:58 (03:19:08 ago)
  Software declared up time   : 00:02:52 (03:17:13 ago)
  CPLD version                : 13012400
  Firmware version            : 15.3(3r)S

Sub-slot: 1/0, BUILT-IN-2T+20X1GE
  Operational status          : ok
  Internal state              : inserted
  Physical insert detect time : 00:03:25 (03:16:40 ago)
  Logical insert detect time  : 00:03:25 (03:16:40 ago)

Slot: 4, ASR1000-SIP40
  Running state               : ok
  Internal state              : online
  Internal operational state  : ok
  Physical insert detect time : 00:00:58 (03:19:08 ago)
  Software declared up time   : 00:01:51 (03:18:15 ago)
  CPLD version                : 00200800
  Firmware version            : 15.2(1r)S
```

To verify the activation and proper operation of a Cisco ASR 1000 Series Fixed Ethernet Line Card, enter the **no hw-module slot 2 shutdown** command. After this, enter the **show platform** command and observe slot 1 in the ok state. Finally, enter the **show platform diag** command and observe ok in the Running state field, as shown in the following example:

```
Router# show platform diag
Chassis type: ASR1013

Slot: 1, ASR1000-2T+20X1GE
  Running state               : ok
  Internal state              : online
  Internal operational state  : ok
  Physical insert detect time : 00:00:58 (03:19:08 ago)
  Software declared up time   : 00:02:52 (03:17:13 ago)
  CPLD version                : 13012400
  Firmware version            : 15.3(3r)S

Sub-slot: 1/0, BUILT-IN-2T+20X1GE
  Operational status          : ok
  Internal state              : inserted
  Physical insert detect time : 00:03:25 (03:16:40 ago)
  Logical insert detect time  : 00:03:25 (03:16:40 ago)

Slot: 4, ASR1000-SIP40
  Running state               : ok
  Internal state              : online
```

```
Internal operational state  : ok
Physical insert detect time : 00:00:58 (03:19:08 ago)
Software declared up time   : 00:01:51 (03:18:15 ago)
CPLD version                : 00200800
Firmware version            : 15.2(1r)S
```

Preparing for Online Removal of SFP or XFP Modules

The Cisco ASR 1000 Series Aggregation Services Routers support OIR of an SFP or XFP module without removing the Cisco ASR 1000 Series Fixed Ethernet Line Card. This means that a Cisco ASR 1000 Series Fixed Ethernet Line Card can remain installed in the router with one XFP remaining active, while you remove another XFP from one of the line-card ports, or that a Cisco ASR 1000 Series Fixed Ethernet Line Card can remain installed in the router with some number of SFP modules remaining active, while you remove other SFP modules from the line-card ports.

The interface configuration is retained or recalled if a Cisco ASR 1000 Series Fixed Ethernet Line Card or SFP or XFP is removed and then replaced with one of the same type.

However, if the line card is already installed in the router and the system is operational, we recommend that you shut down the port using the **interface config** command before removing the SFP or XFP modules.

C H A P T E R **4**

Installing and Removing the SFP and XFP Modules

This chapter describes how to install and remove small form-factor pluggables (SFP modules or XFP modules) on the Cisco ASR 1000 Series Fixed Ethernet Line Card. This chapter contains the following sections:

Removing and Installing SFP Modules

Note The Cisco ASR 1000 Series Fixed Ethernet Line Card will accept only the SFP modules listed as supported in this document. An SFP check is run every time an SFP module is inserted into a Cisco ASR 1000 Series Fixed Ethernet Line Card, and only those SFP modules that pass this check are usable.

Before you remove or install an SFP module, read the installation information provided in this section and the "Laser and LED Safety" section on page 2-24.

Caution Protect the SFP modules by inserting clean dust covers on them after the cables are removed. Ensure that you clean the optic surfaces of the fiber cables before you plug them back into the optical ports of another SFP module. Avoid getting dust and other contaminants into the optical ports of your SFP modules because the optics will not work correctly when obstructed with dust.

Caution We recommend that you do not install or remove the SFP module with fiber-optic cables attached to it because of potential damage to the cable, the cable connector, or the optical interfaces in the SFP module. Disconnect all the cables before removing or installing an SFP module.

Removing and inserting an SFP module can shorten its useful life. Therefore, you should not remove and insert SFP modules unless it is absolutely necessary.

SFP modules use one of four different latching devices to install and remove the module from a port. The four types of SFP module-latching devices are described in the following sections:

- Bale Clasp SFP Module, page 4-36

- Mylar Tab SFP Module, page 4-38

- Actuator Button SFP Module, page 4-40

- Slide Tab SFP Module, page 4-42

Bale Clasp SFP Module

The bale clasp SFP module has a clasp that you should use to remove or install the SFP module. (See Figure 5-1.)
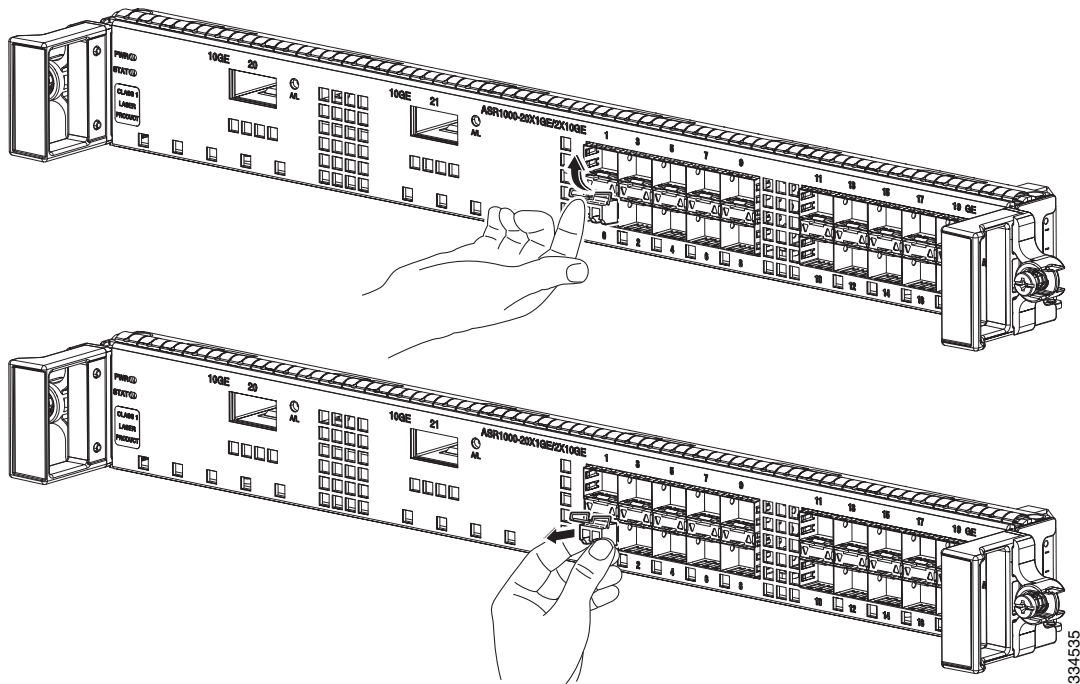
Figure 5-1   Bale Clasp SFP Module
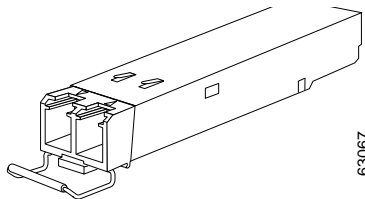
Removing a Bale Clasp SFP Module

To remove this type of SFP module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap or ankle strap by following the instructions provided.

Step 2   Disconnect and remove all the interface cables from the ports and note the current connections of the cables to the ports on the line card.

Step 3   Open the bale clasp on the SFP module with your index finger in a downward direction, as shown in Figure 5-2. If the bale clasp is obstructed and you cannot use your index finger to open it, use a small flat-blade screwdriver to open the bale clasp.

Step 4   Grasp the SFP module between your thumb and index finger and carefully remove it from the port as shown in Figure 5-2.

*Figure 5-2*   *Removing a Bale Clasp SFP Module*

Step 5   Place the removed SFP module on an antistatic mat, or immediately place it in a static shielding bag if you plan to return it to the factory.

Step 6   Protect your line card by inserting clean SFP module cage covers into the optical module cage when no SFP modules are installed.

Installing a Bale Clasp SFP Module

To install this type of SFP module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap or ankle strap according to the instructions provided.

Step 2   Close the bale clasp before inserting the SFP module.

Step 3   Line up the SFP module with the port, and slide it into the port. (See Figure 5-3.)

*Figure 5-3*   *Installing a Bale Clasp SFP Module into a Port*
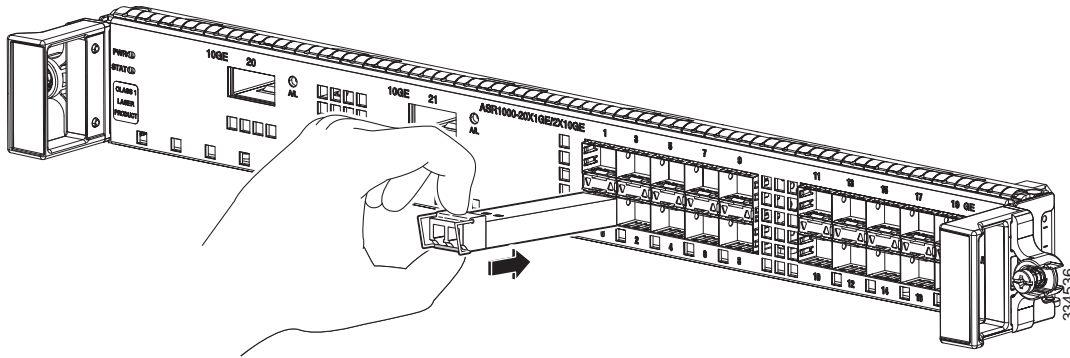
Note   Verify that the SFP modules are completely seated and secured in their assigned receptacles on the line card by firmly pushing on each SFP module. If the SFP module is not completely seated and secured in the receptacle, you will hear a click as the triangular pin at the bottom of the SFP module snaps into the hole in the receptacle.

Mylar Tab SFP Module

The mylar tab SFP module has a tab that you pull to remove the module from a port. (See Figure 5-4.)

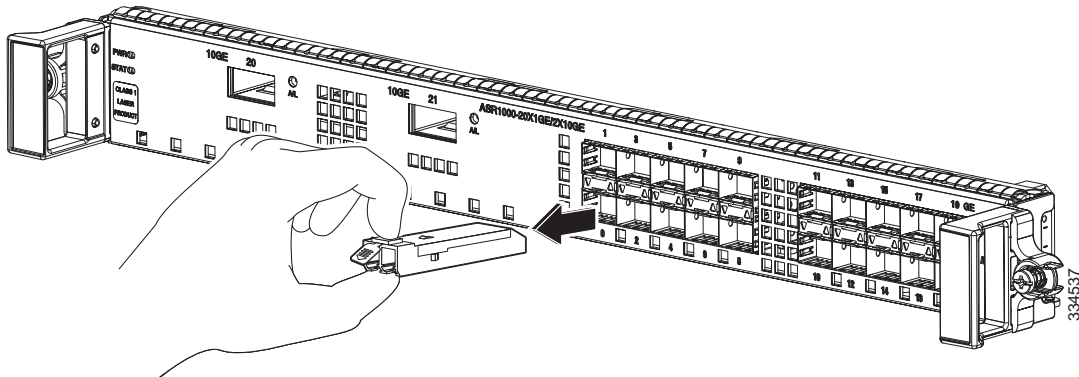*Figure 5-4*   *Mylar Tab SFP Module*
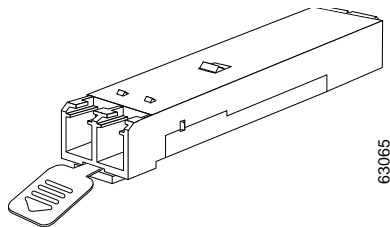
Removing a Mylar Tab SFP Module

To remove this type of SFP module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap or ankle strap according to the instructions provided.

Step 2   Disconnect and remove all the interface cables from the ports; note the current connections of the cables to the ports on the line card.

Step 3   Pull the tab gently in a slightly downward direction until it disengages from the port and then pull the SFP module out. (See Figure 5-5.)

Figure 5-5   ***Removing a Mylar Tab SFP Module***

Step 4   Place the removed SFP module on an antistatic mat, or immediately place it in a static shielding bag if you plan to return it to the factory.

Step 5   Protect your line card by inserting clean SFP module cage covers on the optical module cage when there is no SFP module installed.

⚠

Caution   When pulling the tab to remove the SFP module, be sure to pull it in a straight outward motion so that you can remove the SFP module from the port in a parallel direction. Do not twist or pull the tab because you might disconnect it from the SFP module.

Installing a Mylar Tab SFP Module

To install this type of SFP module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap or ankle strap according to the instructions provided.

Step 2   Line up the SFP module with the port, and slide it into place. (See Figure 5-6.)

***Figure 5-6***   ***Installing a Mylar Tab SFP Module***
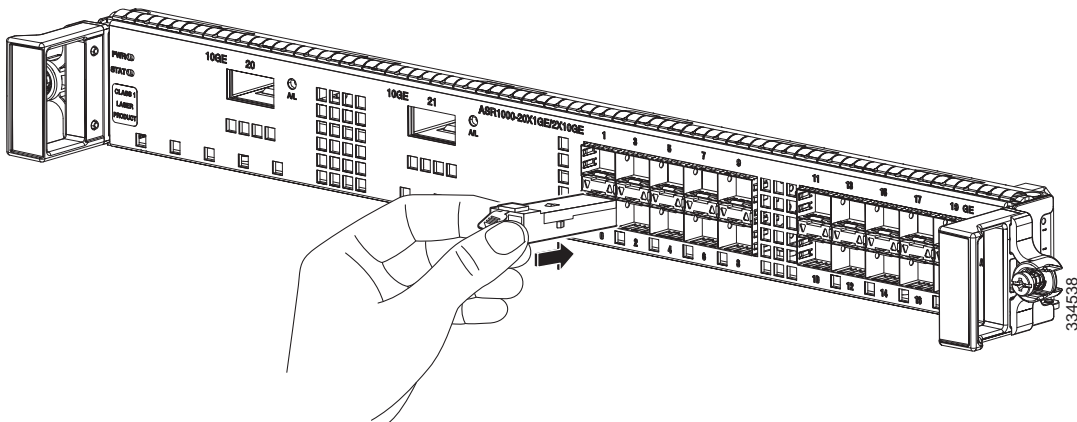
> **Note** Verify that the SFP modules are completely seated and secured in their assigned receptacles on the line card by firmly pushing on each SFP module. If the SFP module is not completely seated and secured in the receptacle, you will hear a click as the triangular pin at the bottom of the SFP module snaps into the hole in the receptacle.

Actuator Button SFP Module

The actuator button SFP module includes a button that you should push in order to remove the SFP module from a port. (See Figure 5-7.)
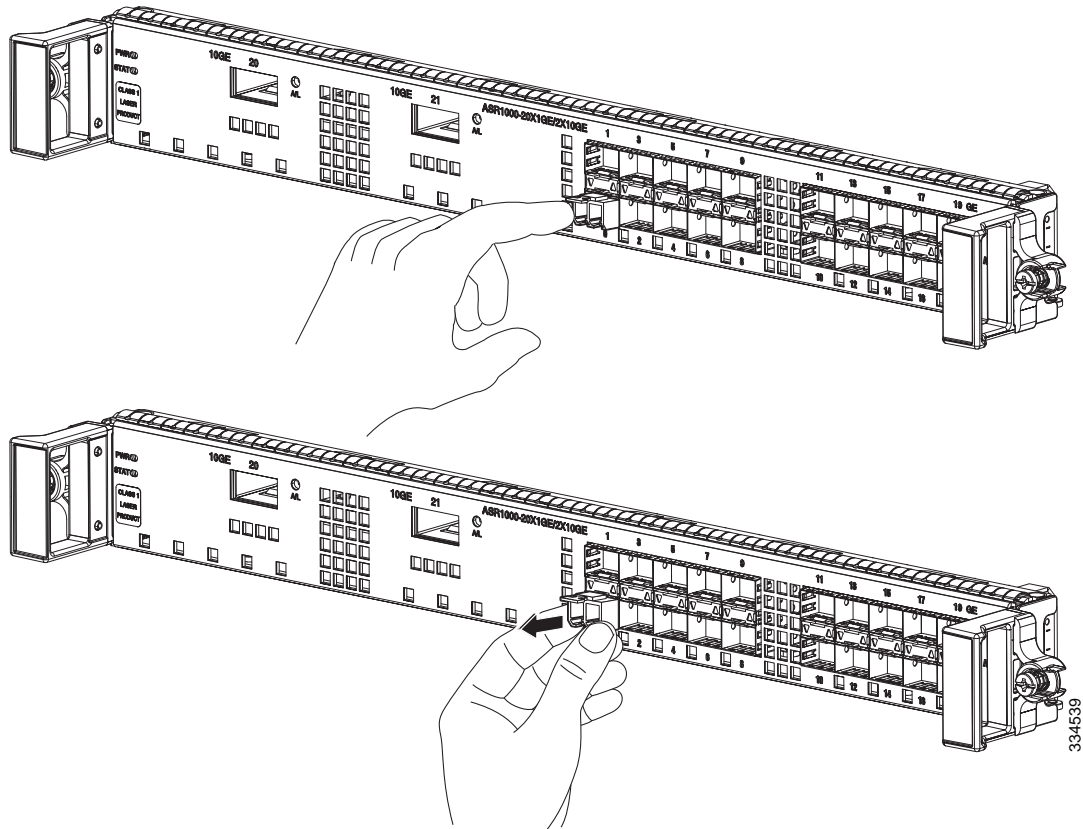
Figure 5-7   Actuator Button SFP Module
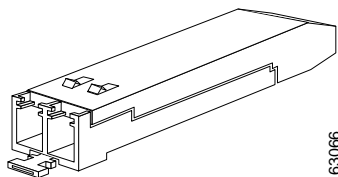
Removing an Actuator Button SFP Module

To remove this type of SFP module, follow these steps:

Step 1 Attach an ESD-preventive wrist strap or ankle strap according to the instructions provided.

Step 2 Disconnect and remove all the interface cables from the ports; note the current connections of the cables to the ports on the line card.

Step 3 Gently press the actuator button on the front of the SFP module until it clicks and the latch mechanism is activated, releasing the SFP module from the port. (See Figure 5-8.)

***Figure 5-8***   ***Removing an Actuator Button SFP Module from a Port***

Step 4   Grasp the actuator button between your thumb and index finger and carefully pull the SFP module from the port.

Step 5   Place the removed SFP module on an antistatic mat, or immediately place it in a static shielding bag if you plan to return it to the factory.

Step 6   Protect your line card by inserting clean SFP module cage covers on the optical module cage when there is no SFP module installed.

Installing an Actuator Button SFP Module

To install this type of SFP module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap or ankle strap according to the instructions provided.

Step 2   Line up the SFP module with the port and slide it in until the actuator button clicks into place. (See Figure 5-9.) Do not press the actuator button as you insert the SFP module because you might inadvertently disengage the SFP module from the port.

*Figure 5-9*   *Installing an Actuator Button SFP Module*
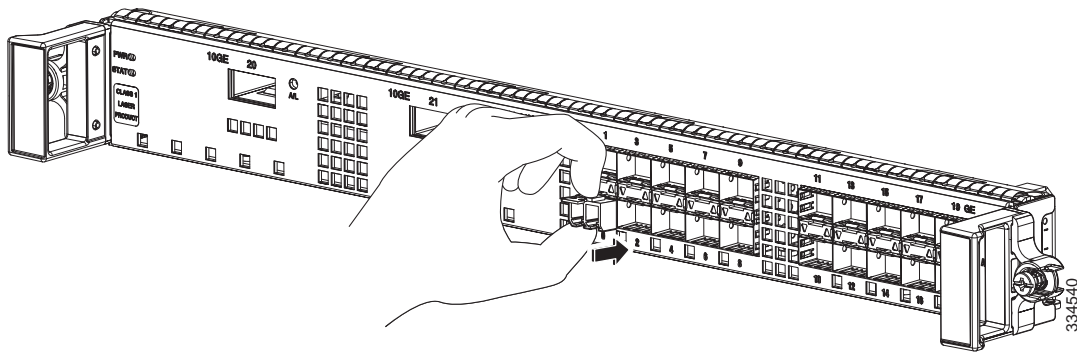
✎ **Note**   Verify that the SFP modules are completely seated and secured in their assigned receptacles on the line card by firmly pushing on each SFP module. If the SFP module is not completely seated and secured in the receptacle, you will hear a click as the triangular pin at the bottom of the SFP module snaps into the hole in the receptacle.

Slide Tab SFP Module

The slide tab SFP module has a tab underneath the front of the SFP module. Use the tab to disengage the module from a port. (See Figure 5-10.)

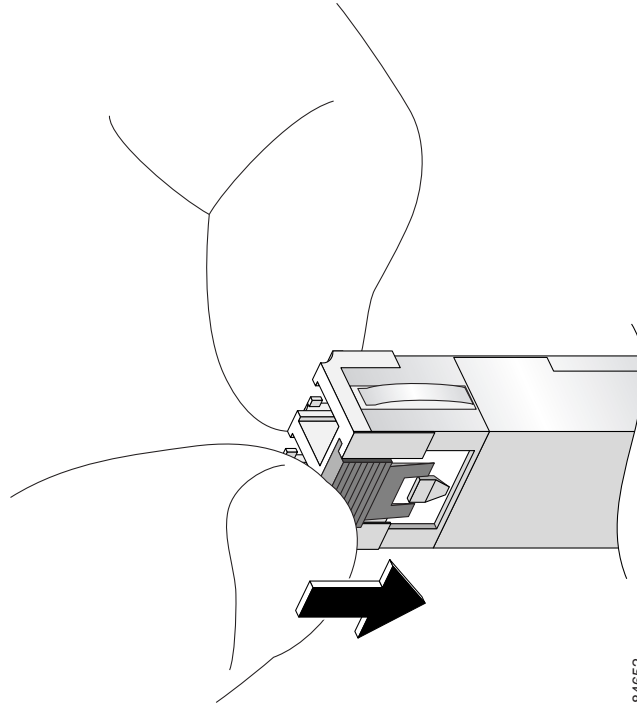*Figure 5-10*   *Slide Tab SFP Module*
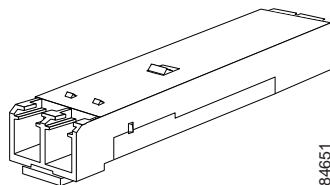
Removing a Slide Tab SFP Module

To remove this type of SFP module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap or ankle strap according to the instructions provided.

Step 2   Disconnect and remove all the interface cables from the ports; note the current connections of the cables to the ports on the line card.

Step 3   Grasp the SFP module between your thumb and index finger.

Step 4   With your thumb, push the slide tab at the bottom front of the SFP module in the direction of the line card to disengage the module from the line card port. (See Figure 5-11.)
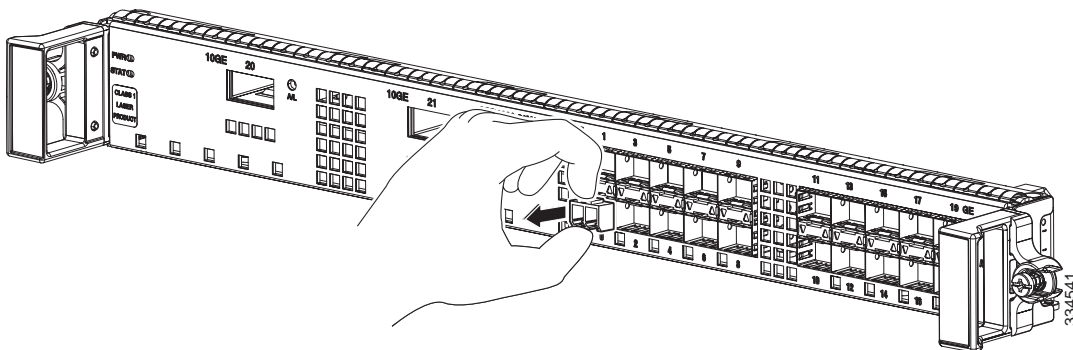
Figure 5-11   *Disengaging the Slide Tab*

Step 5   With the tab still pushed, carefully pull the SFP module from the port, as shown in Figure 5-12.

⚠️

Caution   You must disengage the SFP module by pushing on the slide tab before you pull out the SFP module. If you pull the SFP module without disengaging the tab, you can damage the SFP module.

Figure 5-12   *Removing a Slide Tab SFP Module*

Step 6   Place the removed SFP module on an antistatic mat, or immediately place it in a static shielding bag if you plan to return it to the factory.

Step 7   Protect your line card by inserting clean SFP module cage covers on the optical module cage when there is no SFP module installed.

Installing a Slide Tab SFP Module

To install this type of SFP module, follow these steps:

Step 1   Attach an ESD-preventive wrist strap or ankle strap according to the instructions provided.

Step 2   Hold the SFP module with the hardware label facing up.

⚠️

Caution   The SFP module must be inserted with the hardware label facing up to avoid damage to the module or the line card.

Step 3   Insert the SFP module into the appropriate slot and gently push on it until it snaps into the slot tightly. (See Figure 5-13.)

Figure 5-13   *Installing a Slide Tab SFP Module*
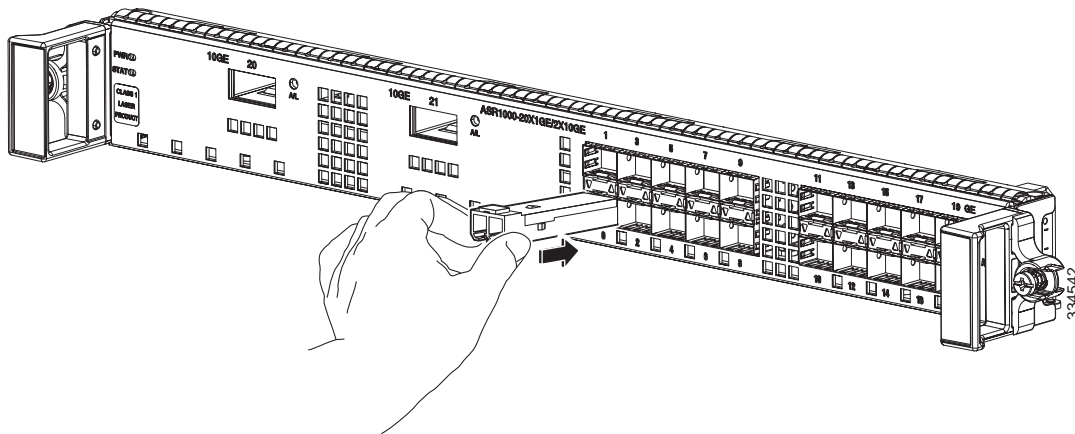
✎

Note   Verify that the SFP modules are completely seated and secured in their assigned receptacles on the line card by firmly pushing on each SFP module. If the SFP module is not completely seated and secured in the receptacle, you will hear a click as the triangular pin on the bottom of the SFP module snaps into the hole in the receptacle.

Removing and Installing XFP Modules

✎

Note   The dual LC connector on the XFP transceiver modules support network interface cables with either Physical Contact (PC) or Ultra-Physical Contact (UPC) polished face types. The dual LC connector on the XFP transceiver modules do not support network interface cables with an Angle Polished Connector (APC) polished face type.

The 10-GE XFP transceiver module is a hot-swappable I/O device that plugs into 10-GE ports. (See Figure 5-14.) The XFP transceiver module connects the electrical circuitry of the system with the optical network.

Figure 5-14   10-GE XFP Transceiver Module
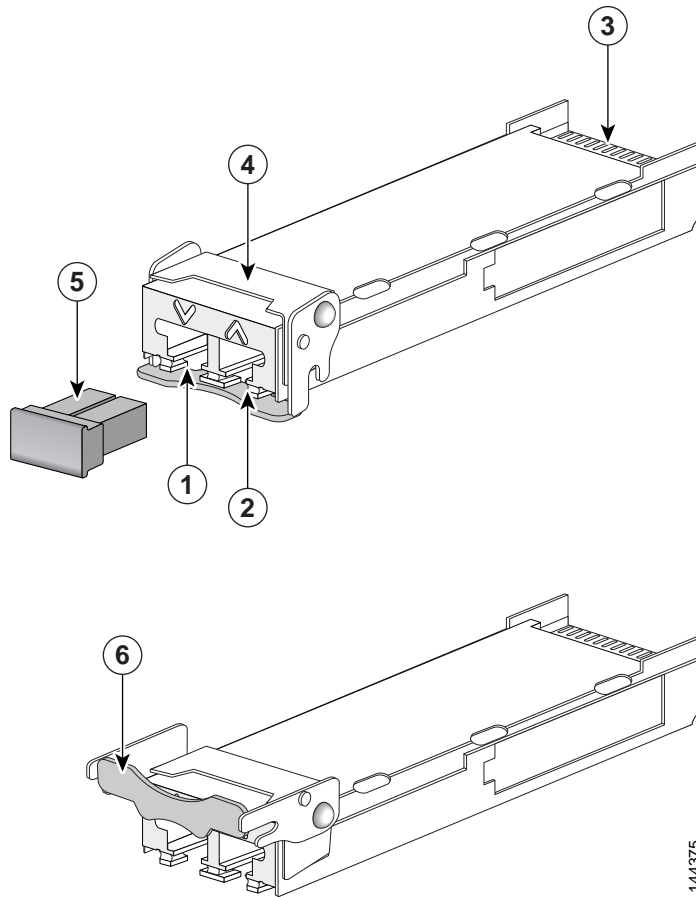
1	Transmit optical bore	4	Bale clasp (locked position)
2	Receive optical bore	5	Dust plug
3	Transceiver socket connector	6	Bale clasp (unlocked position)

Installing the 10-GE XFP Transceiver Module

⚠️

Caution   The XFP transceiver is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling XFP transceivers or when coming into contact with system modules.

To install an XFP transceiver, follow these steps:

Step 1   Remove the XFP transceiver from its protective packaging.

✎

Note   Do not remove the optical bore dust plugs until directed to do so later in the procedure.

Step 2   Check the label on the XFP transceiver body to verify that you have the correct model for your network.

**Cisco ASR 1000 Fixed Ethernet Line Card Hardware Installation Guide** ■

Step 3   Position the XFP transceiver in front of the XFP socket opening on the module. Slide the XFP transceiver part of the way into the transceiver socket on the system module's front panel.

Step 4   Remove the optical bore dust plug from the XFP transceiver.

Step 5   Pivot the bale clasp up such that it is parallel with the transceiver body. (See Figure 5-15.)

Step 6   Continue sliding the XFP transceiver into the socket until the XFP transceiver fits into the transceiver socket connector.

Step 7   Latch the XFP transceiver in the transceiver socket by pivoting the bale clasp down such that the bale clasp is perpendicular to the transceiver body. (See Figure 5-15.)

⚠️
Caution   If the latch is not fully engaged, you may accidently disconnect the XFP transceiver.

Step 8   Immediately reinstall the dust plug in the XFP transceiver optical bores. Do not remove the dust plug until you are ready to attach the network interface cable.

Figure 5-15   *Installing the 10-GE XFP Transceiver Module*
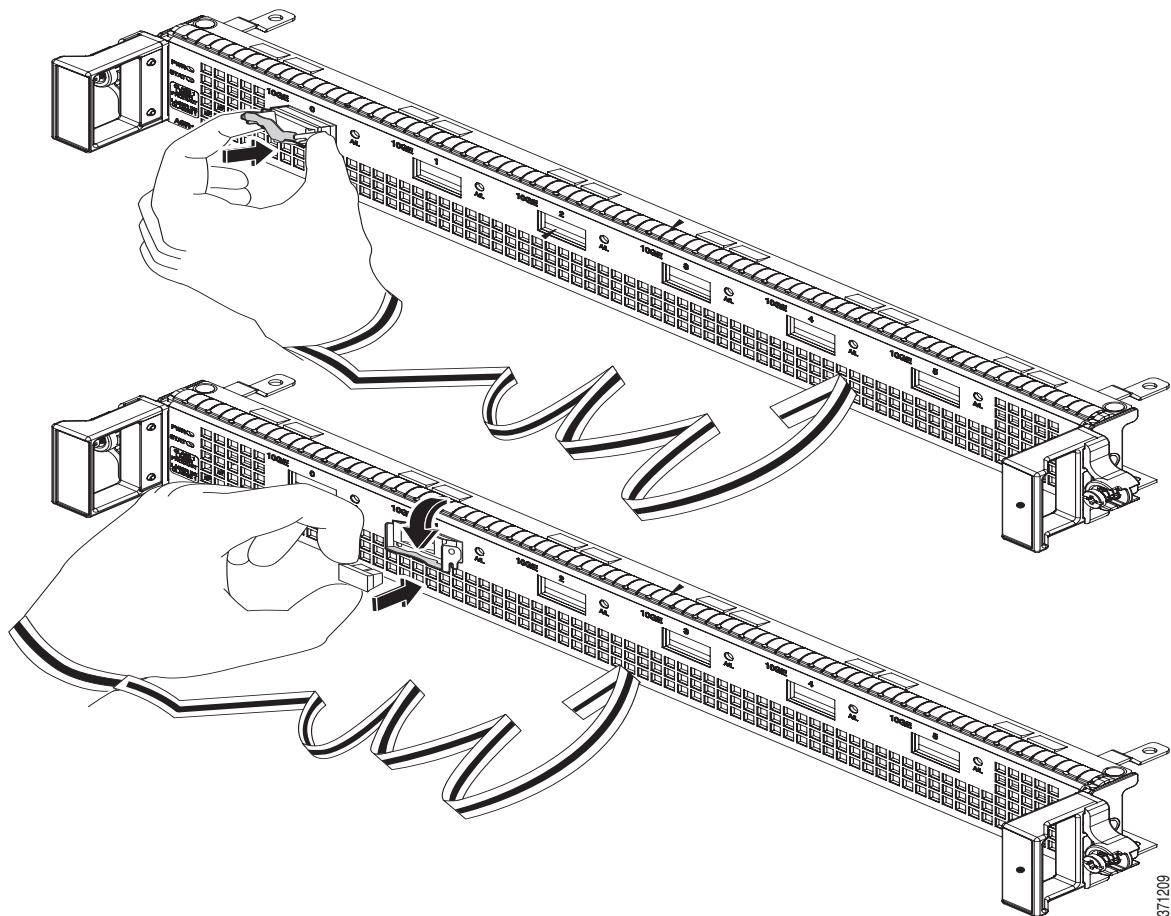
✎
Note   10-GE XFP transceivers are keyed to prevent incorrect insertion.

Before removing the dust plugs and making any optical connections, follow these guidelines:

- Always keep the protective dust plugs on the unplugged fiber-optic cable connectors and the transceiver optical bores until you are ready to make a connection.

- Always inspect and clean the LC connector end faces just before making any connections. Refer to the Tip on this page for a pointer about fiber-optic inspection and cleaning.

- Always grasp the LC connector housing to plug or unplug a fiber-optic cable.

a. Remove the dust plugs from the optical network interface cable LC connectors. Save the dust plugs for future use.

b. Inspect and clean the LC connector's fiber-optic end faces.

Tip   For complete information on inspecting and cleaning fiber-optic connections, refer to this white paper:
http://www.cisco.com/en/US/tech/tk482/tk607/technologies_white_paper09186a0080254eba.shtml

c. Remove the dust plugs from the XFP transceiver module optical bores.

d. Immediately attach the network interface cable LC connectors to the XFP transceiver module. (See Figure 5-16 for cabling the XFP transceiver module.)

Figure 5-16   *Cabling a10-GE XFP Transceiver Module*
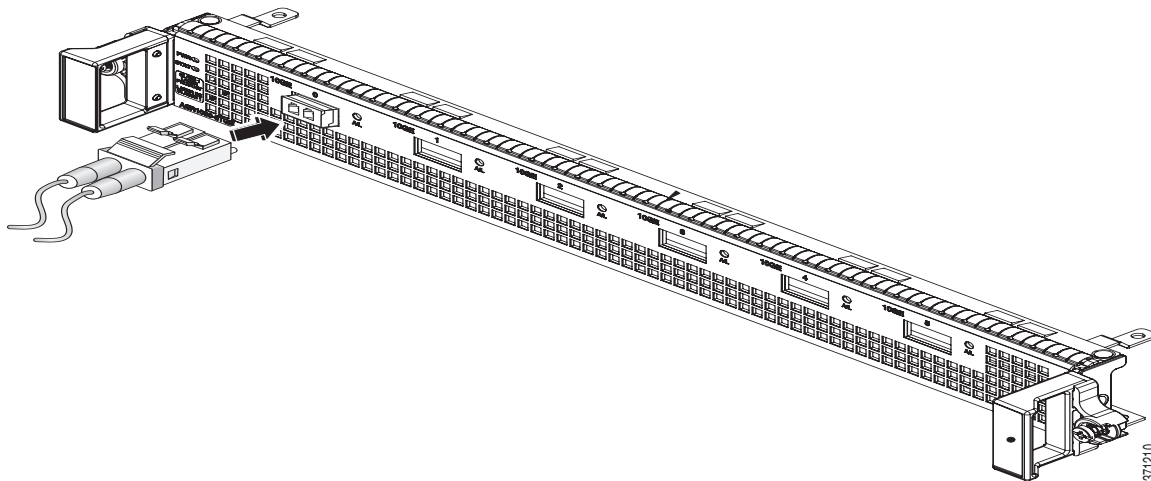

Removing the 10-GE XFP Transceiver Module

Caution   The XFP transceiver is a static-sensitive device. Always use an ESD wrist strap or similar individual grounding device when handling XFP transceivers or when coming into contact with modules.

To remove an XFP transceiver, follow these steps:

Step 1   Disconnect the network interface cable from the XFP transceiver connectors. Immediately reinstall the dust plug into the fiber-optic cable LC connector.

Step 2   Pivot the XFP transceiver bale clasp up to release the XFP transceiver from the socket. (See Figure 4-17.)

Step 3   Slide the XFP transceiver out of the socket. Pivot the bale clasp down and immediately install the dust plug into the XFP transceiver optical bores. (See Figure 4-17.)

Step 4   Immediately place the XFP transceiver in an antistatic bag.

Figure 4-17   Removing the 10-GE XFP Transceiver
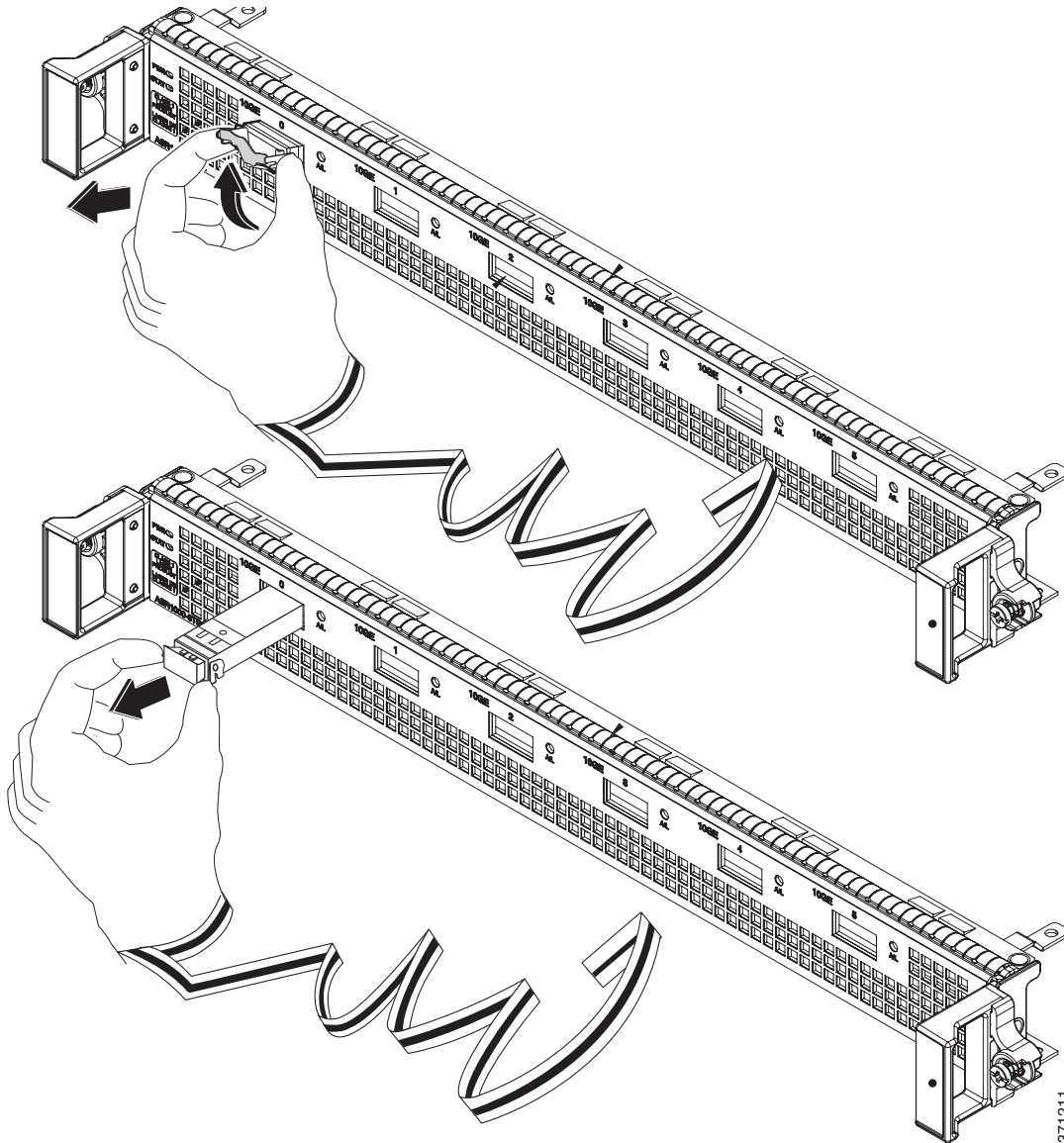
Troubleshooting

This chapter describes how to troubleshoot the installation of the Cisco ASR 1000 Series Fixed Ethernet Line Card on the Cisco ASR 1000 Series Aggregation Services Routers. This chapter contains the following sections:

Troubleshooting Installation Issues

This section provides troubleshooting information pertaining to the installation of the Cisco ASR 1000 Series Fixed Ethernet Line Card. Possible problems, observations and comments, and solutions are indicated for the following troubleshooting symptoms:

- Cisco ASR 1000 Series Fixed Ethernet Line Card transitions repeatedly from on to off
- Cisco ASR 1000 Series Fixed Ethernet Line Card is deactivated

Cisco ASR 1000 Series Fixed Ethernet Line Card Transitions Repeatedly From On to Off		
Possible Problem	**Observations and Comments**	**Solutions**
Cisco ASR 1000 Series Fixed Ethernet Line Card is booting up, which is a normal operation.	Cisco ASR 1000 Series Fixed Ethernet Line Card STATUS LED alternates between green, amber, or off.	Wait for 150 seconds until the boot process completes and the STATUS LED stays on.
Cisco ASR 1000 Series Fixed Ethernet Line Card does not go beyond the bootup stage.	Cisco ASR 1000 Series Fixed Ethernet Line Card STATUS LED transitions continue and alternate between green, amber, or off.	Follow the recommended action for the displayed error message.
Cisco ASR 1000 Series Fixed Ethernet Line Card is not up to date.	During the Cisco ASR 1000 Series Fixed Ethernet Line Card initialization, the need to update the field-programmable gate array (FPGA) is automatically detected.	Follow the system prompts to update the FPGA image. If the Cisco ASR 1000 Series Fixed Ethernet Line Card is cycling because of a field-programmable device (FPD) problem, the most likely cause is an FPD failure or that the FPD package file is not present.

Cisco ASR 1000 Series Fixed Ethernet Line Card is Deactivated

Possible Problem	Observations and Comments	Solutions
Cisco ASR 1000 Series Fixed Ethernet Line Card is not fully seated in the chassis slot.	Output of the **show diag** *slot* command. STATUS LED is off.	Follow this procedure: 1. Remove the Cisco ASR 1000 Series Fixed Ethernet Line Card from the slot. 2. Inspect the Cisco ASR 1000 Series Fixed Ethernet Line Card. Verify that there are no bent pins or parts and that there is nothing that could prevent a good connection. 3. Insert the Cisco ASR 1000 Series Fixed Ethernet Line Card into the chassis slot.
Cisco ASR 1000 Series Fixed Ethernet Line Card is not at the minimum hardware-programmable revision level.	Error message indicating that the Cisco ASR 1000 Series Fixed Ethernet Line Card is not at the minimum FPGA revision level. Output of the **show hw-module subslot fpd** command. Output of the **show diag slot** command. STATUS LED is off.	Follow the FPD upgrade process to update the FPGA.

Troubleshooting Line Card States

provides solutions for line card issues.

Table 5-1   Troubleshooting Line Card States

Problem	Observation
Various problems with the line card states.	• The LED on the line card front panel is green, indicating that the that line card is up and running with Cisco IOS. • The **show platform** command shows the status of line card slot as **ok**. • The **show hw-module subslot x/y oir** [*internal*] command indicates that the SPA operation status is **ok**. • The **show running-config** command shows interfaces for the line card. • The **show ip interface brief** command shows the configured interfaces for the line card if they are ready for configuration.

Using debug Commands

The **debug hw-module subslot** command is intended for use by Cisco Systems technical support personnel.

⚠

Caution   Because debugging output is assigned high priority in the CPU process, it can render the system unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support staff. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased **debug** command processing overhead will affect system use.

For information about the other **debug** commands supported on the Cisco ASR 1000 Series Aggregated Services Router error messages, including messages related to the Cisco ASR 1000 Series Fixed Ethernet Line Card, refer to the following documents:

- *Cisco IOS Release 12.2 SR Command References*
- *Cisco ASR 1000 Series Fixed Ethernet Line Card Software Configuration Guide*

Packing a Cisco ASR 1000 Series Fixed Ethernet Line Card for Shipment

This section provides step-by-step instructions for packing a Cisco ASR 1000 Series Fixed Ethernet Line Card for shipment. Before beginning this procedure, you should have the following original Cisco Systems packaging materials:

- Static shielding bag
- Smaller inner carton
- Larger exterior carton
- Two-foam packing cushions

⚠

Caution   The Cisco Systems original packaging is to be used for the shipment of all Cisco ASR 1000 native line cards. Failure to use Cisco Systems packaging properly may result in damage or loss of product.

⚠

Caution   During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could electrocute yourself.

✎

Note   The following instructions assume that the Cisco ASR 1000 Series Fixed Ethernet Line Card has been removed from the router according to the procedures specified in this guide.

To pack a Cisco ASR 1000 Series Fixed Ethernet Line Card for shipment, perform the following steps:

Step 1   Insert the Cisco ASR 1000 Series Fixed Ethernet Line Card into the static shielding bag.

Step 2 Insert the bagged Cisco ASR 1000 Series Fixed Ethernet Line Card into the smaller inner carton. Ensure that you position the Cisco ASR 1000 Series Fixed Ethernet Line Card such that the bottom motherboard lip is held by the packaging cutout.

Step 3 Close the smaller inner carton and tape the sides closed.

Step 4 Place the sealed smaller inner carton containing the Cisco ASR 1000 Series Fixed Ethernet Line Card into the two-foam packing cushions (they only fit one way).

Step 5 Place the sealed smaller inner carton and packing cushions into the larger exterior carton, and seal the larger exterior carton with tape for shipment.

Troubleshooting Performance and Scalability

Each Cisco ASR 1000-ESP200 uses 4 third generation Cisco QFPs (QFP-3rd-Gen) Application Specific Integrated Circuits (ASICs) to achieve maximum performance. Each QFP-3rd-Gen ASIC is mapped with the Cisco ASR 1000 Fixed Ethernet Line Cards. Through this mapping, the Cisco ASR 1000-ESP200 can perform all baseline packet routing operations such as Quality of Service (QoS) classification and IP multicasting. They can also perform Network Address Translation (NAT) tasks.

The Cisco ASR 1000 Fixed Ethernet Line Card supports 48K VLAN configuration with QOS. When configuring 48K VLAN with QOS, ensure that you distribute the VLAN in a way that no single QFP-3rd-Gen is configured with more than 32K VLAN. For optimal performance, it is recommended to insert the the Cisco ASR 1000 Fixed Ethernet Line Card in central slots, that is, slot 2 or 3 in the Cisco ASR 1013 Router.

Figure 5-1 displays the Cisco ASR 1000 Fixed Ethernet Line Cards of the Cisco ASR 1013 Router and their mappings to the QFP-3rd-Gen ASICs.

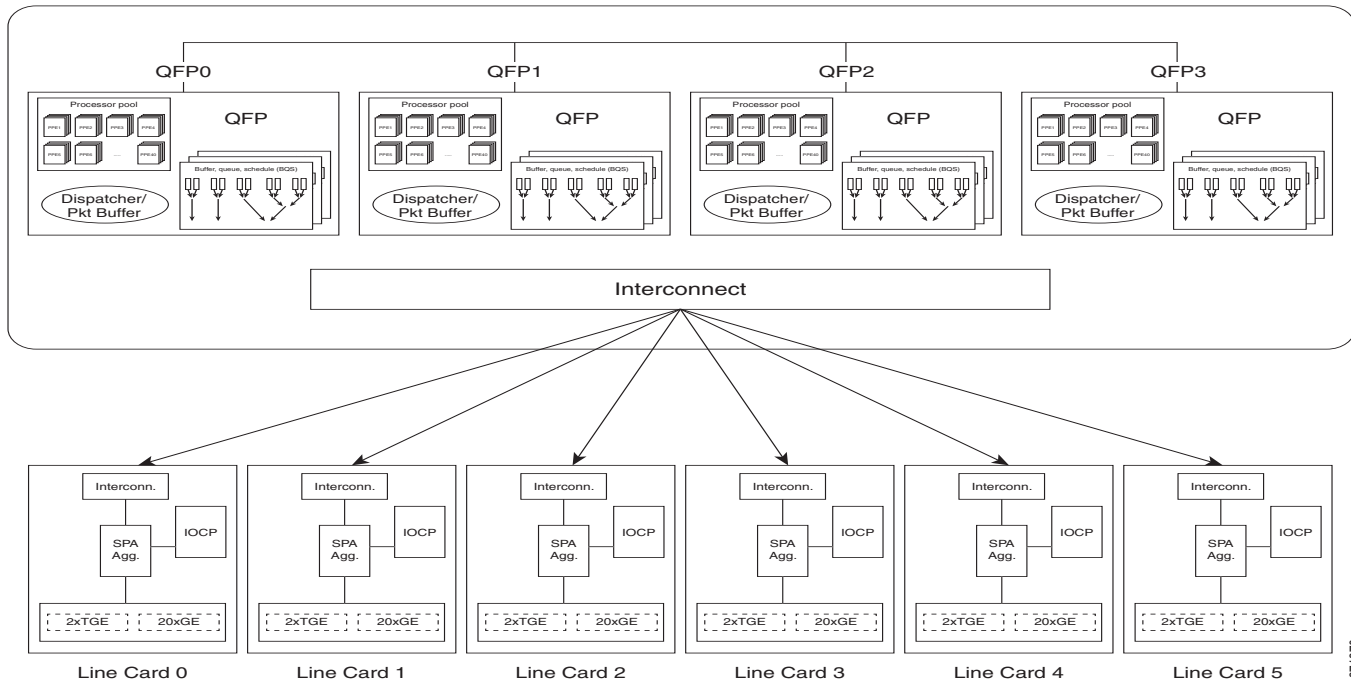*Figure 5-1*   *Cisco ASR 1000-ESP200 and their QFP-3rd-Gen ASIC Mappings*
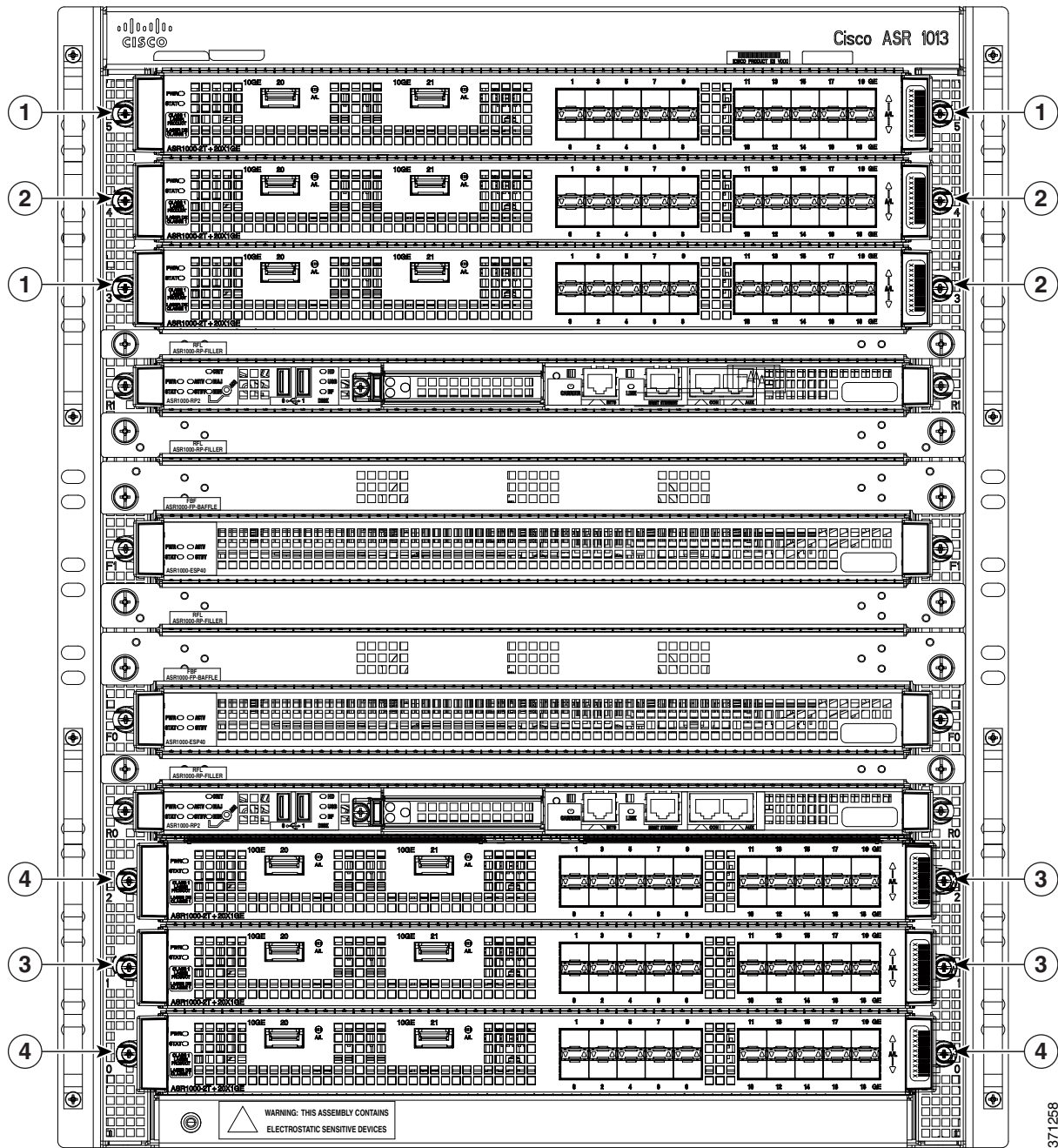
1	Egress queueing for interfaces handled by QFP-3rd-Gen 3	**3**	Egress queueing for interfaces handled by QFP-3rd-Gen 1
2	Egress queueing for interfaces handled by QFP-3rd-Gen 2	**4**	Egress queueing for interfaces handled by QFP-3rd-Gen 0

Note   The QFP-3rd-Gen ASIC is mapped with the interfaces on each of the halves of the Cisco ASR 1000 Fixed Ethernet Line Card.

Figure Figure 5-2 displays an example of a packet flow in the Cisco ASR 1000 ESP 200.

Figure 5-2   *Packet flow in the Cisco ASR 1000 ESP 200*