

This chapter describes the Cisco ONS 15454 SDH electrical card features and functions. It includes descriptions, hardware specifications, and block diagrams for each card. For installation and card turn-up procedures, refer to the *Cisco ONS 15454 SDH Procedure Guide*.

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- [E1-42 Card](#)
- [E3-12 Card](#)
- [DS3i-N-12 Card](#)
- [STM1E-12 Card](#)
- [FILLER Card](#)
- [FMEC E1-120NP Card](#)
- [FMEC E1-120PROA Card](#)
- [FMEC E1-120PROB Card](#)
- [E1-75/120 Impedance Conversion Panel](#)
- [FMEC-E3/DS3 Card](#)
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## Electrical Card Overview

The card overview section summarizes card functions and compatibility.

**Note:** Each card is marked with a symbol that corresponds to a slot (or slots) on the ONS 15454 shelf assembly. The cards are then installed into slots displaying the same symbols. See the [Card Slot Requirements](#) for a list of slots and symbols.

### Card Summary

[Table 3-1](#) shows available electrical cards for the ONS 15454 SDH.

**Table 3-1: Electrical Cards**

<b>Card</b>	<b>Description</b>	<b>For Additional Information...</b>
E1-42	Provides 42 E-1 ports and supports 1:3 protection. It operates in Slots 1 to 4 and Slots 14 to 17.	See the <a href="#">E1-42 Card</a> .
E3-12	Provides 12 E-3 ports and supports 1:1 protection. It operates in Slots 1 to 5 and Slots 13 to 17.	See the <a href="#">E3-12 Card</a> .
DS3i-N-12	Provides 12 DS-3 ports and supports 1:1 and 1:N protection. It operates in Slots 1 to 5 and Slots 13 to 17.	See the <a href="#">DS3i-N-12 Card</a> .
STM1E-12	Provides 12 electrical STM-1 ports and supports 1:1 protection. It operates in Slots 1 to 4 and Slots 14 to 17.	See the <a href="#">STM1E-12 Card</a> .
FILLER	Assures fulfillment of EMC requirements in case of empty interface card slots.	See the <a href="#">FILLER Card</a> .
FMEC E1-120NP	Provides electrical connection into the system for 42 pairs of 120-ohm balanced E-1 ports from the E1-42 card. It uses Molex 96-pin LFH connectors.	See the <a href="#">FMEC E1-120NP Card</a> .
FMEC E1-120PROA	Provides electrical connection into the system for 42 pairs of 120-ohm balanced E-1 ports from the E1-42 card. It provides 1:3 protection from the A side (left side of the shelf). It occupies four slots, Slots 18 to 21. It uses Molex 96-pin LFH connectors.	See the <a href="#">FMEC E1-120PROA Card</a> .
FMEC E1-120PROB	Provides electrical connection into the system for 42 pairs of 120-ohm balanced E-1 ports from the E1-42 card. It provides 1:3 protection from the B side (right side of the shelf). It occupies four slots, Slots 26 to 29. It uses Molex 96-pin LFH connectors.	See the <a href="#">FMEC E1-120PROB Card</a> .
E1-75/120	Installed in the rack to provide a balanced 120-ohm connection for 42 E-1 interfaces that have a 75-ohm unbalanced connection. It uses Molex 96-pin LFH connectors and 1.0/2.3 miniature coax connectors.	See the <a href="#">E1-75/120 Impedance Conversion Panel</a> .
FMEC-E3/DS3	Provides electrical connection into the system for 12 pairs of 75-ohm 1.0/2.3 miniature coax connectors for unbalanced E-3 or DS-3 ports.	See the <a href="#">FMEC-E3/DS3 Card</a> .
FMEC STM1E 1:1	Provides electrical connection into the system for 2 x 12 pairs of 75-ohm 1.0/2.3 miniature coax connectors for unbalanced electrical STM-1 ports from two STM1E-12 cards in the case of 1:1 protected operation. The FMEC STM1E 1:1 card is two slots wide and is recognized in Slots 18-19, 20-21, 26-27, and 28-29.	See the <a href="#">FMEC STM1E 1:1 Card</a> .
BLANK-FMEC	Assures fulfillment of EMC requirements in case of empty FMEC slots.	See the <a href="#">BLANK-FMEC Faceplate</a> .
MIC-A/P	Provides connection for one of the two redundant inputs of system power and system connection for input and output alarms.	See the <a href="#">MIC-A/P FMEC</a> .
MIC-C/T/P	Provides connection for one of the two redundant inputs of system power and system connection for LAN ports and system timing input/output.	See the <a href="#">MIC-C/T/P FMEC</a> .

### Card Compatibility

[Table 3-2](#) lists the Cisco Transport Controller (CTC) software compatibility for each electrical card. See [Table 2-4](#) for a list of cross-connect cards that are compatible with each electrical card.

**Note:** "Yes" indicates that this card is fully or partially supported by the indicated software release. Refer to the individual card reference section for more information about software limitations for this card.

**Table 3-2: Electrical Card Software Release Compatibility**

Electrical Card	R3.4	R4.0	R4.1	R4.5	R4.6	R4.7	R5.0	R6.0	R7.0	R7.2	R8.0	R8.5
E1-N-14	Yes	Yes	Yes	-	Yes	-	Yes	Yes	Yes	Yes	No	No
E1-42	-	Yes	-	-	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
E3-12	Yes	Yes	Yes	-	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
DS3i-N-12	Yes	Yes	Yes (4.1.2)	-	Yes	-	Yes	Yes	Yes	Yes	Yes	Yes
STM1E-12	-	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes

## E1-42 Card

**Note:** For E1-42 card specifications, see the [E1-42 Card Specifications](#).

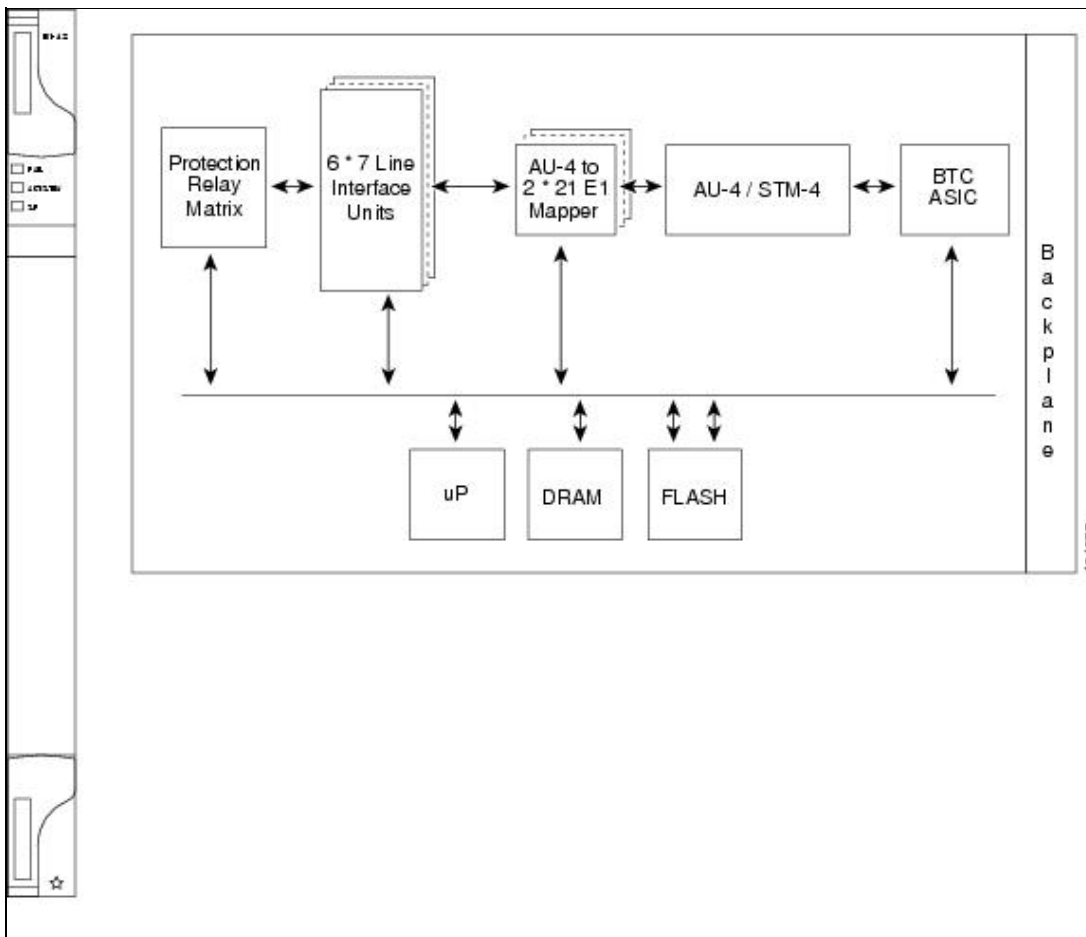
The 42-port ONS 15454 SDH E1-42 card provides 42 ITU-compliant, G.703 E-1 ports. Each port of the E1-42 card operates at 2.048 mbps over a 120-ohm, twisted-pair copper cable. Front mount electrical connection is done using the FMEC E1-120 NP card for unprotected operation, the FMEC E1-120PROA for 1:3 protection in the left side of the shelf, or the FMEC E1-120PROB for 1:3 protection in the right side of the shelf.

**Caution!** This interface can only be connected to SELV circuits. The interface is not intended for connection to any Australian telecommunications network without the written consent of the network manager.

**Note:** If you need 75-ohm unbalanced interfaces, you must additionally use the E1-75/120 conversion panel.

[Figure 3-1](#) shows the E1-42 card faceplate and block diagram.

**Figure 3-1: E1-42 Faceplate and Block Diagram**



## E1-42 Card Functionality

Each E1-42 port features ITU-T G.703 compliant outputs and inputs supporting cable losses of up to 6 dB at 1024 kHz. The E1-42 card supports 1:3 protection. You can also provision the E1-42 card to monitor line and frame errors in both directions.

The E1-42 card can function as a working or protect card in 1:3 protection schemes. If you use the E1-42 card as a standard E-1 card, you can install the E1-42 card in Slots 1 to 4 and 14 to 17 of the ONS 15454 SDH. If you use the card's 1:3 functionality, you must install an E1-42 card as the protect card in Slot 3 (for bank A) or in Slot 15 (for bank B).

You can group and map E1-42 card traffic in VC-12 as per ITU-T G.707 to any other card in an ONS 15454 SDH node. For performance-monitoring purposes, you can gather bidirectional E-1 frame-level information (for example, loss of frame, parity errors, or CRC errors).

**Note:** The lowest level cross-connect with the XC-VXL-10G card, XC-VXL-2.5G card, and XC-VXC-10G card is VC-12 (2.048 mbps).

## E1-42 Card-Level Indicators

Table 3-3 describes the three LEDs on the E1-42 card faceplate.

Figure 3-1: E1-42 Faceplate and Block Diagram

**Table 3-3: E1-42 Card-Level Indicators**

Card-Level LEDs	Description
Red FAIL LED	Indicates that the card's processor is not ready. The FAIL LED is on during reset and flashes during the boot process. Replace the card if the FAIL LED persists in flashing.
ACT/STBY LED  Green (Active)  Amber (Standby)	Indicates that the E1-42 card is operational and ready to carry traffic (green) or that the card is in Standby mode (amber).
Amber SF LED	Indicates a signal failure or condition such as LOS, LOF, or high BERs on one or more of the card's ports.

### E1-42 Port-Level Indicators

You can obtain the status of the 42 E-1 ports using the LCD screen on the ONS 15454 SDH fan-tray assembly. Use the LCD to view the status of any port or card slot; the screen displays the number and severity of alarms for a given port or slot. Refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* for a complete description of the alarm messages.

### E3-12 Card

**Note:** For E3-12 card specifications, see the [E3-12 Card Specifications](#).

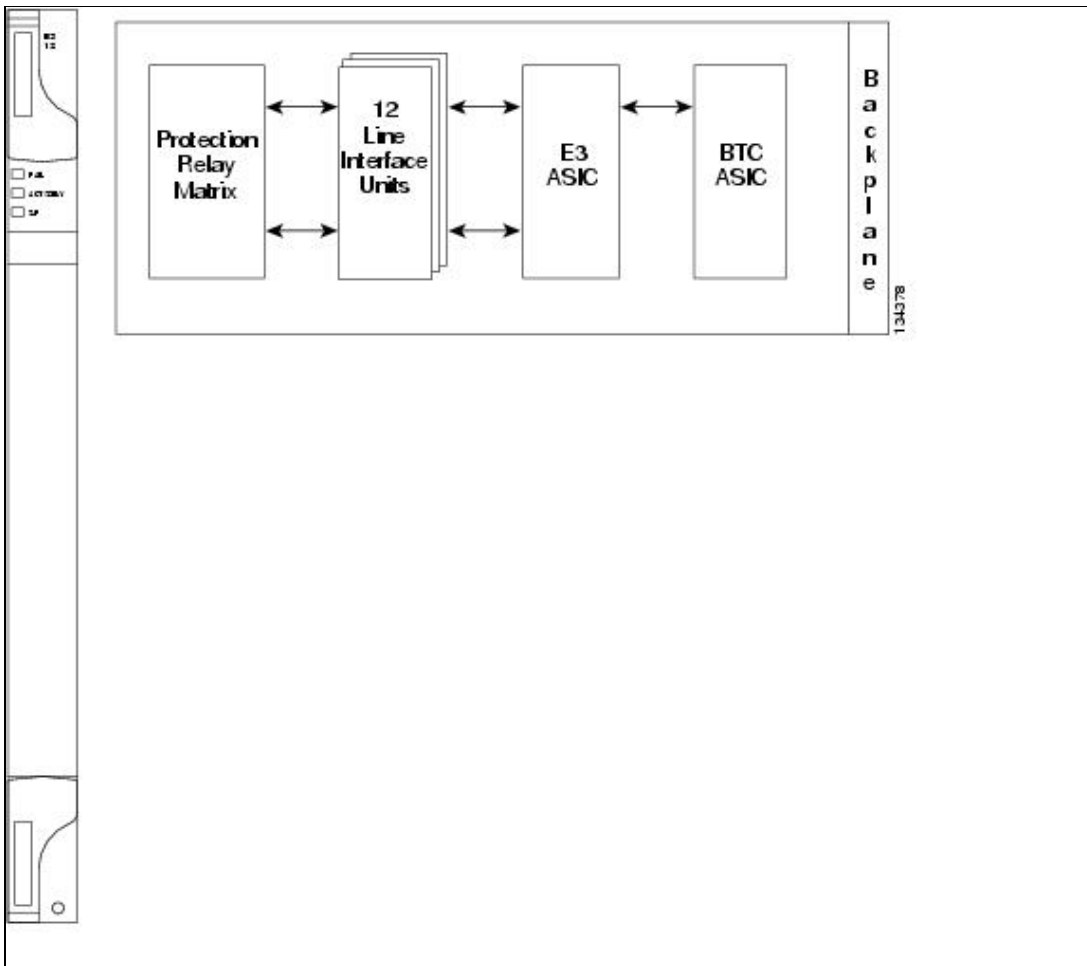
The 12-port ONS 15454 SDH E3-12 card provides 12 ITU-compliant, G.703 E-3 ports per card. Each interface operates at 34.368 mbps over a 75-ohm coaxial cable (with the FMEC-E3/DS3 card). The E3-12 card operates as a working or protect card in 1:1 protection schemes.

**Caution!** This interface can only be connected to SELV circuits. The interface is not intended for connection to any Australian telecommunications network without the written consent of the network manager.

**Note:** The E3-12 card can be deployed in a central office or a carrier's exchange.

[Figure 3-2](#) shows the E3-12 card faceplate and block diagram.

**Figure 3-2: E3-12 Card Faceplate and Block Diagram**



### E3-12 Card Functionality

You can install the E3-12 card in Slots 1 to 5 and 14 to 17 of the ONS 15454 SDH. Each E3-12 port features ITU-T G.703 compliant outputs supporting cable losses of up to 12 dB at 17184 kHz. The E3-12 card supports 1:1 protection.

**Note:** The lowest level cross-connect with the XC-VXL-10G card, XC-VXL-2.5G card, and XC-VXC-10G card is VC-12 (2.048 mbps).

**Note:** When a protection switch moves traffic from the E3-12 working/active card to the E3-12 protect/standby card, ports on the now active/standby card cannot be taken out of service. Lost traffic can result if you take a port out of service, even if the E3-12 active/standby card no longer carries traffic.

### E3-12 Card-Level Indicators

Table 3-4 describes the three LEDs on the E3-12 card faceplate.

Table 3-4: E3-12 Card-Level Indicators

Card-Level LEDs	Description
Red FAIL LED	Indicates that the card's processor is not ready. The FAIL LED is on during reset and flashes during the boot process. Replace the card if the FAIL LED persists in flashing.

Figure 3-2: E3-12 Card Faceplate and Block Diagram

ACT/STBY LED	When the ACT/STBY LED is green, the E3-12 card is operational and ready to carry traffic. When the ACT/STBY LED is amber, the E3-12 card is operational and in Standby (protect) mode.
Green (Active)	
Amber (Standby)	
Amber SF LED	Indicates a signal failure or condition such as port LOS.

### E3-12 Port-Level Indicators

You can find the status of the twelve E3-12 card ports using the LCD screen on the ONS 15454 SDH fan-tray assembly. Use the LCD to view the status of any port or card slot; the screen displays the number and severity of alarms for a given port or slot. Refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* for a complete description of the alarm messages.

### DS3i-N-12 Card

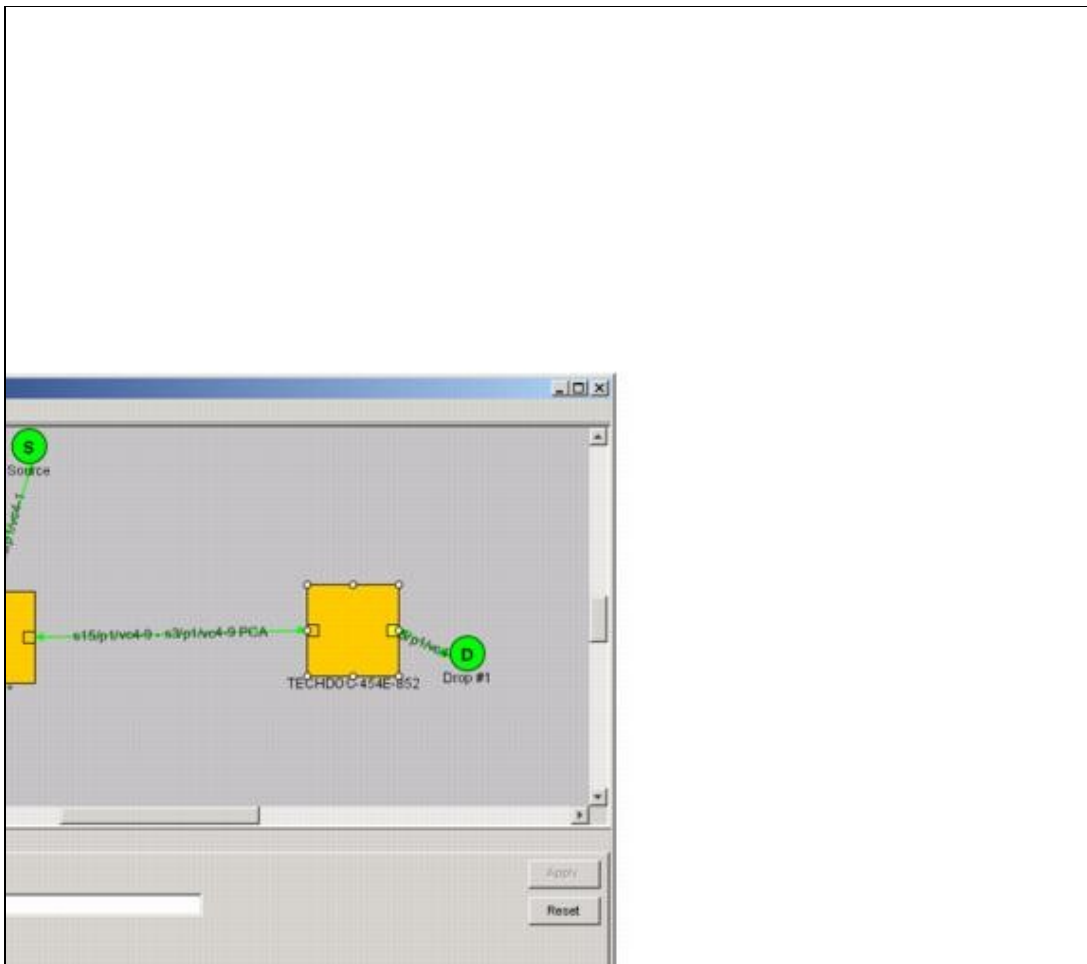
**Note:** For DS3i-N-12 card specifications, see the [DS3i-N-12 Card Specifications](#).

The 12-port ONS 15454 SDH DS3i-N-12 card provides 12 ITU-T G.703, ITU-T G.704, and Telcordia GR-499-CORE compliant DS-3 ports per card. Each port operates at 44.736 mbps over a 75-ohm coaxial cable (with the FMEC-E3/DS3 card). The DS3i-N-12 can operate as the protect card in a 1:N (N = 4) DS-3 protection group. It has circuitry that allows it to protect up to four working DS3i-N-12 cards. In a 1:N protection group the DS3i-N-12 card must reside in either the Slot 3 or 15.

[Figure 3-3](#) shows the DS3i-N-12 faceplate and block diagram.

**Figure 3-3: DS3i-N-12 Faceplate and Block Diagram**





### DS3i-N-12 Card Functionality

The DS3i-N-12 can detect several different errored logic bits within a DS-3 frame. This function lets the ONS 15454 SDH identify a degrading DS-3 facility caused by upstream electronics (DS-3 Framer). In addition, DS-3 frame format autodetection and J1 path trace are supported. By monitoring additional overhead in the DS-3 frame, subtle network degradations can be detected.

The DS3i-n-12 can also aggregate DS3 and E1 traffic and transport it between SONET and SDH networks through AU4/STS 3 trunks, with the ability to add and drop DS3s to an STS3 trunk at intermediate nodes.

The following list summarizes the DS3i-N-12 card features:

- Provisionable framing format (M23, C-bit, or unframed)
- Autorecognition and provisioning of incoming framing
- VC-3 payload mapping as per ITU-T G.707
- Idle signal ("1100") monitoring as per Telcordia GR-499-CORE
- P-bit monitoring
- C-bit parity monitoring
- X-bit monitoring
- M-bit monitoring
- F-bit monitoring
- Far-end block error (FEBE) monitoring
- Far-end alarm and control (FEAC) status and loop code detection
- Path trace byte support with TIM-P alarm generation

Figure 3-3: DS3i-N-12 Faceplate and Block Diagram

You can install the DS3i-N-12 card in Slots 1 to 5 and 13 to 17. Each DS3i-N-12 port features DS-N-level outputs supporting distances up to 137 m (450 feet). With FMEC-E3/DS3, the card supports 1.0/2.3 miniature coax nonbalanced connectors.

**Note:** The lowest level cross-connect with the XC-VXL-10G card, XC-VXL-2.5G card, and XC-VXC-10G card is VC-12 (2.048 mbps).

## DS3i-N-12 Card-Level Indicators

Table 3-5 describes the three LEDs on the DS3i-N-12 card faceplate.

**Table 3-5: DS3i-N-12 Card-Level Indicators**

Card-Level LEDs	Description
Red FAIL LED	Indicates that the card's processor is not ready. The FAIL LED is on during reset and flashes during the boot process. Replace the card if the red FAIL LED persists in flashing.
ACT/STBY LED Green (Active) Amber (Standby)	When the ACT/STBY LED is green, the DS3i-N-12 card is operational and ready to carry traffic. When the ACT/STBY LED is amber, the DS3i-N-12 card is operational and in Standby (protect) mode.
Amber SF LED	Indicates a signal failure or condition such as LOS or LOF on one or more of the card's ports.

## DS3i-N-12 Port-Level Indicators

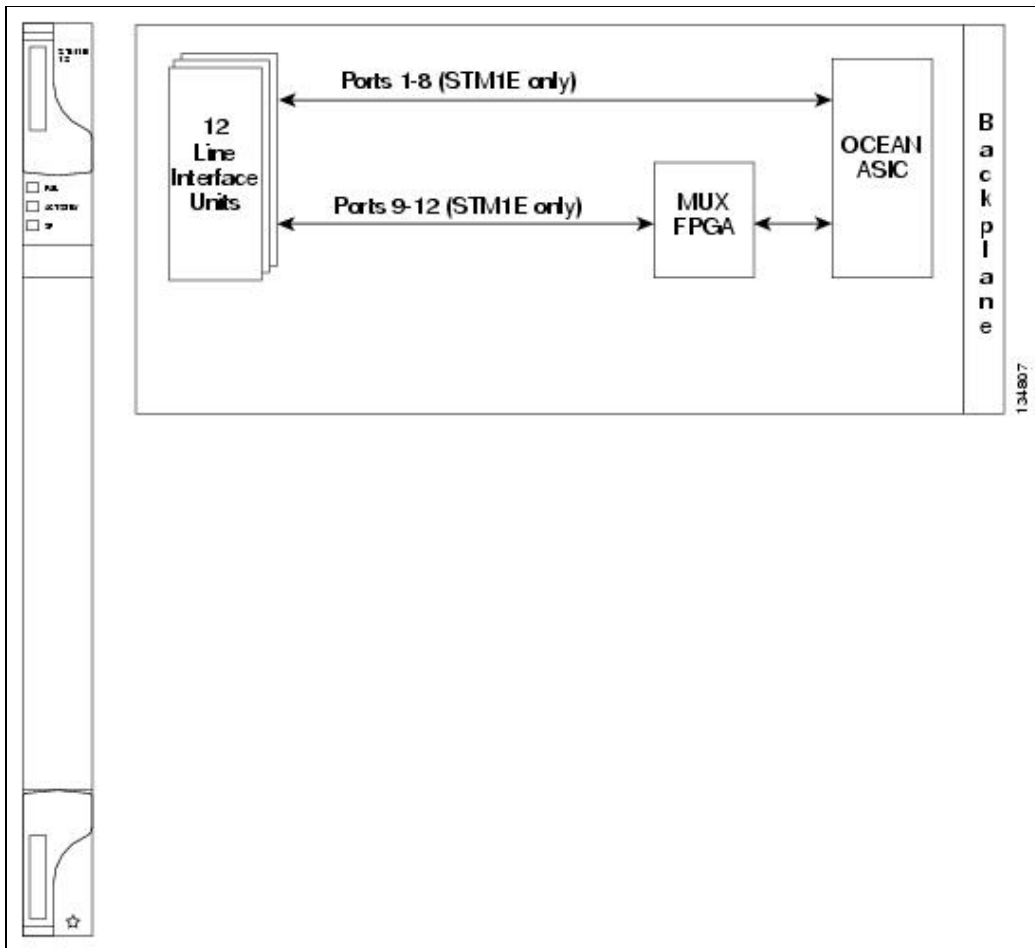
You can find the status of the DS3i-N-12 card ports using the LCD screen on the ONS 15454 SDH fan-tray assembly. Use the LCD to view the status of any port or card slot; the screen displays the number and severity of alarms for a given port or slot. Refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* for a complete description of the alarm messages.

## STM1E-12 Card

**Note:** For STM1E-12 card specifications, see the [STM1E-12 Card Specifications](#).

The 12-port ONS 15454 SDH STM1E-12 card provides 12 ITU-compliant, G.703 STM-1 ports per card. Each interface operates at 155.52 mbps for STM-1 over a 75-ohm coaxial cable (with the FMEC STM1E 1:1 card). The STM1E-12 card operates as a working or protect card in 1:1 protection schemes. Figure 3-4 shows the STM1E-12 faceplate and block diagram.

**Figure 3-4: STM1E-12 Faceplate and Block Diagram**



### STM 1E-12 Card Functionality

You can install the STM1E-12 card in Slots 1 to 4 and 14 to 17 of the ONS 15454 SDH. Each STM1E-12 port features ITU-T G.703 compliant outputs supporting cable losses of up to 12.7 dB at 78 MHz. The STM1E-12 card supports no protection and 1:1 protection. In both cases, the FMEC STM1E 1:1 card is used. Up to two unprotected active STM1E-12 cards use the same FMEC STM1E 1:1 card, and one active STM1E-12 card and one protect STM1E-12 card use the same FMEC STM1E 1:1 card.

**Note:** When a protection switch moves traffic from the STM1E-12 working/active card to the STM1E-12 protect/standby card, ports on the now active/standby card cannot be taken out of service. Lost traffic can result if you take a port out of service, even if the STM1E-12 active/standby card no longer carries traffic.

**Note:** Use an external clock when doing service disruption time measurements on the STM1E-12.

### STM1E-12 Card-Level Indicators

Table 3-6 describes the three LEDs on the STM1E-12 card faceplate.

Table 3-6: STM1E-12 Card-Level Indicators

Card-Level LEDs	Description
Red FAIL LED	Indicates that the card's processor is not ready. The FAIL LED is on during reset and flashes during the boot process. Replace the card if the FAIL LED persists in flashing.

Figure 3-4: STM1E-12 Faceplate and Block Diagram

<p>ACT/STBY LED</p> <p>Green (Active)</p> <p>Amber (Standby)</p>	<p>When the ACT/STBY LED is green, the STM1E-12 card is operational and ready to carry traffic. When the ACT/STBY LED is amber, the STM1E-12 card is operational and in Standby (protect) mode.</p>
<p>Amber SF LED</p>	<p>Indicates a signal failure or condition such as port LOS.</p>

### STM1E-12 Port-Level Indicators

You can find the status of the 12 STM1E-12 card ports using the LCD screen on the ONS 15454 SDH fan-tray assembly. Use the LCD to view the status of any port or card slot; the screen displays the number and severity of alarms for a given port or slot. Refer to the *Cisco ONS 15454 SDH Troubleshooting Guide* for a complete description of the alarm messages.

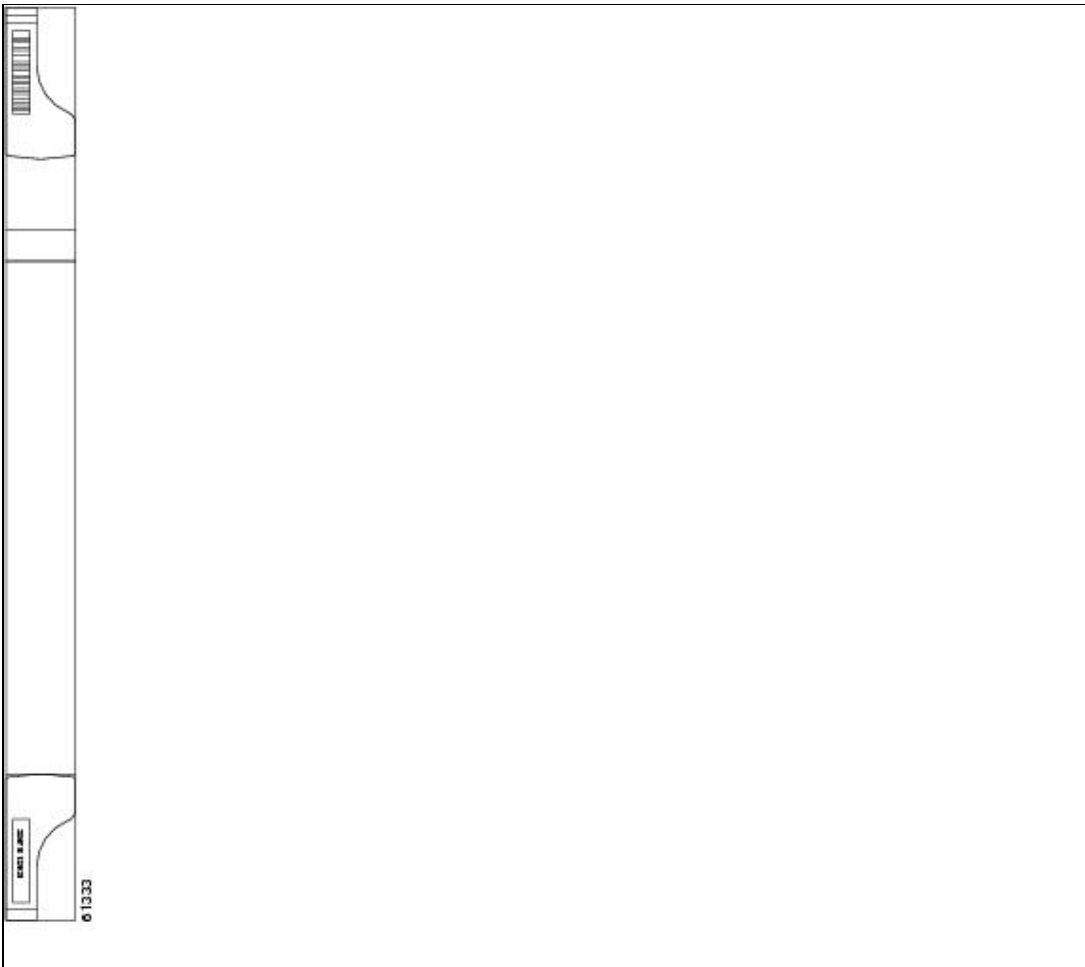
### FILLER Card

**Note:** For FILLER card specifications, see the [FILLER Card](#).

The FILLER card provides EMC emission control for empty multiservice card slots. It also provides a way to close off the subrack front area, thus allowing air flow and convection to be maintained through the subrack. [Figure 3-5](#) shows the FILLER card faceplate.

**Caution!** You must install the FILLER card in every empty interface card slot to maintain EMC requirements of the system and proper air flow.

**Figure 3-5: FILLER Faceplate**



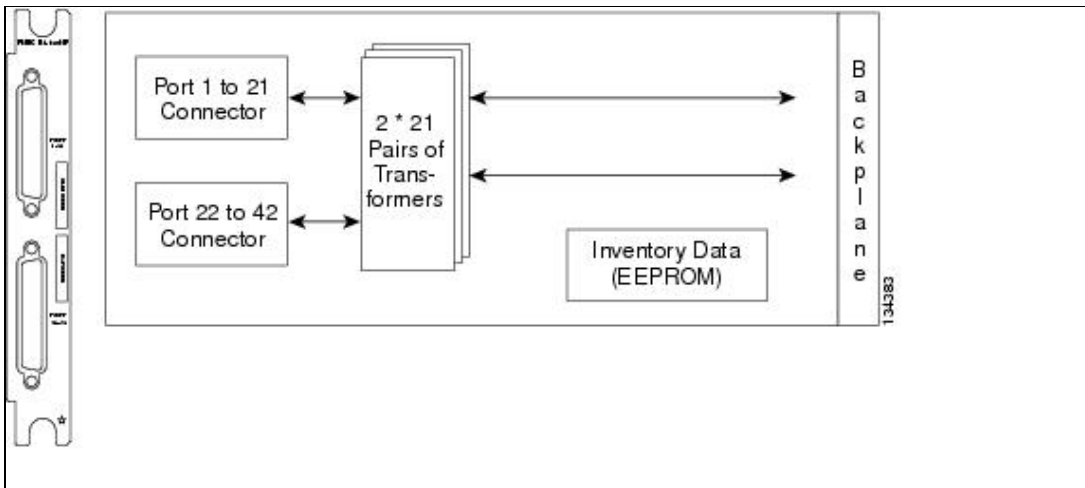
## FMEC E1-120NP Card

**Note:** For FMEC E1-120NP specifications, see the [FMEC E1-120NP Specifications](#).

The ONS 15454 SDH FMEC E1-120NP card provides front mount electrical connection for 42 ITU-compliant, G.703 E-1 ports. With the FMEC E1-120NP card, each E1-42 port operates at 2.048 mbps over a 120-ohm balanced interface. Twenty-one interfaces are led through one common Molex 96-pin LFH connector. [Figure 3-6](#) shows the FMEC E1-120NP faceplate and block diagram.

**Caution!** This interface can only be connected to SELV circuits. The interface is not intended for connection to any Australian telecommunications network without the written consent of the network manager.

**Figure 3-6: FMEC E1-120NP Faceplate and Block Diagram**



You can install the FMEC E1-120NP card in any EFCA slot from Slot 18 to 22 or Slot 25 to 29 of the ONS 15454 SDH. Each FMEC E1-120NP card port features E1-level inputs and outputs supporting cable losses of up to 6 dB at 1024 kHz.

Use [Table 3-7](#) to make the connection from the E-1 96-pin connector for Ports 1 to 21 to the external balanced 120-ohm E-1 interfaces.

**Table 3-7: E-1 Interface Pinouts on the FMEC E1-120NP Card Ports 1 to 21**

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	TX 11 N	25	RX 11 N	49	TX 21 N	73	RX 21 N
2	TX 11 P	26	RX 11 P	50	TX 21 P	74	RX 21 P
3	TX 10 N	27	RX 10 N	51	TX 20 N	75	RX 20 N
4	TX 10 P	28	RX 10 P	52	TX 20 P	76	RX 20 P
5	TX 9 N	29	RX 9 N	53	TX 19 N	77	RX 19 N
6	TX 9 P	30	RX 9 P	54	TX 19 P	78	RX 19 P
7	TX 8 N	31	RX 8 N	55	TX 18 N	79	RX 18 N
8	TX 8 P	32	RX 8 P	56	TX 18 P	80	RX 18 P
9	TX 7 N	33	RX 7 N	57	TX 17 N	81	RX 17 N
10	TX 7 P	34	RX 7 P	58	TX 17 P	82	RX 17 P
11	TX 6 N	35	RX 6 N	59	TX 16 N	83	RX 16 N
12	TX 6 P	36	RX 6 P	60	TX 16 P	84	RX 16 P
13	TX 5 N	37	RX 5 N	61	TX 15 N	85	RX 15 N
14	TX 5 P	38	RX 5 P	62	TX 15 P	86	RX 15 P
15	TX 4 N	39	RX 4 N	63	TX 14 N	87	RX 14 N
16	TX 4 P	40	RX 4 P	64	TX 14 P	88	RX 14 P
17	TX 3 N	41	RX 3 N	65	TX 13 N	89	RX 13 N
18	TX 3 P	42	RX 3 P	66	TX 13 P	90	RX 13 P
19	TX 2 N	43	RX 2 N	67	TX 12 N	91	RX 12 N
20	TX 2 P	44	RX 2 P	68	TX 12 P	92	RX 12 P
21	TX 1 N	45	RX 1 N	69	NC	93	NC
22	TX 1 P	46	RX 1 P	70	NC	94	NC
23	NC	47	NC	71	NC	95	NC

Figure 3-6: FMEC E1-120NP Faceplate and Block Diagram

24	NC	48	NC	72	NC	96	NC
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Use [Table 3-8](#) to make the connection from the E-1 96-pin connector for Ports 22 to 42 to the external balanced 120-ohm E-1 interfaces.

**Table 3-8: E-1 Interface Pinouts on the FMEC E1-120NP Card Ports 22 to 42**

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	TX 32 N	25	RX 32 N	49	TX 42 N	73	RX 42 N
2	TX 32 P	26	RX 32 P	50	TX 42 P	74	RX 42 P
3	TX 31 N	27	RX 31 N	51	TX 41 N	75	RX 41 N
4	TX 31 P	28	RX 31 P	52	TX 41 P	76	RX 41 P
5	TX 30 N	29	RX 30 N	53	TX 40 N	77	RX 40 N
6	TX 30 P	30	RX 30 P	54	TX 40 P	78	RX 40 P
7	TX 29 N	31	RX 29 N	55	TX 39 N	79	RX 39 N
8	TX 29 P	32	RX 29 P	56	TX 39 P	80	RX 39 P
9	TX 28 N	33	RX 28 N	57	TX 38 N	81	RX 38 N
10	TX 28 P	34	RX 28 P	58	TX 38 P	82	RX 38 P
11	TX 27 N	35	RX 27 N	59	TX 37 N	83	RX 37 N
12	TX 27 P	36	RX 27 P	60	TX 37 P	84	RX 37 P
13	TX 26 N	37	RX 26 N	61	TX 36 N	85	RX 36 N
14	TX 26 P	38	RX 26 P	62	TX 36 P	86	RX 36 P
15	TX 25 N	39	RX 25 N	63	TX 35 N	87	RX 35 N
16	TX 25 P	40	RX 25 P	64	TX 35 P	88	RX 35 P
17	TX 24 N	41	RX 24 N	65	TX 34 N	89	RX 34 N
18	TX 24 P	42	RX 24 P	66	TX 34 P	90	RX 34 P
19	TX 23 N	43	RX 23 N	67	TX 33 N	91	RX 33 N
20	TX 23 P	44	RX 23 P	68	TX 33 P	92	RX 33 P
21	TX 22 N	45	RX 22 N	69	NC	93	NC
22	TX 22 P	46	RX 22 P	70	NC	94	NC
23	NC	47	NC	71	NC	95	NC
24	NC	48	NC	72	NC	96	NC

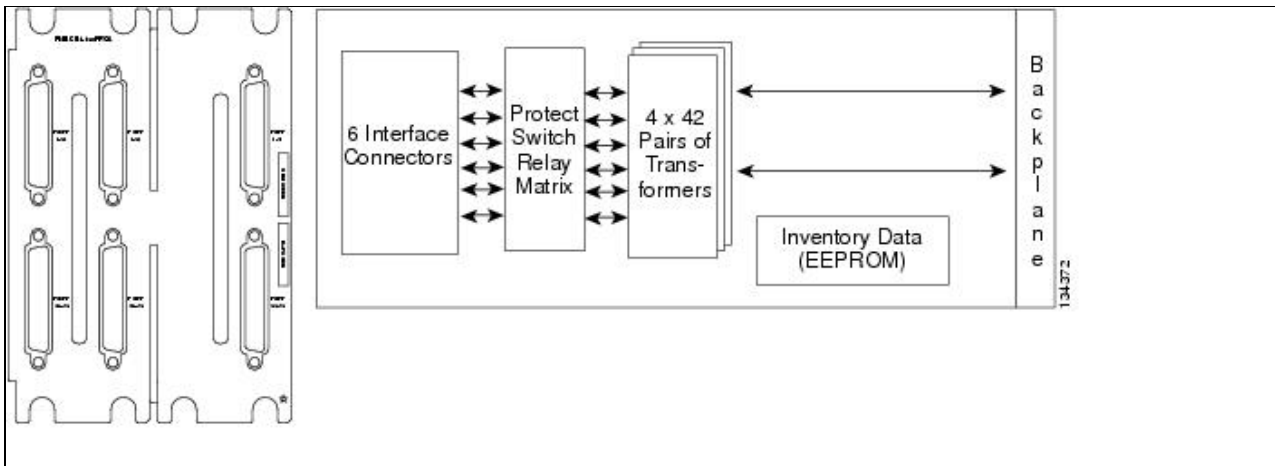
## FMEC E1-120PROA Card

**Note:** For FMEC E1-120PROA specifications, see the [FMEC E1-120PROA Specifications](#).

The ONS 15454 SDH FMEC E1-120PROA card provides front mount electrical connection for 126 ITU compliant, G.703 E-1 ports. With the FMEC E1-120PROA card, each E1-42 port operates at 2.048 mbps over a 120-ohm balanced interface. Each Molex 96-pin LFH connector supports 21 E1 interfaces. [Figure 3-7](#) shows the FMEC E1-120PROA faceplate and block diagram.

**Caution!** This interface can only be connected to SELV circuits. The interface is not intended for connection to any Australian telecommunications network without the written consent of the network manager.

**Figure 3-7: FMEC E1-120PROA Faceplate and Block Diagram**



You can install the FMEC E1-120PROA card in the EFCA in the four far-left slots (Slots 18 to 21) on the ONS 15454 SDH. Each FMEC E1-120PROA card port features E1-level inputs and outputs supporting cable losses of up to 6 dB at 1024 kHz.

Use [Table 3-9](#) to make the connection from the E-1 96-pin connector for Ports 1 to 21 to the external balanced 120-ohm E-1 interfaces.

**Table 3-9: E-1 Interface Pinouts on the FMEC E1-120PROA Card Ports 1 to 21**

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	TX 11 N	25	RX 11 N	49	TX 21 N	73	RX 21 N
2	TX 11 P	26	RX 11 P	50	TX 21 P	74	RX 21 P
3	TX 10 N	27	RX 10 N	51	TX 20 N	75	RX 20 N
4	TX 10 P	28	RX 10 P	52	TX 20 P	76	RX 20 P
5	TX 9 N	29	RX 9 N	53	TX 19 N	77	RX 19 N
6	TX 9 P	30	RX 9 P	54	TX 19 P	78	RX 19 P
7	TX 8 N	31	RX 8 N	55	TX 18 N	79	RX 18 N
8	TX 8 P	32	RX 8 P	56	TX 18 P	80	RX 18 P
9	TX 7 N	33	RX 7 N	57	TX 17 N	81	RX 17 N
10	TX 7 P	34	RX 7 P	58	TX 17 P	82	RX 17 P
11	TX 6 N	35	RX 6 N	59	TX 16 N	83	RX 16 N
12	TX 6 P	36	RX 6 P	60	TX 16 P	84	RX 16 P
13	TX 5 N	37	RX 5 N	61	TX 15 N	85	RX 15 N
14	TX 5 P	38	RX 5 P	62	TX 15 P	86	RX 15 P
15	TX 4 N	39	RX 4 N	63	TX 14 N	87	RX 14 N
16	TX 4 P	40	RX 4 P	64	TX 14 P	88	RX 14 P
17	TX 3 N	41	RX 3 N	65	TX 13 N	89	RX 13 N
18	TX 3 P	42	RX 3 P	66	TX 13 P	90	RX 13 P
19	TX 2 N	43	RX 2 N	67	TX 12 N	91	RX 12 N
20	TX 2 P	44	RX 2 P	68	TX 12 P	92	RX 12 P
21	TX 1 N	45	RX 1 N	69	NC	93	NC
22	TX 1 P	46	RX 1 P	70	NC	94	NC
23	NC	47	NC	71	NC	95	NC
24	NC	48	NC	72	NC	96	NC

Figure 3-7: FMEC E1-120PROA Faceplate and Block Diagram



Use [Table 3-10](#) to make the connection from the E-1 96-pin connector for Ports 22 to 42 to the external balanced 120-ohm E-1 interfaces.

**Table 3-10: E-1 Interface Pinouts on the FMEC E1-120PROA Card Ports 22 to 42**

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	TX 32 N	25	RX 32 N	49	TX 42 N	73	RX 42 N
2	TX 32 P	26	RX 32 P	50	TX 42 P	74	RX 42 P
3	TX 31 N	27	RX 31 N	51	TX 41 N	75	RX 41 N
4	TX 31 P	28	RX 31 P	52	TX 41 P	76	RX 41 P
5	TX 30 N	29	RX 30 N	53	TX 40 N	77	RX 40 N
6	TX 30 P	30	RX 30 P	54	TX 40 P	78	RX 40 P
7	TX 29 N	31	RX 29 N	55	TX 39 N	79	RX 39 N
8	TX 29 P	32	RX 29 P	56	TX 39 P	80	RX 39 P
9	TX 28 N	33	RX 28 N	57	TX 38 N	81	RX 38 N
10	TX 28 P	34	RX 28 P	58	TX 38 P	82	RX 38 P
11	TX 27 N	35	RX 27 N	59	TX 37 N	83	RX 37 N
12	TX 27 P	36	RX 27 P	60	TX 37 P	84	RX 37 P
13	TX 26 N	37	RX 26 N	61	TX 36 N	85	RX 36 N
14	TX 26 P	38	RX 26 P	62	TX 36 P	86	RX 36 P
15	TX 25 N	39	RX 25 N	63	TX 35 N	87	RX 35 N
16	TX 25 P	40	RX 25 P	64	TX 35 P	88	RX 35 P
17	TX 24 N	41	RX 24 N	65	TX 34 N	89	RX 34 N
18	TX 24 P	42	RX 24 P	66	TX 34 P	90	RX 34 P
19	TX 23 N	43	RX 23 N	67	TX 33 N	91	RX 33 N
20	TX 23 P	44	RX 23 P	68	TX 33 P	92	RX 33 P
21	TX 22 N	45	RX 22 N	69	NC	93	NC
22	TX 22 P	46	RX 22 P	70	NC	94	NC
23	NC	47	NC	71	NC	95	NC
24	NC	48	NC	72	NC	96	NC

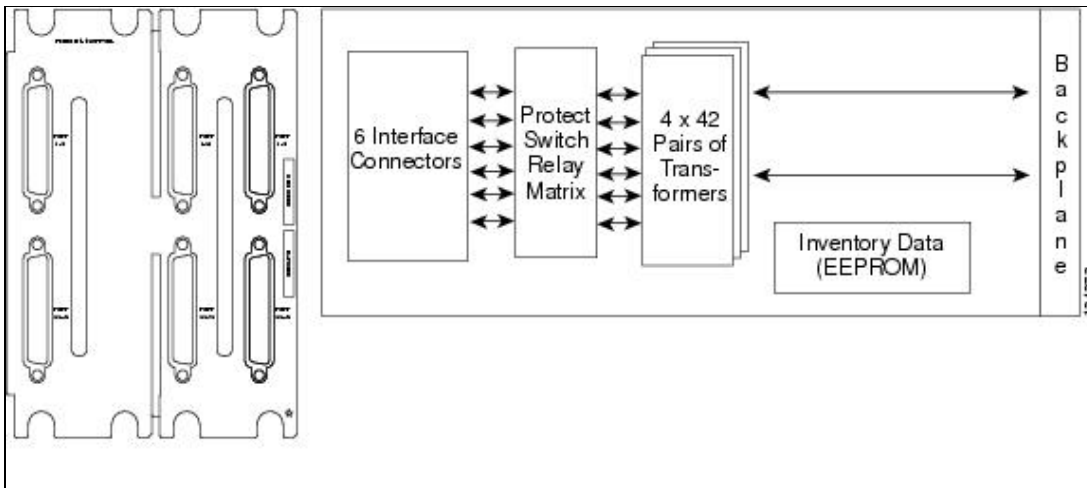
## FMEC E1-120PROB Card

**Note:** For FMEC E1-120PROB specifications, see the [FMEC E1-120PROB Specifications](#).

The ONS 15454 SDH FMEC E1-120PROB card provides front mount electrical connection for 126 ITU-compliant, G.703 E-1 ports. With the FMEC E1-120PROB card, each E1-42 port operates at 2.048 mbps over a 120-ohm balanced interface. Each Molex 96-pin LFH connector supports 21 E-1 interfaces. [Figure 3-8](#) shows the FMEC E1-120PROB faceplate and block diagram.

**Caution!** This interface can only be connected to SELV circuits. The interface is not intended for connection to any Australian telecommunications network without the written consent of the network manager.

**Figure 3-8: FMEC E1-120PROB Faceplate and Block Diagram**



You can install the FMEC E1-120PROB card in EFCA Slots 26 to 29 of the ONS 15454 SDH. Each FMEC E1-120PROB card port features E1-level inputs and outputs supporting cable losses of up to 6 dB at 1024 kHz.

Use [Table 3-11](#) to make the connection from the E-1 96-pin connector for Ports 1 to 21 to the external balanced 120-ohm E-1 interfaces.

**Table 3-11: E-1 Interface Pinouts on the FMEC E1-120PROB Card Ports 1 to 21**

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	TX 11 N	25	RX 11 N	49	TX 21 N	73	RX 21 N
2	TX 11 P	26	RX 11 P	50	TX 21 P	74	RX 21 P
3	TX 10 N	27	RX 10 N	51	TX 20 N	75	RX 20 N
4	TX 10 P	28	RX 10 P	52	TX 20 P	76	RX 20 P
5	TX 9 N	29	RX 9 N	53	TX 19 N	77	RX 19 N
6	TX 9 P	30	RX 9 P	54	TX 19 P	78	RX 19 P
7	TX 8 N	31	RX 8 N	55	TX 18 N	79	RX 18 N
8	TX 8 P	32	RX 8 P	56	TX 18 P	80	RX 18 P
9	TX 7 N	33	RX 7 N	57	TX 17 N	81	RX 17 N
10	TX 7 P	34	RX 7 P	58	TX 17 P	82	RX 17 P
11	TX 6 N	35	RX 6 N	59	TX 16 N	83	RX 16 N
12	TX 6 P	36	RX 6 P	60	TX 16 P	84	RX 16 P
13	TX 5 N	37	RX 5 N	61	TX 15 N	85	RX 15 N
14	TX 5 P	38	RX 5 P	62	TX 15 P	86	RX 15 P
15	TX 4 N	39	RX 4 N	63	TX 14 N	87	RX 14 N
16	TX 4 P	40	RX 4 P	64	TX 14 P	88	RX 14 P
17	TX 3 N	41	RX 3 N	65	TX 13 N	89	RX 13 N
18	TX 3 P	42	RX 3 P	66	TX 13 P	90	RX 13 P
19	TX 2 N	43	RX 2 N	67	TX 12 N	91	RX 12 N
20	TX 2 P	44	RX 2 P	68	TX 12 P	92	RX 12 P
21	TX 1 N	45	RX 1 N	69	NC	93	NC
22	TX 1 P	46	RX 1 P	70	NC	94	NC
23	NC	47	NC	71	NC	95	NC

Figure 3-8: FMEC E1-120PROB Faceplate and Block Diagram

24	NC	48	NC	72	NC	96	NC
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Use [Table 3-12](#) to make the connection from the E-1 96-pin connector for Ports 22 to 42 to the external balanced 120-ohm E-1 interfaces.

**Table 3-12: E-1 Interface Pinouts on the FMEC E1-120PROB Card Ports 22 to 42**

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	TX 32 N	25	RX 32 N	49	TX 42 N	73	RX 42 N
2	TX 32 P	26	RX 32 P	50	TX 42 P	74	RX 42 P
3	TX 31 N	27	RX 31 N	51	TX 41 N	75	RX 41 N
4	TX 31 P	28	RX 31 P	52	TX 41 P	76	RX 41 P
5	TX 30 N	29	RX 30 N	53	TX 40 N	77	RX 40 N
6	TX 30 P	30	RX 30 P	54	TX 40 P	78	RX 40 P
7	TX 29 N	31	RX 29 N	55	TX 39 N	79	RX 39 N
8	TX 29 P	32	RX 29 P	56	TX 39 P	80	RX 39 P
9	TX 28 N	33	RX 28 N	57	TX 38 N	81	RX 38 N
10	TX 28 P	34	RX 28 P	58	TX 38 P	82	RX 38 P
11	TX 27 N	35	RX 27 N	59	TX 37 N	83	RX 37 N
12	TX 27 P	36	RX 27 P	60	TX 37 P	84	RX 37 P
13	TX 26 N	37	RX 26 N	61	TX 36 N	85	RX 36 N
14	TX 26 P	38	RX 26 P	62	TX 36 P	86	RX 36 P
15	TX 25 N	39	RX 25 N	63	TX 35 N	87	RX 35 N
16	TX 25 P	40	RX 25 P	64	TX 35 P	88	RX 35 P
17	TX 24 N	41	RX 24 N	65	TX 34 N	89	RX 34 N
18	TX 24 P	42	RX 24 P	66	TX 34 P	90	RX 34 P
19	TX 23 N	43	RX 23 N	67	TX 33 N	91	RX 33 N
20	TX 23 P	44	RX 23 P	68	TX 33 P	92	RX 33 P
21	TX 22 N	45	RX 22 N	69	NC	93	NC
22	TX 22 P	46	RX 22 P	70	NC	94	NC
23	NC	47	NC	71	NC	95	NC
24	NC	48	NC	72	NC	96	NC

## E1-75/120 Impedance Conversion Panel

**Note:** For specifications, see the [E1-75/120 Impedance Conversion Panel Specifications](#).

The ONS 15454 SDH E1-75/120 impedance conversion panel provides front mount electrical connection for 42 ITU-compliant, G.703 E-1 ports. With the E1-75/120 conversion panel, each E1-42 port operates at 2.048 mbps over a 75-ohm unbalanced coaxial 1.0/2.3 miniature coax connector. [Figure 3-9](#) shows the E1-75/120 faceplate.

**Caution!** This interface can only be connected to SELV circuits. The interface is not intended for connection to any Australian telecommunications network without the written consent of the network manager.

**Figure 3-9: E1-75/120 Impedance Conversion Panel Faceplate**

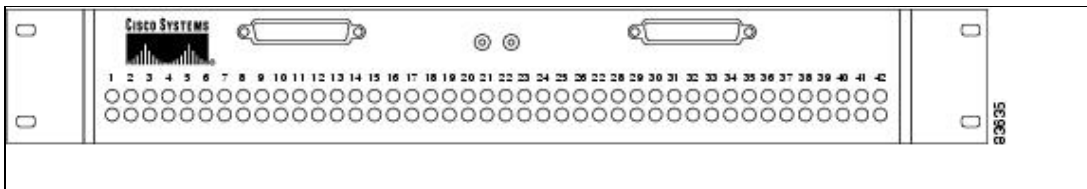


Figure 3-10 shows the E1-75/120 with optional rackmount brackets installed.

Figure 3-10: E1-75/120 with Optional Rackmount Brackets

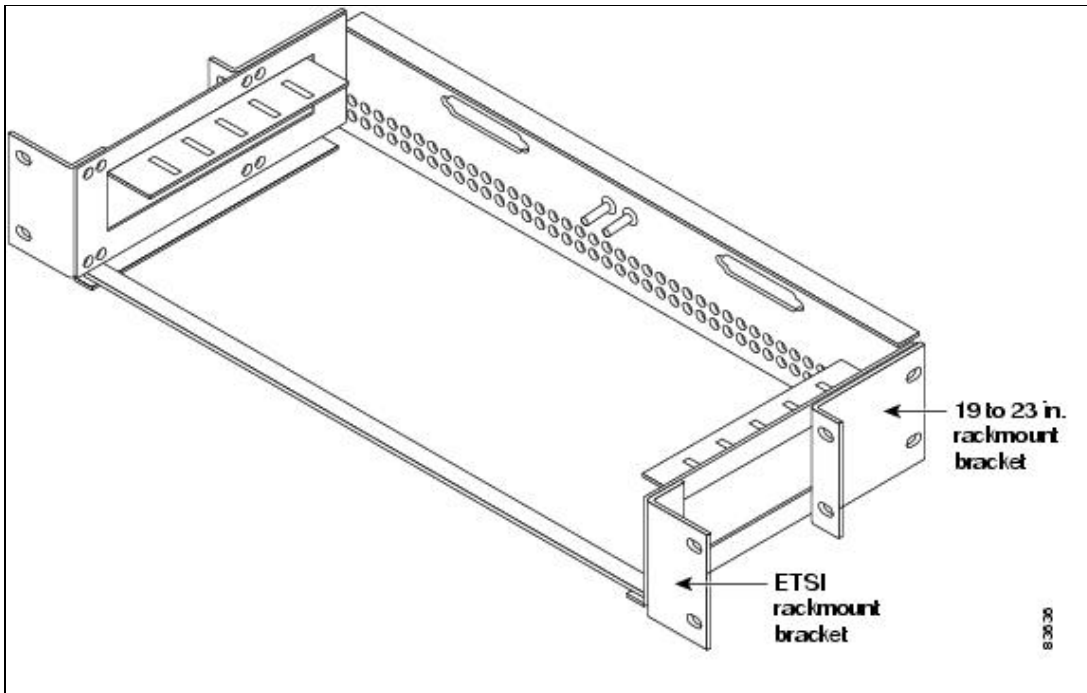


Figure 3-11 shows a block diagram of the impedance conversion panel.

Figure 3-11: E1-75/120 Impedance Conversion Panel Block Diagram

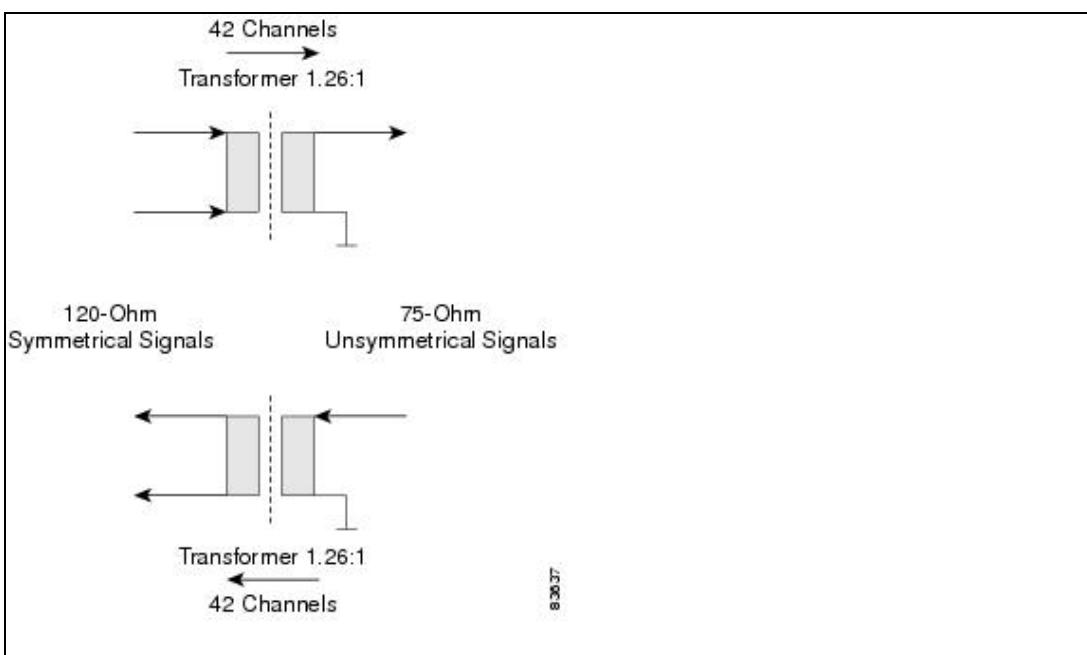


Figure 3-9: E1-75/120 Impedance Conversion Panel Faceplate

You can install the E1-75/120 conversion panel in the rack containing the ONS 15454 SDH shelf or in a nearby rack. If you install the E1-75/120 conversion panel in a place where a longer cable is required, make sure that the total cable loss of the balanced 120-ohm cable and the unbalanced 75-ohm cable does not exceed the maximum allowed value. The E1-75/120 conversion panel enables the use of 75-ohm interfaces on client side with the E1-42 card that has 120-ohm interfaces.

Before you can install the E1-75/120 in the rack, install the rackmount brackets that are required for the rack that you are using.

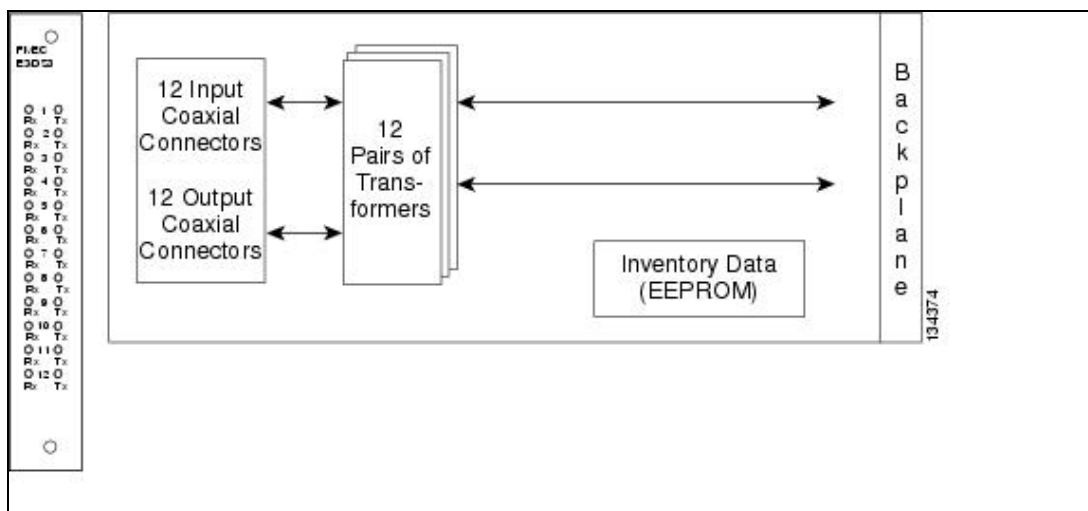
## FMEC-E3/DS3 Card

**Note:** For FMEC-E3/DS3 specifications, see the [FMEC-E3/DS3 Specifications](#).

The ONS 15454 SDH FMEC-E3/DS3 card provides front mount electrical connection for 12 ITU-compliant, G.703 E-3 or DS-3 ports. With the FMEC-E3/DS3 card, each interface of an E3-12 card operates at 34.368 mbps and each interface of a DS3i-N-12 card operates at 44.736 mbps over a 75-ohm unbalanced coaxial 1.0/2.3 miniature coax connector. [Figure 3-12](#) shows the FMEC-E3/DS3 faceplate and block diagram.

**Caution!** This interface can only be connected to SELV circuits. The interface is not intended for connection to any Australian telecommunications network without the written consent of the network manager.

**Figure 3-12: FMEC-E3/DS3 Faceplate and Block Diagram**



You can install the FMEC-E3/DS3 card in any EFCA slot from Slot 18 to 22 or Slot 25 to 29 on the ONS 15454 SDH. Each FMEC-E3/DS3 card interface features E3-level or DS3-level inputs and outputs supporting cable losses:

- E3 signals
  - ◆ Up to 12 dB at 17184 kHz
- DS3 signals. One of the following:
  - ◆ Up to 137 m (450 ft) 734A, RG59, or 728A
  - ◆ Up to 24 m (79 ft) RG179

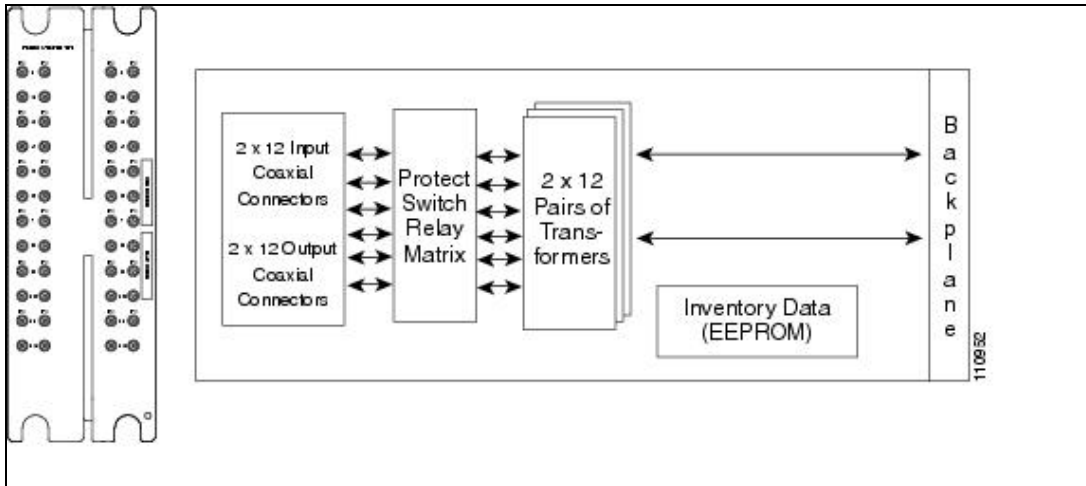
## FMEC STM1E 1:1 Card

**Note:** For FMEC STM1E 1:1 specifications, see the [FMEC STM1E 1:1 Specifications](#).

The ONS 15454 SDH FMEC STM1E 1:1 card provides front mount electrical connection for 2 x 12 ITU-compliant, G.703 STM1E ports. With the FMEC STM1E 1:1 card, each interface of an STM1E-12 card operates at 155.52 mbps for STM-1 over a 75-ohm unbalanced coaxial 1.0/2.3 miniature coax connector. The FMEC STM1E 1:1 card is required if you want to use the STM1E-12 card in 1:1 protection mode or for connection to two unprotected STM1E-12 cards.

Figure 3-13 shows the FMEC STM1E 1:1 faceplate and block diagram.

Figure 3-13: FMEC STM1E 1:1 Faceplate and Block Diagram



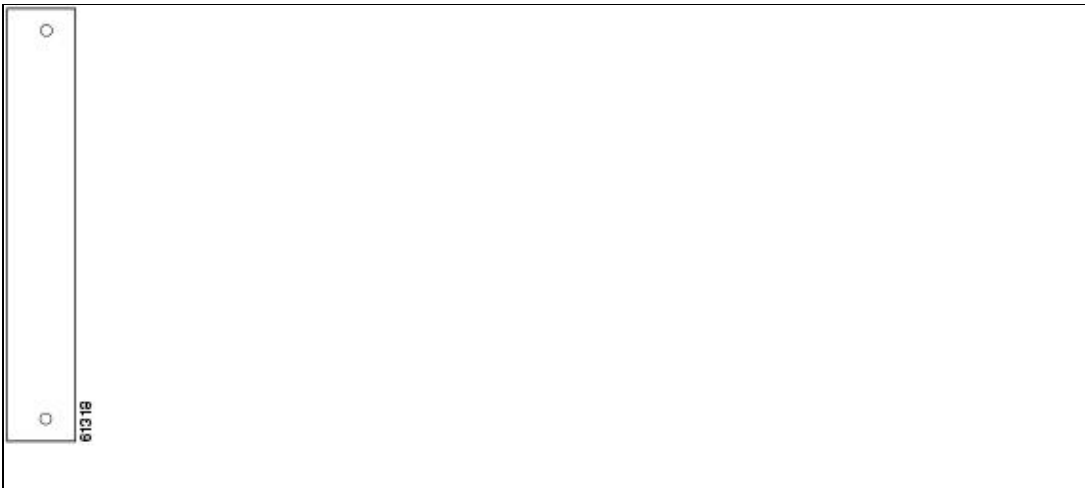
You can install the FMEC STM1E 1:1 card in any EFCA slot pair (18/19, 20/21, 26/27, or 28/29) on the ONS 15454 SDH. Each FMEC STM1E 1:1 card interface features STM1-level inputs and outputs supporting cable losses of up to 12.7 dB at 78 MHz.

## BLANK-FMEC Faceplate

**Note:** For BLANK-FMEC specifications, see the [BLANK-FMEC Specifications](#).

The BLANK-FMEC sheet metal faceplate provides EMC emission control for empty FMEC slots. It also provides a way to close off the EFCA area, thus allowing air flow and convection to be maintained through the EFCA. You must install the BLANK-FMEC faceplate in every empty FMEC slot to maintain EMC requirements of the system and proper air flow. [Figure 3-14](#) shows the BLANK-FMEC faceplate.

Figure 3-14: BLANK-FMEC Faceplate

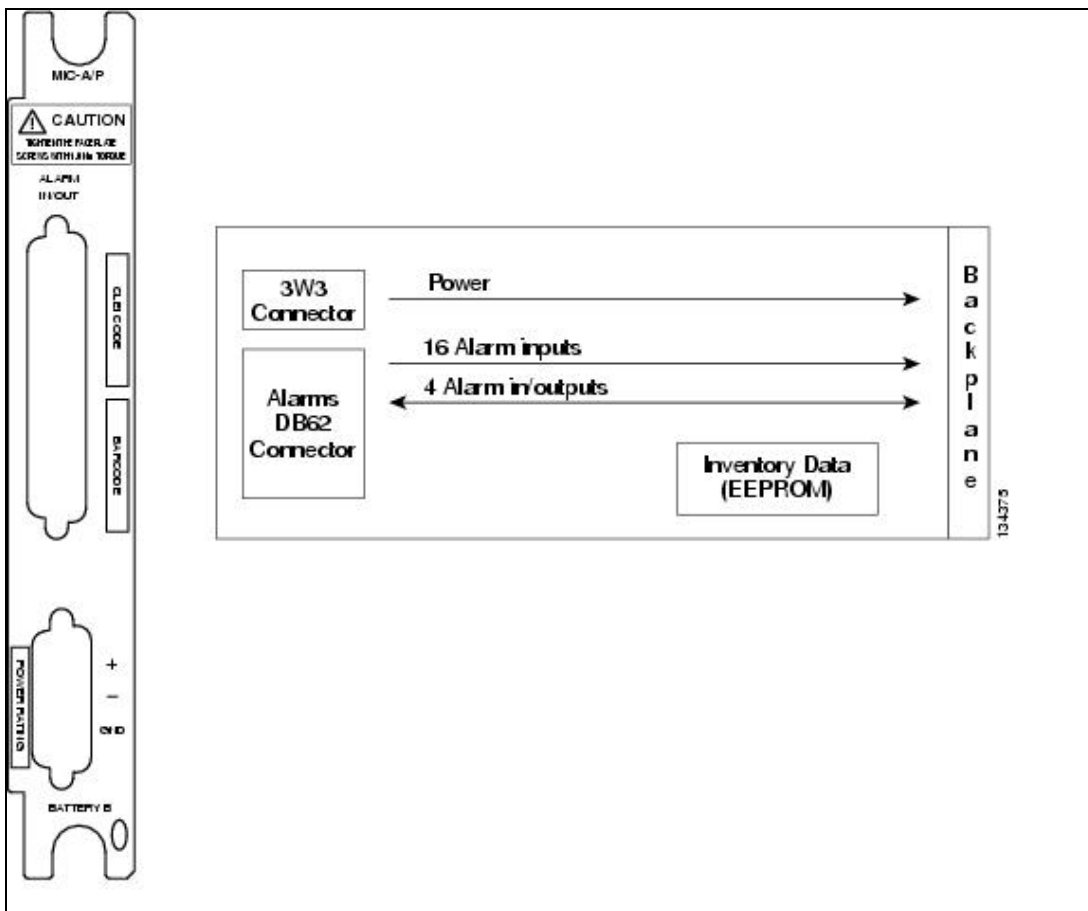


## MIC-A/P FMEC

**Note:** For MIC-A/P FMEC specifications, see the [MIC-A/P Specifications](#).

The MIC-A/P FMEC provides connection for the BATTERY B input, one of the two possible redundant power supply inputs. It also provides connection for eight alarm outputs (coming from the TCC2/TCC2P card), sixteen alarm inputs, and four configurable alarm inputs/outputs. Its position is in Slot 23 in the center of the subrack EFCA area. [[ONS 15454 SDH Reference Manual R8.5.x -- Electrical Cards#Figure 3-15 shows the MIC-A/P faceplate and block diagram.

**Figure 3-15: MIC-A/P Faceplate and Block Diagram**



**Figure 3-14: BLANK-FMEC Faceplate**

The MIC-A/P FMEC has the following features:

- Connection for one of the two possible redundant power supply inputs
- Connection for eight alarm outputs (coming from the TCC2/TCC2P card)
- Connection for four configurable alarm inputs/outputs
- Connection for sixteen alarm inputs
- Storage of manufacturing and inventory data

**Note:** For proper system operation, both the MIC-A/P and the MIC-C/T/P FMECs must be installed in the ONS 15454 SDH shelf.

**Note:** The MIC-A/P card controls whether FMEC cards on its side of the shelf appear in the CTC graphical user interface (GUI). For example, if the MIC-A/P is removed from the shelf, FMECs to the left of the card might disappear in CTC. This is normal behavior because when the MIC-A/P card is removed, communication can no longer be established with the disappeared FMECs. For more information, refer to the IMPROPROMVL entry in the "Alarm Troubleshooting" chapter of the *Cisco ONS 15454 SDH Troubleshooting Guide*.

Table 3-13 shows the alarm interface pinouts on the MIC-A/P DB-62 connector.

**Table 3-13: Alarm Interface Pinouts on the MIC-A/P DB-62 Connector**

Pin No.	Signal Name	Signal Description	Color
1	ALMCUTOFF N	Alarm cutoff, normally open ACO pair	White/blue
2	ALMCUTOFF P	Alarm cutoff, normally open ACO pair	Blue/white
3	ALMINP0 N	Alarm input pair 1, reports closure on connected wires	White/orange
4	ALMINP0 P	Alarm input pair 1, reports closure on connected wires	Orange/white
5	ALMINP1 N	Alarm input pair 2, reports closure on connected wires	White/green
6	ALMINP1 P	Alarm input pair 2, reports closure on connected wires	Green/white
7	ALMINP2 N	Alarm input pair 3, reports closure on connected wires	White/brown
8	ALMINP2 P	Alarm input pair 3, reports closure on connected wires	Brown/white
9	ALMINP3 N	Alarm input pair 4, reports closure on connected wires	White/gray
10	ALMINP3 P	Alarm input pair 4, reports closure on connected wires	Gray/white
11	EXALM0 N	External customer alarm 1	Red/blue
12	EXALM0 P	External customer alarm 1	Blue/red
13	GND	Frame ground	-
14	EXALM1 N	External customer alarm 2	Red/orange
15	EXALM1 P	External customer alarm 2	Orange/red
16	EXALM2 N	External customer alarm 3	Red/green
17	EXALM2 P	External customer alarm 3	Green/red
18	EXALM3 N	External customer alarm 4	Red/brown
19	EXALM3 P	External customer alarm 4	Brown/red
20	EXALM4 N	External customer alarm 5	Red/gray
21	EXALM4 P	External customer alarm 5	Gray/red
22	EXALM5 N	External customer alarm 6	Black/blue
23	EXALM5 P	External customer alarm 6	Blue/black
24	EXALM6 N	External customer alarm 7	Black/orange
25	EXALM6 P	External customer alarm 7	Orange/black

Figure 3-15: MIC-A/P Faceplate and Block Diagram



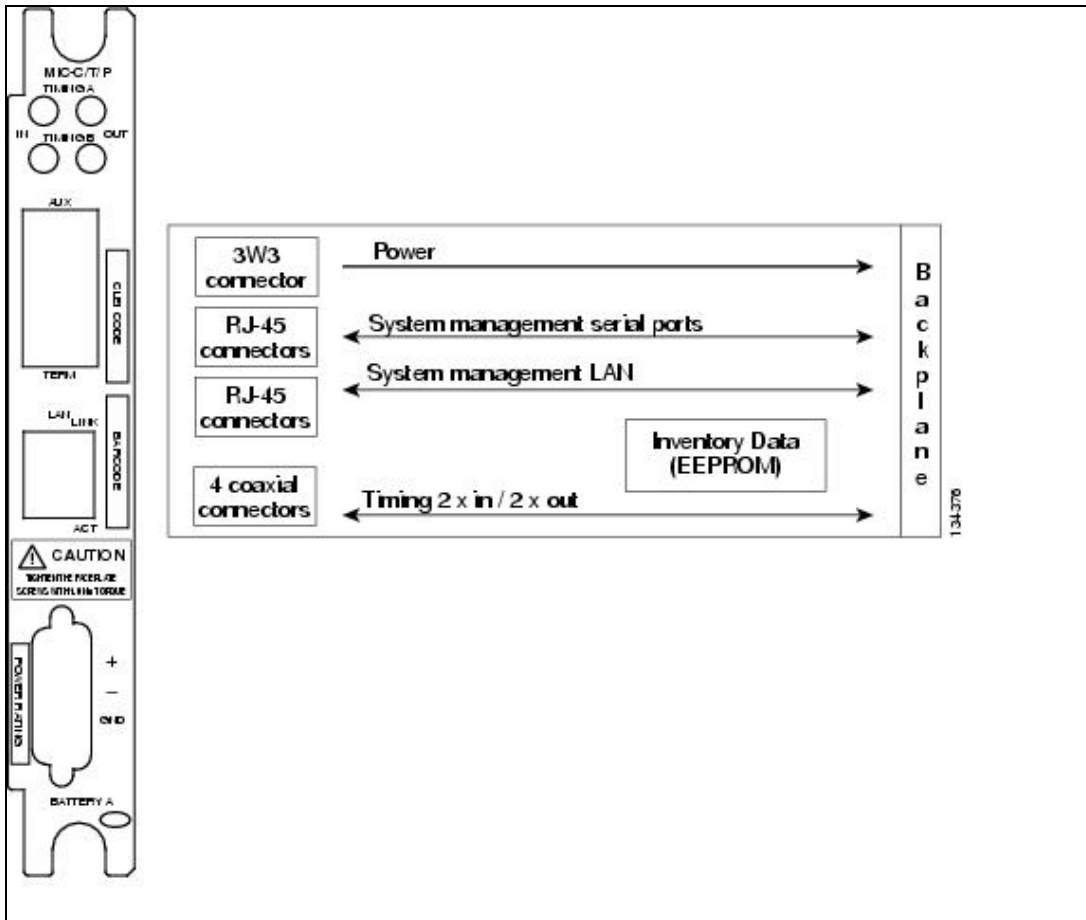
26	GND	Frame ground	-
27	EXALM7 N	External customer alarm 8	Black/green
28	EXALM7 P	External customer alarm 8	Green/black
29	EXALM8 N	External customer alarm 9	Black/brown
30	EXALM8 P	External customer alarm 9	Brown/black
31	EXALM9 N	External customer alarm 10	Black/gray
32	EXALM9 P	External customer alarm 10	Gray/black
33	EXALM10 N	External customer alarm 11	Amber/blue
34	EXALM10 P	External customer alarm 11	Blue/Amber
35	EXALM11 N	External customer alarm 12	Amber/orange
36	EXALM11 P	External customer alarm 12	Orange/Amber
37	ALMOUP0 N	Normally open output pair 1	White/blue
38	ALMOUP0 P	Normally open output pair 1	Blue/white
39	GND	Frame ground	-
40	ALMOUP1 N	Normally open output pair 2	White/orange
41	ALMOUP1 P	Normally open output pair 2	Orange/white
42	ALMOUP2 N	Normally open output pair 3	White/green
43	ALMOUP2 P	Normally open output pair 3	Green/white
44	ALMOUP3 N	Normally open output pair 4	White/brown
45	ALMOUP3 P	Normally open output pair 4	Brown/white
46	AUDALM0 N	Normally open Minor audible alarm	White/gray
47	AUDALM0 P	Normally open Minor audible alarm	Gray/white
48	AUDALM1 N	Normally open Major audible alarm	Red/blue
49	AUDALM1 P	Normally open Major audible alarm	Blue/red
50	AUDALM2 N	Normally open Critical audible alarm	Red/orange
51	AUDALM2 P	Normally open Critical audible alarm	Orange/red
52	GND	Frame ground	-
53	AUDALM3 N	Normally open Remote audible alarm	Red/green
54	AUDALM3 P	Normally open Remote audible alarm	Green/red
55	VISALM0 N	Normally open Minor visual alarm	Red/brown
56	VISALM0 P	Normally open Minor visual alarm	Brown/red
57	VISALM1 N	Normally open Major visual alarm	Red/gray
58	VISALM1 P	Normally open Major visual alarm	Gray/red
59	VISALM2 N	Normally open Critical visual alarm	Black/blue
60	VISALM2 P	Normally open Critical visual alarm	Blue/black
61	VISALM3 N	Normally open Remote visual alarm	Black/orange
62	VISALM3 P	Normally open Remote visual alarm	Orange/black

## MIC-C/T/P FMEC

**Note:** For MIC-C/T/P FMEC specifications, see the [MIC-C/T/P Specifications](#).

The MIC-C/T/P FMEC provides connection for the BATTERY A input, one of the two possible redundant power supply inputs. It also provides connection for system management serial port, system management LAN port, modem port (for future use), and system timing inputs and outputs. Install the MIC-C/T/P in Slot 24. [Figure 3-16](#) shows the MIC-C/T/P faceplate and block diagram.

Figure 3-16: MIC-C/T/P Faceplate and Block Diagram



The MIC-C/T/P FMEC has the following features:

- Connection for one of the two possible redundant power supply inputs
- Connection for two serial ports for local craft/modem (for future use)
- Connection for one LAN port
- Connection for two system timing inputs
- Connection for two system timing outputs
- Storage of manufacturing and inventory data

**Note:** For proper system operation, both the MIC-A/P and the MIC-C/T/P FMECs must be installed in the shelf.

The MIC-C/T/P FMEC has one pair of LEDs located on the RJ-45 LAN connector. The green LED is on when a link is present, and the amber LED is on when data is being transferred.