



Install the Shelf and Common Control Cards

This chapter explains how to install the Cisco ONS 15454 ETSI and Cisco ONS 15454 ANSI shelf assemblies. Where procedures differ for the two shelf types, the procedure will indicate “ANSI only” or “ETSI only.” For a summary of the tools and equipment required for installation, see the [“Required Tools and Equipment \(ETSI\)”](#) section on page 1-4 or the [“Required Tools and Equipment \(ANSI\)”](#) section on page 1-3.



Note

Unless otherwise specified, “ONS 15454” refers to both ANSI and ETSI shelf assemblies.

Before You Begin

This section lists the chapter procedures (NTPs). Turn to a procedure for applicable tasks (DLPs). Read the installation procedures and precautions before you install the ONS 15454 ANSI or ONS 15454 ETSI and connect the power source.

1. [NTP-G1 Unpack and Inspect the Shelf Assembly, page 1-6](#)—Complete this procedure before continuing with the [“NTP-G2 Install the Shelf Assembly”](#) procedure on page 1-8.
2. [NTP-G2 Install the Shelf Assembly, page 1-8](#)—Complete this procedure to install the shelf assembly in a rack.
3. [NTP-G3 Open and Remove the Front Door, page 1-20](#)—Complete this procedure to access the equipment before continuing with other procedures in this chapter.
4. [NTP-G4 Open and Remove the FMEC Cover \(ETSI Only\), page 1-23](#)—Complete this procedure to access the electrical facility connection assembly (EFCA) for the front mount electrical connections (FMECs) before continuing with other procedures in this chapter.
5. [NTP-G5 Remove the Backplane Covers \(ANSI Only\), page 1-26](#)—Complete this procedure to access the backplane before continuing with other procedures.
6. [NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs \(ETSI Only\), page 1-28](#)—Complete this procedure to install the MIC-A/P and MIC-T/C/P FMECs, which are required for power supply as well as alarm, timing, and LAN connections.
7. [NTP-G7 Install the Power and Ground, page 1-30](#)—Complete this procedure before continuing with the [“NTP-G8 Install the Fan-Tray Assembly”](#) procedure on page 1-40.
8. [NTP-G8 Install the Fan-Tray Assembly, page 1-40](#)—Complete this procedure to install the fan-tray assembly in the shelf.

9. [NTP-G9 Install the Alarm Expansion Panel \(ANSI Only\), page 1-44](#)—Complete this procedure if you are planning to install the Alarm Interface Controller–International (AIC-I) card and want to increase the number of alarm contacts provided by the AIC-I card.
10. [NTP-G10 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections, page 1-47](#)—Complete as needed to set up wire-wrap pin connections.
11. [NTP-G11 Install an External Wire-Wrap Panel on the AEP \(ANSI Only\), page 1-59](#)—Complete this procedure to connect an external wire-wrap panel to the alarm expansion panel (AEP).
12. [NTP-G12 Install and Close the FMEC Cover \(ETSI Only\), page 1-64](#)—Complete this procedure to install the FMEC cover.
13. [NTP-G13 Install the Rear Cover \(ANSI Only\), page 1-65](#)—Complete this procedure as needed to install the rear cover after you have finished servicing the backplane.
14. [NTP-G14 Install DWDM Equipment, page 1-67](#)—Complete this procedure as needed to install equipment needed for DWDM networks.
15. [NTP-G15 Install the Common Control Cards, page 1-72](#)—Complete this procedure to install the TCC2/TCC2P card and the AIC-I card.
16. [NTP-G16 Perform the Shelf Installation Acceptance Test, page 1-77](#)—Complete this procedure to determine if you have correctly completed all other procedures in the chapter.

**Warning**

Installation of the equipment must comply with local and national electrical codes. Statement 1074

**Warning**

This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both. Statement 1043

**Warning**

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017

**Warning**

Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

**Warning**

A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022

**Note**

The ONS 15454 is suitable for mounting on concrete or other noncombustible surfaces only.

**Note**

In this chapter, “shelf assembly” refers to the steel enclosure that holds cards and connects power, and “node” refers to the entire hardware and software system.

Required Tools and Equipment (ANSI)

You need the following tools and equipment to install and test the ONS 15454 ANSI shelf assembly.

Cisco-Supplied Materials (ANSI)

The following materials are required and are shipped with the ONS 15454 ANSI shelf (wrapped in plastic). The number in parentheses gives the quantity of the item included in the package.

- #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX) (8)
- #12 -24 x 3/4 socket set screws (48-1003-XX) (2)
- T-handle #12-24 hex tool for set screws (1)
- ESD wrist strap with 1.8 m (6 ft) coil cable (1)
- Tie wraps (10)
- Pinned hex (Allen) key for front door (1)
- Spacers (50-1193-XX) (4)
- Spacer mounting brackets (2)
- Sheet metal backplane cover (installed) (1)
- External (bottom) brackets for the fan-tray air filter
- Standoff kit (53-0795-XX):
 - Plastic fiber management guides (2)
 - Fan filter bracket screws (53-48-0003) (6)

User-Supplied Materials (ANSI)

The following materials and tools are required but are not supplied with the ONS 15454 ANSI:

- One or more of the following equipment racks:
 - 19-inch ANSI Standard (Telcordia GR-63-CORE) (482.6 mm) rack; total width 22 inches (558.8 mm)
 - 23-inch ANSI Standard (Telcordia GR-63-CORE) (584.2 mm) rack; total width 26 inches (660.4 mm)
- Fuse panel
- Power cable (from fuse and alarm panel to assembly), #10AWG, copper conductors, 194 degrees Fahrenheit (90 degrees Celsius)
- Ground cable #6AWG stranded
- Alarm cable pairs for all alarm connections, #22 or #24 AWG (0.51 mm² or 0.64 mm²), solid tinned
- 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type
- Single-mode SC fiber jumpers with UPC polish (55 dB or better) for optical (OC-N) cards
- Shielded coaxial cable terminated with SMB or BNC connectors for DS-3 cards

- Shielded ABAM cable terminated with AMP Champ connectors or unterminated for DS1N-14 cards with #22 or #24 AWG (0.51 mm² or 0.64 mm²) ground wire (typically about two ft [61 cm] in length)
- 6-pair #29 AWG double-shielded cable
- Tie wraps and/or lacing cord
- Labels
- Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for #10 AWG copper conductors

Tools Needed (ANSI)

The following tools are needed to install an ONS 15454 ANSI:

- #2 Phillips screwdriver
- Medium slot-head screwdriver
- Small slot-head screwdriver
- Wire wrapper
- Wire cutters
- Wire strippers
- Crimp tool
- BNC insertion tool

Test Equipment (ANSI)

The following test equipment is needed to install an ONS 15454:

- Voltmeter
- Optical power meter (for use with fiber optics only)
- BER tester, DS-1 and DS-3

Required Tools and Equipment (ETSI)

You need the following tools and equipment to install and test the ONS 15454 ETSI shelf assembly.

Cisco-Supplied Equipment (ETSI)

These materials are required for installation and are supplied with the ONS 15454 ETSI. The shipped quantity of each item is in parentheses.

- Double-hole grounding lug for ground connection with a wire receptacle to accommodate the recommended 13.3 mm² (#6 AWG) multistrand copper wire (1)
- M4 x 8 mm pan-head Phillips screws (2)
- M6 x 20 mm socket set screws (2)
- M6 x 20 mm pan-head Phillips screws (8)
- Tie wraps 0.125-inch (3.2 mm) W x 6.0-inch (152 mm) L (24)

- ESD wrist strap (disposable) (1)
- Pinned Allen key for front door (1)
- Hex key 3-mm long arm (1)
- Bottom brackets for the fan-tray air filter
- Cable assembly, Ethernet, RJ-45 (1)
- Power cable (from fuse and alarm panel to MIC-A/P and MIC-C/T/P) (2)

**Caution**

Only use the power cables that are designed to be used with ONS 15454 ETSI. They are sold separately.

User-Supplied Equipment (ETSI)

The following materials and tools are required for installation but are not supplied with the ONS 15454 ETSI:

- Equipment rack (ETSI rack, 2200 mm [86.6 inch] H x 600 mm [23.6 inch] W x 300 mm [11.8 inch] D)
- Fuse and alarm panel
- Copper ground cable 13.3-mm² (#6 AWG) stranded, specified for up to 90 degrees Celsius (194 degrees Fahrenheit)
- Alarm cable pairs for all alarm connections, 0.51 mm² or 0.64 mm² (#22 or #24 AWG), solid-tinned
- Single-mode SC fiber jumpers with UPC polish (55 dB or better) for optical cards
- Coaxial cable terminated with 1.0/2.3 miniature coax connectors for FMEC cards
- DB-37 cable
- Shielded building integrated timing supply (BITS) clock coaxial cable terminated with 1.0/2.3 miniature coax connectors
- Labels

**Note**

Ring runs are not provided by Cisco and can hinder side-by-side shelf installation where space is limited.

Tools Needed (ETSI)

To install the ONS 15454 ETSI, you need the following tools.

- #2 Phillips screwdriver
- Medium slot-head screwdriver
- Small slot-head screwdriver
- Video fiber connector inspection instrument
- CLETOP cleaning cassette
- Crimping tool—This tool must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug.
- Wire stripping tool

Test Equipment (ETSI)

To install the ONS 15454 ETSI, you need the following test equipment.

- Voltmeter
- Power meter (only for use with fiber optics)
- Bit error rate (BER) tester for E1-N-14, E1-42, E3-12, DS3i-N-12, STM1E-12, and FMEC cards

NTP-G1 Unpack and Inspect the Shelf Assembly

Purpose	This procedure explains how to unpack the ONS 15454 shelf assemblies and verify their contents.
Tools/Equipment	Pinned hex (Allen) key for front door
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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- Step 1** Complete the [“DLP-G1 Unpack and Verify the Shelf Assembly” task on page 1-6.](#)
- Step 2** Complete the [“DLP-G2 Inspect the Shelf Assembly” task on page 1-7.](#)
- Step 3** Continue with the [“NTP-G1 Unpack and Inspect the Shelf Assembly” procedure on page 1-6.](#)
- Stop.** You have completed this procedure.
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DLP-G1 Unpack and Verify the Shelf Assembly

Purpose	This task removes the shelf assembly from the package.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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- Step 1** When you receive the ONS 15454 system equipment at the installation site, open the top of the box. The Cisco Systems logo designates the top of the box.
- Step 2** Remove the foam inserts from the box. The box contains the ONS 15454 shelf (wrapped in plastic) and a smaller box of items needed for installation.
- Step 3** To remove the shelf, grasp both rings of the shelf removal strap and slowly lift the shelf out of the box.
- Step 4** Open the smaller box of installation materials, and verify that you have all items listed in the [“Required Tools and Equipment \(ETSI\)” section on page 1-4](#) or the [“Required Tools and Equipment \(ANSI\)” section on page 1-3.](#)



Note The fan-tray assembly is shipped separately.

Step 5 Return to your originating procedure (NTP).

DLP-G2 Inspect the Shelf Assembly

Purpose	This task verifies that all parts of the shelf assembly are in good condition.
Tools/Equipment	Pinned hex (Allen) key for front door
Prerequisite Procedures	DLP-G1 Unpack and Verify the Shelf Assembly, page 1-6
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** Open the shelf using the pinned hex key. For more information, see the [“DLP-G9 Open the Front Cabinet Compartment \(Door\)” task on page 1-20](#).
- Step 2** Verify the following:
- The pins are not bent or broken.
 - The frame is not bent.
- Step 3** If the pins are bent or broken, or the frame is bent, call your Cisco sales engineer for a replacement.
- Step 4** Close the front door before installing.
- Step 5** Return to your originating procedure (NTP).
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NTP-G2 Install the Shelf Assembly

Purpose	This procedure reverses the mounting bracket and mounts shelf assemblies in a rack.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Pinned hex tool ETSI only: Two M6 x 20 socket set screws Eight M6 x 20 pan-head Phillips mounting screws ANSI only: Two #12-24 x 3/4 set screws (48-1003-XX) Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX)
Prerequisite Procedures	NTP-G1 Unpack and Inspect the Shelf Assembly, page 1-6
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Warning

Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over. Statement 1048



Warning

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045



Warning

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 45°C (113°F). Statement 1047



Warning

Take care when connecting units to the supply circuit so that wiring is not overloaded. Statement 1018

**Warning**

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack. Statement 1006

**Warning**

To prevent airflow restriction, allow at least 1 inch (25.4 mm) of clearance around the ventilation openings.

**Warning**

The ONS 15454 must have 1 inch (25.4 mm) of airspace below the installed shelf assembly to allow air flow to the fan intake. The air ramp (the angled piece of sheet metal on top of the shelf assembly) provides this spacing and should not be modified in any way.

**Note**

The shelf, the air ramp, and the E1-75/120 conversion panel ship with the ETSI mounting brackets installed as needed for installation in an ETSI rack. If you want to install the node in a 19-inch (482.6-mm) rack, the ETSI mounting brackets of the shelf and the air ramp need to be replaced with the 19-inch (482.6-mm) mounting brackets that shipped in the ship kit.

- Step 1** (ANSI shelves only.) Complete the “[DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch \(482.6-mm\) Rack \(ANSI Only\)](#)” task on page 1-10 if you need to convert from a 23-inch (584.2 mm) to a 19-inch (482.6 mm) rack.
- Step 2** (ANSI shelves only.) To install the air filter on the bottom of the shelf rather than below the fan-tray assembly, complete the “[DLP-G4 Install the External Brackets and Air Filter \(ANSI Only\)](#)” task on page 1-11.
- Step 3** Complete the necessary rack mount task as applicable:
- [DLP-G5 Mount the Shelf Assembly in a Rack \(One Person\)](#), page 1-13
 - [DLP-G6 Mount the Shelf Assembly in a Rack \(Two People\)](#), page 1-15
 - [DLP-G7 Mount Multiple Shelf Assemblies in a Rack](#), page 1-16
 - [DLP-G8 Install the Air Ramp](#), page 1-19
- Step 4** Continue with the “[NTP-G3 Open and Remove the Front Door](#)” procedure on page 1-20.
- Stop. You have completed this procedure.**

DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only)

Purpose	This task installs the mounting bracket to convert a 23-inch (584.2 mm) rack to a 19-inch (482.6-mm) rack. This task applies to ONS 15454 ANSI shelves only.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

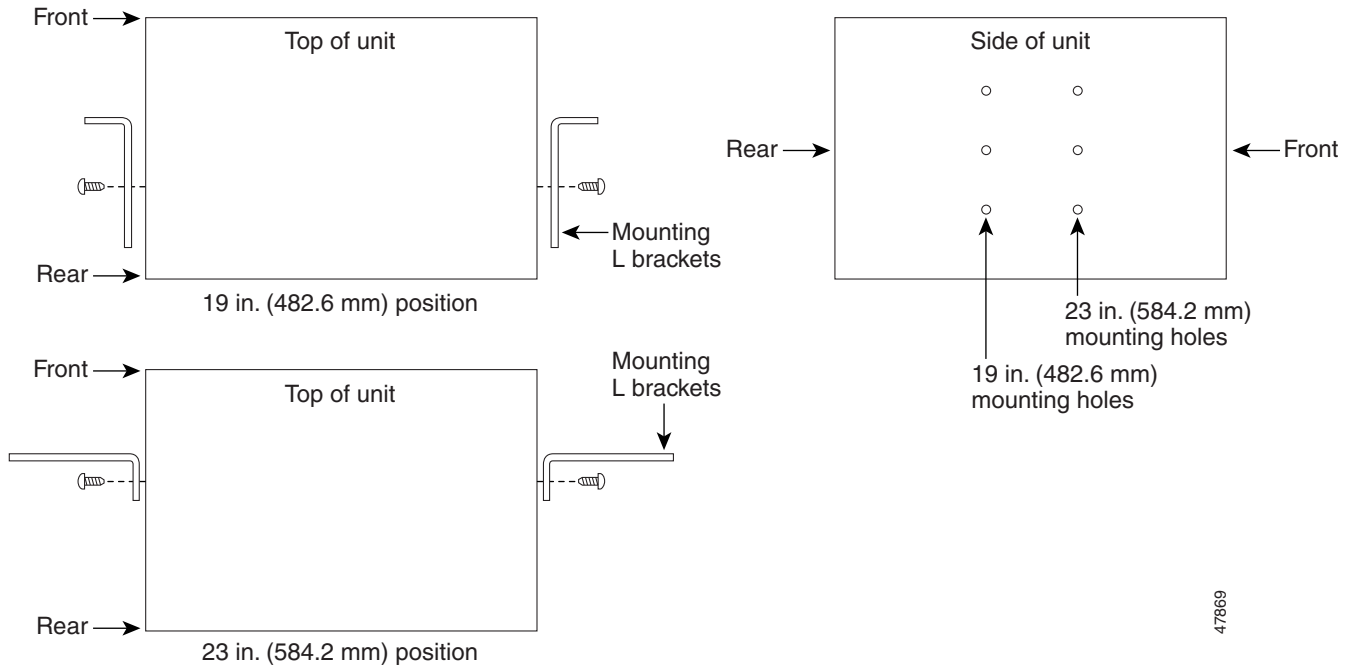

Caution

Use only the fastening hardware provided with the ONS 15454 ANSI to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.


Caution

When mounting the ONS 15454 in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 ANSI ship kit, or remove the coating from the threads to ensure electrical continuity.

-
- Step 1** Remove the screws that attach the mounting bracket to the side of the shelf assembly.
- Step 2** Flip the detached mounting bracket upside down.
Text imprinted on the mounting bracket will now also be upside down.
- Step 3** Place the widest side of the mounting bracket flush against the shelf assembly (see [Figure 1-1](#)).
The narrow side of the mounting bracket should be towards the front of the shelf assembly. Text imprinted on the mounting bracket should be visible and upside down.
- Step 4** Align the mounting bracket screw holes against the shelf assembly screw holes.
- Step 5** Insert the screws that were removed in [Step 1](#) and tighten them.
- Step 6** Repeat the task for the mounting bracket on the opposite side.

Figure 1-1 Reversing the Mounting Brackets (23-inch [584.2-mm] Position to 19-inch [482.6-mm] Position)

Step 7 Return to your originating procedure (NTP).

DLP-G4 Install the External Brackets and Air Filter (ANSI Only)

Purpose	This task installs the external brackets and air filter on the bottom of the shelf rather than below the fan-tray assembly. Installing the external brackets and air filter on the bottom of the shelf enables access to the air filter without removing the fan-tray assembly. This task applies to the ONS 15454 ANSI shelf only.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only) , page 1-10, if applicable
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Note

If you choose not to install the brackets, install the air filter by sliding it into the compartment at the bottom of the shelf assembly. Each time you remove and reinstall the air filter in the future, you must first remove the fan-tray assembly. Do not install an air filter in both filter locations on any shelf assembly.

Step 1 With the fan-tray assembly removed, place the ONS 15454 facedown on a flat surface.



Note Although the filter will work if it is installed with either side facing up, Cisco recommends that you install it with the metal bracing facing up to preserve the surface of the filter.

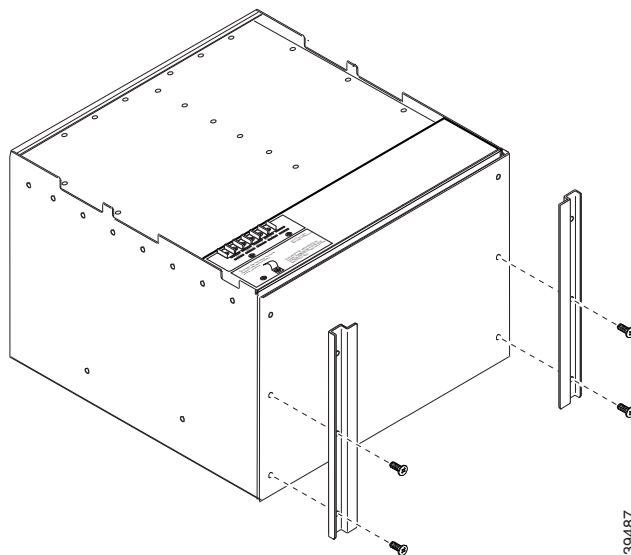
Step 2 Locate the three screw holes that run along the left and right sides of the bottom of the shelf assembly.

Step 3 Secure each bracket to the bottom of the shelf assembly using the screws (48-0003) provided in the backplane standoff kit (53-0795-XX).

Each bracket has a filter stopper and a flange on one end. Make sure to attach the brackets with the stoppers and flanges facing the rear of the shelf assembly (the top, if the ONS 15454 is facedown during installation).

Figure 1-2 illustrates bottom bracket installation. If you do not use the brackets, in the future you must remove the fan-tray assembly before removing the air filter. The brackets enable you to clean and replace the air filter without removing the fan-tray assembly.

Figure 1-2 Installing the External Brackets



Step 4 Slide the air filter into the shelf assembly.

Step 5 Return to your originating procedure (NTP).

DLP-G5 Mount the Shelf Assembly in a Rack (One Person)

Purpose	This task allows one person to mount the shelf assembly in a rack.
Tools/Equipment	Pinned hex tool # 2 Phillips screwdriver ETSI only: Two M6 x 20 socket set screws Eight M6 x 20 pan-head Phillips mounting screws ANSI only: Two #12-24 x 3/4 set screws (48-1003-XX) Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX)
Prerequisite Procedures	NTP-G1 Unpack and Inspect the Shelf Assembly, page 1-6
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

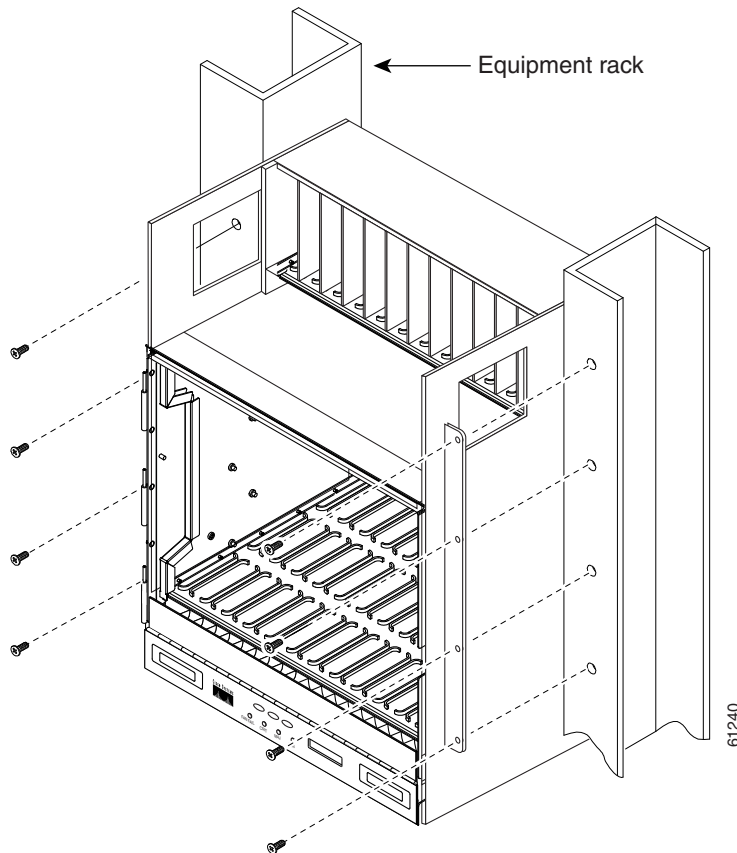

Note

The ONS 15454 ETSI requires 616.5 mm (24.24 inch) minimum of vertical rack space and 25 mm (1 inch) below the installed shelf assembly to allow air flow to the fan intake. If a second ONS 15454 ETSI is installed above a shelf assembly, the air ramp between the shelves provides space for air flow. To ensure that the mounting is secure, use two to four M6 mounting screws for each side of the shelf assembly. A shelf assembly should be mounted at the bottom of the rack if it is the only unit in the rack.

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- Step 1** Verify that the proper fuse and alarm panel has been installed in the top mounting space. If a fuse and alarm panel is not present, you must install one according to manufacturer instructions:
- (ETSI only) Verify that a 100-A fuse panel (30-A fuse per shelf minimum) is installed.
 - (ANSI only) If you are installing the 15454-SA-ANSI or 15454-SA-HD shelf assembly, a 100-A fuse panel (30-A fuse per shelf minimum) is required.
 - (ANSI only) If you are installing the 15454-SA-NEBS3 shelf assembly, a standard 80-A fuse panel (20-A fuse per shelf minimum) is required.
- Step 2** Ensure that the shelf assembly is set for the desired rack size (either 23 inches [584.2 mm] or 19 inches [482.6 mm]).

Figure 1-3 shows the rack-mounting position for the ONS 15454 ETSI.

Figure 1-3 Mounting an ONS 15454 ETSI in a Rack



- Step 3** Using the hex tool that shipped with the assembly, install the two temporary set screws into the holes that will not be used to mount the shelf. Let the set screws protrude sufficiently to hold the mounting brackets.
- Step 4** Lift the shelf assembly to the desired position in the rack and set it on the screws.
- Step 5** Align the screw holes on the mounting brackets with the mounting holes in the rack.
- Step 6** Using the Phillips screwdriver, install one mounting screw in each side of the assembly.
- Step 7** When the shelf assembly is secured to the rack, install the remaining mounting screws.



Note Use at least one set of the horizontal screw slots on the shelf assembly to prevent slippage.

- Step 8** Using the hex tool, remove the temporary set screws.
- Step 9** Return to your originating procedure (NTP).

DLP-G6 Mount the Shelf Assembly in a Rack (Two People)

Purpose	This task allows two people to mount the shelf assembly in a rack.
Tools/Equipment	Pinned hex tool # 2 Phillips screwdriver ETSI only: Two M6 x 20 socket set screws Eight M6 x 20 pan-head Phillips mounting screws ANSI only: Two #12-24 x 3/4 set screws (48-1003-XX) Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX)
Prerequisite Procedures	NTP-G1 Unpack and Inspect the Shelf Assembly, page 1-6
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Note

The ONS 15454 ETSI requires 616.5 mm (24.24 inch) minimum of vertical rack space and 25 mm (1 inch) below the installed shelf assembly to allow air flow to the fan intake. If a second ONS 15454 ETSI is installed above a shelf assembly, the air ramp between the shelves provides space for air flow. To ensure that the mounting is secure, use two to four M6 mounting screws for each side of the shelf assembly. A shelf assembly should be mounted at the bottom of the rack if it is the only unit in the rack.



Note

The ONS 15454 ANSI must have one inch (25.4 mm) of airspace below the installed shelf assembly to allow air flow to the fan intake. If a second ONS 15454 is installed underneath a shelf assembly, the air ramp on top of the bottom shelf assembly provides the desired space. However, if the ONS 15454 is installed above third-party equipment, you must provide a minimum spacing of one inch (25.4 mm) between the third-party shelf assembly and the bottom of the ONS 15454. The third-party equipment must not vent heat upward into the ONS 15454.

- Step 1** Verify that the proper fuse and alarm panel has been installed in the top mounting space. If a fuse and alarm panel is not present, you must install one according to manufacturer's instructions:
- (ETSI only.) Verify that a 100-A fuse panel (30-A fuse per shelf minimum) is installed.
 - (ANSI only.) If you are installing the 15454-SA-ANSI or 15454-SA-HD shelf assembly, a 100-A fuse panel (30-A fuse per shelf minimum) is required.
 - (ANSI only.) If you are installing the 15454-SA-NEBS3 shelf assembly, a standard 80-A fuse panel (20-A fuse per shelf minimum) is required.
- Step 2** Ensure that the shelf assembly is set for the desired rack size (either 23 inches [584.2 mm] or 19 inches [482.6 mm]).
- Step 3** Using the hex tool that shipped with the assembly, install the two set screws into the holes that will not be used to mount the shelf. Let the set screws protrude sufficiently to hold the mounting brackets.

- Step 4** Lift the shelf assembly to the desired position in the rack.
- Step 5** Align the screw holes on the mounting brackets with the mounting holes in the rack.
- Step 6** Have one person hold the shelf assembly in place while the other person uses the Phillips screwdriver to install one mounting screw in each side of the assembly.
- Step 7** When the shelf assembly is secured to the rack, install the remaining mounting screws.



Note Use at least one set of the horizontal screw slots on the shelf assembly to prevent slippage.

- Step 8** Use the hex tool to remove the temporary set screws.
- Step 9** Return to your originating procedure (NTP).

DLP-G7 Mount Multiple Shelf Assemblies in a Rack

Purpose	This task installs multiple shelves in a rack.
Tools/Equipment	Pinned hex tool #2 Phillips screwdriver ETSI only: Two M6 x 20 socket set screws (per shelf) Eight M6 x 20 pan-head Phillips mounting screws (per shelf) ANSI only: Two #12-24 x 3/4 set screws (48-1003-XX) (per shelf) Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX) (per shelf)
Prerequisite Procedures	NTP-G1 Unpack and Inspect the Shelf Assembly, page 1-6
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Note A standard ETSI rack can hold three ONS 15454 ETSI shelf assemblies and two air ramps. When mounting a shelf assembly in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack. If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.



Note The ONS 15454 ETSI requires 616.5 mm (24.24 inch) minimum of vertical rack space and 25 mm (1 inch) below the installed shelf assembly to allow air flow to the fan intake. If a second ONS 15454 ETSI is installed above a shelf assembly, the air ramp between the shelves provides space for air flow. When using third-party equipment above the ONS 15454 ETSI, provide a minimum of 25 mm (1 inch) between the third-party unit and the bottom of the ONS 15454 ETSI. The third-party equipment must not vent heat upward into the ONS 15454 ETSI.

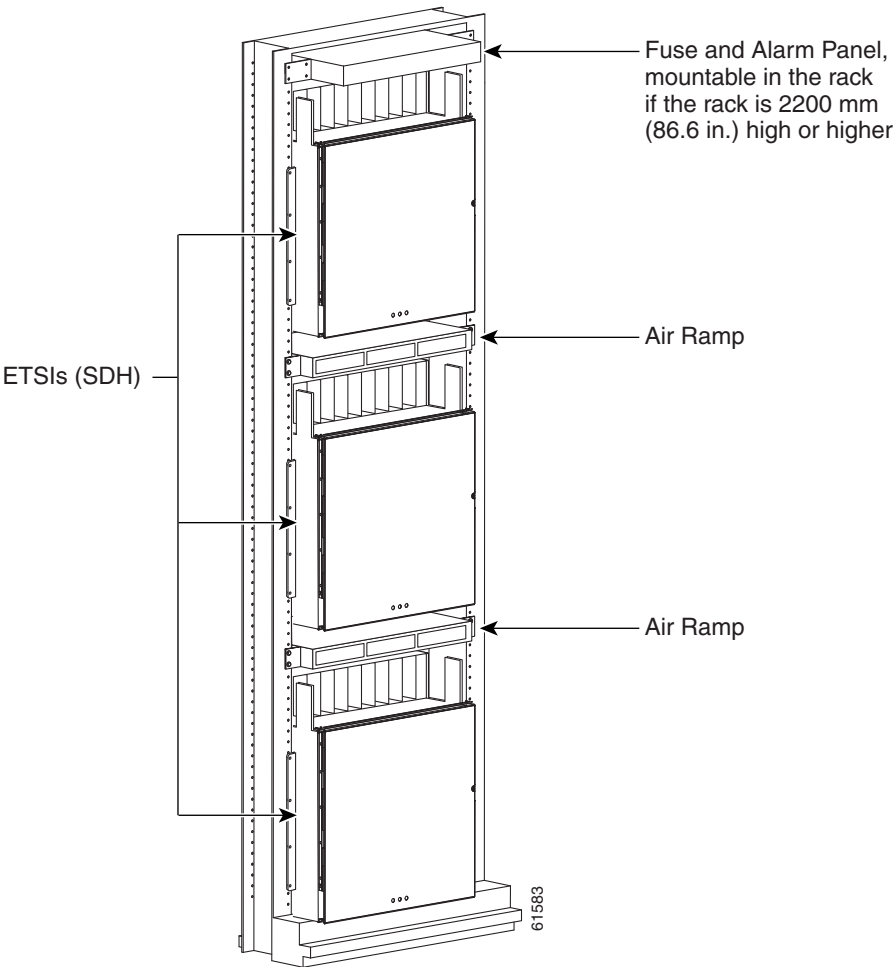
**Note**

The ONS 15454 ANSI must have one inch (25.4 mm) of airspace below the installed shelf assembly to allow air flow to the fan intake. If a second ONS 15454 is installed underneath a shelf assembly, the air ramp on top of the bottom shelf assembly provides the desired space. However, if the ONS 15454 is installed above third-party equipment, you must provide a minimum spacing of one inch (25.4 mm) between the third-party shelf assembly and the bottom of the ONS 15454. The third-party equipment must not vent heat upward into the ONS 15454.

- Step 1** Verify that the proper fuse and alarm panel has been installed in the top mounting space. If a fuse and alarm panel is not present, you must install one according to manufacturer's instructions:
- (ETSI only.) Verify that a 100-A fuse panel (30-A fuse per shelf minimum) is installed.
 - (ANSI only.) If you are installing the 15454-SA-ANSI or 15454-SA-HD shelf assembly, a 100-A fuse panel (30-A fuse per shelf minimum) is required.
 - (ANSI only.) If you are installing the 15454-SA-NEBS3 shelf assembly, a standard 80-A fuse panel (20-A fuse per shelf minimum) is required.
- Step 2** Mount the first shelf assembly in the bottom of the rack using the [“DLP-G5 Mount the Shelf Assembly in a Rack \(One Person\)” task on page 1-13](#) or the [“DLP-G6 Mount the Shelf Assembly in a Rack \(Two People\)” task on page 1-15](#).

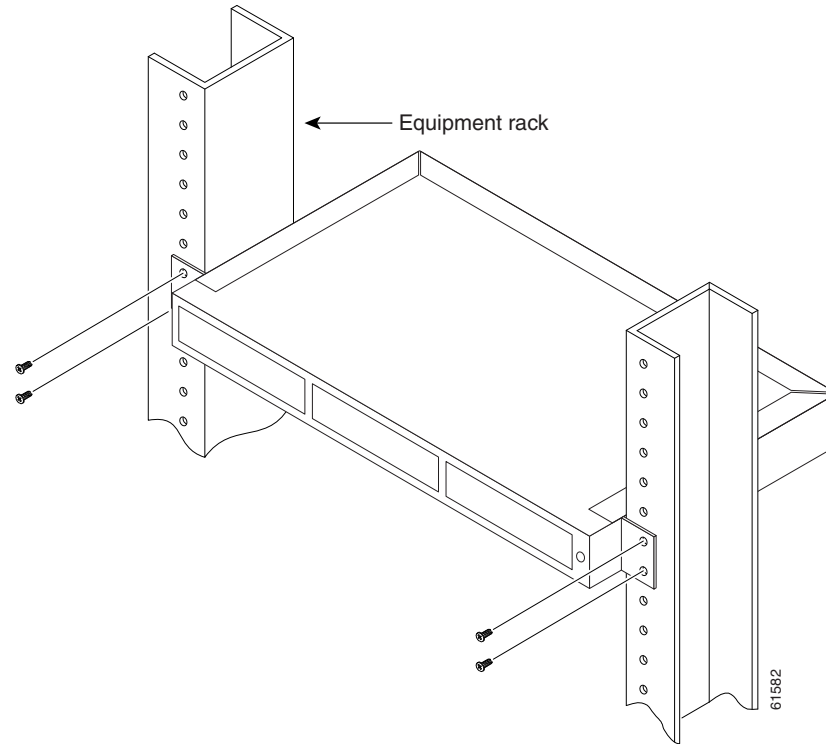
Figure 1-4 shows a three-shelf ONS 15454 ETSI bay assembly.

Figure 1-4 *Three-Shelf ONS 15454 ETSI (15454 SDH) Bay Assembly*



Step 3 (ETSI only.) Mount the air ramp above the ONS 15454 ETSI.

The air ramp is needed if you install more than one ONS 15454 ETSI shelf in a rack. To ensure that the air ramp is secure, use one or two M6 mounting screws for each side of the shelf assembly. Figure 1-5 shows how to mount an air ramp in the rack.

Figure 1-5 **Mounting the Air Ramp in a Rack**

Step 4 Repeat this task for every shelf assembly you need to install.

Step 5 Return to your originating procedure (NTP).

DLP-G8 Install the Air Ramp

Purpose	Use this task to install the air ramp.
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** The air ramp requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan. See the [“15.5 Typical DWDM Rack Layouts”](#) section on [page 15-17](#) for more information about air ramp placement.
- Step 2** Verify that the mounting brackets attached to the unit are correct for your rack size. Complete the [“DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch \(482.6-mm\) Rack \(ANSI Only\)”](#) task on [page 1-10](#) as required.

- Step 3** Align the chassis with the rack mounting screw holes; insert and tighten the four screws.
- Step 4** Return to your originating procedure (NTP).

NTP-G3 Open and Remove the Front Door

Purpose	This procedure opens and removes the front door to access the equipment.
Tools/Equipment	Open-end wrench Pinned hex (Allen) key
Prerequisite Procedures	NTP-G2 Install the Shelf Assembly, page 1-8
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** Complete the “[DLP-G9 Open the Front Cabinet Compartment \(Door\)](#)” task on page 1-20.
- Step 2** Complete the “[DLP-G10 Remove the Front Door](#)” task on page 1-21.
- Step 3** If you are using an ETSI shelf, continue with the “[NTP-G4 Open and Remove the FMEC Cover \(ETSI Only\)](#)” procedure on page 1-23. If you are using an ANSI shelf, continue with the “[NTP-G5 Remove the Backplane Covers \(ANSI Only\)](#)” procedure on page 1-26.

Stop. You have completed this procedure.

DLP-G9 Open the Front Cabinet Compartment (Door)

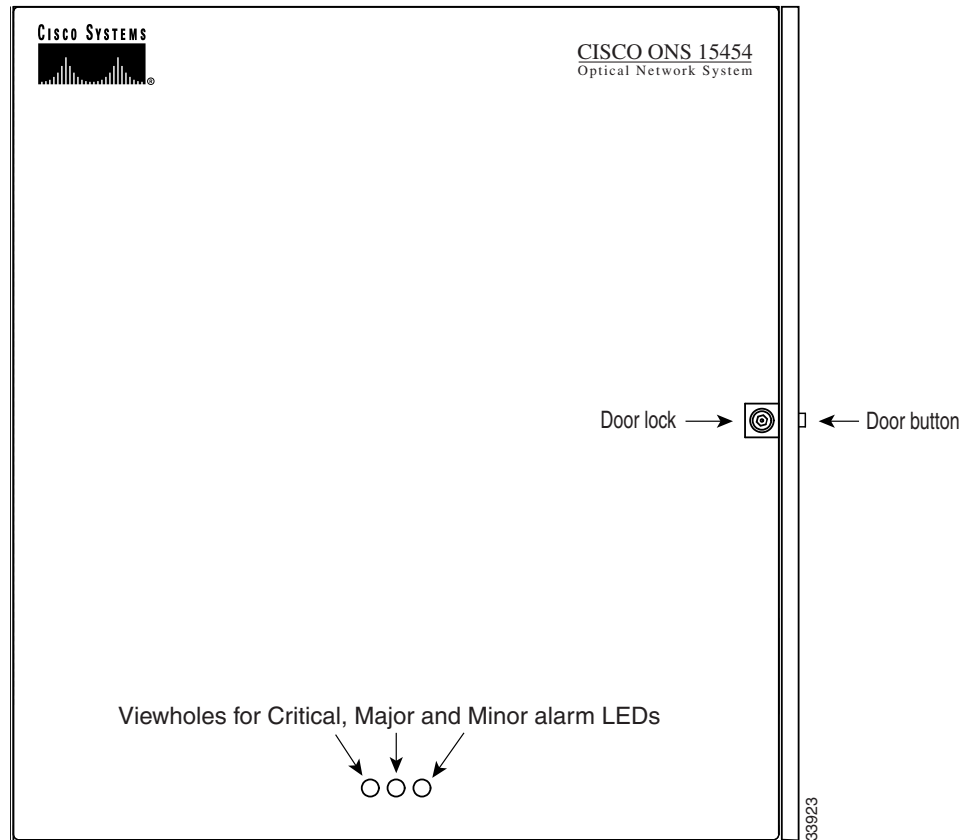
Purpose	This task opens the front door.
Tools/Equipment	Pinned hex (Allen) key
Prerequisite Procedures	NTP-G2 Install the Shelf Assembly, page 1-8
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Note

The ONS 15454 shelf assembly has an ESD plug input and is shipped with an ESD wrist strap. The ESD plug input is located on the outside of the shelf assembly on the right side. It is labeled “ESD” on the top and bottom. Always wear an ESD wrist strap and connect the strap to the ESD plug when working on the ONS 15454.

- Step 1** Open the front door lock.
- The ONS 15454 shelf assembly comes with a pinned hex key for locking and unlocking the front door. Turn the key counterclockwise to unlock the door and clockwise to lock it. [Figure 1-6](#) illustrates the front door of the ANSI shelf.

Figure 1-6 Cisco ONS 15454 ANSI Front Door

- Step 2** Press the door button to release the latch. A button on the right side of the shelf assembly releases the door.
- Step 3** Swing the door open.
- Step 4** Return to your originating procedure (NTP).

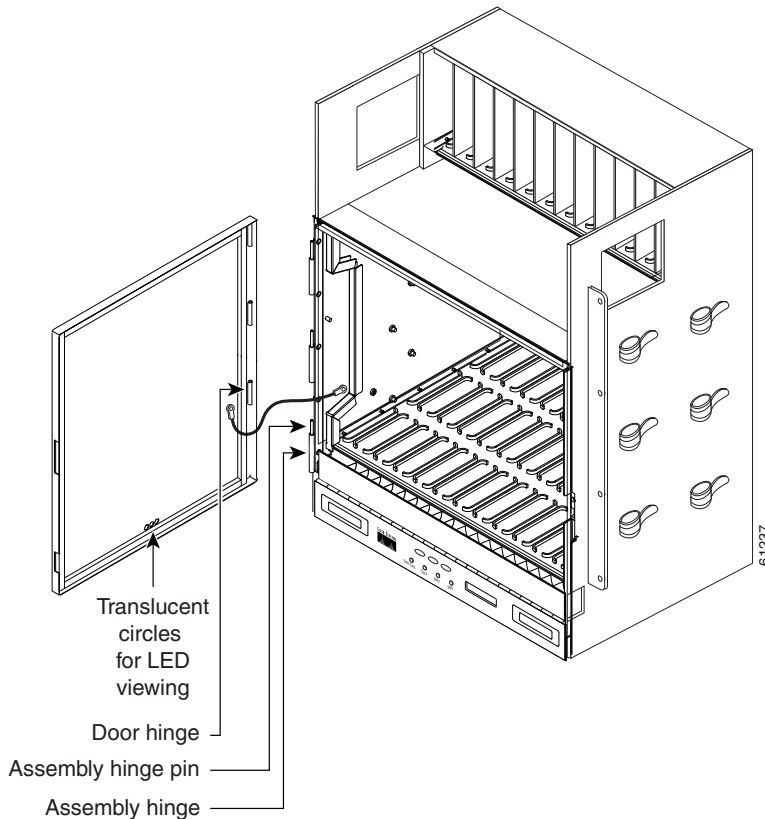
DLP-G10 Remove the Front Door

Purpose	This task removes the front cabinet compartment door.
Tools/Equipment	Open-end wrench
Prerequisite Procedures	DLP-G9 Open the Front Cabinet Compartment (Door), page 1-20
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** For ONS 15454 ETSI shelves:
- Unscrew the nut holding the ground wire to the shelf. Remove the nut and washer.

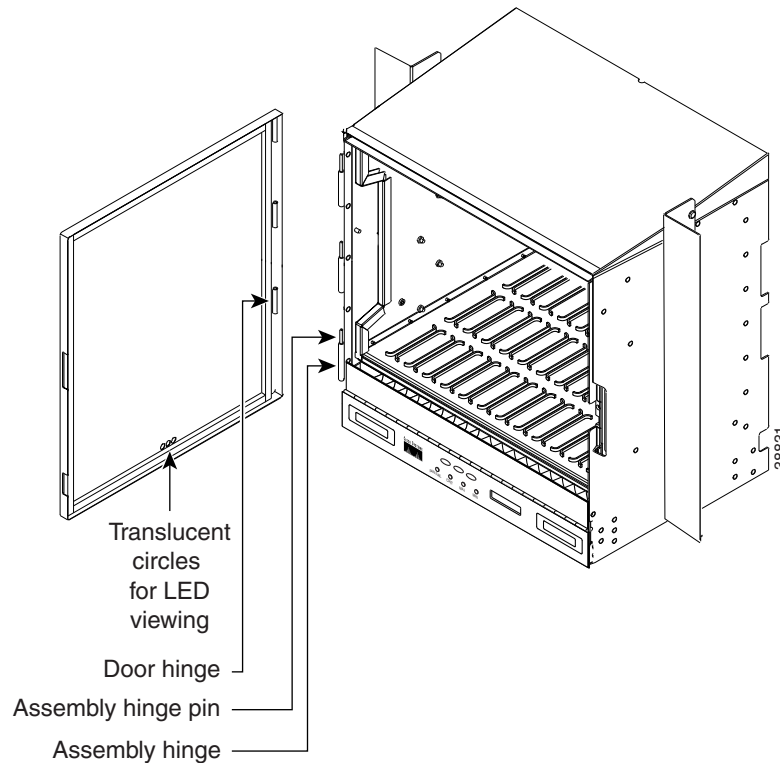
- b. Remove the ground wire from the shelf.
- c. Hold the door at the top left corner and remove the door from its hinges ([Figure 1-7](#)).

Figure 1-7 Removing the ONS 15454 ETSI Front Door



Step 2 For ONS 15454 ANSI shelves:

- a. To remove the door ground strap, perform the following:
 - To detach the ground strap from the front door, loosen the #6 Kepnut (49-0600-01) using the open-end wrench. Detach the end of the ground strap terminal lug (72-3622-01) from the male stud on the inside of the door.
 - To detach the other end of the ground strap from the longer screw on the fiber guide, loosen the #4 Kepnut (49-0337-01) on the terminal lug using the open-end wrench. Remove the terminal lug and lock washer.
- b. Lift the door from its hinges at the top left corner of the door ([Figure 1-8](#)).

Figure 1-8 Removing the ONS 15454 ANSI Front Door

Step 3 Return to your originating procedure (NTP).

NTP-G4 Open and Remove the FMEC Cover (ETSI Only)

Purpose	This procedure opens and removes the FMEC cover on the ONS 15454 ETSI. The ONS 15454 ETSI has a screw-in panel over the EFCA. The FMEC cover protects the FMEC cards.
Tools/Equipment	Medium slot-head screwdriver
Prerequisite Procedures	NTP-G2 Install the Shelf Assembly, page 1-8
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the [“DLP-G11 Open the FMEC Cover”](#) task on page 1-24.

Step 2 Complete the [“DLP-G12 Remove the FMEC Cover”](#) task on page 1-25.

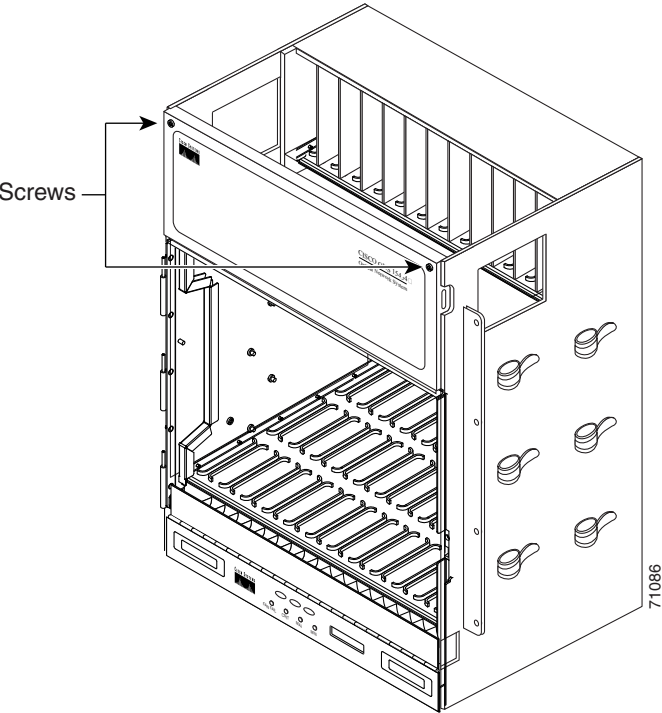
- Step 3** Continue with the “NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only)” procedure on [page 1-28](#).
Stop. You have completed this procedure.

DLP-G11 Open the FMEC Cover

Purpose	This task opens the FMEC cover. The FMEC cover must be opened to install the MIC-A/P and the MIC-C/T/P.
Tools/Equipment	Medium slot-head screwdriver
Prerequisite Procedures	DLP-G9 Open the Front Cabinet Compartment (Door) , page 1-20
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** Unscrew the screws on the FMEC cover ([Figure 1-9](#)).

Figure 1-9 *Unscrewing the FMEC Cover*



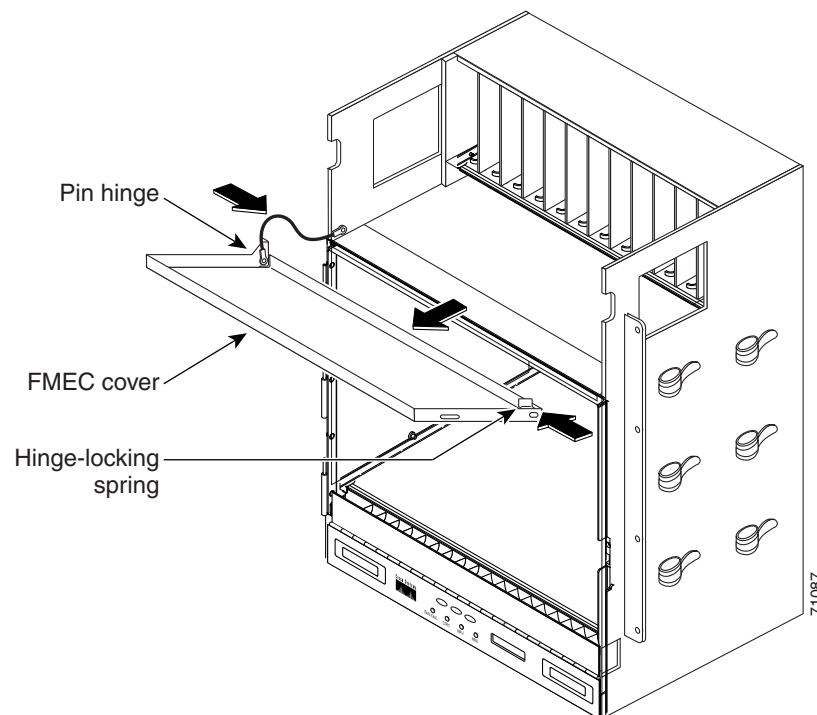
- Step 2** Use the handles to pull the cover forward.
Step 3 Return to your originating procedure (NTP).

DLP-G12 Remove the FMEC Cover

Purpose	This task removes the FMEC cover in order to install the MIC-A/P and the MIC-C/T/P.
Tools/Equipment	Medium slot-head screwdriver
Prerequisite Procedures	DLP-G11 Open the FMEC Cover, page 1-24
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Unscrew the nut holding the ground wire to the shelf. Remove the nut and washer.
- Step 2** Remove the ground wire from the left side of the shelf.
- Step 3** Pull the right side of the hinge-locking spring ([Figure 1-10](#)).

Figure 1-10 Removing the ONS 15454 FMEC Cover



- Step 4** Detach the cover from the pin of the hinge.
- Step 5** Remove the cover carefully from the left pin of the hinge.
- Step 6** Return to your originating procedure (NTP).
-

NTP-G5 Remove the Backplane Covers (ANSI Only)

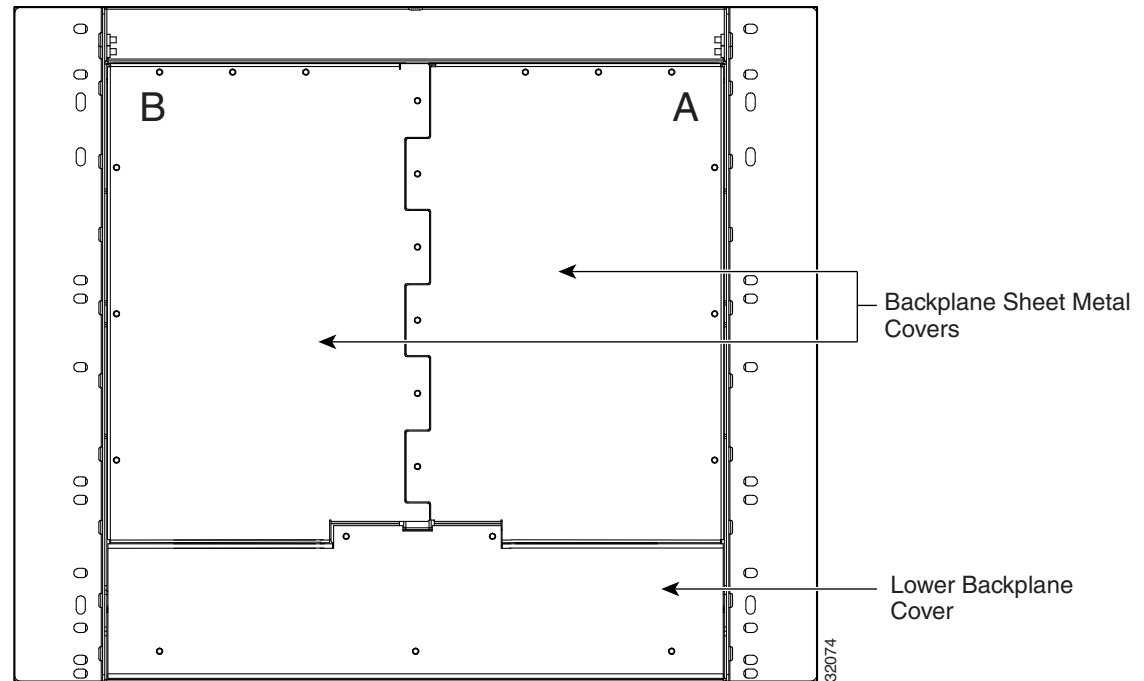
Purpose	This procedure describes how to access the ONS 15454 ANSI backplane by removing the covers. The backplane has two sheet metal covers (one on either side) and a lower backplane cover at the bottom.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G2 Install the Shelf Assembly, page 1-8 NTP-G3 Open and Remove the Front Door, page 1-20
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Complete the “[DLP-G13 Remove the Lower Backplane Cover](#)” task on page 1-26.
- Step 2** Complete the “[DLP-G14 Remove the Backplane Sheet Metal Cover](#)” task on page 1-27.
- Step 3** Continue with the “[NTP-G7 Install the Power and Ground](#)” procedure on page 1-30.
- Stop. You have completed this procedure.**
-

DLP-G13 Remove the Lower Backplane Cover

Purpose	This task removes the lower backplane cover of the ONS 15454 ANSI shelf assembly.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Unscrew the five retaining screws that hold the cover in place ([Figure 1-11](#)).

Figure 1-11 Backplane Covers on the 15454 ANSI Shelf

- Step 2** Grasp the cover on each side.
- Step 3** Gently pull the cover away from the backplane.
- Step 4** Return to your originating procedure (NTP).

DLP-G14 Remove the Backplane Sheet Metal Cover

Purpose	This task removes the backplane sheet metal cover that is installed on the rear of the 15454 ANSI shelf.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	DLP-G13 Remove the Lower Backplane Cover, page 1-26
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** To remove the backplane sheet metal cover, loosen the five screws that secure it to the ONS 15454 ANSI shelf and pull it away from the shelf assembly ([Figure 1-11 on page 1-27](#)).
- Step 2** Loosen the nine perimeter screws that hold the backplane sheet metal cover(s) in place.
- Step 3** Lift the panel by the bottom to remove it from the shelf assembly.

- Step 4** Store the panel for later use. Attach the backplane cover(s) whenever electrical interface assemblies (EIAs) are not installed.
- Step 5** Return to your originating procedure (NTP).

NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only)

Purpose	This procedure installs the MIC-A/P and the MIC-T/C/P, which are a type of FMEC installed in the EFCA. The EFCA is located at the top of the ONS 15454 ETSI shelf. It provides connection for installing power, external alarms, timing input and output, and craft interface terminals. This procedure applies to the ETSI shelf only.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver FMEC cards (the MIC-A/P and MIC-T/C/P)
Prerequisite Procedures	NTP-G4 Open and Remove the FMEC Cover (ETSI Only) , page 1-23
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Caution

Always use the supplied ESD wristband when working with a powered ONS 15454 ETSI. Plug the wristband cable into the ESD jack located on the lower-right outside edge of the shelf assembly.



Warning

Voltage is present on the backplane when the system is operating. To reduce risk of an electric shock, keep hands and fingers out of the power supply bays and backplane areas. Statement 166



Note

The ONS 15454 ETSI EFCA has 12 FMEC slots numbered sequentially from left to right beginning with Slot 18. Slots 18 to 22 and 25 to 29 provide electrical connections for the corresponding slots, so they are unnecessary in dense wave division multiplexing (DWDM) applications.

- Step 1** Ensure you are installing the FMECs in the correct slot:

- FMEC Slot 23 supports the MIC-A/P.

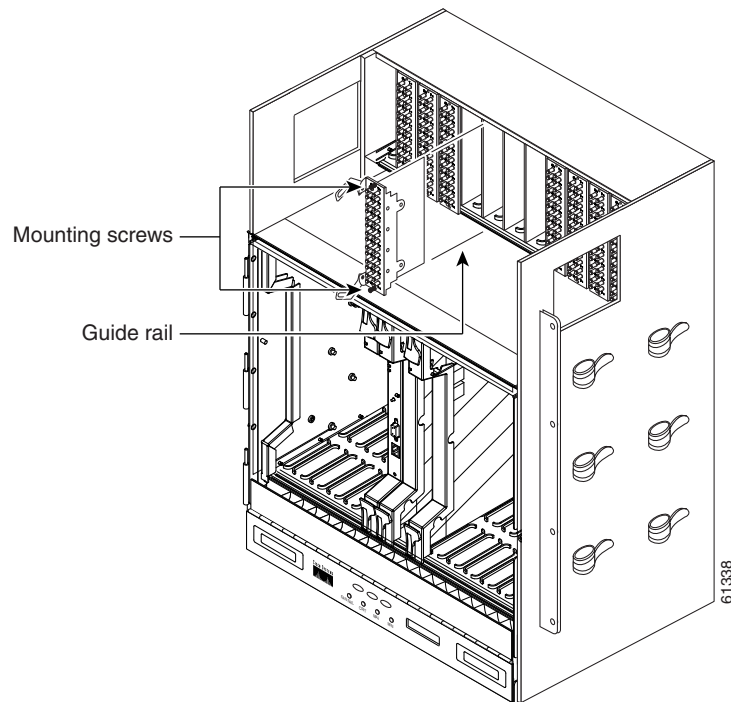
The MIC-A/P card provides connection for the BATTERY B input, one of the two possible redundant power supply inputs. It also provides connection for eight alarm outputs (coming from the TCC2/TCC2P card), sixteen alarm inputs, and four configurable alarm inputs/outputs.

- FMEC Slot 24 supports the MIC-C/T/P.

The MIC-C/T/P card 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, and system timing inputs and outputs.

- Step 2** Hold the FMEC by the faceplate.
- Step 3** Slide the FMEC along the guide rails into the desired FMEC slot or slots.
- Step 4** Push the FMEC gently into the connector. The ONS 15454 ETSI FMECs plug into electrical connectors on the back panel of the shelf assembly when the screws are tightened. [Figure 1-12](#) shows FMEC installation.

Figure 1-12 Installing FMECs on the ONS 15454 ETSI



- Step 5** Tighten the screws.
- Step 6** Continue with the [“NTP-G7 Install the Power and Ground”](#) procedure on page 1-30.
- Stop. You have completed this procedure.**

NTP-G7 Install the Power and Ground

Purpose	This procedure installs power feeds and grounds the ONS 15454.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Screws (ETSI only.) Power cable (from fuse panel to MIC-A/P and to MIC-C/T/P), shipped with the ONS 15454 ETSI (ANSI only.) Power cable (from fuse and alarm panel to assembly), #10 AWG, copper conductors, 194 degrees F [90 degrees C]) Ground cable 13.3-mm² (#6 AWG) stranded (ETSI only.) Two-hole grounding lug, shipped with the ONS 15454 ETSI Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for 5.26-mm² (#10 AWG) copper conductors (ANSI only.) Wire wrapper Wire cutters Wire strippers Crimp tool Fuse panel
Prerequisite Procedures	(ETSI) NTP-G4 Open and Remove the FMEC Cover (ETSI Only), page 1-23 (ETSI) NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), page 1-28 (ANSI) NTP-G5 Remove the Backplane Covers (ANSI Only), page 1-26
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Warning

Before performing any of the following procedures, ensure that power is removed from the DC circuit. Statement 1003



Warning

This equipment is intended to be grounded. Ensure that the host is connected to earth ground during normal use. Statement 39



Warning

Use copper conductors only. Statement 1025



Warning

Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards. Statement 1033

**Warning**

This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. Statement 1045

**Warning**

A readily accessible two-poled disconnect device must be incorporated in the fixed wiring. Statement 1022

**Warning**

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028

**Caution**

Always use the supplied ESD wristband when working with a powered ONS 15454. Plug the wristband cable into the ESD jack located on the lower-right outside edge of the shelf assembly.

- Step 1** Verify that the correct fuse and alarm panel is installed in the top mounting space:
- (ETSI only.) Verify that a 100-A fuse panel (30-A fuse per shelf minimum) is installed. If not, install one according to manufacturer's instructions.
 - (ANSI only.) If you have the 15454-SA-ANSI or 15454-SA-HD shelf, a 100-A fuse panel (30-A fuse per shelf minimum) should be installed. If not, install one according to manufacturer's instructions.
 - (ANSI only.) If you have the 15454-SA-NEBS3 shelf, a standard 80-A fuse panel (20-A fuse per shelf minimum) should be installed. If not, install one according to manufacturer's instructions.
- Step 2** Depending on your type of shelf, complete the [“DLP-G15 Connect the Office Ground to the ONS 15454 ETSI” task on page 1-32](#) or the [“DLP-G16 Connect the Office Ground to the ONS 15454 ANSI” task on page 1-34](#).
- Step 3** Depending on your shelf, complete the [“DLP-G17 Connect Office Power to the ONS 15454 ETSI” task on page 1-35](#) or the [“DLP-G18 Connect Office Power to the ONS 15454 ANSI” task on page 1-37](#).
- Step 4** Complete the [“DLP-G19 Turn On and Verify Office Power” task on page 1-39](#).
- Step 5** Continue with the [“NTP-G8 Install the Fan-Tray Assembly” procedure on page 1-40](#).
- Stop. You have completed this procedure.**

DLP-G15 Connect the Office Ground to the ONS 15454 ETSI

Purpose	This task connects ground to the ONS 15454 ETSI shelf.
Tools/Equipment	2-hole grounding lug, included in the installation kit 2 Phillips head, M6 (metric) machine screws with locking washers, included in the installation kit Grounding wire—Use 13.3-mm² (#6 AWG) copper wire. #2 Phillips screwdriver Crimping tool—This tool must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug. Wire stripping tool
Prerequisite Procedures	DLP-G9 Open the Front Cabinet Compartment (Door) , page 1-20
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

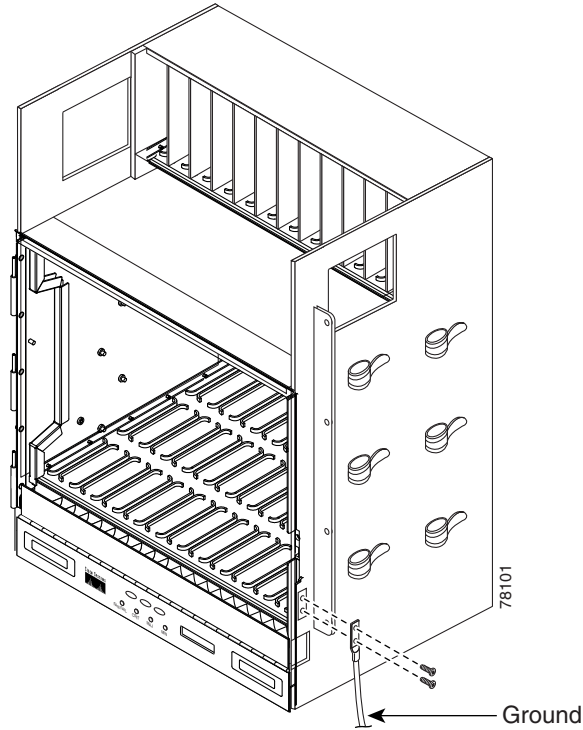


Warning

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. Statement 1024

-
- Step 1** Use a wire-stripping tool to remove approximately 0.75 inch (19 mm) of the covering from the end of the grounding wire.
 - Step 2** Insert the stripped end of the grounding wire into the open-end of the grounding lug.
 - Step 3** Use the crimping tool to secure the grounding wire in two different places in the grounding lug.
 - Step 4** Locate the grounding receptacle on the side panel of the shelf ([Figure 1-13](#)).
 - Step 5** Place the grounding lug against the grounding receptacle on the side panel of the shelf.
 - Step 6** Insert one of the screws through the locking washer and through the hole in the grounding lug. Insert the screw into the threaded holes on the right side of the shelf. Ensure that the grounding lug does not interfere with other system hardware or rack equipment.
 - Step 7** Repeat [Step 6](#) with the second screw.
 - Step 8** Prepare the other end of the grounding wire and connect it to an appropriate grounding point in your site to ensure adequate earth ground for the shelf.

Figure 1-13 *Grounding the ONS 15454 ETSI*



Step 9 Return to your originating procedure (NTP).

DLP-G16 Connect the Office Ground to the ONS 15454 ANSI

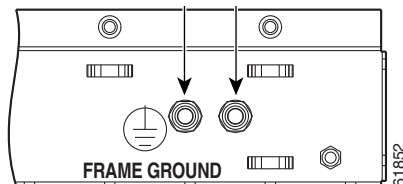
Purpose	This task connects ground to the ONS 15454 ANSI shelf.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Screws Power cable (from fuse and alarm panel to assembly), #10 AWG, copper conductors, 194 degrees F [90 degrees C] Ground cable #6 AWG stranded Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for #10 AWG copper conductors
Prerequisite Procedures	DLP-G13 Remove the Lower Backplane Cover, page 1-26
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Verify that the office ground cable (#6 AWG stranded) is connected to the top of the bay according to local site practice.
- Step 2** Attach one end of the shelf ground cable (#10 AWG) to the right side of the backplane ground nut. See [Figure 1-14](#) for the location of the ground on the backplane.



Note When terminating a frame ground, use the Kepnut provided with the ONS 15454 and tighten it to a torque specification of 31 in-lb. The Kepnut provides a frame ground connection that minimizes the possibility of loosening caused by rotation during installation and maintenance activity. The type of prevention the kep nut provides for the frame ground connection is inherently provided by the terminal block for battery and battery return connections.

Figure 1-14 Ground Location on the Backplane



-
- Step 3** Attach the other end of the shelf ground cable to the bay.
- Step 4** Return to your originating procedure (NTP).
-

DLP-G17 Connect Office Power to the ONS 15454 ETSI

Purpose	This task connects power to the ONS 15454 ETSI shelf.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Wire wrapper Wire cutters Wire strippers Crimp tool Fuse panel Power cable (from fuse and alarm panel to assembly), 5.26-mm ² (#10 AWG), copper conductors, 194°F [90°C]) Ground cable 13.3-mm ² (#6 AWG) stranded Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for 5.26-mm ² (#10 AWG) copper conductors
Prerequisite Procedures	DLP-G15 Connect the Office Ground to the ONS 15454 ETSI, page 1-32
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Warning

When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046



Caution

Do not apply power to the ONS 15454 ETSI until you complete all installation steps and check the continuity of the –48 VDC battery and battery return.



Note

No more than 2 m (7 ft) of the power supply cable should be exposed between the equipment and the fiber-storage tray.



Note

Only use listed compression-type connectors when terminating the battery, battery return, and ground conductors. Connectors must be suitable for copper conductors.



Caution

When terminating power, return, and frame ground, do not use soldering lug connectors, screwless (push-in) connectors, quick-connect connectors, or other friction-fit connectors.

**Note**

If the system loses power or if both TCC2/TCC2P cards are reset, you must reset the ONS 15454 ETSI clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the [“NTP-G24 Set Up Name, Date, Time, and Contact Information” procedure on page 3-8](#).

-
- Step 1** Verify that the MIC-A/P FMEC is installed in Slot 23 and the MIC-C/T/P FMEC is installed in Slot 24 of the EFCA.
- Step 2** Attach the connector on the end of the power cable to the power FMEC.
- Step 3** Tighten the screws of the connector on the power cable.
- Step 4** Connect the power cable to the fuse panel or power source. Use the pin connections in [Table 1-1](#). The conductor (green with yellow stripes) is used for secondary grounding such as grounding to the rack.

Table 1-1 Pin Connection of the Power FMECs

Pin	Function	Cable Color
A1	Battery return	Black
A2	–48 V battery	Red
A3	Ground	Green with yellow stripes

- Step 5** Return to your originating procedure (NTP).
-

DLP-G18 Connect Office Power to the ONS 15454 ANSI

Purpose	This task connects power to the ONS 15454 ANSI shelf.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Wire wrapper Wire cutters Wire strippers Crimp tool Fuse panel Power cable (from fuse and alarm panel to assembly), #10 AWG, copper conductors, 194 degrees F [90 degrees C] Ground cable #6 AWG stranded Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for #10 AWG copper conductors
Prerequisite Procedures	DLP-G16 Connect the Office Ground to the ONS 15454 ANSI, page 1-34
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Warning

When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046



Note

The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE Issue 3.

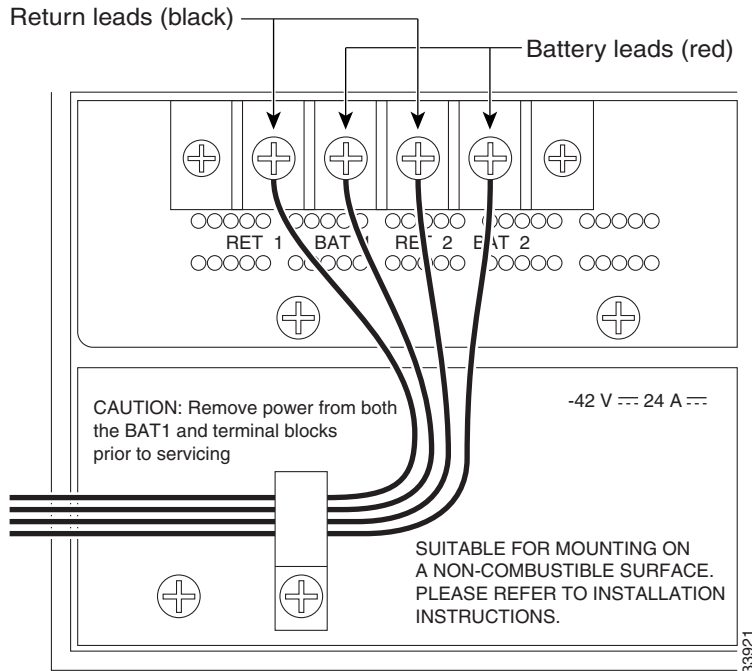


Note

If the system loses power or both TCC2/TCC2P cards are reset and the system is not provisioned to get the time from a Network Time Protocol/Simple Network Time Protocol (NTP/SNTP) server, you must reset the ONS 15454 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the [“NTP-G24 Set Up Name, Date, Time, and Contact Information” procedure on page 3-8](#).

If you are using the TCC2/TCC2P cards, the system clock will run for up to three hours. In this case, no action would be required.

- Step 1** Connect the office power according to the fuse panel engineering specifications.
- Step 2** Measure and cut the cables as needed to reach the ONS 15454 from the fuse panel. [Figure 1-15](#) shows the ONS 15454 power terminals.
- Step 3** Dress the power according to local site practice.

Figure 1-15 Cisco ONS 15454 Power Terminals

- Step 4** Remove or loosen the #8 power terminal screws on the ONS 15454. To avoid confusion, label the cables connected to the BAT1/RET1 (A) power terminals as 1, and the cables connected to the BAT2/RET2 (B) power terminals as 2.



Note Use only pressure terminal connectors, such as ring and fork types, when terminating the battery, battery return, and frame ground conductors.



Caution

Before you make any crimp connections, coat all bare conductors (battery, battery return, and frame ground) with an appropriate antioxidant compound. Bring all unplated connectors, braided strap, and bus bars to a bright finish, then coat with an antioxidant before you connect them. You do not need to prepare tinned, solder-plated, or silver-plated connectors and other plated connection surfaces, but always keep them clean and free of contaminants.



Caution

When terminating power, return, and frame ground, do not use soldering lug, screwless (push-in) connectors, quick-connect, or other friction-fit connectors.

- Step 5** Strip 1/2 inch (12.7 mm) of insulation from all power cables that you will use.

- Step 6** Crimp the lugs onto the ends of all power leads.



Note When terminating battery and battery return connections as shown in [Figure 1-15](#), follow a torque specification of 10 in-lb.

- Step 7** Terminate the return 1 lead to the RET1 backplane terminal. Use oxidation-prevention grease to keep the connections noncorrosive.
- Step 8** Terminate the negative 1 lead to the negative BAT1 backplane power terminal. Use oxidation prevention grease to keep connections noncorrosive.
- Step 9** If you use redundant power leads, terminate the return 2 lead to the positive RET2 terminal on the ONS 15454. Terminate the negative 2 lead to the negative BAT2 terminal on the ONS 15454. Use oxidation-preventative grease to keep connections noncorrosive.
- Step 10** Route the cables out below the power terminals using the plastic cable clamp, as shown in [Figure 1-15 on page 1-38](#).
- Step 11** Return to your originating procedure (NTP).

DLP-G19 Turn On and Verify Office Power

Purpose	This task measures the power to verify correct power and returns for the ONS 15454 shelf.
Tools/Equipment	Voltmeter
Prerequisite Procedures	DLP-G15 Connect the Office Ground to the ONS 15454 ETSI, page 1-32 DLP-G17 Connect Office Power to the ONS 15454 ETSI, page 1-35 DLP-G16 Connect the Office Ground to the ONS 15454 ANSI, page 1-34 DLP-G18 Connect Office Power to the ONS 15454 ANSI, page 1-37
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Caution

Do not apply power to the shelf assembly until you complete all installation steps.

- Step 1** Using a voltmeter, verify the office battery and ground at the following points on the fuse and alarm panel:
- To verify the power, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side connection and verify that it is between -40.5 VDC and -57 VDC. Place the red test lead on the B-side connection and verify that it is between -40.5 VDC and -57 VDC.



Note

The voltages -40.5 VDC and -57 VDC are, respectively, the minimum and maximum voltages required to power the chassis.

- To verify the ground, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side return ground and verify that no voltage is present. Place the red test lead on the B-side return ground and verify that no voltage is present.
- Step 2** Complete one of the following to power up the node:
- If you are using a 80-A fuse panel, insert a 20-A fuse into the fuse position according to site practice.

- If you are using a 100-A fuse panel, insert a 30-A fuse into the fuse position according to site practice.

Step 3 Using a voltmeter, verify the ONS 15454 shelf for –48 VDC battery and ground:

- To verify the A-side of the shelf, place the black lead of the voltmeter to the frame ground. Place the red test lead to the BAT1 (A-side battery connection) red cable. Verify that it reads between –40.5 VDC and –57 VDC. Then place the red test lead of the voltmeter to the RET1 (A-side return ground) black cable and verify that no voltage is present.



Note The voltages –40.5 VDC and –57 VDC are, respectively, the minimum and maximum voltages required to power the chassis.

- To verify the B-side of the shelf, place the black test lead of the voltmeter to the frame ground. Place the red test lead to the BAT2 (B-side battery connection) red cable. Verify that it reads between –40.5 VDC and –57 VDC. Then place the red test lead of the voltmeter to the RET2 (B-side return ground) black cable and verify that no voltage is present.

Step 4 Return to your originating procedure (NTP).

NTP-G8 Install the Fan-Tray Assembly

Purpose	This procedure installs the fan-tray assembly.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G3 Open and Remove the Front Door, page 1-20 NTP-G7 Install the Power and Ground, page 1-30
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Caution

Do not operate an ONS 15454 without a fan-tray air filter. A fan-tray air filter is mandatory, except for ONS 15454 ANSI applications in an outside plant cabinet.



Note

Error messages appear on the TCC2/TCC2P card, the fan-tray LED, and in Cisco Transport Controller (CTC) when the fan-tray assembly is removed from the shelf or when one fan is not working.



Note

If you are installing the ONS 15454 in an outside plant cabinet, remove the air filter to provide maximum cooling capabilities and to comply with Telcordia GR-487-CORE.

**Caution**

You must place the edge of the air filter flush against the front of the fan-tray assembly compartment when installing the fan tray on top of the filter. Failure to do so could result in damage to the filter, the fan tray, or both.

**Caution**

Do not force a fan-tray assembly into place. Doing so can damage the connectors on the fan tray and/or the connectors on the back panel of the shelf assembly.

**Note**

To install the fan-tray assembly, it is not necessary to move any of the fiber-storage facilities.

Step 1

Install the air filter. The air filter can be installed internally between the fan tray and shelf assembly, or externally by mounting the air filter bracket on the bottom of the shelf assembly. Slide the air filter into the bracket.

Step 2

Install the fan-tray assembly. [Figure 1-16](#) shows the fan-tray assembly location on the ONS 15454 ETSI. [Figure 1-17](#) shows the fan-tray assembly location on the ONS 15454 ANSI.

- For the ONS 15454 ETSI shelf, press and hold the locks on the outer edges as you slide the fan-tray assembly into the shelf assembly.
- For the ONS 15454 ANSI shelf, slide the fan-tray assembly into the shelf.

The electrical plug at the rear of the tray should plug into the corresponding receptacle on the assembly.

**Caution**

Do not force a fan-tray assembly into place. This can damage the connectors on the fan-tray assembly and/or the connectors on the back panel of the shelf assembly.

Figure 1-16 Installing the Fan-Tray Assembly on the ONS 15454 ETSI

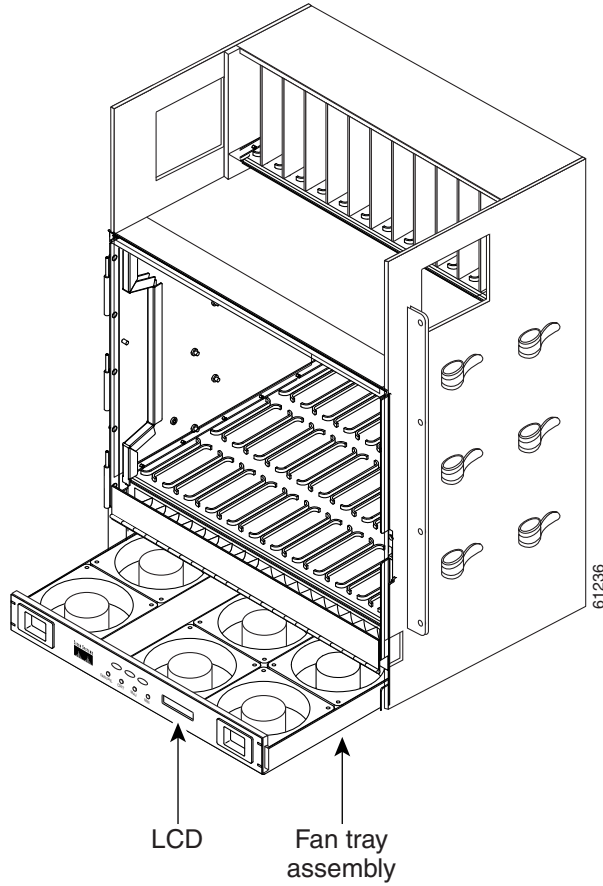
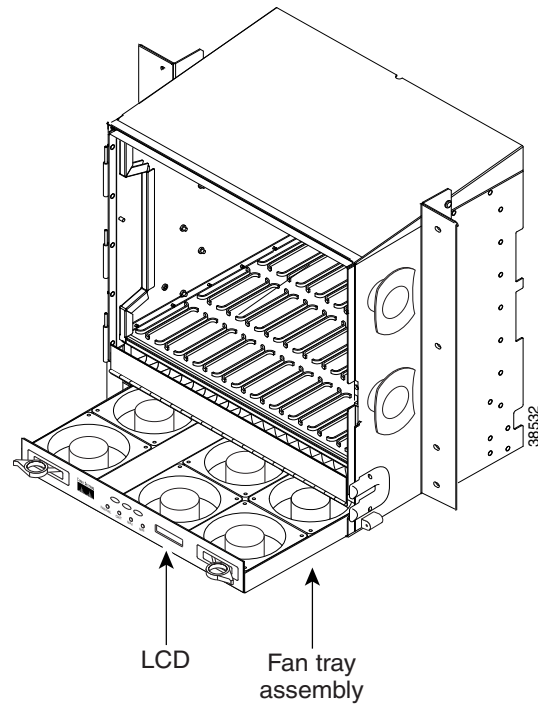


Figure 1-17 Installing the Fan-Tray Assembly on the ONS 15454 ANSI



- Step 3** To verify that the tray has plugged into the assembly, look at the fan tray and listen to determine that the fans are running.
- Step 4** If you want to install an alarm expansion panel on the ONS 15454 ANSI shelf, continue with the [“NTP-G9 Install the Alarm Expansion Panel \(ANSI Only\)”](#) procedure on page 1-44. Otherwise, continue with the [“NTP-G10 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections”](#) procedure on page 1-47.

Stop. You have completed this procedure.

NTP-G9 Install the Alarm Expansion Panel (ANSI Only)

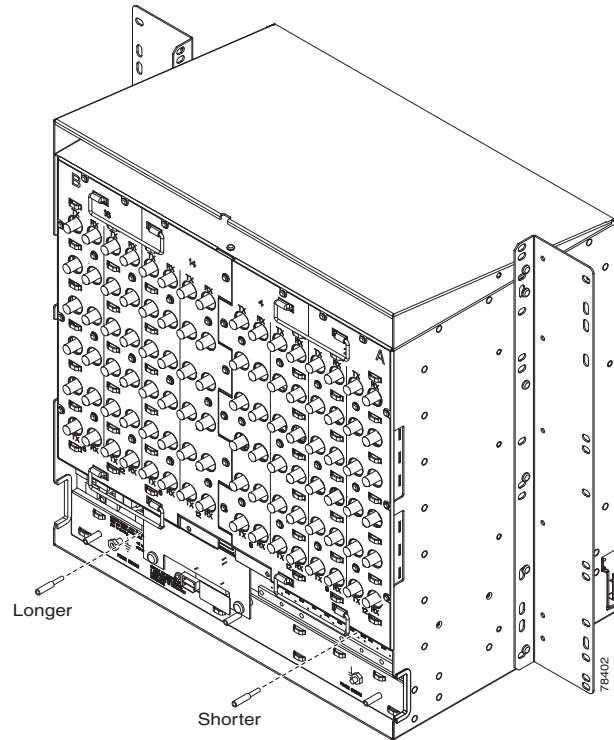
Purpose	This procedure installs an AEP onto the 15454-SA-ANSI or 15454-SA-HD shelf backplane. The AEP provides alarm contacts (32 inputs, 16 outputs) in addition to the 16 provided by the AIC-I card. Typically, the AEP is preinstalled when ordered with the ONS 15454; however, the AEP can be ordered separately. The AIC-I card must be installed before you can provision the alarm contacts enabled by the AEP.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Wire wrapper 6-pair #29 AWG double-shielded cable Standoffs (4)
Prerequisite Procedures	DLP-G13 Remove the Lower Backplane Cover, page 1-26
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None


Note

The AIC-I card provides direct alarm contacts (external alarm inputs and external control outputs). In the ANSI shelf, these AIC-I alarm contacts are routed through the backplane to wire-wrap pins accessible from the back of the shelf. When you install an AEP, the direct AIC-I alarm contacts cannot be used. Only the AEP alarm contacts can be used.

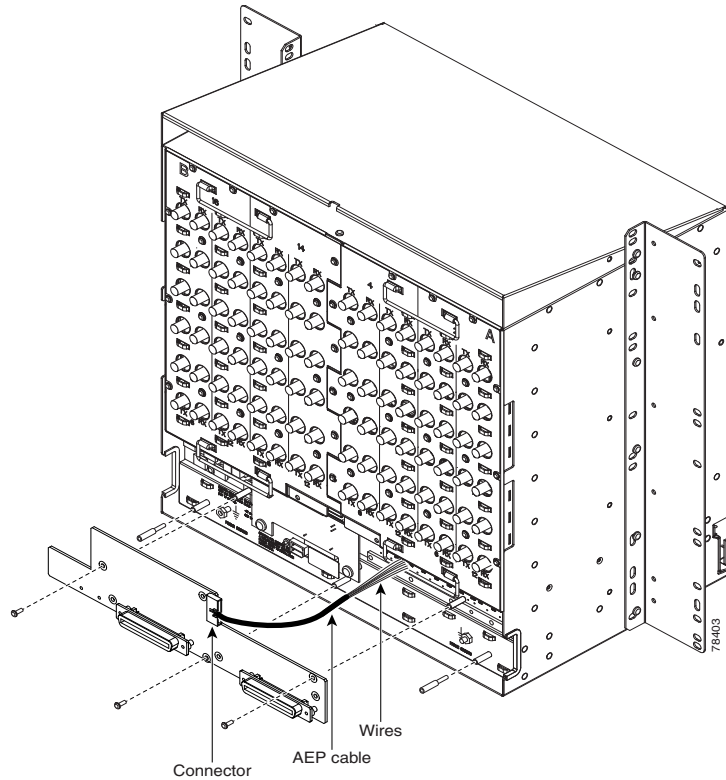
-
- Step 1** Remove the two backplane screws. Replace the two screws with standoffs. Insert the longer standoff on the left, and the shorter standoff on the right ([Figure 1-18](#)).

Figure 1-18 *Replace Backplane Screws with Standoffs*



Step 2 Attach the remaining two standoffs on either side of the backplane ([Figure 1-19](#)).

Step 3 Position the AEP board over the standoffs.

Figure 1-19 *Installing Standoffs and the AEP*

Step 4 Insert and tighten three screws to secure the AEP to the backplane.

Step 5 Connect the AEP cable to the backplane and AEP:

- a. Connect the 10 colored wires to the wire-wrap pins on the backplane. [Figure 1-20](#) shows where the cable wires are connected. [Table 1-2](#) shows AEP and AIC-I signals that each wire carries
- b. Plug the other end of the AEP cable into AEP connector port. The brown pin is on the top.

Figure 1-20 *AEP Wire-Wrap Connections to Backplane Pins*

Table 1-2 Pin Assignments for the AEP

AEP Cable Wire	Backplane Pin	AIC-I Signal	AEP Signal
Black	A1	GND	AEP_GND
White	A2	AE_+5	AEP_+5
Slate	A3	VBAT–	VBAT–
Violet	A4	VB+	VB+
Blue	A5	AE_CLK_P	AE_CLK_P
Green	A6	AE_CLK_N	AE_CLK_N
Yellow	A7	AE_DIN_P	AE_DOUT_P
Orange	A8	AE_DIN_N	AE_DOUT_N
Red	A9	AE_DOUT_P	AE_DIN_P
Brown	A10	AE_DOUT_N	AE_DIN_N

Step 6 Continue with the “[NTP-G10 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections](#)” procedure on page 1-47.

Stop. You have completed this procedure.

NTP-G10 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections

Purpose	This procedure installs alarm, timing, LAN, and craft wires on the ONS 15454 shelf. These wires are attached to the MIC FMECs on the ETSI shelf and attached to the backplane on the ANSI shelf.
Tools/Equipment	Connectors according to function Twisted 0.51 mm ² or 0.64 mm ² (#22 or #24 AWG) shielded wires for LAN or craft 75-ohm coaxial cable with 1.0/2.3 miniature coax connector 0.51 mm ² or 0.64 mm ² (#22 or #24 AWG) alarm wires
Prerequisite Procedures	(ETSI only.) NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only) , page 1-28 (ANSI only.) NTP-G5 Remove the Backplane Covers (ANSI Only) , page 1-26
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Caution

Always use the supplied ESD wristband when working with a powered ONS 15454 ETSI. Plug the wristband cable into the ESD jack located on the lower-right outside edge of the shelf assembly.

-
- Step 1** For an ONS 15454 ETSI shelf, complete the following tasks as necessary:
- Complete the “[DLP-G20 Install Alarm Wires on the MIC-A/P \(ETSI Only\)](#)” task on page 1-48 if you want to provision external alarms and/or controls with the AIC-I card.
 - Complete the “[DLP-G21 Install Timing Wires on the MIC-C/T/P \(ETSI Only\)](#)” task on page 1-51 if you are provisioning external timing.
 - Complete the “[DLP-G22 Install LAN Wires on the MIC-C/T/P \(ETSI Only\)](#)” task on page 1-52 to create an external LAN connection. LAN wires or the LAN port on the TCC2/TCC2P card are necessary to create an external LAN connection.
- Step 2** For an ONS 15454 ANSI shelf, complete the following tasks as necessary:
- Complete the “[DLP-G23 Install Alarm Wires on the Backplane \(ANSI Only\)](#)” task on page 1-53 if you are using an AIC or AIC-I card and are not using an AEP.
 - Complete the “[DLP-G24 Install Timing Wires on the Backplane \(ANSI Only\)](#)” task on page 1-56 if you are provisioning external timing.
 - Complete the “[DLP-G25 Install LAN Wires on the Backplane \(ANSI Only\)](#)” task on page 1-57 to create an external LAN connection. LAN wires or the LAN port on the TCC2/TCC2P card are necessary to create an external LAN connection.
 - Complete the “[DLP-G26 Install the TL1 Craft Interface \(ANSI Only\)](#)” task on page 1-58 to access TL1 using the craft interface. Craft wires or the EIA/TIA-232 port on the TCC2/TCC2P card are required to access TL1.

Stop. You have completed this procedure.

DLP-G20 Install Alarm Wires on the MIC-A/P (ETSI Only)

Purpose	This task installs alarm cables on the MIC-A/P on the ONS 15454 ETSI so that you can provision external (environmental) alarms and controls with the AIC-I card.
Tools/Equipment	DB-62 connector 0.51 mm ² or 0.64 mm ² (#22 or #24 AWG) wires
Prerequisite Procedures	NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only) , page 1-28
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Using 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wires, connect the alarm and control wires on the appropriate pins of the DB-62 connector. The pin connectors, signal names, and functions are listed in [Table 1-3](#).

Table 1-3 Alarm Pin Assignments

DB-62 Pin Connector	Signal Name	Function
1	ALMCUTOFF–	Alarm cutoff
2	ALMCUTOFF+	Alarm cutoff
3	ALMINP0–	Alarm input pair number 1
4	ALMINP0+	Alarm input pair number 1
5	ALMINP1–	Alarm input pair number 2
6	ALMINP1+	Alarm input pair number 2
7	ALMINP2–	Alarm input pair number 3
8	ALMINP2+	Alarm input pair number 3
9	ALMINP3–	Alarm input pair number 4
10	ALMINP3+	Alarm input pair number 4
11	EXALM0–	Extra alarm 0
12	EXALM0+	Extra alarm 0
13	FGND	Ground
14	EXALM1–	Extra alarm 1
15	EXALM1+	Extra alarm 1
16	EXALM2–	Extra alarm 2
17	EXALM2+	Extra alarm 2
18	EXALM3–	Extra alarm 3
19	EXALM3+	Extra alarm 3
20	EXALM4–	Extra alarm 4
21	EXALM4+	Extra alarm 4
22	EXALM5–	Extra alarm 5
23	EXALM5+	Extra alarm 5
24	EXALM6–	Extra alarm 6
25	EXALM6+	Extra alarm 6
26	FGND	Ground
27	EXALM7–	Extra alarm 7
28	EXALM7+	Extra alarm 7
29	EXALM8–	Extra alarm 8
30	EXALM8+	Extra alarm 8
31	EXALM9–	Extra alarm 9
32	EXALM9+	Extra alarm 9
33	EXALM10–	Extra alarm 10
34	EXALM10+	Extra alarm 10
35	EXALM11–	Extra alarm 11
36	EXALM11+	Extra alarm 11

Table 1-3 Alarm Pin Assignments (continued)

DB-62 Pin Connector	Signal Name	Function
37	ALMOUP0–	Normally open output pair number 1
38	ALMOUP0+	Normally open output pair number 1
39	FGND	Ground
40	ALMOUP1–	Normally open output pair number 2
41	ALMOUP1+	Normally open output pair number 2
42	ALMOUP2–	Normally open output pair number 3
43	ALMOUP2+	Normally open output pair number 3
44	ALMOUP3–	Normally open output pair number 4
45	ALMOUP3+	Normally open output pair number 4
46	AUDALM0–	Normally open minor audible alarm
47	AUDALM0+	Normally open minor audible alarm
48	AUDALM1–	Normally open major audible alarm
49	AUDALM1+	Normally open major audible alarm
50	AUDALM2–	Normally open critical audible alarm
51	AUDALM2+	Normally open critical audible alarm
52	FGND	Ground
53	AUDALM3–	Normally open remote audible alarm
54	AUDALM3+	Normally open remote audible alarm
55	VISALM0–	Normally open minor visible alarm
56	VISALM0+	Normally open minor visible alarm
57	VISALM1–	Normally open major visible alarm
58	VISALM1+	Normally open major visible alarm
59	VISALM2–	Normally open minor visible alarm
50	VISALM2+	Normally open minor visible alarm
61	VISALM3–	Normally open minor visible alarm
62	VISALM3+	Normally open minor visible alarm

- Step 2** Connect the other end of the alarm and control wires according to local site practice.
- Step 3** Connect the DB-62 connector to the ALARM IN/OUT connector on the MIC-A/P faceplate.
- Step 4** Tighten the screws of the connector on the alarm cable.
- Step 5** Return to your originating procedure (NTP).

DLP-G21 Install Timing Wires on the MIC-C/T/P (ETSI Only)

Purpose	This task installs the timing cables on the ONS 15454 ETSI MIC-C/T/P.
Tools/Equipment	75-ohm coaxial cable with a 1.0/2.3 miniature coax connector on the MIC-C/T/P side
Prerequisite Procedures	NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only) , page 1-28
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Using coaxial cable with 1.0/2.3 miniature coax connectors, connect the clock cable to the appropriate connector on the faceplate of the MIC-C/T/P.

Step 2 Gently push the cable with the 1.0/2.3 miniature coax connector down until the cable connector slides into the 1.0/2.3 miniature coax connector on the faceplate with a click.

The MIC-C/T/P provides 1.0/2.3 miniature coax connectors that are used for timing input and output. The top connectors are for “A” (BITS-1) timing, and the bottom connectors are for “B” (BITS-2) timing. In each case, the left connector is the input and the right connector is the output. The input connectors for timing provide a 75-ohm termination. System cables are available that can convert timing clocks from 75 ohms to 100/120 ohms. [Table 1-4](#) shows MIC-C/T/P pin assignments.

Table 1-4 MIC-C/T/P Clock Connector Pin Assignment

Pin	Function
IN 1	Input from external device
OUT 1	Output to external device
IN 2	Input from external device
OUT 2	Output to external device

A high-impedance option (> 3 kilo-ohms or greater) is possible through a jumper on the MIC-C/T/P FMEC. You can change the top timing input to high impedance by removing the jumper on P3 of the MIC-C/T/P FMEC. You can change the bottom timing input to high impedance by removing the jumper on P2 on the MIC-C/T/P FMEC.



Note Refer to ITU-T G.813 for rules about provisioning timing references.

Step 3 Connect the other end of the cable to the external source of the timing signal according to [Table 1-4](#).

Step 4 Repeat [Step 3](#) for each cable that is required.

Step 5 Return to your originating procedure (NTP).

DLP-G22 Install LAN Wires on the MIC-C/T/P (ETSI Only)

Purpose	This task installs the LAN wires on the ONS 15454 ETSI MIC-C/T/P.
Tools/Equipment	Standard CAT-5 UTP Ethernet cable (straight-through for data terminating equipment [DTE] or cross-over for data circuit-terminating equipment [DCE]) or RJ-45 connector Crimping tool for RJ-45 connector 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wire, preferably CAT-5 UTP
Prerequisite Procedures	NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), page 1-28
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Note

Rather than using the LAN connection port on the MIC-C/T/P, you can use the LAN connection port on the TCC2/TCC2P card if preferred. Use either the MIC-C/T/P connection or the TCC2/TCC2P card connection. You cannot use the LAN connection port on the MIC-C/T/P and the LAN connection port on the TCC2/TCC2P card simultaneously; however, it is possible for you to make a direct connection from a computer to the LAN connection port on the TCC2/TCC2P card while the LAN connection port on the MIC-C/T/P is in use as long as the computer connected directly to the TCC2/TCC2P card is not connected to a LAN.

- Step 1

Using 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wire or CAT-5 UTP Ethernet cable, connect the wires to the RJ-45 connector according to [Table 1-5](#).

Table 1-5 LAN Pin Assignments

LAN	RJ-45 Pin	RJ-45 Pin	Function
LAN 1 Connecting to DCE ¹ (a hub or switch)	1	3	PNMSRX+ white/green
	2	6	PNMSRX– green
Cross-over Ethernet cable	3	1	PNMSTX white/orange
	4	4	—
	5	5	—
	6	2	PNMSTX– orange
	7	7	—
	8	8	—

Table 1-5 LAN Pin Assignments (continued)

LAN	RJ-45 Pin	RJ-45 Pin	Function
LAN 1 Connecting to DTE (a PC/workstation or router)	1	1	PNMSRX+ white/green
	2	2	PNMSRX- green
Straight-through Ethernet cable	3	3	PNMSTX+ white/orange
	4	4	—
	5	5	—
	6	6	PNMSTX- orange
	7	7	—
	8	8	—

1. The Cisco ONS 15454 ETSI is DCE.

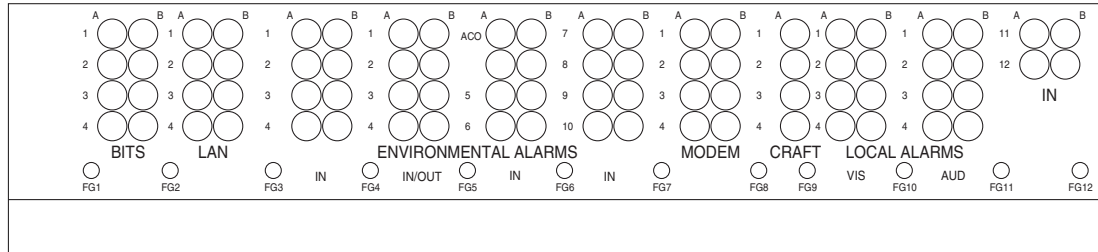
Step 2 Return to your originating procedure (NTP).

DLP-G23 Install Alarm Wires on the Backplane (ANSI Only)

Purpose	This task installs alarm wires on the backplane so that you can provision external (environmental) alarms and controls with the AIC or AIC-I card. If you are using the AEP, do not perform this task.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm ² or 0.64 mm ²) wires 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm ² or 0.64 mm ²), twisted-pair T1-type
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only), page 1-26
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Using 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²) twisted-pair T1-type wires, wrap the alarm wires on the appropriate wire-wrap pins according to local site practice. Ground the shield of the BITS Input cable at the BITS end. For BITS Output, wrap the ground shield of the BITS cable to the frame ground pin (FG1) located below the column of BITS pins.

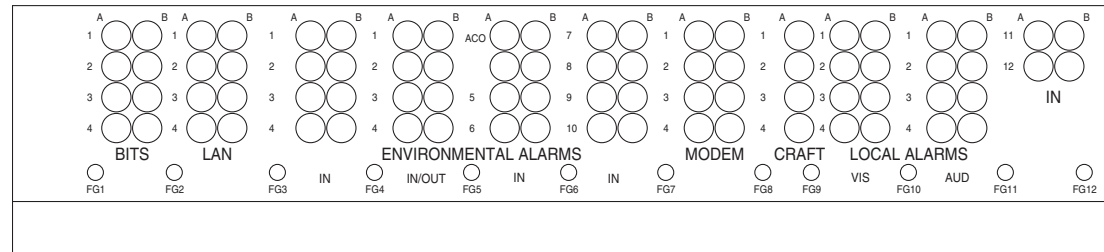
[Figure 1-21](#) shows alarm pin assignments for the AIC-I in the Release 3.4 or higher ONS 15454 backplane, and [Figure 1-22](#) calls out the external alarm pins on that backplane.

Figure 1-21 Cisco ONS 15454 Backplane Pinouts (Release 3.4 or Later)

Field	Pin	Function	Field	Pin	Function	
BITS	A1	BITS Output 2 negative (-)	ENVIR ALARMS IN/OUT	A1/A13	Normally open output pair number 1	
	B1	BITS Output 2 positive (+)		B1/B13		
	A2	BITS Input 2 negative (-)		A2/A14	Normally open output pair number 2	
	B2	BITS Input 2 positive (+)		B2/B14		
	A3	BITS Output 1 negative (-)		A3/A15	Normally open output pair number 3	
	B3	BITS Output 1 positive (+)		B3/B15		
	A4	BITS Input 1 negative (-)		A4/A16	Normally open output pair number 4	
	B4	BITS Input 1 positive (+)		B4/B16		
LAN	Connecting to a hub, or switch		ACO	A1	Normally open ACO pair	
	A1	RJ-45 pin 6 RX-		B1		
	B1	RJ-45 pin 3 RX+	CRAFT	A1	Receive (PC pin #2)	
	A2	RJ-45 pin 2 TX-		A2	Transmit (PC pin #3)	
	B2	RJ-45 pin 1 TX+		A3	Ground (PC pin #5)	
	Connecting to a PC/Workstation or router			A4	DTR (PC pin #4)	
	A1	RJ-45 pin 2 RX-	LOCAL ALARMS AUD (Audible)	A1	Alarm output pair number 1: Remote audible alarm.	
	B1	RJ-45 pin 1 RX+		B1		
	A2	RJ-45 pin 6 TX-		A2	Alarm output pair number 2: Critical audible alarm.	
	B2	RJ-45 pin 3 TX+		B2		
	ENVIR ALARMS IN	A1	Alarm input pair number 1: Reports closure on connected wires.	N/O	A3	Alarm output pair number 3: Major audible alarm.
		B1	Alarm input pair number 2: Reports closure on connected wires.		B3	Alarm output pair number 4: Minor audible alarm.
A2		Alarm input pair number 3: Reports closure on connected wires.	A4		Alarm output pair number 4: Minor audible alarm.	
B2		Alarm input pair number 4: Reports closure on connected wires.	B4			
A3		Alarm input pair number 5: Reports closure on connected wires.	LOCAL ALARMS VIS (Visual)	A1	Alarm output pair number 1: Remote visual alarm.	
B3		Alarm input pair number 6: Reports closure on connected wires.		B1		
A4		Alarm input pair number 7: Reports closure on connected wires.		A2	Alarm output pair number 2: Critical visual alarm.	
B4		Alarm input pair number 8: Reports closure on connected wires.		B2		
A5		Alarm input pair number 9: Reports closure on connected wires.	N/O	A3	Alarm output pair number 3: Major visual alarm.	
B5		Alarm input pair number 10: Reports closure on connected wires.		B3	Alarm output pair number 4: Minor visual alarm.	
A6		Alarm input pair number 11: Reports closure on connected wires.		A4		
B6		Alarm input pair number 12: Reports closure on connected wires.		B4		
A7		Alarm input pair number 13: Reports closure on connected wires.				
B7		Alarm input pair number 14: Reports closure on connected wires.				
A8		Alarm input pair number 15: Reports closure on connected wires.				
B8		Alarm input pair number 16: Reports closure on connected wires.				
A9		Alarm input pair number 17: Reports closure on connected wires.				
B9		Alarm input pair number 18: Reports closure on connected wires.				
A10		Alarm input pair number 19: Reports closure on connected wires.				
B10		Alarm input pair number 20: Reports closure on connected wires.				
A11		Alarm input pair number 21: Reports closure on connected wires.				
B11		Alarm input pair number 22: Reports closure on connected wires.				
A12		Alarm input pair number 23: Reports closure on connected wires.				
B12		Alarm input pair number 24: Reports closure on connected wires.				

If you are using an AIC-I card, contacts provisioned as OUT are 1-4. Contacts provisioned as IN are 13-16.

83020

Figure 1-22 Highlighted Environmental Alarms

Field	Pin	Function	Field	Pin	Function		
BITS	A1	BITS Output 2 negative (–)	ENVIR ALARMS IN/OUT	A1/A13	Normally open output pair number 1		
	B1	BITS Output 2 positive (+)		B1/B13	Normally open output pair number 2		
	A2	BITS Input 2 negative (–)		A2/A14			
	B2	BITS Input 2 positive (+)		B2/B14	Normally open output pair number 3		
	A3	BITS Output 1 negative (–)	A3/A15				
	B3	BITS Output 1 positive (+)	B3/B15				
	A4	BITS Input 1 negative (–)	A4/A16	Normally open output pair number 4			
	B4	BITS Input 1 positive (+)	B4/B16				
LAN	Connecting to a hub, or switch		ACO	A1	Normally open ACO pair		
	A1	RJ-45 pin 6 RX–		B1			
	B1	RJ-45 pin 3 RX+	CRAFT	A1	Receive (PC pin #2)		
	A2	RJ-45 pin 2 TX–		A2	Transmit (PC pin #3)		
	B2	RJ-45 pin 1 TX+		A3	Ground (PC pin #5)		
	Connecting to a PC/Workstation or router			A4	DTR (PC pin #4)		
	A1	RJ-45 pin 2 RX–	LOCAL ALARMS AUD (Audible)	A1	Alarm output pair number 1: Remote audible alarm.		
	B1	RJ-45 pin 1 RX+		B1	Alarm output pair number 2: Critical audible alarm.		
	A2	RJ-45 pin 6 TX–		A2			
	B2	RJ-45 pin 3 TX+		B2	Alarm output pair number 3: Major audible alarm.		
	ENVIR ALARMS IN	A1	Alarm input pair number 1: Reports closure on connected wires.	N/O		A3	Alarm output pair number 4: Minor audible alarm.
		B1	Alarm input pair number 2: Reports closure on connected wires.			B3	
A2		Alarm input pair number 3: Reports closure on connected wires.	A4				
B2		Alarm input pair number 4: Reports closure on connected wires.	B4				
A3		Alarm input pair number 5: Reports closure on connected wires.	LOCAL ALARMS VIS (Visual)	A1	Alarm output pair number 1: Remote visual alarm.		
B3		Alarm input pair number 6: Reports closure on connected wires.		B1	Alarm output pair number 2: Critical visual alarm.		
A4		Alarm input pair number 7: Reports closure on connected wires.		A2			
B4		Alarm input pair number 8: Reports closure on connected wires.		B2	Alarm output pair number 3: Major visual alarm.		
A5		Alarm input pair number 9: Reports closure on connected wires.	N/O	A3		Alarm output pair number 4: Minor visual alarm.	
B5		Alarm input pair number 10: Reports closure on connected wires.		B3			
A6		Alarm input pair number 11: Reports closure on connected wires.		A4			
B6		Alarm input pair number 12: Reports closure on connected wires.		B4			
A7		Alarm input pair number 13: Reports closure on connected wires.					
B7		Alarm input pair number 14: Reports closure on connected wires.					
A8		Alarm input pair number 15: Reports closure on connected wires.					
B8		Alarm input pair number 16: Reports closure on connected wires.					
A9	Alarm input pair number 17: Reports closure on connected wires.						
B9	Alarm input pair number 18: Reports closure on connected wires.						
A10	Alarm input pair number 19: Reports closure on connected wires.						
B10	Alarm input pair number 20: Reports closure on connected wires.						
A11	Alarm input pair number 21: Reports closure on connected wires.						
B11	Alarm input pair number 22: Reports closure on connected wires.						
A12	Alarm input pair number 23: Reports closure on connected wires.						
B12	Alarm input pair number 24: Reports closure on connected wires.						

If you are using an AIC-1 card, contacts provisioned as OUT are 1-4. Contacts provisioned as IN are 13-16.

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**Note**

The X.25, Modem, and TBOS pin fields are not active on either pin field.

Step 2 Return to your originating procedure (NTP).

DLP-G24 Install Timing Wires on the Backplane (ANSI Only)

Purpose	This task installs the BITS timing wires on the ONS 15454 ANSI backplane.
Tools/Equipment	Wire wrapper 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm ² or 0.64 mm ²), twisted-pair T1-type
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only) , page 1-26
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Using 100-ohm shielded BITS clock cable #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type, wrap the clock wires on the appropriate wire-wrap pins according to local site practice.

Ground the shield of the BITS input cable at the BITS end. For BITS output, wrap the ground shield of the BITS cable to the frame ground pin (FG1) located beneath the column of BITS pins. [Table 1-6](#) lists the pin assignments for the BITS timing pin fields.

Table 1-6 External Timing Pin Assignments for BITS

BITS Pin	Tip/Ring	CTC/TL1 Name	Function
A4	ring	BITS-1	Input from BITS device 1
B4	tip	BITS-1	Input from BITS device 1
A3	ring	BITS-1	Output to external device 1
B3	tip	BITS-1	Output to external device 1
A2	ring	BITS-2	Input from BITS device 2
B2	tip	BITS-2	Input from BITS device 2
A1	ring	BITS-2	Output to external device 2
B1	tip	BITS-2	Output to external device 2



Note For more detailed information about timing, see [Chapter 20, “Security Reference.”](#) To set up system timing, see the [“NTP-G53 Set Up Timing” procedure on page 6-4.](#)

Step 2 Return to your originating procedure (NTP).

DLP-G25 Install LAN Wires on the Backplane (ANSI Only)

Purpose	This task installs the LAN wires on the ONS 15454 ANSI backplane.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm ² or 0.64 mm ²) wire, preferably CAT-5 UTP
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Note

Rather than using the LAN wires, you can use the LAN connection port on the TCC2/TCC2P if preferred. Use either the backplane connection or the TCC2/TCC2P front connection. You cannot use the LAN backplane pins and the LAN connection port on the TCC2/TCC2P simultaneously; however, it is possible for you to make a direct connection from a computer to the LAN connection port on the TCC2/TCC2P while the LAN backplane pins are in use as long as the computer that is connected directly to the TCC2/TCC2P is not connected to a LAN.

Step 1

Using #22 or #24 AWG (0.51 mm² or 0.64 mm²) wire or CAT-5 UTP Ethernet cable, wrap the wires on the appropriate wire-wrap pins according to local site practice.



Caution

Cross talk might result if both receive (Rx) and transmit (Tx) pins connect on the same twisted pair of wires from the CAT-5 cable. The two Tx pins need to be on one twisted pair, and the two Rx pins need to be on another twisted pair.

A frame ground pin is located beneath each pin field (FG2 for the LAN pin field). Wrap the ground shield of the LAN interface cable to the frame ground pin. [Table 1-7](#) shows the LAN pin assignments.

Table 1-7 LAN Pin Assignments for the ONS 15454 ANSI Shelf

Pin Field	Backplane Pins	RJ-45 Pins	Function/Color
LAN 1 Connecting to data circuit-terminating equipment (DCE) (a hub or switch); the ONS 15454 is a DCE	B2	1	TX+ white/green
	A2	2	TX- green
	B1	3	RX+ white/orange
	A1	6	RX- orange
LAN 1 Connecting to data terminal equipment (DTE) (a PC/workstation or router)	B1	1	RX+ white/green
	A1	2	RX- green
	B2	3	TX+ white/orange
	A2	6	TX- orange



Note The TCC2/TCC2P does not support Ethernet polarity detection. If your Ethernet connection has incorrect polarity (this can only occur with cables that have the receive wire pairs flipped), a “Lan Connection Polarity Reversed” condition is raised. This condition usually occurs during an upgrade or initial node deployment. To correct the situation, ensure that your Ethernet cable has the correct mapping of the wire-wrap pins.

Step 2 Return to your originating procedure (NTP).

DLP-G26 Install the TL1 Craft Interface (ANSI Only)

Purpose	This task installs the TL1 craft interface on the ONS 15454 ANSI shelf using the craft backplane pins. You can also use a LAN cable connected to the TCC2/TCC2P EIA/TIA-232 port to access a TL1 craft interface.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm ² or 0.64 mm ²) alarm wires
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only), page 1-26
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Note Rather than using the craft pins, you can use a LAN cable connected to the TCC2/TCC2P EIA/TIA-232 port to access a TL1 craft interface.

- Step 1** Using #22 or #24 AWG (0.51 mm² or 0.64 mm²) wire, wrap the craft interface wires on the appropriate wire-wrap pins according to local site practice.
- Step 2** Wrap the ground shield of the craft interface cable to the frame-ground pin.
- Wrap the ground wire of your computer cable to pin A3 on the craft pin field. [Table 1-8](#) shows the pin assignments for the CRAFT pin field.



Note You cannot use the craft backplane pins and the EIA/TIA-232 port on the TCC2/TCC2P card simultaneously. Using a combination prevents access to the node or causes a loss in connectivity.

Table 1-8 *Craft Interface Pin Assignments*

Pin Field	Contact	Function
Craft	A1	Receive
	A2	Transmit
	A3	Ground
	A4	DTR

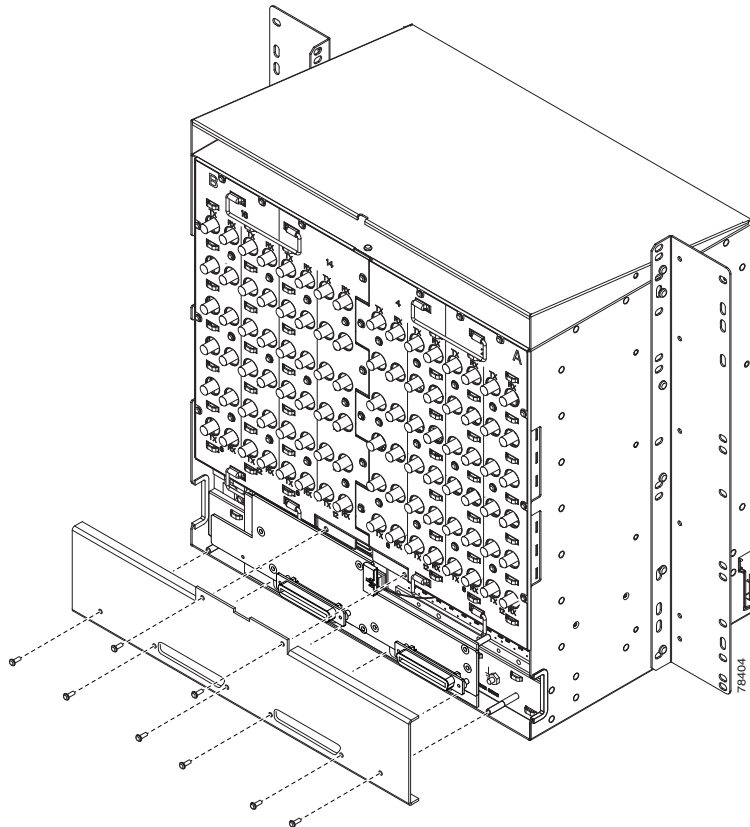
Step 3 Return to your originating procedure (NTP).

NTP-G11 Install an External Wire-Wrap Panel on the AEP (ANSI Only)

Purpose	This procedure connects an external wire-wrap panel to the ONS 15454 ANSI AEP to provide the physical alarm contacts for the AEP.
Tools/Equipment	External wire-wrap panel
Prerequisite Procedures	NTP-G9 Install the Alarm Expansion Panel (ANSI Only) , page 1-44
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Position the lower cover over the AEP. Make sure that the AEP AMP Champ connectors protrude through the cutouts in the lower cover ([Figure 1-23](#)).

Figure 1-23 Installing the AEP Cover



Step 2 Insert and tighten the eight screws to secure the AEP cover to the AEP.

- Step 3** Connect the cables from the external wire-wrap panel to the AMP Champ connectors on the AEP. [Table 1-9](#) lists the alarm input pin assignments.

Table 1-9 Alarm Input Pin Assignments

AMP Champ Pin	Signal Name	AMP Champ Pin	Signal Name
1	ALARM_IN_1–	27	GND
2	GND	28	ALARM_IN_2–
3	ALARM_IN_3–	29	ALARM_IN_4–
4	ALARM_IN_5–	30	GND
5	GND	31	ALARM_IN_6–
6	ALARM_IN_7–	32	ALARM_IN_8–
7	ALARM_IN_9–	33	GND
8	GND	34	ALARM_IN_10–
9	ALARM_IN_11–	35	ALARM_IN_12–
10	ALARM_IN_13–	36	GND
11	GND	37	ALARM_IN_14–
12	ALARM_IN_15–	38	ALARM_IN_16–
13	ALARM_IN_17–	39	GND
14	GND	40	ALARM_IN_18–
15	ALARM_IN_19–	41	ALARM_IN_20–
16	ALARM_IN_21–	42	GND
17	GND	43	ALARM_IN_22–
18	ALARM_IN_23–	44	ALARM_IN_24–
19	ALARM_IN_25–	45	GND
20	GND	46	ALARM_IN_26–
21	ALARM_IN_27–	47	ALARM_IN_28–
22	ALARM_IN_29–	48	GND
23	GND	49	ALARM_IN_30–
24	ALARM_IN_31–	50	—
25	ALARM_IN_+	51	GND1
26	ALARM_IN_0–	52	GND2

[Table 1-10](#) lists the alarm output (external control) pin assignments.

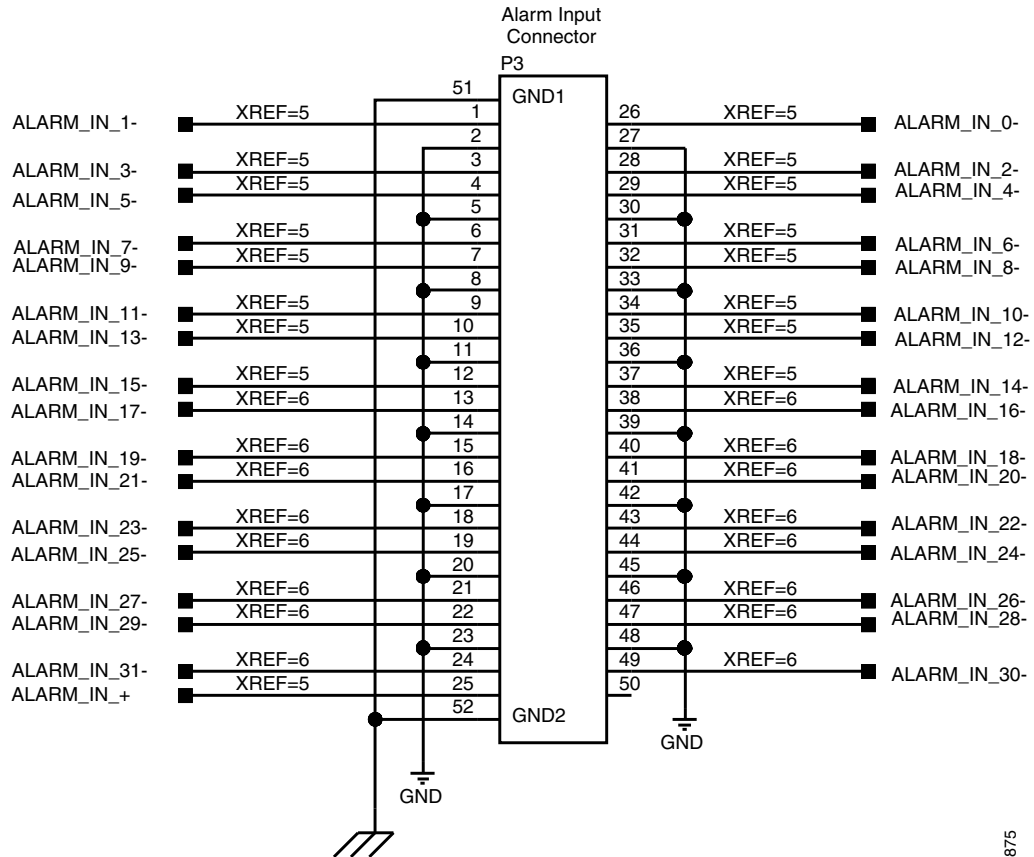
Table 1-10 Alarm Output Pin Assignments

AMP Champ Pin	Signal Name	AMP Champ Pin	Signal Name
1	—	27	COM_0
2	COM_1	28	—
3	NO_1	29	NO_2

Table 1-10 Alarm Output Pin Assignments (continued)

AMP Champ Pin	Signal Name	AMP Champ Pin	Signal Name
4	—	30	COM_2
5	COM_3	31	—
6	NO_3	32	NO_4
7	—	33	COM_4
8	COM_5	34	—
9	NO_5	35	NO_6
10	—	36	COM_6
11	COM_7	37	—
12	NO_7	38	NO_8
13	—	39	COM_8
14	COM_9	40	—
15	NO_9	41	NO_10
16	—	42	COM_10
17	COM_11	43	—
18	NO_11	44	NO_12
19	—	45	COM_12
20	COM_13	46	—
21	NO_13	47	NO_14
22	—	48	COM_14
23	COM_15	49	—
24	NO_15	50	—
25	—	51	GND1
26	NO_0	52	GND2

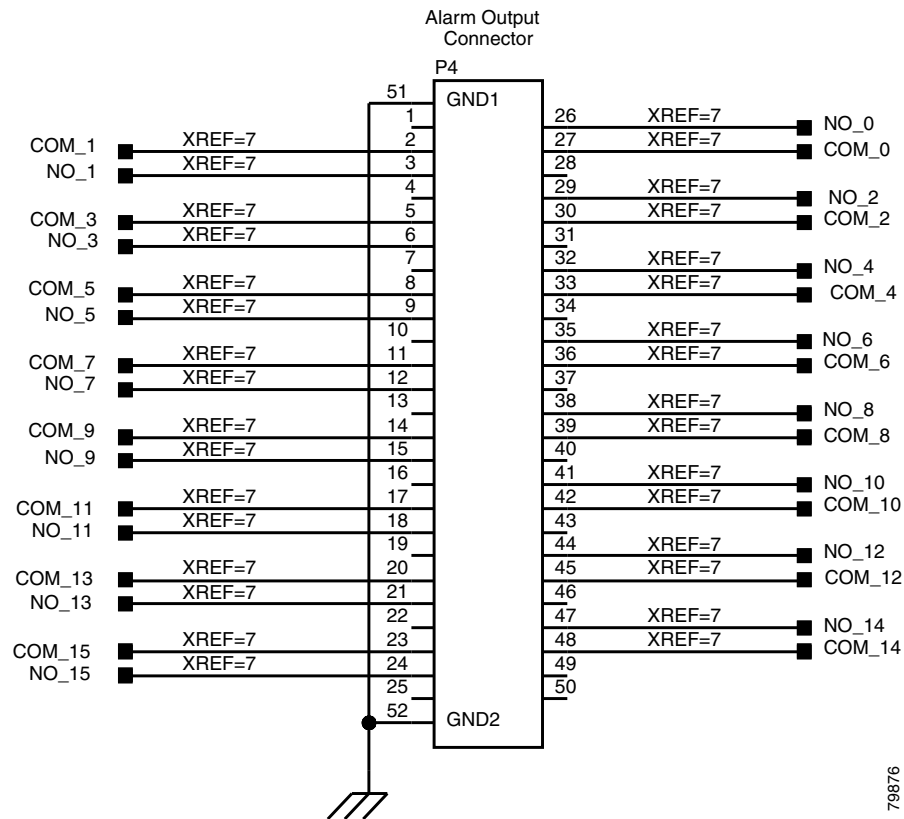
Figure 1-24 illustrates the alarm input connectors.

Figure 1-24 Alarm Input Connector

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Figure 1-25 illustrates the alarm output connectors.

Figure 1-25 Alarm Output Connector



Step 4 Continue with the “NTP-G12 Install and Close the FMEC Cover (ETSI Only)” procedure on page 1-64 as needed.

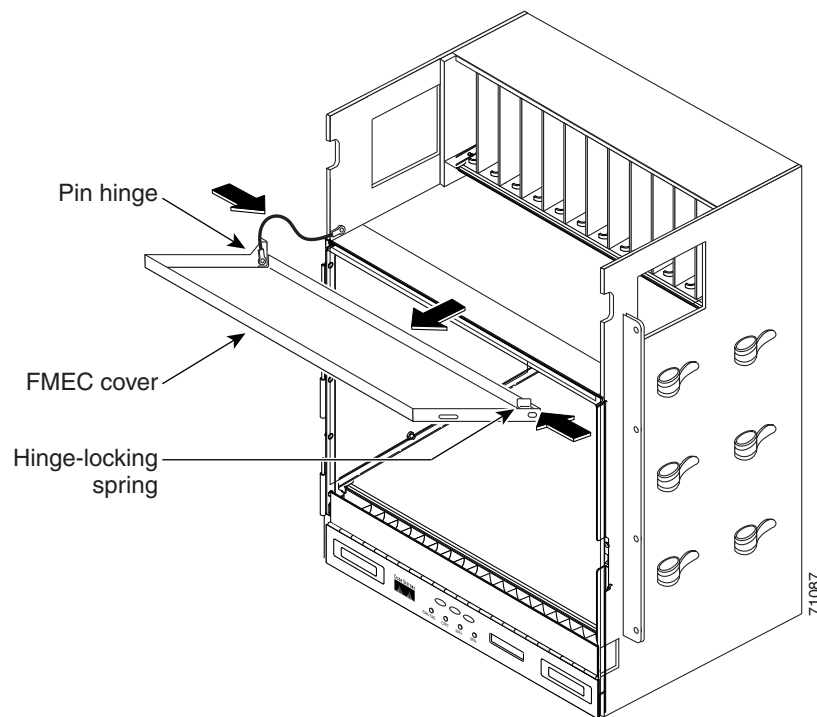
Stop. You have completed this procedure.

NTP-G12 Install and Close the FMEC Cover (ETSI Only)

Purpose	This procedure installs and closes the ONS 15454 ETSI FMEC cover.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G4 Open and Remove the FMEC Cover (ETSI Only), page 1-23
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Insert the cover carefully onto the left pin of the hinge ([Figure 1-26](#)).
- Step 2** Move the cover to the right side towards the right pin of the hinge.
- Step 3** Pull the right side of the hinge-locking spring ([Figure 1-26](#)). Push the cover onto the right pin until the spring snaps into place.

Figure 1-26 ONS 15454 ETSI FMEC Cover



- Step 4** Attach the ground wire to the shelf.
- Step 5** Attach the washer and nut.
- Step 6** Attach the cover to the shelf using the screws on the top of the cover.

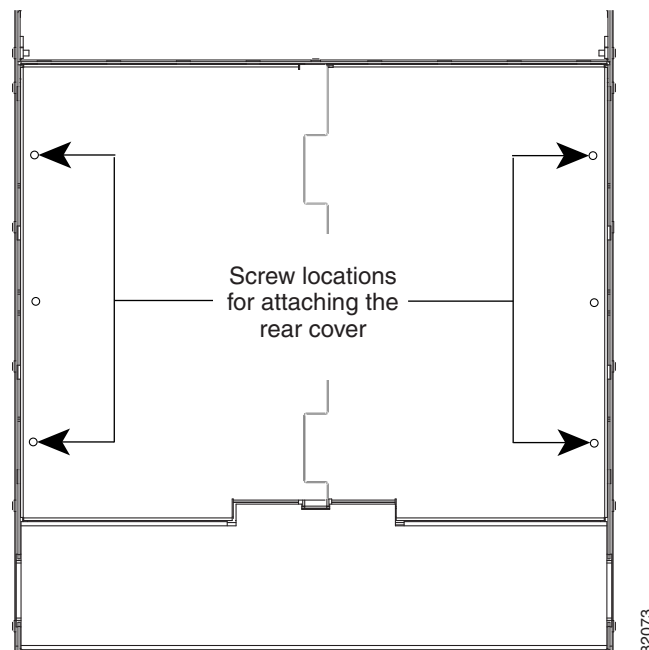
- Step 7** Continue with the “[NTP-G14 Install DWDM Equipment](#)” procedure on page 1-67.
Stop. You have completed this procedure.
-

NTP-G13 Install the Rear Cover (ANSI Only)

Purpose	The following procedure explains how to install the rear cover on an ONS 15454 ANSI shelf.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only) , page 1-26
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** Locate the three screws that run vertically along on each side of the backplane ([Figure 1-27](#)).

Figure 1-27 Backplane Attachment for the Rear Cover



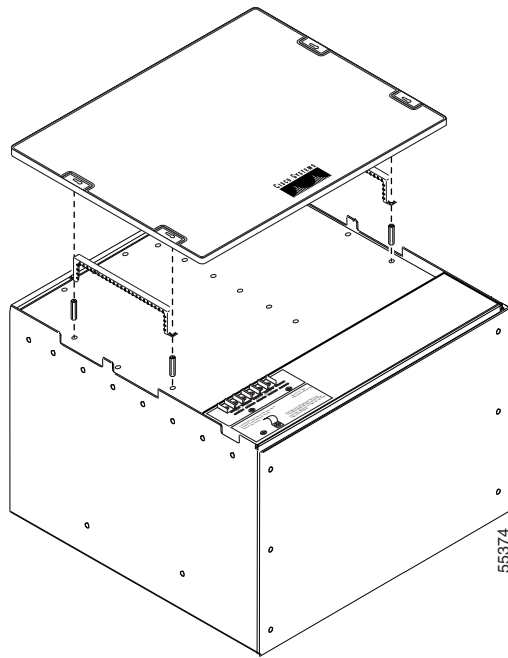
Tip

Only six screws (three on each side) line up with the screw slots on the mounting brackets, making the screws easy to locate.

- Step 2** Loosen the top and bottom screws on one edge of the backplane to provide room to slide the mounting brackets into place using the U-shaped screw slots on each end.
- Step 3** Slide one of the mounting brackets into place and tighten the screws.
- Step 4** Repeat Steps 2 and 3 for the second mounting bracket.
- Step 5** Attach the cover by hanging it from the mounting screws on the back of the mounting brackets and pulling it down until it fits snugly into place.

Figure 1-28 shows rear cover installation using spacers.

Figure 1-28 *Installing the Rear Cover with Spacers*



- Step 6** Continue with the [“NTP-G14 Install DWDM Equipment”](#) procedure on page 1-67.
- Stop. You have completed this procedure.**
-

NTP-G14 Install DWDM Equipment

Purpose	This procedure installs the optional DWDM assemblies.
Tools/Equipment	#2 Phillips screwdriver Crimping tool (large enough for #10 to #14 AWG) #14 AWG wire
Prerequisite Procedures	NTP-G2 Install the Shelf Assembly, page 1-8
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Complete the “[DLP-G27 Install the DCU Shelf Assembly](#)” task on page 1-68 as needed.
- Step 2** Complete the “[DLP-G28 Install the Fiber Patch-Panel Tray](#)” task on page 1-68 as needed.
- Step 3** Complete the “[DLP-G29 Install the Fiber-Storage Tray](#)” task on page 1-69 as needed.
- Step 4** Complete the “[DLP-G8 Install the Air Ramp](#)” task on page 1-19 as needed.
- Step 5** Complete the “[DLP-G30 Install the FlexLayer Shelf](#)” task on page 1-69 as needed.



Note Procedures for installing FlexLayer hardware in this chapter require that you have a network plan calculated for your DWDM network with Cisco MetroPlanner, Release 2.5. MetroPlanner is a DWDM planning tool that is available your Cisco account representative. MetroPlanner prepares a shelf plan for each network node and calculates the power and attenuation levels for the DWDM cards installed in the node. For information about Cisco MetroPlanner, refer to the *Cisco MetroPlanner DWDM Operations Guide*, Release 2.5.

- Step 6** Complete the “[DLP-G31 Install the FlexLayer Modules](#)” task on page 1-70 as needed.
- Step 7** Complete the “[DLP-G32 Install the Y-Cable Protection Modules](#)” task on page 1-71 as needed.

Stop. You have completed this procedure.

DLP-G27 Install the DCU Shelf Assembly

Purpose	If you are installing dispersion compensation modules, use this task to install the Dispersion Compensation Unit (DCU) chassis.
Tools/Equipment	#2 Phillips screwdriver Crimping tool #14 AWG wire and lug
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** The DCU chassis requires 1 rack unit (RU) in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan. See the [“15.5 Typical DWDM Rack Layouts” section on page 15-17](#) for common site layout plans.
- Step 2** Two sets of mounting brackets are included with the DCU mounting kit, one set each for 19-inch (482.6-mm) or 23-inch (584.2-mm) racks. Verify that your chassis is equipped with the correct set of brackets for your rack. Change the brackets as required.
- Step 3** Align the chassis with the rack mounting screw holes; one at a time, insert and tighten the four screws.
- Step 4** Connect a frame ground to the ground terminal provided on either side of the chassis. Use minimum #14 AWG wire.
- Step 5** Return to your originating procedure (NTP).
-

DLP-G28 Install the Fiber Patch-Panel Tray

Purpose	This task installs the fiber patch-panel tray.
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** The fiber patch-panel tray requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan. See the [“15.5 Typical DWDM Rack Layouts” section on page 15-17](#) for common site configurations.
- Step 2** Verify that the mounting brackets attached to the unit are correct for your rack size. Complete [“DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch \(482.6-mm\) Rack \(ANSI Only\)” task on page 1-10](#) as required.

- Step 3** Align the chassis with the rack mounting screw holes, then insert and tighten the four screws.
- Step 4** Return to your originating procedure (NTP).
-

DLP-G29 Install the Fiber-Storage Tray

Purpose	This task installs the fiber-storage tray. The fiber-storage tray stores slack fiber-optic cable.
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** The fiber-storage tray requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan. See the [“15.5 Typical DWDM Rack Layouts”](#) section on page 15-17 for common site configurations.
- Step 2** Verify that the mounting brackets attached to the unit are correct for your rack size. Complete [“DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch \(482.6-mm\) Rack \(ANSI Only\)”](#) task on page 1-10 as required.
- Step 3** Align the chassis with the rack mounting screw holes, insert the screws (4), and tighten.
- Step 4** Return to your originating procedure (NTP).
-

DLP-G30 Install the FlexLayer Shelf

Purpose	This task installs the FlexLayer shelf. Perform this task if you are installing any FlexLayer modules.
Tools/Equipment	#2 Phillips screwdriver FlexLayer shelf assembly (15216-FL-SA)
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** The FlexLayer shelf requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan. Refer to [Chapter 15, “Shelf Hardware Reference”](#) for typical DWDM site layout plans.
- Step 2** A set of mounting brackets are included with the FlexLayer mounting kit, one set each for 19-inch (482.6-mm) or 23-inch (584.2-mm) racks. Verify that your chassis is equipped with the correct set of brackets for your rack. Change the brackets as required.

- Step 3** Align the chassis with the rack mounting screw holes; one at a time, insert and tighten the three screws.
- Step 4** Repeat this task as necessary for each FlexLayer shelf assembly you want to install.
- Step 5** Return to your originating procedure (NTP).

DLP-G31 Install the FlexLayer Modules

Purpose	This task installs the FlexLayer modules in the FlexLayer shelf assembly. You can only install two-channel FlexLayer modules.
Tools/Equipment	#2 Phillips screwdriver FlexLayer modules
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** Determine the FlexLayer modules that you want to install in the FlexLayer shelf. The FlexLayer shelf can house up to four Add/Drop FlexLayer modules or four Y-cable splitter modules. [Table 1-11](#) lists the two-channel FlexLayer modules and part numbers. Refer to [Chapter 15, “Shelf Hardware Reference”](#) for more information about FlexLayer modules.

Table 1-11 ONS 15xxx FlexLayer Hardware Part Numbers

Part Number	Description
2 Channel Add/Drop FlexLayer Modules	
15216-FLB-2-31.1=	ITU-100 GHz 2 Ch, FlexMod - 1530.33 and 1531.12
15216-FLB-2-32.6=	ITU-100 GHz 2 Ch, FlexMod - 1531.90 and 1532.68
15216-FLB-2-35.0=	ITU-100 GHz 2 Ch, FlexMod - 1534.25 and 1535.04
15216-FLB-2-36.6=	ITU-100 GHz 2 Ch, FlexMod - 1535.82 and 1536.61
15216-FLB-2-38.9=	ITU-100 GHz 2 Ch, FlexMod - 1538.19 and 1538.98
15216-FLB-2-40.5=	ITU-100 GHz 2 Ch, FlexMod - 1539.77 and 1540.56
15216-FLB-2-42.9=	ITU-100 GHz 2 Ch, FlexMod - 1542.14 and 1542.94
15216-FLB-2-44.5=	ITU-100 GHz 2 Ch, FlexMod - 1543.73 and 1544.53
15216-FLB-2-46.9=	ITU-100 GHz 2 Ch, FlexMod - 1546.12 and 1546.92
15216-FLB-2-48.5=	ITU-100 GHz 2 Ch, FlexMod - 1547.72 and 1548.51
15216-FLB-2-50.9=	ITU-100 GHz 2 Ch, FlexMod - 1550.12 and 1550.92
15216-FLB-2-52.5=	ITU-100 GHz 2 Ch, FlexMod - 1551.72 and 1552.52
15216-FLB-2-54.9=	ITU-100 GHz 2 Ch, FlexMod - 1554.13 and 1554.94
15216-FLB-2-56.5=	ITU-100 GHz 2 Ch, FlexMod - 1555.75 and 1556.55
15216-FLB-2-58.9=	ITU-100 GHz 2 Ch, FlexMod - 1558.17 and 1558.98
15216-FLB-2-60.6=	ITU-100 GHz 2 Ch, FlexMod - 1559.79 and 1560.61

Step 2 Insert the appropriate module into the FlexLayer shelf assembly.

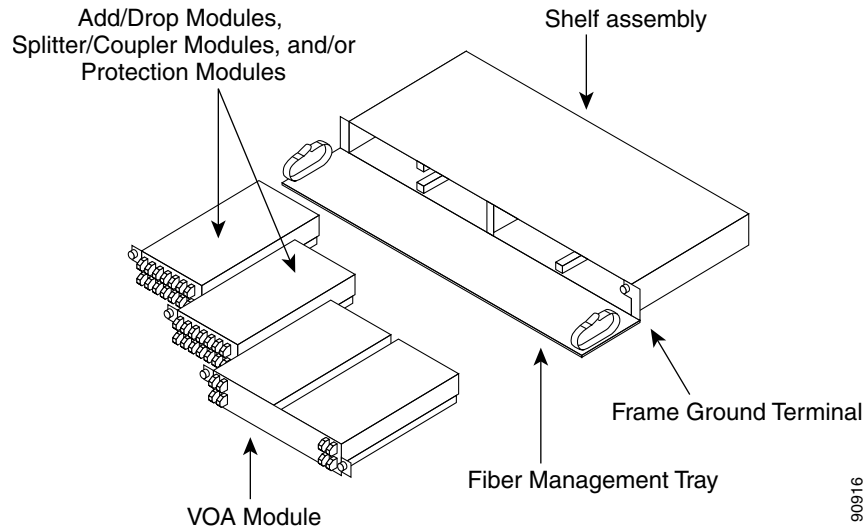


Note FlexLayer modules are not listed in generated Cisco MetroPlanner 2.5 site plans.

Step 3 Use a Phillips screwdriver to install the two accompanying screws.

Figure 1-29 shows the FlexLayer shelf assembly and how the FlexLayer modules can be installed.

Figure 1-29 ONS 15xxx FlexLayer Shelf Assembly



Step 4 Repeat this task as necessary for each FlexLayer module you want to install.

Step 5 Return to your originating procedure (NTP).

DLP-G32 Install the Y-Cable Protection Modules

Purpose	This task installs the Y-cable protection modules in the FlexLayer shelf assembly.
Tools/Equipment	#2 Phillips screwdriver Y-Cable modules: • Multi-Mode Y Cable Protection FlexMod: 15216-CS-MM-Y= • Single-Mode Y Cable Protection FlexMod: 15216-CS-SM-Y=
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Determine the Y-cable modules that you want to install in the FlexLayer shelf.

- Step 2** Insert the appropriate Y-cable module into the FlexLayer shelf assembly. Use a Phillips screwdriver to install the two accompanying screws.
- Step 3** Repeat this task as necessary for each Y-cable module you want to install ([Figure 15-12 on page 15-14](#)).
- Step 4** Return to your originating procedure (NTP).

NTP-G15 Install the Common Control Cards

Purpose	This procedure describes how to install the common control cards.
Tools/Equipment	Redundant TCC2/TCC2P cards AIC-I card (optional)
Prerequisite Procedures	NTP-G2 Install the Shelf Assembly, page 1-8 NTP-G14 Install DWDM Equipment, page 1-67
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher



Warning

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 shock yourself. Statement 94



Caution

Always use the supplied ESD wristband when working with a powered ONS 15454. Plug the wristband cable into the ESD jack located on the lower-right outside to edge of the shelf assembly.



Note

If protective clips are installed on the backplane connectors of the cards, remove the clips before installing the cards.



Note

If you install a card incorrectly, the FAIL LED flashes continuously.

- Step 1** Complete the [“DLP-G33 Install the TCC2 or TCC2P Card” task on page 1-73](#).



Note

If you install the wrong card in a slot, see the [“NTP-G107 Remove and Replace DWDM Cards” procedure on page 12-1](#).

- Step 2** Complete the [“DLP-G34 Install the AIC-I Card” task on page 1-76](#), if necessary.

- Step 3** Continue with the [“NTP-G16 Perform the Shelf Installation Acceptance Test” procedure on page 1-77](#).

DLP-G33 Install the TCC2 or TCC2P Card

Purpose	This task installs redundant TCC2/TCC2P cards. The first card you install in the ONS 15454 must be a TCC2/TCC2P card, and it must initialize before you install any cross-connect or traffic cards.
Tools/Equipment	Two TCC2/TCC2P cards
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None



Caution

Do not remove a TCC2/TCC2P card during the software transfer process, which is indicated by alternate flashing FAIL and ACT/STBY LEDs. Removing a TCC2/TCC2P during the software transfer process will corrupt the system memory.



Note

Allow each card to boot completely before installing the next card.

Step 1 Open the latches/ejectors of the first TCC2/TCC2P card that you will install.

Step 2 Use the latches/ejectors to firmly slide the card along the guide rails until the card plugs into the receptacle at the back of the slot (Slot 7 or 11).



Note

In [Step 4](#) you will be instructed to watch the LED activity (sequence) on the front of the TCC2/TCC2P card. This activity begins immediately after you close the latches in [Step 3](#).

Step 3 Verify that the card is inserted correctly and close the latches/ejectors on the card.



Note

It is possible to close the latches/ejectors when the card is not completely plugged into the back panel of the shelf assembly. Ensure that you cannot insert the card any farther.

If you insert a card into a slot provisioned for a different card, all LEDs turn off.

Step 4 As needed, go to [Step a](#) to verify the LED activity on the TCC2 card. For the TCC2P card, go to [Step b](#).

a. For the TCC2 card:

- All LEDs turn on for about 5 seconds. The red FAIL LED, the yellow ACT/STBY LED, the red REM LED, the green SYNC LED, and the green ACO LED turn on for about 10 seconds.
- The red FAIL LED and the green ACT/STBY LED turn on for about 40 seconds.
- The red FAIL LED blinks for about 10 seconds. (If both TCC2 cards are installed, this LED blinks on the other TCC2 card, as well.)
- The red FAIL LED turns on for about 5 seconds.
- Both green PWR LEDs turn on for 5 seconds. The PWR LEDs then turn red for 2 to 3 minutes before going to steady green.

- While the PWR LEDs are red, the ACT/STBY, MJ, and MN LEDs turn on, followed by the SNYC LED.
- The boot up process is complete when the PWR LEDs turn green and the ACT/STBY remains on. (The ACT/STBY LED will be green if this is the first TCC2 card installed, and amber if this is the second TCC2 card installed.)



Note It might take up to 4 minutes for the A and B power alarms to clear.



Note Alarm LEDs might be on; disregard alarm LEDs until you are logged into CTC and can view the Alarms tab.



Note If you are logged into CTC, the SFTWDOWN alarm might appear as many as two times while the TCC2 card initializes. The alarm should clear after the card completely boots.



Note If the FAIL LED is on continuously, see the tip below about the TCC2 card automatic upload.

b. For the TCC2P card:

- All LEDs turn on briefly. The red FAIL LED, the yellow ACT/STBY LED, the red REM LED, the green SYNC LED, and the green ACO LED turn on for about 10 seconds.
- The red FAIL LED and the green ACT/STBY LED turn on for about 40 seconds.
- The red FAIL LED blinks for about 10 seconds. (If both TCC2 cards are installed, this LED blinks on the other TCC2 card as well.)
- The red FAIL LED turns on for about 5 seconds.
- The red FAIL LED blinks for about 5 seconds and then becomes solid.
- All LEDs (including the CRIT, MAJ, MIN, REM, SYNC, and ACO LEDs) blink once and turn off for about 10 seconds.
- Both green PWR LEDs turn on for 5 seconds. The PWR LEDs then turn red for 2 to 3 minutes before going to steady green.
- The yellow ACT/STBY turns on and the PWR LEDs turn red for 2 to 3 minutes. (The Sync LED may be green at this time.)
- The yellow ACT/STBY LED turns on. (The ACT/STBY LED might take several minutes to turn on while the DCC processor boots.)



Note It might take up to 3 minutes for the A and B power alarms to clear.



Note Alarm LEDs might be on; disregard alarm LEDs until you are logged into CTC and can view the Alarms tab.

**Note**

If you are logged into CTC, the SFTWDOWN alarm might appear as many as two times while the TCC2P card initializes. The alarm should clear after the card completely boots.

**Note**

If the FAIL LED is on continuously, see the tip in [Step 8](#) about the TCC2P card automatic upload.

Step 5 Verify that the ACT/STBY LED is green if this is the first powered-up TCC2/TCC2P card installed, or yellow for standby if this is the second powered-up TCC2/TCC2P. The IP address, temperature of the node, and time of day appear on the LCD. The default time and date is 12:00 AM, January 1, 1970.

Step 6 The LCD cycles through the IP address, node name, and software version. Verify that the correct software version displays on the LCD.

Step 7 If the LCD shows the correct software version, continue with [Step 8](#). If the LCD does not show the correct software version, refer to your next level of technical support, upgrade the software, or remove the TCC2/TCC2P card and install a replacement card.

Refer to the release-specific software upgrade document to replace the software. To exchange the TCC2/TCC2P card, refer to the *Cisco ONS 15454 Troubleshooting Guide* or the *Cisco ONS 15454 SDH Troubleshooting Guide*.

Step 8 Repeat Steps [1](#) through [7](#) for the redundant TCC2/TCC2P card. If both TCC2/TCC2P cards are already installed, proceed to [Step 9](#).

**Tip**

If you install a standby TCC2/TCC2P card that has a different software version than the active TCC card, the newly installed standby TCC2/TCC2P card automatically copies the software version from the active TCC2/TCC2P card. You do not need to do anything in this situation. However, the loading TCC2/TCC2P card does not boot up in the normal manner. When the standby card is first inserted, the LEDs follow most of then normal bootup sequence. After the red FAIL LED turns on for about 5 seconds, the FAIL LED and the ACT/STBY LED begin to flash alternately for up to 30 minutes while the new software loads onto the active TCC2/TCC2P card. After loading the new software, the upgraded TCC2/TCC2P card's LEDs repeat the appropriate bootup sequence, and the amber ACT/STBY LED turns on.

**Note**

If you insert a card into a slot provisioned for a different card, all LEDs turn off.

**Note**

Alarm LEDs might be on; disregard alarm LEDs until you are logged into CTC and can view the Alarms tab.

Step 9 Return to your originating procedure (NTP).

DLP-G34 Install the AIC-I Card

Purpose	This task installs the AIC-I card. The AIC-I card provides connections for external alarms and controls (environmental alarms).
Tools/Equipment	AIC-I card
Prerequisite Procedures	DLP-G33 Install the TCC2 or TCC2P Card, page 1-73
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None



Note When installing cards, allow each card to boot completely before installing the next card.

- Step 1

Open the latches/ejectors on the card.
- Step 2

Use the latches/ejectors to firmly slide the card along the guide rails in Slot 9 until the card plugs into the receptacle at the back of the slot.
- Step 3

Verify that the card is inserted correctly and close the latches/ejectors on the card.



Note It is possible to close the latches/ejectors when the card is not completely plugged into the backplane. Ensure that you cannot insert the card any further.

- Step 4

Verify the following:

 - The red FAIL LED turns on for 1 second, then blinks for up to 5 seconds.
 - The PWR A and PWR B LEDs become red and the two INPUT/OUTPUT LEDs become green for approximately 3 seconds.
 - The PWR A LED turns green, the INPUT/OUTPUT LEDs turn off, and the ACT LED turns on.



Note It might take up to 3 minutes for the PWR A and PWR B LEDs to update.



Note If the red FAIL LED does not turn on, check the power.



Note If you insert a card into a slot provisioned for a different card, no LEDs turn on.



Note If the red FAIL LED is on continuously or the LEDs act erratically, the card is not installed properly. Remove the card and repeat Steps 1 to 4.

- Step 5

Return to your originating procedure (NTP).

NTP-G16 Perform the Shelf Installation Acceptance Test

Purpose	Use this procedure to perform a shelf installation acceptance test for the ONS 15454 ETSI and ONS 15454 ANSI.
Tools/Equipment	Voltmeter Oval and/or block ferrites
Prerequisite Procedures	Applicable procedures in Chapter 1, “Install the Shelf and Common Control Cards”
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** If you installed an ONS 15454 ETSI shelf, complete [Table 1-12](#) by verifying that each applicable procedure was completed.

Table 1-12 ONS 15454 ETSI Shelf Installation Task Summary

Description	Completed
NTP-G1 Unpack and Inspect the Shelf Assembly, page 1-6	
NTP-G2 Install the Shelf Assembly, page 1-8	
NTP-G3 Open and Remove the Front Door, page 1-20	
NTP-G4 Open and Remove the FMEC Cover (ETSI Only), page 1-23	
NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), page 1-28	
NTP-G7 Install the Power and Ground, page 1-30	
NTP-G8 Install the Fan-Tray Assembly, page 1-40	
NTP-G10 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections, page 1-47	
NTP-G12 Install and Close the FMEC Cover (ETSI Only), page 1-64	
NTP-G14 Install DWDM Equipment, page 1-67	
NTP-G15 Install the Common Control Cards, page 1-72	

- Step 2** If you installed an ONS 15454 ANSI shelf, complete [Table 1-13](#) by verifying that each applicable procedure was completed.

Table 1-13 ONS 15454 ANSI Shelf Installation Task Summary

Description	Completed
NTP-G1 Unpack and Inspect the Shelf Assembly, page 1-6	
NTP-G2 Install the Shelf Assembly, page 1-8	
NTP-G3 Open and Remove the Front Door, page 1-20	
NTP-G5 Remove the Backplane Covers (ANSI Only), page 1-26	
NTP-G7 Install the Power and Ground, page 1-30	

Table 1-13 ONS 15454 ANSI Shelf Installation Task Summary (continued)

Description	Completed
NTP-G8 Install the Fan-Tray Assembly, page 1-40	
NTP-G9 Install the Alarm Expansion Panel (ANSI Only), page 1-44	
NTP-G10 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections, page 1-47	
NTP-G11 Install an External Wire-Wrap Panel on the AEP (ANSI Only), page 1-59	
NTP-G13 Install the Rear Cover (ANSI Only), page 1-65	
NTP-G14 Install DWDM Equipment, page 1-67	
NTP-G15 Install the Common Control Cards, page 1-72	

Step 3 Complete the “DLP-G35 Inspect the Shelf Installation and Connections” task on page 1-78.

Step 4 Complete the “DLP-G36 Measure Voltage” task on page 1-79.

Step 5 Continue with [Chapter 2, “Connect the PC and Log into the GUI.”](#)

Stop. You have completed this procedure.

DLP-G35 Inspect the Shelf Installation and Connections

Purpose	Use this task to inspect the shelf installation and connections and verify that everything is installed and connected properly.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Make sure all external wiring connections on the backplane (i.e. power, ground, alarms, etc.) are secure. If a wire or cable is loose, return to the appropriate procedure in this chapter to correct it.
- Step 2** (ETSI only) To check that the FMEC cover is seated correctly, verify that it can be easily closed without disturbing cables.
- Step 3** Return to your originating procedure (NTP).
-

DLP-G36 Measure Voltage

Purpose	Use this task to measure the power to verify correct power and returns.
Tools/Equipment	Voltmeter
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Using a voltmeter, verify the office ground and power:
- Place the black lead (positive) on the frame ground on the bay. Hold it there while completing [Step b](#).
 - Place the red lead (negative) on the fuse power points on the third-party power distribution panel to verify that they read between -40.5 VDC and -57 VDC (power) and 0 (return ground).
- Step 2** Using a voltmeter, verify the shelf ground and power wiring:
- Place the black lead (positive) on the RET1 and the red lead on the BAT1 point. Verify a reading between -40.5 VDC and -57 VDC. If there is no voltage, check the following and correct if necessary:
 - Battery and ground are reversed to the shelf.
 - Battery is open or missing.
 - Return is open or missing.
- Step 3** Repeat [Step 1](#) and [Step 2](#) for the RET2 and BAT2 of the redundant power supply input.
- Step 4** Return to your originating procedure (NTP).
-

