



Hardware Installation Procedures

This chapter describes procedures for installing essential hardware components. This section describes common hardware installation and verification procedures and tasks. Refer to the *Cisco ONS 15540 ESPx Hardware Installation Guide* for complete hardware installation instructions.

Before You Begin

This section lists the chapter non-trouble procedures (NTPs). Turn to a procedure for applicable tasks or detailed level procedures (DLPs).

- Step 1 [NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1](#)—Complete this procedure to install the chassis in the rack.
- Step 2 [NTP-3 Install the Cable Management System, page 2-4](#)—Complete this procedure to install the optional fiber routing management system.
- Step 3 [NTP-4 Install Processor Cards, Line Card Motherboards, and Modules, page 2-12](#)—Complete this procedure to install all line cards, modules, and motherboards in the shelf.
- Step 4 [NTP-5 Connect the Hardware, page 2-26](#)—Complete this procedure to make the network and fiber optic connections on the shelf.
- Step 5 [NTP-6 Ground the Shelf, page 2-55](#)—Complete this procedure before continuing with the “[DLP-24 Clean Optical Connectors](#)” task on page 2-31.
- Step 6 [NTP-7 Power Up the Shelf, page 2-57](#)—Complete this procedure to install the power supplies, connect the power, and power up the shelf.
- Step 7 [NTP-8 Verify Installation of Hardware, page 2-66](#)—Complete this procedure to verify that the hardware is properly installed.

NTP-2 Install the Cisco ONS 15540 ESPx Chassis

Purpose	This procedure describes how to install the Cisco ONS 15540 ESPx chassis.
Tools/Equipment	19-inch rack-mounting kit Number 1 Phillips screwdriver
Prerequisite Procedures	NTP-1 Unpack and Inspect the Shelf, page 1-7

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

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- Step 1 Complete the “[DLP-1 Flush-Mount the Cisco ONS 15540 ESPx](#)” task on page 2-2.
- Step 2 Continue with the “[NTP-3 Install the Cable Management System](#)” procedure on page 2-4.
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DLP-1 Flush-Mount the Cisco ONS 15540 ESPx

Purpose	This task installs the Cisco ONS 15540 ESPx chassis in a rack.
Tools/Equipment	Rack-mounting kit Number 1 Phillips screwdriver
Prerequisite Procedures	NTP-1 Unpack and Inspect the Shelf , page 1-7
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

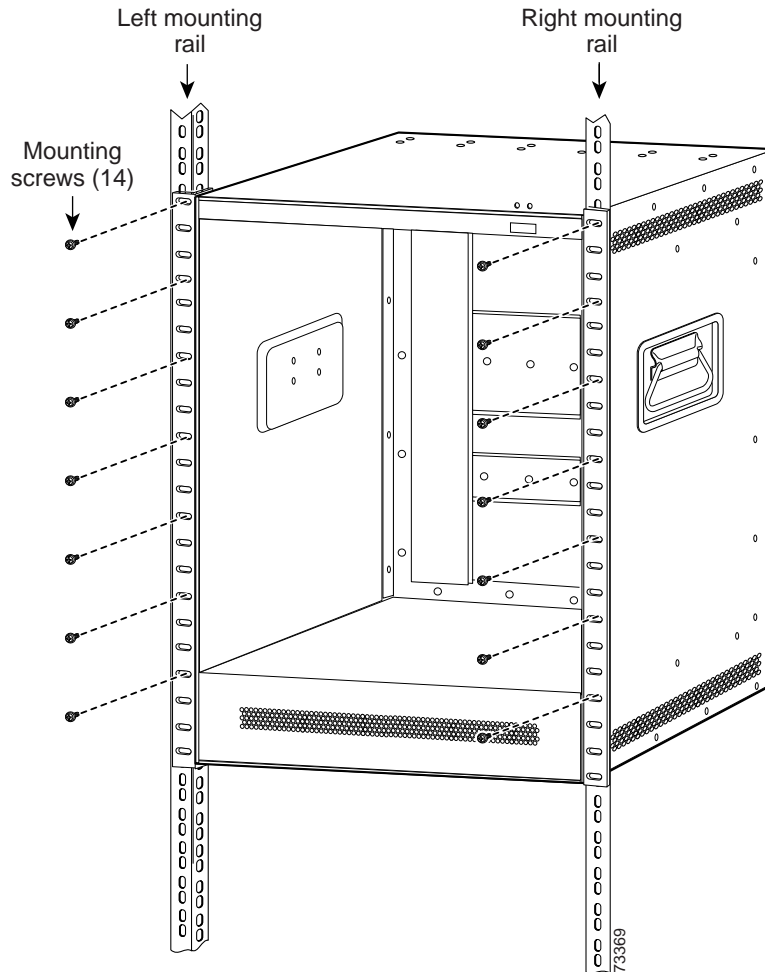


Warning

At least three people are required to mount the chassis in the equipment rack: two people are needed to hold the chassis in place while a third person tightens the mounting screws. When handling the chassis, always follow proper lifting practices.

- Step 3** Align the mounting bracket holes with the rack post holes (see [Figure 2-2](#)) and attach the shelf to the rack (performed by the third person).

Figure 2-2 Attaching Shelf to Equipment Rack



- Step 4** Use the number 12-24 screws shipped with the chassis to mount the chassis in the rack. (See [Figure 2-2](#).) Use seven screws on each L bracket on the sides of the chassis. Start with the first screw at the top of the chassis and use a screw every 2 RU to equally space the screws out and safely secure the chassis in the rack.

NTP-3 Install the Cable Management System

Purpose	This procedure describes how to install the cable management tray.
Tools/Equipment	Number 1 Phillips screwdriver 12-24 screws
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1

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

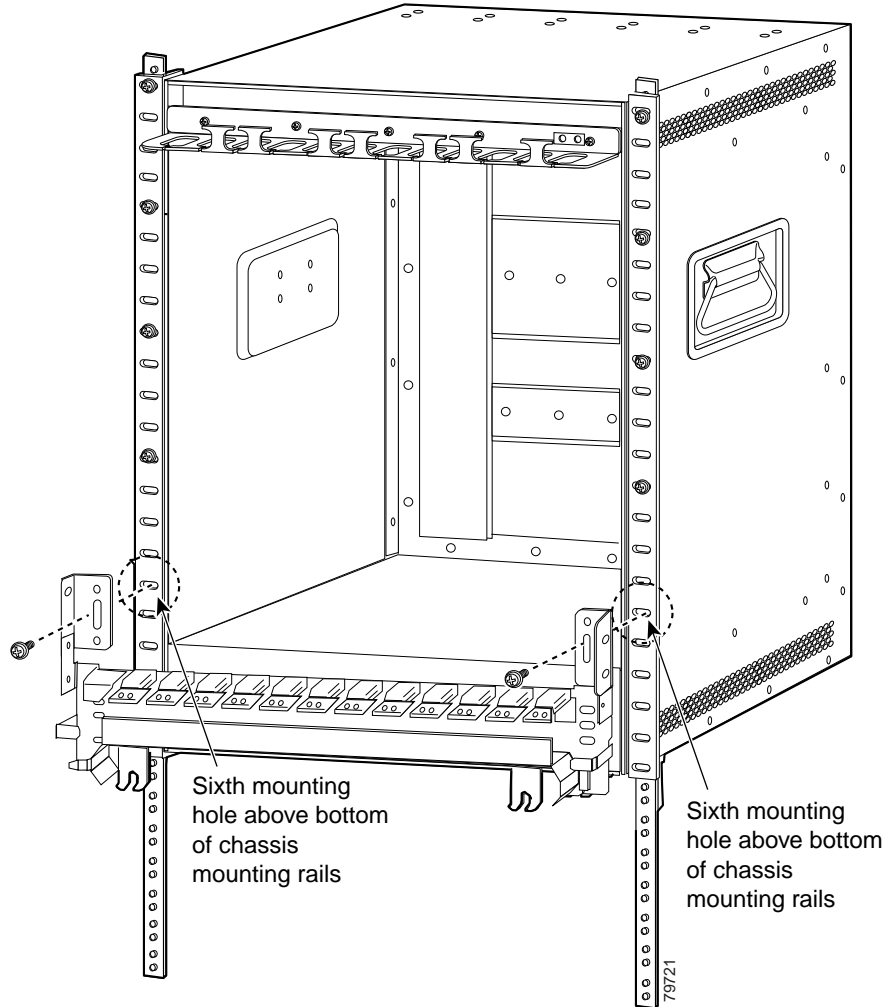
-
- Step 1** Complete the “[DLP-2 Install the Cable Management Tray](#)” task on page 2-5.
- Step 2** Complete the “[DLP-3 Install the Cable Management Drawer](#)” task on page 2-6.
- Step 3** Complete the “[DLP-4 Install Adapters in the Cross Connect Panel](#)” task on page 2-7.
- Step 4** Complete the “[DLP-5 Install the Vertical Cable Guide](#)” task on page 2-10.
- Step 5** Continue with the “[NTP-4 Install Processor Cards, Line Card Motherboards, and Modules](#)” procedure on page 2-12.
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DLP-2 Install the Cable Management Tray

Purpose	This task installs the cable management tray.
Tools/Equipment	Number 1 Phillips screwdriver Four 12-24 screws
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis , page 2-1
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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- Step 1** Place the cable management tray over the fan assembly, ensuring that the tray is just under the chassis slots.
- Step 2** Secure the cable management tray to the rack with four 12-24 screws, two on each side. To ensure correct placement of the tray, install the second of the two screws in the sixth slot from the bottom of the chassis rack up on each side of the cable management tray. (See [Figure 2-3](#).)

Figure 2-3 Installing the Cable Management Tray

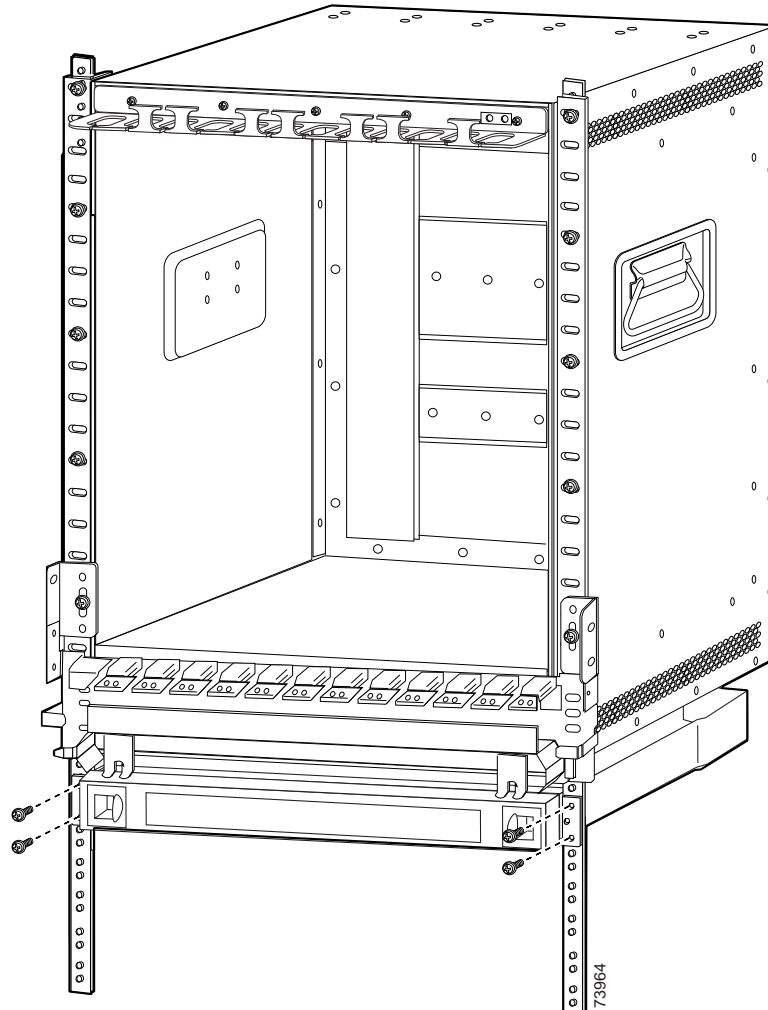


DLP-3 Install the Cable Management Drawer

Purpose	This task installs the cable management drawer.
Tools/Equipment	Number 1 Phillips screwdriver Four 12-24 screws
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1 DLP-2 Install the Cable Management Tray, page 2-5
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** Hold the drawer with both hands and position the drawer in the rack beneath the chassis. See [Figure 2-4](#).

Figure 2-4 Installing the Fiber Routing Drawer



- Step 2** Align the mounting holes on the bracket with the mounting holes in the equipment rack.
- Step 3** Use a number 1 Phillips screwdriver to install the 12-24 screws through the elongated holes in the brackets and into the threaded holes in the mounting post. Repeat this step for the other side.

DLP-4 Install Adapters in the Cross Connect Panel

Purpose	This task installs the adapter in a cross connect drawer.
Tools/Equipment	Number 1 Phillips screwdriver Four 12-24 screws

Prerequisite Procedures [NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1](#)
[DLP-2 Install the Cable Management Tray, page 2-5](#)
[DLP-3 Install the Cable Management Drawer, page 2-6](#)

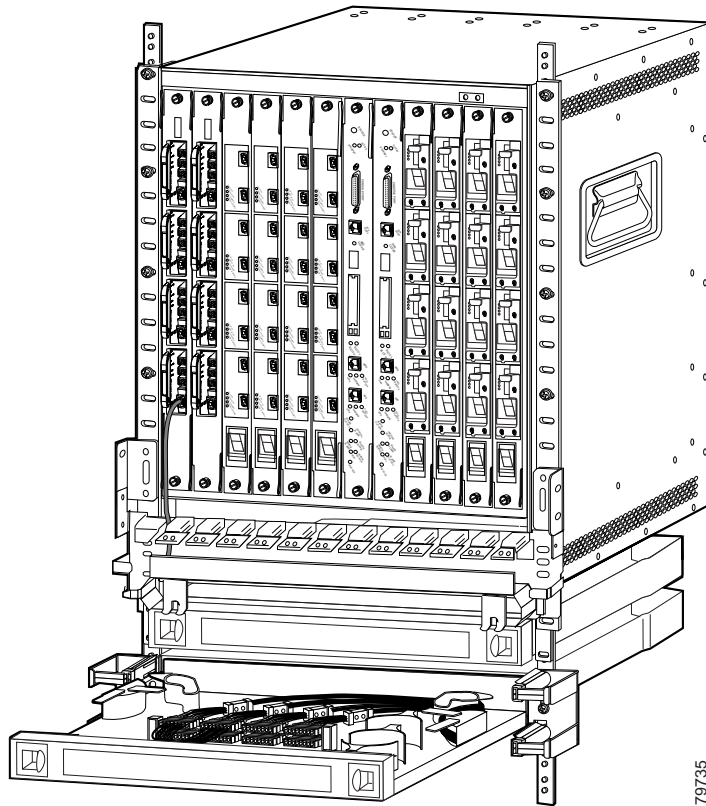
Required/As Needed Required

Onsite/Remote Onsite

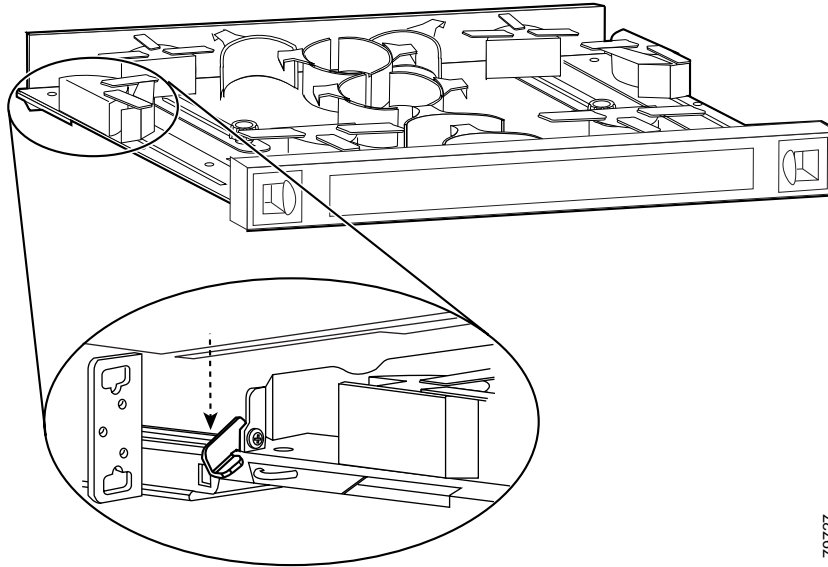
Security Level None

Step 1 Open the cross connect drawer. (See [Figure 2-5](#).)

Figure 2-5 Pulling out the Cross Connect Drawer

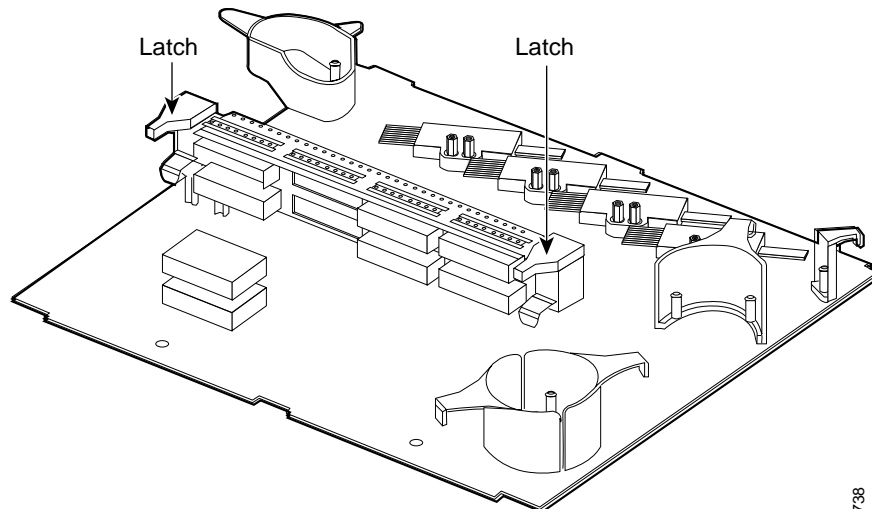


Step 2 Lock the drawer in the open position by pushing the lever at the back left of the drawer down in the lock position. (See [Figure 2-6](#).)

Figure 2-6 Locking the Drawer

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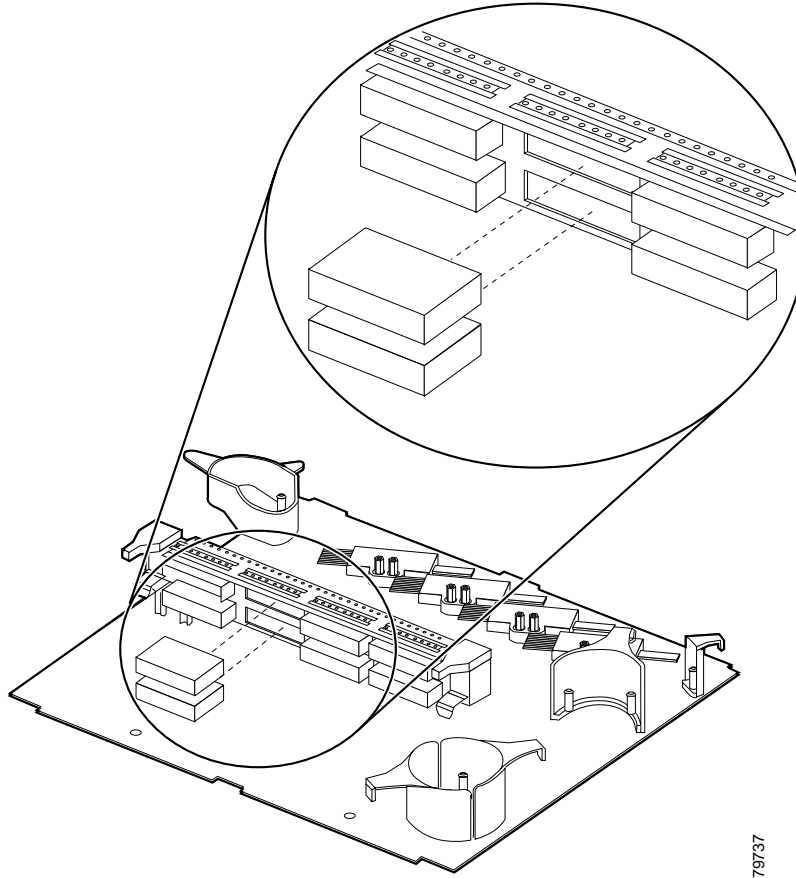
- Step 3** Pull the cross connect panel up by flipping the latches up and using them to pull the panel up simultaneously. (See [Figure 2-7](#).)

Figure 2-7 Pulling up the Cross Connect Panel

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- Step 4** Remove the adapter from its packaging.
- Step 5** Insert the adapter into the panel from the front as shown in [Figure 2-8](#).

Figure 2-8 Inserting the Adapter



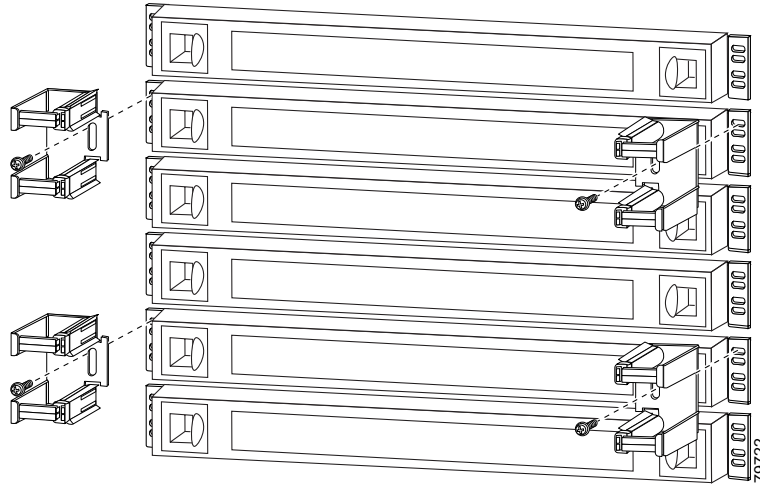
Step 6 Flip the latches down and push the panel down when all desired adapters have been installed.

DLP-5 Install the Vertical Cable Guide

Purpose	This task installs the vertical cable guide to the rack.
Tools/Equipment	Number 1 Phillips screwdriver Four 12-24 screws
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1 DLP-2 Install the Cable Management Tray, page 2-5 DLP-3 Install the Cable Management Drawer, page 2-6
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

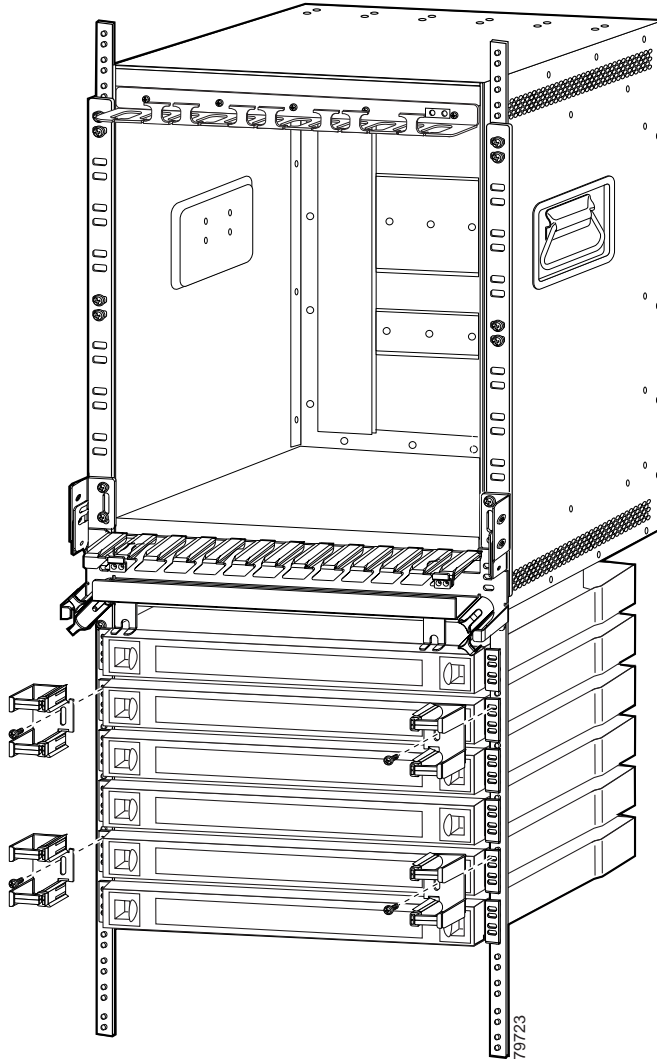
- Step 1 Make sure you have the correct vertical cable guide for the side of the rack you are installing on.
- Step 2 Hold the vertical cable guide over the rack next to the correct storage or cross connect drawer. See [Figure 2-9](#) for placement guidelines.

Figure 2-9 *Placing the Vertical Cable Guides*



- Step 3** Align the mounting holes on the vertical cable guide with the mounting holes in the equipment rack.
- Step 4** Secure the vertical cable guides with 12-24 or 10-32 screws. (See [Figure 2-10](#).)

Figure 2-10 Installing the Vertical Cable Guides



NTP-4 Install Processor Cards, Line Card Motherboards, and Modules

Purpose	This procedure describes how to install the processor cards, line card motherboards, and modules supported by the Cisco ONS 15540 ESPx.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** To install the processor card in the shelf, complete the “[DLP-6 Install the Processor Card](#)” task on [page 2-13](#).
- Step 2** To install the optional redundant processor card in the shelf, complete the “[DLP-7 Install the Redundant Processor Card](#)” task on [page 2-15](#) as needed.
- Step 3** As needed, complete the “[DLP-8 Install the Mux/Demux Motherboard](#)” task on [page 2-15](#) before continuing to the “[DLP-9 Install the 4-Channel Mux/Demux Module](#)” task on [page 2-17](#), “[DLP-10 Install the 8-Channel Mux/Demux Module](#)” task on [page 2-17](#), or the “[DLP-12 Install the PSM](#)” task on [page 2-18](#).
- Step 4** As needed, complete the “[DLP-11 Install the 32-Channel Terminal Mux/Demux Module](#)” task on [page 2-17](#).
- Step 5** As needed, complete the “[DLP-13 Install the 2.5-Gbps Line Card Motherboard](#)” task on [page 2-19](#) before continuing to the “[DLP-15 Install the Type 1 SM Transponder Module](#)” task on [page 2-21](#) or the “[DLP-16 Install the Type 1 MM Transponder Module](#)” task on [page 2-22](#).
- Step 6** As needed, complete the “[DLP-14 Install the 10-Gbps Line Card Motherboard](#)” task on [page 2-20](#) before continuing to the “[DLP-17 Install the 10-GE Transponder Module](#)” task on [page 2-23](#).
- Step 7** As needed, complete the “[DLP-18 Install the Type 2 Extended Range Transponder Module](#)” task on [page 2-24](#).
- Step 8** As needed, complete the “[DLP-19 Install the SFP Optics](#)” task on [page 2-25](#).
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DLP-6 Install the Processor Card

Purpose	This task installs the processor card.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-2 Install the Cable Management Tray , page 2-5
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Insert the processor card carefully into chassis slot 6. Guide the upper and lower edges of the processor card in the tracks until its connectors come into contact with the backplane.
- Step 2** Use your thumb and forefinger of each hand to simultaneously push the processor card in until it is fully seated in the backplane connector.
- Step 3** Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the module.

- Step 4** Check the LEDs listed in [Table 2-1](#) while powered to ensure proper installation.

Table 2-1 Processor Card LEDs

LED	Status	Description
STATUS	Red	A board resets or initially powers on.
	Orange	System initialization.
	Green	Full initialization and operational.
ACTIVE	Green	This board is the primary processor and is running IOS software.
STANDBY	Green	This board is the secondary processor.
SLOT 0	Green	Flash PC Card is present.
SLOT 1	Green	Flash PC Card is present.
NME ¹		
FULL DUPLEX	Green	Full duplex is running.
	Off	Half duplex is running.
100MBPS	Green	Operating at 100 Mbps.
	Off	Operating at 10 Mbps.
LINK	Green	Link is up.
	Off	Link is down.
ASE ²		
FULL DUPLEX	Green	Full duplex is running.
	Off	Half duplex is running.
100MBPS	Green	Operating at 100 Mbps.
	Off	Operating at 10 Mbps.
LINK	Green	Link is up.
	Off	Link is down.
CRITICAL ALARM	Yellow	A critical alarm condition exists.
MAJOR ALARM	Yellow	A major alarm condition exists.
MINOR ALARM	Yellow	A minor alarm condition exists.
ALARM CUT OFF	Yellow	A major or minor alarm condition exists and the cutoff button has been pushed. Turns off by software when the original alarm clears or any new alarm occurs.
HIST	Yellow	A major or minor alarm occurred. Clears if the History Clear button is pushed and no alarm exists.

1. NME = network management Ethernet

2. ASE = aggregation shelf Ethernet

Step 5 Insert a blank card into slot 7 if you are not installing a redundant processor card. Otherwise, continue with the [“DLP-7 Install the Redundant Processor Card”](#) task on page 2-15.

DLP-7 Install the Redundant Processor Card

Purpose	This task installs the redundant processor card.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Insert the redundant processor card carefully into chassis slot 7. Guide the upper and lower edges of the redundant processor card in the tracks until its connectors come into contact with the backplane.
- Step 2** Use your thumb and forefinger of each hand to simultaneously push the redundant processor card in until it is fully seated in the backplane connector.
- Step 3** Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the module.

- Step 4** Check the LEDs listed in [Table 2-1](#) while powered to ensure proper installation.
-

DLP-8 Install the Mux/Demux Motherboard

Purpose	This task installs the mux/demux motherboard, which is used for the mux/demux modules.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13
Required/As Needed	Required for mux/demux modules.
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Select chassis slot 0 for west or slot 1 for east to install the mux/demux motherboard and remove the card or filler in the slot.
- Step 2** Take the new mux/demux motherboard from the shipping container.
- Step 3** Remove the dust covers from the module and clean the optical connectors.



Caution Wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.

- Step 4** Insert the mux/demux motherboard carefully into the chassis slot while guiding the upper and lower edges of the mux/demux motherboard in the tracks until its connectors come into contact with the backplane.

- Step 5** Use the release levers to push the mux/demux motherboard in until it is fully seated in the backplane connector.
- Step 6** Push the release levers in simultaneously to lock the mux/demux motherboard into the slot.
- Step 7** Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the mux/demux motherboard.

- Step 8** Check the LEDs listed in [Table 2-2](#) while powered to ensure proper installation.



Note Mux/demux motherboards without OSC have no LEDs.

Table 2-2 *Mux/Demux Motherboard with OSC LEDs*

LED	Status	Description
STATUS	Blinking green	The motherboard has a good system clock from the primary processor and is out of the reset state.
	Orange	System clock is not present.
	Solid green	Software initialization is successful.
	Off	Board failure.
TX	Solid green	OSC is present and the optical laser output is enabled.
	Off	OSC is not present and the optical laser output is disabled.
RX	Solid green	OSC is present and the optical data stream is received.
	Off	OSC is not present and the optical data stream is not received.

DLP-9 Install the 4-Channel Mux/Demux Module

Purpose	This task installs the mux/demux module in the mux/demux motherboard.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13 DLP-8 Install the Mux/Demux Motherboard, page 2-15
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Take a new mux/demux module from the shipping container.
- Step 2** Insert the mux/demux module carefully into the mux/demux motherboard slot while guiding the upper and lower edges of the mux/demux module in the tracks until its connectors come into contact with the backplane connectors.
-

DLP-10 Install the 8-Channel Mux/Demux Module

Purpose	This task installs the mux/demux module in the mux/demux motherboard.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13 DLP-8 Install the Mux/Demux Motherboard, page 2-15
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Take a new mux/demux module from the shipping container.
- Step 2** Insert the mux/demux module carefully into the mux/demux motherboard slot while guiding the upper and lower edges of the mux/demux module in the tracks until its connectors come into contact with the backplane connectors.
-

DLP-11 Install the 32-Channel Terminal Mux/Demux Module

Purpose	This task installs the 32-channel terminal mux/demux module.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13
Required/As Needed	As needed

Onsite/Remote	Onsite
Security Level	None

- Step 1** Take the new 32-channel terminal mux/demux module from the shipping container.
- Step 2** Insert the 32-channel terminal mux/demux module carefully into the desired slot while guiding the upper and lower edges of the 32-channel terminal mux/demux module in the tracks until its connectors come into contact with the backplane connectors. The 32-channel terminal mux/demux module can be installed in slots 0 or 1.
- Step 3** Use the release levers to push the motherboard in until it is fully seated in the backplane connector.
- Step 4** Push the release levers in simultaneously to lock the motherboard into the slot.
- Step 5** Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the mux/demux motherboard.

- Step 6** Check the LEDs listed in [Table 2-3](#) while powered to ensure proper installation.

Table 2-3 32-Channel Terminal Mux/Demux Module OSC LEDs

LED	Status	Description
STATUS	Orange	Reset.
	Blinking green	The motherboard has a good system clock from the primary processor and is out of the reset state.
	Steady green	Software initialization is successful.
Rx	Green	OSC is present and the optical data stream is received.
	Off	Board failure.
Tx	Green	OSC is present and the optical laser output is enabled.
	Off	Board failure.

DLP-12 Install the PSM

Purpose	This task installs the PSM (protection switch module) in a mux/demux motherboard.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-8 Install the Mux/Demux Motherboard, page 2-15 , if needed
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Take the new PSM from the shipping container.
- Step 2** Insert the PSM carefully into the motherboard subslot while guiding the upper and lower edges of the PSM in the tracks until its connectors come into contact with the backplane connectors.
- Step 3** Check that the LED on the left is green and the LED on the right is off to ensure that the software initialization is successful.
-

DLP-13 Install the 2.5-Gbps Line Card Motherboard

Purpose	This task installs the 2.5-Gbps line card motherboard.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** Take the new 2.5-Gbps line card motherboard from the shipping container.
- Step 2** Remove the dust covers from the module and clean the optical connectors.



Caution Failure to remove these dust covers may cause damage to the system.

- Step 3** Select a chassis slot to install the 2.5-Gbps line card motherboard. A 2.5-Gbps line card motherboard can be installed in slots 2 through 5 and slots 8 through 11.
- Step 4** Insert the 2.5-Gbps line card motherboard carefully into the chassis slot while guiding the upper and lower edges of the 2.5-Gbps line card motherboard in the tracks until its connectors come into contact with the backplane.
- Step 5** Use the release levers to push the 2.5-Gbps line card motherboard in until it is fully seated in the backplane connector.
- Step 6** Push the release levers in simultaneously to lock the 2.5-Gbps line card motherboard into the slot.

Step 7 Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the line card motherboard.

Step 8 Check the LEDs listed in [Table 2-4](#) while powered to ensure proper installation.

Table 2-4 2.5-Gbps Line Card Motherboard LEDs

LED	Status	Description
STATUS	Blinking green	Motherboard has a good system clock from the primary processor and is out of the reset state.
	Solid green	Software initialization is successful.
	Orange	System clock is not present. Board is unavailable.
	Off	Board failure.

DLP-14 Install the 10-Gbps Line Card Motherboard

Purpose	This task installs the 10-Gbps line card motherboard.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Take the new 10-Gbps line card motherboard from the shipping container.

Step 2 Remove the dust covers from the module and clean the optical connectors.



Caution Failure to remove these dust covers may cause damage to the system.

Step 3 Select a chassis slot to install the 10-Gbps line card motherboard. A 10-Gbps line card motherboard can be installed in slots 2 through 5 and slots 8 through 11.

Step 4 Insert the 10-Gbps line card motherboard carefully into the chassis slot while guiding the upper and lower edges of the 10-Gbps line card motherboard in the tracks until its connectors come into contact with the backplane.

Step 5 Use the release levers to push the 10-Gbps line card motherboard in until it is fully seated in the backplane connector.

Step 6 Push the release levers in simultaneously to lock the 10-Gbps line card motherboard into the slot.

Step 7 Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the 10-Gbps line card motherboard.

Step 8 Check the LEDs listed in [Table 2-5](#) while powered to ensure proper installation.

Table 2-5 10-Gbps Line Card Motherboard LEDs

LED	Status	Description
STATUS	Blinking green	Motherboard has a good system clock from the primary processor and is out of the reset state.
	Solid green	Software initialization is successful.
	Orange	System clock is not present. Board is unavailable.
	Off	Board failure.

DLP-15 Install the Type 1 SM Transponder Module

Purpose	This task installs the Type 1 SM transponder module.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-13 Install the 2.5-Gbps Line Card Motherboard, page 2-19
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** Take the new Type 1 SM transponder module from the shipping container.
- Step 2** Insert the Type 1 SM transponder module carefully into the line card motherboard while guiding the upper and lower edges of the Type 1 SM transponder module in the tracks until its connectors come into contact with the backplane.
- Step 3** Use the release levers to push the Type 1 SM transponder module in until it is fully seated in the backplane connector.
- Step 4** Push the release levers in simultaneously to lock the Type 1 SM transponder module into the motherboard.

Step 5 Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the module.

Step 6 Check the LEDs listed in [Table 2-6](#) while powered to ensure proper installation.

Table 2-6 Type 1 SM Transponder Module LEDs

LED	Status	Description
LCL RX OK	Green	Data is received on the client side.
TRUNK RX OK	Green	Data is received on the trunk side.
LCL TX ENABLE	Green	Client side transmit laser is enabled.
TRUNK TX ENABLE	Green	Trunk side transmit laser is enabled.

DLP-16 Install the Type 1 MM Transponder Module

Purpose	This task installs the Type 1 MM transponder module.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-13 Install the 2.5-Gbps Line Card Motherboard, page 2-19
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

- Step 1** Take the new Type 1 MM transponder module from the shipping container.
- Step 2** Insert the Type 1 MM transponder module carefully into the line card motherboard while guiding the upper and lower edges of the Type 1 MM transponder module in the tracks until its connectors come into contact with the backplane.
- Step 3** Use the release levers to push the Type 1 MM transponder module in until it is fully seated in the backplane connector.
- Step 4** Push the release levers in simultaneously to lock the Type 1 MM transponder module into the motherboard.

Step 5 Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the module.

Step 6 Check the LEDs listed in [Table 2-7](#) while powered to ensure proper installation.

Table 2-7 MM Transponder Module LEDs

LED	Status	Description
LCL RX OK	Green	Data is received on the client side.
TRUNK RX OK	Green	Data is received on the trunk side.
LCL TX ENABLE	Green	Client side transmit laser is enabled.
TRUNK TX ENABLE	Green	Trunk side transmit laser is enabled.

DLP-17 Install the 10-GE Transponder Module

Purpose	This task installs the 10-GE transponder module.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-14 Install the 10-Gbps Line Card Motherboard, page 2-20
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Step 1 Take the new 10-GE transponder module from the shipping container.

Step 2 Insert the 10-GE transponder module carefully into the line card motherboard while guiding the upper and lower edges of the 10-GE transponder module in the tracks until its connectors come into contact with the backplane.

Step 3 Use the release levers to push the 10-GE transponder module in until it is fully seated in the backplane connector.

Step 4 Push the release levers in simultaneously to lock the 10-GE transponder module into the 10-Gbps line card motherboard.

Step 5 Use a number 1 Phillips screwdriver to tighten the captive installation screws.



Note Captive installation screws must be tightened to guarantee proper seating of the module.

Step 6 Check the LEDs listed in [Table 2-8](#) while powered to ensure proper installation.

Table 2-8 10-GE Transponder Module LEDs

LED	State	Description
CLIENT RX	Off	No frame lock on the PCS 64B66B decoder
	Green	Frame lock = '1' on PCS 64B66B decoder
TRUNK RX	Off	No frame lock on the PCS 64B66B decoder
	Green	Frame lock = '1' on PCS 64B66B decoder
CLIENT TX	On	Laser is transmitting an optical signal.
	Off	Laser is shut and is not transmitting an optical signal.
TRUNK TX	On	Laser is transmitting an optical signal
	Off	Laser is shut and is not transmitting an optical signal.

DLP-18 Install the Type 2 Extended Range Transponder Module

Purpose	This task installs the Type 2 extended range transponder module.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-13 Install the 2.5-Gbps Line Card Motherboard, page 2-19
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Take the new Type 2 extended range transponder module from the shipping container.
- Step 2** Insert the Type 2 extended range transponder module carefully into the line card motherboard while guiding the upper and lower edges of the Type 2 extended range transponder module in the tracks until its connectors come into contact with the backplane.
- Step 3** Check the LEDs listed in [Table 2-9](#) while powered to ensure proper installation.

Table 2-9 Type 2 Extended Range Transponder Module LEDs

LED	Status	Description
CLIENT RX	Green	Data is received on the client side.
TRUNK RX	Green	Data is received on the trunk side.
CLIENT TX	Green	Client side transmit laser is enabled.
TRUNK TX	Green	Trunk side transmit laser is enabled.

DLP-19 Install the SFP Optics

Purpose	This task installs the SFP optics.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-18 Install the Type 2 Extended Range Transponder Module, page 2-24
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Select an SFP optic to install.



Note Only use Cisco-certified SFP optics for the Type 2 extended range transponder modules.

- Step 2** Insert the SFP optic into the Type 2 extended range transponder module.
- Step 3** Push the SFP until you hear a click. The click indicates that it is securely set in the module.
-

NTP-5 Connect the Hardware

Purpose	This procedure describes to how connect the processor card ports and how to connect the optical fiber cables between the optical cards and modules.
Tools/Equipment	Straight-through EIA/TIA Straight-through RJ-45 Auxiliary port cable Optical cables
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1 NTP-3 Install the Cable Management System, page 2-4 NTP-4 Install Processor Cards, Line Card Motherboards, and Modules, page 2-12
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Complete the [“DLP-20 Connect the Console Port” task on page 2-27](#) for privileged shelf management access.
- Step 2** Complete the [“DLP-21 Connect the NME Port on the Processor Card” task on page 2-27](#) for LAN-based network management access to the shelf.
- Step 3** As needed, complete the [“DLP-22 Connect the Auxiliary Port on the Processor Card” task on page 2-28](#) for modem access to the shelf.
- Step 4** Complete the [“DLP-23 Select Optical Cables” task on page 2-28](#).
- Step 5** Complete the [“DLP-24 Clean Optical Connectors” task on page 2-31](#) whenever you make optical connections on the shelf.
- Step 6** As needed, complete the [“DLP-25 Use Cable Storage Drawers” task on page 2-32](#).
- Step 7** As needed, complete the [“DLP-26 Connect the OSC to the Mux/Demux Module” task on page 2-34](#).
- Step 8** As needed, complete the [“DLP-27 Interconnect the Mux/Demux Modules” task on page 2-36](#).
- Step 9** As needed, complete the [“DLP-28 Connect the PSM to a Remote PSM” task on page 2-36](#).
- Step 10** As needed, complete the [“DLP-29 Connect the Transponder Modules to Client Equipment” task on page 2-39](#).
- Step 11** As needed, complete the [“DLP-30 Direct Connect the Mux/Demux Module to the 2.5-Gbps Line Card Motherboard” task on page 2-40](#).
- Step 12** As needed, complete the [“DLP-31 Connect the Mux/Demux Module to the 2.5-Gbps Line Card Motherboard Using the Cross Connect Drawers” task on page 2-42](#).
- Step 13** As needed, complete the [“DLP-32 Direct Connect the Mux/Demux Module to the 10-Gbps Line Card Motherboard” task on page 2-47](#).
- Step 14** As needed, complete the [“DLP-33 Direct Connect the Mux/Demux Module to the 10-Gbps Line Card Motherboards Using Y Cables” task on page 2-49](#).
- Step 15** As needed, complete the [“DLP-34 Connect the Mux/Demux Module to the 10-Gbps Line Card Motherboard Using the Cross Connect Drawer” task on page 2-52](#).
-

DLP-20 Connect the Console Port

Purpose	This task connects the console port on the processor card.
Tools/Equipment	Straight-through EIA/TIA for the DB-25 console port
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13 DLP-7 Install the Redundant Processor Card, page 2-15 , if redundancy is desired
Required/As Needed	Required for local console connection and for remote management connection
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Place the DB-25 connector in front of the console port on the processor card faceplate.
- Step 2** Align the male DB-25 connector with the female console port.
- Step 3** Gently push the DB-25 connector into the console port and secure it into place by tightening the side screws on the DB-25 connector.
- Step 4** Route the fiber cables down through the cutout holes on the cable management tray out of the right side of the shelf assembly.
-

DLP-21 Connect the NME Port on the Processor Card

Purpose	This task connects the NME (network management Ethernet) port on the processor card.
Tools/Equipment	Straight-through RJ-45 for the NME (network management Ethernet) port
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13 DLP-7 Install the Redundant Processor Card, page 2-15 , if redundancy is desired
Required/As Needed	Required for 10/100BASE-T network management LAN access.
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Place the RJ-45 connector in front of the NME port on the processor card.
- Step 2** Align the keyed ridge of the cable connector with the receiving slot on the processor card connection point.
- Step 3** Gently push the RJ-45 cable connector into the faceplate connection point until the connector snaps into place.
- Step 4** Route the fiber cables down through the cutout holes on the cable management tray out of the right side of the shelf assembly.
-

DLP-22 Connect the Auxiliary Port on the Processor Card

Purpose	This task connects the auxiliary port on the processor card.
Tools/Equipment	Aux port cable that ships with the shelf for the auxiliary port
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13 DLP-7 Install the Redundant Processor Card, page 2-15 , if redundancy is desired
Required/As Needed	Required for modem access.
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Place the auxiliary port cable connector in front of the auxiliary port on the processor card faceplate.
- Step 2** Align the keyed ridge of the cable connector with the receiving slot on the faceplate connection point.
- Step 3** Gently push the cable connector into the faceplate connection point until the connector snaps into place.
- Step 4** Route the fiber cables down through the cutout holes on the cable management tray out of the right side of the shelf assembly.
-

DLP-23 Select Optical Cables

Purpose	This task selects the optical patch cables before you connect the hardware.
Tools/Equipment	None
Prerequisite Procedures	NTP-3 Install the Cable Management System, page 2-4
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Check the placement of the line cards and modules in the shelf. [Table 2-10](#) lists the cable kits available. Select the appropriate mux/demux, intra-chassis, and inter-chassis patch cables from those listed in [Table 2-11](#) to [Table 2-15](#).

Table 2-10 Optical Cable Kits

Part Number	Description
15500-CAB-KIT1	Cable Kit 1 - (order 1x for LCMB without splitter, order 2x for line card motherboard with splitter): 2x MTP-8MU, 2x MU adapter, 8x MU-MU

Table 2-10 Optical Cable Kits (continued)

Part Number	Description
15500-CAB-KIT2	Cable Kit 2 - 10G lower channels - (order 1x for every 10G line card motherboard with without splitter, order 2x for line card motherboard with with splitter): 1x MTP-8MU, 1x MTP-4MU, 2x MU adapter, 4x MU-MU
15500-CAB-KIT3	Cable Kit 3 - 10G higher channels - (order 1x for every 10G line card motherboard with with out splitter, order 2x for LCMB with splitter): 1x MTP-8MU, 1x MTP-4MU, 2x MU adapter, 4x MU-MU

Table 2-11 Optical Mux/Demux and Intra-Chassis Cables (Simplex)

Part Number	Description
15500-CAB-MMU-01=	10-in. (0.25-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-02=	14-in. (0.35-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-03=	17-in. (0.45-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-04=	20-in. (0.5-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-05=	40-in. (1.0-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-09=	46-in. (1.16-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-06=	60-in (1.5-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-07=	79-in (2.0-m) tuned low loss MU to MU SM OADM patch cable
15500-CAB-MMU-08=	98-in (2.5-m) tuned low loss MU to MU SM OADM patch cable

- Step 2** Check the connectors and placement of the equipment at your site. Select the appropriate optical trunk cables from those listed in [Table 2-12](#).

Table 2-12 Optical Trunk Cables

Part Number	Description
15500-CAB-MSC01=	40-in. (1.0-m) tuned low loss MU to SC SM patch cable
15500-CAB-MSC02=	118-in. (3.0-m) tuned low loss MU to SC SM patch cable
15500-CAB-MST03=	40-in. (1.0-m) tuned low loss MU to ST SM patch cable
15500-CAB-MST04=	118-in. (3.0-m) tuned low loss MU to ST SM patch cable

- Step 3** Check the connectors and placement of the equipment at your site. Select the appropriate optical client cables from those listed in [Table 2-13](#).

Table 2-13 Optical Client Cables (Simplex)

Part Number	Description
15500-CAB-SC11=	40-in. (1.0-m) SC to SC 62.5/125m MM cable
15500-CAB-SC19=	40-in. (1.0-m) SC to SC 50/125m MM cable
15500-CAB-SC12=	40-in. (1.0-m) SC to SC SM cable

Table 2-13 Optical Client Cables (Simplex) (continued)

Part Number	Description
15500-CAB-SC13=	40-in. (1.0-m) (3.0-m) SC to SC 62.5/125m MM cable
15500-CAB-SC20=	118-in. (3.0-m) SC to SC 50/125m MM cable
15500-CAB-SC14=	118-in. (3.0-m) SC to SC SM cable
15500-CAB-ST15=	40-in. (1.0-m) SC to ST 62.5/125m MM cable
15500-CAB-ST21=	40-in. (1.0-m) SC to ST 50/125m MM cable
15500-CAB-ST16=	40-in. (1.0-m) SC to ST SM cable
15500-CAB-ST17=	118-in. (3.0-m) SC to ST 62.5/125m MM cable
15500-CAB-ST22=	118-in. (3.0-m) SC to ST 50/125m MM cable
15500-CAB-ST18=	118-in. (3.0-m) SC to ST SM cable

- Step 4** Check the connectors and placement of the equipment at your site. Select the MTP cables from those listed in [Table 2-14](#).

Table 2-14 MTP Cables

Part Number	Description
15500-CAB-MTP-01=	86-in. (2.18-m) MTP to MTP cable - 2.5-Gbps line card motherboard
15500-CAB-MTPMU-M	86-in. (2.18-m) MTP to 8 MU optical cable - mux/demux to cross connect drawer - (Gray)
15500-CAB-MTPMU-L	86-in. (2.18-m) MTP to 8 MU optical cable - line card to cross connect drawer - (Green)
15500-CAB-MTPMU-1	86-in. (2.18-m) MTP to 4 MU optical cable-10-Gbps Ch 1/2 (Aqua)
15500-CAB-MTPMU-2	86-in. (2.18-m) MTP to 4 MU optical cable- 10-Gbps Ch 3/4 (Rose)
15500-CAB-MTP-01,	86-in. (2.18-m) MTP to MTP cable- 2.5-Gbps line card motherboard (Blue)
15500-CAB-MTP-02	86-in. (2.18-m) MTP to MTP cable - 10-Gbps line card motherboard- Ch. 1/2 (Aqua)
15500-CAB-MTP-03	86-in. (2.18-m) MTP to MTP cable - 10-Gbps line card motherboard- Ch. 3/4 (Rose)
15500-CAB-MTP-04	86-in. (2.18-m) MTP to 2x MTP cable - 10-Gbps line card motherboard Y-cable (Violet)

- Step 5** If the shelf is configured for y-cable protection, check the type of equipment at your site. Select the appropriate optical y patch cables from those listed in [Table 2-15](#).

Table 2-15 Optical Y Patch Cables

Part Number	Description
15500-CAB-YMM-SC=	50/125 micrometer MM y-cable with SC for channel protection
15500-CAB-YMM2-SC=	62.5/125 micrometer MM y-cable with SC for channel protection
15500-CAB-YSM-SC=	SM y-cable with SC for channel protection

DLP-24 Clean Optical Connectors

Purpose	This task describes how to clean optical connectors.
Tools/Equipment	Alcohol pad Magnifying glass Canned, dry, oil-free, compressed air
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

- Step 1** Wipe the ferrules and end-face surfaces of the connector gently with an alcohol pad from the cleaning kit. Be sure that the pad makes full contact with the end-face surfaces. Wait five seconds for the surfaces to dry and repeat.
- Step 2** Blow dry the connectors with canned, dry, oil-free, compressed air.
- Step 3** Use a magnifying glass to inspect the ferrule.

The connectors used inside the system have been cleaned by the manufacturer and connected to the adapters in the proper manner. The operation of the system should be error free if the customer provides clean connectors on the application side, follows the previous directions, and ensures the following:

- Clean the connectors using lens tissues before connecting to the adapters. Use pure alcohol to remove soil.
- Do not clean the inside of the connector adapters. Do not use force or quick movements when connecting the fiber optic connectors in the adapters.
- Cover the connector adapters to avoid soiling or contaminating the inside of the adapters while cleaning the chassis. When not using the connectors, cover the connectors and adapters to avoid the inside of the adapters or the surface of the connectors from getting dirty.



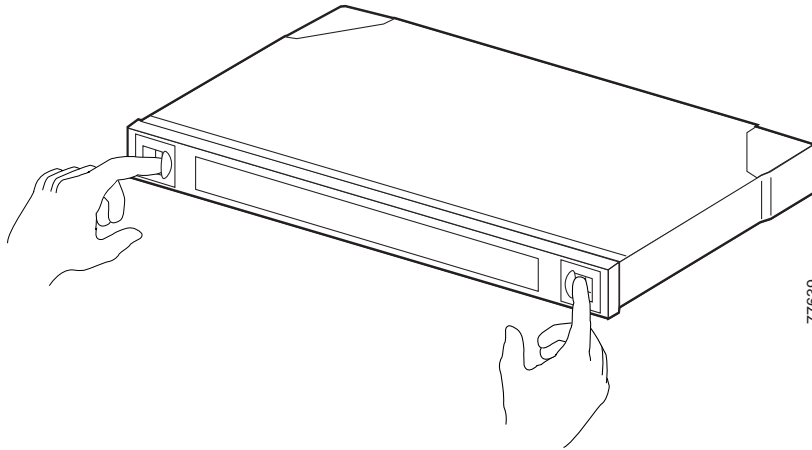
Note If the surface is not clean or does not have a uniform shine, repeat the process using a fresh surface of the alcohol pad.

DLP-25 Use Cable Storage Drawers

Purpose	This task describes how to use the cable storage drawers.
Tools/Equipment	None
Prerequisite Procedures	NTP-3 Install the Cable Management System, page 2-4
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

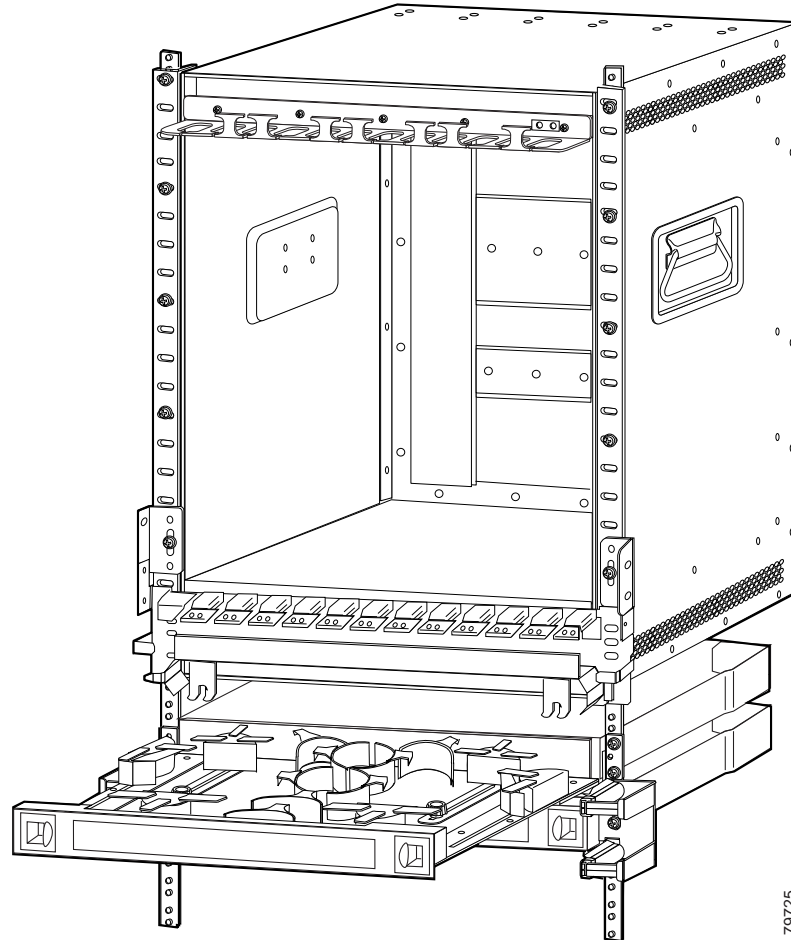
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- Step 1** Open the cable storage drawer by pushing the tabs in to release the lock on the drawer (see [Figure 2-11](#)).

Figure 2-11 Opening the Cable Storage Drawer



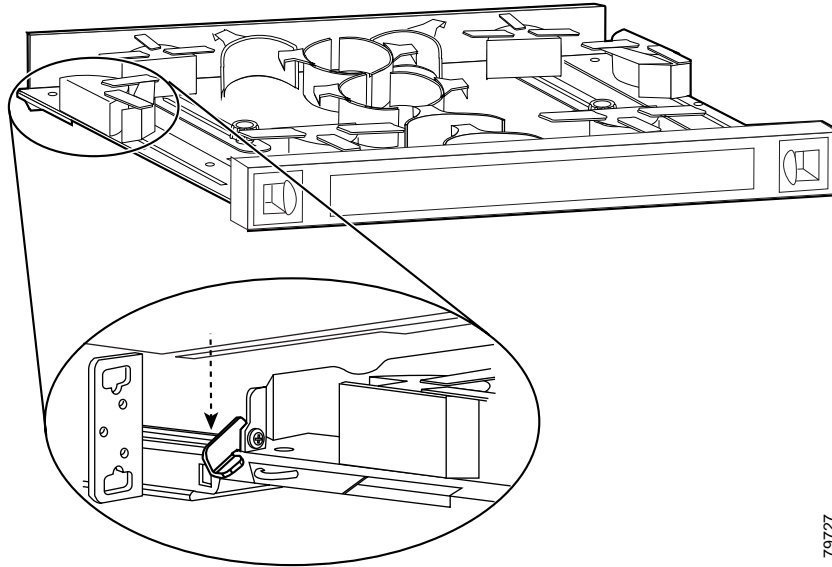
- Step 2** Pull out the cable storage drawer (see [Figure 2-12](#)).

Figure 2-12 Pulling out the Cable Storage Drawer



- Step 3** Lock the drawer in the open position by pushing the latch at the back left of the drawer down into the locked position (see [Figure 2-13](#)).

Figure 2-13 Locking the Drawer



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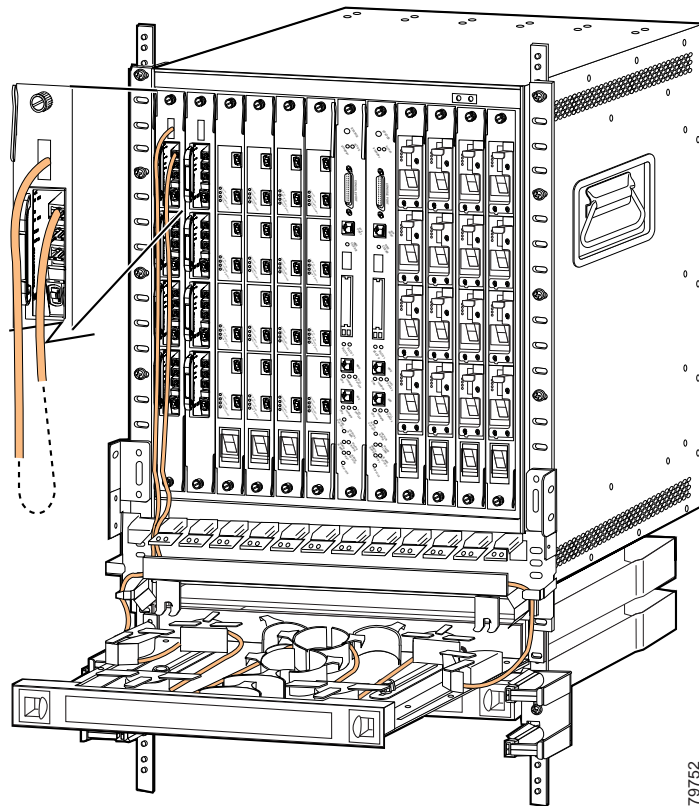
- Step 4** Push the connector of the cable into the adapter until the connector snaps into place.
- Step 5** Route the cable down through the cutout holes on the cable management tray on the bottom of the shelf assembly. Pull the cable out of the left side of the tray.
- Step 6** Route the cable down the left side of the chassis and into the drawer. Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 7** Pull the cable up out of the right side of the drawer and then back up through the cutout holes on the cable management tray.
- Step 8** Insert the connector into the desired card or module.
- Step 9** Unlock the drawer to close it by moving the latch back into an upright position.

DLP-26 Connect the OSC to the Mux/Demux Module

Purpose	This task connects the OSC to the mux/demux module.
Tools/Equipment	Two MU-to-MU cables per OSC module
Prerequisite Procedures	DLP-9 Install the 4-Channel Mux/Demux Module, page 2-17 DLP-10 Install the 8-Channel Mux/Demux Module, page 2-17 DLP-11 Install the 32-Channel Terminal Mux/Demux Module, page 2-17 DLP-23 Select Optical Cables, page 2-28 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Route the fiber cable from the top OSC Tx connector on the motherboard down through the cable management tray. (See [Figure 2-14](#).)
- Step 2** Route the cable out of the left side of the tray, down the vertical cable guides and in through the left side of the cable storage drawer.
- Step 3** Route the cable through the cable storage drawer and out the right side. Bring the cable up and into the right side of the cable management tray and continue to route the cable through until you come to the OSC In of the desired mux/demux module.
- Step 4** Connect OSC Rx from the motherboard to OSC Out on the module.

Figure 2-14 OSC Cabling



- Step 5** Bring the cable up to the desired connection point on the module and insert the connector. Repeat these steps to connect the OSC Rx from the motherboard to the OSC Out on the module.
-

DLP-27 Interconnect the Mux/Demux Modules

Purpose	This task interconnects the mux/demux modules by daisy chaining the cables.
Tools/Equipment	MU-to-MU connectors (short fiber length)
Prerequisite Procedures	DLP-9 Install the 4-Channel Mux/Demux Module, page 2-17 or DLP-10 Install the 8-Channel Mux/Demux Module, page 2-17 or DLP-11 Install the 32-Channel Terminal Mux/Demux Module, page 2-17 . DLP-23 Select Optical Cables, page 2-28 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Connect the Thru Out of the module with the DWDM Trunk to Trunk In of the next module in slot 0.
- Step 2** Connect the Thru Out of the remaining modules to Trunk In of the next module in slot 0.
- Step 3** Perform Step 1 and Step 2 for Thru In and Trunk Out in the same slot. Repeat these steps above for slot 1.
- Step 4** Connect the trunk fiber to the mux/demux module.
-

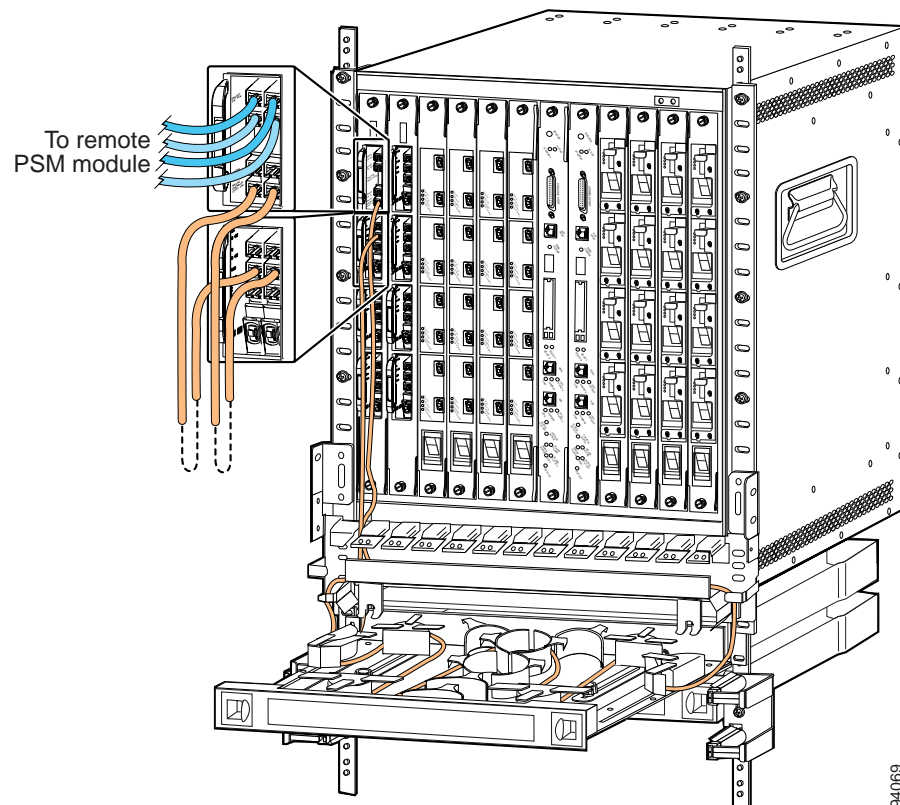
DLP-28 Connect the PSM to a Remote PSM

Purpose	This task connects the PSM to a remote PSM.
Tools/Equipment	Two MU-to-MU cables to connect to the mux/demux modules Four MU-to-MU cables to connect east and west trunks to the remote PSM
Prerequisite Procedures	DLP-12 Install the PSM, page 2-18 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Use MU connector cables to make your east and west connections from the PSM to the remote PSM module.
- Step 2** Attach MU connectors to the mux/demux out/in connections on the PSM.
- Step 3** Route the cables down through the vertical cable guides and in through the left side of the cable storage drawer.
- Step 4** Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 5** Pull the cable up out of the right side of the drawer and back up through the cable management tray.

- Step 6** Insert the other end of the MU connectors into the Trunk In/Out ports on the desired mux/demux module. [Figure 2-15](#) shows the connections described in these steps with the PSM in slot 0, subslot 0, and an 8-channel mux/demux module in slot 0, subslot 1.

Figure 2-15 Cabling the PSM



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DLP-78 Connect the PSM to Transponder Modules

Purpose	This task connects the PSM to transponder modules using the cross connect drawer.
Tools/Equipment	Two MU-to-MU cables to connect the PSM to the line card motherboard through the cross connect drawer. One MTP-to-8 MU cables to connect the transponder module to the PSM
Prerequisite Procedures	DLP-12 Install the PSM, page 2-18 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1 Connect the MTP connector into the East or West port on the desired line card motherboard.
 - Step 2 Route the cables down through the vertical cable guides and in through the right side of the cross connect drawer.
 - Step 3 Connect the cables to the top half of the appropriate adapter LINECARD connections on the inner side of the cross connect panel. These are color coded and should be connected by matching the color on the panel to the colored wires out of the transition box.

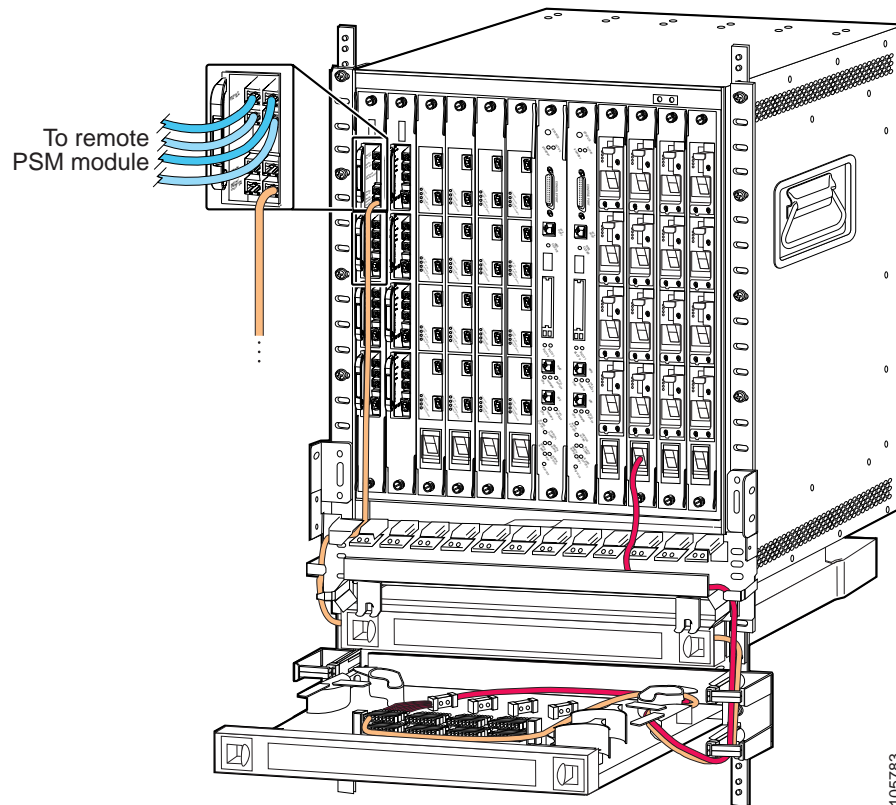


Note The adapters in the cross connect drawer match the subcard slots. For example, the adapter on the far left would match subcard 0.

- Step 4 Connect one end of the MU-to-MU cable to the mux/demux out and in ports on the PSM.
- Step 5 Route the cables down through the vertical cable guides and in through the left side of the cable storage drawer.
- Step 6 Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 7 Route the cable out of the right side of the cable storage drawer and down into right side of the cross connect drawer.
- Step 8 Connect the end of the MU-to-MU cable to the Tx and Rx ports of the first channel on the outer side of the LINECARD connections on the panel.

Figure 2-16 shows an example of cabling a PSM to a line card motherboard.

Figure 2-16 Cabling PSM to Line Card Motherboards

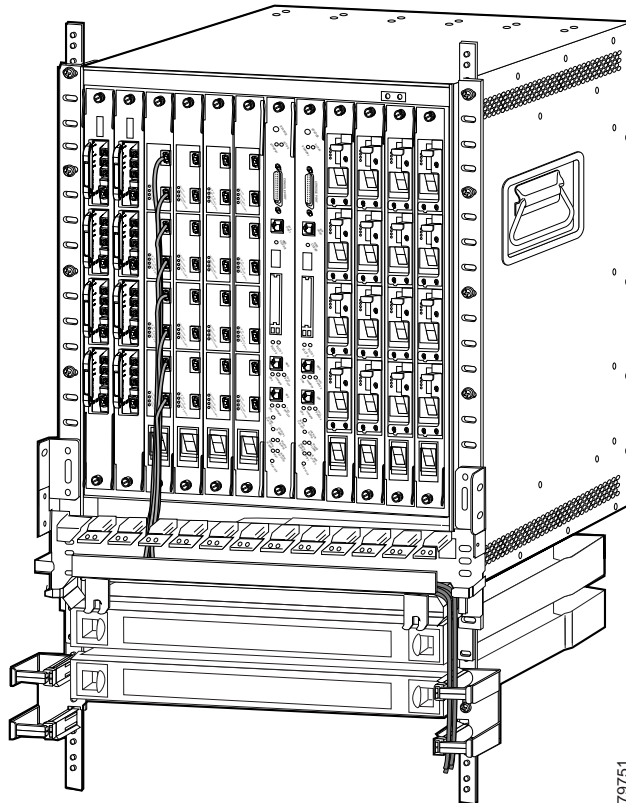


DLP-29 Connect the Transponder Modules to Client Equipment

Purpose	This task connects the transponder modules to the client equipment.
Tools/Equipment	MU-to-MU cables
Prerequisite Procedures	DLP-15 Install the Type 1 SM Transponder Module, page 2-21 or DLP-16 Install the Type 1 MM Transponder Module, page 2-22 or DLP-17 Install the 10-GE Transponder Module, page 2-23 or DLP-18 Install the Type 2 Extended Range Transponder Module, page 2-24 DLP-19 Install the SFP Optics, page 2-25 DLP-23 Select Optical Cables, page 2-28 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Connect the MU connector to the Rx port on the transponder module.
- Step 2** Route the fiber cables down through the cable management tray out of the right side of the shelf assembly. (See [Figure 2-17](#).)

Figure 2-17 Cabling Transponder Modules



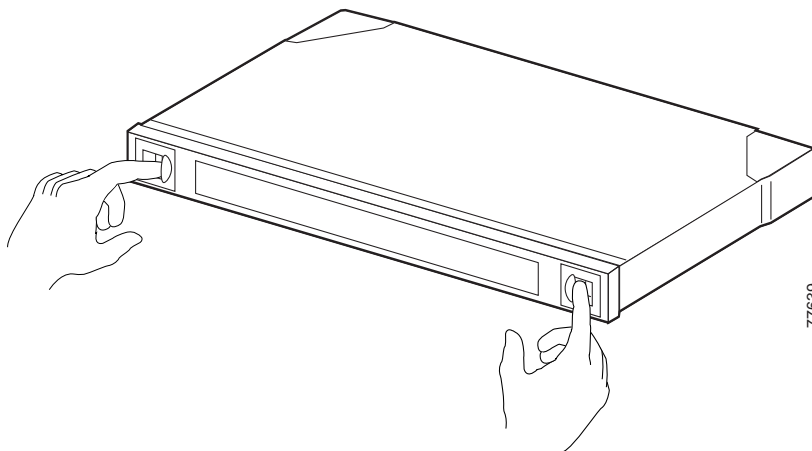
Step 3 Connect the cables to your equipment according to your configuration.

DLP-30 Direct Connect the Mux/Demux Module to the 2.5-Gbps Line Card Motherboard

Purpose	This task directly connects the mux/demux module to the line card motherboard using the cable storage drawer.
Tools/Equipment	MTP-to-MTP cable, blue MTP cable installation tool
Prerequisite Procedures	DLP-9 Install the 4-Channel Mux/Demux Module, page 2-17 or DLP-10 Install the 8-Channel Mux/Demux Module, page 2-17 or DLP-11 Install the 32-Channel Terminal Mux/Demux Module, page 2-17 DLP-13 Install the 2.5-Gbps Line Card Motherboard, page 2-19 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

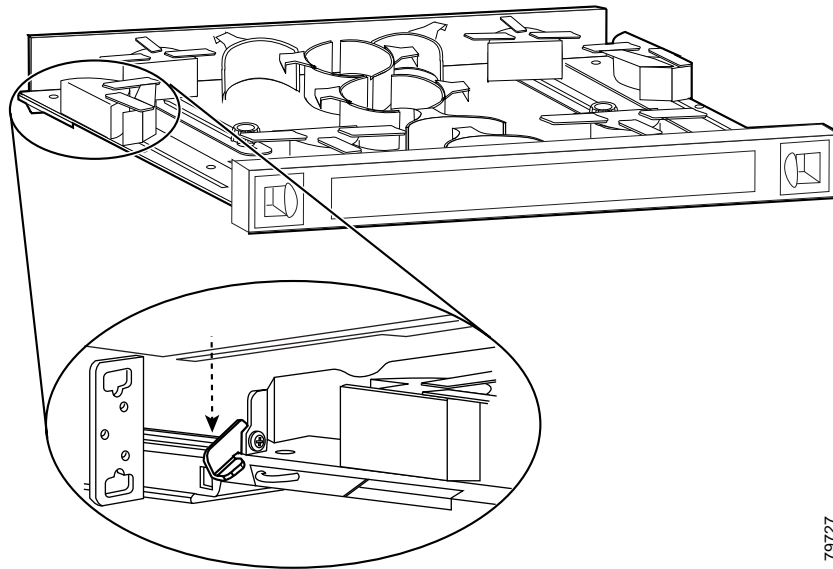
Step 1 Open the cable storage drawer by pushing the tabs in to release the lock on the drawer. (See [Figure 2-18](#).) Pull out the drawer.

Figure 2-18 Opening the Cable Storage Drawer



Step 2 Lock the drawer in the open position by pushing the latch at the back left of the drawer down into the lock position. (See [Figure 2-19](#).)

Figure 2-19 Locking the Drawer

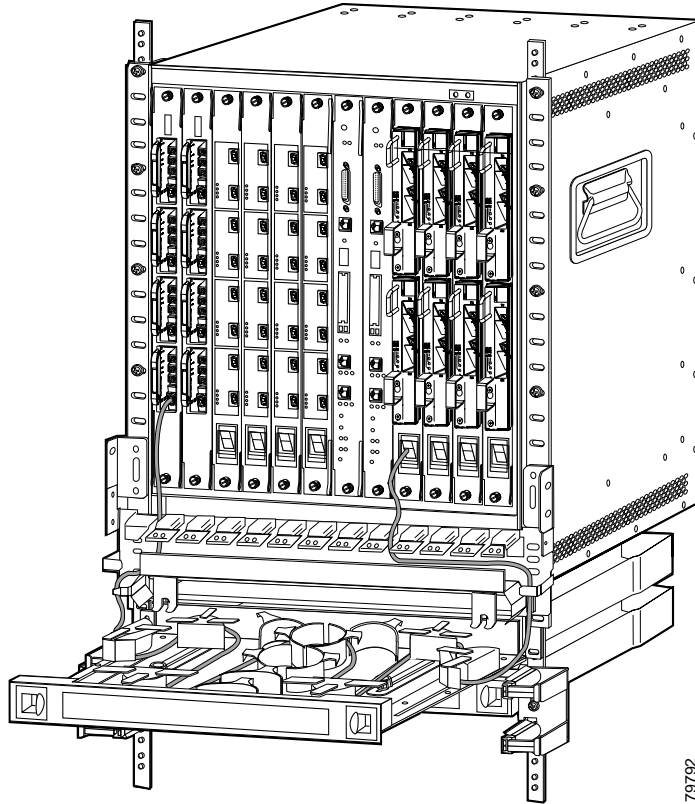


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- Step 3** Use the MTP cable installation tool to push the MTP connector of the cable into the MPO 1 or MPO 2 on the mux/demux module until the connector snaps into place.
- Step 4** Route the MTP cable down through the cable management tray. Pull the cable out the left side of the tray and into the drawer.
- Step 5** Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 6** Pull the cable up out of the right side of the drawer and back up through the cable management tray.
- Step 7** Insert the MTP connector into the MTP adapter labeled East, West, EO, or WO on the desired line card motherboard. (See [Figure 2-20](#).)

Repeat Steps 1 through 4 to continue cabling the system without the cross connect panel.

Figure 2-20 Routing the MTP-to-MTP Cable



Step 8 Unlock the drawer by moving the latch back into an upright position and close the drawer.



Tip You can use the client clips shipped with the chassis to clip together cables for easy handling and organization.

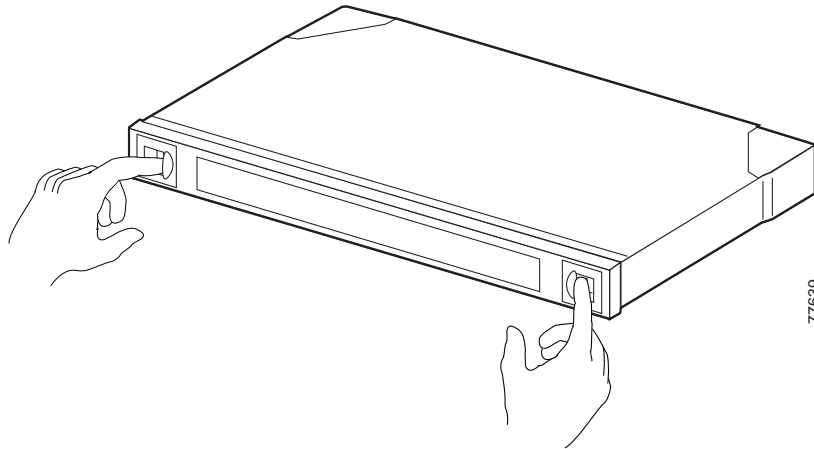
DLP-31 Connect the Mux/Demux Module to the 2.5-Gbps Line Card Motherboard Using the Cross Connect Drawers

Purpose	This task connects the mux/demux module to the 2.5-Gbps line card motherboard using the cross connect drawer.
Tools/Equipment	MTP-to-8MU cable, gray MTP-to-8MU cable, green MU-to-MU cable MTP cable installation tool
Prerequisite Procedures	DLP-8 Install the Mux/Demux Motherboard, page 2-15 DLP-13 Install the 2.5-Gbps Line Card Motherboard, page 2-19 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed

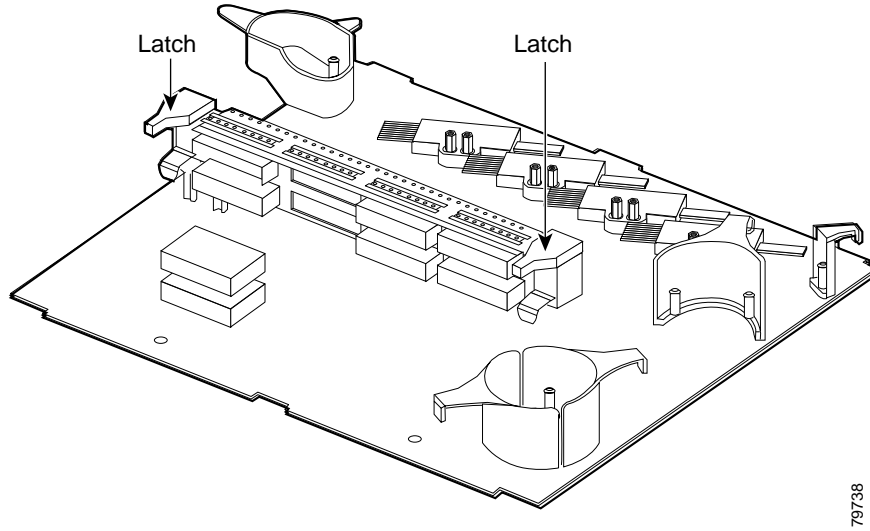
Onsite/Remote	Onsite
Security Level	None

- Step 1** Open the cable storage drawer by pushing the tabs in to release the lock on the drawer. (See [Figure 2-21](#).) Pull out the drawer.

Figure 2-21 Opening the Cable Storage Drawer

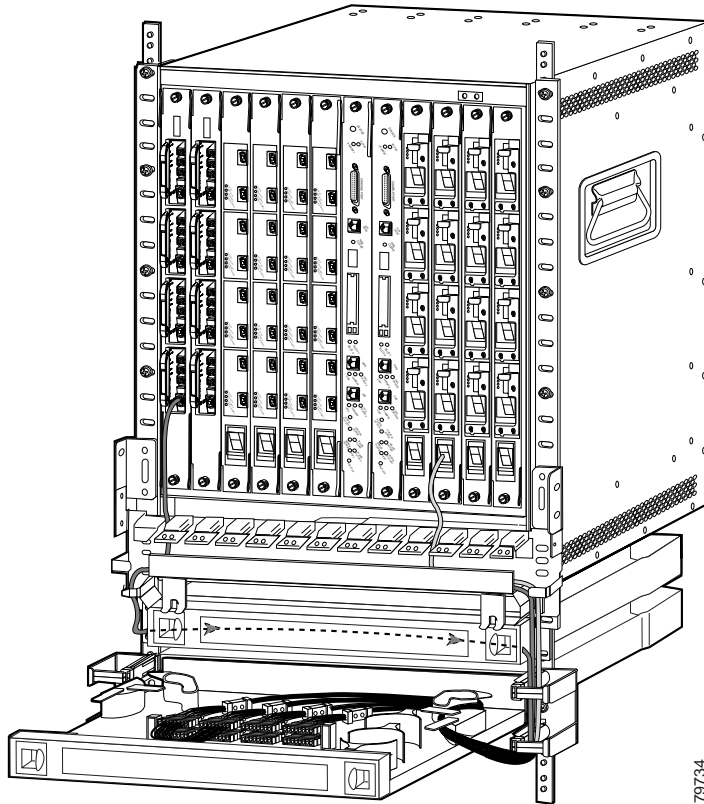


- Step 2** Lock the drawer in the open position by pushing the latch at the back left of the drawer down into the lock position.
- Step 3** Use the MTP cable installation tool to push the MTP connector of the gray cable into the MPO 1 or MPO 2 on the mux/demux module until the connector snaps into place.
- Step 4** Route the MTP cable down through the cable management tray. Pull the cable out the left side of the tray and into the drawer.
- Step 5** Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 6** Close the cable storage drawer once the cables are routed out of the right side and you unlock the drawer.
- Step 7** Open the cross connect drawer appropriate for your system configuration. See Step 1 and Step 2 for drawer opening details.
- Step 8** Flip the latches on the cross connect panel up and use them to pull the panel up. (See [Figure 2-22](#).)

Figure 2-22 Pulling Up the Cross Connect Panel

79738

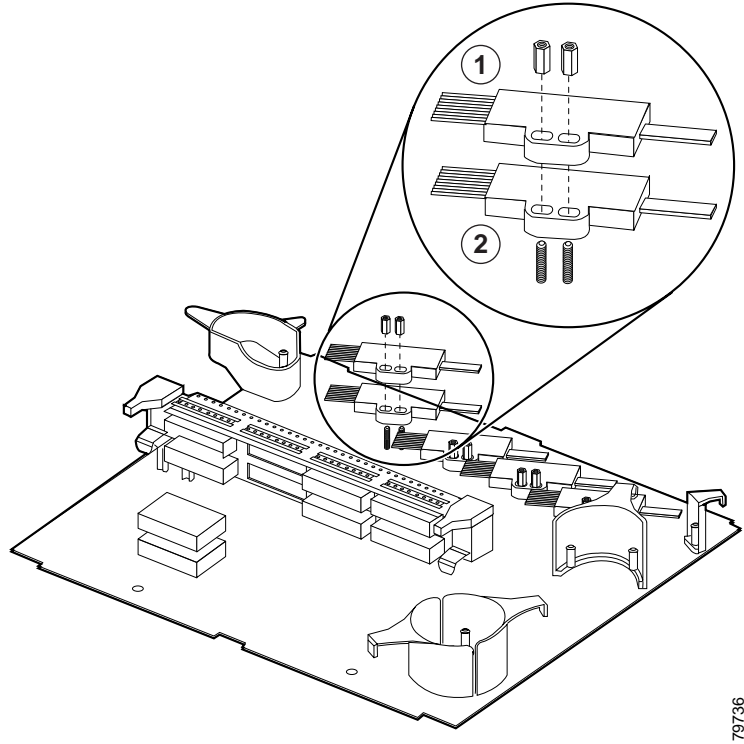
Step 9 Route the MU breakout end of the gray cable in through the right side of the drawer. (See [Figure 2-23](#).)

Figure 2-23 Routing the Cross Connect Cables

79734

Step 10 Mount the transition box as shown in [Figure 2-24](#).

Figure 2-24 Mounting the Transition Box

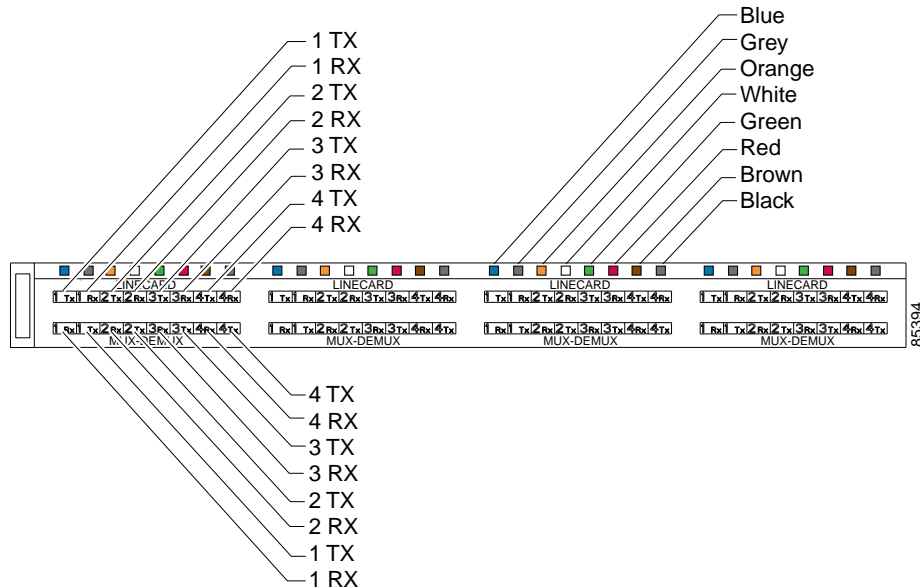


79736

1	Line card motherboard connections
2	Mux/demux motherboard connections

- Step 11** Connect the cables to the bottom half of the desired adapter mux/demux connections on the inner side of the cross connect panel. These are color coded and should be connected by matching the color on the panel to the colored wires out of the transition box.

Figure 2-25 Cross Connect Panel



- Step 12** Connect the MU connectors on the outer side of the panel. Connect the Tx from the line card to the Tx on the mux/demux side. Connect the Rx line card side to the Rx on the mux/demux side.
- Step 13** Connect the 8 MU breakout cables on the green cable to the LINECARD connections on the cross connect panel. These are color coded and should be connected by matching the color on the panel to the colored wires out of the transition box.
- Step 14** Pull the cable up out of the right side of the drawer and back up through the cable management tray.
- Step 15** Insert the MTP connector into the MTP adapter labeled East, West, EO, or WO on the desired line card motherboard.
- Step 16** Unlock the drawer by moving the latch back into an upright position and close the drawer.



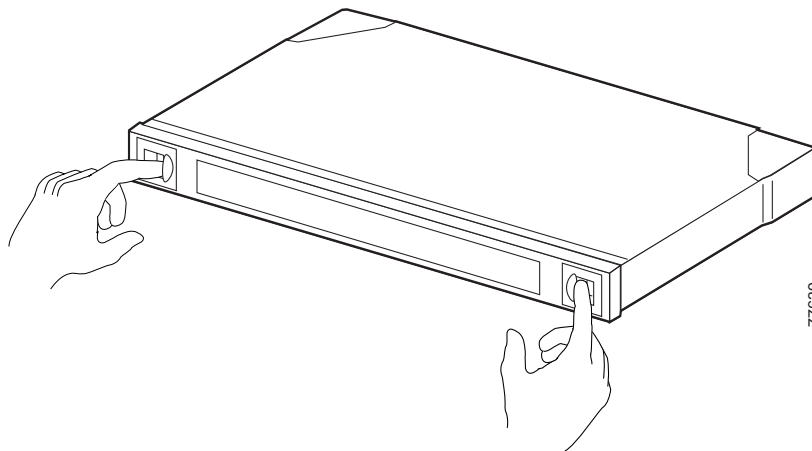
Tip You can use the client clips shipped with the chassis to clip together cables for easy handling and organization.

DLP-32 Direct Connect the Mux/Demux Module to the 10-Gbps Line Card Motherboard

Purpose	This task directly connects the mux/demux modules to the 10-Gbps line card motherboard using the cable storage drawer.
Tools/Equipment	Aqua MTP-to-MTP cable to connect lower channel 10-GE transponder module (channels 1/2, 5/6, 9/10, 13/14, 17/18, 21/22, 25/26, or 29/30) Rose MTP-to-MTP cable to connect higher channel 10-GE transponder module (channels 3/4, 7/8, 11/12, 15/16, 19/20, 23/24, 27/28, or 31/32) MTP cable installation tool
Prerequisite Procedures	DLP-8 Install the Mux/Demux Motherboard, page 2-15 DLP-9 Install the 4-Channel Mux/Demux Module, page 2-17 DLP-10 Install the 8-Channel Mux/Demux Module, page 2-17 DLP-11 Install the 32-Channel Terminal Mux/Demux Module, page 2-17 DLP-14 Install the 10-Gbps Line Card Motherboard, page 2-20 DLP-23 Select Optical Cables, page 2-28 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

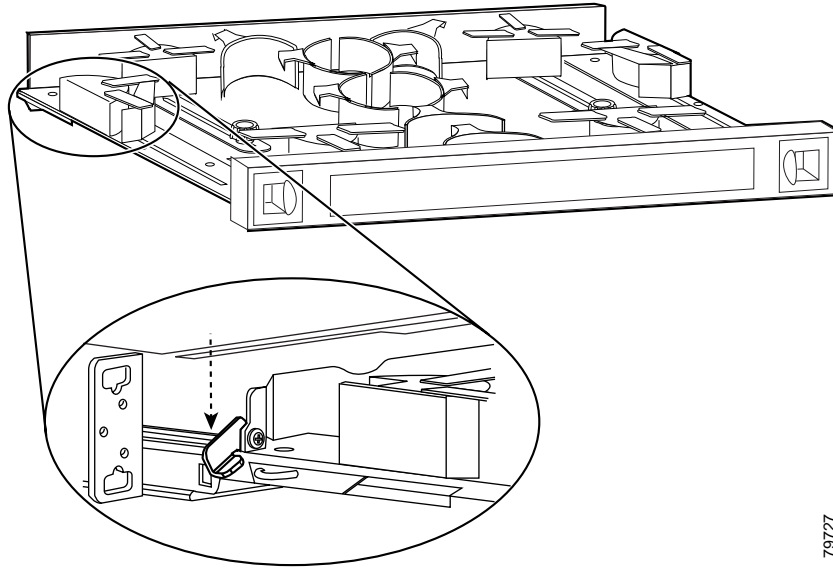
- Step 1** Open the cable storage drawer by pushing the tabs in to release the lock on the drawer. (See [Figure 2-26](#).) Pull out the drawer.

Figure 2-26 Opening the Cable Storage Drawer



- Step 2** Lock the drawer in the open position by pushing the latch at the back left of the drawer down into the lock position. (See [Figure 2-27](#).)

Figure 2-27 Locking the Drawer



79727

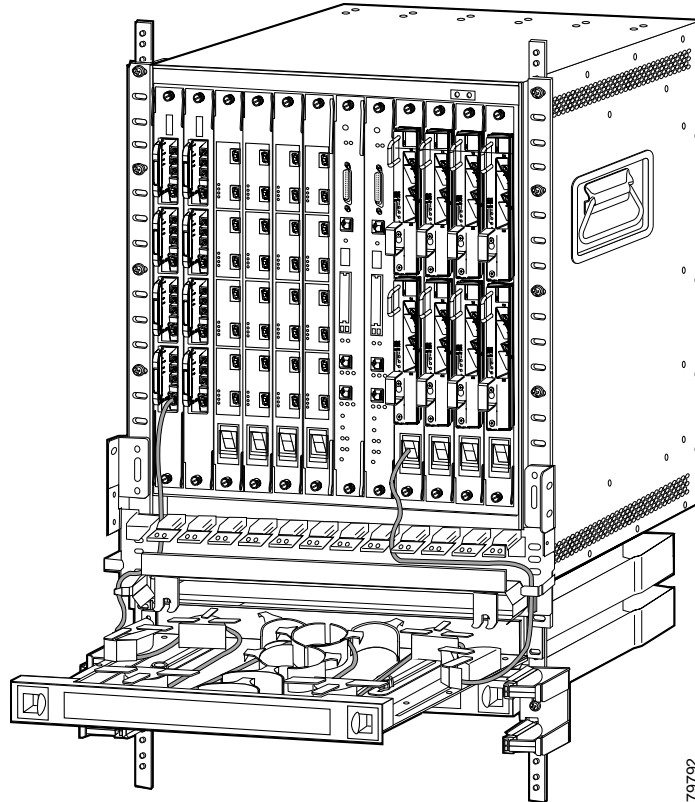
- Step 3** Use the MTP cable installation tool to push the MTP connector of the cable into the MPO 1 or MPO 2 on the mux/demux module until the connector snaps into place.



Note The 10-GE transponder modules must be in increasing order in the 10-Gbps line card motherboard for these connections to function correctly. Be sure that the modules supporting the first channel in the channel pair is in the top subslot and the module supporting the second channel in the channel pair is in the bottom subslot.

- Step 4** Route the MTP cable down through the cable management tray. Pull the cable out of the left side of the tray and into the drawer.
- Step 5** Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 6** Pull the cable up out of the right side of the drawer and back up through the cable management tray.
- Step 7** Insert the MTP connector into the MTP adapter labeled East, West, EO, or WO on the desired line card motherboard. (See [Figure 2-28](#).)
- Repeat Steps 1 through 4 to continue cabling the system without the cross connect panel.

Figure 2-28 Routing the MTP-to-MTP Cable



Step 8 Unlock the drawer by moving the latch back into an upright position and close the drawer.



Tip

You can use the client clips shipped with the chassis to clip together cables for easy handling and organization.

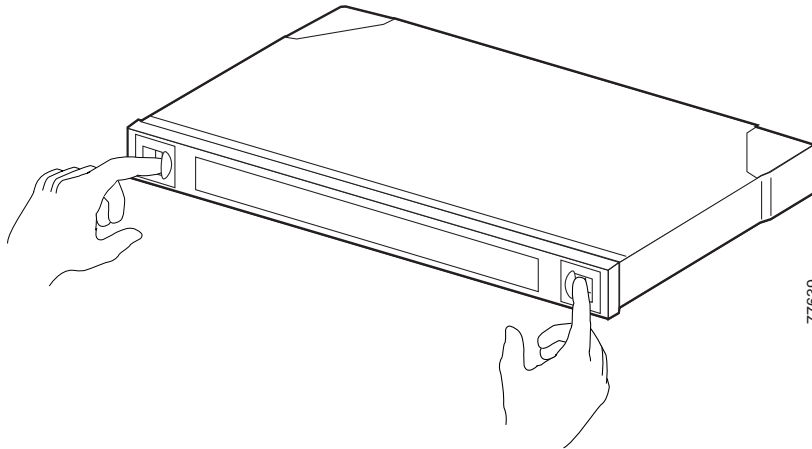
DLP-33 Direct Connect the Mux/Demux Module to the 10-Gbps Line Card Motherboards Using Y Cables

Purpose	This task directly connects the mux/demux modules to the 10-Gbps line card motherboards using the y cable and the cable storage drawer.
Tools/Equipment	Blue MTP-to-2MTP cable MTP cable installation tool
Prerequisite Procedures	DLP-9 Install the 4-Channel Mux/Demux Module, page 2-17 DLP-10 Install the 8-Channel Mux/Demux Module, page 2-17 DLP-11 Install the 32-Channel Terminal Mux/Demux Module, page 2-17 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed

Onsite/Remote	Onsite
Security Level	None

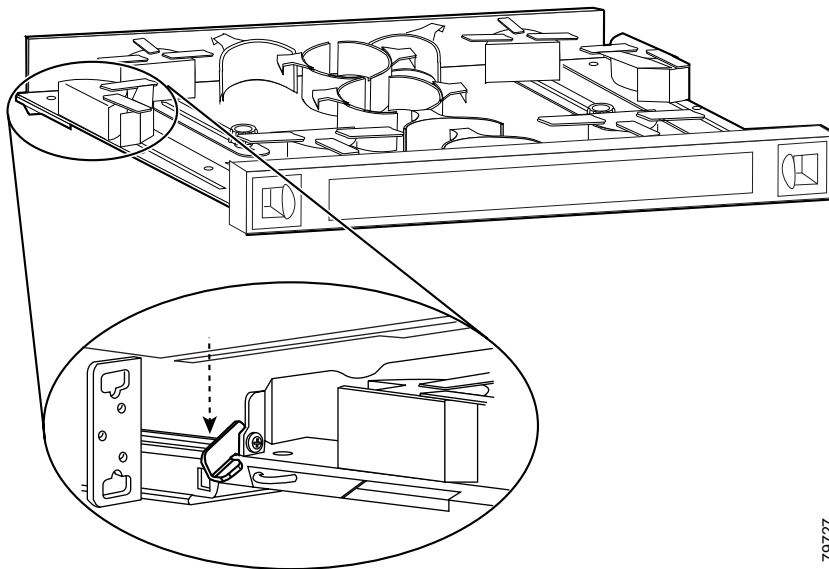
- Step 1** Open the cable storage drawer by pushing the tabs in to release the lock on the drawer. (See [Figure 2-29](#).) Pull out the drawer.

Figure 2-29 Opening the Cable Storage Drawer



- Step 2** Lock the drawer in the open position by pushing the latch at the back left of the drawer down into the lock position. (See [Figure 2-30](#).)

Figure 2-30 Locking the Drawer



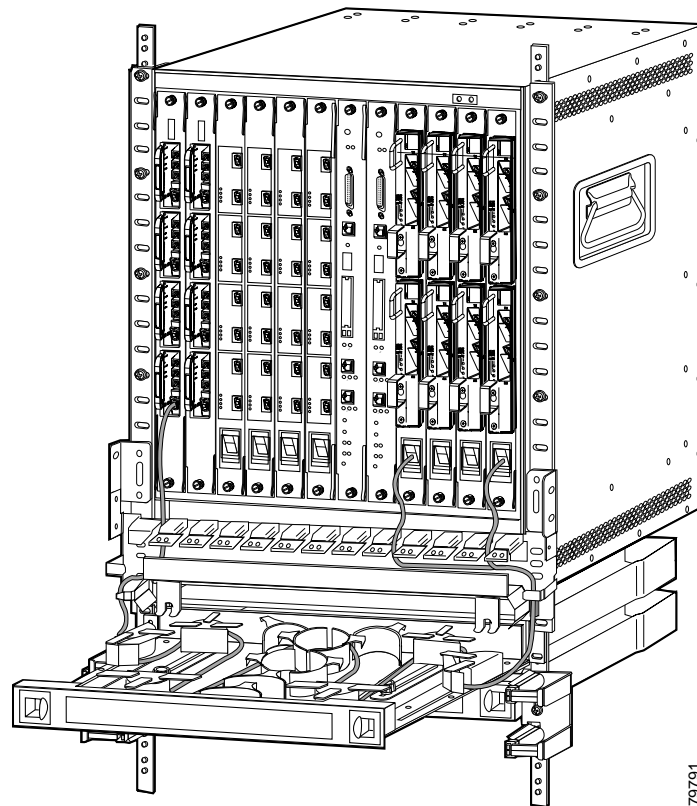
- Step 3** Use the MTP cable installation tool to push the MTP connector of the cable into the MPO 1 or MPO 2 on the mux/demux module until the connector snaps into place.



Note The 10-GE transponder modules must be in increasing order in the 10-Gbps line card motherboard for these connections to function correctly. Be sure that the modules supporting the first channel in the channel pair is in the top subslot and the module supporting the second channel in the channel pair is in the bottom subslot.

- Step 4** Route the MTP cable down through the cable management tray. Pull the cable out the left side of the tray, and into the drawer.
- Step 5** Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 6** Pull the cable up out of the right side of the drawer and back up through the cable management tray.
- Step 7** Insert one MTP connector into the MTP adapter labeled East, West, EO, or WO on the desired line card motherboard. (See [Figure 2-31](#).)
- Step 8** Insert the other MTP in a different 10-Gbps line card motherboard.

Figure 2-31 Routing the MTP-to-2 MTP Cable



- Step 9** Unlock the drawer by moving the latch back into an upright position and close the drawer.



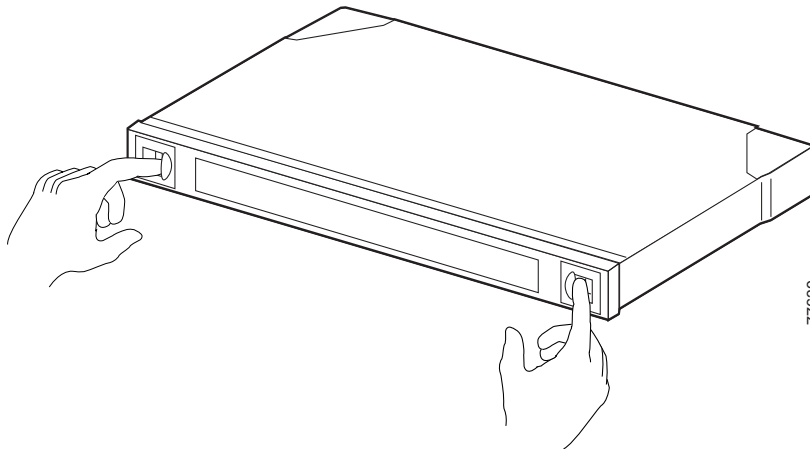
Tip You can use the client clips shipped with the chassis to clip together cables for easy handling and organization.

DLP-34 Connect the Mux/Demux Module to the 10-Gbps Line Card Motherboard Using the Cross Connect Drawer

Purpose	This task connects the mux/demux modules to the 10-Gbps line card motherboards using the cross connect drawer.
Tools/Equipment	Aqua MTP-to-4 MU cables Rose MTP-to-4 MU cables MTP cable installation tool
Prerequisite Procedures	DLP-14 Install the 10-Gbps Line Card Motherboard, page 2-20 DLP-17 Install the 10-GE Transponder Module, page 2-23 DLP-24 Clean Optical Connectors, page 2-31
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

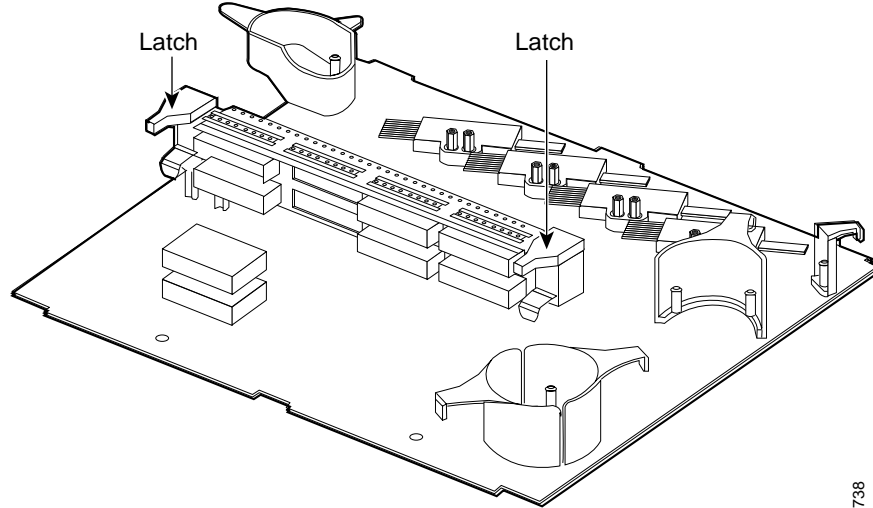
- Step 1** Open the cable storage drawer by pushing the tabs in to release the lock on the drawer. (See [Figure 2-32.](#)) Pull out the drawer.

Figure 2-32 Opening the Cable Storage Drawer



- Step 2** Lock the drawer in the open position by pushing the latch at the back left of the drawer down into the lock position.
- Step 3** Use the MTP cable installation tool to push the MTP connector of the gray cable into the MPO 1 or MPO 2 on the mux/demux module until the connector snaps into place.
- Step 4** Route the MTP cable down through the cable management tray. Pull the cable out the left side of the tray and into the drawer.
- Step 5** Continue to route the cable through the drawer around the round cable retainers to the right side.
- Step 6** Close the cable storage drawer once the cables are routed out of the right side and you unlock the drawer.
- Step 7** Open the cross connect drawer appropriate for your system configuration. See Step 1 and Step 2 for drawer opening details.
- Step 8** Flip the latches on the cross connect panel up and use them to pull the panel up. (See [Figure 2-33.](#))

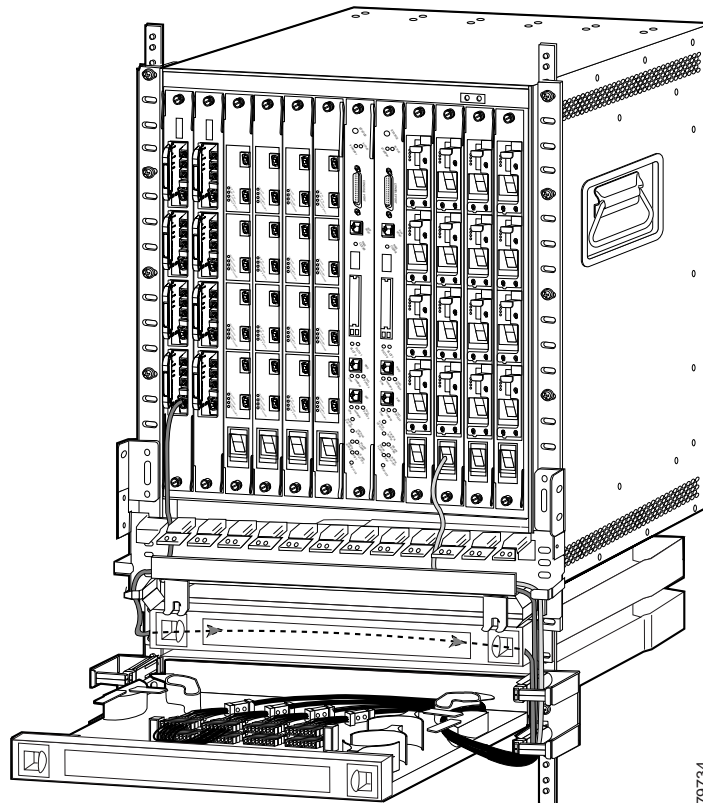
Figure 2-33 Pulling Up the Cross Connect Panel



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- Step 9** Route the MU breakout end of the gray cable in through the right side of the drawer. (See [Figure 2-34](#).)

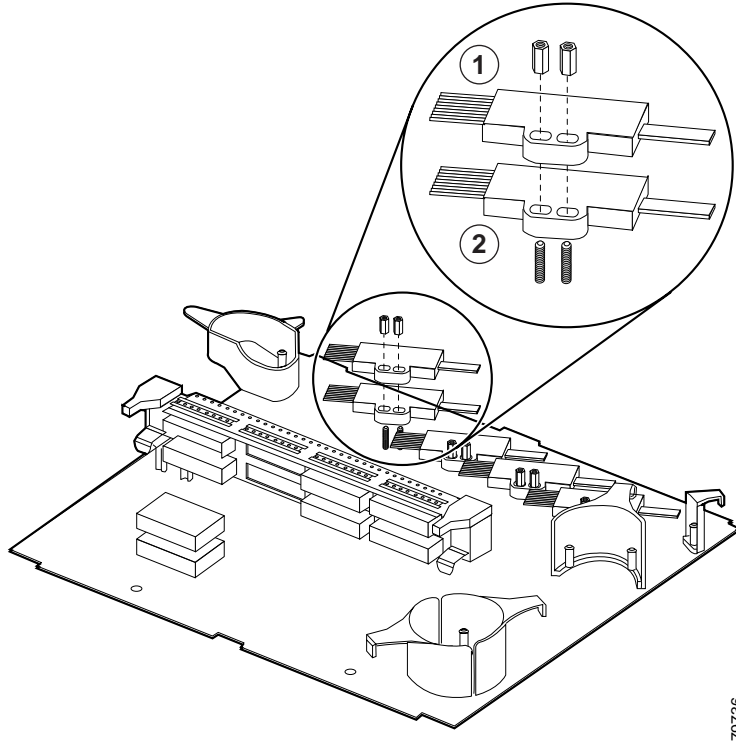
Figure 2-34 Routing the Cross Connect Cables



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- Step 10** Mount the transition box as shown in [Figure 2-35](#).

Figure 2-35 Mounting the Transition Box

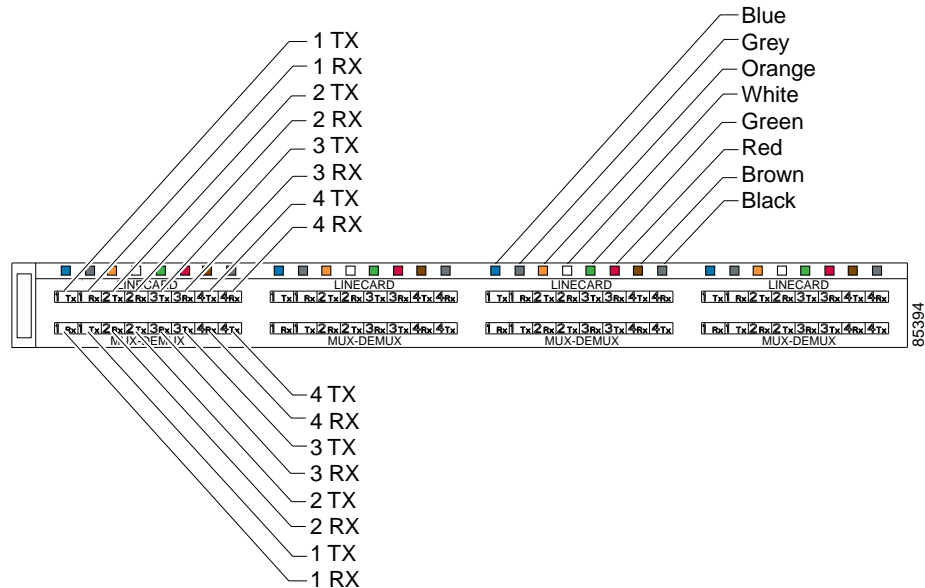


79736

1	Line card motherboard connections
2	Mux/demux motherboard connections

- Step 11** Connect the cables to the bottom half of the desired adapter mux/demux connections on the inner side of the cross connect panel. These are color coded and should be connected by matching the color on the panel to the colored wires out of the transition box. (See Figure 2-36.)

Figure 2-36 Cross Connect Panel



- Step 12** Connect the MU connectors on the outer side of the panel. Connect the Tx from the line card to the Tx on the mux/demux side. Connect the Rx line card side to the Rx on the mux/demux side.
- Step 13** Connect the 8 MU breakout cables on the green cable to the LINECARD connections on the cross connect panel. These are color coded and should be connected by matching the color on the panel to the colored wires out of the transition box.
- Step 14** Pull the cable up out of the right side of the drawer and back up through the cable management tray.
- Step 15** Insert the MTP connector into the MTP adapter labeled East, West, EO, or WO on the desired line card motherboard.
- Step 16** Unlock the drawer by moving the latch back into an upright position and close the drawer.



Tip You can use the client clips shipped with the chassis to fasten the cables for easy handling and organization.

NTP-6 Ground the Shelf

Purpose	This procedure grounds the shelf to the earth ground.
Tools/Equipment	Wire-stripping tool Crimping tool Two grounding lugs Number 1 Phillips screwdriver Two 12-24 screw
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1
Required/As Needed	Required

Onsite/Remote	Onsite
Security Level	None

**Tip**

If you use the cable management guides, install the grounding equipment after you install the top cable management guide.

-
- Step 1** Use a wire-stripping tool to remove approximately 0.75 inch (20 mm) of the covering from the end of the grounding wire.
- Step 2** Insert the stripped end of the grounding wire into the open end of the grounding lug.
- Step 3** Use the crimping tool to secure the grounding wire in place in the grounding lug.
- Step 4** Locate the grounding receptacle on the chassis.
- Step 5** Remove the label that covers the grounding receptacle.

**Note**

Step 6 is optional if you are not using the top cable management guide.

-
- Step 6** Place the lug mounting adapter against the grounding receptacle at the top of the chassis.
- Step 7** Place the grounding lug against the lug mounting adapter.
- Step 8** Insert two 12-24 screws through the holes in the grounding lug and the grounding receptacle. Ensure that the grounding lug does not interfere with other hardware or rack equipment.
- Step 9** Install the locking washers and nuts; use a number 1 Phillips screwdriver to tighten the grounding lug to the grounding receptacle.
- Step 10** Prepare the other end of the grounding wire and connect it to an appropriate grounding point in your site to ensure adequate earth ground for the Cisco ONS 15540 ESPx.
-

NTP-7 Power Up the Shelf

Purpose	This procedure describes how to install the power supplies and power up the shelf.
Tools/Equipment	–48 VDC or 120–240 VAC power supplies Wire-stripping tool AC power cord
Prerequisite Procedures	DLP-6 Install the Processor Card, page 2-13 NTP-6 Ground the Shelf, page 2-55
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** As needed, complete the “[DLP-35 Rack-Mount the 15540-PWR-AC External Power Shelf](#)” task on [page 2-57](#).
- Step 2** As needed, complete the “[DLP-36 Rack-Mount the 15540-ACPS-N-E External Power Shelf](#)” task on [page 2-58](#).
- Step 3** Complete the “[DLP-37 Connect DC-Input Power from the 15540-ACPS-N-E External Power Shelf](#)” task on [page 2-59](#) for DC power supplies.
- Step 4** Complete the “[DLP-38 Install the 15540-ACPS-N-E External Power Supply](#)” task on [page 2-63](#) for AC power supplies.
- Step 5** Complete the “[DLP-39 Connect the 15540-ACPS-N-E External Power Supply](#)” task on [page 2-65](#) for AC power supplies.
- Step 6** Complete the “[DLP-40 Verify the Powerup](#)” task on [page 2-66](#) after connecting the power.
-

DLP-35 Rack-Mount the 15540-PWR-AC External Power Shelf

Purpose	This task installs the external power shelf.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	NTP-6 Ground the Shelf, page 2-55
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

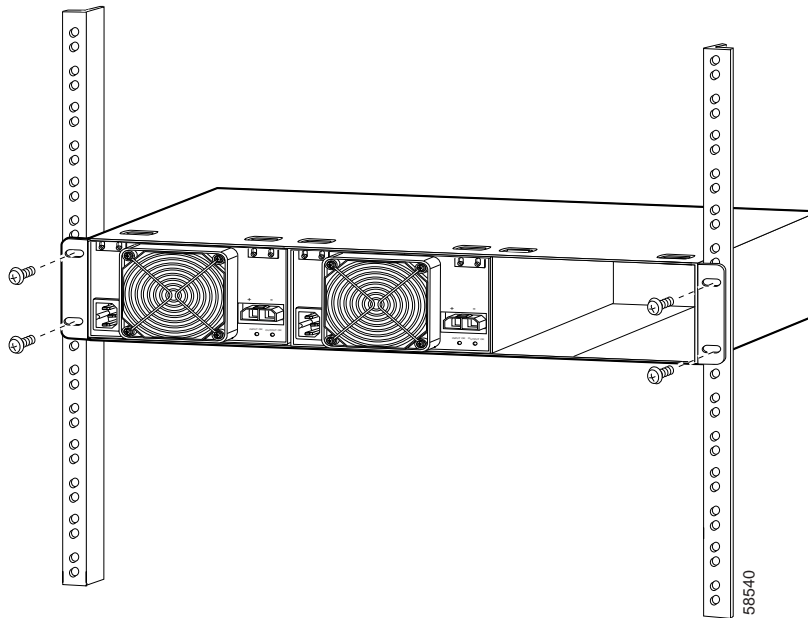
-
- Step 1** Choose a rack space that is close enough to your chassis so that you can connect all power cords to the chassis and to the power outlet.



Note We recommend that you install the 15540-PWR-AC external power shelf directly above your Cisco ONS 15540 chassis, leaving one half inch of space between the chassis and the power shelf or in a directly adjacent rack. The external power shelf is a 19-inch (483 mm) wide rack mount shelf, 3.5 inches (86 mm) high and 12 inches (305 mm) deep.

- Step 2** Align the mounting holes in the L brackets with the mounting holes in the equipment rack.
- Step 3** Secure the 15540-PWR-AC external power shelf using four (two per side) 12-24 x 3/4-inch screws through the elongated holes in the L bracket and into the threaded holes in the mounting post. (See [Figure 2-37](#).)

Figure 2-37 Installing the 15540-PWR-AC External Power Shelf in the Rack



- Step 4** Use a tape measure and level to ensure that the 15540-PWR-AC external power shelf is installed straight and level.

DLP-36 Rack-Mount the 15540-ACPS-N-E External Power Shelf

Purpose	This task installs the external power shelf.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	NTP-6 Ground the Shelf, page 2-55
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

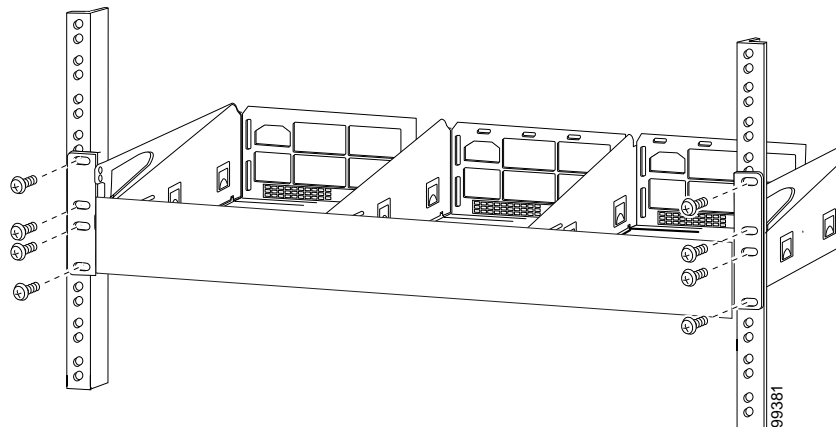
- Step 1** Choose a rack space that is close enough to your chassis so that you can connect all power cords to the chassis and to the power outlet.



Note We recommend that you install the 15540-ACPS-N-E external power shelf directly above your Cisco ONS 15540 chassis, leaving one-half inch of space between the chassis and the power shelf or in a directly adjacent rack. The external power shelf is a 19-inch (483 mm) wide rack mount shelf, 3.5 inches (86 mm) high and 12 inches (305 mm) deep.

- Step 2** Align the mounting holes of the external power shelf with the mounting holes in the equipment rack.
- Step 3** Secure the external power shelf using eight (four per side) 12-24 x 3/4-inch screws through the holes in the external power shelf and into the threaded holes in the mounting post. (See [Figure 2-38](#).)

Figure 2-38 Installing the 15540-ACPS-N-E External Power Shelf in the Rack



- Step 4** Use a tape measure and level to ensure that the external power shelf is installed straight and level.
- Step 5** Remove the spacer bar after the external power shelf is secured to the rack.

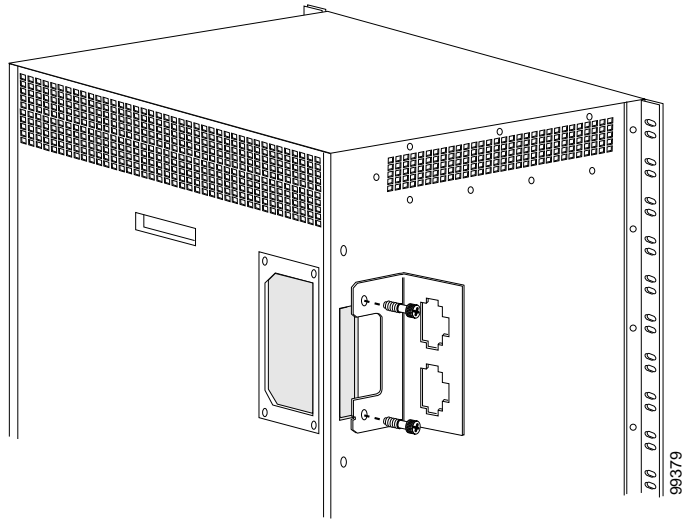
DLP-37 Connect DC-Input Power from the 15540-ACPS-N-E External Power Shelf

Purpose	This task connects the external power shelf.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	NTP-6 Ground the Shelf, page 2-55
Required/As Needed	As needed

Onsite/Remote	Onsite
Security Level	None

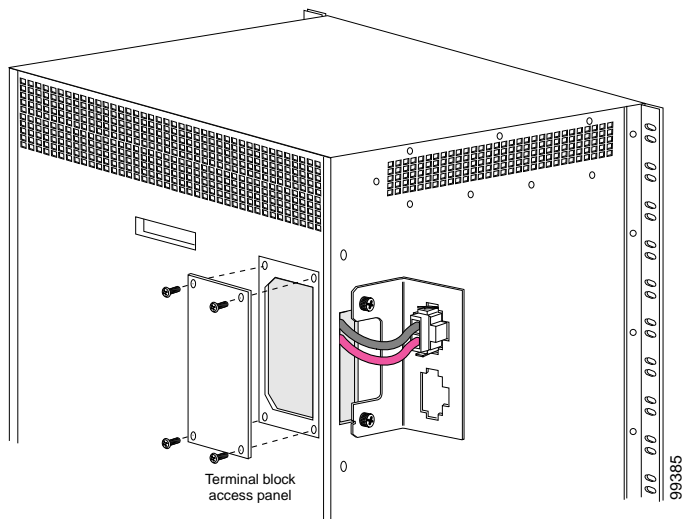
- Step 1** Attach the cable strain relief bracket to the side of the Cisco ONS 15540 ESPx chassis. (See [Figure 2-39](#).)

Figure 2-39 Installing the Cable Strain Relief Bracket



- Step 2** Remove the four screws from the terminal block access panel on the back panel of the chassis. (See [Figure 2-40](#).)

Figure 2-40 Removing the Terminal Block Access Panel



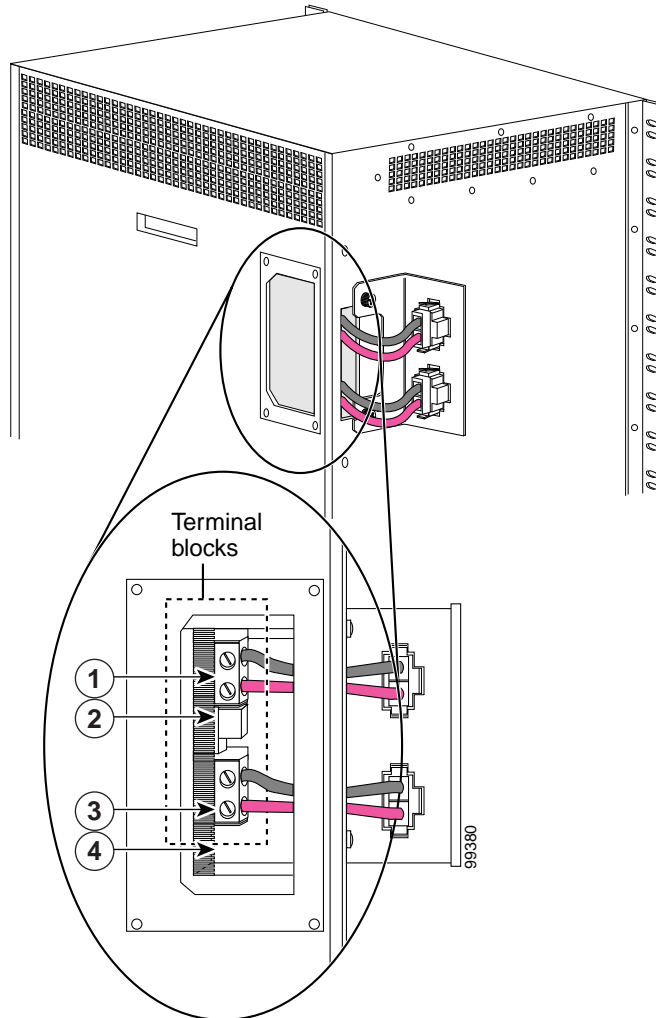
- Step 3** Snap the cable connector of the short DC power cable into the cable strain relief bracket. (See [Figure 2-40](#).)

- Step 4** Insert the cable through the left rear of the chassis and connect the leads to the terminal blocks (see [Figure 2-41](#)) in the following sequence:
- Black lead to RTNA.
 - Red lead to side A with -48V.



Note The ground connections should always be connected first and disconnected last.

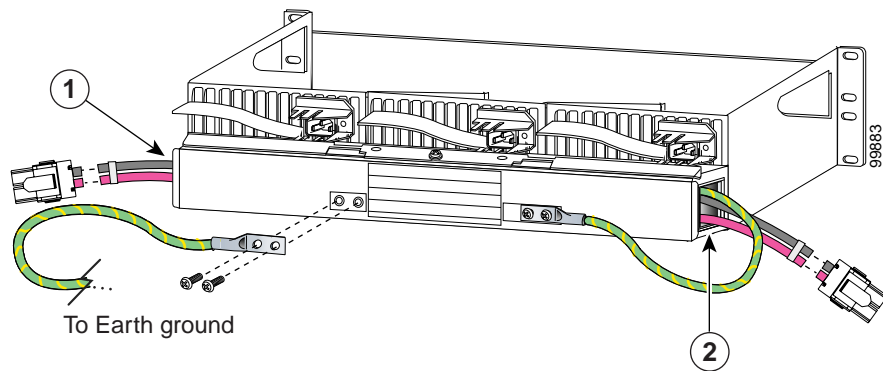
Figure 2-41 Connecting Cable Wires to the Terminal Blocks



1	RTNA	3	RTNB
2	-48VA	4	-48VB

- Step 5** Repeat [Step 3](#) and [Step 4](#), connecting the second set of cables in the following sequence:
- Black lead to RTNB.
 - Red lead to -48B.
- Step 6** Reinstall the terminal block access panel onto the chassis. Use the same four screws used in [Step 2](#) to secure the panel. (See [Figure 2-40](#).)
- Step 7** Use two number 10 screws to attach the earth ground lead to the ground lugs on the rear of the 15540-ACPS-N-E external power shelf. (See [Figure 2-42](#).)

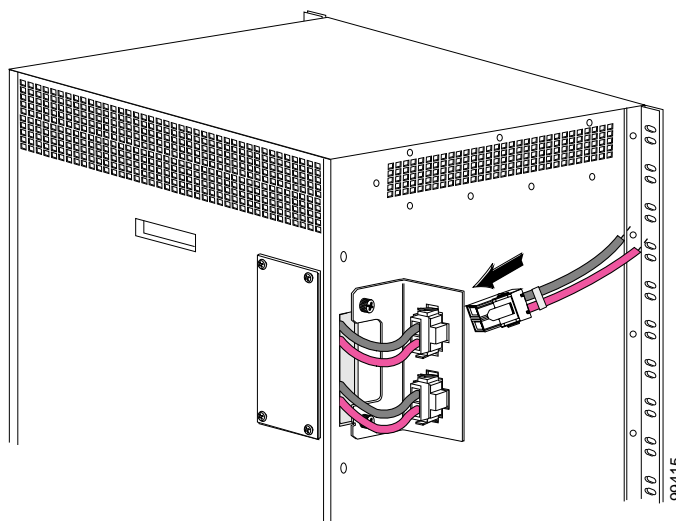
Figure 2-42 Installing the DC Power Cable



1	Side B	2	Side A
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- Step 8** Connect the earth ground lead to an appropriate ground source.
- Step 9** Attach the side A and side B cable ends to the short DC power cables at the cable strain relief bracket. (See [Figure 2-43](#).)

Figure 2-43 Connecting the DC Power Cables

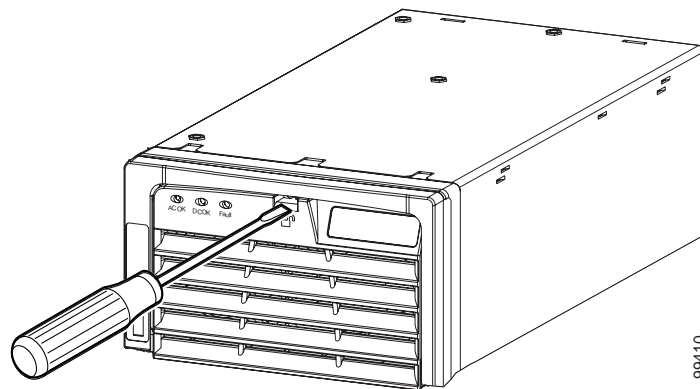


DLP-38 Install the 15540-ACPS-N-E External Power Supply

Purpose	This task installs the external power supply.
Tools/Equipment	Number 1 Phillips screwdriver
Prerequisite Procedures	DLP-36 Rack-Mount the 15540-ACPS-N-E External Power Shelf , page 2-58
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

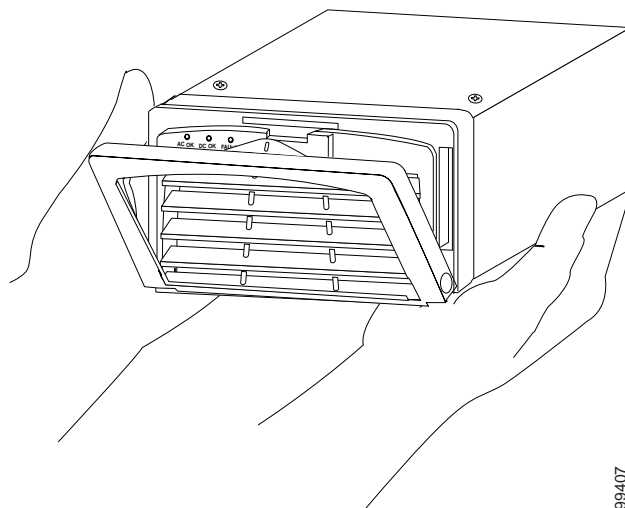
- Step 1** Use a flat blade screwdriver to push in on the release handle latch until the release handle opens. (See [Figure 2-44](#).)

Figure 2-44 Opening the Release Handle



- Step 2** With the release handle partially open, place both hands underneath the bottom of the external power supply and carry it to the external power shelf. (See [Figure 2-45](#).)

Figure 2-45 Handling the 15540-ACPS-N-E Power Supply

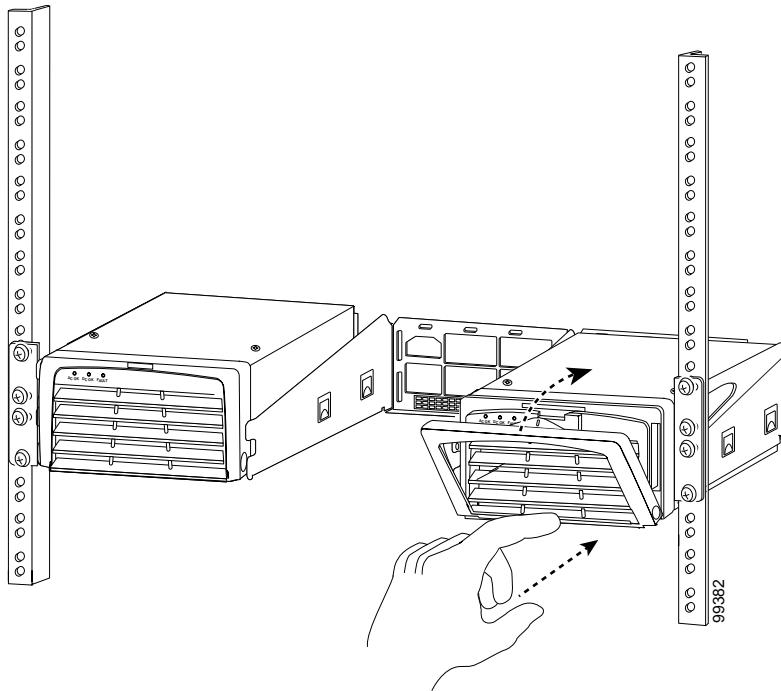




Caution Use both hands to install and remove the 15540-ACPS-N-E power supply.

- Step 3** Slide the 15540-ACPS-N-E power supply all the way into the 15540-ACPS-N-E external power shelf bay until the release handle closes. (See [Figure 2-46](#).)

Figure 2-46 Installing the 15540-ACPS-N-E Power Supply



- Step 4** Ensure that all site power and grounding requirements described in the *Regulatory Compliance and Safety Information for the Cisco ONS 15500 Series* have been met before you connect the 15540-ACPS-N-E power supply to a power source.



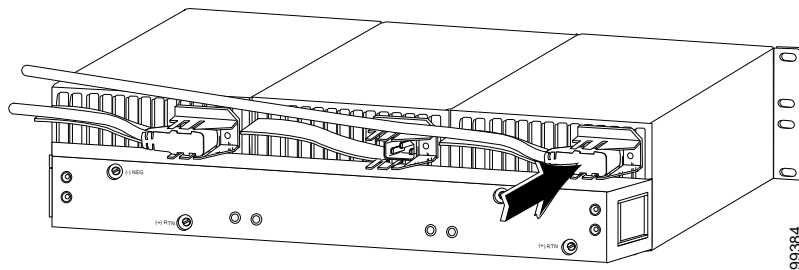
Caution In a system with multiple power supplies, connect each power supply to a separate AC-input power source. In case of a power source failure, the second source is still available.

DLP-39 Connect the 15540-ACPS-N-E External Power Supply

Purpose	This task connects the external power shelf.
Tools/Equipment	Power cord
Prerequisite Procedures	NTP-6 Ground the Shelf, page 2-55 DLP-36 Rack-Mount the 15540-ACPS-N-E External Power Shelf, page 2-58
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Connect the power cord to the 15540-ACPS-N-E external power shelf. (See [Figure 2-47](#).)

Figure 2-47 Installing the AC Power Cord



- Step 2** Verify 15540-ACPS-N-E power supply operation by checking the power supply front panel LEDs:
- AC OK LED is on.
 - DC OK LED is on.
- Step 3** Check the external power supply status from the system console by entering the **show hardware** command. For more information on commands, refer to the [Cisco ONS 15540 ESPx Configuration Guide](#) and the [Cisco ONS 15540 ESPx Command Reference](#).
-

DLP-40 Verify the Powerup

Purpose	This task verifies the LEDs on the shelf after powerup.
Tools/Equipment	None
Prerequisite Procedures	DLP-37 Connect DC-Input Power from the 15540-ACPS-N-E External Power Shelf, page 2-59 or DLP-39 Connect the 15540-ACPS-N-E External Power Supply, page 2-65
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Verify that the Status LED is yellow.
- Step 2** Verify that the Active LED on the primary processor and the Standby LED on the standby processor are both green.
- Step 3** Verify that alarm LEDs are off.
- Step 4** Verify that LEDs on the mux/demux modules and the transponder modules are green.
- Step 5** Perform a **show hardware** command to verify the status of both power supplies. The status for both power supplies should be OK.

```
Power-Supply Module
```

```
Power-Supply A is : OK
Power-Supply B is : OK
```

NTP-8 Verify Installation of Hardware

Purpose	This procedure verifies the hardware installation.
Tools/Equipment	Console
Prerequisite Procedures	NTP-2 Install the Cisco ONS 15540 ESPx Chassis, page 2-1 NTP-3 Install the Cable Management System, page 2-4 NTP-4 Install Processor Cards, Line Card Motherboards, and Modules, page 2-12 NTP-5 Connect the Hardware, page 2-26 NTP-6 Ground the Shelf, page 2-55 NTP-7 Power Up the Shelf, page 2-57
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

-
- Step 1** Connect to the console port on the processor card through your PC or network.

The CLI (command-line interface) on the console prompts you to enter the initial configuration dialog. Answer **no** to this prompt as follows:

```
Would you like to enter the initial dialog? [yes]: no
```



Note If there are several prompts, answer no until you come to the EXEC prompt.

Step 2 Type enable at the user EXEC prompt to enter privilege EXEC mode:

```
Switch> enable
Switch#
```

Step 3 Verify that all hardware is correctly installed in the proper slots by performing a **show hardware** command. The following example shows the command output.

```
Switch# show hardware
```

```
-----
CN_Tower_Backplane named Switch, Date: 12:44:21 UTC Fri Nov 14 2003
-----
```

```
-----
Back-Plane Information
-----
```

Orderable	Product No.	MAC-Address	MAC-Size	Serial No.	Mfg. Date	H/W	V
15540-CHSA		00-00-16-44-3e-b7	16	TBC04501952	01/09/2002	3.0	

Slot	Orderable	Product No.	Part No.	Rev	Serial No.	Mfg. Date	H/W	Ver.
0/*	15540-LCMB-UNKNOWN		73-7793-02	11	CAB0604MD7A	2/20/2002	1.0	
0/2	15540-MDXC-16EH=		74-2858-01	01	ANX0614000N	06/18/2002	1.0	
1/*	15540-LCMB-UNKNOWN		73-7793-01	11	CAB0604MD7R	01/29/2002	1.0	
1/0	15440-MDXD-16AD=		74-2857-01	A1	404049	03/04/2002	1.0	
1/2				0	403416	01/18/2002	0.1	
3/*	15540-TBD		73-7789-01	03	CAB0543L2SX	11/5/2001	5.0	
3/0	N/A		68-1105-02	02	CAB0513HGV6	02/23/2001	2.32	
3/1	N/A		68-1105-02	02	CAB0512HGPA	02/23/2001	2.32	
3/2	15540-TSP2-0300=		68-1342-06	A1	CNH0716004N	04/22/2003	5.1	
3/3	15540-TSP2-0300=		68-1342-06	A1	CNH0716003V	04/22/2003	5.1	
4/*	15540-TBD		73-7789-03	A0	CAB0605MF0P	02/06/2002	2.3	
4/0	15540-MDXE-0203		05-1197-01	C^N	DIF07420102	01/01/2000	1.0	
4/1	15540-MDXE-OSC		05-1211-01	C^N	DIF07430109	10/22/2003	1.0	
4/2	15540-MDXE-0204		05-1198-01	C^N	DIF07430108	10/22/2003	1.0	
4/3	15540-04		05-1194-01	C^N	DIF07400104	01/01/2000	1.0	
6/*	15540-CPU=		73-5621-06	A1	CAB0553M51D	01/11/2002	6.2	
7/*	N/A		73-5621-02	02	CAB0505GZH3	02/15/2001	2.5	
8/*	15540-LCMB-1100=		68-1672-03	A0	CAB06310XYA	09/23/2002	2.2	
8/0	15540-MDXE-OSC		05-1211-01	C^N	DIF07430110	10/22/2003	1.0	
8/1	15540-MDXE-0201		05-1195-01	C^N	DIF07430107	10/22/2003	1.0	
8/2	15540-MDXE-0201		05-1195-01	C^N	DIF07420107	01/01/2000	1.0	
8/3	15540-04		05-1194-01	C^N	DIF07410105	01/01/2000	1.0	

```
-----
Power-Supply Module
-----
```

```
Power-Supply A is : OK
Power-Supply B is : Not working
ESPx-ALPHA#
```

- Step 4** Verify that the modules have the correct hardware version and software version by performing a **show hardware detail** command. The follow example shows the command output.

```
Switch# show hardware detail
```

```
-----
-----
Back-Plane Information
-----
-----
Orderable Product No.  MAC-Address          MAC-Size  Serial No.   Mfg. Date  H/W Ve
-----
15540-CHSA              00-00-16-44-3e-b7 16         TBC04501952 01/09/2002 3.0
```

```
-----
-----
Slot Orderable Product No.   Part No.   Rev Serial No.   Mfg. Date  H/W Ver.
-----
0/* 15540-LCMB-UNKNOWN        73-7793-02 11 CAB0604MD7A    2/20/2002 1.0
0/2 15540-MDXC-16EH=          74-2858-01 01 ANX0614000N    06/18/2002 1.0
1/* 15540-LCMB-UNKNOWN        73-7793-01 11 CAB0604MD7R    01/29/2002 1.0
1/0 15440-MDXD-16AD=          74-2857-01 A1 404049         03/04/2002 1.0
1/2                                     0 403416         01/18/2002 0.1
3/* 15540-TBD                 73-7789-01 03 CAB0543L2SX    11/5/2001 5.0
3/0 N/A                       68-1105-02 02 CAB0513HGV6    02/23/2001 2.32
3/1 N/A                       68-1105-02 02 CAB0512HGPA    02/23/2001 2.32
3/2 15540-TSP2-0300=         68-1342-06 A1 CNH0716004N    04/22/2003 5.1
3/3 15540-TSP2-0300=         68-1342-06 A1 CNH0716003V    04/22/2003 5.1
4/* 15540-TBD                 73-7789-03 A0 CAB0605MFOP    02/06/2002 2.3
4/0 15540-MDXE-0203          05-1197-01 C^N DIF07420102    01/01/2000 1.0
4/1 15540-MDXE-OSC           05-1211-01 C^N DIF07430109    10/22/2003 1.0
4/2 15540-MDXE-0204          05-1198-01 C^N DIF07430108    10/22/2003 1.0
4/3 15540-04                 05-1194-01 C^N DIF07400104    01/01/2000 1.0
6/* 15540-CPU=               73-5621-06 A1 CAB0553M51D    01/11/2002 6.2
7/* N/A                       73-5621-02 02 CAB0505GZH3    02/15/2001 2.5
8/* 15540-LCMB-1100=         68-1672-03 A0 CAB06310XYA    09/23/2002 2.2
8/0 15540-MDXE-OSC           05-1211-01 C^N DIF07430110    10/22/2003 1.0
8/1 15540-MDXE-0201          05-1195-01 C^N DIF07430107    10/22/2003 1.0
8/2 15540-MDXE-0201          05-1195-01 C^N DIF07420107    01/01/2000 1.0
8/3 15540-04                 05-1194-01 C^N DIF07410105    01/01/2000 1.0
```

```
-----
Power-Supply Module
-----
```

```
Power-Supply A is : OK
Power-Supply B is : Not working
ESPx-ALPHA#sh hardware detail
```

```
-----
CN_Tower_Backplane named Switch, Date: 12:47:08 UTC Fri Nov 14 2003
-----
```

```
-----
Back-Plane Information
-----
```

```
Slot Number           : N/A
Controller Type       : 0x1006
On-Board Description   : CN_Tower_Backplane
Orderable Product Number: 15540-CHSA
Board Part Number     : 73-5655-03
Board Revision        : 02
Serial Number         : TBC04501952
Manufacturing Date    : 01/09/2002
Hardware Version      : 3.0
RMA Number            : 0x00
```

RMA Failure Code : 0x00

Optical Back-Plane Type : Patchable Optical Backplane
 MAC Address : 00-00-16-44-3e-b7
 MAC Address Block Size : 16

```
-----
Slot Number          : 0/*
Controller Type      : 0x101A
On-Board Description : CN_TOWER_MUX/DEMUX_OSC
Orderable Product Number: 15540-LCMB-UNKNOWN
Board Part Number    : 73-7793-02
Board Revision       : 11
Serial Number        : CAB0604MD7A
Manufacturing Date   : 2/20/2002
Hardware Version     : 1.0
RMA Number           : 0x00
RMA Failure Code     : 0x00
Functional Image Version: 2.67
Function-ID          : 0
-----
```

```
-----
Slot Number          : 0/2
Controller Type      : 0x1025
On-Board Description : Mux_16Channel
Orderable Product Number: 15540-MDXC-16EH=
Board Part Number    : 74-2858-01
Board Revision       : 01
Serial Number        : ANX0614000N
Manufacturing Date   : 06/18/2002
Hardware Version     : 1.0
RMA Number           :
RMA Failure Code     :
```

```
-----
Slot Number          : 1/*
Controller Type      : 0x101A
On-Board Description : CN_TOWER_MUX/DEMUX_OSC
Orderable Product Number: 15540-LCMB-UNKNOWN
Board Part Number    : 73-7793-01
Board Revision       : 11
Serial Number        : CAB0604MD7R
Manufacturing Date   : 01/29/2002
Hardware Version     : 1.0
RMA Number           : 0x00
RMA Failure Code     : 0x00
Functional Image Version: 2.67
Function-ID          : 0
-----
```

