Unpacking and Installing the Cisco ONS 15454 Four-Shelf and Zero-Shelf Bay Assembly

Cisco ONS 15454 Four-Shelf and Zero-Shelf Bay Assembly Overview

The Cisco ONS 15454 four-shelf and zero-shelf bay assemblies provide a dual-feed, pre-wired TPA-type fuse and alarm panel, two vertical fiber ducts, and two 2.38-inch vertical extenders and extender bases. The four-shelf bay assembly also provides a pre-installed, four-shelf configuration that includes four ONS 15454 shelf assemblies with electrical interface assembly (EIA) panels or EIA blank cover panels.

This guide describes how to unpack and install the Cisco ONS 15454 four-shelf and zero-shelf bay assembly. Because it is a complete system, installation simply requires you to remove the unit from the shipping pallet, move the unit into place, secure it, and supply power and ground attachment. Refer to the Cisco ONS 15454 user documentation for component-specific installation and replacement procedures. Figure 1 on page 2 shows a four-shelf bay assembly.

This guide includes the following sections:

Corporate Headquarters:
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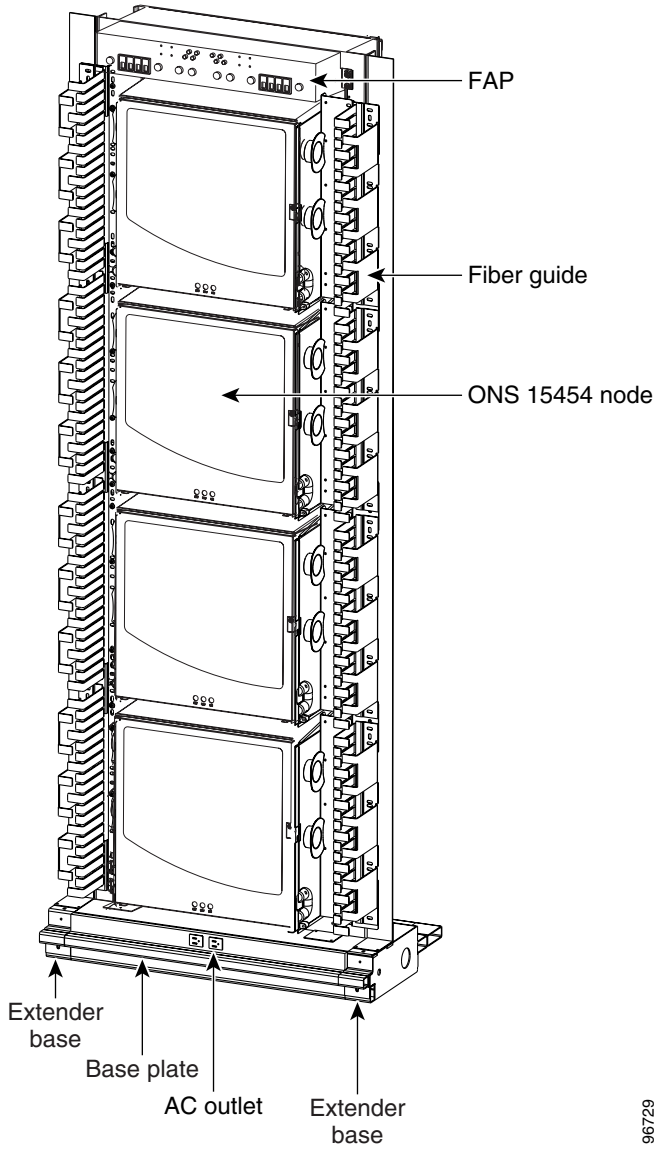
Figure 1 Four-Shelf Bay Assembly

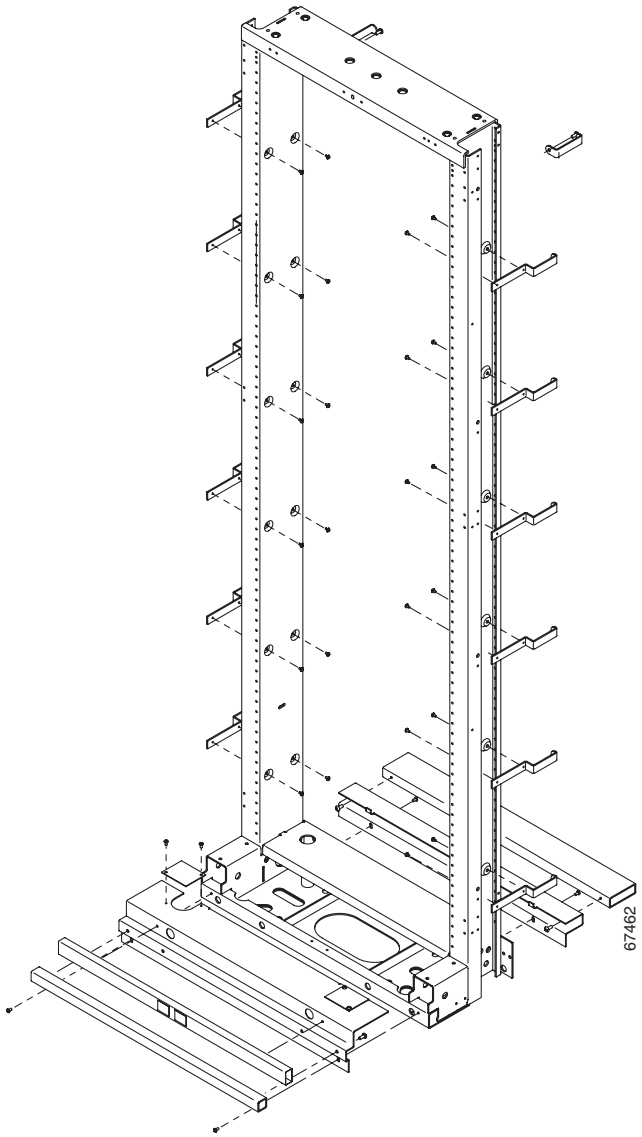


Caution The AC outlet at the base of the shelf should be protected by a 20A breaker maximum.

Note An AC outlet is provided on the front of the base if 110VAC powering is needed. Wiring for AC power must be performed by an electrician.

Figure 2 shows how the rack is assembled.

Figure 2 Rack assembly



Safety Recommendations

The following guidelines will help to ensure your safety and protect the equipment. This list does not include every potentially hazardous situation.

- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Always disconnect the power source and unplug all power cables before installing or removing the bay assembly.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing power grounds.
- When using equipment such as a forklift or pallet jack to move the bay assembly to another location, use only moving equipment that is capable of preventing the bay assembly from tipping.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the bay assembly.
- Do not work alone if potentially hazardous conditions exist.

Included Material

The zero-shelf and four-shelf bay assemblies ship with the following materials:

- TPA fuse
- Electrical tape
- Anti-oxidant compound
- Lacing twine
- Tubing
- Emery cloth
- Tags
- Fishe-paper
- Floor cutout template
- ESD wrist strap
- Unpacking and installation documentation

In addition to the list above the four-shelf bay assembly also ships with the following materials:

- Hex screws
- Allen tool
- Plastic rear cover
- Rear cover support
- Right and left fiber channels
- Phillips head custom screws
- Touch up paint
- Quick installation and configuration documentation

Recommended Material

Because most of the installation is complete when you receive the system, the bay assembly requires little installation material. The most significant tasks are removing the packaging from the bay assembly and removing the bay assembly from the shipping pallet. Because the actual installation of the bay assembly in each facility is done according to local site practice, your material needs may vary.

Cisco recommends that you have the following items on hand for installation:

- A forklift or pallet jack to move the packaged bay assembly to the unpacking/staging area
- A pair of scissors to cut the plastic banding on the shipping container
- Utility blankets or their equivalent to protect the bay assembly while on the forklift or pallet jack
- Phillips screw driver or cordless drill with Phillips bit
- 3/4 inch socket or box-end wrench for the earthquake floor bolts
- Four optional kits listed in Table 3 on page 33 that can be ordered separately
- Use this guide in conjunction with Cisco ONS 15454 documentation (procedure guide, troubleshooting guide and reference manual), and the latest release of the *Cisco ONS 15454-FAP-LVD Operations Guide*.

Unpacking Instructions

The ONS 15454 four-shelf and zero-self bay assembly ships in a corrugated container that covers the rack on its shipping pallet. After removing the corrugated container, you must remove the bolts that hold the rack to the pallet before moving the unit to the desired location. Figure 3 shows the four-shelf bay assembly on a shipping pallet.

Caution Cisco recommends that a minimum of three people move the bay assembly.

Step 1 Use a forklift or pallet jack to place the shipping container as close to the installation location as possible.

Step 2 Cut the plastic banding off of the cardboard shipping container.

Step 3 Remove the cap from the corrugated container.

Step 4 Pull the side panels away from the shipping pallet and set it aside.

Step 5 Remove the base plate from the bottom front of the rack:

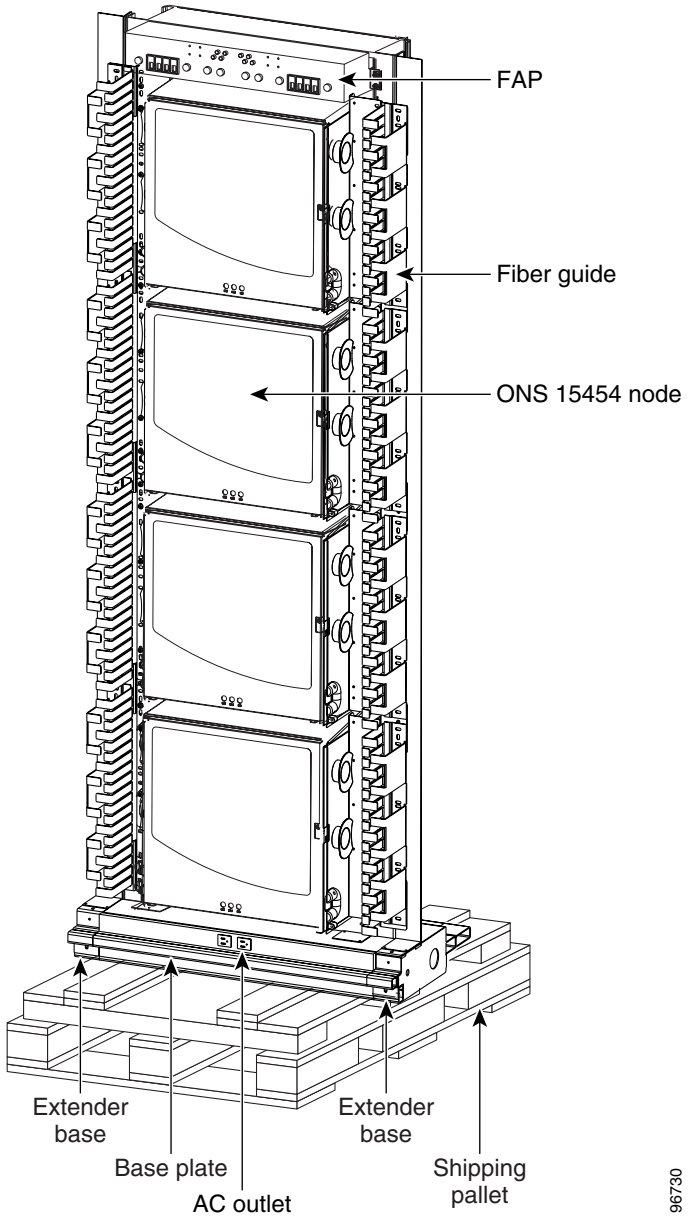
a. Remove the two screws that fasten the base plate to the rack.

b. Pull the base plate away.

Step 6 Remove the four bolts that hold the rack to the pallet (rack base bolts).

Step 7 Remove the vertical extenders if necessary.

Figure 3 Four-Shelf Bay Assembly on a Shipping Pallet



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

Installation Instructions

Prior to installing the bay assembly, you should prepare your slab or raised floor plan.

Slab Floor Plan

Level Equipment

Temporarily position and level using metal shims and the equipment frame.

Drill Slab Floor

Step 1 Mark the slab floor for the anchoring holes using either the provided template or by positioning the rack in the desired location. Figure 4 on page 8 shows a rack cross section with cabling routes. Figure 5 on page 8 shows fiber routing for a slab base. After the floor marks have been made, move the template or rack aside.

Step 2 Drill the anchoring holes into the slab using a masonry drill bit. Make sure the masonry dust is removed from the holes.

Step 3 Reposition the rack over the holes. Depending on the type of slab floor mounting hardware used, the anchors may need to be inserted into the holes before the rack is repositioned.

Step 4 Relevel the rack using metal shims if necessary.

Step 5 Install the bay assembly according to local site practice.

Figure 4 Cross Section of Rack Showing Cabling Routes (Slab for Local)

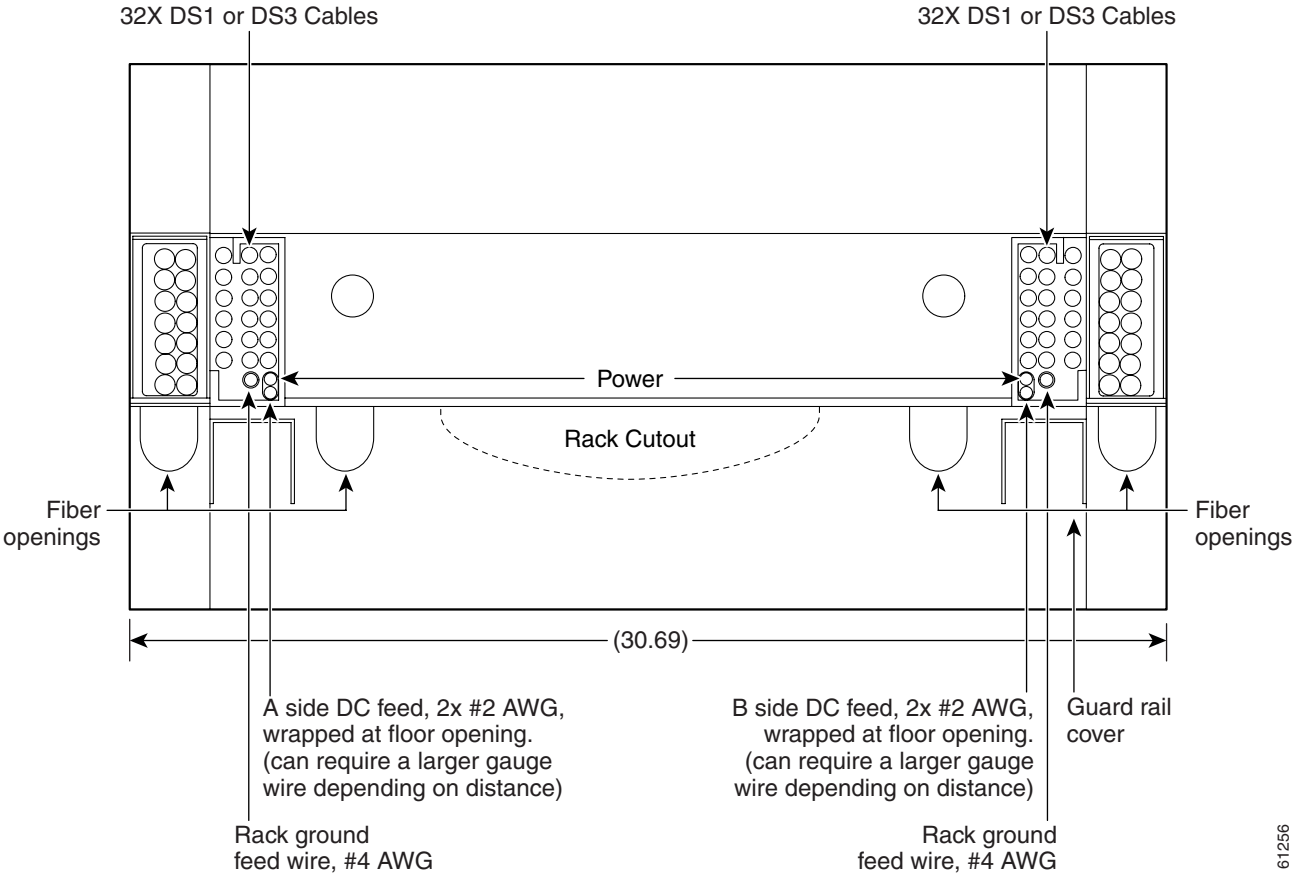
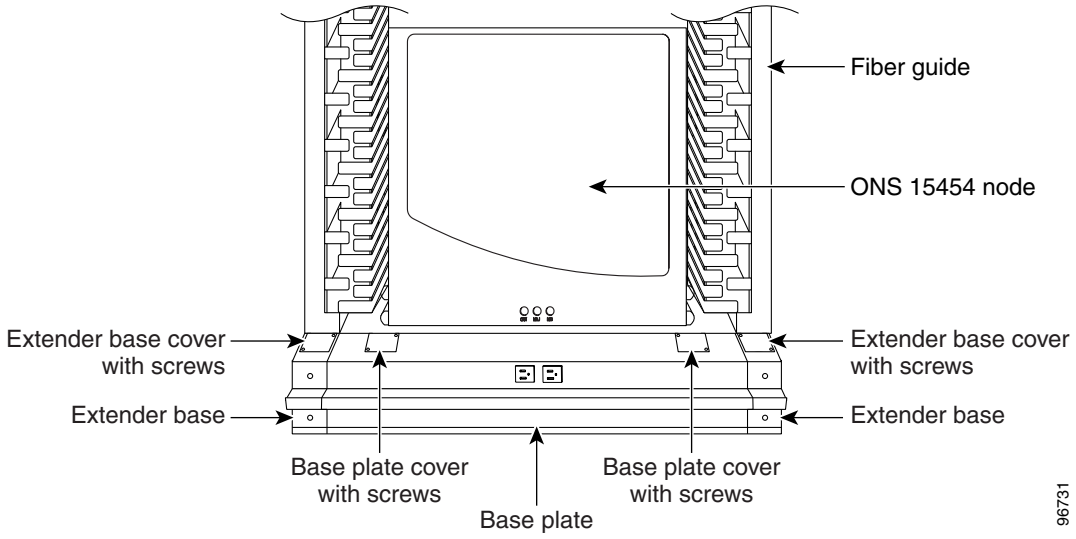


Figure 5 Slab Base Fiber Routing



Raised Floor Plan

Level Equipment

The raised floor is laser-leveled at the time of the floor installation, so no leveling blocks or shims should be necessary to level the frames. This is especially important in seismic zones 2B and higher, because leveling blocks will cause a rocking motion of the frames during an earthquake.

Cut and Drill Removable Floor Tile

Step 1 Mark the removable floor tile for the cable access to the rack using one of the following methods: the floor cutout template (700-14208-XX) included in the accessory kit that ships with the zero-shelf bay assembly, the diagrams in Figure 6, a floor plan drawing, or place the frame in the proper footprint and mark the tile from the base of the frame or cabinet.

Step 2 Mark the tile for the frame anchoring holes.

Step 3 Remove the tile.

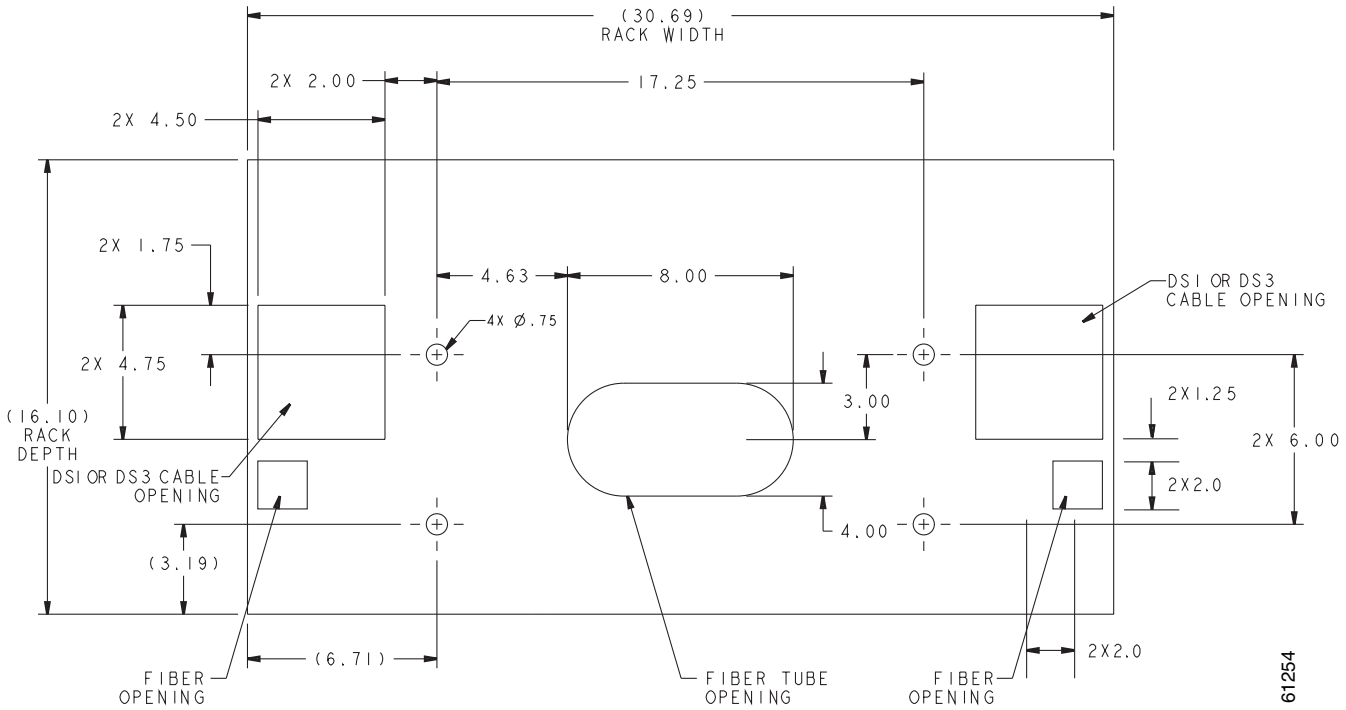
Step 4 Cut cable access holes.

Step 5 Drill the anchoring holes through the tile in an area away from the equipment to ensure the equipment area is not contaminated with metal shavings or debris. Continue with the procedures in the "Framework Anchoring" section on page 10.

Note If the floor plan identifies a future frame on the same tile as the one you are adding a frame to, you must drill and cut the tile for the future frame at this time because you cannot remove the tile later.

Note It will be necessary to use alternate anchoring holes in the event the primary holes are obstructed by the stringers that support the removable tile.

Figure 6 Raised Floor Cutout for CORE and Local



Framework Anchoring

To anchor framework to a raised floor, you must know in what earthquake zone the equipment is being installed. Zones 0–2A have the frames bolted to the raised floor through a u-channel across the bottom of the floor tile and stringers. Zones 2B–4 have 1/2-inch threaded rods extending through the raised floor and connected to seismic anchors with coupling nuts. In all zones, standard hold-down parts are used on top of the floor with threaded rods of varying lengths. Anchors and hold-down material must be engineered for proper seismic zone.

Seismic Zones 0–2A

To fasten network and unequal flange duct framework to a raised floor:

Step 1 Place a 1 5/8 x 1 5/8 u-channel (with continuous slot down) under the stringers and use clips to cover the free ends of the u-channel where the threaded rod goes through to prevent it from spreading when compressed.

In the base of the frame, use the hold-down plate engineered for that frame, threaded rod, nut, washer, insulating bushing, and hold-down washer.

On the bottom of the u-channel, use the clip, washer, lockwasher, and nut.

Note The u-channel should not extend more than four inches past the edge of the stringers or it will block access under the floor.

Warning **End caps must be used on the u-channel to prevent injury.**

Step 2 Torque the nut to 30 ft-lbs.

Note Do not over tighten the nut; the tile will become deformed and will be uneven with surrounding tiles.

Seismic Zones 2B–4

In seismic zones 2B and higher, threaded rods are run down to seismic anchors with coupling nuts from the concrete floor. U-channels are not used in higher earthquake zones. Anchor the rack at all four corners in higher earthquake zones.

Note Do not over tighten threaded rods; floor tile will deform and make the floor uneven.

Install the ONS 15454 Four-Shelf or Zero-Shelf Bay Assembly

The emphasis in the following installation instructions is to position the bay assembly in your facility after it has been removed from its shipping pallet. Perform actual installation and individual node provisioning according to local site practice.

Step 1 Use a utility blanket or its equivalent to protect the bay assembly while on the forklift or pallet jack.

Step 2 Position the forklift or pallet jack so that it faces the front (door side) of the bay assembly.

Step 3 With one person on each side of the bay assembly, position the forklift or pallet jack under the rack.

Step 4 If a safety strap is used to secure the bay assembly, fit the safety strap snugly around the bay assembly. Do not cinch the strap too tightly. Cinching the strap too tightly can result in component damage.

Step 5 Move the bay assembly to the installation site and unload it. To avoid injury, make sure that a sufficient number of people are present.

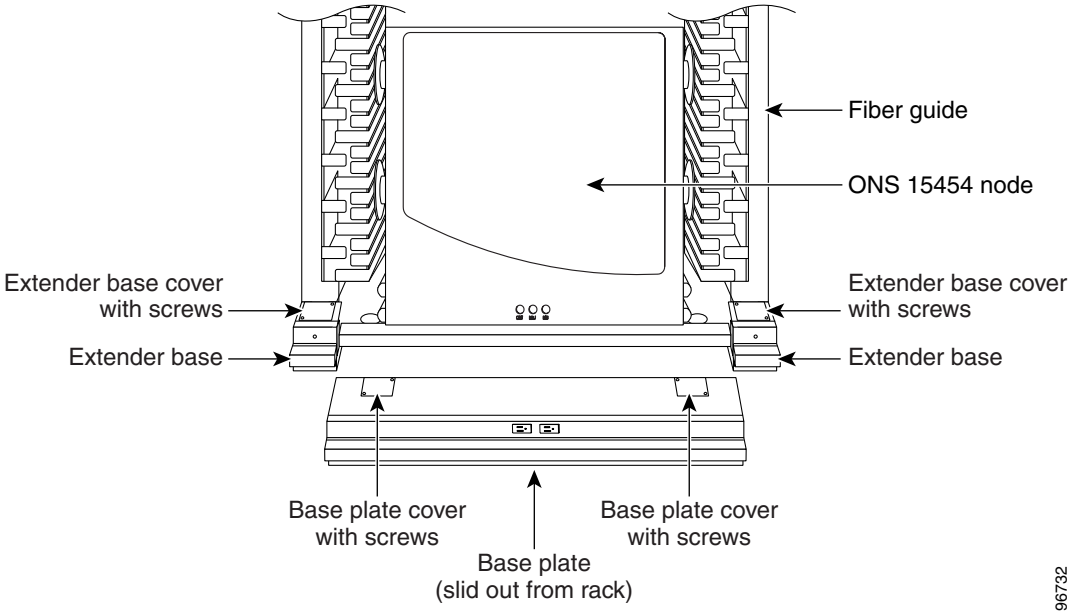
Step 6 Install the bay assembly according to local site practice.

Step 7 After the rack is installed attach the extender bases and vertical extenders to both sides of the rack as needed.

Route Fiber Through the Base

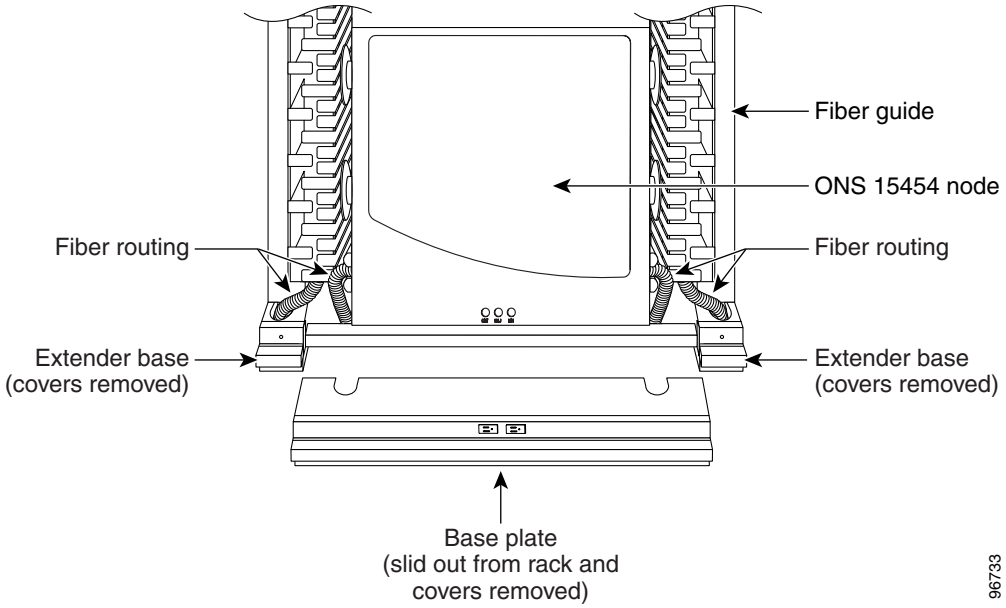
Step 1 After installing the rack onto the raised floor slide the base plate out from the rack (if not already removed) (Figure 7).

Figure 7 Sliding the Base Plate Out From the Rack



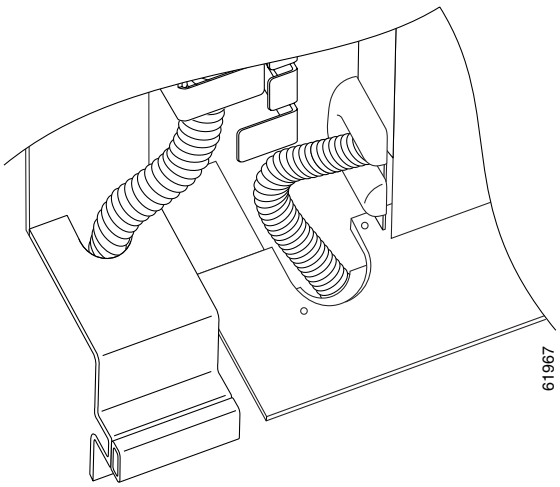
Step 2 To route fiber, unscrew and remove the covers on the base plate and extender bases (Figure 8).

Figure 8 Base Plate and Extender Bases with Covers Removed



When the covers have been removed, you have access to the base of the rack and any holes previously cut into the raised floor tile, as shown in Figure 9.

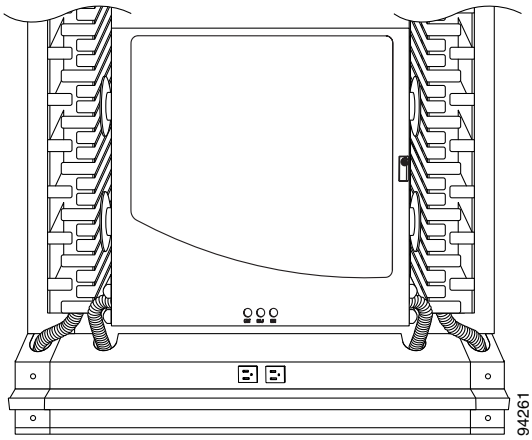
Figure 9 Raised Floor Base Fiber Routing Close-up



You can use the base plate or extender base holes to route the fibers. Cisco recommends using the base plate holes for the bottom node and the extender base holes for the other three nodes on the four-node rack. All electrical cables will be routed in the back of the rack in the extender bases. Holes should already be cut out in the raised floor tile to compensate for any DS1, DS3, ground and power cables.

Step 3 Once all fiber cables have been placed in the front portion of the rack, replace the base plate by sliding it toward the back of the rack. Figure 10 shows the routed fiber with the base plate replaced.

Figure 10 Raised Floor Base Fiber Routing



Cabling Illustrations

Figure 11 through Figure 19 illustrate cabling schemes for a bay assembly.

Figure 11 A Fiber Guide on a Four-Node Rack

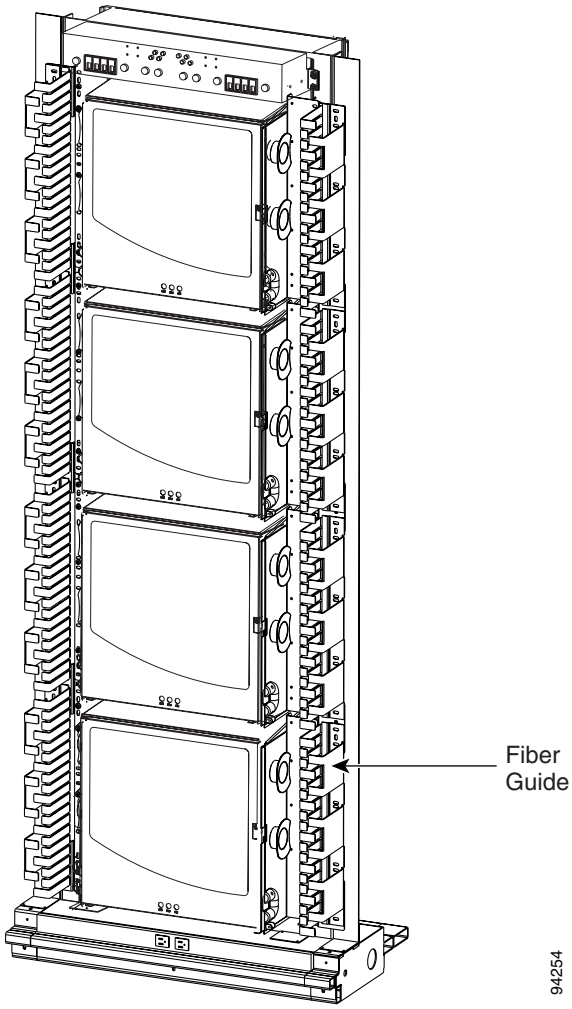


Figure 12 Rear View of a Four-Node Rack

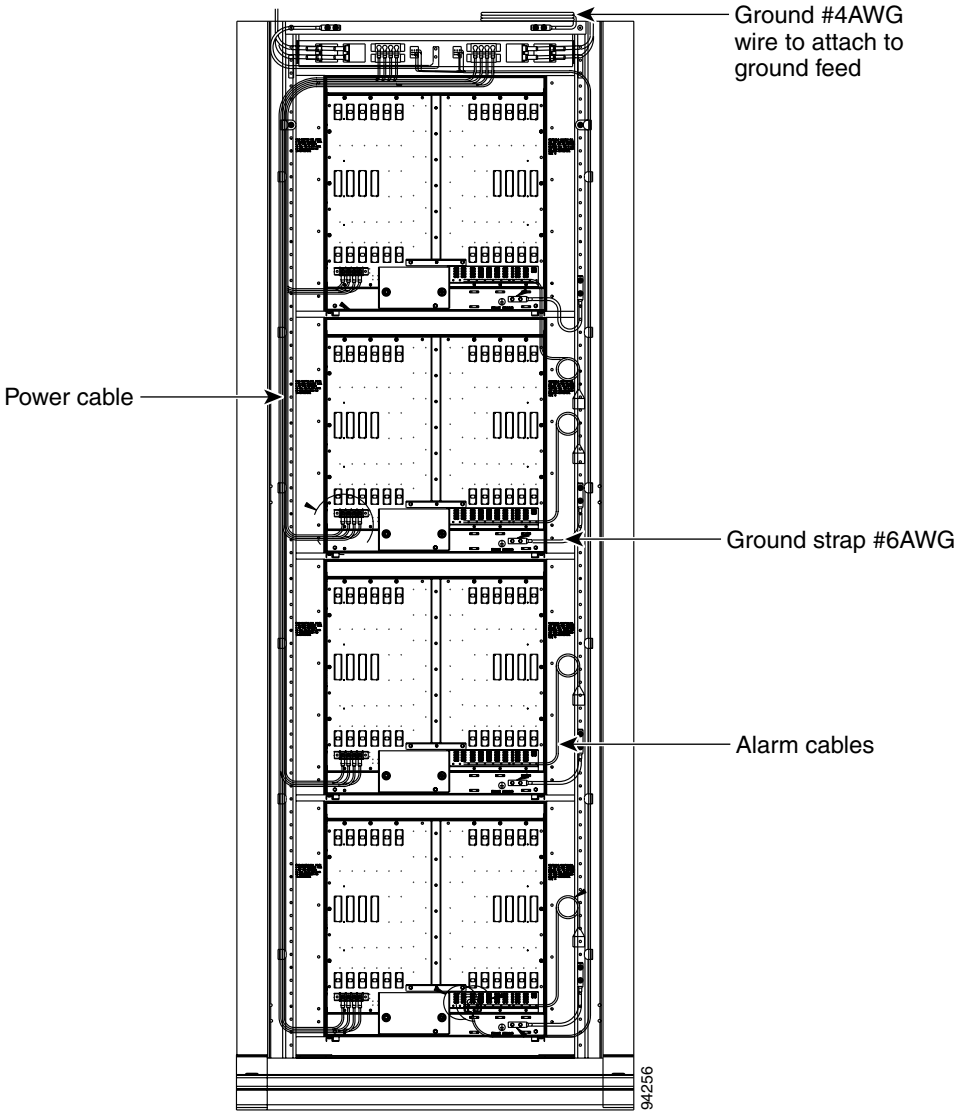


Figure 13 Side View of DS1 and Power Cables

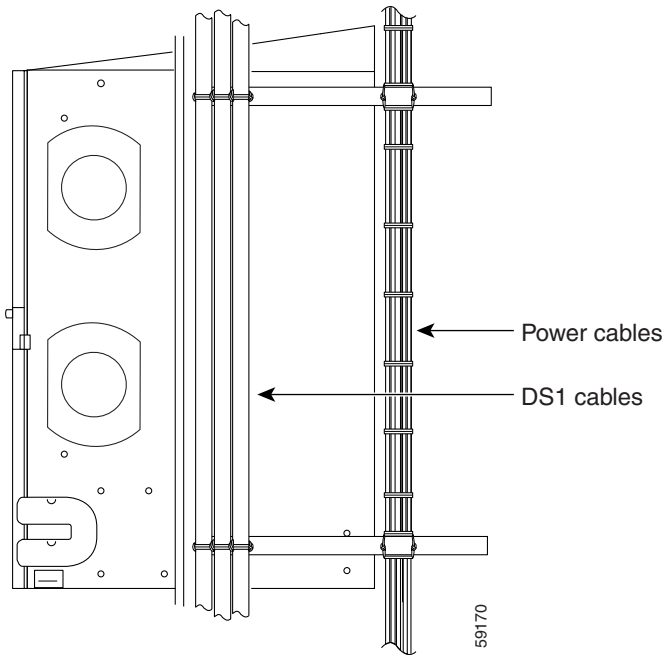


Figure 14 Close-Up of Power Cable Lacing

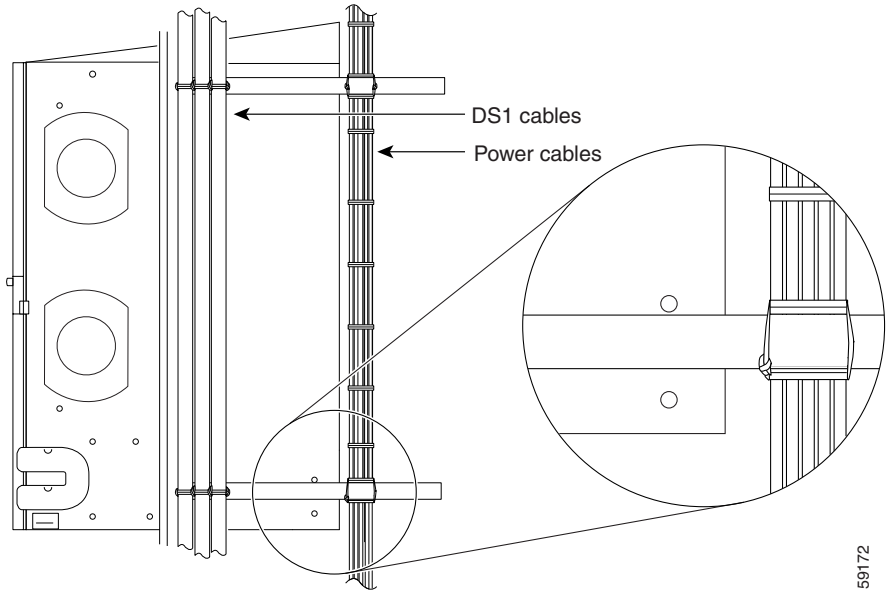


Figure 15 Side Rack View of DS1 and Power Cables

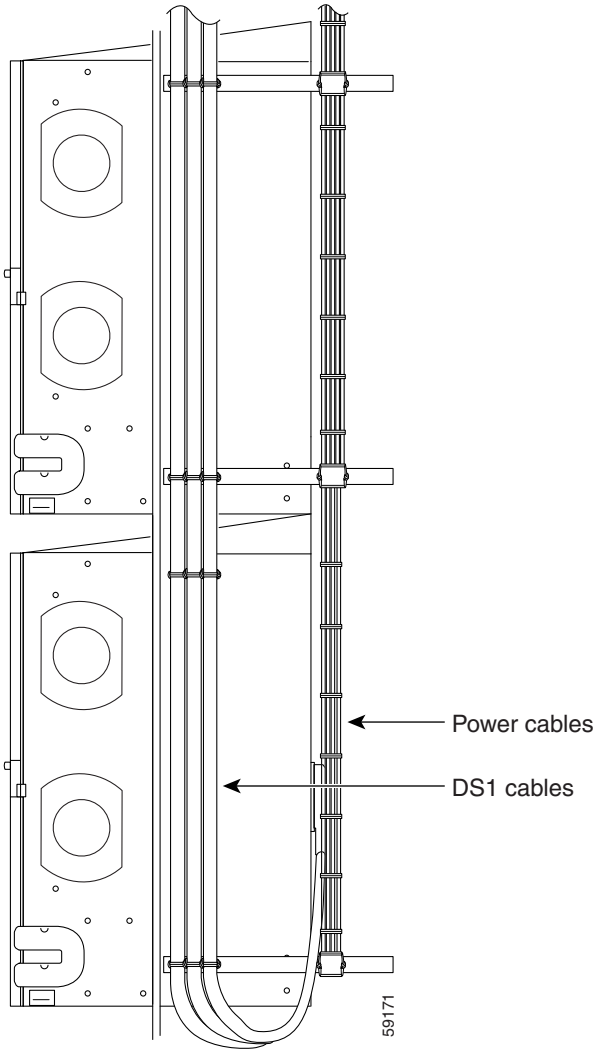


Figure 16 Cabling on One Node

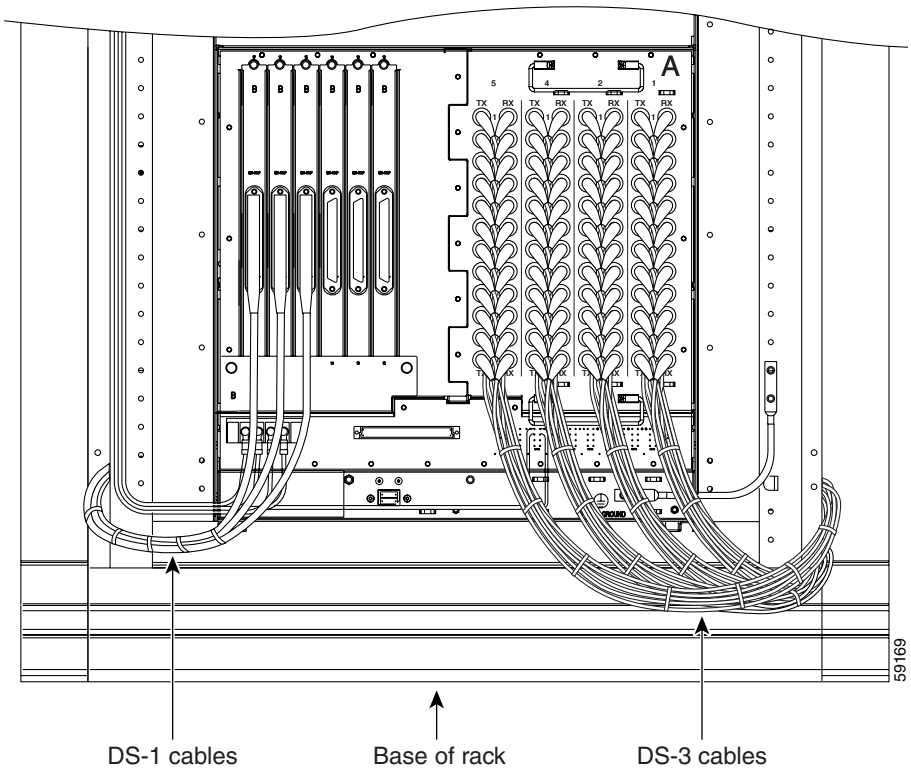


Figure 17 Standoff with Wiring

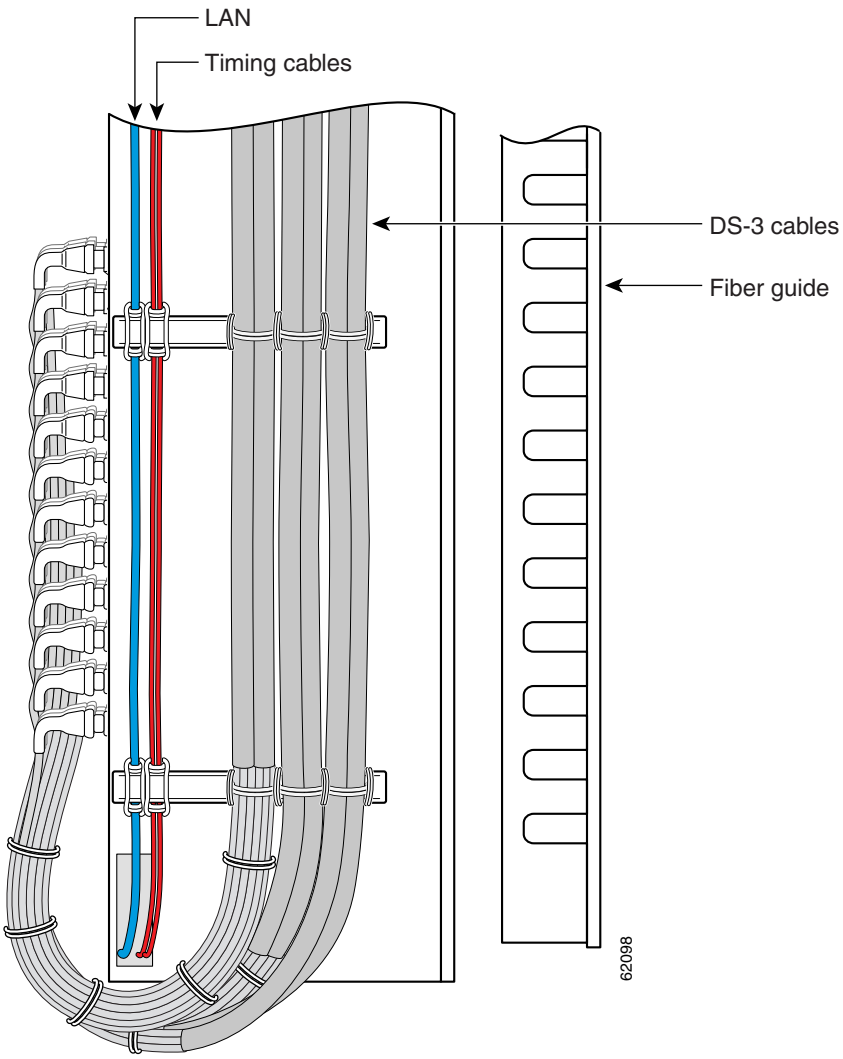


Figure 18 Standoff at Bottom of Rack

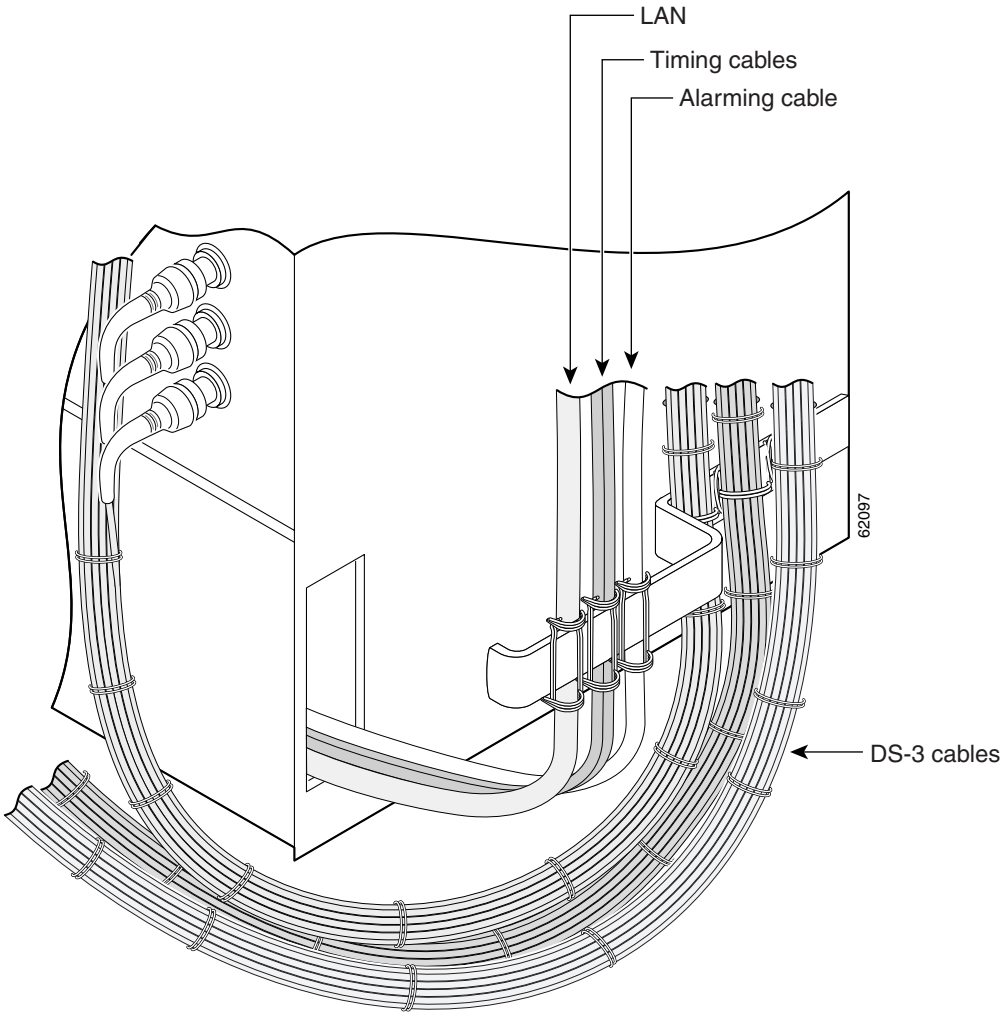
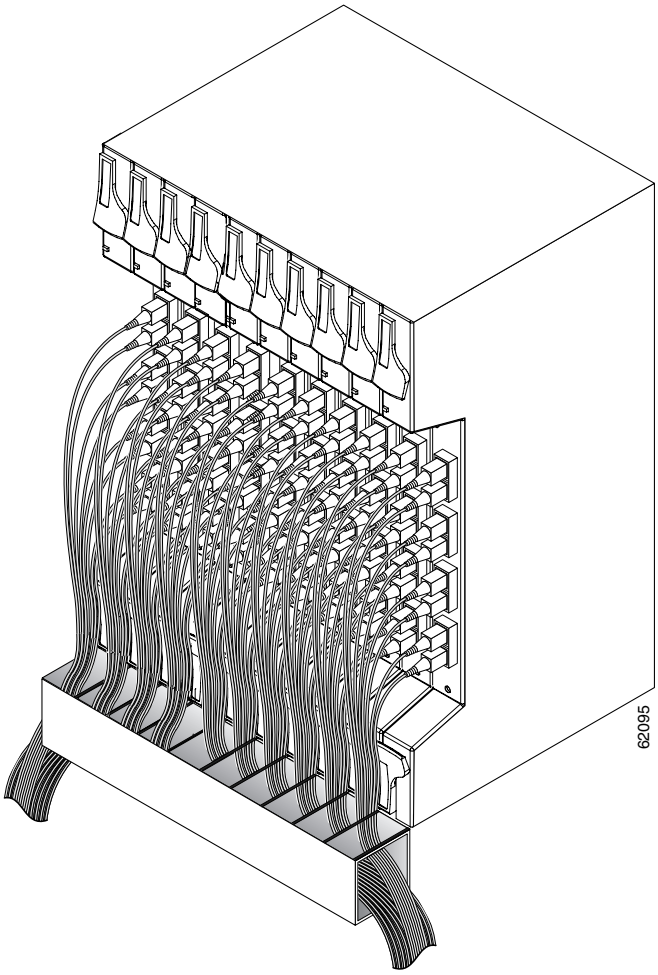


Figure 19 48 Fibers from One Node



Fuse and Alarm Panel Wiring

The FAP included in the four-shelf and zero-shelf bay assemblies provides four sets of two 30A fused drops, for powering the redundant A and B inputs of four ONS 15454 nodes. The FAP has integrated low voltage disconnect (LVD) circuitry to provide a shutdown of the output power due to a drop in input voltage from the network power source.

Necessary overload protection is provided with eight user pluggable TPA fuses, separated into two sets of four fuses, to allow for diverse routing of two power sources to each shelf assembly. Also provided is an LED alarm display for visual fault identification, with the capability for external alarm closures for remote fault signaling.

The FAP has the capability to report six alarms to a network operations center (NOC). Equipped with an alarm interface card, the ONS 15454 has the capability to report up to 32 environmental alarms, depending on which alarm interface card is installed. Only one shelf (with an AIC/AIC-I card) is needed to monitor alarming for a loss of power and a blown fuse condition. The alarms are reported to the NOC through the connected LAN wire also tied to the same shelf. Figure 20 through Figure 23 show different views of the FAP including front, rear, Side A, Side B and alarming. Refer to the latest release of the *Cisco ONS 15454-FAP-LVD Operations Guide* for more information on the fuse and alarm panel.

Figure 20 FAP (Front View)

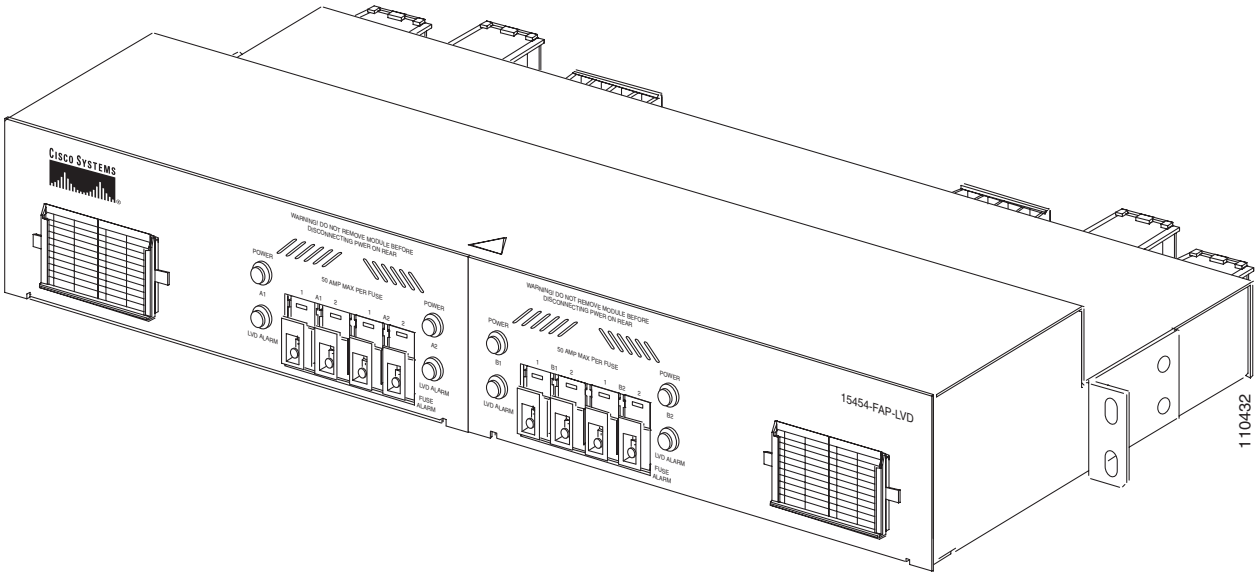


Figure 21 FAP Side A

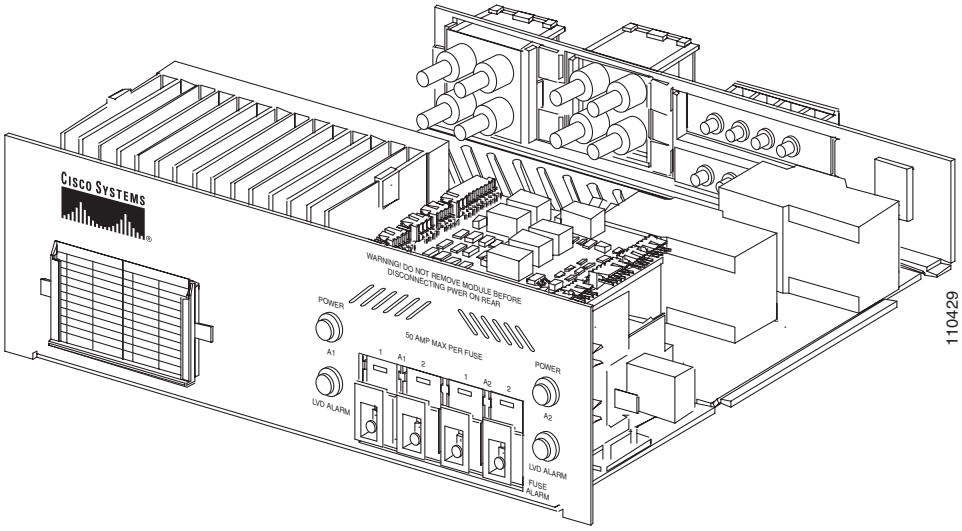


Figure 22 FAP Side B

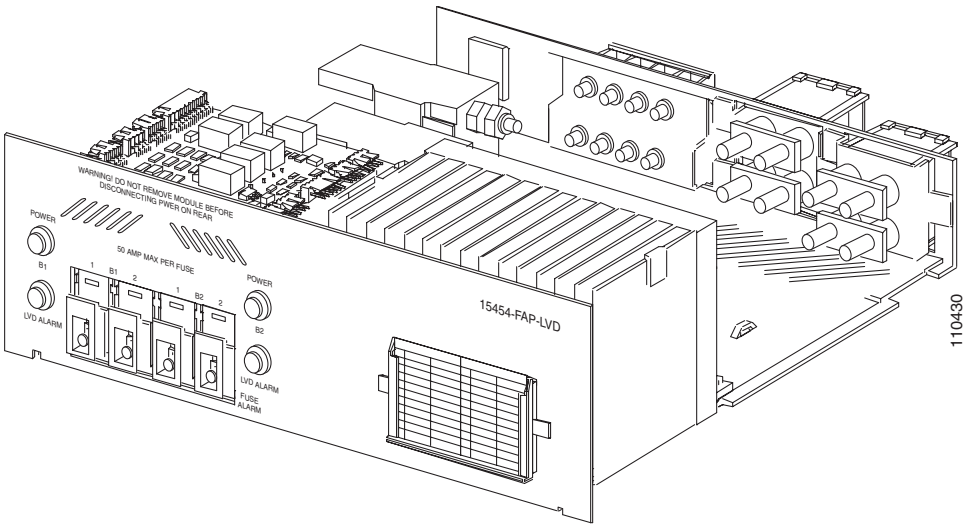
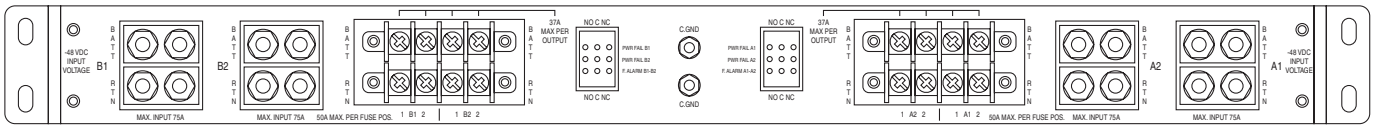


Figure 23 FAP (Rear View)



FAP Alarming

The Cisco ONS 15454 bay assemblies use 6-pair, CAT 3-rated, twisted pair wire for FAP wiring. To achieve all of the alarming capabilities of the FAP the wiring is doubled on the pins of the alarm cards. Figure 24 shows a close-up of the alarm pins and wiring. Table 1 lists the FAP wiring for each wire pair and Figure 25 shows the wire-wrap pin layout.

For assistance contact the Cisco Technical Assistance Center (TAC) at www.cisco.com or call (800) 553-2447 for unresolved problems.

Figure 24 Close-Up of FAP Alarm Pins, Alarm Wiring, and Ground

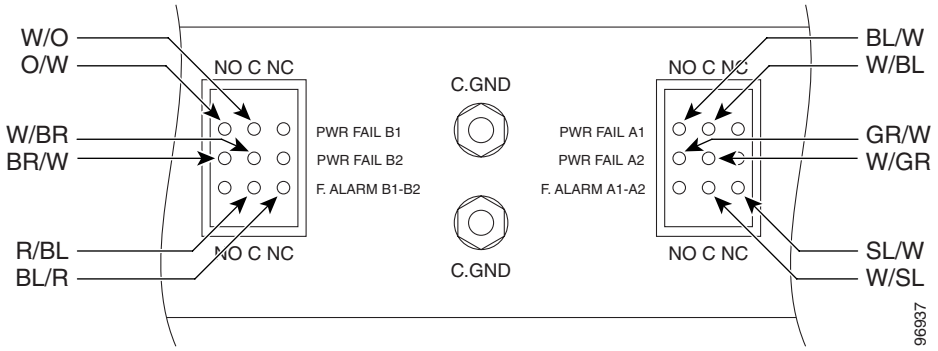


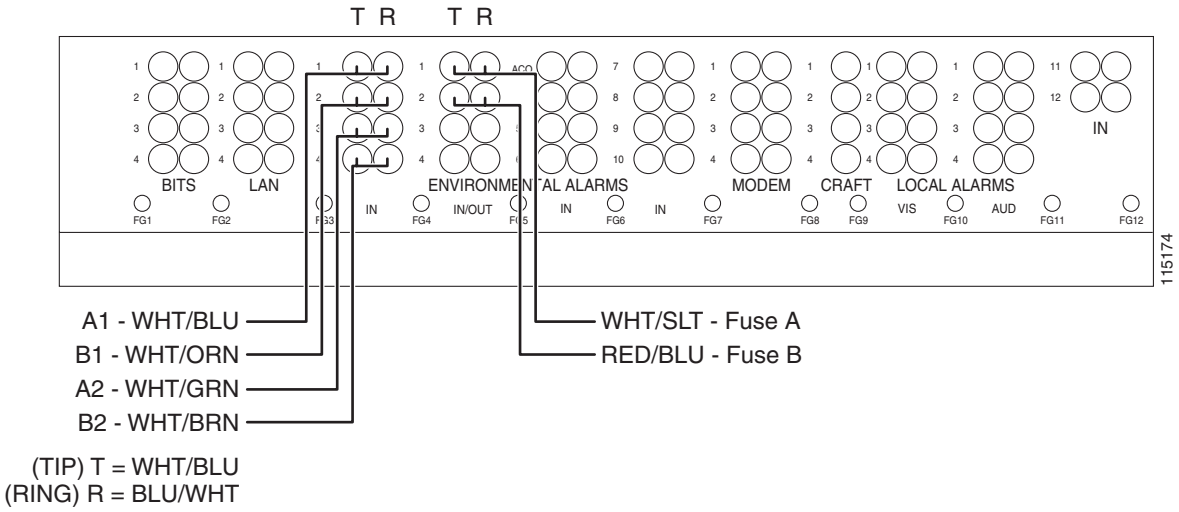
Table 1 FAP Power Alarm Wiring

Wire Pair	FAP Termination	Environmental Termination (see Figure 25)
First pair: Loss of power Blue/White (NO)-White/Blue (C)	Pin row: Power Fail A1 Pin column: NO and C	First environmental termination input position on the ONS 15454 shelf
Second pair: Loss of power Orange/White (NO)-White/Orange (C)	Pin row: Power Fail B1 Pin column: NO and C	Second environmental termination input position on the ONS 15454 shelf
Third pair: Loss of power Green/White (NO)-White/Green (C)	Pin row: Power Fail A2 Pin column: NO and C	Third environmental termination input position on the ONS 15454 shelf
Fourth pair: Loss of power Brown/White (NO)-White/Brown (C)	Pin row: Power Fail B2 Pin column: NO and C	Fourth environmental termination input position on the ONS 15454 shelf
Fifth pair: Fuses A White/Slate (C)-Slate/White (NC)	Pin row: Fuse Alarm A1 and A2 Pin column: C and NC	Fifth environmental termination input position on the ONS 15454 shelf
Sixth pair: Fuses B Red/Blue (C)-Blue/Red (NC)	Pin Row: Fuse Alarm B1 and B2 Pin column: C and NC	Sixth environmental termination input position on the ONS 15454 shelf

Note The AIC-I requires a shelf assembly running Software Release 3.4.0 or later. The AIC-I uses wire-wrap field pin assignments according to the layout in Figure 25.

Perform wire-wrapping according to the T (Tip) and R (Ring) diagram in Figure 25.

Figure 25 Wire-Wrap Pin Layout in a Release 3.4 and Later ANSI Shelf Assembly



FAP Output and Input Power

Route output and input power according to local site practice. Refer to the latest release of the *Cisco ONS 15454-FAP-LVD Operations Guide* for more information. Figure 26 through Figure 30 show output and input lugs and wiring and Table 2 on page 28 lists lug wiring positions.

Figure 26 Connecting Output Power Using Ring-Type Compression Lugs

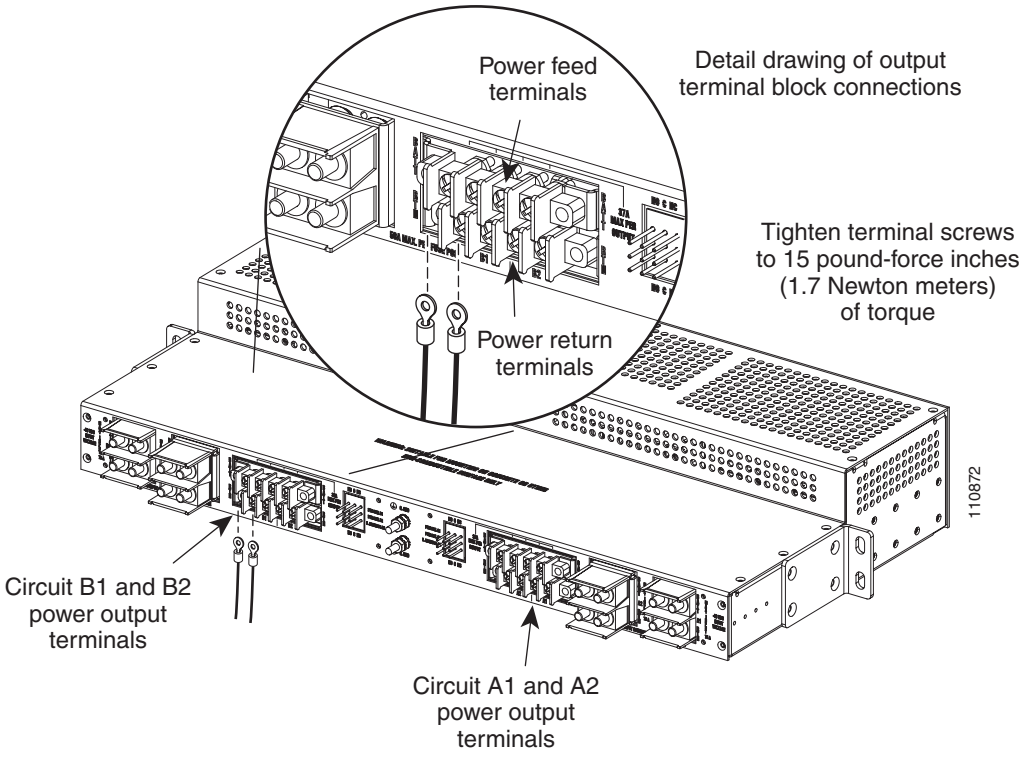


Figure 27 Close-Up of Lugs on Rear of FAP

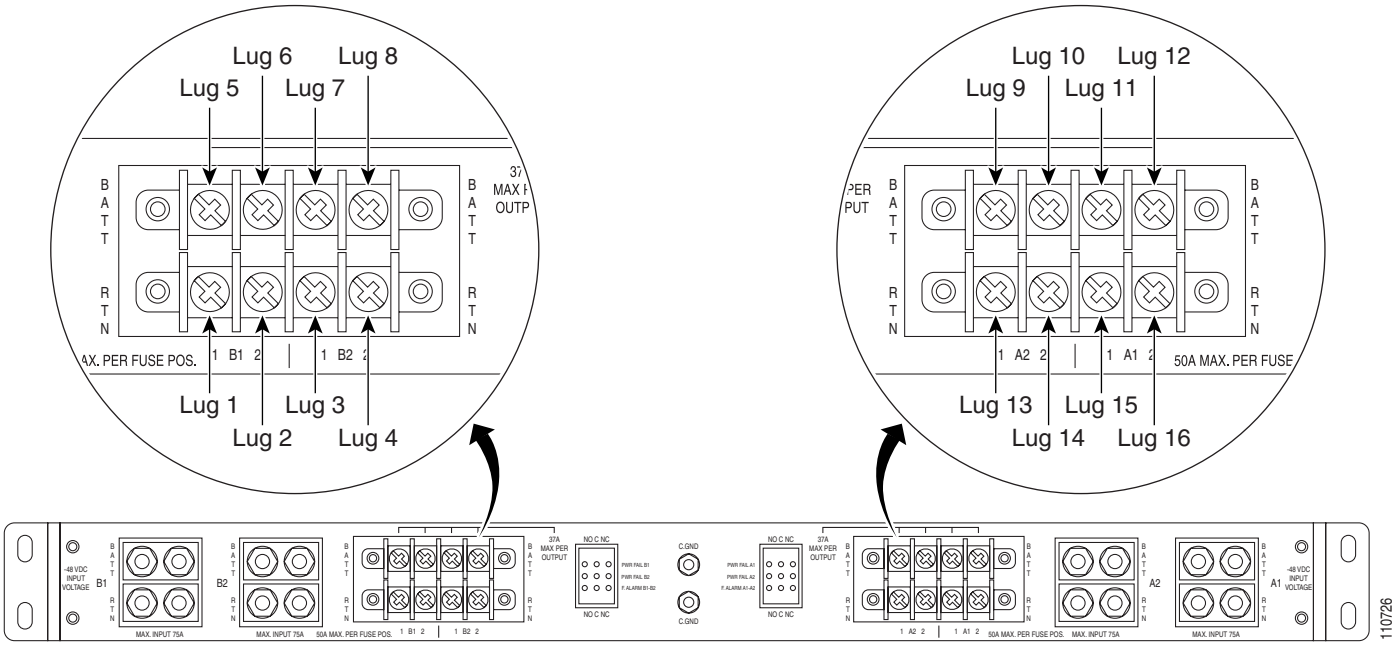


Table 2 Lug Wiring Positions

Lug (From) (See Figure 27 on page 27)		Wire		Lug (To) (See Figure 28 on page 29)	
Lug	**Label**	**Color**	**Wire P/N**	**Label**	**Lug**
1	FAP, B Side, RTN, Pos 1	Black	31-0768-01	Shelf, 1, RTN 2	31
2	FAP, B Side, RTN, Pos 2			Shelf, 2, RTN 2	27
3	FAP, B Side, RTN, Pos 3			Shelf, 3, RTN 2	23
4	FAP, B Side, RTN, Pos 4			Shelf, 4, RTN 2	19
5	FAP, B Side, -48 V, Pos 1	Red	31-0767-01	Shelf, 1, BAT 2	32
6	FAP, B Side, -48 V, Pos 2			Shelf, 2, BAT 2	28
7	FAP, B Side, -48 V, Pos 3			Shelf, 3, BAT 2	24
8	FAP, B Side, -48 V, Pos 4			Shelf, 4, BAT 2	20
9	FAP, A Side, -48 V, Pos 1			Shelf, 1, BAT 1	30
10	FAP, A Side, -48 V, Pos 2			Shelf, 2, BAT 1	26
11	FAP, A Side, -48 V, Pos 3			Shelf, 3, BAT 1	22
12	FAP, A Side, -48 V, Pos 4			Shelf, 4, BAT 1	18
13	FAP, A Side, RTN, Pos 1	Black	31-0768-01	Shelf, 1, RTN 1	29
14	FAP, A Side, RTN, Pos 2			Shelf, 2, RTN 1	25
15	FAP, A Side, RTN, Pos 3			Shelf, 3, RTN 1	21
16	FAP, A Side, RTN, Pos 4			Shelf, 4, RTN 1	17

Figure 28 Lug Wiring from Rear of FAP to Shelf Lugs

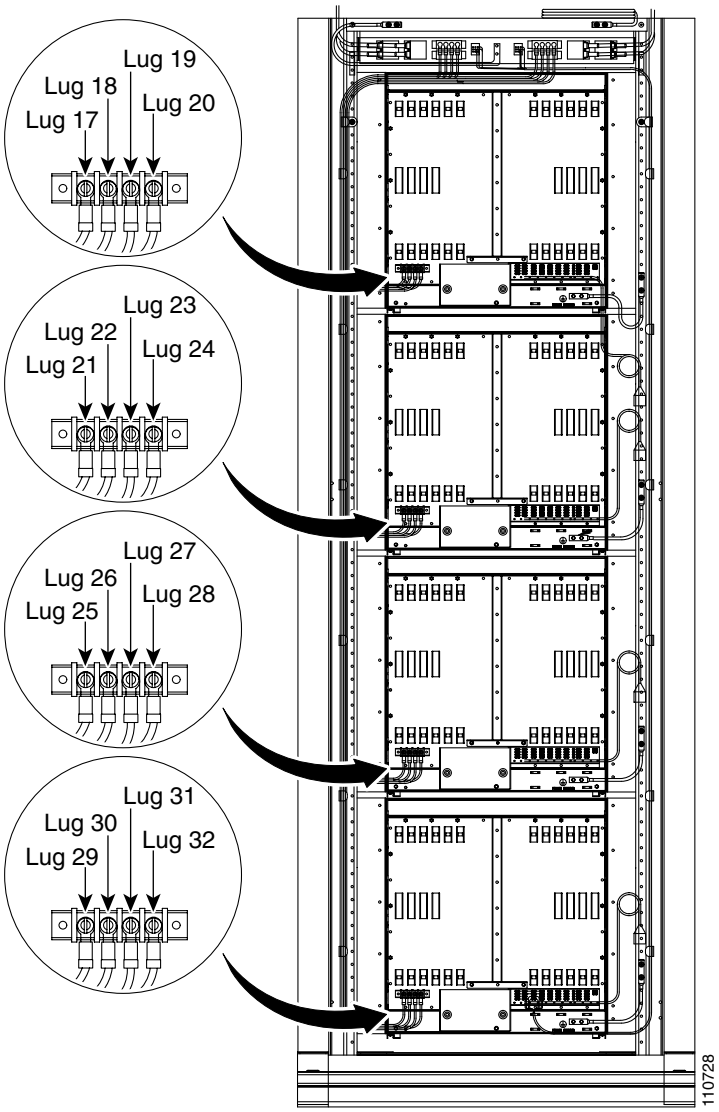


Figure 29 Connecting Input Power

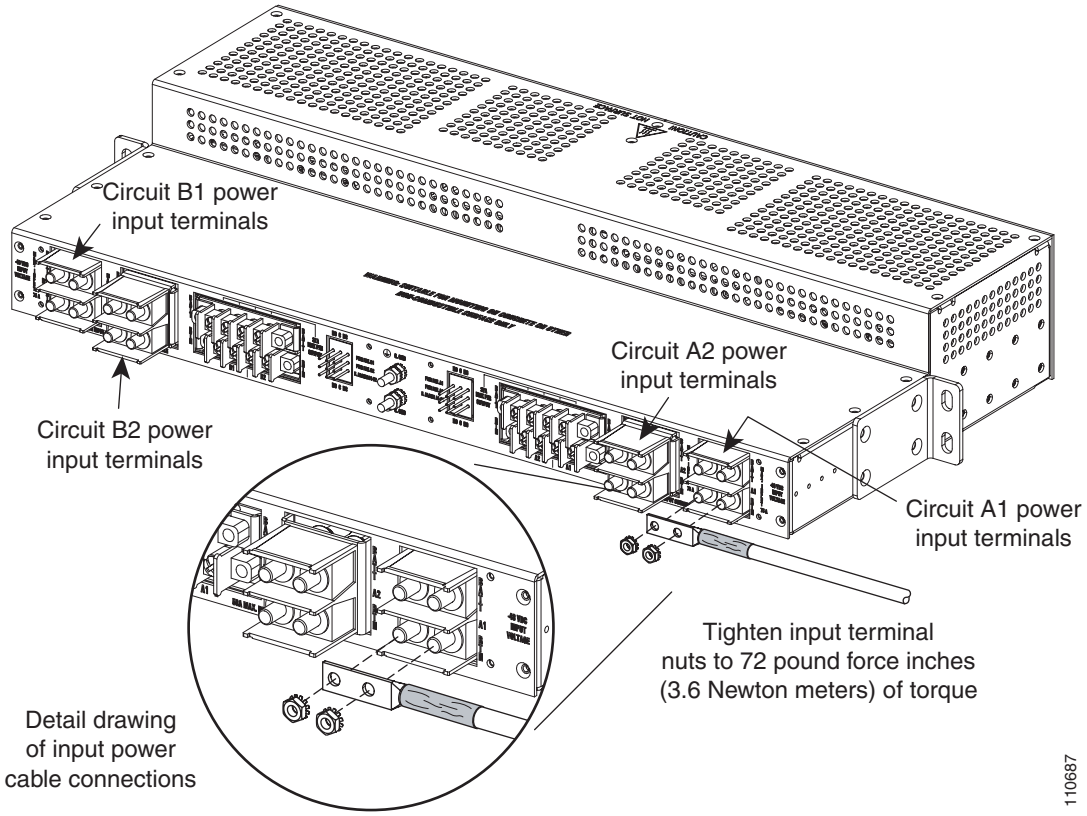
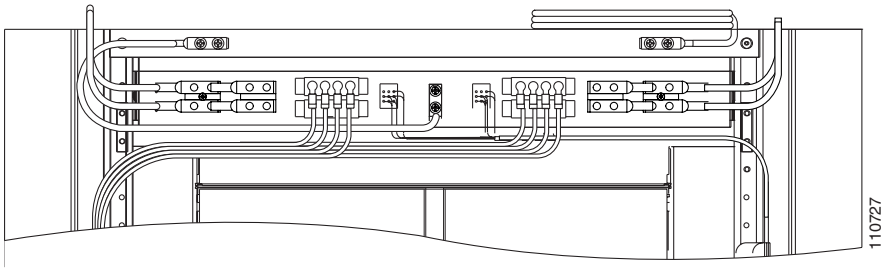


Figure 30 Wiring from Rear of FAP



Replace Side A or Side B of the FAP

Note When replacing Side A or Side B of the FAP, all wires must be disconnected from that module.

Step 1 Turn off the power supply to the side you are replacing, either Side A or Side B.

Warning **Each side (Side A or Side B) has two power inputs. You must remove both power inputs from the side you are replacing in order for that side to be powered down.**

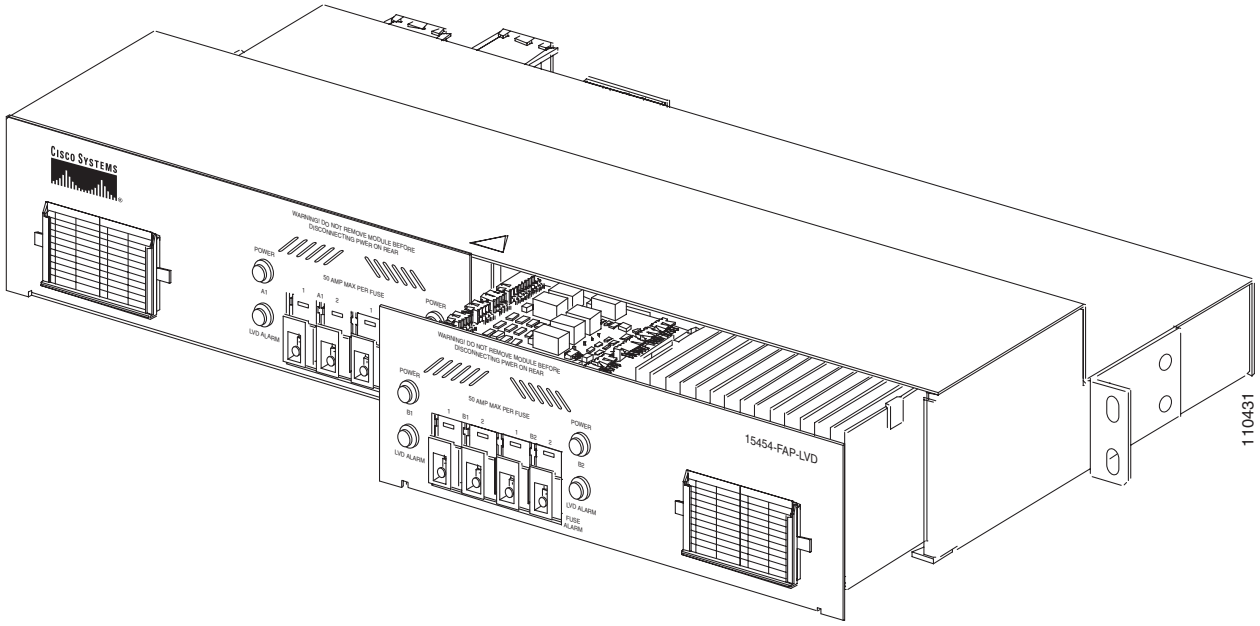
Step 2 Disconnect the alarm wires on the module that is being replaced.

Step 3 Disconnect all wires from the input and output terminals on the side that is being replaced.

Step 4 Remove the four screws on the front and the four screws on the back of the side that is being replaced.

Step 5 Slide out the side that is being replaced from the FAP. Figure 31 shows Side B being removed/replaced.

Figure 31 Removing or Replacing FAP Side B



Step 6 Slide in the new Side A or Side B and fasten it using the same eight screws (four front, four back) that were previously removed.

Step 7 Connect all wires from the output and input terminals on the new Side A or Side B.

Step 8 Connect the alarm wires on the new Side A or Side B.

Step 9 Turn on the power to the new Side A or Side B.

Ground and Power

The ground studs and power input and output terminals are mounted on the rear side of the FAP. The plastic protective covers install over the input and output power terminals to prevent accidental contact with the terminals when power is present in the panel.

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 rack is connected to common office 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 fuse must be incorporated in the fixed wiring.**

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.

Central Office Ground to Bay Wire Ground

Connect the CO ground to the bay wire ground according to local site practice.

Note The bay assembly ground must be attached to the common central office (CO) ground via an H TAP compression connector.

Central Office Power to FAP

Connect the CO power to the FAP according to local site practice.

Note CO power from the BDFB to the bay assembly must be a direct feed from a single breaker (one breaker for return, and one breaker for -48VDC) at the BDFB to the input connection of the bay assembly. The size or gauge of the power wire feed must be calculated by the distance from the BDFB to the FAP.

Optional Kits

There are four optional kits that can be ordered separately as needed for cable protection, aisle guards, and supplementary installation components. This section lists the kits by product name, title, and part number and provides descriptions for each kit.

Table 3 Optional Kits

Product Name	Title	Part Number
15454-BAY-EXT=	15454 Bay Extender Kit (2.38-inch)	74-2794-01
15454-BAY-COVER=	15454 Bay End Plate Cover Kit	74-2795-01
15454-BAY-GUARD=	15454 Bay End Guard Kit	74-2796-01
15454-BAY-ACC1=	15454 First Aid Kit	53-2073-01

15454 Bay Extender Kit (2.38-inch)

The 15454 Bay Extender Kit provides rear cable protection, additional cable management space and includes a 2.38-inch vertical extender (Figure 32) and extender base (Figure 33 and Figure 34).

Figure 32 Vertical Extender

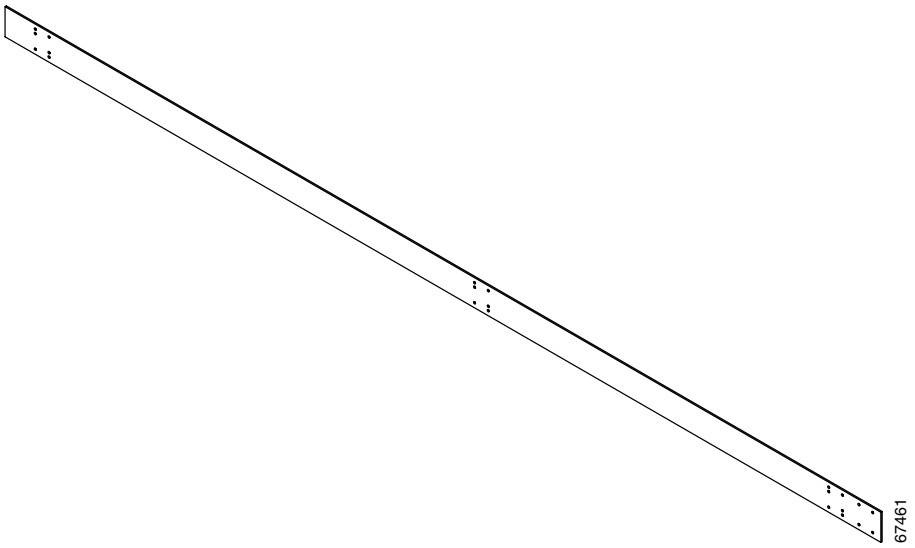


Figure 33 Extender Base

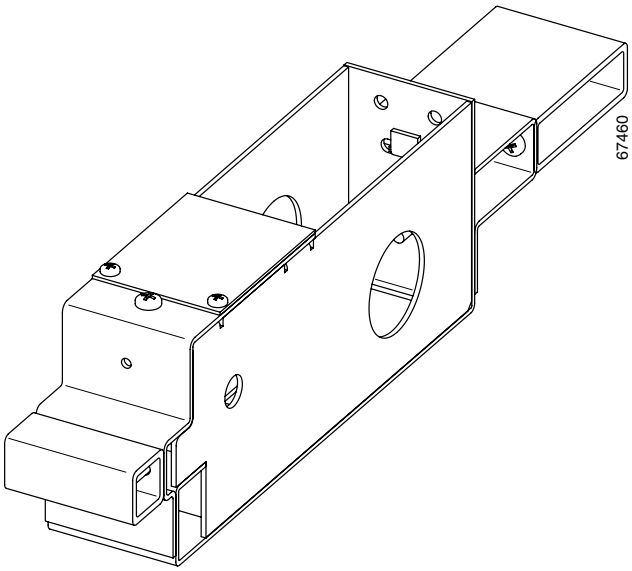
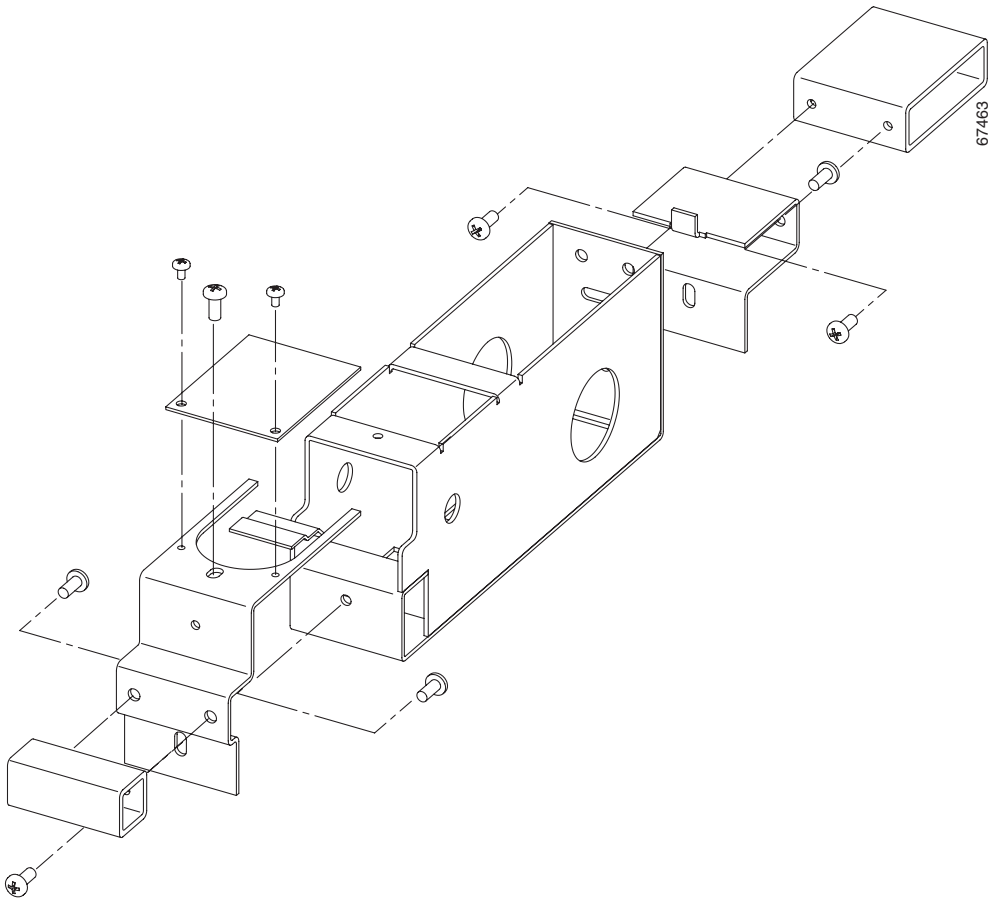


Figure 34 Extender Base Assembly



15454 Bay End Plate Cover Kit

The 15454 Bay End Plate Cover Kit provides a basic end plate for temporary cable protection. It contains parts that mount flush against the rack with no major footprint change (thickness of the metal only) against the edge of the rack to protect the cables. This plate is usually used for an aisle that is not complete, or as an aisle guard for aisles. The end plate cover can be mounted with the 2.38-inch extender as shown in Figure 35 or mounted directly as shown in Figure 36.

Figure 35 End Plate Cover Assembly Mounted with 2.38-inch Extender

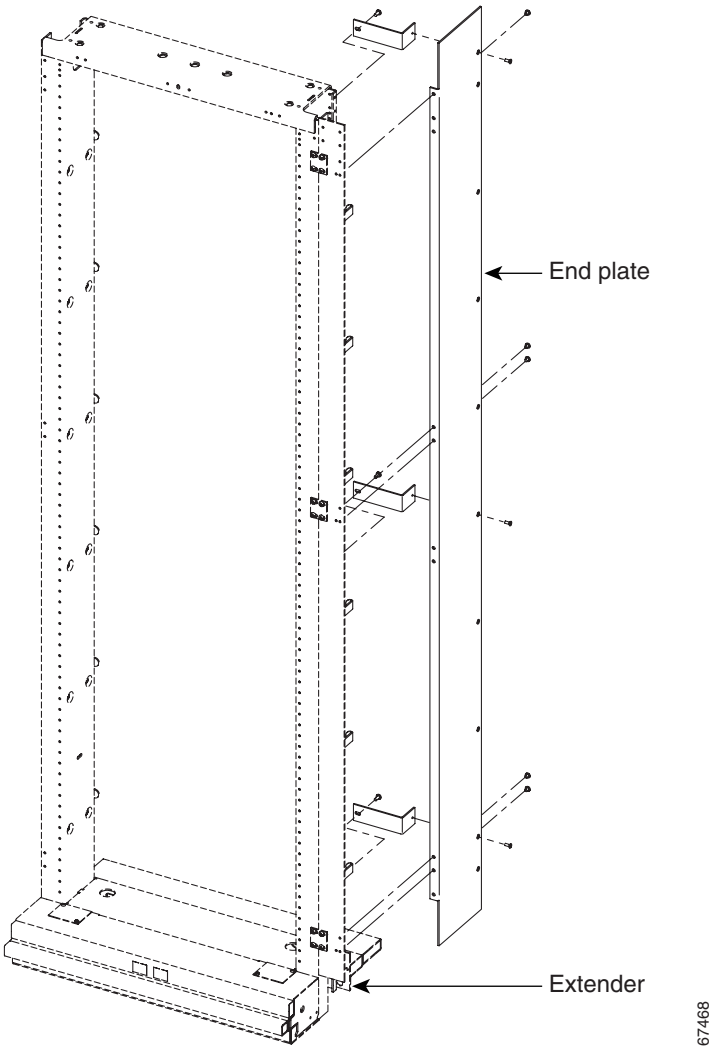
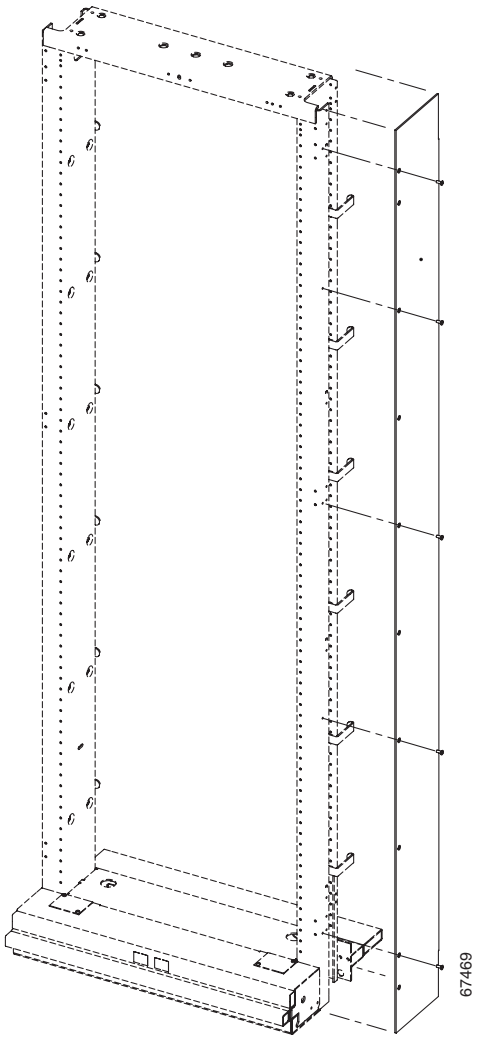


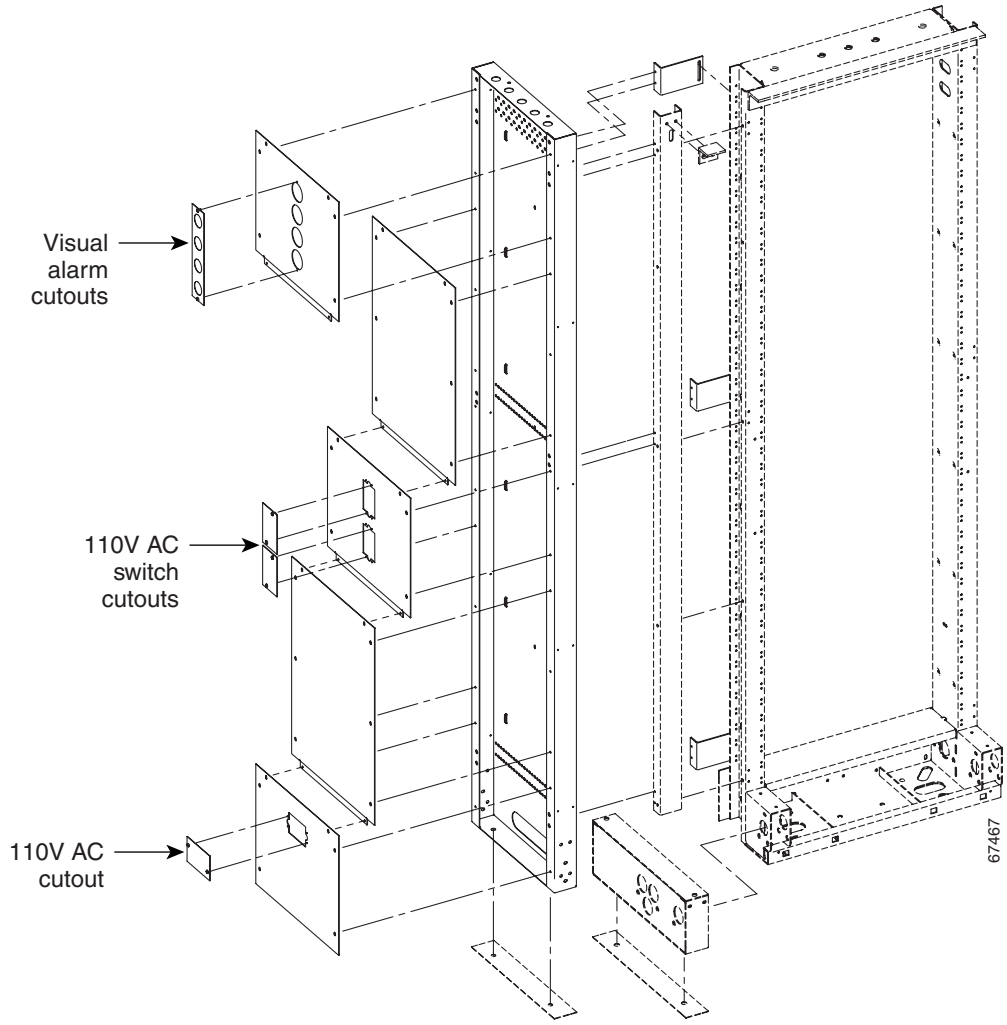
Figure 36 End Plate Cover Assembly Mounted Directly



15454 Bay End Guard Kit

The 15454 Bay End Guard Kit provides a full aisle guard with AC on/off switch cutout. It is used to complete the end of the aisle (about 2.50-inch wide or thick). The end guard may or may not have power (110VAC), 110VAC outlets, and a visual light for alarms. See Figure 37 for end guard assembly.

Figure 37 End Guard Assembly



15454 First Aid Kit

The 15454 First Aid Kit contains extra items such as, tape, cord, tags; and cosmetic items such as, touch-up paint to promote a quality installation.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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This document is to be used in conjunction with Cisco ONS 15454 user documentation and 15454-FAP-LVD documentation.