



Cards Features and Functions

This chapter describes Cisco ONS 15600 card features and functions.

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2.1 Card Overview



Caution

When working with cards, wear the supplied ESD wristband to avoid ESD damage to the card. Plug the wristband cable into the ESD jack located on the lower-left outside edge of the shelf assembly.

2.1.1 Card Summary

Table 2-1 **ONS 15600 Cards and Descriptions**

Card	Description	For Additional Information...
TSC Card	The timing and shelf controller (TSC) card performs all system-timing functions for each ONS 15600.	See the “ 2.2 TSC Card ” section on page 2-3.
SSXC Card	The single shelf cross-connect card (SSXC) is the central element for ONS 15600 switching.	See the “ 2.3 SSXC Card ” section on page 2-6

Table 2-1 ONS 15600 Cards and Descriptions (continued)

Card	Description	For Additional Information...
OC48 1550 Card	The OC48/STM16 LR/LH 16 Port 1550 card provides 16 long-range, Telcordia-compliant, GR-253 SONET OC-48 ports per card	See the “2.4 OC48/STM16 LR/LH 16 Port 1550 Card” section on page 2-8.
OC48 1310 Card	The OC48/STM16 SR/SH 16 Port 1310 card provides 16 short-range, Telcordia-compliant, GR-253 SONET OC-48 ports per card.	See the “2.5 OC48/STM16 SR/SH 16 Port 1310 Card” section on page 2-11.
OC192 1550 Card	The OC192/STM64 LR/LH 4 port 1550 card provides four long-range, Telcordia-compliant, GR-253 SONET OC-192 ports per card.	See the “2.6 OC192/STM64 LR/LH 4 Port 1550 Card” section on page 2-14.
OC192 1310 Card	The OC192/STM64 SR/SH 4 Port 1310 card provides four short-range, Telcordia-compliant, GR-253 SONET OC-192 ports per card.	See the “2.7 OC192/STM64 SR/SH 4 Port 1310 Card” section on page 2-17.
ASAP Card	The Any-Service, Any-Port (ASAP) card provides up to 16 Telcordia-compliant, GR-253 SONET OC-3, OC-12, OC-48, or Gigabit Ethernet ports per card in any combination of line rates.	See the “2.8 ASAP Card” section on page 2-20.
Filler Card	The filler card is used to fill unused optical (OC-N) traffic card slots in the ONS 15600 shelf.	See the “2.9 Filler Card” section on page 2-24

2.1.2 Card Compatibility

This section lists ONS 15600 cards and their compatible software versions. In the table below, “Yes” means the cards are compatible with the listed software versions. Table cells with dashes mean cards are not compatible with the listed software versions.

[Table 2-2](#) lists Cisco Transport Controller (CTC) software release compatibility for each card.

Table 2-2 ONS 15600 Software Release Compatibility Per Card

Card	R1.0	R1.x.x	R5.0
TSC	Yes	Yes	Yes
CXC	Yes	Yes	—
SSXC	—	—	Yes
OC48/STM16 LR/LH 16 Port 1550	Yes	Yes	Yes
OC48/STM16 SR/SH 16 Port 1310	—	Yes	Yes
OC192/STM64 LR/LH 4 Port 1550	Yes	Yes	Yes
OC192/STM64 SR/SH 4 Port 1310	—	Yes	Yes
ASAP	—	—	Yes

2.2 TSC Card

**Caution**

Do not operate the ONS 15600 with a single TSC card or a single SSXC card installed. Always operate the shelf with one active card and one protect card.

The timing and shelf controller (TSC) card performs all system-timing functions for each ONS 15600. The TSC card monitors the recovered clocks from each traffic card and two building integrated timing supply (BITS) interfaces for frequency accuracy. The TSC card is provisionable, allowing timing from any optical interface source, a BITS input source, or the internal Stratum 3E as the system-timing reference. You can provision any of the clock inputs as primary or secondary timing sources, but the ONS 15600 does not support mixed timing references. If you specify external timing references, your options are BITS1, BITS2, and the internal Stratum 3E sources. If you select line timing, you can specify up to two line ports from which to derive timing, as well as the internal stratum 3E sources. You cannot specify BITS as the primary reference and a line source as the secondary reference. A slow-reference tracking loop allows the TSC to synchronize with the recovered clock and enables holdover if the reference is lost.

The TSC card also provides shelf control related functions. The TSC card has a 100-Mbps Ethernet link to each card on the shelf and monitors the presence of these cards. The TSC provides bulk memory for nonvolatile storage of system software and data and provides EIA-TIA 232 and Ethernet customer interfaces. The TSC card processes and routes line and section DCC traffic as well as routing the K1, K2, and K3 overhead bytes between traffic (line) cards and SSXC cards. The TSC card controls and monitors the shelf fans and all of the alarm interfaces.

2.2.1 TSC Slots and Connectors

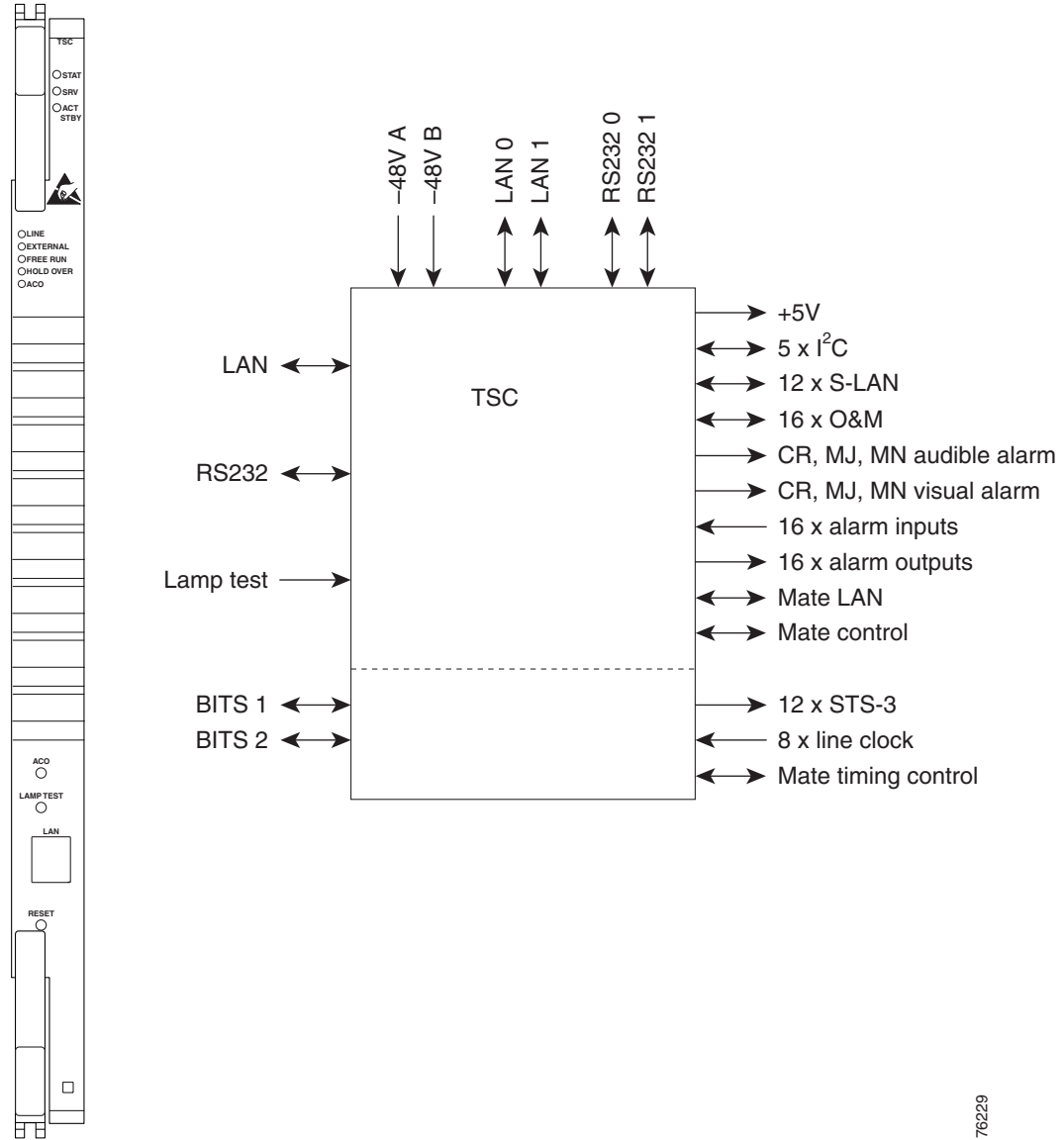
Install TSC cards in Slots 5 and 10 for redundancy. If the active TSC card fails, timing reference and control function switches to the protect TSC card. All TSC card protection switches conform to the Telcordia protection switching standard of equal to or less than 50 ms.

The TSC card features an RJ-45 10/100 Base-T LAN port on the faceplate. Two additional RJ-45 10/100 Base-T LAN ports and two RS-232 DB-9 type craft user interfaces are available via the Customer Access Panel (CAP) on the backplane.

2.2.2 TSC Faceplate and Block Diagram

Figure 2-1 shows the TSC card faceplate and a block diagram of the card.

Figure 2-1 TSC Card Faceplate and Block Diagram



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2.2.3 TSC Card-Level Indicators

Table 2-3 describes the functions of the card-level LEDs on the TSC card faceplate.

Table 2-3 TSC Card-Level Indicators

Indicator	Color	Definition
STAT	Red	Indicates a hardware fault; this LED is off during normal operation. Replace the card if the STAT LED persists. During diagnostics, the LED will flash quickly during initialization and slowly during configuration synchronization.
SRV	Green	The service mode of the card. Green indicates that the card is in use, amber indicates that the card is out of service, and off indicates that the card is either booting or has no power applied.
ACT/STBY	Green	The ACT/STBY (Active/Standby) LED indicates that the TSC is active (green) or standby (off).

2.2.4 TSC Network-Level Indicators

Table 2-4 describes the functions of the network-level LEDs on the TSC card faceplate.

Table 2-4 TSC Network-Level Indicators

Indicator	Color	Definition
LINE	Green	Node timing is synchronized to a line timing reference
EXTERNAL	Green	Node timing is synchronized to an external timing reference
FREE RUN	Green	Node is not using an external timing reference. Indicated when the timing mode is set to an internal reference or after all external references are lost.
HOLDOVER	Amber	External/line timing references have failed. The TSC has switched to internal timing and the 24-hour holdover period has not elapsed.
ACO	Amber	The alarm cutoff (ACO) push button has been activated. After pressing the ACO button, the amber ACO LED turns on. The ACO button opens the audible closure on the backplane. The ACO state is stopped if a new alarm occurs. After the originating alarm is cleared, the ACO LED and audible alarm control are reset.

2.2.5 TSC Push-Button Switches

Table 2-5 describes the functions of the push-button switches on the TSC card faceplate.

Table 2-5 TSC Card Push-Button Switches

Push-Button	Function
ACO	Extinguishes external audible (environmental) alarms. When this button is activated, the amber-colored ACO LED turns on.
LAMP TEST	Verifies that all the LEDs in the shelf are functioning properly. When this button is activated, all of the front-panel LEDs in the shelf turn on temporarily to verify operation.
RESET	Activates a soft reset of all of the main processor memory on the card. Note The RESET button is recessed to prevent accidental activation.

2.3 SSXC Card

The single shelf cross-connect card (SSXC) is the central element for ONS 15600 switching. The SSXC card establishes connections and performs time division switching (TDS) at STS-1 and STS-Nc levels between ONS 15600 traffic cards.

The SSXC card works with the TSC card to maintain connections and set up cross-connects within the ONS 15600. You establish cross-connect and provisioning information using CTC or TL1. The TSC card stores the proper internal cross-connect information and relays the setup information to the SSXC card.

2.3.1 SSXC Switch Matrix

The switch matrix on each SSXC card consists of 6,144 STS-1 ports, with a maximum of 6,144 STS-1 cross-connections. When creating bidirectional STS-1 cross-connects, each bidirectional cross-connect uses two STS-1 ports, with the result that the SSXC card supports 3,072 bidirectional STS-1 cross-connections. Any STS-1 on any port can be connected to any other port, meaning that the STS cross-connections are non blocking. Non-blocking connections allow network operators to connect any STS1, STS3, STS12, STS24, STS48, or STS192 payload that is received on an OC-48 or OC-192 interface (or any STS6 or STS9 payload that is received on an ASAP interface) to any other interface capable of supporting the bandwidth.

The SSXC card has 128 input ports and 128 output ports capable of STS-48. An STS-1 on any of the input ports can be mapped to an STS-1 output port, thus providing full STS-1 time slot assignments (TSAs).

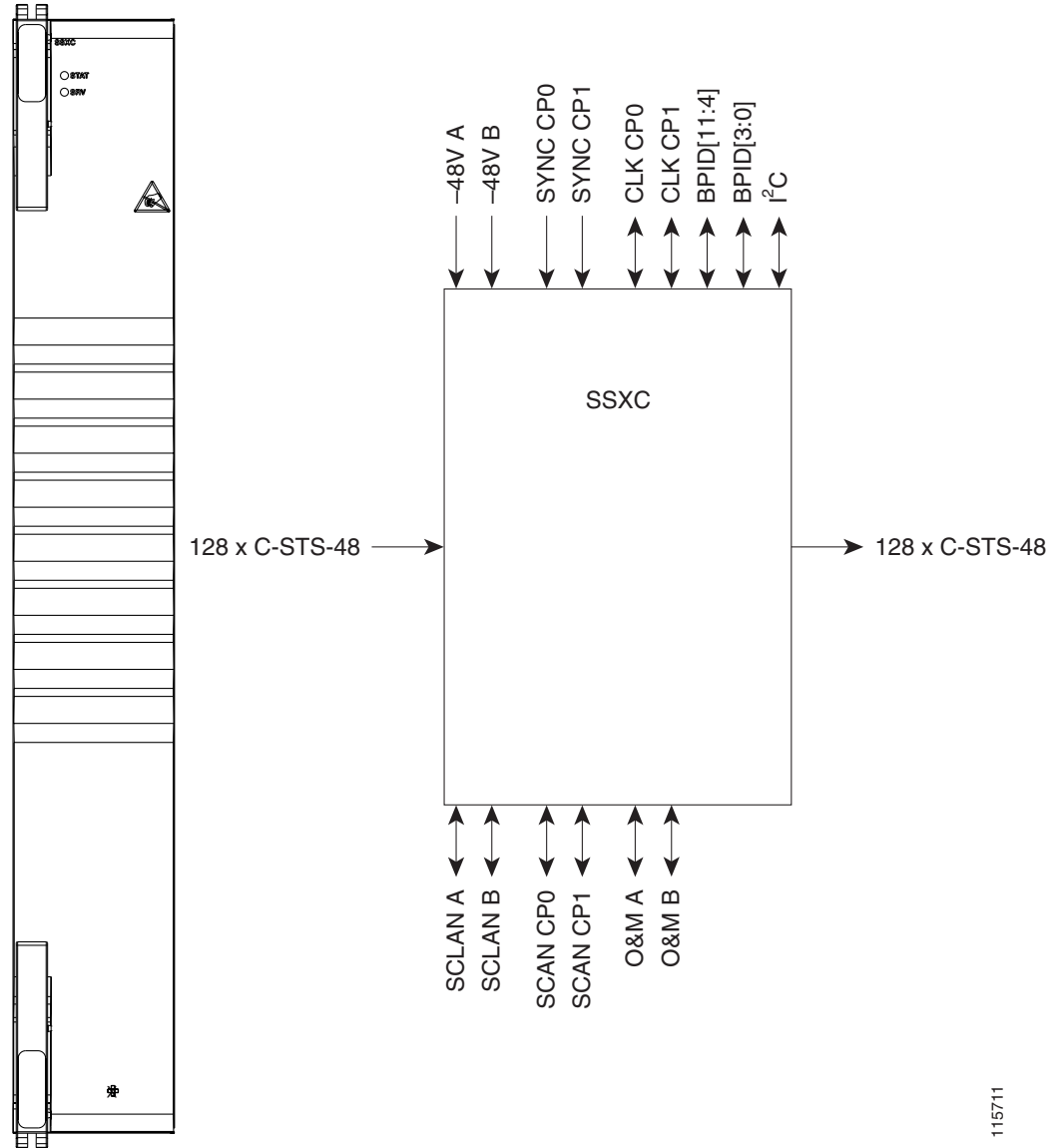
2.3.2 SSXC Slots and Connectors

Install an SSXC card in Slot 6 and a second SSXC card in Slot 8 for redundancy. (Slots 7 and 9 are also occupied by the SSXC faceplate.) The SSXC card has no external interfaces. All SSXC card interfaces are provided on the ONS 15600 backplane.

2.3.3 SSXC Faceplate and Block Diagram

Figure 2-2 shows the SSXC card faceplate and a block diagram of the card.

Figure 2-2 SSXC Card Faceplate and Block Diagram



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2.3.4 SSXC Card-Level Indicators

Table 2-6 describes the functions of the card-level LEDs on the SSXC card faceplate.

Table 2-6 SSXC Card-Level Indicators

Indicator	Color	Definition
STAT	Red	Indicates a hardware fault; this LED is off during normal operation. Replace the card if the STAT LED persists. During diagnostics, the LED will flash quickly during initialization and flash slowly during configuration synchronization.
SRV	Green	The service mode of the card. Green indicates the card is in use; off indicates that the card can be removed for service.
	Amber	The service mode of the card. Amber indicates the card is in use; off indicates that the card can be removed for service.

2.4 OC48/STM16 LR/LH 16 Port 1550 Card

The OC48/STM16 LR/LH 16 Port 1550 card provides 16 long-range, Telcordia-compliant, GR-253 SONET OC-48 ports per card. The ports operate at 2488.320 Mbps over a single-mode fiber span. The OC48/STM16 LR/LH 16 Port 1550 card has four physical connector adapters with eight fibers per connector adapter. The card supports STS-1 payloads and concatenated payloads at STS-3c, STS-12c, STS-24c, or STS-48c signal levels.

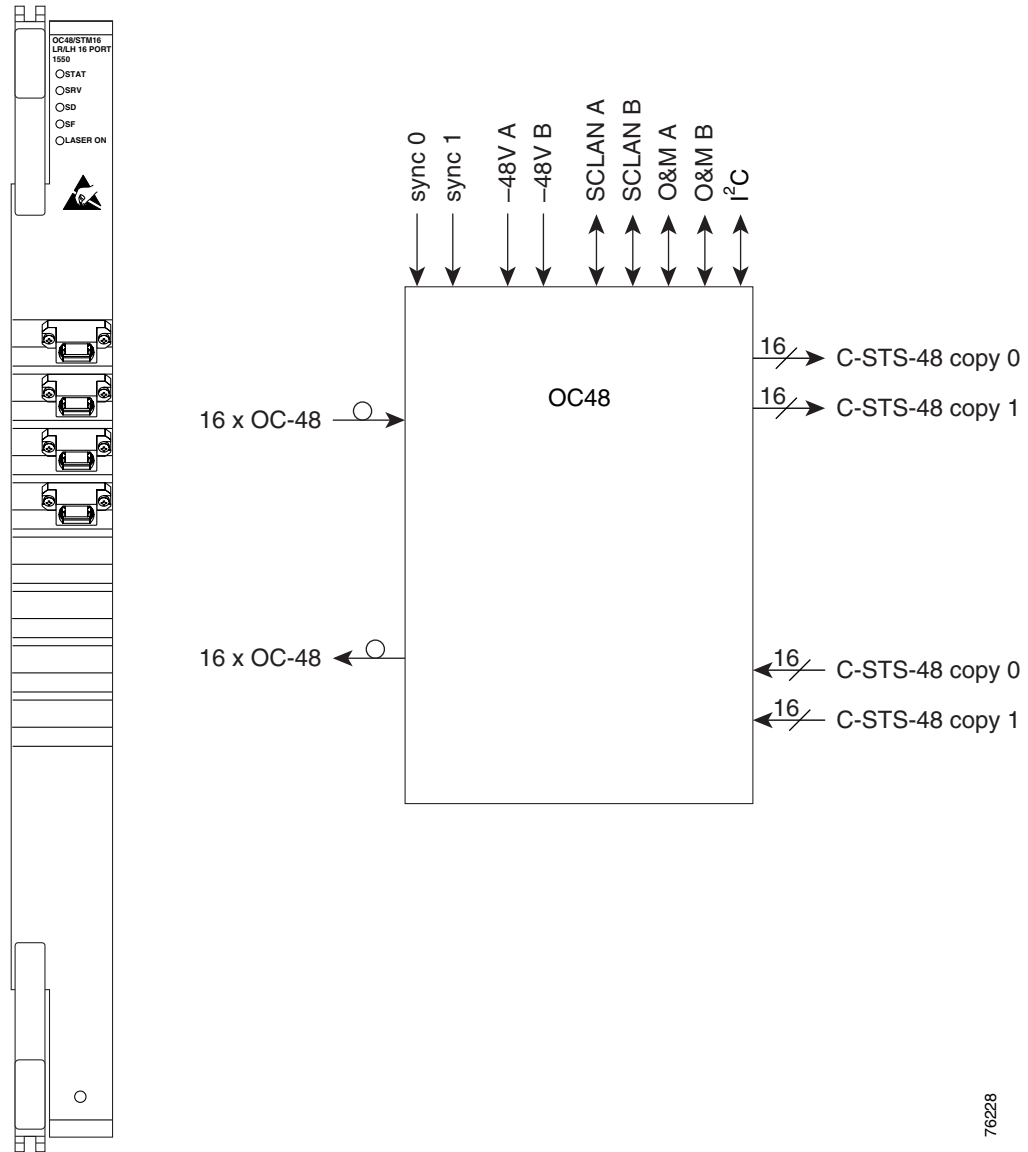
2.4.1 OC48/STM16 LR/LH 16 Port 1550 Slots and Connectors

You can install OC48/STM16 LR/LH 16 Port 1550 cards in Slots 1 through 4 and 11 through 14. The card provides four bidirectional OGI type connector adapters on the faceplate (angled downward), each carrying eight fiber strands (4 transmit and 4 receive).

2.4.2 OC48/STM16 LR/LH 16 Port 1550 Faceplate and Block Diagram

Figure 2-3 shows the OC48/STM16 LR/LH 16 Port 1550 faceplate and a block diagram of the card.

Figure 2-3 OC48/STM16 LR/LH 16 Port 1550 Faceplate and Block Diagram



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2.4.3 OC48/STM16 LR/LH 16 Port 1550 Card-Level Indicators

Table 2-7 describes the functions of the card-level LEDs on the OC48/STM16 LR/LH 16 Port 1550 card.

Table 2-7 OC48/STM16 LR/LH 16 Port 1550 Card-Level Indicators

Indicator	Color	Description
STAT LED	Red	Indicates a hardware fault; this LED is off during normal operation. Replace the card if the STAT LED persists. During diagnostics, the LED will flash quickly during initialization and flash slowly during configuration synchronization.
SRV LED	Green	The service mode of the card. Green indicates that the card is in use, amber indicates that the card is out of service, and off indicates that the card is either booting or has no power applied.
LASER ON	Green	The green LASER ON LED indicates that at least one of the card's lasers is active.

2.4.4 OC48/STM16 LR/LH 16 Port 1550 Network-Level Indicators

Table 2-8 describes the functions of the network-level LEDs on the OC48/STM16 LR/LH 16 Port 1550 card.

Table 2-8 OC48/STM16 LR/LH 16 Port 1550 Network-Level Indicators

Indicator	Color	Description
SD LED	Blue	The blue SD LED indicates a signal degrade or condition such as a low level signal on at least one of the card's ports.
SF LED	Red	The red SF LED indicates a signal failure or condition such as LOS, LOF, or turns on when the transmit and receive fibers are incorrectly connected. When the fibers are properly connected, the LED turns off.

2.4.5 OC48/STM16 LR/LH 16 Port 1550 Card OGI Connector Pinout

Table 2-9 shows the OC48/STM16 LR/LH 16 Port 1550 card OGI connector pinouts.

Table 2-9 OC48/STM16 LR/LH 16 Port 1550 Card OGI Connector Pinout

Connector	OGI Pin and Card Port							
1	1	2	3	4	5	6	7	8
	Transmit 4	Receive 4	Transmit 3	Receive 3	Transmit 2	Receive 2	Transmit 1	Receive 1
2	1	2	3	4	5	6	7	8
	Transmit 8	Receive 8	Transmit 7	Receive 7	Transmit 6	Receive 6	Transmit 5	Receive 5
3	1	2	3	4	5	6	7	8
	Transmit 12	Receive 12	Transmit 11	Receive 11	Transmit 10	Receive 10	Transmit 9	Receive 9

Table 2-9 OC48/STM16 LR/LH 16 Port 1550 Card OGI Connector Pinout (continued)

Connector	OGI Pin and Card Port							
4	1	2	3	4	5	6	7	8
	Transmit 16	Receive 16	Transmit 15	Receive 15	Transmit 14	Receive 14	Transmit 13	Receive 13

2.5 OC48/STM16 SR/SH 16 Port 1310 Card

The OC48/STM16 SR/SH 16 Port 1310 card provides 16 short-range, Telcordia-compliant, GR-253 SONET OC-48 ports per card. The ports operate at 2488.320 Mbps over a single-mode fiber span. The OC48/STM16 SR/SH 16 Port 1310 card has four physical connector adapters with eight fibers per connector adapter. The card supports STS-1 payloads and concatenated payloads at STS-3c, STS-12c, STS-24c, or STS-48c signal levels.

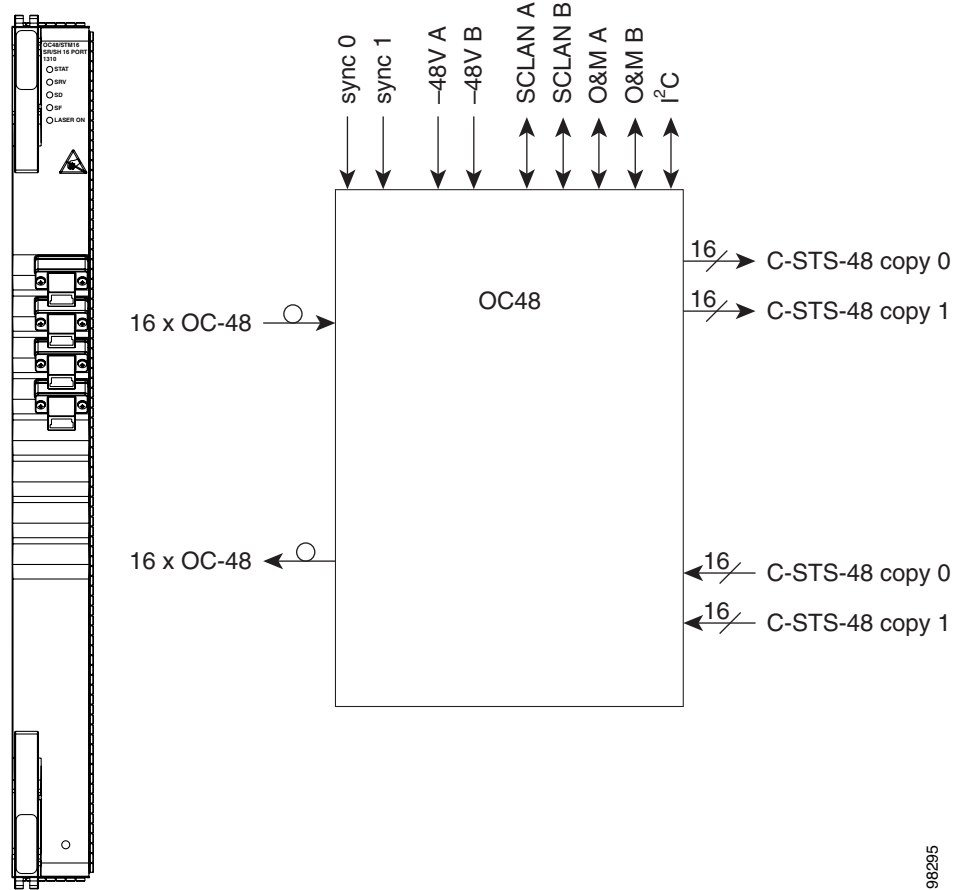
2.5.1 OC48/STM16 SR/SH 16 Port 1310 Slots and Connectors

You can install OC48/STM16 SR/SH 16 Port 1310 cards in Slots 1 through 4 and 11 through 14. The card provides four bidirectional OGI type connector adapters on the faceplate (angled downward), each carrying eight fiber strands (4 transmit and 4 receive).

2.5.2 OC48/STM16 SR/SH 16 Port 1310 Faceplate and Block Diagram

Figure 2-4 shows the OC48/STM16 SR/SH 16 Port 1310 faceplate and block diagram.

Figure 2-4 OC48/STM16 SR/SH 16 Port 1310 Faceplate and Block Diagram



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2.5.3 OC48/STM16 SR/SH 16 Port 1310 Card-Level Indicators

Table 2-10 describes the functions of the card-level LEDs on the OC48/STM16 SR/SH 16 Port 1310 card.

Table 2-10 OC48/STM16 SR/SH 16 Port 1310 Card-Level Indicators

Indicator	Color	Description
STAT LED	Red	Indicates a hardware fault; this LED is off during normal operation. Replace the card if the STAT LED persists. During diagnostics, the LED will flash quickly during initialization and flash slowly during configuration synchronization.
SRV LED	Green	The service mode of the card. Green indicates that the card is in use, amber indicates that the card is out of service, and off indicates that the card is either booting or has no power applied.
LASER ON	Green	The green LASER ON LED indicates that at least one of the card's lasers is active.

2.5.4 OC48/STM16 SR/SH 16 Port 1310 Network-Level Indicators

Table 2-11 describes the functions of the network-level LEDs on the OC48/STM16 SR/SH 16 Port 1310 card.

Table 2-11 OC48/STM16 SR/SH 16 Port 1310 Network-Level Indicators

Indicator	Color	Description
SD LED	Blue	The blue SD LED indicates a signal degrade or condition such as a low level signal on at least one of the card's ports.
SF LED	Red	The red SF LED indicates a signal failure or condition such as LOS, LOF, or high BERs on at least one of the card's ports. The red SF LED also turns on when the transmit and receive fibers are incorrectly connected. When the fibers are properly connected, the LED turns off.

2.5.5 OC48/STM16 SR/SH 16 Port 1310 Card OGI Connector Pinout

Table 2-12 shows the OC48/STM16 SR/SH card OGI connector pinouts.

Table 2-12 OC48/STM16 SR/SH 16 Port 1310 Card OGI Connector Pinout

Connector	OGI Pin and Card Port							
1	1	2	3	4	5	6	7	8
	Transmit 4	Receive 4	Transmit 3	Receive 3	Transmit 2	Receive 2	Transmit 1	Receive 1
2	1	2	3	4	5	6	7	8
	Transmit 8	Receive 8	Transmit 7	Receive 7	Transmit 6	Receive 6	Transmit 5	Receive 5
3	1	2	3	4	5	6	7	8
	Transmit 12	Receive 12	Transmit 11	Receive 11	Transmit 10	Receive 10	Transmit 9	Receive 9

Table 2-12 OC48/STM16 SR/SH 16 Port 1310 Card OGI Connector Pinout (continued)

Connector	OGI Pin and Card Port							
4	1	2	3	4	5	6	7	8
	Transmit 16	Receive 16	Transmit 15	Receive 15	Transmit 14	Receive 14	Transmit 13	Receive 13

2.6 OC192/STM64 LR/LH 4 Port 1550 Card

The OC192/STM64 LR/LH 4 port 1550 card provides four long-range, Telcordia-compliant, GR-253 SONET OC-192 ports per card. The ports operate at 9953.28 Mbps over a single-mode fiber. The OC192/STM64 LR/LH 4 port 1550 card has four physical connector adapters with two fibers per connector adapter. The card supports STS-1 payloads and concatenated payloads at STS-3c, STS-12c, STS-24c, STS-48c, or STS-192c signal levels.

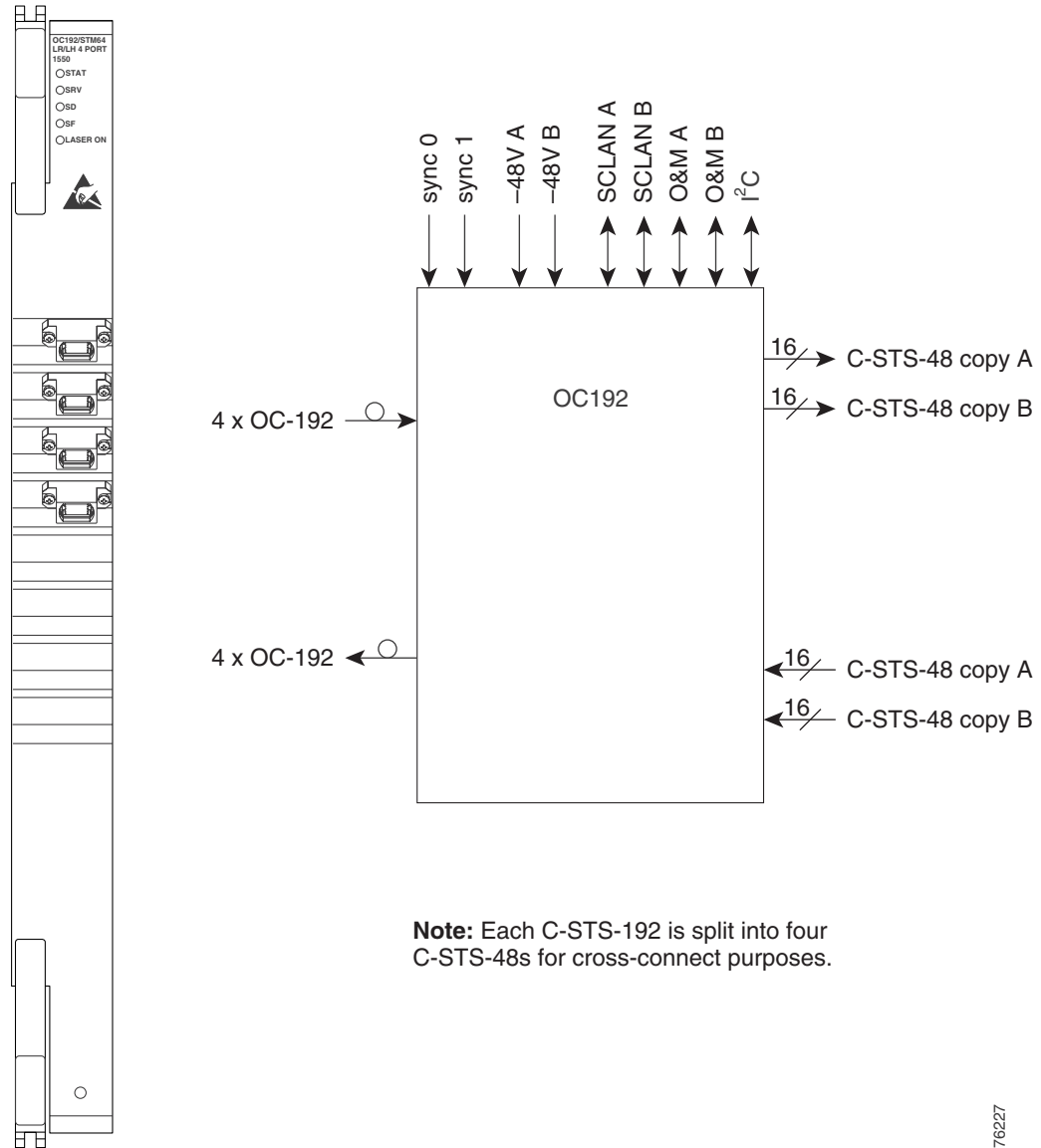
2.6.1 OC192/STM64 LR/LH 4 Port 1550 Slots and Connectors

You can install OC192/STM64 LR/LH 4 port 1550 cards in Slots 1 through 4 and 11 through 14. The card provides four bidirectional OGI type connector adapters on the faceplate (angled downward), carrying two fiber strands (1 transmit and 1 receive). Only one transmit and receive pair is used per connector adapter. On a breakout cable, use port three, fiber 4 (transmit) and fiber 3 (receive).

2.6.2 OC192/STM64 LR/LH 4 Port 1550 Faceplate and Block Diagram

Figure 2-5 shows the OC192/STM64 LR/LH 4 Port 1550 faceplate and a block diagram of the card.

Figure 2-5 OC192/STM64 LR/LH 4 Port 1550 Faceplate and Block Diagram



2.6.3 OC192/STM64 LR/LH 4 Port 1550 Card-Level Indicators

Table 2-13 describes the functions of the card-level LEDs on the OC192/STM64 LR/LH 4 Port 1550 card.

Table 2-13 OC192/STM64 LR/LH 4 Port 1550 Card-Level Indicators

Indicator	Color	Description
STAT LED	Red	Indicates a hardware fault; this LED is off during normal operation. Replace the unit if the STAT LED persists. During diagnostics, the LED will flash quickly during initialization and flash slowly during configuration synchronization.
SRV LED	Green	The service mode of the card. Green indicates that the card is in use, amber indicates that the card is out of service, and off indicates that the card is either booting or has no power applied.
LASER ON	Green	The green LASER ON LED indicates that at least one of the card's lasers is active.

2.6.4 OC192/STM64 LR/LH 4 Port 1550 Network-Level Indicators

Table 2-14 describes the functions of the network-level LEDs on the OC192/STM64 LR/LH 4 Port 1550 card.

Table 2-14 OC192/STM64 LR/LH 4 Port 1550 Network-Level Indicators

Indicator	Color	Description
SD LED	Blue	The blue SD LED indicates a signal degrade or condition such as a low signal level on at least one of the card's ports.
SF LED	Red	The red SF LED indicates a signal failure or condition such as LOS, LOF, or high BERs on at least one of the card's ports. The red SF LED is also on when the transmit and receive fibers are incorrectly connected. When the fibers are properly connected, the LED turns off.

2.6.5 OC192/STM64 LR/LH 4 Port 1550 Card OGI Connector Pinout

Table 2-15 shows the OC192/STM64 LR/LH 4 Port 1550 card OGI connector pinouts.

Table 2-15 OC192/STM64 LR/LH 4 Port 1550 Card OGI Connector Pinout

Connector	OGI Pin and Card Port							
	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8
	—	—	Transmit 1	Receive 1	—	—	—	—
2	1	2	3	4	5	6	7	8
	—	—	Transmit 2	Receive 2	—	—	—	—
3	1	2	3	4	5	6	7	8
	—	—	Transmit 3	Receive 3	—	—	—	—

Table 2-15 OC192/STM64 LR/LH 4 Port 1550 Card OGI Connector Pinout (continued)

Connector	OGI Pin and Card Port							
4	1	2	3	4	5	6	7	8
	—	—	Transmit 4	Receive 4	—	—	—	—

2.7 OC192/STM64 SR/SH 4 Port 1310 Card

The OC192/STM64 SR/SH 4 Port 1310 card provides four short-range, Telcordia-compliant, GR-253 SONET OC-192 ports per card. The ports operate at 9953.28 Mbps over a single-mode fiber. The OC192/STM64 SR/SH 4 port 1310 card has four physical connector adapters with two fibers per connector adapter. The card supports STS-1 payloads and concatenated payloads at STS-3c, STS-12c, STS-24c, STS-48c, or STS-192c signal levels.

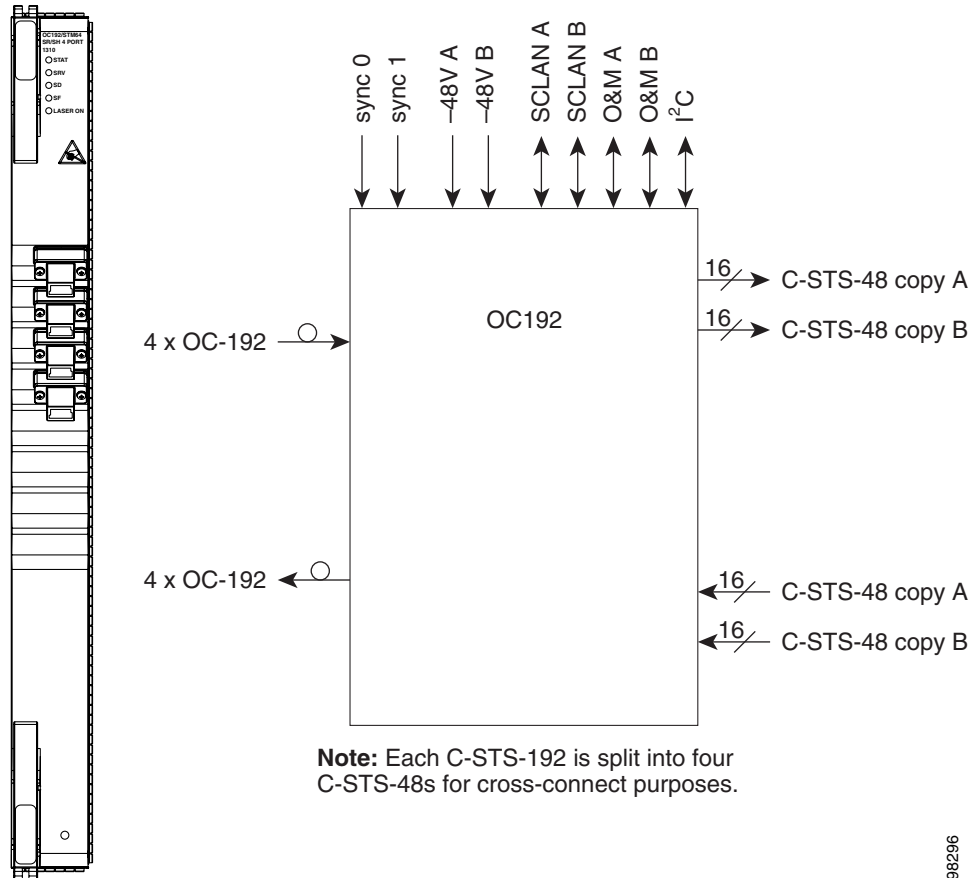
2.7.1 OC192/STM64 SR/SH 4 Port 1310 Slots and Connectors

You can install OC192/STM64 SR/SH 4 Port 1310 cards in Slots 1 through 4 and 11 through 14. The card provides four bidirectional OGI type connector adapters on the faceplate (angled downward), carrying two fiber strands (1 transmit and 1 receive). Only one transmit and receive pair is used per connector adapter. On a breakout cable, use port three, fiber 4 (transmit) and fiber 3 (receive).

2.7.2 OC192/STM64 SR/SH 4 Port 1310 Faceplate and Block Diagram

Figure 2-6 shows the OC192/STM64 SR/SH 4 Port 1310 faceplate and block diagram.

Figure 2-6 OC192/STM64 SR/SH 4 Port 1310 Faceplate and Block Diagram



2.7.3 OC192/STM64 SR/SH 4 Port 1310 Card-Level Indicators

Table 2-16 describes the functions of the card-level LEDs on the OC192/STM64 SR/SH 4 Port 1310 card.

Table 2-16 OC192/STM64 SR/SH 4 Port 1310 Card-Level Indicators

Indicator	Color	Description
STAT LED	Red	Indicates a hardware fault; this LED is off during normal operation. Replace the unit if the STAT LED persists. During diagnostics, the LED will flash quickly during initialization and flash slowly during configuration synchronization.

Table 2-16 OC192/STM64 SR/SH 4 Port 1310 Card-Level Indicators (continued)

Indicator	Color	Description
SRV LED	Green	The service mode of the card. Green indicates that the card is in use, amber indicates that the card is out of service, and off indicates that the card is either booting or has no power applied.
LASER ON	Green	The green LASER ON LED indicates that at least one of the card's lasers is active.

2.7.4 OC192/STM64 SR/SH 4 Port 1310 Network-Level Indicators

Table 2-17 describes the functions of the network-level LEDs on the OC192/STM64 SR/SH 4 Port 1310 card.

Table 2-17 OC192/STM64 SR/SH 4 port 1310 Network-Level Indicators

Indicator	Color	Description
SD LED	Blue	The blue SD LED indicates a signal degrade or condition such as a low signal level on at least one of the card's ports.
SF LED	Red	The red SF LED indicates a signal failure or condition such as LOS, LOF, or high BERs on at least one of the card's ports. The red SF LED also turns on when the transmit and receive fibers are incorrectly connected. When the fibers are properly connected, the LED turns off.

2.7.5 OC192/STM64 SR/SH 4 Port 1310 Card OGI Connector Pinout

Table 2-18 shows the OC192/STM64 SR/SH 4 Port 1310 card OGI connector pinouts.

Table 2-18 OC192/STM64 SR/SH 4 Port 1310 Card OGI Connector Pinout

Connector	OGI Pin and Card Port							
1	1	2	3	4	5	6	7	8
	—	—	Transmit 1	Receive 1	—	—	—	—
2	1	2	3	4	5	6	7	8
	—	—	Transmit 2	Receive 2	—	—	—	—
3	1	2	3	4	5	6	7	8
	—	—	Transmit 3	Receive 3	—	—	—	—
4	1	2	3	4	5	6	7	8
	—	—	Transmit 4	Receive 4	—	—	—	—

2.8 ASAP Card

The Any-Service, Any-Port (ASAP) card provides up to 16 Telcordia-compliant, GR-253 SONET OC-3, OC-12, OC-48, or Gigabit Ethernet ports per card in any combination of line rates. The ports operate at up to 2488.320 Mbps over a single-mode fiber. The ASAP card has sixteen physical connector adapters with two fibers per connector adapter (Tx and Rx). The card supports STS-1 payloads and concatenated payloads at STS-3c, STS-6c, STS-9c, STS-12c, STS-24c, or STS-48c signal levels. It is fully interoperable with the ONS 15454 G-Series Ethernet cards.

Table 2-19 The following table gives a list of circuits supported by each SFP on ASAP card

SFP on ASAP	STS1	STS3c	STS6c	STS9c	STS12c	STS18c	STS24c	STS36c	STS48c
OC3	x	x							
OC12	x	x	x	x	x				
OC48	x	x	x	x	x	x	x	x	x
OC192	x	x	x	x	x	x	x	x	x

The ASAP card consists of the ASAP carrier modules, the 4-port I/O module (4PIO), and the Pluggable Port Module (PPM, also known as a Small Form-Factor Pluggable [SFP]). The ASAP carrier module has 4 slots available for the 4PIOs, totaling 16 ports. The ports can each be provisioned as either OC-3, OC-12, OC-48, or Gigabit Ethernet.

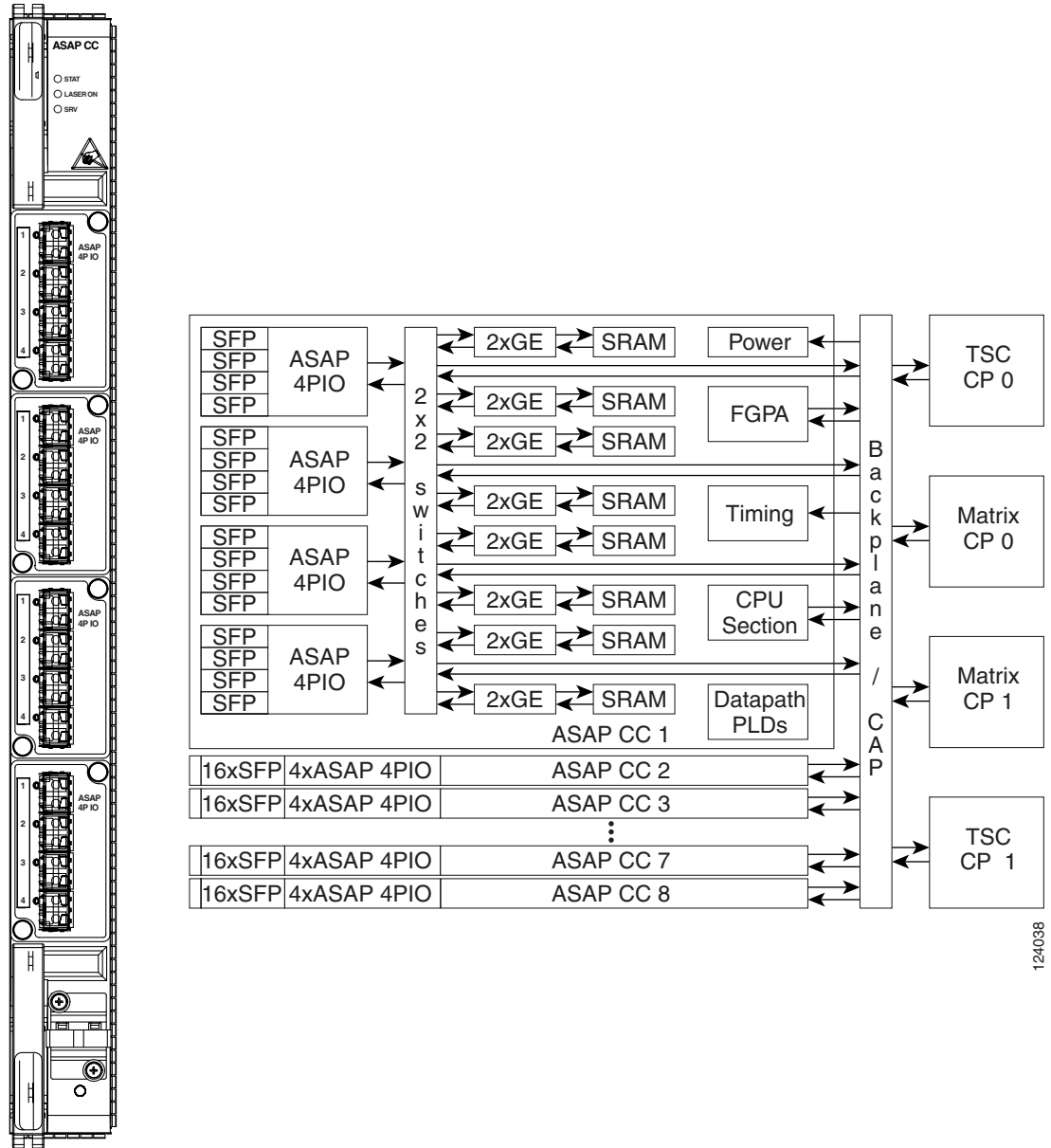
2.8.1 ASAP Slots and Connectors

You can install ASAP carrier modules in Slots 1 through 4 and 11 through 14. Each 4PIO module can accommodate up to four SFPs, and each SFP has a female LC connector.

2.8.2 ASAP Card Faceplate and Block Diagram

Figure 2-7 shows the ASAP card faceplate and block diagram.

Figure 2-7 ASAP Card Faceplate and Block Diagram

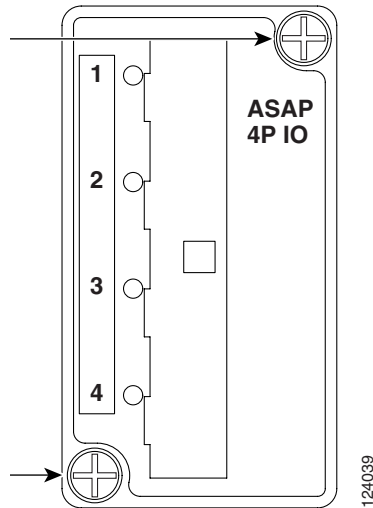


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2.8.3 4PIO Module Faceplate

Figure 2-8 shows the 4PIO module faceplate.

Figure 2-8 4PIO Module Faceplate



2.8.4 ASAP Card-Level Indicators

Table 2-20 describes the functions of the card-level LEDs on the ASAP carrier module.

Table 2-20 ASAP Card-Level Indicators

Indicator	Color	Description
STAT LED	Red	Indicates a hardware fault; this LED is off during normal operation. Replace the unit if the STAT LED persists. During diagnostics, the LED will flash quickly during initialization and flash slowly during configuration synchronization.
SRV LED	Green/Amber	The service mode of the card. Green indicates that the card is in use, amber indicates that the card is out of service, and off indicates that the card is either booting or has no power applied.
LASER ON	Green	The green LASER ON LED indicates that at least one of the card's lasers is active.

2.8.5 ASAP Card Port-Level Indicators

Table 2-21 describes the functions of the port-level LEDs (numbered 1 through 4) on the 4PIO modules, depending on whether the port is configured for SONET or Ethernet.

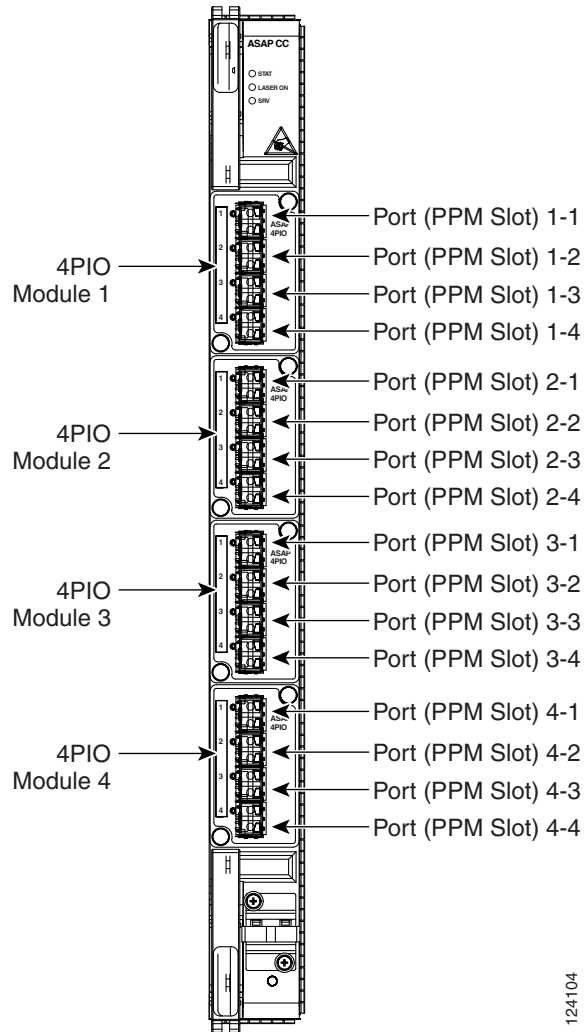
Table 2-21 *ASAP (4PIO Module) Port-Level Indicators*

Color	Description for a SONET-Configured Port	Description for an Ethernet-Configured Port
Green	Indicates that the port is provisioned.	Solid green indicates that there is a link and no traffic. Flashing green indicates that there is a link, and the LED flashes at a rate proportional to the level of traffic being received and transmitted over the port.
Amber	Indicates that the signal is degraded.	Amber indicates that the link has an issue inhibiting traffic, such as a signal error, or disabled or unprovisioned port.
Red	Indicates a signal failure.	Indicates a signal failure.
Off	Indicates that the port is unprovisioned.	Indicates that there is no link.

2.8.6 ASAP Card Port Numbering

Figure 2-9 shows the installed 4PIO modules and corresponding port numbers for each PPM slot.

Figure 2-9 ASAP Port Numbering

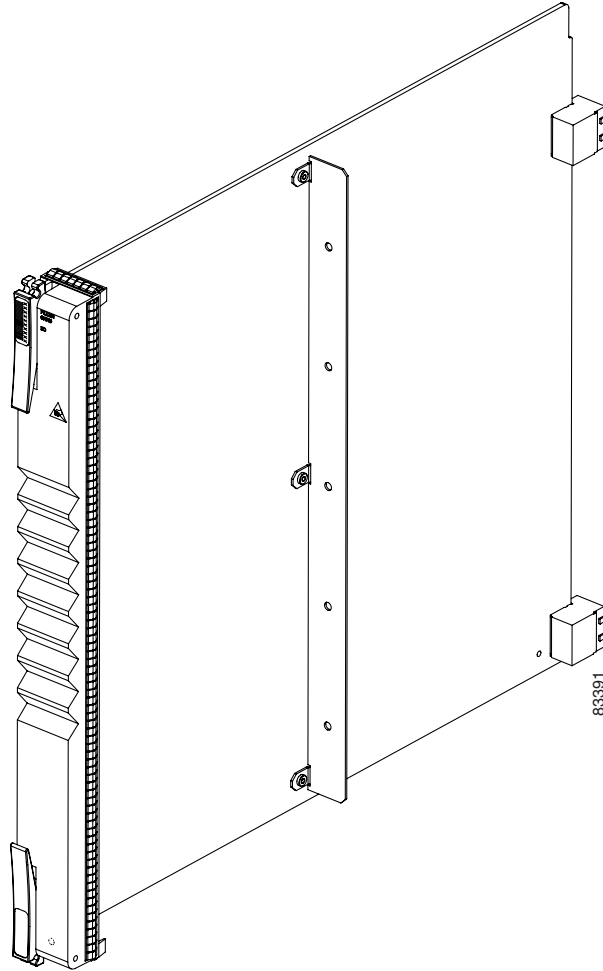


2.9 Filler Card

The filler card is used to fill unused optical (OC-N) traffic card slots in the ONS 15600 shelf. In Software Release 1.1 the Filler card has a card presence indicator (CPI) that allows the shelf to report the presence of the filler card to CTC. The Filler card uses dummy backplane connectors and a standard faceplate to secure the card in the empty shelf slot.

Figure 2-10 shows the Filler card body and faceplate.

Figure 2-10 ONS 15600 Filler Card



2.10 SFP Modules

This section describes the Small Form-Factor Pluggables (SFPs) that can be used with the ONS 15600 ASAP card.



Note

SFPs are also generically known as PPMs (Pluggable Port Modules) in the CTC software interface.

2.10.1 SFP Compatibility

Table 2-22 lists the SFPs that are compatible with the ASAP card.

**Caution**

Use only SFPs certified for use in Cisco Optical Networking Systems. The qualified Cisco SFP pluggable module's top assembly numbers (TANs) are provided in [Table 2-22](#).

Table 2-22 SFP Card Compatibility

Card	Compatible SFP (Cisco Product ID)	Cisco Top Assembly Number (TAN)
ASAP (ONS 15600 SONET/SDH)	ONS-SE-2G-L2	10-2013-01
	ONS-SE-Z1	10-1971-01
	ONS-SI-622-L2	10-1936-01
	ONS-SI-155-L2	10-1937-01

2.10.2 SFP Description

SFPs are integrated fiber optic transceivers that provide high-speed serial links from a port or slot to the network. Various latching mechanisms can be utilized on the SFP modules. There is no correlation between the type of latch to the model type (such as SX or LX/LH) or technology type (such as Gigabit Ethernet). See the label on the SFP for technology type and model. One type of latch available is a mylar tab as shown in [Figure 2-11](#), a second type of latch available is an actuator/button ([Figure 2-12](#)), and a third type of latch is a bail clasp ([Figure 2-13](#)).

SFP dimensions are:

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

SFP temperature ranges for are:

- COM—Commercial operating temperature range –5 to 70 degrees C
- EXT—Extended operating temperature range –5 to 85 degrees C
- IND—Industrial operating temperature range –40 to 85 degrees C

Figure 2-11 Mylar Tab SFP

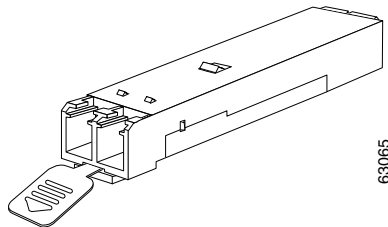
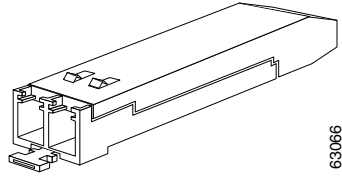
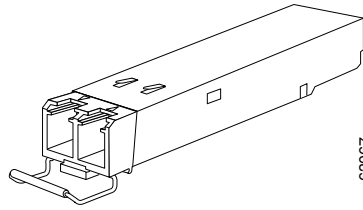


Figure 2-12 **Actuator/Button SFP**



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Figure 2-13 **Bail Clasp SFP**



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