Install the Shelf and Backplane Cable

This chapter provides procedures for installing the Cisco ONS 15454. To view a summary of the tools and equipment required for installation, see the "Required Tools and Equipment" section on page 1-2.

Note Except where noted, the procedures and tasks in this chapter apply to DWDM (Software Release 4.5) and non-DWDM (Software R4.1 and earlier) nodes.

Before You Begin

This section lists the chapter procedures (NTPs). Turn to a procedure for applicable tasks (DLPs).

1. NTP-A1 Unpack and Inspect the ONS 15454 Shelf Assembly, page 1-4—Complete this procedure before continuing with the "NTP-A2 Install the Shelf Assembly" procedure on page 1-6.
2. NTP-A2 Install the Shelf Assembly, page 1-6—Complete this procedure to install the shelf assembly in a rack.
3. NTP-A3 Open and Remove the Front Door, page 1-13—Complete this procedure to access the equipment before continuing with other procedures.
4. NTP-A4 Remove the Backplane Covers, page 1-16—Complete this procedure to access the backplane before continuing with other procedures.
5. NTP-A5 Install the Electrical Interface Assemblies, page 1-17—Complete this procedure if you plan to install electrical cards. This procedure is a prerequisite to the "NTP-A9 Install the Electrical Card Cables on the Backplane" procedure on page 1-48.
6. NTP-A6 Install the Power and Ground, page 1-24—Complete this procedure before continuing with the "NTP-A7 Install the Fan-Tray Assembly" procedure on page 1-30.
7. NTP-A7 Install the Fan-Tray Assembly, page 1-30—Complete this procedure to install the fan-tray assembly in the shelf.
8. NTP-A119 Install the Alarm Expansion Panel, page 1-32—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.
9. NTP-A8 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections, page 1-36—Complete as needed to set up wire-wrap pin connections.
10. NTP-A120 Install an External Wire-Wrap Panel to the AEP, page 1-43—Complete this procedure to connect an external wire-wrap panel to the alarm expansion panel (AEP).

11. NTP-A9 Install the Electrical Card Cables on the Backplane, page 1-48—Complete this procedure if you plan to install electrical cards.
12. NTP-A10 Route Electrical Cables, page 1-56—Complete this procedure as needed before continuing with the "NTP-A11 Install the Rear Cover" procedure on page 1-58.
13. NTP-A11 Install the Rear Cover, page 1-58—Complete this procedure as needed to install the rear cover.
14. NTP-A12 Install Ferrites, page 1-60—Complete this procedure to attach ferrites to power cables.
15. NTP-A238 Install Optional DWDM Equipment, page 1-63—Complete this procedure if you are installing the optional equipment associated with DWDM applications.
16. NTP-A13 Perform the Shelf Installation Acceptance Test, page 1-65—Complete this procedure to determine if you have correctly completed all other procedures in the chapter.

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.**

Warning **The ONS 15454 is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock, key, or other means of security. A restricted access area is controlled by the authority responsible for the location.**

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

Required Tools and Equipment

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

Cisco-Supplied Materials

The following materials are required and are shipped with the ONS 15454 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)
- Clear plastic rear cover (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)

The following materials are required to install the optional Air Ramp. The number in parentheses gives the quantity of the item included in the package

- M4.0x 8mm,SS pan-head Phillips mounting screws (2)
- Mounting Brackets, 19-inch, 23-inch (2)

User-Supplied Materials

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

- One or more of the following equipment racks:
  - 19-inch ANSI Standard (GR-63-CORE) (482.6 mm) rack; total width 22 inches (558.8 mm)
  - 23-inch ANSI Standard (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), #10 AWG, copper conductors, 194°F [90°C])

Note If you are installing power on a 15454-SA-NEBS3E, 15454-SA-NEBS3, or 15454-SA-R1, P/N: 800-07149 shelf assembly, a #10 to #12 AWG power cable is required.

- Ground cable #6 AWG stranded

Note If you are installing power on a 15454-SA-NEBS3E, 15454-SA-NEBS3 or 15454-SA-R1, P/N: 800-07149 shelf assembly, the #10 AWG ground cable is required.

- Alarm cable pairs for all alarm connections, #22 or #24 AWG (0.51 mm² or 0.64 mm²), solid tinned
- 100-ohm shielded Building Integrated Timing Supply (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 feet 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

- #2 Phillips screwdriver

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

Test Equipment

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

NTP-A1 Unpack and Inspect the ONS 15454 Shelf Assembly

Purpose	This procedure unpacks the ONS 15454 and verifies the contents.
Tools/Equipment	Pinned hex (Allen) key for front door
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the "DLP-A1 Unpack and Verify the Shelf Assembly" task on page 1-4.

Step 2 Complete the "DLP-A2 Inspect the Shelf Assembly" task on page 1-5.

Step 3 Continue with the "NTP-A2 Install the Shelf Assembly" procedure on page 1-6.

Stop. You have completed this procedure.

DLP-A1 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

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 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 "Cisco-Supplied Materials" section on page 1-2.

Note The fan-tray assembly is shipped separately.

Step 5 Return to your originating procedure (NTP).

DLP-A2 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-A1 Unpack and Verify the Shelf Assembly, page 1-4
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-A8 Open the Front Cabinet Compartment (Door)" task on page 1-13.

Step 2 Verify the following:

- Pins are not bent or broken.
- 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).

NTP-A2 Install the Shelf Assembly

Purpose	This procedure describes how to reverse the mounting bracket and mount shelf assemblies in a rack.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Pinned hex key Two set screws (48-1003-XX)
Prerequisite Procedures	NTP-A1 Unpack and Inspect the ONS 15454 Shelf Assembly, page 1-4
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **To prevent the equipment from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 131°F (55°C). To prevent airflow restriction, allow at least 1 inch (25.4 mm) of clearance around the ventilation openings.**

Warning **The ONS 15454 should be installed in the lower rack position or mounted above another ONS 15454 shelf assembly.**

Warning **The ONS 15454 must have 1 inch 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 10 Gbps compatible shelf assembly (15454-SA-10G) and fan-tray assembly (15454-FTA3) are required with the ONS 15454 XC10G, OC-192, and OC-48 any slot (AS) cards.

Step 1 Complete the "DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack" task on page 1-7 if you need to convert from a 23-inch (584.2 mm) to a 19-inch (482.6 mm) rack.

Step 2 To install the air filter on the bottom of the shelf rather than beneath the fan-tray assembly, complete the "DLP-A4 Install the External Brackets and Air Filter" task on page 1-8.

Step 3 Complete the necessary rack mount task:

- DLP-A5 Mount the Shelf Assembly in a Rack (One Person), page 1-10
- DLP-A6 Mount the Shelf Assembly in a Rack (Two People), page 1-11
- DLP-A7 Mount Multiple Shelf Assemblies in a Rack, page 1-12

Step 4 Continue with the "NTP-A3 Open and Remove the Front Door" procedure on page 1-13.

Stop. You have completed this procedure.

DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack

Purpose	This task installs the mounting bracket to convert a 23-inch (584.2 mm) rack to a 19-inch (482.6 mm) rack.
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 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 shipping 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).

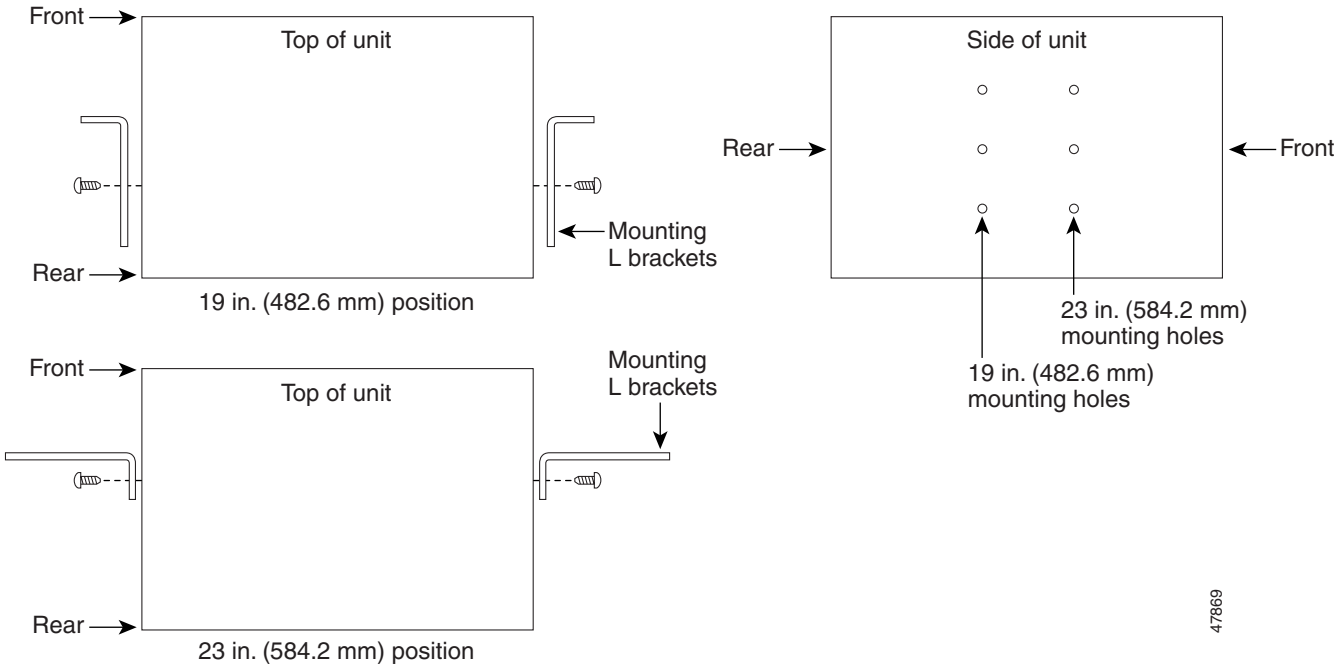
The narrow side of the mounting bracket should be towards the front of the shelf assembly. Text imprinted on the mounting bracket should be visible and upside down.

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-A4 Install the External Brackets and Air Filter

Purpose	This task installs the external brackets and air filter on the bottom of the shelf rather than beneath the fan-tray assembly.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack, page 1-7, if applicable
Required/As Needed	As needed; perform this task if you want to access the air filter without removing the fan-tray assembly.
Onsite/Remote	Onsite
Security Level	None

Note The shelf assembly ships with external (bottom) brackets that you can use to install the air filter on the bottom of the shelf rather than beneath the fan-tray assembly. When you use the brackets to install the fan-tray air filter, you do not need to remove the fan-tray assembly to access the air filter. Attach the brackets to the bottom of the shelf assembly before installing the rack.

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 face down 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.

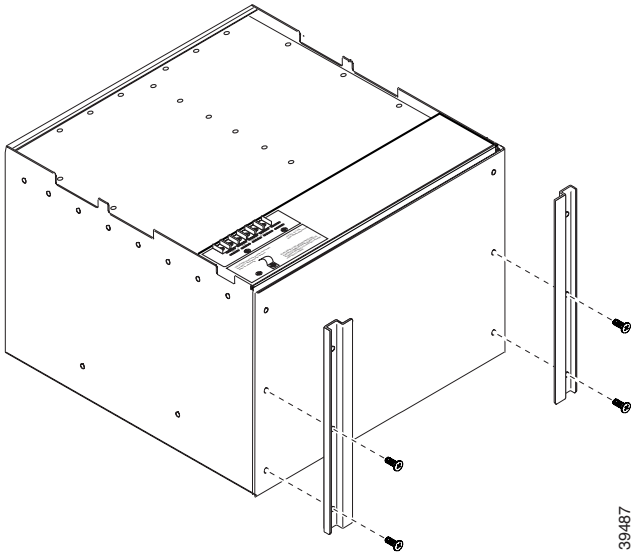
Step 2 Locate the three screw holes that run along the left and right sides of the bottom of the shelf assembly.

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 face-down 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-A5 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 key Two set screws (48-1003-XX) # 2 Phillips screwdriver
Prerequisite Procedures	DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack, page 1-7, if applicable DLP-A4 Install the External Brackets and Air Filter, page 1-8, if applicable
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Verify that the proper fuse and alarm panel has been installed in the top mounting space. If a fuse and alarm panel has not been installed, you must install one according to manufacturer's instructions.

- If installing the 15454-SA-ANSI shelf assembly, a 100-A fuse panel (30-A fuse per shelf minimum) is required.
- If 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 key that shipped with the assembly, install the two set screws into the screw holes that will not be used to mount the shelf.

Step 4 Lift the shelf assembly to the desired rack position and set it on the set screws.

Step 5 Align the screw holes on the mounting ears 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 ONS 15454 to prevent slippage.

Step 8 Remove the temporary set screws.

Step 9 Return to your originating procedure (NTP).

DLP-A6 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 key Two set screws (48-1003-XX) # 2 Phillips screwdriver
Prerequisite Procedures	DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack, page 1-7, if applicable DLP-A4 Install the External Brackets and Air Filter, page 1-8, if applicable
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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.

- If installing the 15454-SA-ANSI shelf assembly, a 100-A fuse panel (30-A fuse per shelf minimum) is required.
- If 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 key that shipped with the shelf assembly, install the two set screws (48-1003-XX) into the screw holes that will not be used to mount the shelf.

Step 4 Lift the shelf assembly to the desired position in the rack.

Step 5 Align the screw holes on the mounting ears with the mounting holes in the rack.

Step 6 While one person holds the shelf assembly in place, the other person can install one mounting screw in each side of the assembly using the Phillips screwdriver.

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 ONS 15454 to prevent slippage.

Step 8 Remove the temporary set screws.

Step 9 Return to your originating procedure (NTP).

DLP-A7 Mount Multiple Shelf Assemblies in a Rack

Purpose	This task allows multiple shelves to be assembled in a rack.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack, page 1-7, if applicable DLP-A4 Install the External Brackets and Air Filter, page 1-8, if applicable
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The ONS 15454 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.

- If installing the 15454-SA-ANSI shelf assembly, a 100-A fuse panel (30-A fuse per shelf minimum) is required.
- If 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 ONS 15454 directly below the fuse and alarm panel using the "DLP-A5 Mount the Shelf Assembly in a Rack (One Person)" task on page 1-10 or the "DLP-A6 Mount the Shelf Assembly in a Rack (Two People)" task on page 1-11.

Step 3 Repeat the task with the remaining shelves.

Step 4 Return to your originating procedure (NTP).

NTP-A3 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 key
Prerequisite Procedures	NTP-A2 Install the Shelf Assembly, page 1-6
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the "DLP-A8 Open the Front Cabinet Compartment (Door)" task on page 1-13.

Step 2 Complete the "DLP-A9 Remove the Front Door" task on page 1-14.

Step 3 Continue with the "NTP-A4 Remove the Backplane Covers" procedure on page 1-16.

Stop. You have completed this procedure.

DLP-A8 Open the Front Cabinet Compartment (Door)

Purpose	This task describes how to open the front cabinet compartment door.
Tools/Equipment	Pinned hex key
Prerequisite Procedures	NTP-A2 Install the Shelf Assembly, page 1-6
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note The ONS 15454 has an ESD plug input and is shipped with an ESD wrist strap. The ESD plug input is located on the outside edge of the shelf assembly on the right-hand 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.

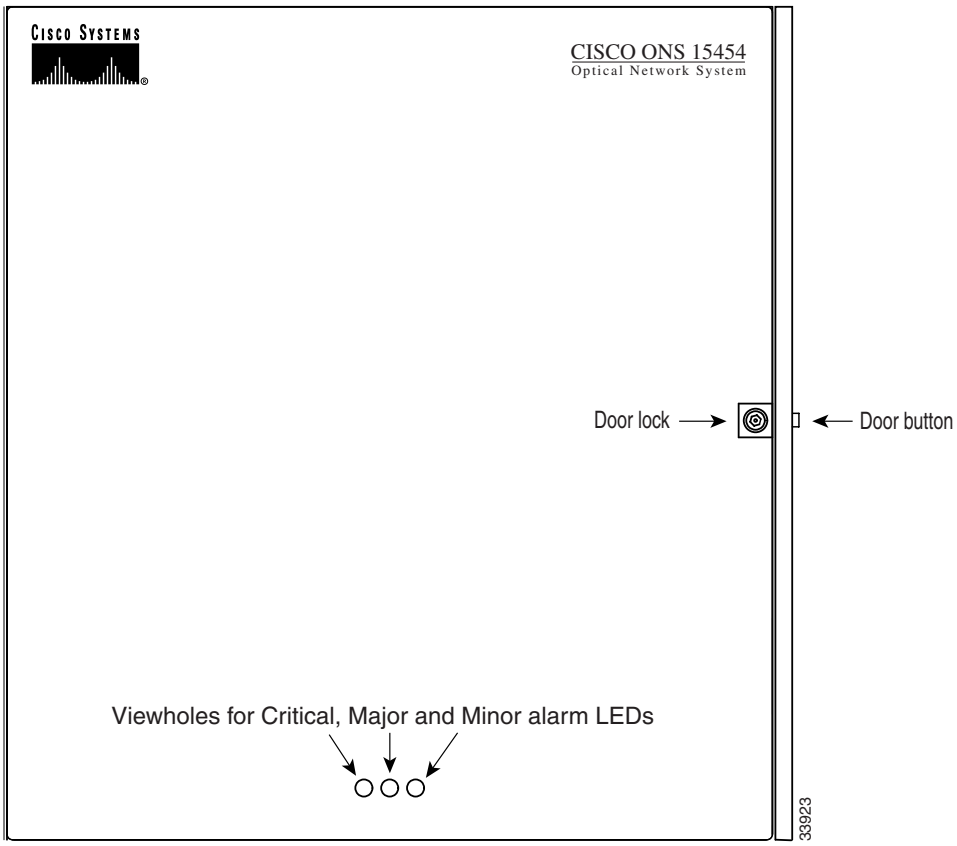
Step 1 Open the front door lock (Figure 1-3).

The ONS 15454 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.

Step 2 Press the door button to release the latch.

Step 3 Swing the door open.

Figure 1-3 Cisco ONS 15454 Front Door



Step 4 Return to your originating procedure (NTP).

DLP-A9 Remove the Front Door

Purpose	Use this task to remove the front cabinet compartment door.
Tools/Equipment	Open-end wrench
Prerequisite Procedures	DLP-A8 Open the Front Cabinet Compartment (Door), page 1-13
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

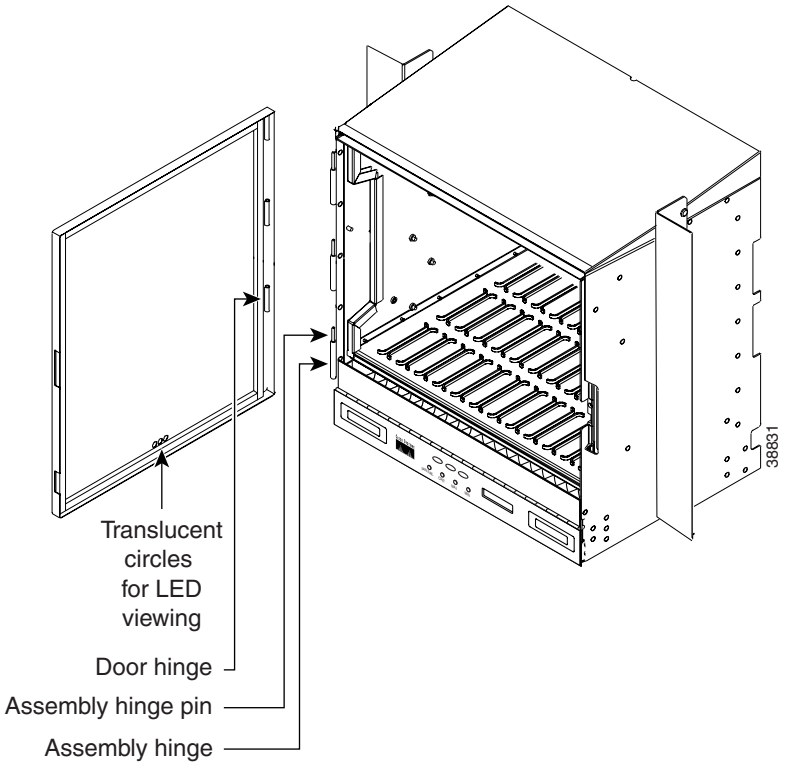
Step 1 To remove the door ground strap (available in Release 3.3 and later), perform the following:

a. To detach the ground strap from the front door, loosen the #6 kep nut (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.

b. To detach the other end of the ground strap from the longer screw on the fiber guide, loosen the #4 kep nut (49-0337-01) on the terminal lug using the open-end wrench. Remove the terminal lug and lock washer.

Step 2 Lift the door from its hinges at the top left corner of the door (Figure 1-4).

Figure 1-4 Removing the ONS 15454 Front Door



Step 3 Return to your originating procedure (NTP).

NTP-A4 Remove the Backplane Covers

Purpose	This procedure describes how to access the 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-A2 Install the Shelf Assembly, page 1-6
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the "DLP-A10 Remove the Lower Backplane Cover" task on page 1-16.

Step 2 Complete the "DLP-A11 Remove the Backplane Sheet Metal Cover" task on page 1-17.

Step 3 If you plan to install electrical interface assemblies (EIAs), continue with the "NTP-A5 Install the Electrical Interface Assemblies" procedure on page 1-17. If not, continue with the "NTP-A6 Install the Power and Ground" procedure on page 1-24.

Stop. You have completed this procedure.

DLP-A10 Remove the Lower Backplane Cover

Purpose	This task removes the lower backplane cover.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-A3 Open and Remove the Front Door, page 1-13
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Unscrew the five retaining screws that hold the clear plastic cover in place.

Step 2 Grasp the clear plastic cover on each side.

Step 3 Gently pull the cover away from the backplane.

Step 4 Return to your originating procedure (NTP).

DLP-A11 Remove the Backplane Sheet Metal Cover

Purpose	This task removes the backplane sheet cover that is installed on the backplane when EIAs are not installed.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-A3 Open and Remove the Front Door, page 1-13, DLP-A10 Remove the Lower Backplane Cover, page 1-16
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 To remove the lower clear plastic backplane cover, loosen the five screws that secure it to the ONS 15454 and pull it away from the shelf assembly.

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 EIA(s) are not installed.

Step 5 Return to your originating procedure (NTP).

NTP-A5 Install the Electrical Interface Assemblies

Purpose	This procedure describes how to install electrical interface assemblies (EIAs). Typically, an EIA panel is already installed on the backplane when the node is received, but EIA panels can be ordered separately. Refer to the *Cisco ONS 15454 Reference Manual* for descriptions of the EIAs. This procedure does not apply to DWDM (Software R4.5) nodes.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver perimeter screws (9) inner screws (12) backplane cover screws (5) EIA card (SMB, BNC, AMP Champ)
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required if the node will use electrical signals
Onsite/Remote	Onsite
Security Level	None

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.

Note EIAs are normally factory installed. Verify that the correct EIA is installed on the shelf assembly. If not, install the correct EIA.

Note You do not need to power down the shelf before removing or installing an EIA. An in-service upgrade of one EIA (A side or B side) is possible if all electrical traffic (DS-1, DS-3, DS3XM-6, and EC-1) is being carried on the other side.

Step 1 Complete the "DLP-A12 Install a BNC or High-Density BNC EIA" task on page 1-18 as needed. BNCs are locking connectors; the high-density BNC provides access to every port on every card.

Step 2 Complete the "DLP-A13 Install an SMB EIA" task on page 1-20 as needed. SMBs allow you to access every port on every card using more space and efficient cabling.

Step 3 Complete the "DLP-A14 Install the AMP Champ EIA" task on page 1-22 as needed. AMP Champs are exclusive to DS-1 cables.

Note To attach cables to the EIAs, see the "NTP-A9 Install the Electrical Card Cables on the Backplane" procedure on page 1-48.

Step 4 Continue with the "NTP-A6 Install the Power and Ground" procedure on page 1-24.

Stop. You have completed this procedure.

DLP-A12 Install a BNC or High-Density BNC EIA

Purpose	This task installs a BNC or high-density BNC EIA.
Tools/Equipment	#2 Phillips screwdriver
	Medium slot-head screwdriver
	Small slot-head screwdriver
	Perimeter screws (9)
	Inner screws (12)
	Backplane cover screws (5)
	BNC or high-density BNC card
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required if you are using DS3-12, DS3XM-6, or EC-1 card and prefer a BNC interface to an SMB interface

Onsite/Remote	Onsite
Security Level	None

Step 1 Remove the BNC or high-density BNC card from the packaging. Line up the connectors on the card with the mating connectors on the backplane. Gently push the card until both sets of connectors fit together snugly.

Step 2 Place the metal EIA panel over the card.

Step 3 Insert and tighten the nine perimeter screws (P/N 48-0358) at 8 to 10 lb. (3.6 to 4.5 kg) to secure the cover panel to the backplane.

Step 4 Insert and tighten the twelve (BNC) or nine (high-density BNC) inner screws (P/N 48-0004) at 8 to 10 lb. (3.6 to 4.5 kg) to secure the cover panel to the card and backplane.

Figure 1-5 shows a BNC EIA installation.

Figure 1-5 Installing the BNC EIA

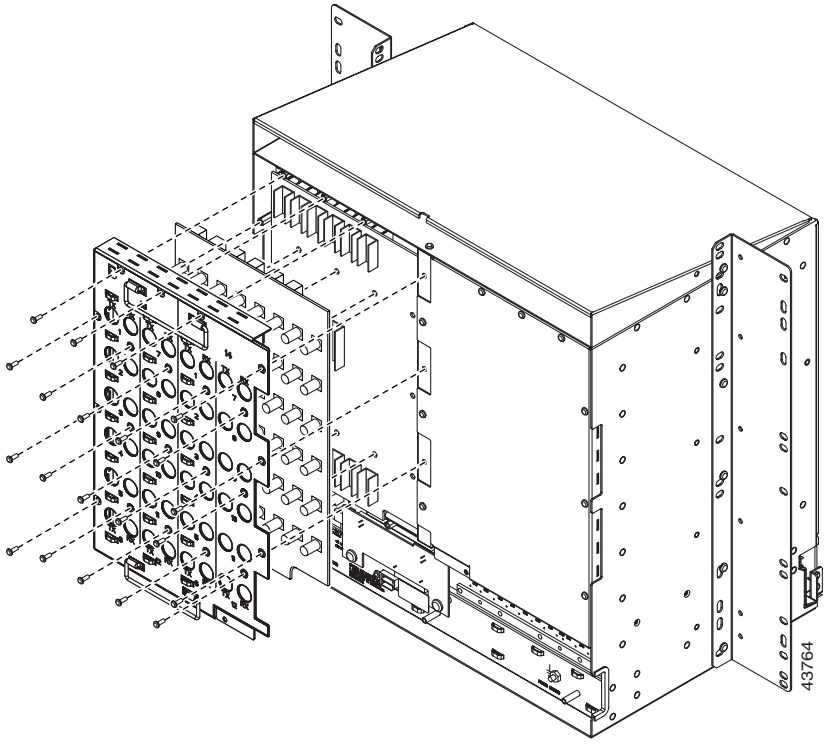
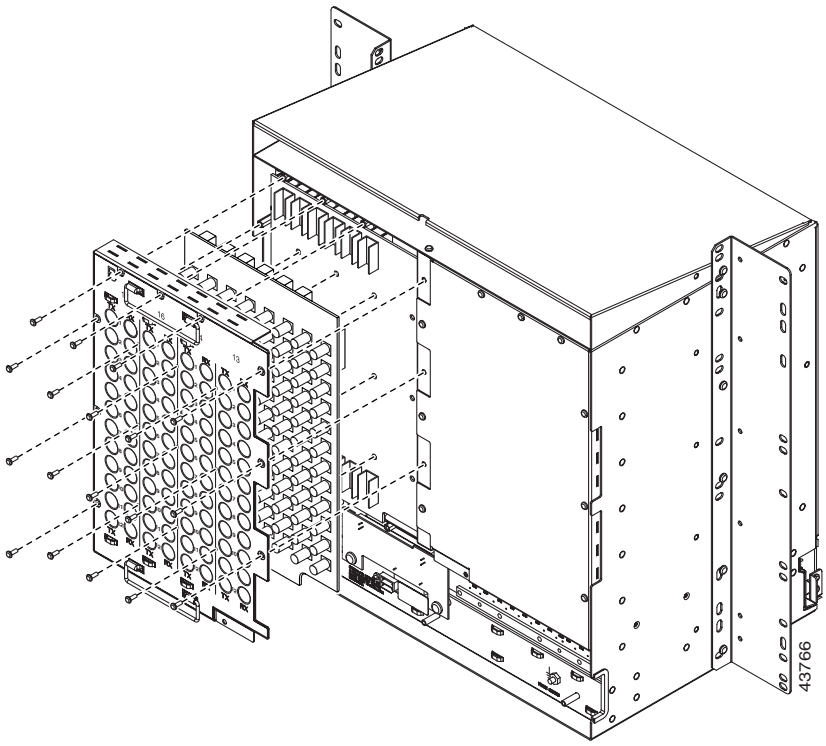


Figure 1-6 shows high-density BNC EIA installation.

Figure 1-6 Installing the High-Density BNC EIA



Step 5 Return to your originating procedure (NTP).

DLP-A13 Install an SMB EIA

Purpose	This task installs an SMB EIA.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver 9 perimeter screws 12 inner screws 5 backplane cover screws SMB card EIA panel
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required if you are using DS1-14 cards and prefer an SMB interface to an AMP interface, or if you are using DS3-12, DS3XM-6, or EC-1 cards and prefer an SMB interface to a BNC interface
Onsite/Remote	Onsite
Security Level	None

Step 1 Remove the SMB card from the packaging. Line up the connectors on the card with the mating connectors on the backplane. Gently push the card until both sets of connectors fit together snugly.

Step 2 Place the EIA panel over the card.

Step 3 Insert and tighten the nine perimeter screws (P/N 48-0358) at 8 to 10 lb. (3.6 to 4.5 kg) to secure the cover panel to the backplane.

Step 4 Insert and tighten the twelve inner screws (P/N 48-0004) at 8 to 10 lb. (3.6 to 4.5 kg) to secure the cover panel to the card and backplane.

If you are using SMB EIAs to make DS-1 connections, you need the DS-1 electrical interface adapter, commonly referred to as a balun (P/N 15454-WW-14=).

Figure 1-7 on page 1-21 shows an SMB EIA installation.

Figure 1-7 Installing the SMB EIA (Use a Balun for DS-1 Connections)

Step 5 Return to your originating procedure (NTP).

DLP-A14 Install the AMP Champ EIA

Purpose	This task installs an AMP Champ EIA.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver 9 perimeter screws 12 inner screws 5 backplane cover screws 6 AMP Champ cards EIA panel
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required if you are using DS1-14 cards and prefer an AMP interface to an SMB interface
Onsite/Remote	Onsite
Security Level	None

Step 1 Align the AMP Champ panel with the backplane and insert and tighten the nine perimeter screws (P/N 48-0358) at 8 to 10 lb. (3.6 to 4.5 kg).

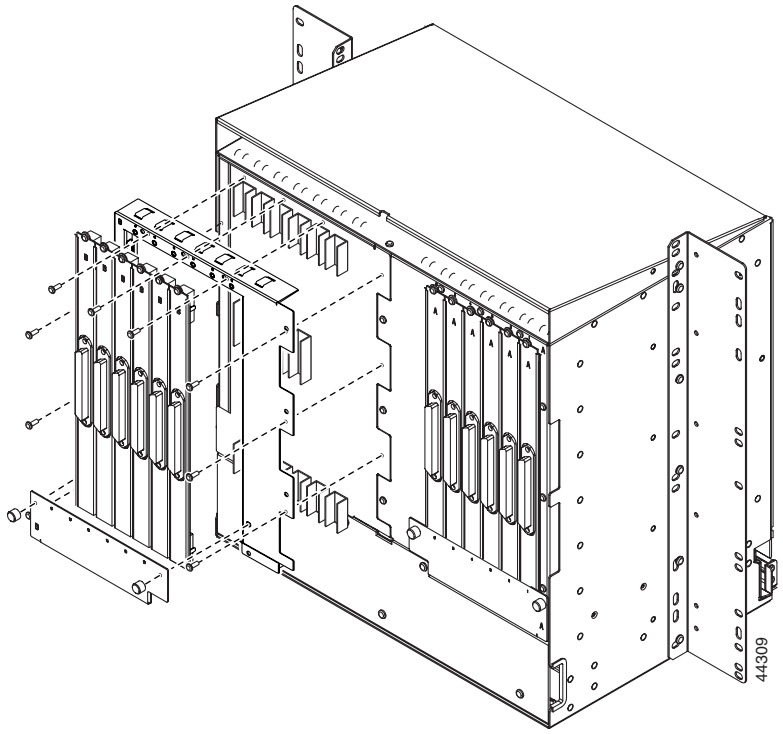
Step 2 Align an AMP Champ card with the backplane connector and push until it fits snugly. Repeat until you have installed all six AMP Champ cards.

Step 3 To secure each AMP Champ card to the cover panel, insert and tighten a screw (P/N 48-0003) at the top of each card at 8 to 10 lb. (3.6 to 4.5 kg).

Step 4 Place the AMP Champ fastening plate along the bottom of the cover panel, and hand-tighten the two thumbscrews.

Figure 1-8 shows an AMP Champ EIA installation.

Figure 1-8 Installing the AMP Champ EIA



Step 5 Return to your originating procedure (NTP).

NTP-A6 Install the Power and Ground

Purpose	This procedure describes how to install power feeds and ground the ONS 15454.
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°F [90°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 Wire wrapper Wire cutters Wire strippers Crimp tool Fuse panel
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **Shut off the power from the power source or turn off the breakers before beginning work.**

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

Warning **Do not mix conductors of dissimilar metals in a terminal or splicing connector where physical contact occurs (such as copper and aluminum, or copper and copper-clad aluminum), unless the device is suited for the purpose and conditions of use.**

Warning **Connect the ONS 15454 only to a DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-based safety standards.**

Warning **The ONS 15454 relies on the protective devices in the building installation to protect against short circuit, overcurrent, and grounding faults. Ensure that the protective devices are properly rated to protect the system, and that they comply with national and local codes.**

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

Warning **When installing redundant power feeds, do not use aluminum conductors.**

Warning **If you use redundant power leads to power the ONS 15454, disconnecting one lead will not remove power from the node.**

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 Complete one of the following:

- If using the 15454-SA-ANSI shelf, a 100-A fuse panel (30-A fuse per shelf minimum) is installed. If not, install one according to manufacturer's instructions.
- If using the 15454-SA-NEBS3 shelf, a standard 80-A fuse panel (20-A fuse per shelf minimum) is installed. If not, install one according to manufacturer's instructions.

Step 2 Complete the "DLP-A16 Connect the Office Ground to the ONS 15454" task on page 1-26.

Step 3 Complete the "DLP-A17 Connect Office Power to the ONS 15454 Shelf" task on page 1-27.

Step 4 Complete the "DLP-A18 Turn On and Verify Office Power" task on page 1-29.

Step 5 Continue with the "NTP-A7 Install the Fan-Tray Assembly" procedure on page 1-30.

Stop. You have completed this procedure.

DLP-A16 Connect the Office Ground to the ONS 15454

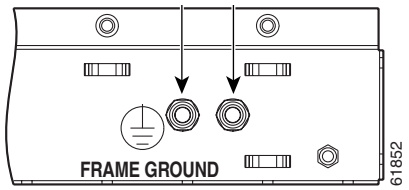
Purpose	This task connects ground to the ONS 15454 shelf.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver Screws Power cable (from fuse and alarm panel to assembly), #10 AWG, copper conductors, 194°F [90°C]) Ground cable #6 AWG stranded Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for #10 AWG copper conductors
Prerequisite Procedures	DLP-A10 Remove the Lower Backplane Cover, page 1-16
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 1-9 for the location of the ground on the backplane.

Note When terminating a frame ground, use the kep nut provided with the ONS 15454 and tighten it to a torque specification of 31 in-lb. The kep nut 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 1-9 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-A17 Connect Office Power to the ONS 15454 Shelf

Purpose	This task connects power to the ONS 15454 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°F [90°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-A16 Connect the Office Ground to the ONS 15454, page 1-26
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **Do not apply power to the ONS 15454 until you complete all installation steps and check the continuity of the -48 VDC and return.**

Note If the system loses power or both TCC+ 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-A25 Set Up Name, Date, Time, and Contact Information" procedure on page 4-6. If you are using the TCC2 cards, the system clock will be kept running for up to three hours. In this case, no action would be required.

Note If you encounter problems with the power supply, refer to the *Cisco ONS 15454 Troubleshooting Guide*.

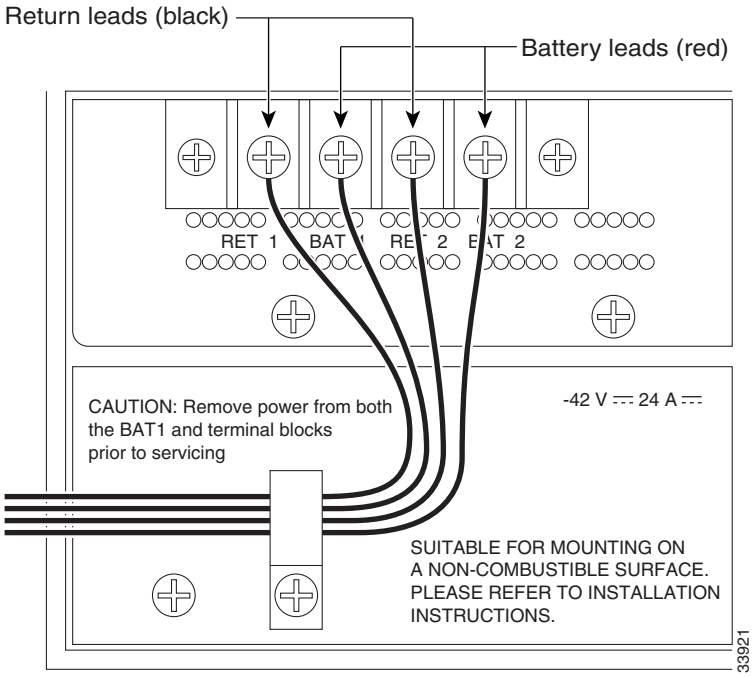
Step 1 Connect the office power according to the fuse panel engineering specifications.

Step 2 Measure and cut the cables as needed to reach the ONS 15454 from the fuse panel. Figure 1-10 shows the ONS 15454 power terminals.

Step 3 Dress the power according to local site practice.

Warning **When installing the ONS 15454, the ground connection must always be made first and disconnected last.**

Figure 1-10 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 1-10, 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 connections noncorrosive.

Warning **Do not secure multiple connectors with the same bolt assembly.**

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 1-10 on page 1-28.

Step 11 Return to your originating procedure (NTP).

DLP-A18 Turn On and Verify Office Power

Purpose	This task measures the power to verify correct power and returns.
Tools/Equipment	Voltmeter
Prerequisite Procedures	DLP-A16 Connect the Office Ground to the ONS 15454, page 1-26 DLP-A17 Connect Office Power to the ONS 15454 Shelf, page 1-27
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Using a voltmeter, verify the office battery and ground at the following points on the fuse and alarm panel:

a. 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 –42 VDC and –57 VDC. Place the red test lead on the B-side connection and verify that it is between –42 VDC and –57 VDC.

Note The voltages –42 VDC and –57 VDC are, respectively, the minimum and maximum voltages required to power the chassis.

b. 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 shelf for –48 VDC battery and ground:

a. 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 –42 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 –42 VDC and –57 VDC are, respectively, the minimum and maximum voltages required to power the chassis.

b. 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 –42 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-A7 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-A3 Open and Remove the Front Door, page 1-13 NTP-A6 Install the Power and Ground, page 1-24
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 in order to comply with GR-78-CORE, except for applications in an outside plant cabinet.

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 GR-487-CORE.

Caution The 15454-FTA3 fan-tray assembly can only be installed in ONS 15454 Release 3.1 or later shelf assemblies (15454-SA-ANSI, 800-19857). It includes a pin that does not allow it to be installed in ONS 15454 shelf assemblies released earlier than ONS 15454 Release 3.1 (15454-SA-NEBS3E, 15454-SA-NEBS3, and 15454-SA-R1, P/N 800-0714915454). Installing the 15454-FTA3 in a noncompliant shelf assembly might result in failure of the alarm interface panel (AIP), which in turn, will result in power loss to the fan-tray assembly.

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.

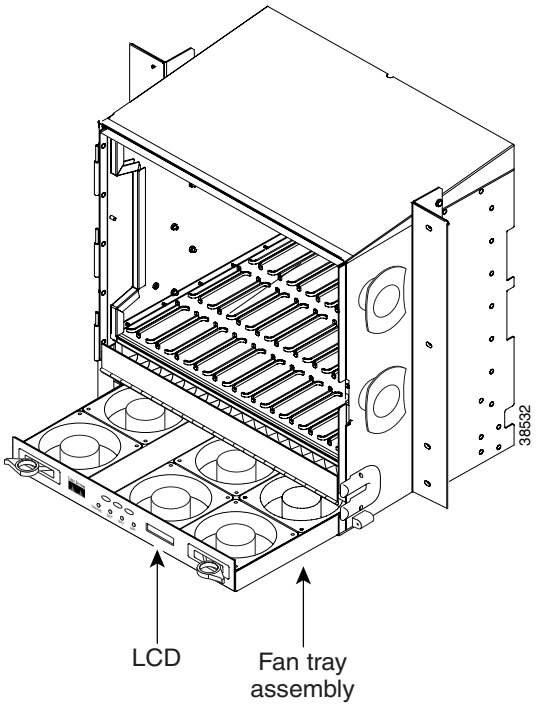
Note To install the fan-tray assembly, it is not necessary to move any of the cable-management facilities.

Step 1 Slide the fan tray into the shelf assembly until the electrical plug at the rear of the tray plugs into the corresponding receptacle on the backplane.

Step 2 To verify that the tray has plugged into the backplane, look at the fan tray and listen to determine that the fans are running.

Figure 1-11 shows the location of the fan tray.

Figure 1-11 Installing the Fan-Tray Assembly



Step 3 Continue with the "NTP-A119 Install the Alarm Expansion Panel" procedure on page 1-32 if you plan to install an Alarm Expansion Panel (AEP). If not, continue with the "NTP-A8 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections" procedure on page 1-36.

Stop. You have completed this procedure.

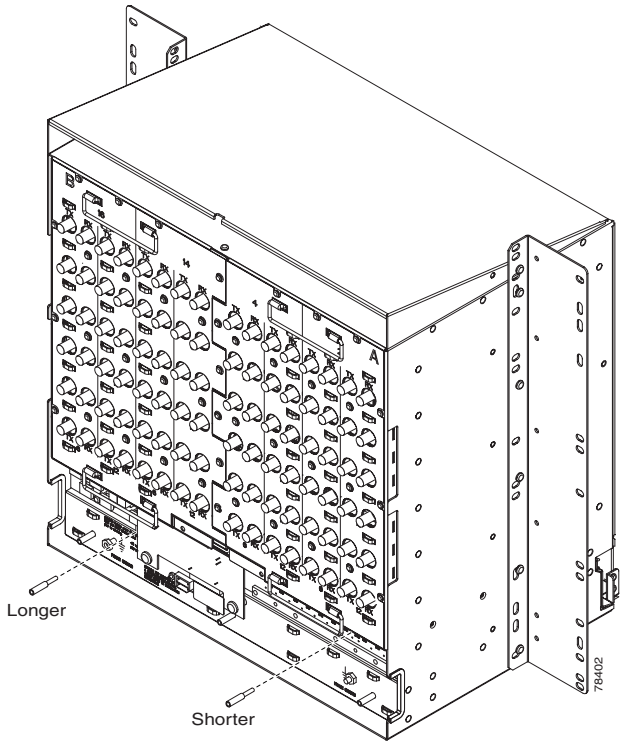
NTP-A119 Install the Alarm Expansion Panel

Purpose	This procedure installs an alarm expansion panel (AEP) onto the 15454-SA-ANSI shelf backplane. The AEP provides alarm contacts in addition to the 16 provided by the AIC-I card. Typically, the AEP is pre-installed when ordered with the ONS 15454; however, the AEP can be ordered separately.
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-A10 Remove the Lower Backplane Cover, page 1-16
Required/As Needed	Required if you are terminating more than 16 alarm contacts (16 inputs + 0 outputs or 12 inputs or 4 outputs); the AIC-I card must be installed before you can provision the alarm contacts enabled by the AEP.
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 1-12).

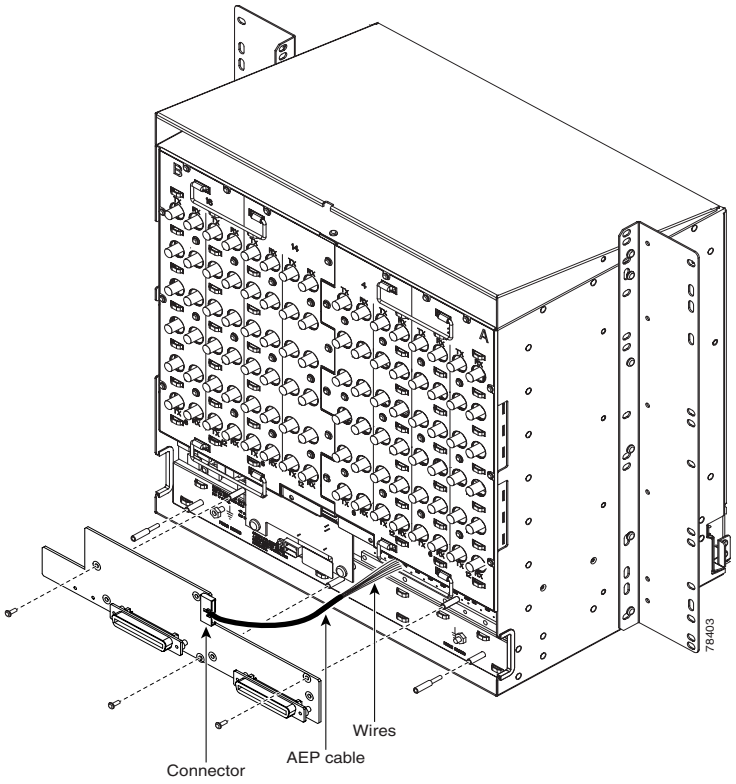
Figure 1-12 Replace Backplane Screws with Standoffs



Step 2 Attach the remaining two standoffs on either side of the backplane (Figure 1-13).

Step 3 Position the AEP board over the standoffs.

Figure 1-13 Installing Standoffs and the AEP



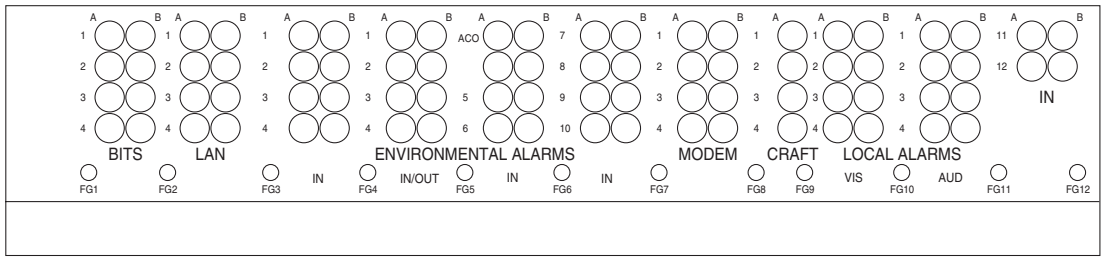
Step 4 Insert and tighten three screws to secure the AEP to the backplane.

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 1-14 shows where the cable wires are connected. Table 1-1 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 1-14 AEP Wire-Wrap Connections to Backplane Pins



Field	Pin	Function
BITS	A1	BITS Output 2 negative (–)
	B1	BITS Output 2 positive (+)
	A2	BITS Input 2 negative (–)
	B2	BITS Input 2 positive (+)
	A3	BITS Output 1 negative (–)
	B3	BITS Output 1 positive (+)
	A4	BITS Input 1 negative (–)
	B4	BITS Input 1 positive (+)
LAN	Connecting to a hub, or switch	
	A1	RJ-45 pin 6 RX–
	B1	RJ-45 pin 3 RX+
	A2	RJ-45 pin 2 TX–
	B2	RJ-45 pin 1 TX+
	Connecting to a PC/Workstation or router	
	A1	RJ-45 pin 2 RX–
	B1	RJ-45 pin 1 RX+
	A2	RJ-45 pin 6 TX–
	B2	RJ-45 pin 3 TX+
ENVIR ALARMS IN	A1	Alarm input pair number 1: Reports closure on connected wires.
	B1	
	A2	Alarm input pair number 2: Reports closure on connected wires.
	B2	
	A3	Alarm input pair number 3: Reports closure on connected wires.
	B3	
	A4	Alarm input pair number 4: Reports closure on connected wires.
	B4	
	A5	Alarm input pair number 5: Reports closure on connected wires.
	B5	
	A6	Alarm input pair number 6: Reports closure on connected wires.
	B6	
	A7	Alarm input pair number 7: Reports closure on connected wires.
	B7	
	A8	Alarm input pair number 8: Reports closure on connected wires.
	B8	
	A9	Alarm input pair number 9: Reports closure on connected wires.
	B9	
	A10	Alarm input pair number 10: Reports closure on connected wires.
	B10	
	A11	Alarm input pair number 11: Reports closure on connected wires.
	B11	
	A12	Alarm input pair number 12: Reports closure on connected wires.
	B12	

Field	Pin	Function
ENVIR ALARMS IN/OUT N/O	A1/A13	Normally open output pair number 1
	B1/B13	
	A2/A14	Normally open output pair number 2
	B2/B14	
	A3/A15	Normally open output pair number 3
	B3/B15	
	A4/A16	Normally open output pair number 4
	B4/B16	
ACO	A1	Normally open ACO pair
	B1	
CRAFT	A1	Receive (PC pin #2)
	A2	Transmit (PC pin #3)
	A3	Ground (PC pin #5)
	A4	DTR (PC pin #4)
LOCAL ALARMS AUD (Audible) N/O	A1	Alarm output pair number 1: Remote audible alarm.
	B1	
	A2	Alarm output pair number 2: Critical audible alarm.
	B2	
	A3	Alarm output pair number 3: Major audible alarm.
	B3	
	A4	Alarm output pair number 4: Minor audible alarm.
	B4	
LOCAL ALARMS VIS (Visual) N/O	A1	Alarm output pair number 1: Remote visual alarm.
	B1	
	A2	Alarm output pair number 2: Critical visual alarm.
	B2	
	A3	Alarm output pair number 3: Major visual alarm.
	B3	
	A4	Alarm output pair number 4: Minor visual alarm.
	B4	

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

83020

Table 1-1 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-A8 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections" procedure on page 1-36.

Stop. You have completed this procedure.

NTP-A8 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections

Purpose	This procedure describes how to install alarm, timing, LAN, and craft wires.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm² or 0.64 mm²) alarm wires
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the "DLP-A19 Install Alarm Wires on the Backplane" task on page 1-37 if you are using an AIC or AIC-I card and not using an AEP.

Step 2 Complete the "DLP-A20 Install Timing Wires on the Backplane" task on page 1-40 as needed. Timing wires are necessary to provision external timing.

Step 3 Complete the "DLP-A21 Install LAN Wires on the Backplane" task on page 1-41 as needed. LAN wires (or the LAN port on the TCC+/TCC2) are necessary to create an external LAN connection.

Step 4 Complete the "DLP-A22 Install the TL1 Craft Interface" task on page 1-42 as needed. Craft wires (or the EIA/TIA-232 port on the TCC+/TCC2) are required to access TL1 using the craft interface.

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 5 Complete one of the following:

- If you installed an alarm expansion panel (AEP), continue with the"NTP-A120 Install an External Wire-Wrap Panel to the AEP" procedure on page 1-43.
- If you did not install an AEP and you plan to install electrical cards, continue with the "NTP-A9 Install the Electrical Card Cables on the Backplane" procedure on page 1-48.
- If you did not install an AEP and do not plan to install electrical cards, continue with the "NTP-A11 Install the Rear Cover" procedure on page 1-58.

Stop. You have completed this procedure.

DLP-A19 Install Alarm Wires on the Backplane

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 mm² or 0.64 mm²) wires 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required to create external alarms and controls without the AEP
Onsite/Remote	Onsite
Security Level	None

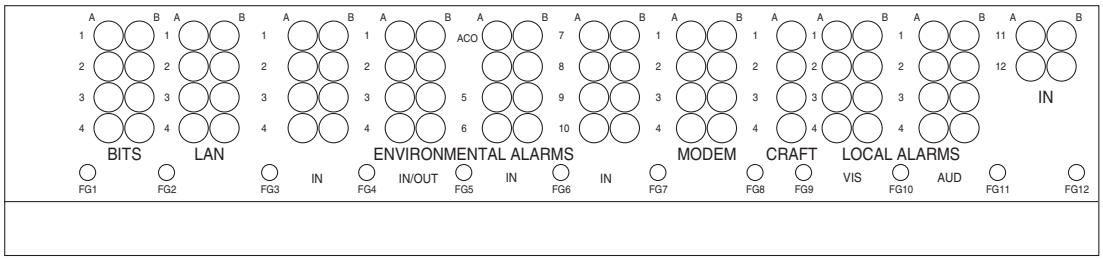
Step 1 Using 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²) twisted-pair T1-type wires, wrap the alarm wires on the appropriate wire-wrap pins according to local site practice. Ground the shield of the BITS Input cable at the BITS end. For BITS Output, wrap the ground shield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

Figure 1-15 shows alarm pin assignments for the AIC-I in the Release 3.4 or higher ONS 15454 backplane. Figure 1-16 shows alarm pin assignments for the AIC in a shelf for Release 3.3 and earlier.

Note The AIC-I requires a shelf assembly running Software Release 3.4.0 or later. The backplane of the ANSI shelf contains a wire-wrap field with pin assignment according to the layout in Figure 1-15. The shelf assembly may be an existing shelf that has been upgraded to 3.4. In this case the backplane pin labeling will appear as indicated in Figure 1-16 on page 1-39. But you must use the pin assignments provided by the AIC-I as shown in Figure 1-15.

For information about attaching ferrites to wire-wrap pin fields, see the "NTP-A12 Install Ferrites" section on page 1-60.

Figure 1-15 Cisco ONS 15454 Backplane Pinouts (Release 3.4 or Later)



Field	Pin	Function
BITS	A1	BITS Output 2 negative (–)
	B1	BITS Output 2 positive (+)
	A2	BITS Input 2 negative (–)
	B2	BITS Input 2 positive (+)
	A3	BITS Output 1 negative (–)
	B3	BITS Output 1 positive (+)
	A4	BITS Input 1 negative (–)
	B4	BITS Input 1 positive (+)
LAN	Connecting to a hub, or switch	
	A1	RJ-45 pin 6 RX–
	B1	RJ-45 pin 3 RX+
	A2	RJ-45 pin 2 TX–
	B2	RJ-45 pin 1 TX+
	Connecting to a PC/Workstation or router	
	A1	RJ-45 pin 2 RX–
	B1	RJ-45 pin 1 RX+
	A2	RJ-45 pin 6 TX–
	B2	RJ-45 pin 3 TX+
ENVIR ALARMS IN	A1	Alarm input pair number 1: Reports closure on connected wires.
	B1	
	A2	Alarm input pair number 2: Reports closure on connected wires.
	B2	
	A3	Alarm input pair number 3: Reports closure on connected wires.
	B3	
	A4	Alarm input pair number 4: Reports closure on connected wires.
	B4	
	A5	Alarm input pair number 5: Reports closure on connected wires.
	B5	
	A6	Alarm input pair number 6: Reports closure on connected wires.
	B6	
	A7	Alarm input pair number 7: Reports closure on connected wires.
	B7	
	A8	Alarm input pair number 8: Reports closure on connected wires.
	B8	
	A9	Alarm input pair number 9: Reports closure on connected wires.
	B9	
	A10	Alarm input pair number 10: Reports closure on connected wires.
	B10	
	A11	Alarm input pair number 11: Reports closure on connected wires.
	B11	
	A12	Alarm input pair number 12: Reports closure on connected wires.
	B12	

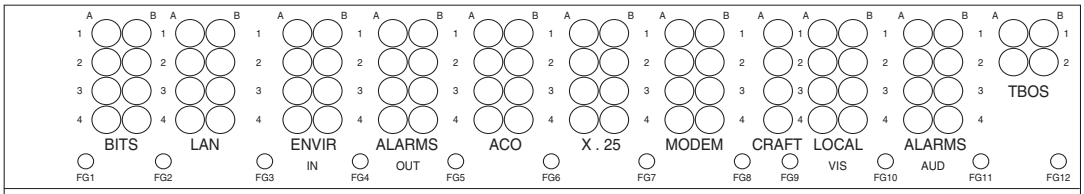
Field	Pin	Function
ENVIR ALARMS IN/OUT N/O	A1/A13	Normally open output pair number 1
	B1/B13	
	A2/A14	Normally open output pair number 2
	B2/B14	
	A3/A15	Normally open output pair number 3
	B3/B15	
	A4/A16	Normally open output pair number 4
	B4/B16	
ACO	A1	Normally open ACO pair
	B1	
CRAFT	A1	Receive (PC pin #2)
	A2	Transmit (PC pin #3)
	A3	Ground (PC pin #5)
	A4	DTR (PC pin #4)
LOCAL ALARMS AUD (Audible) N/O	A1	Alarm output pair number 1: Remote audible alarm.
	B1	
	A2	Alarm output pair number 2: Critical audible alarm.
	B2	
	A3	Alarm output pair number 3: Major audible alarm.
	B3	
	A4	Alarm output pair number 4: Minor audible alarm.
	B4	
LOCAL ALARMS VIS (Visual) N/O	A1	Alarm output pair number 1: Remote visual alarm.
	B1	
	A2	Alarm output pair number 2: Critical visual alarm.
	B2	
	A3	Alarm output pair number 3: Major visual alarm.
	B3	
	A4	Alarm output pair number 4: Minor visual alarm.
	B4	

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

83020

Note The Modem pin field is not active.

Figure 1-16 Cisco ONS 15454 Backplane Pinouts (Release 3.3 and Earlier)



Field	Pin	Function
BITS	A1	BITS Output 2 negative (-)
	B1	BITS Output 2 positive (+)
	A2	BITS Input 2 negative (-)
	B2	BITS Input 2 positive (+)
	A3	BITS Output 1 negative (-)
	B3	BITS Output 1 positive (+)
	A4	BITS Input 1 negative (-)
	B4	BITS Input 1 positive (+)
LAN	Connecting to a hub, or switch	
	A1	RJ-45 pin 6 RX-
	B1	RJ-45 pin 3 RX+
	A2	RJ-45 pin 2 TX-
	B2	RJ-45 pin 1 TX+
	Connecting to a PC/Workstation or router	
	A1	RJ-45 pin 2 RX-
	B1	RJ-45 pin 1 RX+
	A2	RJ-45 pin 6 TX-
	B2	RJ-45 pin 3 TX+
ENVIR ALARMS IN	A1	Alarm input pair number 1: Reports closure on connected wires.
	B1	
	A2	Alarm input pair number 2: Reports closure on connected wires.
	B2	
	A3	Alarm input pair number 3: Reports closure on connected wires.
	B3	
	A4	Alarm input pair number 4: Reports closure on connected wires.
	B4	

Field	Pin	Function
ENVIR ALARMS OUT N/O	A1	Normally open output pair number 1
	B1	
	A2	Normally open output pair number 2
	B2	
	A3	Normally open output pair number 3
	B3	
	A4	Normally open output pair number 4
	B4	
ACO	A1	Normally open ACO pair
	B1	
CRAFT	A1	Receive (PC pin #2)
	A2	Transmit (PC pin #3)
	A3	Ground (PC pin #5)
	A4	DTR (PC pin #4)
LOCAL ALARMS AUD (Audible) N/O	A1	Alarm output pair number 1: Remote audible alarm.
	B1	
	A2	Alarm output pair number 2: Critical audible alarm.
	B2	
	A3	Alarm output pair number 3: Major audible alarm.
	B3	
	A4	Alarm output pair number 4: Minor audible alarm.
	B4	
LOCAL ALARMS VIS (Visual) N/O	A1	Alarm output pair number 1: Remote visual alarm.
	B1	
	A2	Alarm output pair number 2: Critical visual alarm.
	B2	
	A3	Alarm output pair number 3: Major visual alarm.
	B3	
	A4	Alarm output pair number 4: Minor visual alarm.
	B4	

38533

Note The X.25, Modem, and TBOS pin fields are not active.

Step 2 Return to your originating procedure (NTP).

DLP-A20 Install Timing Wires on the Backplane

Purpose	This task installs the timing wires on the backplane.
Tools/Equipment	Wire wrapper 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required if the node is using external BITS timing
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, 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 1-2 lists the pin assignments for the BITS timing pin fields.

Table 1-2 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, refer to the *Cisco ONS 15454 Reference Manual*. To set up system timing, see the "NTP-A28 Set Up Timing" procedure on page 4-21.

Step 2 Return to your originating procedure (NTP).

DLP-A21 Install LAN Wires on the Backplane

Purpose	This task installs the LAN wires on the backplane.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm² or 0.64 mm²) wire, preferably CAT5 UTP
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required if the node is using an external LAN connection
Onsite/Remote	Onsite
Security Level	None

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

Step 1 Using #22 or #24 AWG (0.51 mm² or 0.64 mm²) wire or CAT5 UTP Ethernet cable, wrap the wires on the appropriate wire-wrap pins according to local site practice.

Caution Cross talk may result if both receive (Rx) and transmit (Tx) pins connect on the same twisted pair of wires from the CAT5 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 1-3 shows the LAN pin assignments.

Table 1-3 LAN Pin Assignments

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 does not support Ethernet polarity detection; however, the TCC+ supports this feature. If your Ethernet connection has incorrect polarity (this can only occur with cables that have the receive wire pairs flipped) and a TCC2 is installed, 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-A22 Install the TL1 Craft Interface

Purpose	This task installs the TL1 craft interface.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm² or 0.64 mm²) alarm wires
Prerequisite Procedures	NTP-A4 Remove the Backplane Covers, page 1-16
Required/As Needed	Required to access TL1 using the craft backplane pins
Onsite/Remote	Onsite
Security Level	None

Note Rather than using the craft pins, you can use a LAN cable connected to the TCC+/TCC2 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.

Note For information about attaching ferrites to wire-wrap pin fields, see the "DLP-A31 Attach Ferrites to Wire-Wrap Pin Fields" task on page 1-62.

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 1-4 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 TCC+/TCC2 card simultaneously. Using a combination prevents access to the node or causes a loss in connectivity.

Table 1-4 Craft Interface Pin Assignments

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

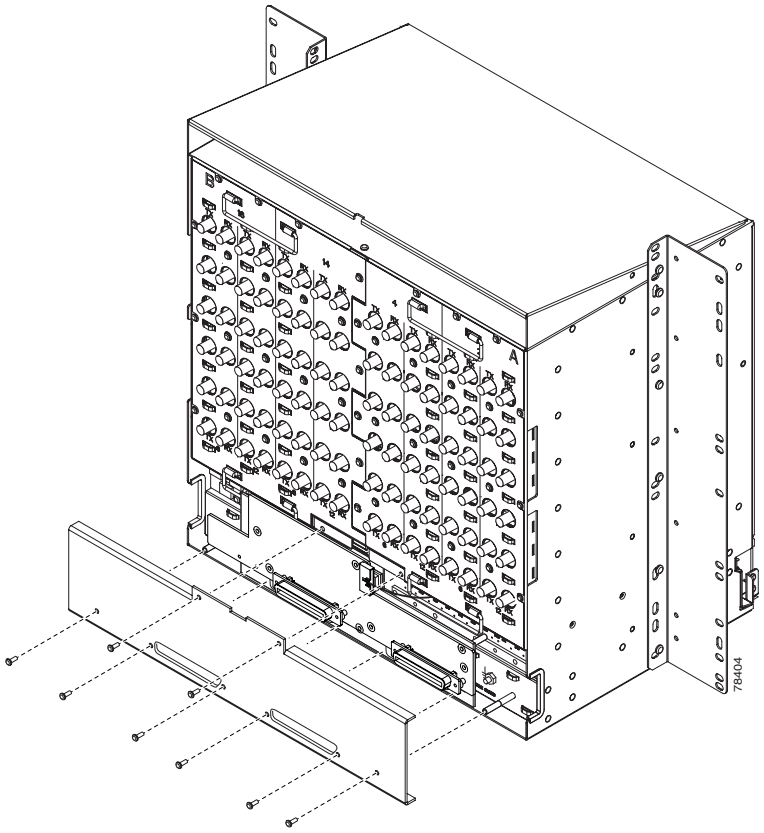
Step 3 Return to your originating procedure (NTP).

NTP-A120 Install an External Wire-Wrap Panel to the AEP

Purpose	This procedure connects an external wire-wrap panel to the AEP to provide the physical alarm contacts for the AEP.
Tools/Equipment	External wire-wrap panel
Prerequisite Procedures	NTP-A119 Install the Alarm Expansion Panel, page 1-32
Required/As Needed	Required if you installed an AEP
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 1-17).

Figure 1-17 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 1-5 lists the alarm input pin assignments.

Table 1-5 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-

Table 1-5 Alarm Input Pin Assignments (continued)

AMP Champ Pin	Signal Name	AMP Champ Pin	Signal Name
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 1-6 lists the alarm output pin assignments.

Table 1-6 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
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	—

Table 1-6 Alarm Output Pin Assignments (continued)

AMP Champ Pin	Signal Name	AMP Champ Pin	Signal Name
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 1-18 illustrates the alarm input connectors.

Figure 1-18 Alarm Input Connector

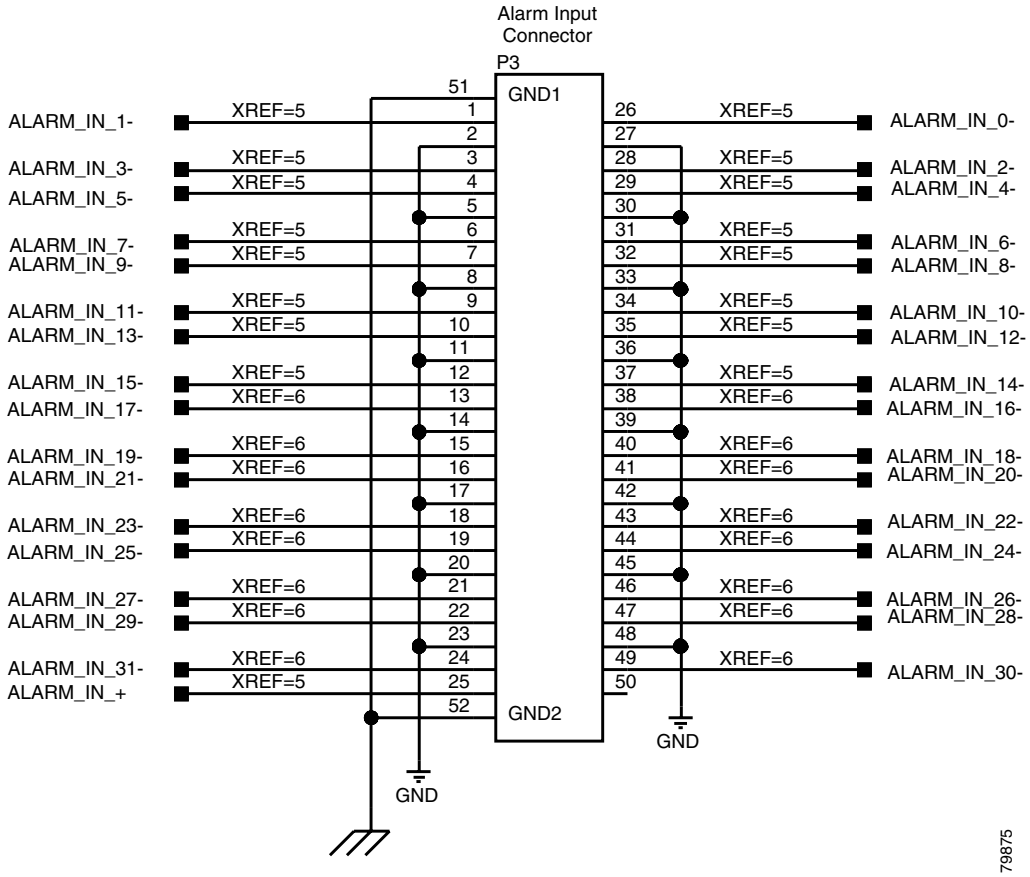
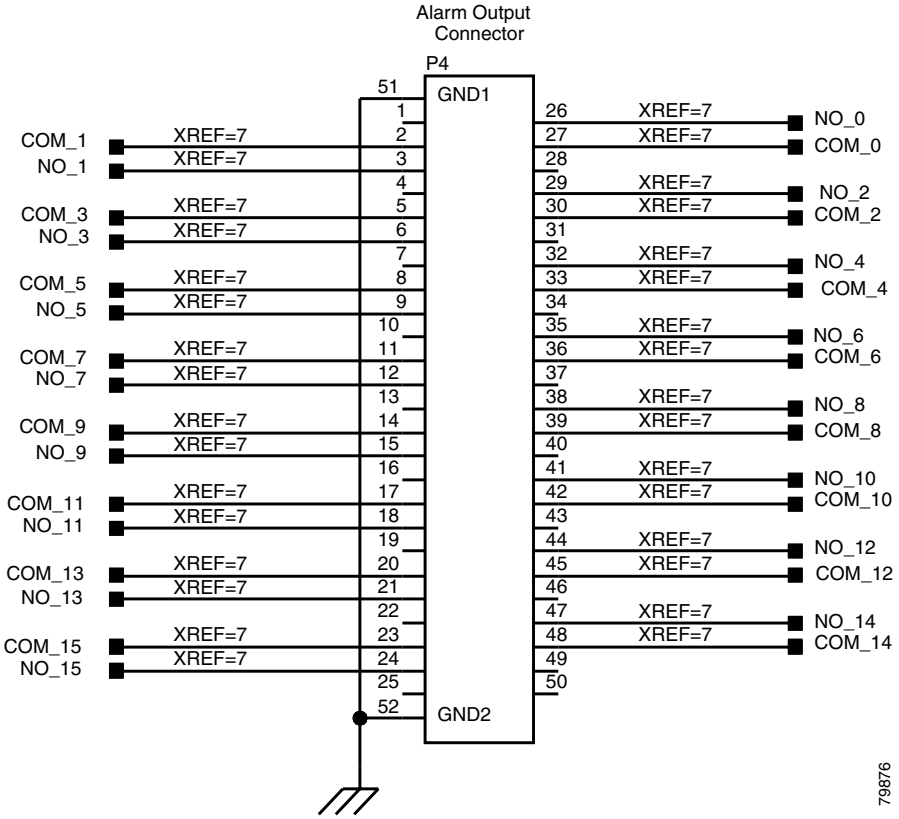


Figure 1-19 illustrates the alarm output connectors.

Figure 1-19 Alarm Output Connector



Step 4 Complete one of the following:

- If you plan to install electrical cards, continue with the "NTP-A9 Install the Electrical Card Cables on the Backplane" procedure on page 1-48.
- If you do not plan to install electrical cards, continue with the "NTP-A11 Install the Rear Cover" procedure on page 1-58.

Stop. You have completed this procedure.

NTP-A9 Install the Electrical Card Cables on the Backplane

Purpose	Optional EIA backplane covers are typically pre-installed when ordered with the ONS 15454. The following procedure describes how to install the electrical card cables to the backplane. If the shelf was not shipped with the correct EIA interface, you must order and install the correct EIA.This procedure does not apply to DWDM (Software R4.5) nodes.
Tools/Equipment	Wire wrapper Twisted-pair cables BNC insertion tool SMB cable connector
Prerequisite Procedures	NTP-A5 Install the Electrical Interface Assemblies, page 1-17
Required/As Needed	Required if you are using electrical cards
Onsite/Remote	Onsite
Security Level	None

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.

Note Refer to the *Cisco ONS 15454 Reference Manual* for more information about EIAs.

Step 1 Complete the "DLP-A23 Install DS-1 Cables Using Electrical Interface Adapters (Balun)" task on page 1-49 as needed. Baluns are used on SMB EIAs to properly terminate DS-1 signals.

Step 2 To install DS-1 cables using AMP Champ cables, complete the "DLP-A24 Install DS-1 AMP Champ Cables on the AMP Champ EIA" task on page 1-50.

Step 3 Complete the "DLP-A25 Install Coaxial Cable With BNC Connectors" task on page 1-53 as needed.

Step 4 Complete the "DLP-A26 Install Coaxial Cable With High-Density BNC Connectors" task on page 1-54 as needed.

Step 5 Complete the "DLP-A27 Install Coaxial Cable with SMB Connectors" task on page 1-55 as needed.

Step 6 Continue with the "NTP-A10 Route Electrical Cables" procedure on page 1-56.

Stop. You have completed this procedure.

DLP-A23 Install DS-1 Cables Using Electrical Interface Adapters (Balun)

Purpose	This task installs the DS-1 cables using the electrical interface adapters.
Tools/Equipment	Wire wrapper Twisted-pair cables
Prerequisite Procedures	DLP-A13 Install an SMB EIA, page 1-20
Required/As Needed	Required if you are using an SMB EIA for DS1N-14 cards
Onsite/Remote	Onsite
Security Level	None

Note All DS-1 cables connected to the ONS 15454 DS-1 ports must terminate with twisted-pair cables to connect to the DS-1 electrical interface adapter. The DS-1 electrical interface adapters project 1.72 inches (43.7 mm) beyond the SMB EIA.

Step 1 Attach the SMB connector on an adapter to the SMB connector for the port's transmit pair on the backplane.

Step 2 Attach the SMB connector on an adapter to the SMB connector for the port's receive pair on the backplane.

Step 3 Terminate the DS-1 transmit and receive cables for the port to the wire-wrap posts on the adapter:

a. Using a wire-wrap tool, connect the receive cables to the receive adapter pins on the backplane connector for the desired port.

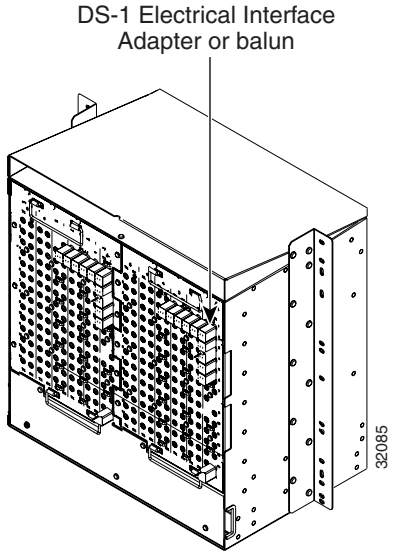
b. Connect the transmit cables to the transmit adapter pins on the backplane connector for the desired port.

c. Terminate the shield ground wire on the DS-1 cable to ground according to local site practice.

Note If you put DS1N-14 cards in Slots 3 and 15 to form 1:N protection groups, do not wire Slots 3 and 15 for DS-1 electrical interface adapters.

Figure 1-20 shows a ONS 15454 backplane with an SMB EIA. DS-1 electrical interface adapters are attached on both sides of the shelf assembly to create DS-1 twisted-pair termination points.

Figure 1-20 Backplane with an SMB EIA for DS-1 Cables



Step 4 Return to your originating procedure (NTP).

DLP-A24 Install DS-1 AMP Champ Cables on the AMP Champ EIA

Purpose	This task installs the DS-1 AMP Champ cables on the AMP Champ EIA.
Tools/Equipment	Wire wrapper Twisted-pair cables
Prerequisite Procedures	DLP-A14 Install the AMP Champ EIA, page 1-22
Required/As Needed	Required if you are using an AMP Champ EIA for DS1N-14 cards
Onsite/Remote	Onsite
Security Level	None

Step 1 Prepare a 56-wire cable for each DS1N-14 card you will install in the shelf assembly.

Step 2 Connect the male AMP Champ connector on the cable to the female AMP Champ connector on the ONS 15454 backplane.

Step 3 Use the clips on the male AMP Champ connector to secure the connection.

The female connector has grooves on the outside edge for snapping the clips into place.

Table 1-7 shows the pin assignments for the AMP Champ connectors on the ONS 15454 AMP Champ EIA.

Note In Table 1-7, the shaded area corresponds to the white/orange binder group. A binder group is a set of 25 pairs of wires coded with an industry-standard color scheme.

Table 1-7 Pin Assignments for AMP Champ Connectors

Signal/Wire	Pin	Pin	Signal/Wire	Signal/Wire	Pin	Pin	Signal/Wire
Tx Tip 1 white/blue	1	33	Tx Ring 1 blue/white	Rx Tip 1 yellow/orange	17	49	Rx Ring 1 orange/yellow
Tx Tip 2 white/orange	2	34	Tx Ring 2 orange/white	Rx Tip 2 yellow/green	18	50	Rx Ring 2 green/yellow
Tx Tip 3 white/green	3	35	Tx Ring 3 green/white	Rx Tip 3 yellow/brown	19	51	Rx Ring 3 brown/yellow
Tx Tip 4 white/brown	4	36	Tx Ring 4 brown/white	Rx Tip 4 yellow/slate	20	52	Rx Ring 4 slate/yellow
Tx Tip 5 white/slate	5	37	Tx Ring 5 slate/white	Rx Tip 5 violet/blue	21	53	Rx Ring 5 blue/violet
Tx Tip 6 red/blue	6	38	Tx Ring 6 blue/red	Rx Tip 6 violet/orange	22	54	Rx Ring 6 orange/violet
Tx Tip 7 red/orange	7	39	Tx Ring 7 orange/red	Rx Tip 7 violet/green	23	55	Rx Ring 7 green/violet
Tx Tip 8 red/green	8	40	Tx Ring 8 green/red	Rx Tip 8 violet/brown	24	56	Rx Ring 8 brown/violet
Tx Tip 9 red/brown	9	41	Tx Ring 9 brown/red	Rx Tip 9 violet/slate	25	57	Rx Ring 9 slate/violet
Tx Tip 10 red/slate	10	42	Tx Ring 10 slate/red	Rx Tip 10 [1] white/blue	26	58	Rx Ring 10 blue/white
Tx Tip 11 black/blue	11	43	Tx Ring 11 blue/black	Rx Tip 11 white/orange	27	59	Rx Ring 11 orange/white
Tx Tip 12 black/orange	12	44	Tx Ring 12 orange/black	Rx Tip 12 white/green	28	60	Rx Ring 12 green/white
Tx Tip 13 black/green	13	45	Tx Ring 13 green/black	Rx Tip 13 white/brown	29	61	Rx Ring 13 brown/white
Tx Tip 14 black/brown	14	46	Tx Ring 14 brown/black	Rx Tip 14 white/slate	30	62	Rx Ring 14 slate/white
Tx Spare0+ Not applicable	15	47	Tx Spare0- Not applicable	Rx Spare0+ Not applicable	31	63	Rx Spare0- Not applicable
Tx Spare1+ Not applicable	16	48	Tx Spare1- Not applicable	Rx Spare1+ Not applicable	32	64	Rx Spare1- Not applicable

1. Shaded areas correspond to the white/orange binder group. A binder group is a set of 25 pairs of wires coded with an industry-standard color scheme.

Table 1-8 shows the pin assignments for the AMP Champ connectors on the ONS 15454 AMP Champ EIA for a shielded DS-1 cable.

Table 1-8 Pin Assignments for AMP Champ Connectors (Shielded DS1 Cable)

64-Pin Blue Bundle				64-Pin Orange Bundle			
Signal/Wire	**Pin**	**Pin**	**Signal/Wire**	**Signal/Wire**	**Pin**	**Pin**	**Signal/Wire**
Tx Tip 1 white/blue	1	33	Tx Ring 1 blue/white	Rx Tip 1 white/blue	17	49	Rx Ring 1 blue/white
Tx Tip 2 white/orange	2	34	Tx Ring 2 orange/white	Rx Tip 2 white/orange	18	50	Rx Ring 2 orange/white
Tx Tip 3 white/green	3	35	Tx Ring 3 green/white	Rx Tip 3 white/green	19	51	Rx Ring 3 green/white
Tx Tip 4 white/brown	4	36	Tx Ring 4 brown/white	Rx Tip 4 white/brown	20	52	Rx Ring 4 brown/white
Tx Tip 5 white/slate	5	37	Tx Ring 5 slate/white	Rx Tip 5 white/slate	21	53	Rx Ring 5 slate/white
Tx Tip 6 red/blue	6	38	Tx Ring 6 blue/red	Rx Tip 6 red/blue	22	54	Rx Ring 6 blue/red
Tx Tip 7 red/orange	7	39	Tx Ring 7 orange/red	Rx Tip 7 red/orange	23	55	Rx Ring 7 orange/red
Tx Tip 8 red/green	8	40	Tx Ring 8 green/red	Rx Tip 8 red/green	24	56	Rx Ring 8 green/red
Tx Tip 9 red/brown	9	41	Tx Ring 9 brown/red	Rx Tip 9 red/brown	25	57	Rx Ring 9 brown/red
Tx Tip 10 red/slate	10	42	Tx Ring 10 slate/red	Rx Tip 10 red/slate	26	58	Rx Ring 10 slate/red
Tx Tip 11 black/blue	11	43	Tx Ring 11 blue/black	Rx Tip 11 black/blue	27	59	Rx Ring 11 blue/black
Tx Tip 12 black/orange	12	44	Tx Ring 12 orange/black	Rx Tip 12 black/orange	28	60	Rx Ring 12 orange/black
Tx Tip 13 black/green	13	45	Tx Ring 13 green/black	Rx Tip 13 black/green	29	61	Rx Ring 13 green/black
Tx Tip 14 black/brown	14	46	Tx Ring 14 brown/black	Rx Tip 14 black/brown	30	62	Rx Ring 14 brown/black
Tx Tip 15 black/slate	15	47	Tx Tip 15 slate/black	Rx Tip 15 black/slate	31	63	Rx Tip 15 slate/black
Tx Tip 16 yellow/blue	16	48	Tx Tip 16 blue/yellow	Rx Tip 16 yellow/blue	32	64	Rx Tip 16 blue/yellow

Step 4 Return to your originating procedure (NTP).

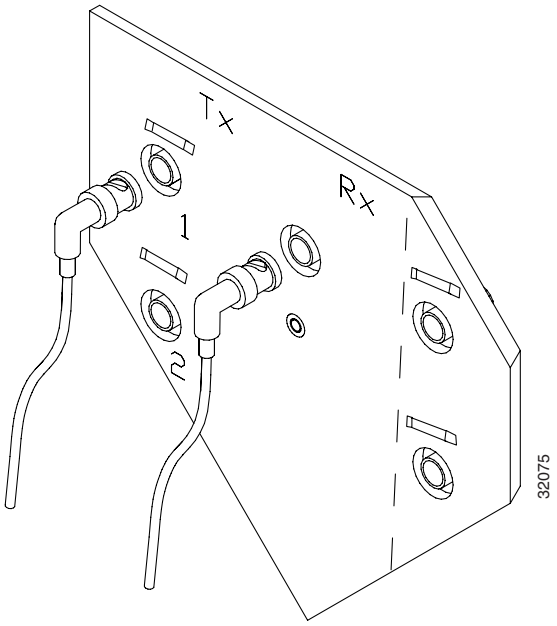
DLP-A25 Install Coaxial Cable With BNC Connectors

Purpose	This task installs the coaxial cable with BNC connectors.
Tools/Equipment	None
Prerequisite Procedures	DLP-A12 Install a BNC or High-Density BNC EIA, page 1-18
Required/As Needed	Required if you are using DS3-12, DS3XM-6, or EC-1 cards and are using a non-high-density BNC interface
Onsite/Remote	Onsite
Security Level	None

Step 1 Place the BNC cable connector over the desired connection point on the backplane.

Figure 1-21 shows how to connect a coaxial cable to the BNC EIA using a right-angle BNC cable connector.

Figure 1-21 Using a Right-Angle Connector to Install Coaxial Cable with BNC Connectors



Step 2 Position the cable connector so that the slot in the connector is over the corresponding notch at the backplane connection point.

Step 3 Gently push the connector down until the notch backplane connector slides into the slot on the cable connector.

Step 4 Turn the cable connector clockwise to lock it into place.

Step 5 Tie wrap or lace the cables to the EIA according to Telcordia standards (GR-1275-CORE) or local site practice.

Step 6 Route the cables to the nearest side of the shelf assembly through the side cutouts according to local site practice. The rubber-coated edges of the side cutouts prevent the cables from chafing.

Warning **Metallic interfaces for connection to outside plant lines (such as T1/E1/T3/E3, etc.) must be connected through a registered or approved device such as CSU/DSU or NT1.**

Step 7 Label all cables at each end of the connection to avoid confusion with cables that are similar in appearance.

Step 8 Return to your originating procedure (NTP).

DLP-A26 Install Coaxial Cable With High-Density BNC Connectors

Purpose	This task installs the coaxial cable with high-density BNC connectors.
Tools/Equipment	BNC insertion tool
Prerequisite Procedures	DLP-A12 Install a BNC or High-Density BNC EIA, page 1-18
Required/As Needed	Required if you are using DS3-12, DS3XM-6, or EC-1 cards and are using a high-density BNC interface
Onsite/Remote	Onsite
Security Level	None

Step 1 Place the cable connector over the desired connection point on the backplane.

Step 2 Using the BNC insertion tool, position the cable connector so that the slot in the connector is over the corresponding notch at the backplane connection point.

Step 3 Gently push the connector down until the notch backplane connector slides into the slot on the cable connector.

Step 4 Turn the cable connector clockwise to lock it into place.

Step 5 Tie wrap or lace the cables to the EIA according to Telcordia standards (GR-1275-CORE) or local site practice.

Step 6 Route the cables to the nearest side of the shelf assembly through the side cutouts according to local site practice.

Warning **Metallic interfaces for connection to outside plant lines (such as T1/E1/T3/E3, etc.) must be connected through a registered or approved device such as CSU/DSU or NT1.**

The rubber-coated edges of the side cutouts prevent the cables from chafing.

Step 7 Return to your originating procedure (NTP).

DLP-A27 Install Coaxial Cable with SMB Connectors

Purpose	This task installs the coaxial cable with SMB connectors.
Tools/Equipment	SMB cable connector
Prerequisite Procedures	DLP-A13 Install an SMB EIA, page 1-20
Required/As Needed	Required if you are using DS3-12, DS3XM-6, or EC-1 cards and are using an SMB interface rather than a BNC interface
Onsite/Remote	Onsite
Security Level	None

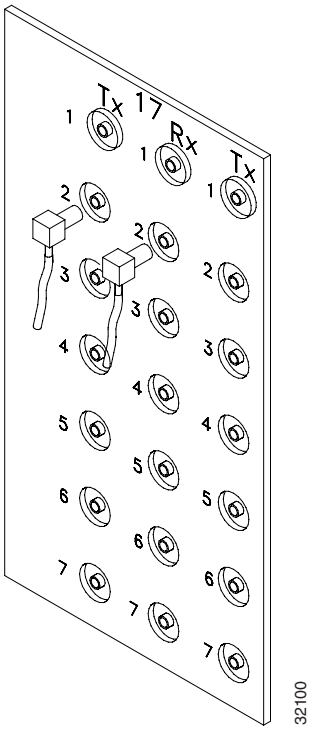
Step 1 Place the SMB cable connector over the desired connection point on the backplane (Figure 1-21).

Step 2 Gently push the connector until it clicks into place.

Step 3 Tie wrap or lace the cables to the EIA according to Telcordia standards (GR-1275-CORE) or local site practice.

Step 4 Route the cables to the nearest side of the shelf assembly into rack runs according to local site practice.

Figure 1-22 Installing Coaxial Cable with SMB Connectors



Warning **Metallic interfaces for connection to outside plant lines (such as T1/E1/T3/E3, etc.) must be connected through a registered or approved device such as CSU/DSU or NT1.**

Step 5 Label the transmit, receive, working, and protect cables at each end of the connection to avoid confusion with cables that are similar in appearance.

Step 6 Return to your originating procedure (NTP).

NTP-A10 Route Electrical Cables

Purpose	The following procedure explains how to route and manage electrical (backplane) cables. This procedure does not apply to DWDM (Software R4.5) nodes.
Tools/Equipment	RG179, RG59 (735A) # 26 AWG cable, or RG59 (734A) # 20 AWG cable
Prerequisite Procedures	NTP-A9 Install the Electrical Card Cables on the Backplane, page 1-48
Required/As Needed	Required if using electrical cards
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the "DLP-A28 Route Coaxial Cables" task on page 1-56 as needed.

Step 2 Complete the "DLP-A29 Route DS-1 Twisted-Pair Cables" task on page 1-58 as needed.

Step 3 Continue with the "NTP-A11 Install the Rear Cover" procedure on page 1-58 as needed.

Stop. You have completed this procedure.

DLP-A28 Route Coaxial Cables

Purpose	This task routes the coaxial cables.
Tools/Equipment	RG179, RG59 (735A) # 26 AWG cable, or RG59 (734A) # 20 AWG cable
Prerequisite Procedures	One or more of the following tasks, as needed: • DLP-A25 Install Coaxial Cable With BNC Connectors, page 1-53 • DLP-A26 Install Coaxial Cable With High-Density BNC Connectors, page 1-54 • DLP-A27 Install Coaxial Cable with SMB Connectors, page 1-55
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Tie wrap or lace the coaxial cables according to local site practice and route the cables through the side cutouts on either side of the ONS 15454. The rubber coated edges of the side cutouts prevent the cables from chafing.

Step 2 Use short lengths of pigtail RG179 to terminate the shelf assembly.

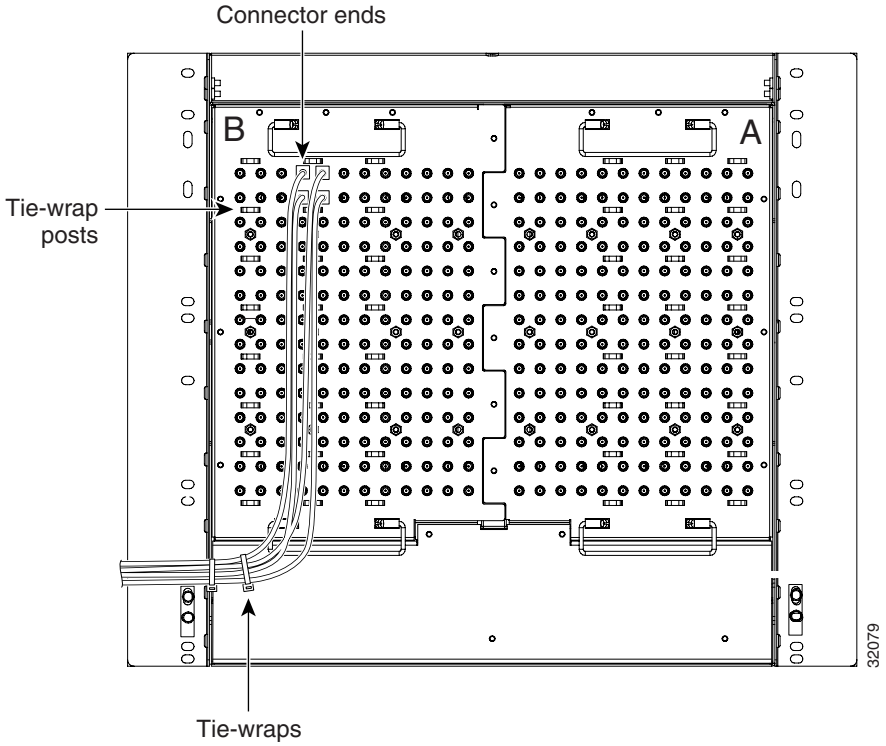
Step 3 Use standard RG59 (735A) cable connected to the RG179 for the remainder of the cable run. When using a 10-foot (3.05 m) section of the RG179, you can attach a maximum length of 437 feet (133 m) of RG59 (735A). When using a 30-foot (9.1 m) section of RG179, you can attach a maximum length of 311 feet (94.8 m) of RG59 (735A).

When using the RG179 cable, the maximum distance available (122 feet, 37.2 m) is less than the maximum distance available with standard RG59 (735A) cable (306 feet, 93.3 m). The maximum distance when using the RG59 (734A) cable is 450 feet (137.2 m). The shorter maximum distance available with the RG179 is due to a higher attenuation rate for the thinner cable. Attenuation rates are calculated using a DS-3 signal:

- For RG179, the attenuation rate is 59 dB/kft (dB per kilo-foot) at 22 MHz.
- For RG59 (735A), the attenuation rate is 23 dB/kft at 22 MHz.

Use a figure of 5.0 for total cable loss when making calculations. Figure 1-23 shows an example of proper coaxial cable routing.

Figure 1-23 Routing Coaxial Cable (SMB EIA Backplane)



Step 4 Return to your originating procedure (NTP).

DLP-A29 Route DS-1 Twisted-Pair Cables

Purpose	This task routes the DS-1 twisted-pair cables.
Tools/Equipment	None
Prerequisite Procedures	DLP-A23 Install DS-1 Cables Using Electrical Interface Adapters (Balun), page 1-49
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Verify the following:

- DS-1 electrical interface adapters are installed on every transmit and receive connector for DS-1 ports.
- Wire-wrap posts on the DS-1 electrical interface adapters are used to connect the terminated incoming cables.

Step 2 Tie-wrap or lace the twisted-pair cables according to local site practice and route the cables into the side cutouts on either side of the ONS 15454.

Note SMB EIAs feature cable-management eyelets for tie wrapping or lacing cables to the cover panel.

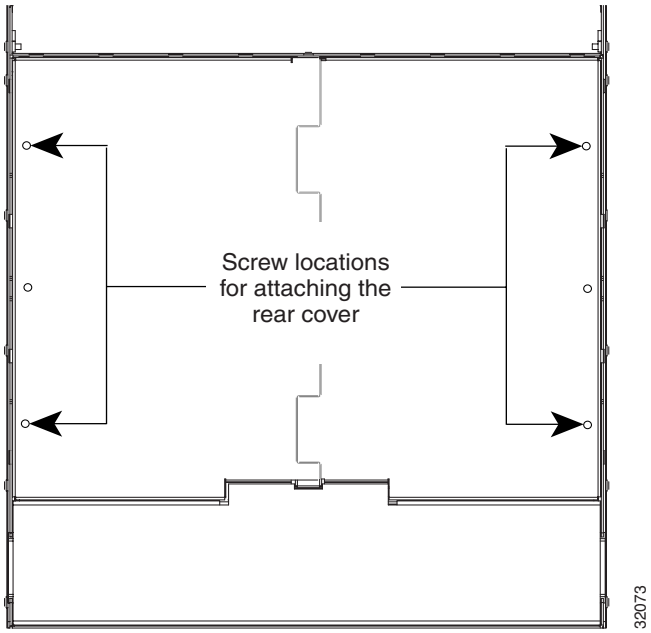
Step 3 Return to your originating procedure (NTP).

NTP-A11 Install the Rear Cover

Purpose	The following procedure explains how to install the rear cover.
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 Locate the three screws that run vertically along both edges of the backplane (Figure 1-24).

Figure 1-24 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.

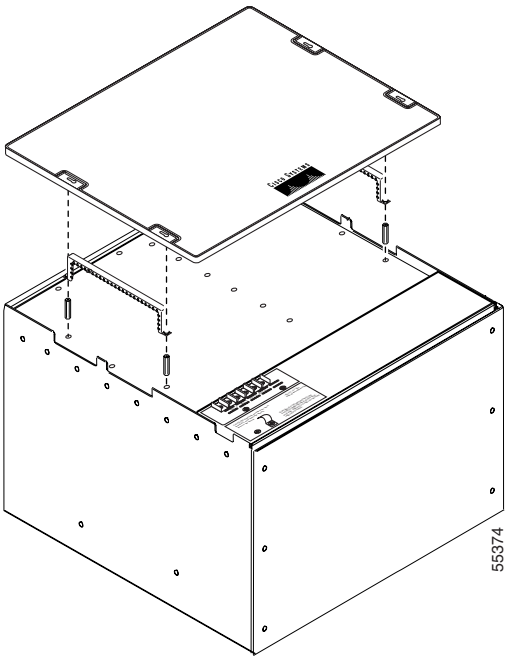
Step 3 Slide one of the mounting brackets into place and tighten the screws.

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 1-25 shows rear cover installation using spacers.

Figure 1-25 Installing the Rear Cover with Spacers



Step 6 Continue with the "NTP-A12 Install Ferrites" procedure on page 1-60.

Stop. You have completed this procedure.

NTP-A12 Install Ferrites

Purpose	This procedure describes how to attach ferrites.
Tools/Equipment	Oval and/or block ferrites
Prerequisite Procedures	NTP-A6 Install the Power and Ground, page 1-24 NTP-A8 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections, page 1-36
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the "DLP-A30 Install Ferrites to Power Cabling" task on page 1-61 as needed.

Step 2 Complete the "DLP-A31 Attach Ferrites to Wire-Wrap Pin Fields" task on page 1-62 as needed.

Step 3 Continue with the "NTP-A13 Perform the Shelf Installation Acceptance Test" procedure on page 1-65.

Stop. You have completed this procedure.

DLP-A30 Install Ferrites to Power Cabling

Purpose	This task attaches ferrites to power cabling. Use a single oval ferrite (TDK ZCAT2035-0930) and/or one block ferrite (Fair Rite 0443164151) for each pair of cables, depending on the EIA.
Tools/Equipment	Oval and/or block ferrites
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

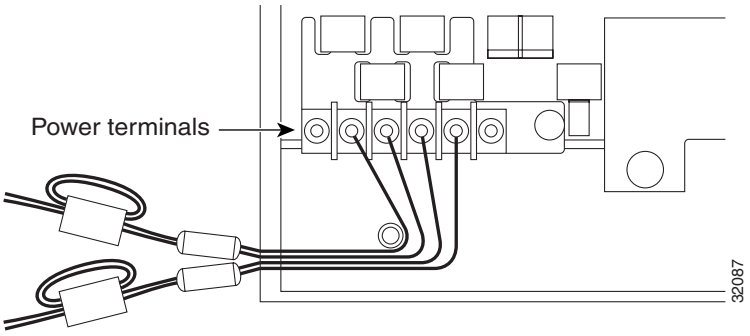
Step 1 If you are using block ferrites, wrap the cables once around and through the block ferrites.

Step 2 If you are using oval ferrites, pull the cable straight through the oval ferrites.

Note If you are using both block and oval ferrites, place the oval ferrite between the ONS 15454 and the block ferrite as shown in Figure 1-26 on page 1-61.

Note Place the oval ferrite as close to the power terminals as possible and place the block ferrite within 5 to 6 inches (127 to 152 mm) of the power terminals.

Figure 1-26 Attaching Block and Oval Ferrites to Power Cabling



Step 3 Return to your originating procedure (NTP).

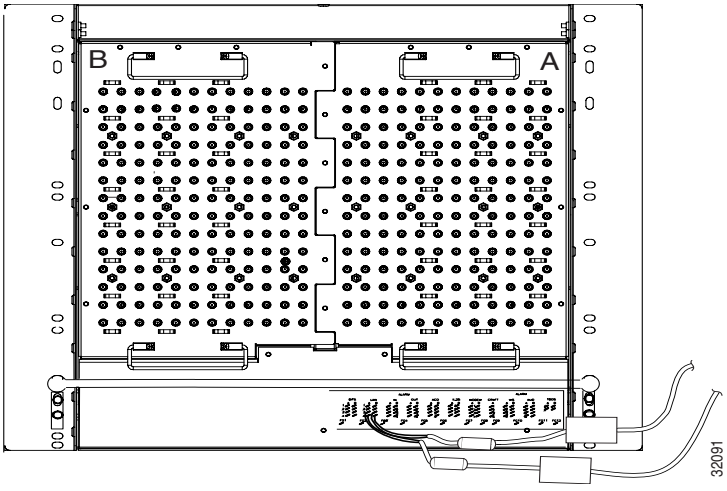
DLP-A31 Attach Ferrites to Wire-Wrap Pin Fields

Purpose	This task attaches ferrites to wire-wrap pin fields. Use an oval ferrite (TDK ZCAT1730-0730) and block ferrite (Fair Rite 0443164151) for each pair of cables. Figure 1-27 on page 1-62 shows the suggested method for attaching ferrites to wire-wrap pin fields.
Tools/Equipment	Oval and block ferrites
Prerequisite Procedures	NTP-A8 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections, page 1-36
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Wrap the cables once around and through the block ferrites and pull the cables straight through the oval ferrites.

Step 2 Place the oval ferrite as close to the wire-wrap pin field as possible and between the ONS 15454 and the block ferrite, as shown in Figure 1-27. The block ferrite should be within 5 to 6 inches (127 to 152 mm) of the wire-wrap pin field.

Figure 1-27 Attaching Ferrites to Wire-Wrap Pin Fields



Step 3 Return to your originating procedure (NTP).

NTP-A238 Install Optional DWDM Equipment

Purpose	Use this procedure to install the optional DWDM assemblies. This procedure applies only to DWDM (Software R4.5) nodes.
Tools/Equipment	# 2 Phillips screwdriver Crimping tool (large enough for #10 - #14 AWG) #14 AWG wire
Prerequisite Procedures	NTP-A2 Install the Shelf Assembly, page 1-6
Required/As Needed	As Needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete the "DLP-A412 Install the DCU Shelf Assembly" task on page 1-63 as needed.

Step 2 Complete the "DLP-A413 Install the Fiber Patch Panel Shelf" task on page 1-64 as needed.

Step 3 Complete the "DLP-A414 Install the Fiber Storage Shelf" task on page 1-64 as needed.

Step 4 Complete the "DLP-A415 Install the Air Ramp" task on page 1-65 as needed.

Stop. **You have completed this procedure**.

DLP-A412 Install the DCU Shelf Assembly

Purpose	If you are installing dispersion compensation modules, use this task to install the 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-RU in a standard 19-inch or 23-inch rack. Locate the RMU space specified in your site plan. Refer to *Cisco ONS 15454 Troubleshooting Guide* for typical DWDM site layout plans.

Step 2 Two sets of mounting brackets are included with the DCU mounting kit, one set each, for 19-inch or 23-inch 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.

Warning **This equipment must be properly grounded per local standards and in compliance with NEBS. If not properly grounded-personal injury or equipment failure could occur.**

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-A413 Install the Fiber Patch Panel Shelf

Purpose	Use this task to install the fiber patch panel shelf.
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 shelf requires 1-RU in a standard 19-inch or 23-inch rack. Locate the RMU space specified in your site plan. Refer to *Cisco ONS 15454 Troubleshooting Guide* for typical DWDM site layout plans.

Step 2 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete "DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack" task on page 1-7 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-A414 Install the Fiber Storage Shelf

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

Step 1 The fiber storage shelf requires 1-RU in a standard 19-inch or 23-inch rack. Locate the RMU space specified in your site plan. Refer to *Cisco ONS 15454 Troubleshooting Guide* for typical DWDM site layout plans.

Step 2 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete "DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack" task on page 1-7 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-A415 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 or 23-inch rack. Locate the RMU space specified in your site plan. Refer to *Cisco ONS 15454 Troubleshooting Guide* for typical DWDM site layout plans.

Step 2 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete "DLP-A3 Reverse the Mounting Bracket to Fit a 19-inch (482.6 mm) Rack" task on page 1-7 as required.

Step 3 Align the chassis with the rack mounting screw holes; one at a time insert the four screws and tighten them.

Step 4 Return to your originating procedure (NTP).

NTP-A13 Perform the Shelf Installation Acceptance Test

Purpose	Use this procedure to perform a shelf installation acceptance test.
Tools/Equipment	Voltmeter
Tools/Equipment	Oval and/or block ferrites
Prerequisite Procedures	Applicable procedures in Chapter 1
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Complete Table 1-9 by verifying that each applicable procedure was completed.

Table 1-9 Shelf Installation Task Summary

Description	Completed
NTP-A1 Unpack and Inspect the ONS 15454 Shelf Assembly, page 1-4	
NTP-A2 Install the Shelf Assembly, page 1-6	
NTP-A3 Open and Remove the Front Door, page 1-13	
NTP-A4 Remove the Backplane Covers, page 1-16	
NTP-A5 Install the Electrical Interface Assemblies, page 1-17	
NTP-A6 Install the Power and Ground, page 1-24	
NTP-A7 Install the Fan-Tray Assembly, page 1-30	

Table 1-9 Shelf Installation Task Summary (continued)

Description	Completed
NTP-A119 Install the Alarm Expansion Panel, page 1-32	
NTP-A8 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections, page 1-36	
NTP-A120 Install an External Wire-Wrap Panel to the AEP, page 1-43	
NTP-A9 Install the Electrical Card Cables on the Backplane, page 1-48	
NTP-A10 Route Electrical Cables, page 1-56	
NTP-A11 Install the Rear Cover, page 1-58	
NTP-A12 Install Ferrites, page 1-60	

Step 2 Complete the "DLP-A32 Inspect the Shelf Installation and Connections" task on page 1-66.

Step 3 Complete the "DLP-A33 Measure Voltage" task on page 1-66.

Step 4 Continue with the "NTP-A15 Install the Common Control Cards" procedure on page 2-2.

Stop. You have completed this procedure.

DLP-A32 Inspect the Shelf Installation and Connections

Purpose	Use this task to inspect the shelf installation and connections and to verify that everything is installed and connected properly.
Tools/Equipment	None
Prerequisite Procedures	Complete Table 1-9 on page 1-65.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Check each wire and cable connection to make sure all cables are locked securely. If a wire or cable is loose, return to the appropriate procedure in this chapter to correct it.

Step 2 To check that the backplane is seated correctly, verify that the screw holes and the backplane interface card holes align properly and that the A and B connectors interlock.

Step 3 Return to your originating procedure (NTP).

DLP-A33 Measure Voltage

Purpose	This task measures the power to verify correct power and returns.
Tools/Equipment	Voltmeter
Prerequisite Procedures	Complete Table 1-9 on page 1-65.

Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Step 1 Using a voltmeter, verify the office ground and power. Figure 1-10 on page 1-28 shows the power terminals.

a. Place the black lead (positive) on the frame ground on the bay. Hold it there while completing Step b.

b. Place the red lead (negative) on the fuse power points and alarm panel to verify that they read between –42 VDC and –57 VDC (power) or 0 (return ground).

Step 2 Using a voltmeter, verify the shelf ground and power wiring:

a. Place the black lead (positive) on the RET1 and the red lead on the BAT1 point. Verify a reading between –42 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.

b. Repeat Step 2 for the RET2 and BAT2 if the B power feed is provided

Step 3 Return to your originating procedure (NTP).