Cisco ONS 15454 Hardware Installation Guide

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Preface

Note Unless otherwise specified, “ONS 15454” refers to both ANSI and ETSI M12 shelf assemblies.

Note The terms “Unidirectional Path Switched Ring” and “UPSR” may appear in Cisco literature. These terms do not refer to using Cisco ONS 15xxx products in a unidirectional path switched ring configuration. Rather, these terms, as well as “Path Protected Mesh Network” and “PPMN”, refer generally to Cisco's path protection feature, which may be used in any topological network configuration. Cisco does not recommend using its path protection feature in any particular topological network configuration.

Note Due to memory limitations, TCC2/TCC2P cards are not supported as the node controller in multi-shelf configuration from R10.5.2.6. Hence, it is recommended to use TCC3 card as the node controller in multi-shelf configuration. However, the TCC2/TCC2P cards can be used as a subtended controller and also in a stand-alone configuration.

This section explains the objectives, intended audience, and organization of this publication and describes the conventions that convey instructions and other information.

This section provides the following information:

Revision History

Date	Notes
June 2010	• Updated the Tools/Equipment information for EAP cable length in “NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card” in chapter, “Install the Cisco ONS 15454 Shelf”. • Updated the list of supplied materials in chapters, “Install the Cisco ONS 15454 M2 Shelf” and “Install the Cisco ONS 15454 M6 Shelf”. • Updated the AC fuse rating values for the ONS 15454 M2 and ONS 15454 M6 shelf assemblies in chapters, “Install the Cisco ONS 15454 M2 Shelf” and “Install the Cisco ONS 15454 M6 Shelf”. • Added a table, “Port Mapping” in the chapter, “Install the Cisco ONS 15454 Shelf”. • Added a note to explain the configuration of 48-port Catalyst switch in chapters, “Install the Cisco ONS 15454 Shelf” and “Install the Cisco ONS 15454 M6 Shelf”. • Added a note on temporary door in chapter, “Install the Cisco ONS 15454 M6 Shelf”.
August 2010	• Updated the wall mounting procedure for ONS 15454 M2 shelf in chapter, “Install the Cisco ONS 15454 M2 Shelf”. • Added a note in NTP-G253 in the chapter, “Install the Cisco ONS 15454 M6 Shelf”. • Updated the total maximum power consumption of ONS 15454 M6 shelf in appendix “Hardware Specifications”.
September 2010	• Modified procedure, “DLP-G682 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration” in chapter, “Install the Cisco ONS 15454 M6 Shelf”.
October 2010	• Added a note in the chapter “Installing the ONS 15454 (ANSI and ETSI) Shelf”. • Added two notes and a step in “DLP-G18 Connect Office Power to the ONS 15454 ANSI” of the chapter, “Installing the ONS 15454 (ANSI and ETSI) Shelf”. • Updated step 1 in “DLP-G19 Turn On and Verify Office Power” of the chapter, “Installing the ONS 15454 (ANSI and ETSI) Shelf”. • Added a step in the “Connect Office Power (DC) to the ONS 15454 M2 Shelf” and “Connect Office Power (DC) to the ONS 15454 M6 Shelf” procedures of the chapters, “Install the Cisco ONS 15454 M2 Shelf” and Install the Cisco ONS 15454 M6 Shelf” respectively. • Added a note in the “Connect Office Power (AC) to the ONS 15454 M2 Shelf” and “Connect Office Power (AC) to the ONS 15454 M6 Shelf” procedures of the chapters, “Install the Cisco ONS 15454 M2 Shelf” and Install the Cisco ONS 15454 M6 Shelf” respectively.
November 2010	• Added Step 11 and a note to Step 9 in the procedure, “DLP-G18 Connect Office Power to the ONS 15454 ANSI”. • Updated Step 1 in the procedure “DLP-G19 Turn On and Verify Office Power”. • Updated Step 11 in the procedure, “DLP-G572 Connect Office Power (DC) to the ONS 15454 M6 Shelf (ANSI Only)” of the chapter, “Install the Cisco ONS 15454 M6 Shelf”.

Date	Notes
February 2011	• Added the section “Card Slot Requirements” in the chapter “Preparing to Install the ONS 15454 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6 Shelf”.
May 2011	• Updated the sections “NTP-G252 Install the ONS 15454 M6 Shelf” and “NTP-G253 Install the External Connection Unit (ECU)” in the chapter “Install the Cisco ONS 15454 M6 Shelf”. • Changed the breaker rating (fuse) for the ONS 15454 ETSI chassis from 40A to 30A in the chapter, “Installing the ONS 15454 (ANSI and ETSI) Shelf”. • Added a note in the “Fiber module” section in chapter “Install the Cisco ONS 15454 M6 Shelf”. • Added a note in the procedure, “NTP-Attach Wires to Timing, LAN, and Craft Pin Connections in ONS 15454 M2” of chapter, “Install the Cisco ONS 15454 M2 Shelf”.
June 2011	• Added the length of the SCSI cables in the chapter “Install the Cisco ONS 15454 M6 Shelf”. • Updated the procedure “DLP-G655 Lock Cables for a Clean Routing” to “DLP-G655 Route and Lock Cables” in chapter “Install the Cisco ONS 15454 M6 Shelf”. • Added a note in the procedure “NTP-Attach Wires to Timing, LAN, and Craft Pin Connections in ONS 15454 M2” in chapter, “Install the Cisco ONS 15454 M2 Shelf”.
August 2011	• Added additional information in the “External LAN Interface for EMS” section in appendix, “Hardware Specifications”. • Updated the values for total maximum power consumption (ONS 15454 M6) in the section “System Power” of the appendix, “Hardware Specifications”. • Updated the “Alarm Connectors” section in the chapter “Install the Cisco ONS 15454 M6 Shelf”.
September 2011	• Updated the “ONS 15454 M6 Shelf Specifications” section in the appendix “Hardware Specifications”.
November 2011	Updated the alarm details in the chapter, “Installing the Cisco 15454 M6 Shelf”.
February 2012	Added a table that lists alarm connector pin details for SCSI alarm wire wrap cable in the chapter, “Installing the Cisco 15454 M6 Shelf”.
March 2012	• Updated the size of the power cable for ONS 15454 M2 and ONS 15454 M6 shelves in the chapter, “Preparing to Install”. • Updated the note in the chapter, “Installing the ONS 15454 (ANSI and ETSI) Shelf”. • Updated the “Fan Tray Units for ONS 15454 Cards” table in the chapter, “Installing the ONS 15454 (ANSI and ETSI) Shelf”.

Date	Notes
May 2012	• Updated the note in the section “Fan Tray Units for ONS 15454 Cards” in the chapter “Installing the ONS 15454 (ANSI and ETSI) Shelf”. • Updated the section “Fan-Tray Assembly” and the procedure “NTP-G268 Install the Fan-Tray Assembly in the ONS 15454 M2 Shelf” in the chapter “Installing the ONS 15454 M2 Shelf”. • Updated the section “Fan-Tray Assembly” and the procedure “NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf” in the chapter “Installing the ONS 15454 M6 Shelf”. • Updated the table “Fan-Tray Assembly Power Requirements” and the section “System Power” in the appendix “Hardware Specifications”. • Added the procedure “DLP-G729 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration without a Catalyst Switch” in the chapter, “Installing the ONS 15454 M6 Shelf”.
June 2012	• Updated the section “Multishelf Management” in the chapter “Installing the ONS 15454 M6 Shelf”. • Updated the sections “NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves” and “NTP-G310 Upgrade the ONS 15454 Multishelf Configuration using the ONS 15454 M6” in the chapter “Installing the ONS 15454 M6 Shelf”.
July 2012	• Added a section “Cooling Profile” in the chapter “Installing the ONS 15454 M6 Shelf”. • Updated the section “Multishelf LAN Topologies” in the chapter “Installing the ONS 15454 M6 Shelf”.
August 2012	Updated the table “Multishelf LAN Topologies in Cisco ONS 15454 M6 and Cisco ONS 15454” in the chapter “Installing the ONS 15454 M6 Shelf”.
October 2012	Updated the table “Multishelf LAN Topologies in Cisco ONS 15454 M6 and Cisco ONS 15454” in the chapter “Installing the ONS 15454 M6 Shelf”.

November 2012	• Updated the section “Mounting Multiple Nodes” in the chapter “Installing the ONS 15454 M6 Shelf” and “Mounting a Single Node” in the chapter “Installing the ONS 15454 M2 Shelf”.
	• In the chapter “Maintaining the ONS 15454 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6 Shelf”, updated the procedures:
	  • NTP-G114 Inspect and Replace the Air Filter
	  • NTP-G274 Replace the Air Filter of the ONS 15454 M2 Shelf Assembly
	  • NTP-G262 Replace the Air Filter of the ONS 15454 M6 Shelf Assembly
	  • NTP-G263 Replace the Air Filter of the AC Power Module in the ONS 15454 M6 Shelf Assembly

Date	Notes

February 2013	• Deleted the section "NTP-G300 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Extended) for a Multishelf Node" and updated the following sections in the chapter "Installing the ONS 15454 (ANSI and ETSI) Shelf":
	  • NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560
	  • NTP-G296 Upgrade the ONS 15454 Multishelf with MS-ISC Card Configuration Using the Catalyst 3560
	  • NTP-G297 Upgrade the ONS 15454 Multishelf with Catalyst 2950 Configuration Using the Catalyst 3560
	  • NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node
	• Updated the table "Multishelf LAN Topologies in Cisco ONS 15454 M6 and Cisco ONS 15454" and the following sections in the chapter "Installing the ONS 15454 M6 Shelf":
	  • NTP-G309 Connect the ONS 15454 M6 and the ONS 15454 in a Mixed Multishelf Configuration
	  • DLP-G682 Connect the ONS 15454M6 as the Node Controller in a Mixed Multishelf Configuration Using the Catalyst 3560
	  • DLP-G683 Connect the ONS 15454 as the Node Controller in a Mixed Multishelf Configuration
	  • NTP-G310 Upgrade the ONS 15454 Multishelf Configuration Using the ONS 15454 M6
	  • DLP-G687 Upgrade the ONS 15454 Multishelf with the Catalyst 2950 Switch Configuration
	  • DLP-G688 Upgrade the ONS 15454 Multishelf with MS-ISC Card Configuration
	  • NTP-G264 Perform the ONS 15454 M6 Shelf Installation Acceptance Test
	• Updated the figures "Mixed Multishelf Configuration with the ONS 15454 M6 as the Node Controller" and "Mixed Multishelf Configuration with the ONS 15454 as the Node Controller" in the chapter "Installing the ONS 15454 M6 Shelf".

March 2013	• Revised the part number and included Release 9.6.0.3 features such as power calculation for 15454-M6-DC20 power module. • Updated the section "External Connection Units" in the chapter "Installing the ONS 15454 M6 Shelf" to include the 15454-M6-ECU-60 unit. • Updated the procedure "NTP-G329 Remove the Deep Door of the ONS 15454 M6 Shelf" in the chapter "Installing the ONS 15454 M6 Shelf". • Updated the procedure "NTP-G331 Remove the Deep Door of the ONS 15454 M2 Shelf" in the chapter "Installing the ONS 15454 M2 Shelf". • Added a note in the chapters, "Installing the ONS 15454 M2 Shelf" and "Installing the ONS 15454 M6 Shelf". • Updated the section "Power Modules" in the chapter "Installing the ONS 15454 M2 Shelf". • Updated the section "Passive Unit Inventory Interfaces" in the chapter "Installing the ONS 15454 M6 Shelf".

Date	Notes
July 2013	• Revised the part number and included Release 9.8 features such as AC2 power module.
November 2013	• Added Release 10.0 feature on deep-front panel. Updated section “4.1 Front Door”. • NTP-G343 Install the Air Plenum in ONS 15454 M2 Shelf. • DLP-G763 Install Air Plenum for ONS 15454 M2 Shelf in ANSI 19-inch Configuration. • DLP-G764 Install Air Plenum in ONS 15454 M2 Shelf for ANSI 23-inch Configuration. • DLP-G765 Install Air Plenum for ONS 15454 M2 Shelf in ETSI Configuration. • Added Release 10.0 feature on air plenum to orient the air flow within the chassis in section “5.4 Air Plenum“. • NTP-G344 Install the Air Plenum in ONS 15454 M6 Shelf • DLP-G766 Install Air Plenum for ONS 15454 M6 Shelf in ANSI 19-inch Cabinet. • DLP-G767 Install Air Plenum in ONS 15454 M6 Shelf for ANSI 23-inch Configuration. • DLP-G768 Install Pre-assembled Air Plenums in ANSI 23-inch Configuration. • DLP-G769 Install Air Plenum for ONS 15454 M6 Shelf in ETSI Configuration.
April 2014	• The full length book-PDF was generated.
December 2014	• Added information for the 15454-M6-DC40 power module.
June 2015	• Added a note to the section, “Alarm Connectors” in the chapter “Installing the ONS 15454 M6 Shelf”.
January 2016	• Updated for R10.5.2
April 2016	Added the following note: Due to memory limitations, TCC2/TCC2P cards are not supported as the node controller in multi-shelf configuration from R10.5.2.6. Hence, it is recommended to use TCC3 card as the node controller in multi-shelf configuration. However, the TCC2/TCC2P cards can be used as a subtended controller and also in a stand-alone configuration.
June 2016	Updated the bandwidth specifications for ONS 15454 M6 in the appendix, “Hardware Specifications”.
July 2016	Updated the sections, “Filler and Blank Cards” in the chapters, “Installing the ONS 15454 M12 (ANSI and ETSI) Shelf”, “Installing the ONS 15454 M2 Shelf”, and “Installing the ONS 15454 M6 Shelf”.
November 2016	Included R 10.6.1 features.
March 2017	Added a note to "DLP-G298 Install LAN Wires in ONS 15454 M6" in the chapter, "Installing the ONS 15454 M6 Shelf".
April 2017	Updated for R10.6.2
October 2019	Updated for R11.1

Document Objectives

This document explains installation, turn up, provisioning, and maintenance for Cisco ONS 15454, Cisco ONS M2, and Cisco ONS M6 systems. Use this document in conjunction with the appropriate publications listed in the Related Documentation, on page xxiii section.

Audience

To use this publication, you should be familiar with Cisco or equivalent optical transmission hardware and cabling, telecommunications hardware and cabling, electronic circuitry and wiring practices, and preferably have experience as a telecommunications technician.

Related Documentation

Use the Cisco ONS 15454 Hardware Installation Guide in conjunction with the following referenced publications:

- Cisco ONS 15454 DWDM Control Card and Node Configuration Guide
- Cisco ONS 15454 DWDM Line Card Configuration Guide
- Cisco ONS 15454 DWDM Network Configuration Guide
- Installing the Cisco ONS 15454 M2 and ONS 15454 M6 Passive Optical Modules
- Regulatory Compliance and Safety Information for Cisco ONS Products
- Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms
- Installing the GBIC, SFP, SFP+, QSFP, XFP, CXP, CFP, and CPAK Optical Modules in Cisco ONS Platforms
- Cisco ONS 15454 DWDM Troubleshooting Guide
- Cisco ONS 15454 DWDM Licensing Configuration Guide

For an update on End-of-Life and End-of-Sale notices, refer to http://www.cisco.com/en/US/products/hw/optical/ps2006/prod_eol_notices_list.html.

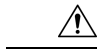
Document Conventions

This publication uses the following conventions:

Convention	Application
boldface	Commands and keywords in body text.
italic	Command input that is supplied by the user.
[ ]	Keywords or arguments that appear within square brackets are optional.

Convention	Application
{ x | x | x }	A choice of keywords (represented by x) appears in braces separated by vertical bars. The user must select one.
Ctrl	The control key. For example, where Ctrl + D is written, hold down the Control key while pressing the D key.
screen font	Examples of information displayed on the screen.
boldface screen font	Examples of information that the user must enter.
< >	Command parameters that must be replaced by module-specific codes.

Note Means *reader take note* . Notes contain helpful suggestions or references to material not covered in the document.



Caution Means *reader be careful* . In this situation, the user might do something that could result in equipment damage or loss of data.

Warning	IMPORTANT SAFETY INSTRUCTIONS This warning symbol means danger. You are in a situation that could cause bodily injury. Before y on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with s practices for preventing accidents. Use the statement number provided at the end of each warning t its translation in the translated safety warnings that accompanied this device. Statement 1071 SAVE THESE INSTRUCTIONS
Waarschuwing	BELANGRIJKE VEILIGHEIDSINSTRUCTIES Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan vero Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schal betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voo Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waars die bij het apparaat wordt geleverd, wilt raadplegen. BEWAAR DEZE INSTRUCTIES
Varoitus	TÄRKEITÄ TURVALLISUUSOHJEITA Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin kä laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käänne turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla. SÄILYTÄ NÄMÄ OHJEET

Attention	IMPORTANTES INFORMATIONS DE SÉCURITÉ Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant e blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient d liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour accidents. Pour prendre connaissance des traductions des avertissements figurant dans les cons sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé a chaque avertissement. CONSERVEZ CES INFORMATIONS
Warnung	WICHTIGE SICHERHEITSHINWEISE Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen f Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und der Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung a Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die mit diesem Gerät ausgeliefert wurden. BEWAHREN SIE DIESE HINWEISE GUT AUF.
Avvertenza	IMPORTANTI ISTRUZIONI SULLA SICUREZZA Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero d presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate documento. CONSERVARE QUESTE ISTRUZIONI
Advarsel	VIKTIGE SIKKERHETSINSTRUKSJONER Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før d å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretse til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å f oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten. TA VARE PÅ DISSE INSTRUKSJONENE
Aviso	INSTRUÇÕES IMPORTANTES DE SEGURANÇA Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de ac Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos a segurança traduzidos que acompanham este dispositivo. GUARDE ESTAS INSTRUÇÕES
¡Advertencia!	INSTRUCCIONES IMPORTANTES DE SEGURIDAD Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipula equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos es prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a e texto traducido en el apartado de traducciones que acompaña a este dispositivo. GUARDE ESTAS INSTRUCCIONES

Varning!	VIKTIGA SÄKERHETSANVISNINGAR Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. I utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till v förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för a dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning. SPARA DESSA ANVISNINGAR
Figyelem	**FONTOS BIZTONSÁGI ELOÍRÁSOK** **Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.** **ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**
Предупреждение	**ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ** **Этот символ предупреждения обозначает опасность. То есть имеет место ситуаци которой следует опасаться телесных повреждений. Перед эксплуатацией оборудо выясните, каким опасностям может подвергаться пользователь при использовани электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявл приведенным в конце каждого предупреждения, чтобы найти его переведенный ва в переводе предупреждений по безопасности, прилагаемом к данному устройству.** **СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**
警告	重要的安全性说明 此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来设备的安全性警告说明的翻译文本。 请保存这些安全性说明
警告	安全上の重要な注意事項 「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。 これらの注意事項を保管しておいてください。

주의	중요 안전 지침 이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지 를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 번역된 안전 경고문에서 해당 번역문을 찾으십시오. 이 지시 사항을 보관하십시오.
Warning Aviso	**Warning** INSTRUÇÕES IMPORTANTES DE SEGURANÇA **Warning** Este símbolo de aviso significa perigo. Você se encontra em uma situação em que lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção d Use o número da declaração fornecido ao final de cada aviso para localizar sua tra avisos de segurança traduzidos que acompanham o dispositivo. **Warning** GUARDE ESTAS INSTRUÇÕES
Warning Advarsel	**Warning** VIGTIGE SIKKERHEDSANVISNINGER **Warning** Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærkson involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standard til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde ov i de oversatte advarsler, der fulgte med denne enhed. **Warning** GEM DISSE ANVISNINGER
تحذير	إرشادات الأمان الهامة يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات
Upozorenje	**VAŽNE SIGURNOSNE NAPOMENE** **Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prou tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju nalazi uz pojedino upozorenje pronaći i njegov prijevod.** **SAČUVAJTE OVE UPUTE**

Upozornění	**DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY** **Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazů. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.** **USCHOVEJTE TYTO POKYNY**
Προειδοποίηση	ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τον κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθειες πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή. ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ
אזהרה	**בטיחות חשובות** הרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום הבטיחות המתורגמות שמצורפות להתקן. **וראות אלה**
Opomena	ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот. ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА
Ostrzeżenie	**WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA** **Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.** **NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ**

Upozornenie	DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu. USCHOVAJTE SI TENTO NÁVOD

Obtaining Optical Networking Information

This section contains information that is specific to optical networking products. For information that pertains to all of Cisco, refer to the Obtaining Documentation, Obtaining Support, and Security Guidelines, on page xxix section.

Where to Find Safety and Warning Information

For safety and warning information, refer to the following document that accompanied the product:

Regulatory Compliance and Safety Information for Cisco ONS Products

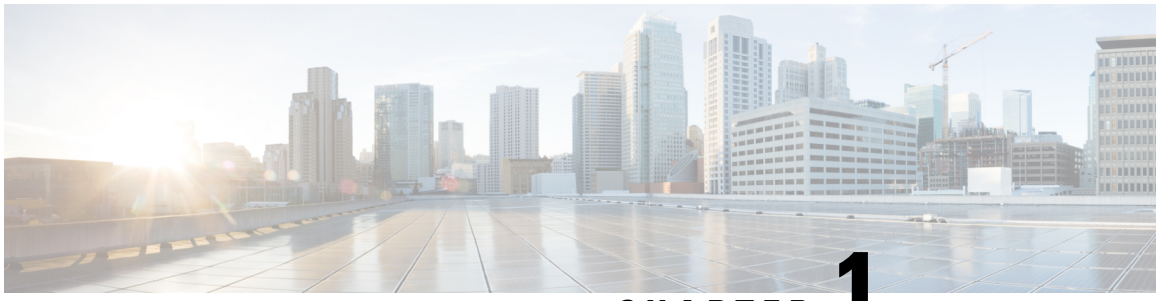
This publication describes the international agency compliance and safety information for the Cisco ONS 15454, ONS 15454 M2, and ONS 15454 M6 system. It also includes translations of the safety warnings that appear in the Cisco ONS 15454 system documentation.

Obtaining Documentation, Obtaining Support, and Security Guidelines

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

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

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.



CHAPTER 1

Overview

This chapter provides an overview of the Cisco ONS 15454 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6 shelf install.

Note Unless otherwise specified, “ONS 15454” refers to both ANSI and ETSI M12 shelf assemblies.

Note The Cisco ONS 15454 shelf assemblies are intended for use with telecommunications equipment only.

Compliance Standards

Install the ONS 15454, ONS 15454 M2 and ONS 15454 M6 shelves in compliance with your local and national electrical codes:

- United States: National Fire Protection Association (NFPA) 70; United States National Electrical Code.
- Canada: Canadian Electrical Code, Part I, CSA C22.1.
- Other countries: If local and national electrical codes, are not available, refer to IEC 364, Part 1 through Part 7.

Safety Labels

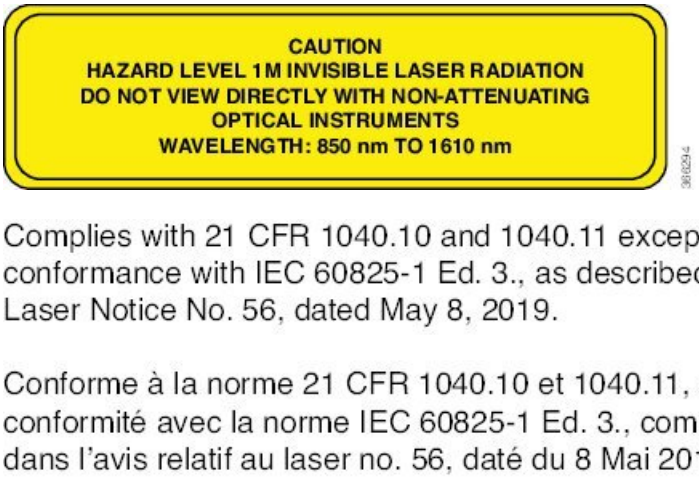
Cisco ONS 15454 Series chassis is classified as Hazard Level 1M as per IEC 60825-1, since it includes embedded Class 1 or Class 1M Laser sources.

The Class 1M Laser Product label is shown in the following figure.

Figure 1: Class 1M Laser Product Label

This section explains the significance of the safety labels attached to the ONS 15454, ONS 15454 M2, and ONS 15454 M6 chassis. The faceplates of the chassis are clearly labeled with warnings about the laser radiation levels. You must understand all warning labels before working on the chassis.

Figure 2: Class 1M Laser Product Label



Statement 291

Safety Precaution for Module Installation and Removal

Ensure to observe the following safety precautions when you are working with the chassis modules.

Invisible laser radiations present. Statement 1016

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments. Statement 1051

Figure 3: Class 1M Laser Product Label

Safety Precaution for Laser Radiation

Cisco ONS 15454 Series chassis is classified as Hazard Level 1M as per IEC 60825-1, since it includes embedded Class 1 or Class 1M Laser sources.

Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

Conforme à la norme 21 CFR 1040.10 et 1040.11, sauf conformité avec la norme IEC 60825-1 Ed. 3., comme décrit dans l'avis relatif au laser no. 56, daté du 8 Mai 2019.

Statement 291

Invisible laser radiations present. Statement 1016

Figure 4: Class 1M Laser Product Label

Cisco ONS 15454 ANSI

When installed in an equipment rack, the ONS 15454 ANSI assembly is typically connected to a fuse and alarm panel to provide centralized alarm connection points and distributed power for the ONS 15454 ANSI. Fuse and alarm panels are third-party equipment and are not described in this documentation. If you are unsure about the requirements or specifications for a fuse and alarm panel, consult the user documentation for the related equipment. The front door of the ONS 15454 ANSI allows access to the shelf, fan-tray assembly, and fiber-storage area. The backplanes provide access to alarm contacts, external interface contacts, power terminals, and BNC/SMB connectors.

You can mount the ONS 15454 ANSI in a 19- or 23-inch rack (482.6 or 584.2 mm). The shelf weighs approximately 55 pounds (24.94 kg) with no cards installed.

The ONS 15454 ETSI is powered using -48 VDC power. Negative and return power terminals are connected via the MIC-A/P and the MIC-C/T/P FMECs. The ground terminal is connected via the 2-hole grounding lug.

Note The ONS 15454 ANSI is designed to comply with Telcordia GR-1089-CORE Type 2 and Type 4. Install and operate the ONS 15454 ANSI only in environments that do not expose wiring or cabling to the outside plant. Acceptable applications include Central Office Environments (COEs), Electronic Equipment Enclosures (EEEs), Controlled Environment Vaults (CEVs), huts, and Customer Premise Environments (CPEs).

For information on hardware and software specifications for the ONS 15454 ANSI shelf, refer to the ONS 15454 Shelf Specifications, on page 479.

Cisco ONS 15454 ETSI

When installed in an equipment rack, the ONS 15454 ETSI assembly is typically connected to a fuse and alarm panel to provide centralized alarm connection points and distributed power for the ONS 15454 ETSI. Fuse and alarm panels are third-party equipment and are not described in this documentation. If you are unsure about the requirements or specifications for a fuse and alarm panel, consult the user documentation for the related equipment. The front door of the ONS 15454 ETSI allows access to the shelf, fan-tray assembly, and fiber-storage area. The FMEC cover at the top of the shelf allows access to power connectors, external alarms and controls, timing input and output, and craft interface terminals.

You can mount the ONS 15454 ETSI in an ETSI rack. The shelf weighs approximately 26 kg (57 pounds) with no cards installed. The shelf includes a front door and a Front Mount Electrical Connection (FMEC) cover for added security, a fan tray module for cooling, and extensive fiber-storage space.

The ONS 15454 ETSI is powered using –48 VDC power. Negative, return, and ground power terminals are connected via the MIC-A/P and the MIC-C/T/P FMECs.

For information on hardware and software specifications for the ONS 15454 ETSI shelf, refer to the ONS 15454 Shelf Specifications, on page 479.

Cisco ONS 15454 M2 Shelf

The ONS 15454 M2 is designed to comply with Telcordia GR-1089-CORE, Issue 5. The ONS 15454 M2 provides only Type 2 and Type 4 interfaces. A single ONS 15454 M2 shelf supports both ANSI and ETSI standards.

The ONS 15454 M2 shelf has 3 horizontal card slots —Slot 1, Slot 2, and Slot 3. While Slot 2 and Slot 3 house MSTP cards that provide 10 to 100 Gbps interconnections, Slot 1 accommodates the TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE card (timing and control card). The ONS 15454 M2 system can be powered by AC or DC power module. The ONS 15454 M2 system contains backup flash memory that supports the database (DB) and image backup in the single mode operation. The ONS 15454 M2 shelf can be mounted on an ANSI or an ETSI rack using the mounting brackets or air deflectors. The air deflectors orient the air flow in a specific direction. The ONS 15454 M2 shelf can also be wall-mounted or desktop-mounted.

When installed in an equipment rack, the Cisco ONS 15454 M2 shelf is typically connected to a fuse panel to provide distributed power for the ONS 15454 M2. The fuse panel is a third-party equipment and is not described in this documentation. If you are unsure about the requirements or specifications for a fuse, consult the user documentation for the related equipment.

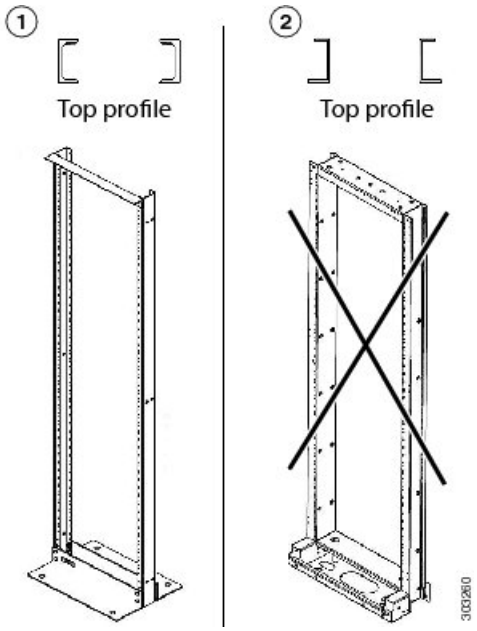
Install and operate the ONS 15454 M2 only in environments that do not expose wiring or cabling to the outside plant.

Two types of front doors can be attached to the Cisco ONS 15454 M2 shelf— the standard door and the deep door. The front door provides access to the shelf, and acts as a protective panel. The deep door provides additional space in front of the shelf to accommodate cables that do not fit inside the standard door. The deep door does not have a hinge and cannot be rotated like the standard door.

You can mount the ONS 15454 M2 on a 19-inch or 23-inch ANSI rack (482.6 or 584.2 mm), or on a 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) ETSI standard equipment rack. The ONS 15454 M2 shelf can also be wall mounted or desktop mounted. The shelf weighs approximately 11.02 pounds (5 kg) with no cards installed.

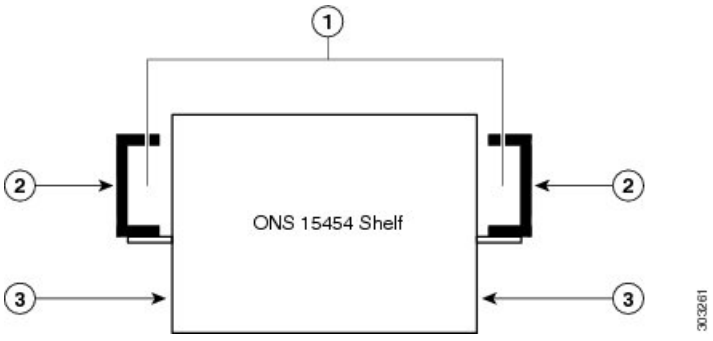
It is mandatory that the correct type of 19-inch ANSI rack is chosen to mount the ONS 15454 M2 shelf. The recommended shape of the rack post is shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5. For proper airflow and cooling of the shelf, the shape of the vertical posts of the rack should be such that the airflow vents are not covered. There must be sufficient space between the shelf side walls, and the vertical walls of the rack post that are parallel to the shelf side walls, as shown in Figure 6: 19-inch Rack Opening for Air Flow, on page 5.

Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves



1	19-inch ANSI rack recommended for the Cisco ONS 15454 M6 shelf	2	19-inch ANSI rack prohibited for the Cisco ONS 15454 M6 shelf

Figure 6: 19-inch Rack Opening for Air Flow



1	Empty space for air flow	2	Rack
3	Shelf side wall		

For information on hardware and software specifications for the ONS 15454 ETSI shelf, refer to the ONS 15454 M2 Shelf Specifications, on page 483.

Cisco ONS 15454 M6 Shelf

The ONS 15454 M6 is designed to comply with Telcordia GR-1089-CORE, Issue 5.

The ONS 15454 M6 provides only Type 2 and Type 4 interfaces. A single ONS 15454 M6 shelf supports both ANSI and ETSI standards.

The ONS 15454 M6 shelf has 8 horizontal card slots numbered 1 to 8. While Slot 2 to Slot 7 house MSTP cards that provide 10 to 100 Gbps interconnections, Slot 1 and Slot 8 accommodate the TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE cards (timing and control cards). The ONS 15454 M6 system can be powered by redundant AC or DC power modules. A single power module (AC or DC) can be used to power up the entire ONS 15454 M6 system. The ONS 15454 M6 system contains backup flash memory that supports the database (DB) and image backup in the single mode operation.

The front door of the ONS 15454 M6 shelf allows access to the shelf, fan-tray assembly, fiber-routing area, power connectors, external alarms and controls, timing input and output, and craft interface terminals. Two types of front doors can be attached to the ONS 15454 M6 shelf—the standard door and the deep door. The front door provides access to the shelf, and acts as a protective panel. The deep door provides additional space in front of the shelf to accommodate cables that do not fit inside the standard door. The deep door does not have a hinge and cannot be rotated like the standard door. The fiber or cable guide used in the ONS 15454 M6 shelf provides improved fiber management.

The ONS 15454 M6 is mounted on a 19-inch or 23-inch ANSI rack, or on a 600 x 600-mm or 600 x 300-mm ETSI standard equipment rack. The rack mounting is done using the mounting brackets or air deflectors. The air deflectors orient the air flow in a specific direction.

Depending on the position of the mounting bracket, the chassis may project to different distances outside the rack. If the chassis projects outside the rack, the cabinet doors must be kept open (if present). The table below displays the details below:

Door Type	Chassis Depth (mm)	Bracket Mount Position	Chassis Projection Outside Rack (mm)
Standard door	287 mm	Front mount	50 mm
Standard door	287 mm	Mid mount	135 mm
Deep door	337 mm	Front mount	100 mm
Deep door	337 mm	Mid mount	185 mm

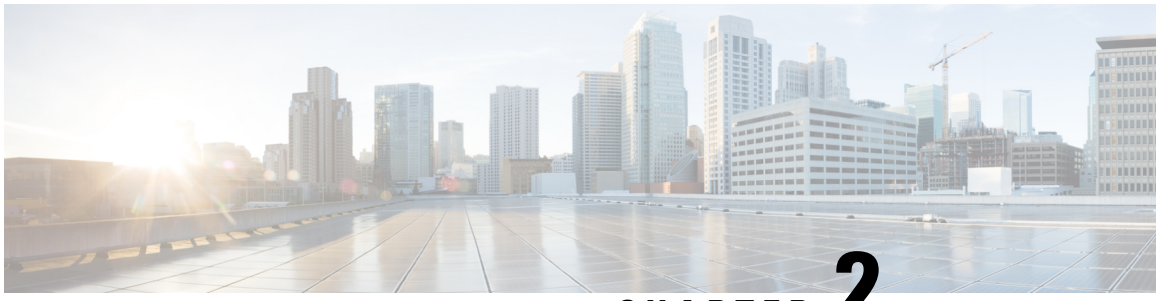
It is mandatory that the correct type of 19-inch ANSI rack is chosen to mount the ONS 15454 M6 shelf. The recommended shape of the rack post is shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5. For proper airflow and cooling of the shelf, the shape of the vertical posts of the rack should be such that the airflow vents are not covered. There must be sufficient space between the shelf side walls, and the vertical walls of the rack post that are parallel to the shelf side walls, as shown in Figure 6: 19-inch Rack Opening for Air Flow, on page 5.

When installed in an equipment rack, the Cisco ONS 15454 M6 shelf is typically connected to a fuse and alarm panel to provide centralized alarm connection points and distributed power for the ONS 15454 M6. Fuse and alarm panels are third-party equipment and are not described in this documentation. If you are unsure about the requirements or specifications for a fuse and alarm panel, consult the user documentation for the related equipment.

The shelf with preinstalled air filter weighs approximately 23.55 pounds (10.680 kg) with no cards installed.

Note Install and operate the ONS 15454 M6 only in environments that do not expose wiring or cabling to the outside plant.

For information on hardware and software specifications for the ONS 15454 ETSI shelf, refer to the ONS 15454 M6 Shelf Specifications, on page 486.



CHAPTER 2

Preparing to Install the ONS 15454 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6 Shelf

This chapter explains how to prepare for the ONS 15454 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6 shelf install.

Note Unless otherwise specified, “ONS 15454” refers to both ANSI and ETSI M12 shelf assemblies.

Note Due to memory limitations, TCC2/TCC2P cards are not supported as the node controller in multi-shelf configuration from R10.5.2.6. Hence, it is recommended to use TCC3 card as the node controller in multi-shelf configuration. The TCC2P card can be used as a control card in a subtended shelf where the node controller is TCC3 card on ONS 15454 chassis or TNC/TNCE/TNCS/TNCS-O/TNCS-2/TNCS-2O cards on ONS 15454 M6 or NCS 20015 chassis. The TCC2P card can also be used as a node controller in a stand-alone configuration.

Important Safety Recommendations

Warning **This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the Regulatory Compliance and Safety Information document for the appropriate Cisco chassis.** Statement 274

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

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

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

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

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

Note The ONS 15454, ONS 15454 M2 and ONS 15454 M6 are suitable for mounting on concrete or other noncombustible surfaces only.

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

Note Unless otherwise specified, ONS 15454, ONS 15454 M2 and ONS 15454 M6 refers to both ANSI and ETSI environments.

Note The ONS 15454 M6 is suitable for installation in network telecommunication facilities where the National Electric Code (NEC) applies.

Required Tools and Equipment

The following sections describe the tools and equipment you need to install and test the ONS 15454 (ANSI and ETSI), ONS 15454 M2 or the ONS 15454 M6 shelves.

Cisco Supplied Materials

The following table lists the materials that are required to install, and are shipped with the ONS 15454 (ANSI and ETSI), ONS 15454 M2 and the ONS 15454 M6 shelves (wrapped in plastic). The shipped quantity of each item is in parentheses.

Note To avoid damage during shipment, either a standard front door or a temporary front door is preinstalled in the Cisco ONS 15454 M6 shelf. If a front door is ordered, a standard front door is preinstalled. If a front door is not ordered, a temporary front door is preinstalled.

Table 1: Cisco Supplied Materials Required to Install

Cisco Supplied Material	ONS 15454	ONS 15454 M2	ONS 15454 M6
Backplane Cover	**ANSI** Sheet metal backplane cover (installed) (1)	—	—
Brackets	**ANSI** External (bottom) brackets for the fan-tray air filter **ETSI** Bottom brackets for the fan-tray air filter	**ANSI** RJ LAN bracket (1)	**ANSI** RJ LAN bracket (1)
Bracket Cover	—	**ANSI** RJ LAN cable bracket cover (1)	**ANSI** RJ LAN cable bracket cover (1)
Bumpers		Rubber bumpers (4)	
Cables	**ETSI** • Cable assembly, Ethernet, RJ-45 (1) • Power cable (from fuse and alarm panel to MIC-A/P and MIC-C/T/P) (2)	Cable assembly, Ethernet, RJ-45 (1)	Cable assembly, Ethernet, RJ-45 (1)
Emery Cloth	—	Emery cloth (1)	Emery cloth (1)

Cisco Supplied Material	ONS 15454	ONS 15454 M2	ONS 15454 M6
ESD wrist strap	**ANSI** ESD wrist strap with 1.8 m (6 ft) coil cable (1) **ETSI** ESD wrist strap (disposable) (1)	ESD wrist strap (disposable) (1)	ESD wrist strap (disposable) (1)
Grounding Lug	**ETSI** Double-hole grounding lug for ground connection with a wire receptacle to accommodate the recommended 13.3 mm² (#6 AWG) multistrand copper wire (1)	• Double-hole grounding lug for ground connection with a wire receptacle to accommodate the recommended 13.3 mm² (#6 AWG) multistrand copper wire (1). • Double-hole grounding lug for ground connection with a wire receptacle to accommodate the recommended 13.3 mm² (#6 AWG) multistrand copper wire angled at 45 degree (1)	• Double-hole grounding lug for ground connection with a wire receptacle to accommodate the recommended 13.3 mm² (#6 AWG) multistrand copper wire (1) • Double-hole grounding lug for ground connection with a wire receptacle to accommodate the recommended 13.3 mm² (#6 AWG) multistrand copper wire angled at 45 degree (1)
Hex Key	**ANSI** Pinned hex (Allen) key for front door (1) **ETSI** • Pinned hex (Allen) key for front door (1) • Hex key 3-mm long arm (1)	—	—
Hex Tool	**ANSI** T-handle #12-24 hex tool for set screws (1)	—	—
Lacing Twine	—	Lacing twine (1)	Lacing twine (1)
Lock Washers	—	M6 lock washers (8)	**ANSI** M6 lock washers (8)
Mounting Brackets	**ANSI** Spacer Mounting Brackets (2)	—	—

Cisco Supplied Material	ONS 15454	ONS 15454 M2	ONS 15454 M6
Power Lug	—	**ANSI** Double-hole power lug for DC power connection with a wire receptacle to accommodate the recommended 8.4 mm² (#8 AWG) multistrand copper wire (1)	—
Screws	**ANSI** • #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX) (8) • #12 -24 x 3/4 socket set screws (48-1003-XX) (2) **ETSI** • M4 x 8 mm pan-head Phillips screws (2) • M6 x 20 mm pan-head Phillips screws (8)	**ANSI** #12-24 x 0.50 pan-head Phillips screws (8) **ETSI** M6.0 x 20 pan-head Phillips screws (8)	**ANSI** #12-24 x 0.50 pan-head Phillips screws (8) **ETSI** M6.0 x 20 pan-head Phillips screws (8)
Spacers	**ANSI** Spacers (50-1193-XX)(4)	—	—
Standoff Kit	**ANSI** Standoff kit (53-0795-XX): Plastic fiber management guides (2)Fan filter bracket screws (53-48-0003) (6)	—	—
Tie Wraps	**ANSI** Tie Wraps (10) **ETSI** Tie wraps 0.125-inch (3.2 mm) W x 6.0-inch (152 mm) L (24)	Tie wraps (10)	Tie wraps (10)

⚠

Caution Only use the power cables that are designed to be used with the ONS 15454 (ANSI or ETSI), the ONS 15454 M2 or ONS 15454 M6. These are sold separately.

User Supplied Materials

The following materials, tools, and equipment are required but are not supplied with the ONS 15454 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6.

Table 2: User Supplied Materials

User Supplied Material	ONS 15454	ONS 15454 M2	ONS 15454 M6
Bit error rate (BER) tester	**ANSI** Bit error rate (BER) tester, DS-1 and DS-3		
BNC insertion tool	**ANSI** BNC insertion tool		
Cables	**ANSI** • Power cable (from fuse and alarm panel to assembly), #10 AWG, copper conductors, 194 degrees Fahrenheit (90 degrees Celsius). • Ground cable #6 AWG stranded • Alarm cable pairs for all alarm connections, #22 or #24 AWG (0.51 mm² or 0.64 mm²), solid tinned. • 100-ohm shielded building integrated timing supply (BITS) clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type • Shielded coaxial cable terminated with SMB or BNC connectors for DS-3 cards. • Shielded ABAM cable terminated with AMP Champ connectors or unterminated for DS1N-14 cards with #22 or #24 AWG (0.51 mm² or 0.64 mm²) ground wire (typically about two ft [61 cm] in length) • 6-pair #29 AWG double-shielded cable	**ANSI** • Power cable (from fuse and alarm panel to assembly), #12 AWG or larger, copper conductors, 194 degrees Fahrenheit (90 degrees Celsius). • Ground cable #6 AWG stranded • Alarm cable pairs for all alarm connections, #22 or #24 AWG (0.51 mm² or 0.64 mm²), solid tinned. • 100-ohm shielded building integrated timing supply (BITS) clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type **ETSI** • Copper ground cable 13.3-mm² (#6 AWG) stranded, specified for up to 90 degrees Celsius (194 degrees Fahrenheit) • Alarm cable pairs for all alarm connections, 0.51 mm² or 0.64 mm² (#22 or #24 AWG), solid-tinned	**ANSI** • Power cable (from fuse and alarm panel to assembly), #8 AWG or larger, copper conductors, 194 degrees Fahrenheit (90 degrees Celsius). • Ground cable #6 AWG stranded • Alarm cable pairs for all alarm connections, #22 or #24 AWG (0.51 mm² or 0.64 mm²), solid tinned. • 100-ohm shielded building integrated timing supply (BITS) clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type **ETSI** • Copper ground cable 13.3-mm² (#6 AWG) stranded, specified for up to 90 degrees Celsius (194 degrees Fahrenheit) • Alarm cable pairs for all alarm connections, 0.51 mm² or 0.64 mm² (#22 or #24 AWG), solid-tinned

User Supplied Material	ONS 15454	ONS 15454 M2	ONS 15454 M6
	ETSI • Copper ground cable 13.3-mm² (#6 AWG) stranded, specified for up to 90 degrees Celsius (194 degrees Fahrenheit) • Alarm cable pairs for all alarm connections, 0.51 mm² or 0.64 mm² (#22 or #24 AWG), solid-tinned • Coaxial cable terminated with 1.0/2.3 miniature coax connectors for FMEC cards • DB-37 cable • Shielded BITS clock coaxial cable terminated with 1.0/2.3 miniature coax connectors		
Cleaning Cassette	CLETOP cleaning cassette	CLETOP cleaning cassette	CLETOP cleaning cassette
Connectors	**ANSI** Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for #10 AWG copper conductors	**ANSI** Listed pressure terminal connectors dual-hole lug for #8 AWG copper conductors	**ANSI** Listed pressure terminal connectors dual-hole lug for #8 AWG copper conductors
Crimp tool	Crimping tool—This tool must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug	Crimping tool—This tool must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug	Crimping tool—This tool must be large enough to accommodate the girth of the grounding lug when you crimp the grounding cable into the lug
Fuse and Alarm panel	**ANSI** Fuse panel **ETSI** Fuse and alarm panel	Fuse panel	**ANSI** Fuse panel **ETSI** Fuse and alarm panel
Jumper	Single-mode SC fiber jumpers with UPC polish (55 dB or better) for optical (OC-N) cards	Single-mode SC fiber jumpers with UPC polish (55 dB or better) for optical (OC-N) cards	Single-mode SC fiber jumpers with UPC polish (55 dB or better) for optical (OC-N) cards
Labels	Labels	Labels	Labels

User Supplied Material	ONS 15454	ONS 15454 M2	ONS 15454 M6
Power Meter	Optical power meter (for use with fiber optics only)	Optical power meter (for use with fiber optics only)	Optical power meter (for use with fiber optics only)
Rack	**ANSI** • 19-inch ANSI Standard (Telcordia GR-63-CORE) (482.6 mm) rack; total width 22 inches (558.8 mm) • 23-inch ANSI Standard (Telcordia GR-63-CORE) (584.2 mm) rack; total width 26 inches (660.4 mm) **ETSI** Equipment rack (ETSI rack, 2200 mm [86.6 inch] H x 600 mm [23.6 inch] Wx 300 mm [11.8 inch] D)	**ANSI** • 19-inch ANSI Standard (Telcordia GR-63-CORE) (482.6 mm) rack; total width 22 inches (558.8 mm) • 23-inch ANSI Standard (Telcordia GR-63-CORE) (584.2 mm) rack; total width 26 inches (660.4 mm) **ETSI** Equipment rack (ETSI rack, 2200 mm [86.6 inch] H x 600 mm [23.6 inch] Wx 300 mm [11.8 inch] D)	**ANSI** • 19-inch ANSI Standard (Telcordia GR-63-CORE) (482.6 mm) rack; total width 22 inches (558.8 mm) • 23-inch ANSI Standard (Telcordia GR-63-CORE) (584.2 mm) rack; total width 26 inches (660.4 mm) **ETSI** Equipment rack (ETSI rack, 2200 mm [86.6 inch] H x 600 mm [23.6 inch] Wx 300 mm [11.8 inch] D)
Screw Driver	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screw driver	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screw driver
Tie wraps and/or lacing cord	**ANSI** Tie wraps and/or lacing cord	**ANSI** Tie wraps or lacing cord (or both)	**ANSI** Tie wraps or lacing cord (or both)
Video fiber connector inspection instrument	**ETSI** Video fiber connector inspection instrument	**ETSI** Video fiber connector inspection instrument	**ETSI** Video fiber connector inspection instrument
Voltmeter	Voltmeter	Voltmeter	Voltmeter
Wire Cutters	Wire cutters	Wire cutters	Wire cutters
Wire Strippers	Wire strippers	Wire strippers	Wire strippers

User Supplied Material	ONS 15454	ONS 15454 M2	ONS 15454 M6
Wire Wrapper	Wire wrapper	Wire wrapper	Wire wrapper

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

Ordering Solutions for ONS 15454 M2 and ONS 15454 M6

Two ordering solutions for the ONS 15454 M2 shelf are offered. Select one of the solution:

- Shelf that is preinstalled with all the ancillary units such as fan tray assembly and power module.
- Shelf that is not preinstalled with the ancillary units but can be ordered separately.

Note In both the ordering solutions, the front door is preinstalled with the ONS 15454 M2 shelf.

Two ordering solutions for the Cisco ONS 15454 M6 shelf are offered. Select one of these solutions:

- Shelf assembly that is preinstalled with all the ancillary units such as fan tray assembly, LCD unit, power module and ECU or ECU2.
- Shelf assembly that is not preinstalled with the ancillary units but can be ordered separately.

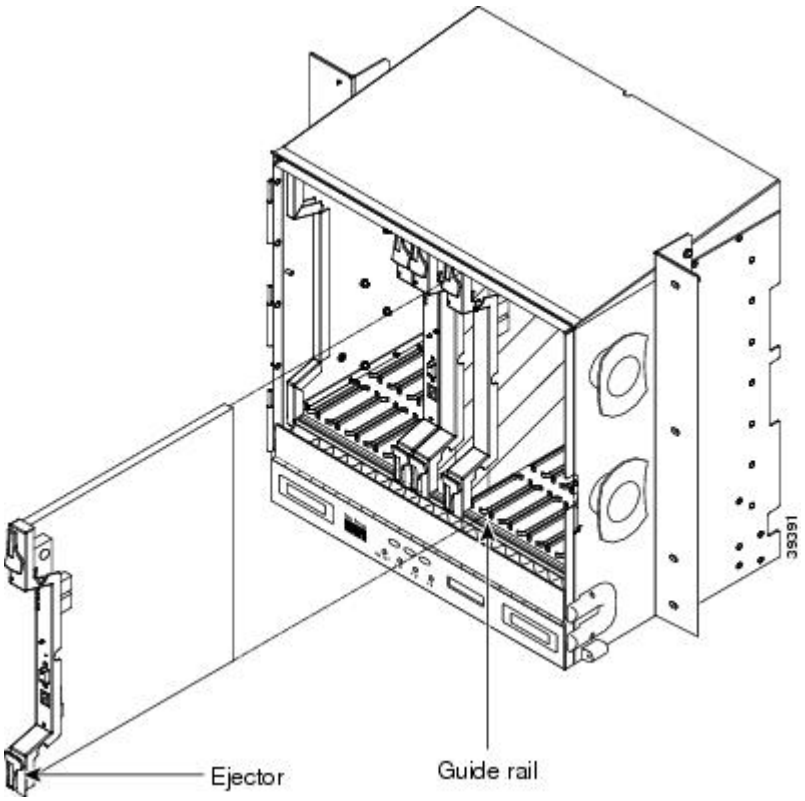
Card Slot Requirements

The cards have electrical plugs at the back that plug into electrical connectors on the shelf backplane. When the ejectors are fully closed, the card plugs into the assembly backplane.

ONS 15454

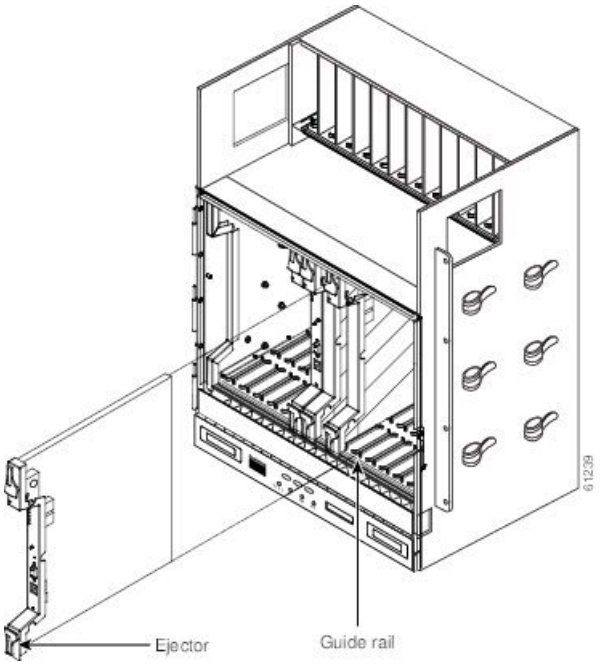
The following figure shows card installation for an ONS 15454 ANSI shelf.

Figure 7: Installing Cards in the ONS 15454 ANSI



The following figure shows card installation in the ONS 15454 ETSI shelf.

Figure 8: Installing Cards in the ONS 15454 ETSI Shelf



The ONS 15454 shelf assemblies have 17 card slots numbered sequentially from left to right. Slots 7 and 11 are dedicated to TCC2/TCC2P/TCC3 cards. Slot 9 is reserved for the optional AIC-I card.

Caution Do not operate the ONS 15454 with a single TCC2/TCC2P/TCC3 card. Always operate the shelf assembly with one working and one protect card of the same type.

Shelf assembly slots have symbols indicating the type of cards that you can install in them. Each ONS 15454 card has a corresponding symbol. The symbol on the card must match the symbol on the slot.

The following table shows the slot and card symbol definitions.

Table 3: Slot and Card Symbols

Symbol Color/Shape	Definition
Orange/Circle	Slots 1 to 6 and 12 to 17. Only install cards with a circle symbol on the faceplate.
Blue/Triangle	Slots 5, 6, 12, and 13. Only install cards with circle or a triangle symbol on the faceplate.
Purple/Square	TCC2/TCC2P/TCC3 slot, Slots 7 and 11. Only install cards with a square symbol on the faceplate.
Green/Cross	Cross-connect (XC/XCVT/XC10G) slot, Slots 8 and 10. Only install ONS 15454 cards with a cross symbol on the faceplate. **Note** Cross-connect cards are not required in DWDM applications. Install a FILLER card or blank card if not using Slots 8 and 10.
Red/P	Protection slot in 1:N protection schemes.
Red/Diamond	AIC/AIC-I slot, Slot 9. Only install cards with a diamond symbol on the faceplate.
Gold/Star	Slots 1 to 4 and 14 to 17. Only install cards with a star symbol on the faceplate.
Blue/Hexagon	(Only used with the 15454-SA-HD shelf assembly.) Slots 3 and 15. Only install ONS 15454 ANSI cards with a blue hexagon symbol on the faceplate.

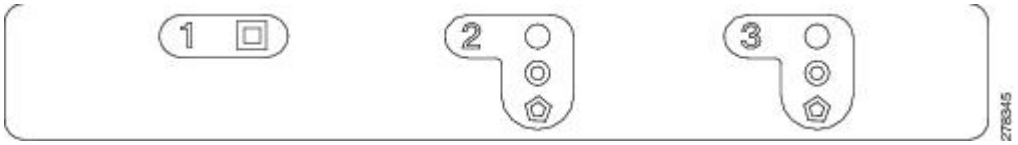
ONS 15454 M2

The ONS 15454 M2 shelf assemblies have 3 card slots numbered sequentially from bottom to top. Slot 1 is reserved for control cards (TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE). Slot 2 and Slot 3 are dedicated for common line cards.

Caution The ONS 15454 M2 shelf must be equipped with a TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE card.

Shelf slots have symbols indicating the type of cards that you can install in them. Each ONS 15454 M2 card has a corresponding symbol. The symbol on the card must match the symbol on the slot.

Figure 9: Slot Symbols



The following table shows the slot and card symbol definitions.

Table 4: Slot and Card Symbols

Symbol Color/Shape	Definition
Purple/Square	Slot 1. TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card slot. Only install the card with a square symbol on the faceplate.
Orange/Circle	Slots 2 and 3. Only install cards with a circle symbol on the faceplate.
Orange/Hollow Circle	Slots 2 to 3. New line cards with high speed back plane connectors.
Pink/Pentagon	Slots 2 and 3. New Uplink card.

ONS 15454 M6

The ONS 15454 M6 shelf assemblies have eight card slots numbered sequentially from bottom to top. Slots 1 and 8 are reserved for control cards (TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE). Slots 2, 3, 4, 5, 6, and 7 are dedicated for common line cards.

⚠

Caution The ONS 15454 M6 system can work with a single control card (TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE). The TNC, TNCE, TSC, TNCS-2, TNCS-2O, and TSCE cards cannot operate in a shelf at the same time.

The shelf assembly slots have symbols indicating the type of cards that you can install in them. Each card has a corresponding symbol. The symbol on the card must match the symbol on the slot.

Figure 10: Slot Symbols

The following table shows the slot and card symbol definitions.

Table 5: Slot and Card Symbols

Symbol Color/Shape	Definition
Purple/Square	Slots 1 and 8. TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card slot. Install cards only with a square symbol on the faceplate.
Orange/Circle	Slots 2 to 7. Install cards only with a circle symbol on the faceplate.
Orange/Hollow Circle	Slots 2 to 7. New line cards with high-speed backplane connectors.

Symbol Color/Shape	Definition
Pink/Pentagon	Slots 4 and 5. New Uplink card.

Note When the ONS 15454 M6 shelf is powered at –60 VDC (nominal), only TNC, OPT-AMP-C, OPT-AMP-17-C, OPT-EDFA-17, OPT-EDFA-24, and 15454-M6-ECU-60 can be installed. For more information about ONS 15454 M6 DC power options, see the DC Power Module, on page 366.

Card Replacement

To replace a card with another card of the same type, you do not need to make any changes to the database; remove the old card and replace it with a new card. To replace a card with a card of a different type, physically remove the card and replace it with the new card, then delete the original card from CTC. For specifics, refer to the "Maintain the Node" chapter in the Cisco ONS 15454 DWDM Configuration Guide.

Caution Removing any active card from the shelf can result in traffic interruption. Use caution when replacing cards and verify that only inactive or standby cards are being replaced. If the active card needs to be replaced, switch it to standby prior to removing the card from the node. For traffic switching procedures, refer to the Cisco ONS 15454 DWDM Configuration Guide.

Note An improper removal (IMPROPRMVL) alarm is raised whenever a card pull (reseat) is performed, unless the card is deleted in CTC first. The alarm clears after the card replacement is complete.

NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves

Purpose	This procedure explains how to unpack the ONS 15454, ONS 15454 M2, and ONS 15454 M6 shelves and verify their contents.
Tools/Equipment	Pinned hex (Allen) key for front door (ONS 15454 only)
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Complete the DLP-G676 Unpack and Verify the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves , on page 22.

Step 2 Complete the DLP-G677 Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 22.

Step 3 Continue with the NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.

Stop. You have completed this procedure.

DLP-G676 Unpack and Verify the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves

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

Procedure

Step 1 When you receive the ONS 15454, ONS 15454 M2, or ONS 15454 M6 system equipment at the installation site, open the top of the box. The Cisco Systems logo designates the top of the box.

Step 2 Remove the foam inserts from the box. The box contains the ONS 15454 shelf (wrapped in plastic) and a smaller box of items needed for installation.

Step 3 To remove the shelf, grasp both rings of the shelf removal strap and slowly lift the shelf out of the box.

Step 4 Open the smaller box of installation materials, and verify that you have all items listed in the Required Tools and Equipment, on page 11.

Note If the shelf and ancillary units are ordered separately, then the power modules, LCD module, ECU or ECU2 module, fan-tray assembly, and mounting brackets are shipped separately.

Step 5 Return to your originating procedure (NTP).

DLP-G677 Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves

Purpose	This task verifies that all parts of the shelf are in good condition.

Tools/Equipment	Pinned hex (Allen) key for front door
Prerequisite Procedures	DLP-G676 Unpack and Verify the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves , on page 22
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Open the shelf using the pinned hex key. For more information, see the DLP-G9 Open the Front Cabinet Compartment (Door) , on page 58.

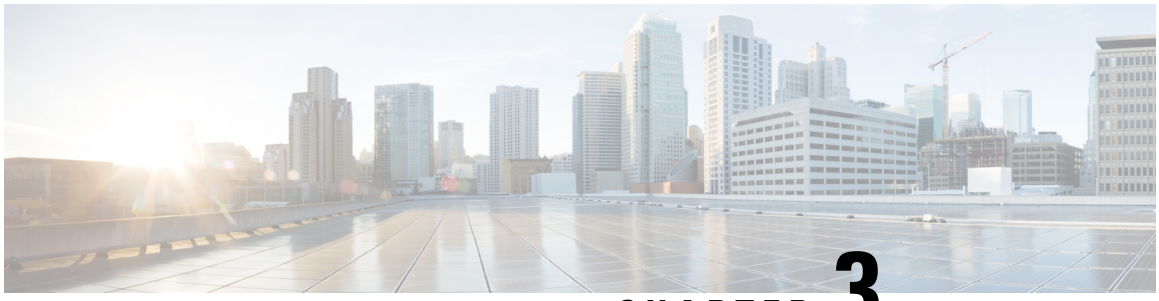
Step 2 Verify the following:

- The pins are not bent or broken.
- The frame is not bent.

Step 3 If the pins are bent or broken, or the frame is bent, call your Cisco sales engineer for a replacement.

Step 4 (ONS 15454 only) Close the front door before installing.

Step 5 Return to your originating procedure (NTP).



CHAPTER 3

Installing the ONS 15454 M12 (ANSI and ETSI) Shelf

This chapter explains how to install the ONS 15454 (ANSI and ETSI) shelf.

Note Unless otherwise specified, “ONS 15454” refers to both ANSI and ETSI M12 shelf assemblies.

Note Due to memory limitations, TCC2/TCC2P cards are not supported as the node controller in multi-shelf configuration from R10.5.2.6. Hence, it is recommended to use TCC3 card as the node controller in multi-shelf configuration. The TCC2P card can be used as a control card in a subtended shelf where the node controller is TCC3 card on ONS 15454 chassis or TNC/TNCE/TNCS/TNCS-O cards on ONS 15454 M6 or NCS 20015 chassis. The TCC2P card can also be used as a node controller in a stand-alone configuration.

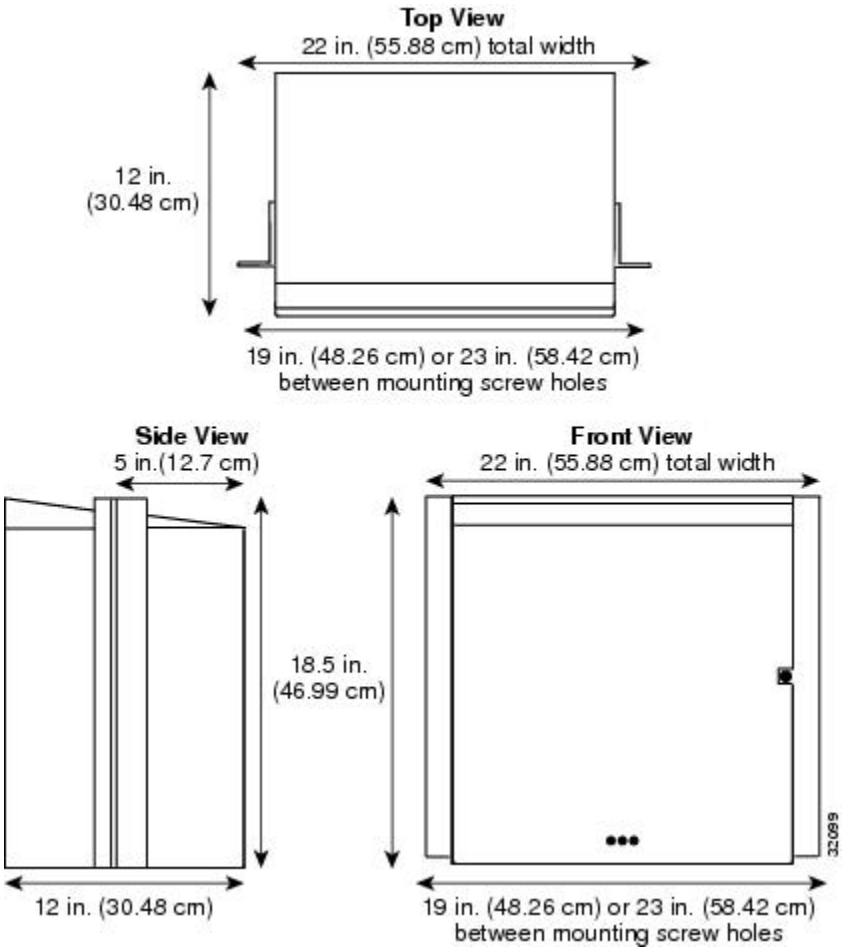
ONS 15454 ANSI Rack Installation

The ONS 15454 ANSI shelf is mounted in a 19- or 23-in. (482.6- or 584.2-mm) equipment rack. The shelf projects five inches (127 mm) from the front of the rack. It mounts in both Electronic Industries Alliance (EIA) standard and Telcordia-standard racks. The shelf is a total of 17 inches (431.8 mm) wide with no mounting ears attached. Ring runs are not provided by Cisco and might hinder side-by-side installation of shelves where space is limited.

The ONS 15454 ANSI assembly measures 18.5 inches (469.9 mm) high, 19 or 23 inches (482.6 or 584.2 mm) wide (depending on which way the mounting ears are attached), and 12 inches (304.8 mm) deep. You can install up to four ONS 15454 ANSIs in a seven-foot (2133.6 mm) equipment rack. The ONS 15454 ANSI must have one inch (25.4 mm) of airspace below the installed shelf to allow air flow to the fan intake. If a second ONS 15454 ANSI is installed underneath the shelf, the air ramp on top of the lower shelf provides the air spacing needed and should not be modified in any way. The following figure shows the dimensions of the ONS 15454 ANSI.

Note A 10-Gbps-compatible shelf (15454-SA-ANSI or 15454-SA-HD) and fan-tray assembly (15454-FTA3, 15454-FTA3-T, or 15454-CC-FTA) are required if ONS 15454 ANSI 10-Gbps Cross-Connect (XC10G) cards are installed in the shelf.

Figure 11: ONS 15454 ANSI Shelf Dimensions



Reversible Mounting Bracket

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

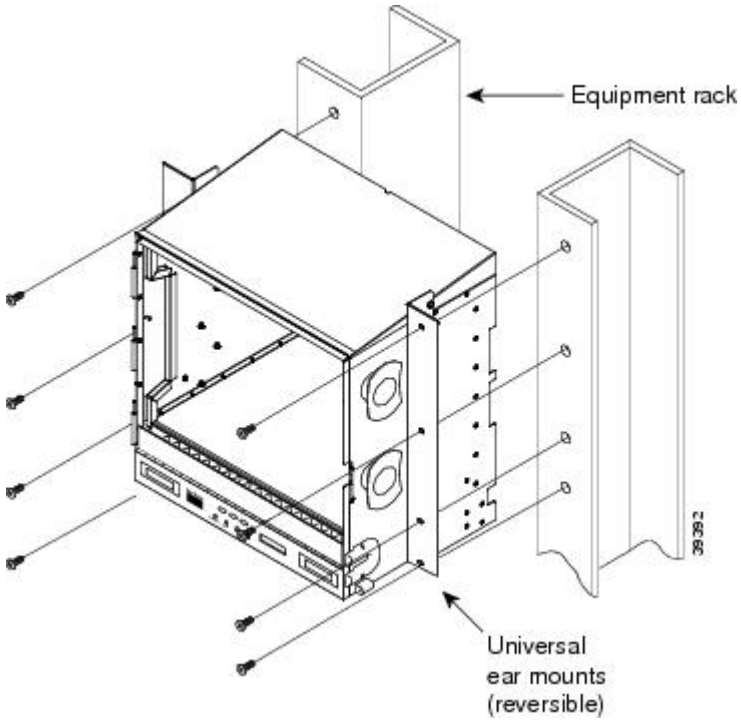
Caution When mounting the ONS 15454 ANSI shelf in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 ANSI shipping kit, or remove the coating from the threads to ensure electrical continuity.

The shelf comes preset for installation in a 23-inch (584.2 mm) rack, but you can reverse the mounting bracket to fit the smaller 19-inch (482.6 mm) rack.

Mounting a Single Node

Mounting the ONS 15454 ANSI shelf in a rack requires a minimum of 18.5 inches (469.9 mm) of vertical rack space and one additional inch (25.4 mm) for air flow. To ensure the mounting is secure, use two to four #12-24 mounting screws for each side of the shelf. The following figure shows the rack mounting position for the ONS 15454 ANSI shelf.

Figure 12: Mounting an ONS 15454 ANSI Shelf in a Rack



Two people should install the shelf; however, one person can install it using the temporary set screws included. The shelf should be empty for easier lifting. The front door can also be removed to lighten the shelf.

Mounting Multiple Nodes

Most standard (Telcordia GR-63-CORE, 19-inch [482.6-mm] or 23-inch [584.2-mm]) seven-foot (2.133-m) racks can hold four ONS 15454 ANSI shelves and a fuse and alarm panel. However, unequal flange racks are limited to three ONS 15454 ANSI shelves and a fuse and alarm panel, or four ONS 15454 ANSI shelves using a fuse and alarm panel from an adjacent rack.

If you are using the external (bottom) brackets to install the fan-tray air filter, you can install three shelf assemblies in a standard seven-foot (2.133-m) rack. If you are not using the external (bottom) brackets, you can install four shelf assemblies in a rack. The advantage of using the bottom brackets is that you can replace the filter without removing the fan-tray.

ONS 15454 ANSI Bay Assembly

The Cisco ONS 15454 ANSI bay assembly simplifies ordering and installing the ONS 15454 ANSI shelf because it allows you to order shelf assemblies preinstalled in a seven-foot (2,133 mm) rack. The bay assembly

is available in a three- or four-shelf configuration. The three-shelf configuration includes three ONS 15454 ANSI shelf assemblies, a prewired fuse and alarm panel, and two fiber-storage trays. The four-shelf configuration includes four ONS 15454 ANSI shelf assemblies and a prewired fuse and alarm panel. You can order optional fiber channels with either configuration. Installation procedures are included in the *Unpacking and Installing the Cisco ONS 15454 Four-Shelf and Zero-Shelf Bay Assembly* document that ships with the bay assembly.

ONS 15454 ETSI Rack Installation

The ONS 15454 ETSI shelf (15454-SA-ETSI) is mounted in a 600 x 600-mm (23-inch) or 600 x 300-mm (11.8-inch) equipment cabinet/rack. The shelf projects 240 mm (9.45 inches) from the front of the rack. It mounts in ETSI-standard racks. The shelf is a total of 435 mm (17.35 inches) wide with no mounting ears attached. Ring runs are not provided by Cisco and might hinder side-by-side installation of shelves where space is limited.

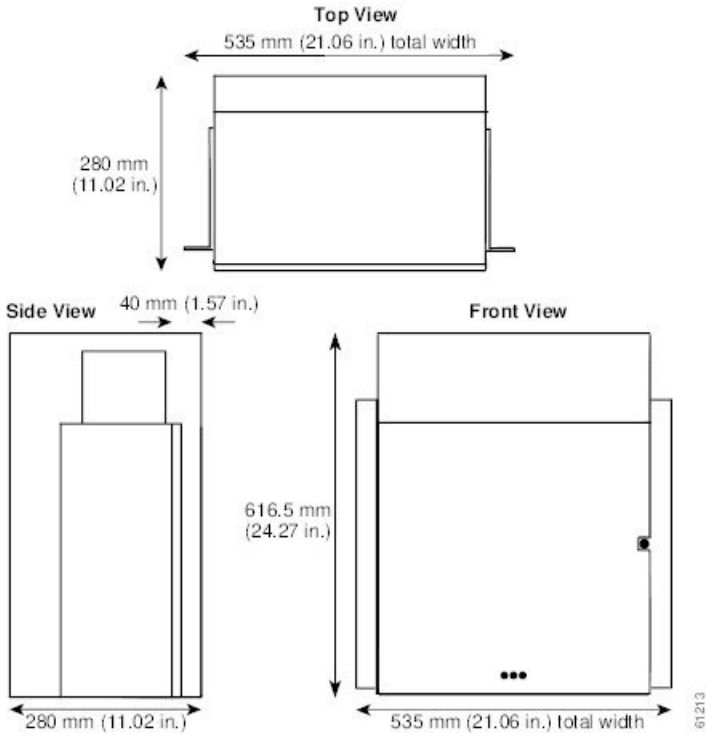
The ONS 15454 ETSI shelf measures 616.5 mm (24.27 inches) high, 535 mm (21.06 inches) wide, and 280 mm (11.02 inches) deep. You can install up to three ONS 15454 ETSI shelves in a seven-foot (2133.6 mm) equipment rack. The ONS 15454 ETSI must have one inch (25.4 mm) of airspace below the installed shelf to allow air flow to the fan intake. If a second ONS 15454 ETSI is installed below the first shelf, an ETSI air ramp unit must be assembled between the two shelves to ensure adequate air flow.

The following figure provides the dimensions of the ONS 15454 ETSI shelf.

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

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

Figure 13: ONS 15454 ETSI Shelf Dimensions

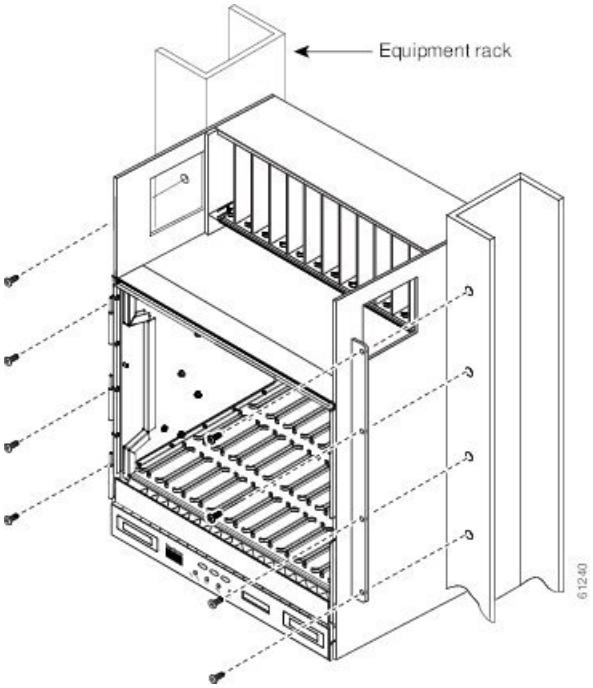


Mounting a Single Node

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

The following figure shows the rack mounting position for the ONS 15454 ETSI shelf.

Figure 14: Mounting an ONS 15454 ETSI Shelf in a Rack

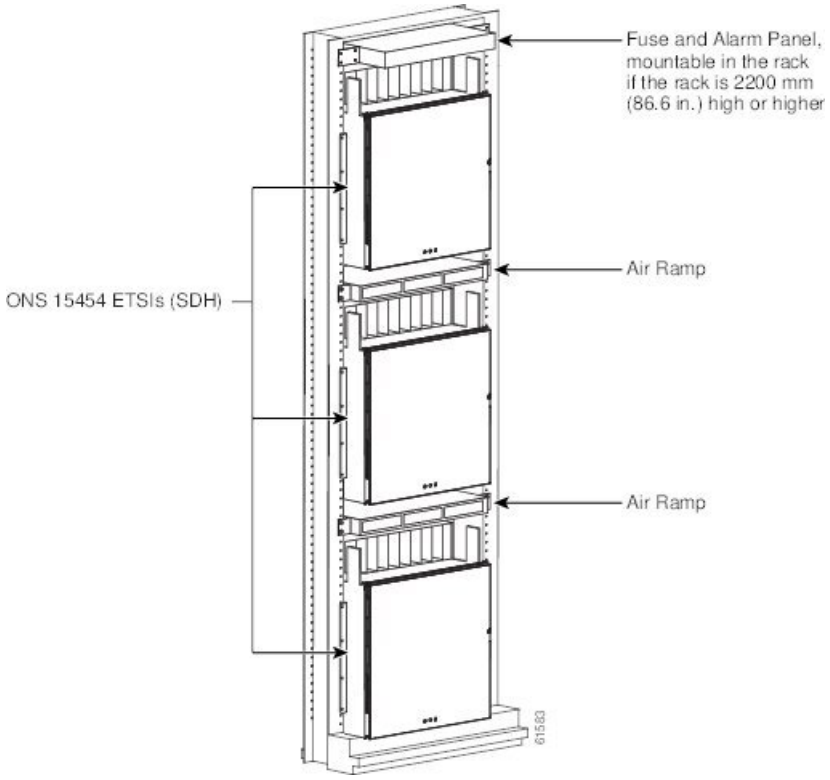


Two people should install the shelf; however, one person can install it using the temporary set screws included. The shelf should be empty for easier lifting. The front door can also be removed to lighten the shelf.

Mounting Multiple Nodes

Most standard (Telcordia GR-63-CORE, 23-inch [584.2 mm]) seven-foot (2,133 mm) racks can hold three ONS 15454 ETSI shelves, two air ramps, and a fuse and alarm panel. The following figure shows a three-shelf ONS 15454 ETSI bay assembly.

Figure 15: Three-Shelf ONS 15454 ETSI Bay Assembly



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

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

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A-20A, 100-240 VAC~.** Statement 1005

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

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

Warning **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

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

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

Warning **To prevent airflow restriction, allow clearance around the ventilation openings to be at least:1 inch (25.4 mm)** Statement 1076

Warning **The ONS 15454 must have 1 inch (25.4 mm) of airspace below the installed shelf assembly to allow air flow to the fan intake. The air ramp (the angled piece of sheet metal on top of the shelf assembly) provides this spacing and should not be modified in any way.** Statement 385

Warning **Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security.** Statement 1072

NTP-G306 Install the ONS 15454 Shelf

Purpose	This procedure reverses the mounting bracket and mounts shelf assemblies in a rack.

Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver Pinned hex key ETSI only: • Two M6 x 20 socket set screws • Eight M6 x 20 pan-head Phillips mounting screws ANSI only: • Two #12-24 x 3/4 set screws (48-1003-XX) • Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX)
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Procedure

Step 1 (ANSI shelves only) Complete the DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only), on page 35 if you need to convert from a 23-inch (584.2 mm) to a 19-inch (482.6 mm) rack.

Step 2 (ANSI shelves only) To install the air filter on the bottom of the shelf rather than below the fan-tray assembly, complete the DLP-G4 Install the External Brackets and Air Filter (ANSI Only), on page 36.

Step 3 Complete the necessary rack mount task as applicable:

- DLP-G678 Mount the ONS 15454 Shelf in a Rack (One Person), on page 38
- DLP-G679 Mount the ONS 15454 Shelf in a Rack (Two People), on page 39
- DLP-G680 Mount Multiple ONS 15454 Shelf Assemblies in a Rack , on page 41
- DLP-G8 Install the Air Ramp, on page 44

Step 4 Continue with the NTP-G3 Open and Remove the Front Door , on page 57.

Stop. You have completed this procedure.

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

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

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

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

Procedure

Step 1 Remove the screws that attach the mounting bracket to the side of the shelf.

Step 2 Flip the detached mounting bracket upside down.

Text imprinted on the mounting bracket will now also be upside down.

Step 3 Place the widest side of the mounting bracket flush against the shelf (see Figure 16: Reversing the Mounting Brackets (23-inch [584.2-mm] Position to 19-inch [482.6-mm] Position, on page 36).

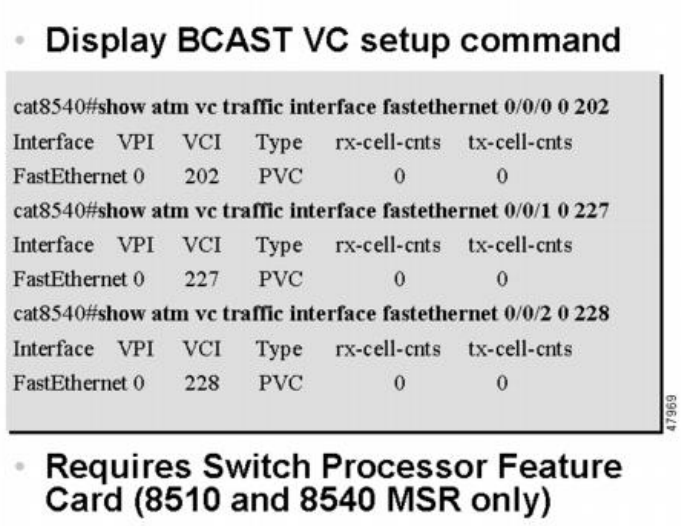
The narrow side of the mounting bracket should be towards the front of the shelf. Text imprinted on the mounting bracket should be visible and upside down.

Step 4 Align the mounting bracket screw holes against the shelf screw holes.

Step 5 Insert the screws that were removed in Step 1 and tighten them.

Step 6 Repeat the task for the mounting bracket on the opposite side.

Figure 16: Reversing the Mounting Brackets (23-inch [584.2-mm] Position to 19-inch [482.6-mm] Position



Step 7 Return to your originating procedure (NTP).

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

Purpose	This task installs the external brackets and air filter on the bottom of the shelf rather than below the fan-tray assembly. Installing the external brackets and air filter on the bottom of the shelf enables access to the air filter without removing the fan-tray assembly. This task applies to the ONS 15454 ANSI shelf only.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only), on page 35, if applicable
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note To install the air filter inside the air ramp unit (15454E-AIR-RAMP or 15454-AIR-RAMP), use the ETSI version of the air filter (15454-FTF2 or 15454E-FTF4).

Caution Although the air filter can work with older fan-trays if it is installed with either side facing up, Cisco recommends that you install it with the metal bracing facing up to preserve the surface of the filter. You must install the air filter with the metal bracing facing up with 15454-CC-FTA.

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

Procedure

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

Caution Although the air filter can work with older fan-trays if it is installed with either side facing up, Cisco recommends that you install it with the metal bracing facing up to preserve the surface of the filter. You must install the air filter with the metal bracing facing up with 15454-CC-FTA.

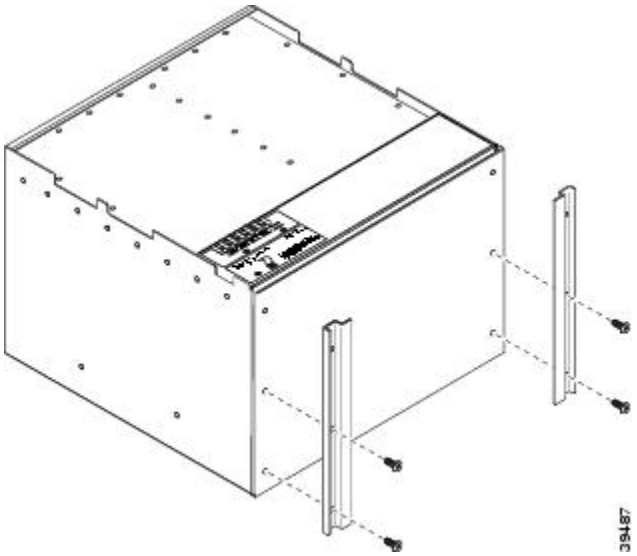
Step 2 Locate the three screw holes that run along the left and right sides of the bottom of the shelf.

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

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

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

Figure 17: Installing the External Brackets



Step 4 Slide the air filter into the shelf.

Step 5 Return to your originating procedure (NTP).

DLP-G678 Mount the ONS 15454 Shelf in a Rack (One Person)

Purpose	This task allows one person to mount the shelf in a rack.
Tools/Equipment	Pinned hex key # 2 Phillips Dynamometric screwdriver ETSI only: Two M6 x 20 socket set screws Eight M6 x 20 pan-head Phillips mounting screws ANSI only: Two #12-24 x 3/4 set screws (48-1003-XX) Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX)
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

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

Procedure

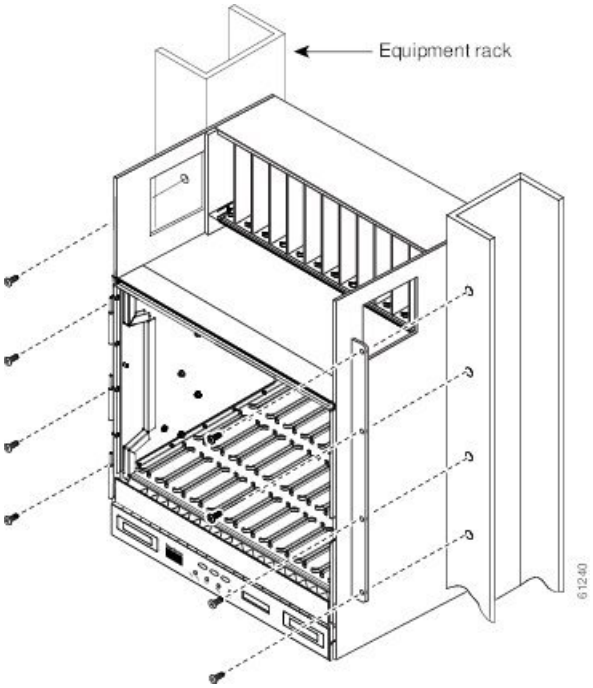
Step 1 Verify that the proper fuse and alarm panel has been installed in the top mounting space. If a fuse and alarm panel is not present, you must install one according to manufacturer instructions:

- (ETSI only) Verify that the fuse rating does not exceed 30A.
- The fuse rating for ANSI chassis must not exceed 30A.

Step 2 Ensure that the shelf is set for the desired rack size (either 23 inches [584.2 mm] or 19 inches [482.6 mm]).

The following figure shows the rack-mounting position for the ONS 15454 ETSI.

Figure 18: Mounting an ONS 15454 ETSI in a Rack



Step 3 Using the hex tool that shipped with the assembly, install the two temporary set screws into the holes that will not be used to mount the shelf. Let the set screws protrude sufficiently to hold the mounting brackets.

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

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

Step 6 Using the Phillips Dynamometric screwdriver, install one mounting screw in each side of the assembly.

When the shelf is secured to the rack, install the remaining mounting screws.

Step 7 When the shelf is secured to the rack, install the remaining mounting screws.

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

Step 8 Using the hex tool, remove the temporary set screws.

Step 9 Return to your originating procedure (NTP).

DLP-G679 Mount the ONS 15454 Shelf in a Rack (Two People)

Purpose	This task allows two people to mount the shelf in a rack.

Tools/Equipment	Pinned hex key # 2 Phillips Dynamometric screwdriver ETSI only: Two M6 x 20 socket set screws Eight M6 x 20 pan-head Phillips mounting screws ANSI only: Two #12-24 x 3/4 set screws (48-1003-XX) Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX)
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

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

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

Procedure

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

- (ETSI only) Verify that the fuse rating does not exceed 30A.
- The fuse rating for ANSI chassis must not exceed 30A.

Step 2 Ensure that the shelf is set for the desired rack size (either 23 inches [584.2 mm] or 19 inches [482.6 mm]).

Step 3 Using the hex tool that shipped with the assembly, install the two set screws into the holes that will not be used to mount the shelf. Let the set screws protrude sufficiently to hold the mounting brackets.

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

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

Step 6 Have one person hold the shelf in place while the other person uses the Phillips Dynamometric screwdriver to install one mounting screw in each side of the assembly.

Step 7 When the shelf is secured to the rack, install the remaining mounting screws.

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

Step 8 Use the hex tool to remove the temporary set screws.

Step 9 Return to your originating procedure (NTP).

DLP-G680 Mount Multiple ONS 15454 Shelf Assemblies in a Rack

Purpose	This task installs multiple shelves in a rack.
Tools/Equipment	Pinned hex key #2 Phillips Dynamometric screwdriver ETSI only: Two M6 x 20 socket set screws (per shelf) Eight M6 x 20 pan-head Phillips mounting screws (per shelf) ANSI only: Two #12-24 x 3/4 set screws (48-1003-XX) (per shelf) Eight #12-24 x 3/4 pan-head Phillips mounting screws (48-1004-XX, 48-1007-XX) (per shelf)
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

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

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

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

Procedure

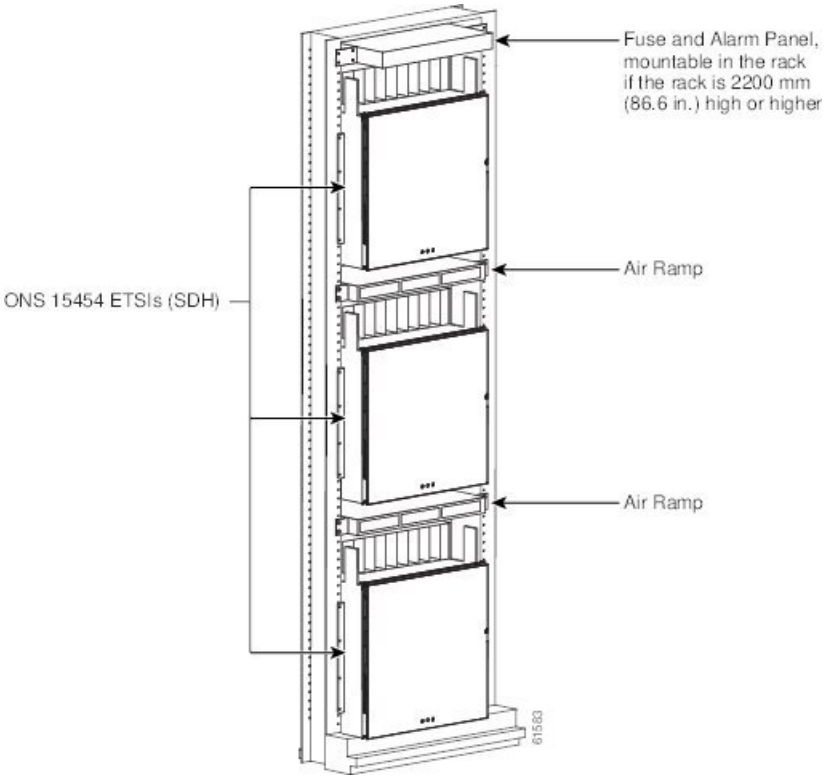
Step 1 Verify that the proper fuse and alarm panel has been installed in the top mounting space. If a fuse and alarm panel is not present, you must install one according to manufacturer's instructions:

- (ETSI only) Verify that the fuse rating does not exceed 30A.
- The fuse rating for ANSI chassis must not exceed 30A.

Step 2 Mount the first shelf in the bottom of the rack using the DLP-G678 Mount the ONS 15454 Shelf in a Rack (One Person), on page 38 or the DLP-G679 Mount the ONS 15454 Shelf in a Rack (Two People), on page 39.

The following figure shows a three-shelf ONS 15454 ETSI bay assembly.

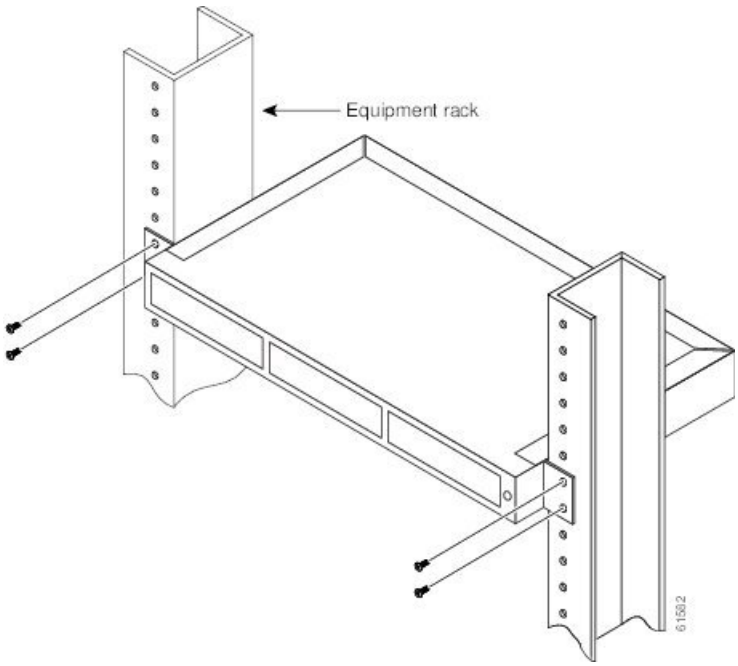
Figure 19: Three-Shelf ONS 15454 ETSI (ONS 15454 SDH) Bay Assembly



Step 3 (ETSI only) Mount the air ramp above the ONS 15454 ETSI according to the DLP-G8 Install the Air Ramp, on page 44.

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

Figure 20: Mounting the Air Ramp in a Rack



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

Step 5 Return to your originating procedure (NTP).

DLP-G8 Install the Air Ramp

Purpose	Use this task to install the air ramp for standard and deep door ONS 15454
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note To install the air filter inside the air ramp unit (15454E-AIR-RAMP or 15454-AIR-RAMP), use the ETSI version of the air filter (15454-FTF2 or 15454E-FTF4).

Procedure

Step 1 The air ramp requires 50 mm of space in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the rack mount unit (RMU) space specified in your site plan.

Step 2 Verify the rack type of your air ramp installation. The brackets are compatible with the following racks.

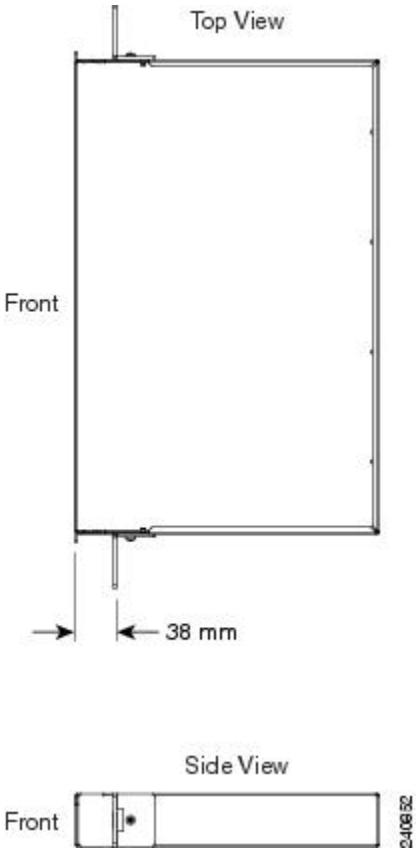
- 19-inch racks as defined in IEC 297-1(2 Nos.)
- 19-inch for deep door configuration (2 Nos.)
- 23-inch for deep door configuration (2 Nos.)
- Pan Head M4x 8mm (4 Nos.)
- Air Filter

Step 3 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete the DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only), on page 35 as required.

Step 4 Align the chassis with the rack mounting screw holes; insert and tighten the four screws.

In an ETSI configuration the air ramp comes with pre-installed brackets as illustrated in the following figure.

Figure 21: Air Ramp with Brackets in an ETSI Configuration

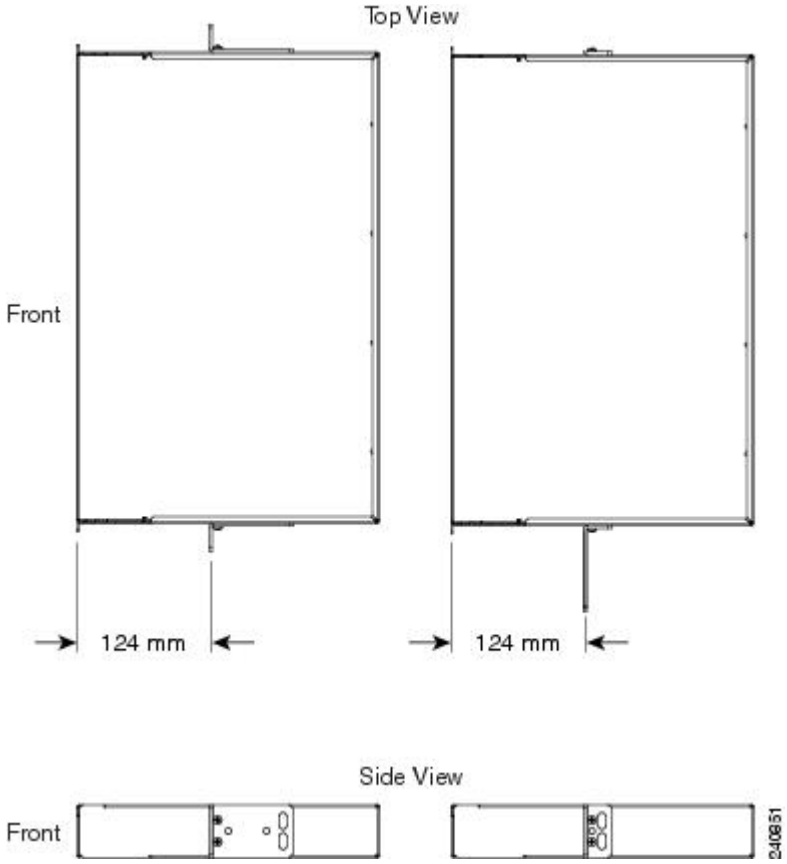


Step 5 To install the 19-inch and 23-inch brackets on an ONS 15454 ANSI, with standard door and spool, remove the screws that attach the mounting bracket to the side of the shelf.

Step 6 Align the mounting bracket screw holes against the shelf screw holes according to the following figure.

Step 7 The bracket mounting holes will align with the forward-most mounting holes on the air ramp. When aligned properly the mounting flange will be 124 mm from the front edge of the air ramp.

Figure 22: Positioning 19" or 23" Reversible Brackets on ONS 15454 ANSI with STD Door and Spool

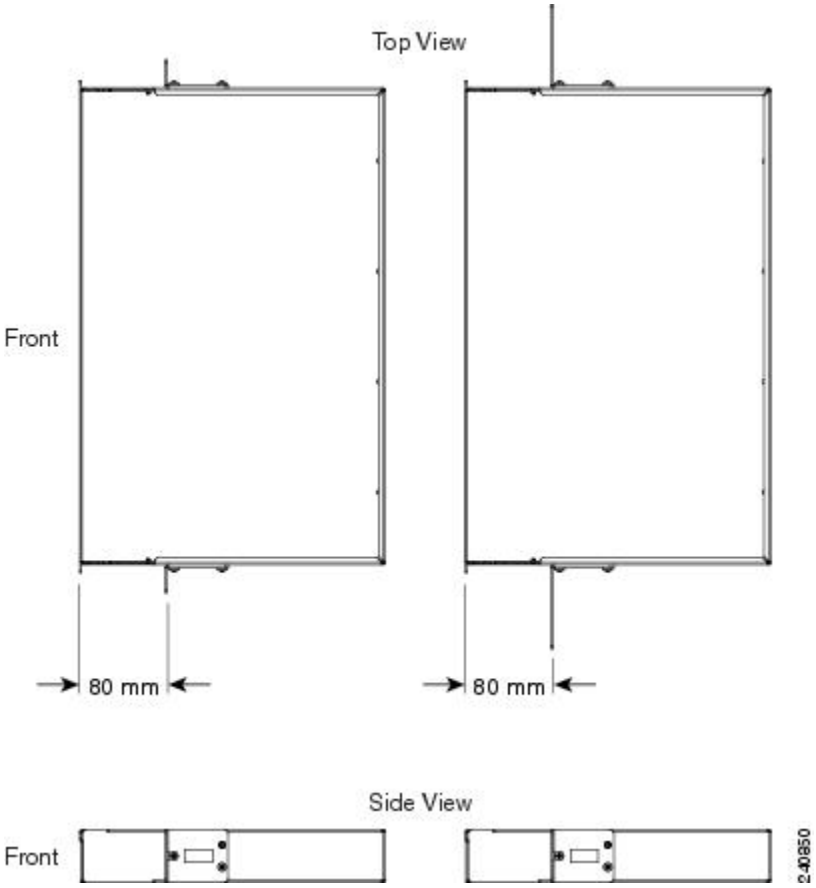


Step 8 To install the 19-inch and 23-inch brackets in an ONS 15454 ANSI deep door, remove the screws that attach the mounting bracket to the side of the shelf.

Step 9 Align the mounting bracket screw holes against the shelf screw holes according to the following figure.

Step 10 The bracket mounting holes will align with the forward-most mounting holes on the air ramp. When aligned properly the mounting flange will be 80 mm from the front edge of the air ramp.

Figure 23: Positioning the Mounting Brackets for Deep Door Configuration



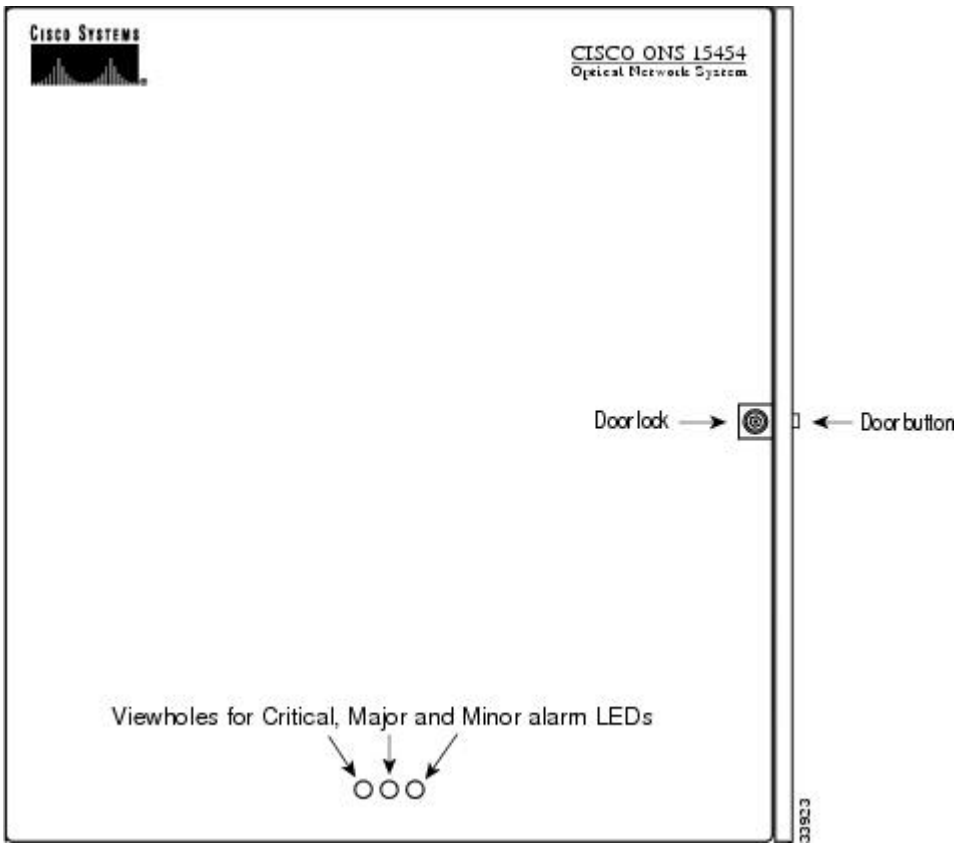
Step 11 Repeat for the other side of the assembly.

Step 12 Return to your originating procedure (NTP).

Front Door

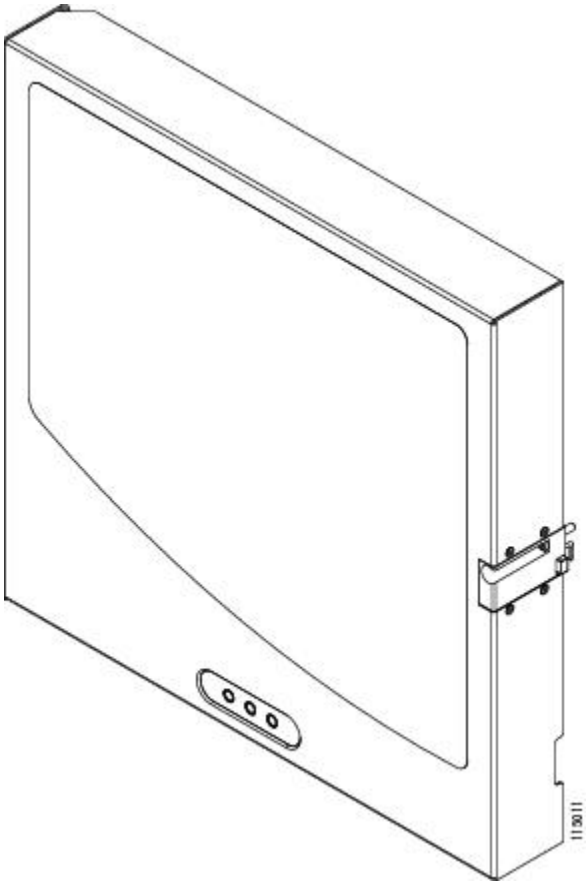
The Critical, Major, and Minor alarm LEDs visible through the front door indicate whether a critical, major, or minor alarm is present anywhere on the ONS 15454 shelf. These LEDs must be visible so that technicians can quickly determine if any alarms are present on the ONS 15454 shelf or the network. You can use the LCD to further isolate alarms. The front door as shown in the following figure provides access to the shelf, fiber-storage tray, fan-tray assembly, and LCD screen.

Figure 24: The ONS 15454 Front Door



The ONS 15454 ANSI ships with a standard door but can also accommodate a deep door and extended fiber clips (15454-DOOR-KIT) to provide additional room for cabling as shown in the following figure. The ONS 15454 ETSI does not support the deep door.

Figure 25: Cisco ONS 15454 ANSI Deep Door

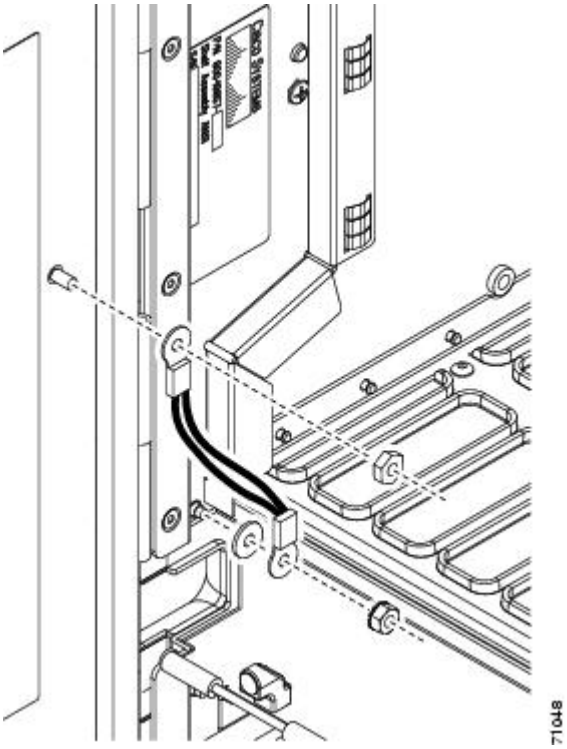


The ONS 15454 door locks with a pinned hex key that ships with the shelf. A button on the right side of the shelf releases the door. You can remove the front door to provide unrestricted access to the front of the shelf.

Note To mount the air ramp on an ONS 15454 ANSI with a deep door, mounting brackets (Cisco P/N 700-25319-01 for 19" deep door, and 700-25287-01 for 23" deep door) are provided.

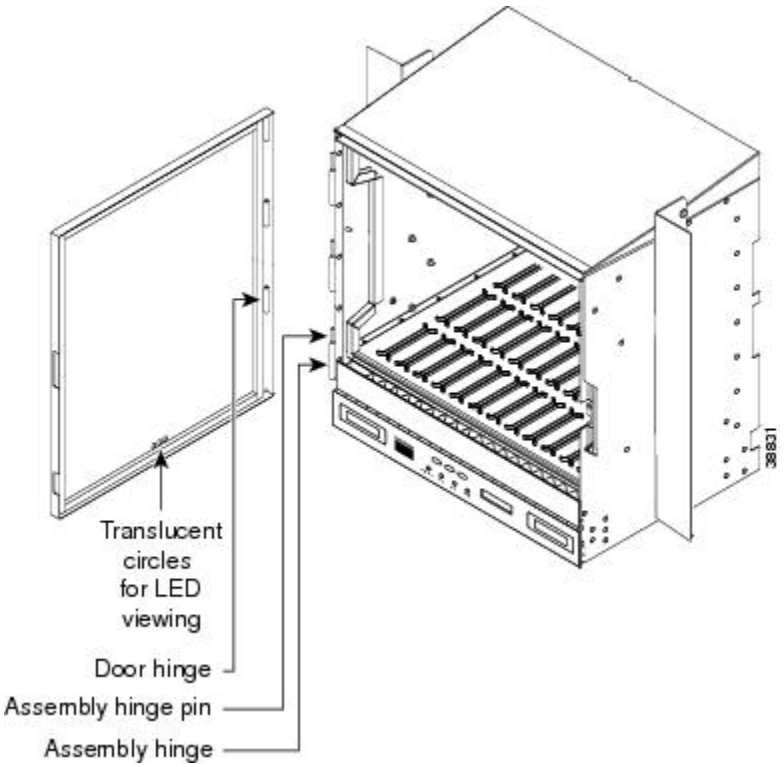
Before you remove the ONS 15454 front door, you must remove the ground strap of the front door.

Figure 26: ONS 15454 ANSI Front Door Ground Strap



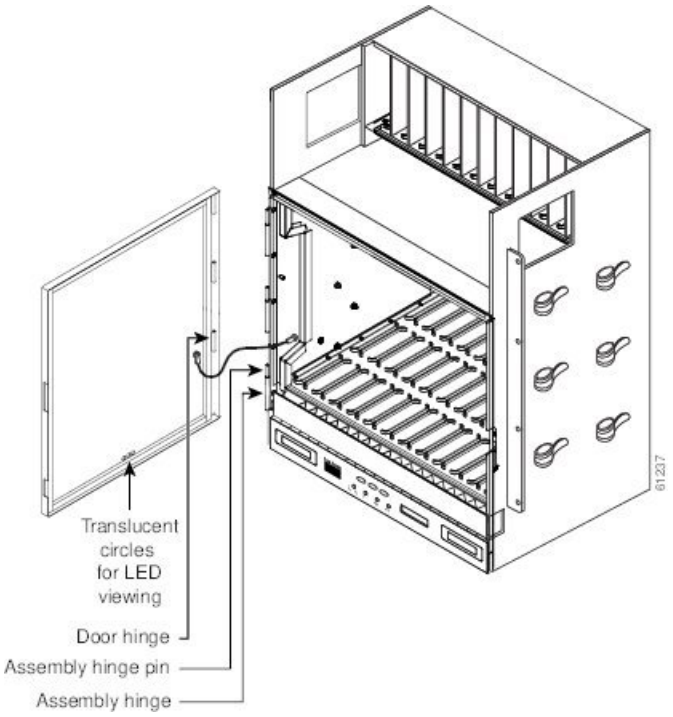
The following figure shows how to remove the ONS 15454 ANSI front door.

Figure 27: Removing the ONS 15454 ANSI Front Door



The following figure shows how to remove the ONS 15454 ETSI front door.

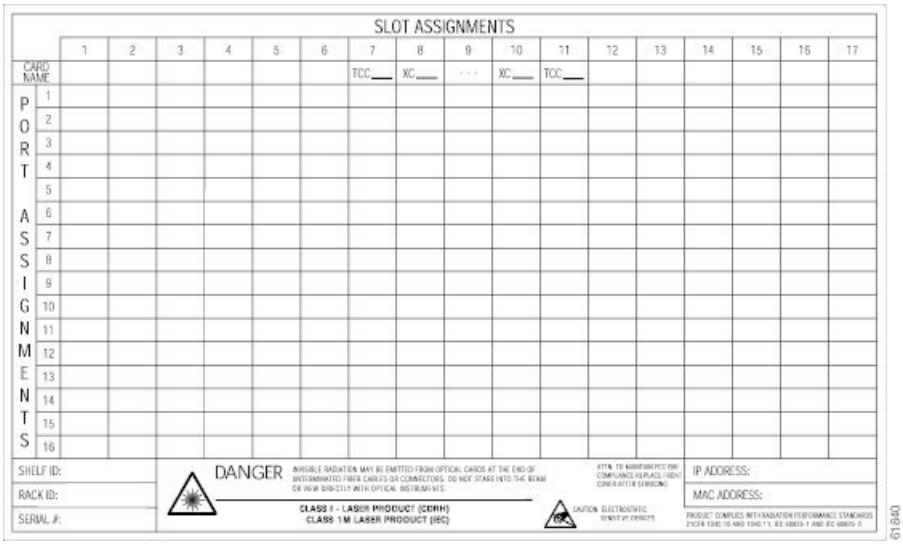
Figure 28: Removing the ONS 15454 ETSI Front Door



An erasable label is pasted on the inside of the front door. You can use the label to record slot assignments, port assignments, card types, node ID, rack ID, and serial number for the ONS 15454.

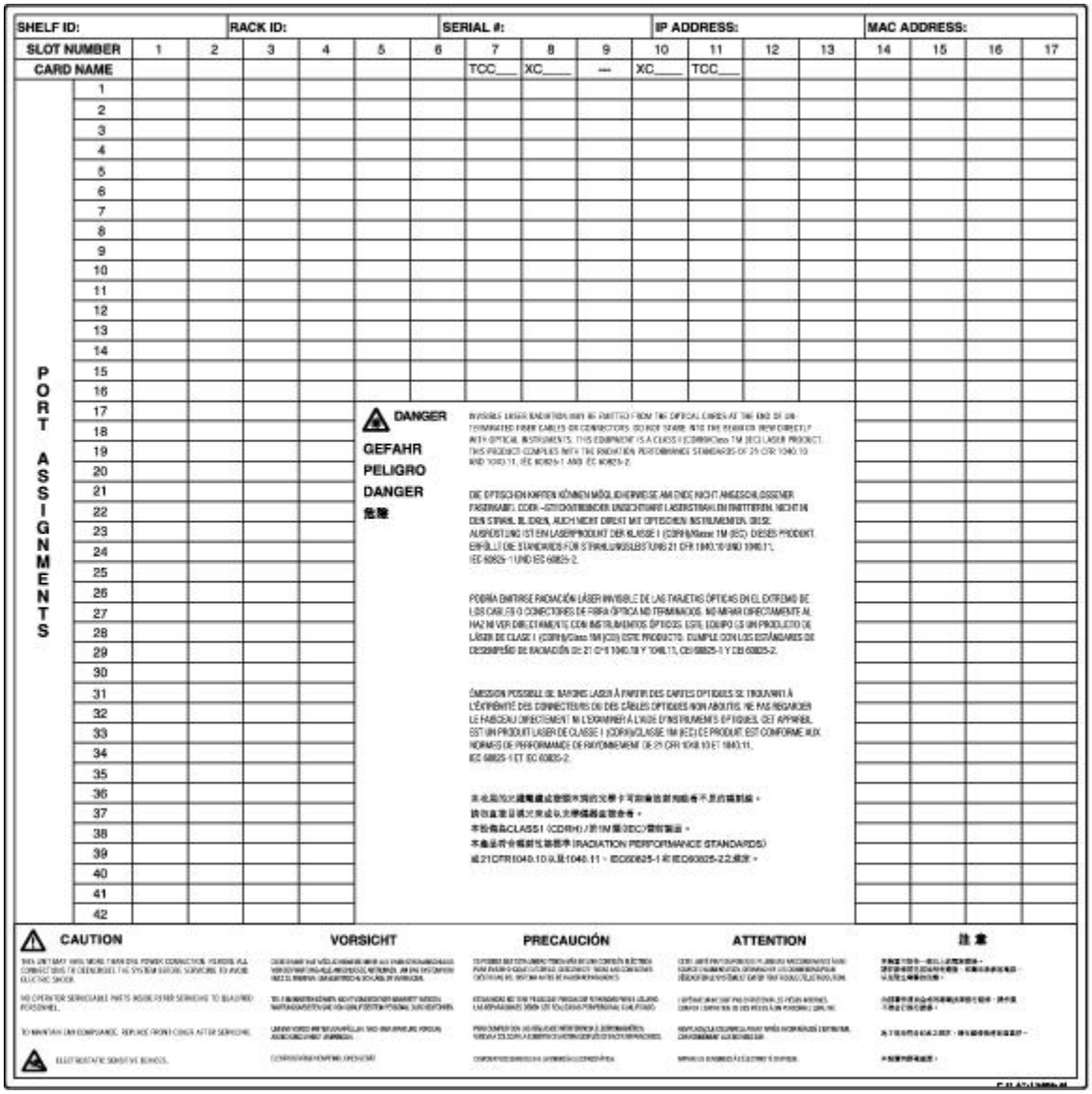
The following figure shows the erasable label on the ONS 15454 ANSI shelf.

Figure 29: ONS 15454 ANSI Front-Door Erasable Label



The following figure shows the erasable label on the ONS 15454 ETSI shelf.

Figure 30: ONS 15454 ETSI Front-Door Erasable Label

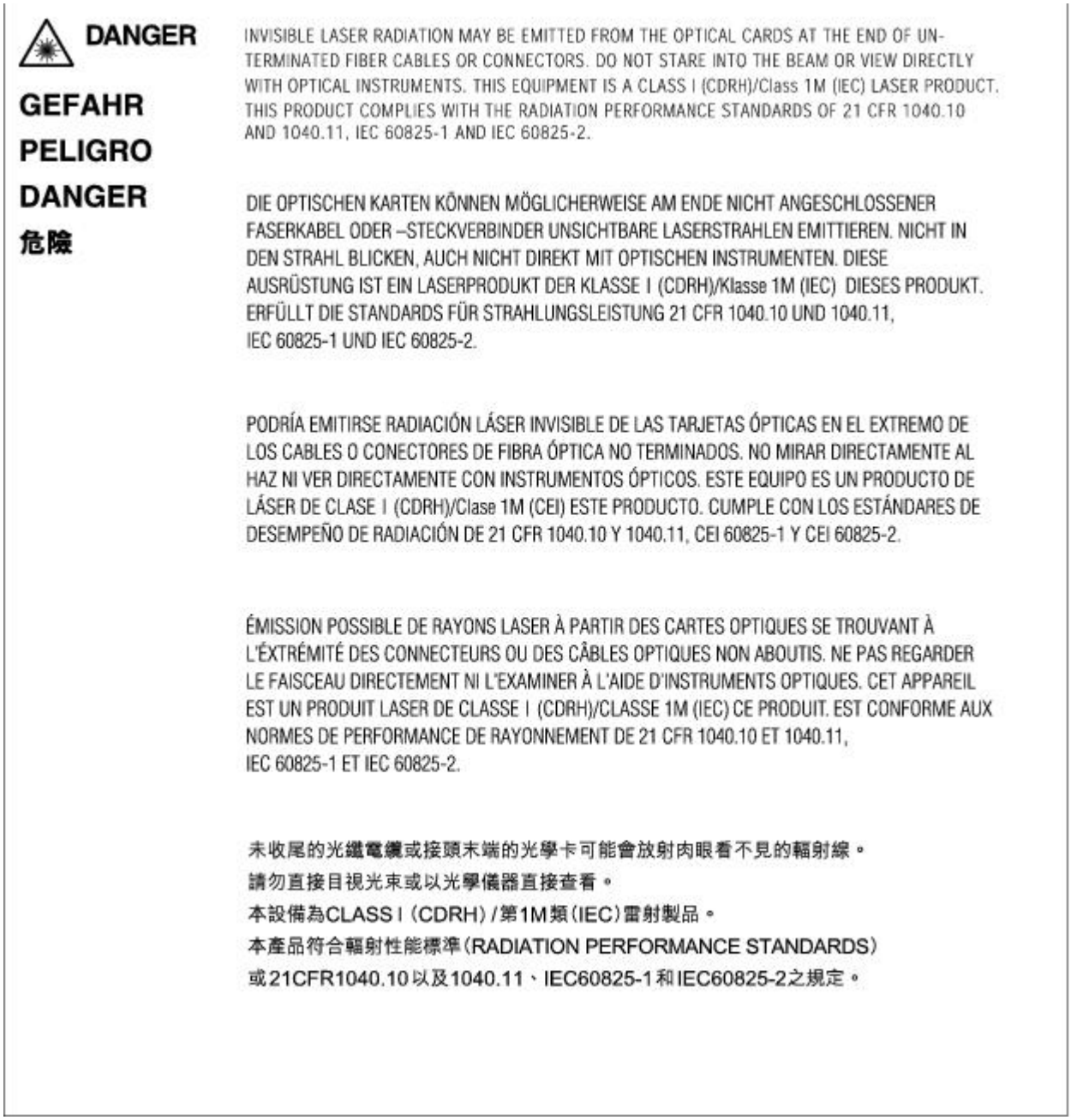


The front door label also includes the Class I and Class 1M laser warning. The following figure shows the ONS 15454 ANSI laser warning.

Figure 31: Laser Warning on the ONS 15454 ANSI Front-Door Label

The following figure shows the ONS 15454 ETSI laser warning.

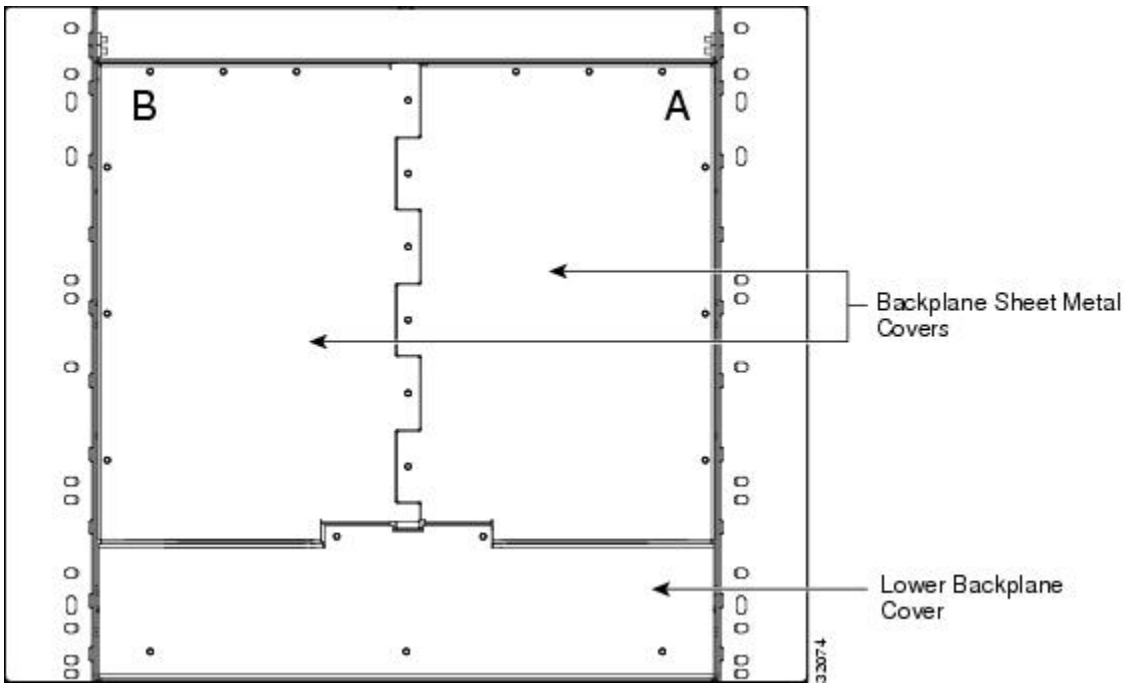
Figure 32: Laser Warning on the ONS 15454 ETSI Front-Door Label



ONS 15454 ANSI Backplane Covers

If a backplane does not have an electrical interface assembly (EIA) panel installed, it should have two sheet metal backplane covers (one on each side of the backplane). See the following figure. Each cover is held in place with nine 6-32 x 3/8 inch Phillips screws.

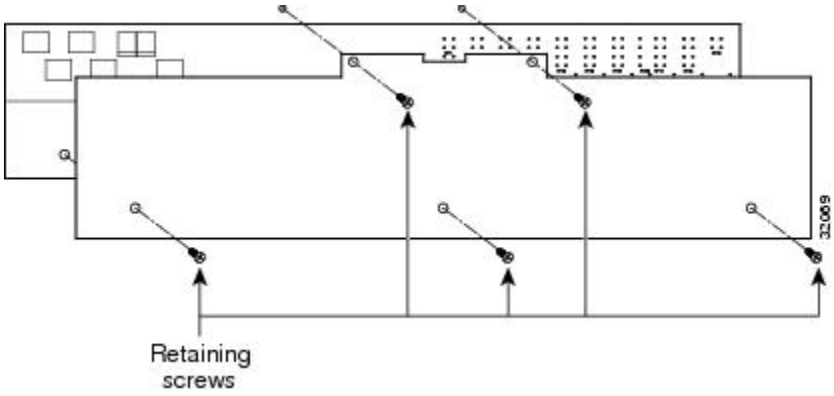
Figure 33: Backplane Covers



Lower Backplane Cover

The lower section of the ONS 15454 ANSI backplane is covered by either a clear plastic protector (15454-SA-ANSI) or a sheet metal cover (15454-SA-HD), which is held in place by five 6-32 x 1/2 inch screws. Remove the lower backplane cover to access the alarm interface panel (AIP), alarm pin fields, frame ground, and power terminals.

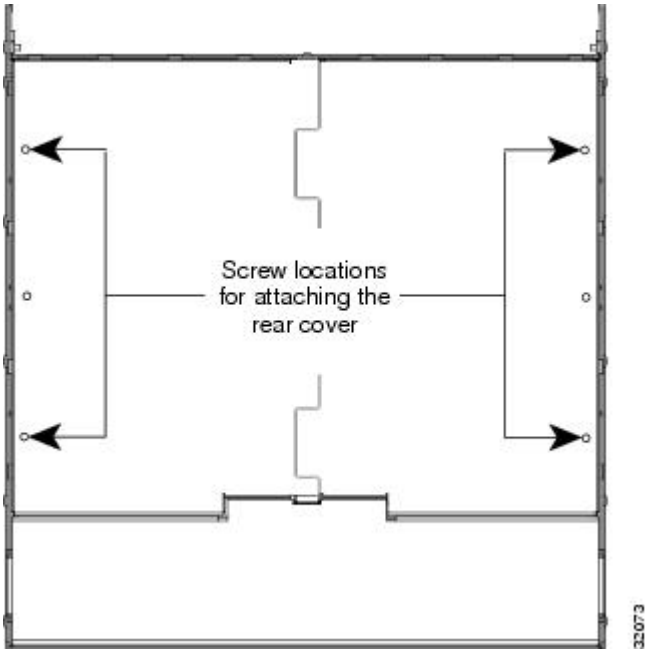
Figure 34: Removing the Lower Backplane Cover



Rear Cover

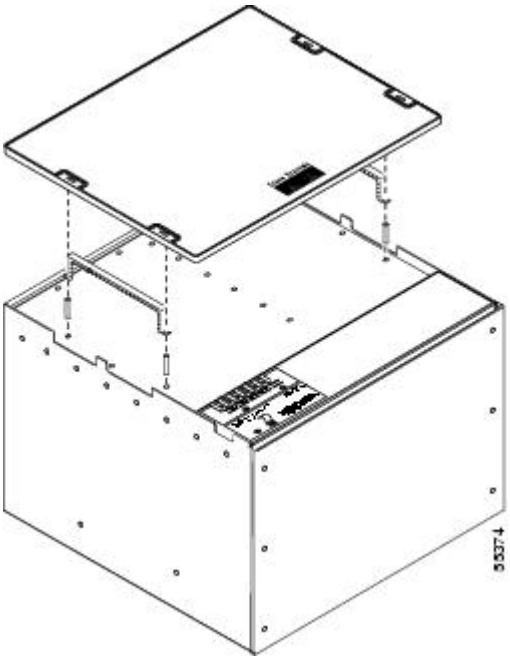
The ONS 15454 ANSI has an optional clear plastic rear cover. This clear plastic cover provides additional protection for the cables and connectors on the backplane.

Figure 35: Backplane Attachment for Cover



You can also install the optional spacers if more space is needed between the cables and rear cover as shown in the following figure.

Figure 36: Installing the Plastic Rear Cover with Spacers



Alarm Interface Panel

The AIP is located above the alarm contacts on the lower section of the backplane. The AIP provides surge protection for the ONS 15454 ANSI. It also provides an interface from the backplane to the fan-tray assembly and LCD. The AIP plugs into the backplane using a 96-pin DIN connector and is held in place with two retaining screws. The panel has a nonvolatile memory chip that stores the unique node address (MAC address). The MAC address identifies the nodes that support circuits. It allows Cisco Transport Controller (CTC) to determine circuit sources, destinations, and spans. The TCC2/TCC2P/TCC3 cards in the ONS 15454 ANSI also use the MAC address to store the node database.

Note The 5-A AIP (73-7665-XX) is required when installing fan-tray assembly 15454-FTA3 or 15454-CC-FTA, which comes preinstalled on the shelf (15454-SA-ANSI or 15454-SA-HD).

Note A blown fuse on the AIP board can cause the LCD display to go blank.

Alarm Interface Panel Replacement

If the AIP fails, a MAC Fail alarm appears on the CTC Alarms menu and/or the LCD display on the fan-tray assembly goes blank. To perform an in-service replacement of the AIP, you must contact the Cisco Technical Assistance Center (Cisco TAC). For contact information, see the Obtaining Documentation, Obtaining Support, and Security Guidelines, on page xxix.

You can replace the AIP on an in-service system without affecting traffic (except Ethernet traffic on nodes running a release earlier than Software Release 4.0). The circuit repair feature allows you to repair circuits affected by MAC address changes on one node at a time. Circuit repair works when all nodes are running the same software version. Each individual AIP upgrade requires an individual circuit repair; if AIPs are replaced on two nodes, the circuit repair must be performed twice. Always replace an AIP during a maintenance window.

Caution Do not use a 2-A AIP with a 5-A fan-tray assembly; doing so causes a blown fuse on the AIP.

Note Ensure that all nodes in the affected network are running the same software version before replacing the AIP and repairing circuits. If you need to upgrade nodes to the same software version, no hardware should be changed or circuit repair performed until after the software upgrade is complete.

NTP-G3 Open and Remove the Front Door

Purpose	This procedure opens and removes the front door to access the equipment.

Tools/Equipment	Open-end wrench Pinned hex (Allen) key
Prerequisite Procedures	NTP-G306 Install the ONS 15454 Shelf, on page 33
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Complete the DLP-G9 Open the Front Cabinet Compartment (Door) , on page 58.

Step 2 Complete the DLP-G10 Remove the Front Door , on page 59.

Step 3 If you are using an ETSI shelf, continue with the NTP-G4 Open and Remove the FMEC Cover (ETSI Only), on page 61. If you are using an ANSI shelf, continue with the NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64.

Stop. You have completed this procedure.

DLP-G9 Open the Front Cabinet Compartment (Door)

Purpose	This task opens the front door.
Tools/Equipment	Pinned hex (Allen) key
Prerequisite Procedures	NTP-G306 Install the ONS 15454 Shelf, on page 33
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

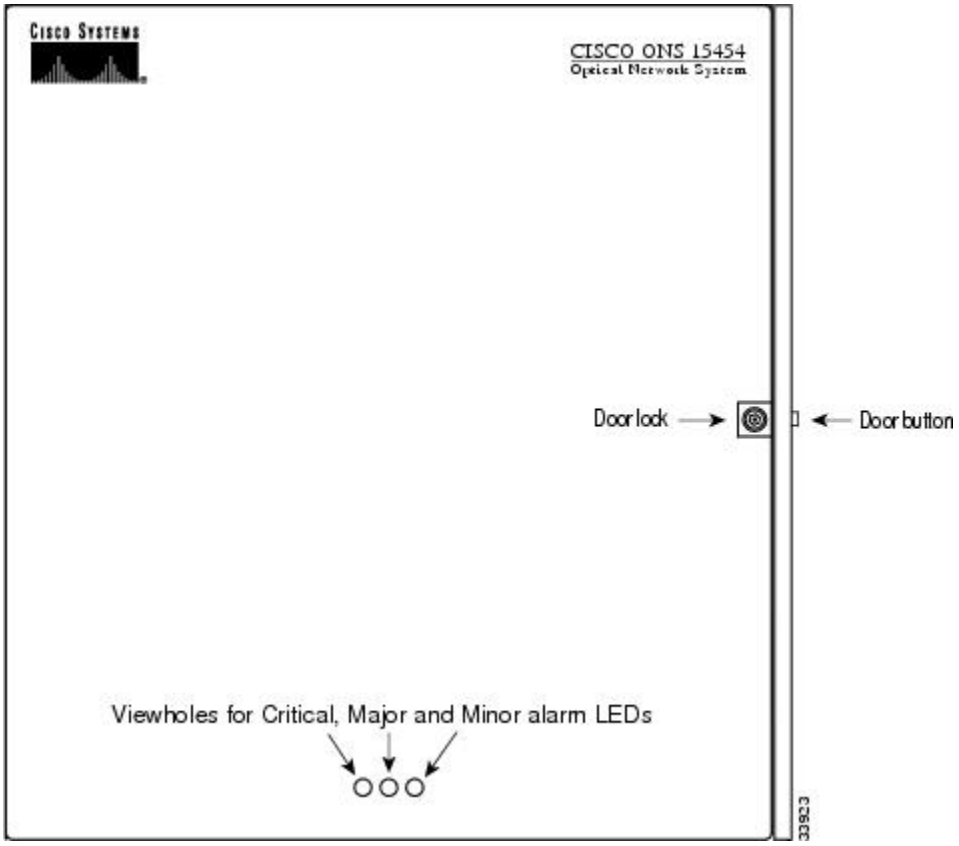
Note The ONS 15454 shelf has an ESD plug input and is shipped with an ESD wrist strap. The ESD plug input is located on the outside of the shelf on the right side. It is labeled “ESD” on the top and bottom. Always wear an ESD wrist strap and connect the strap to the ESD plug when working on the ONS 15454. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 Open the front door lock.

The ONS 15454 shelf comes with a pinned hex key for locking and unlocking the front door. Turn the key counterclockwise to unlock the door and clockwise to lock it. The following figure illustrates the front door of the ANSI shelf.

Figure 37: Cisco ONS 15454 ANSI Front Door



Step 2 Press the door button to release the latch. A button on the right side of the shelf releases the door.

Step 3 Swing the door open.

Step 4 Return to your originating procedure (NTP).

DLP-G10 Remove the Front Door

Purpose	This task removes the front cabinet compartment door.
Tools/Equipment	Open-end wrench
Prerequisite Procedures	DLP-G9 Open the Front Cabinet Compartment (Door) , on page 58
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

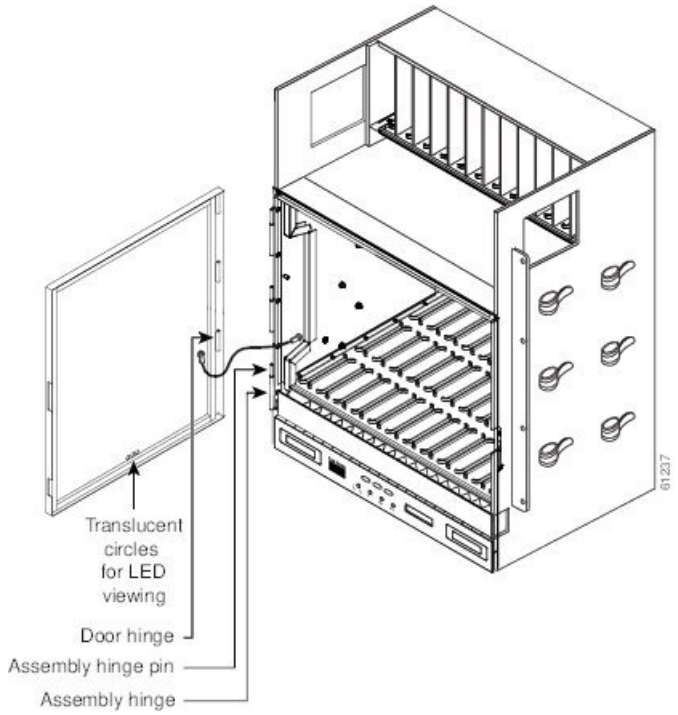
Step 1 For ONS 15454 ETSI shelves:

a) Unscrew the nut holding the ground wire to the shelf. Remove the nut and washer.

b) Remove the ground wire from the shelf.

c) Hold the door at the top left corner and remove the door from its hinges as shown in the following figure.

Figure 38: Removing the ONS 15454 ETSI Front Door



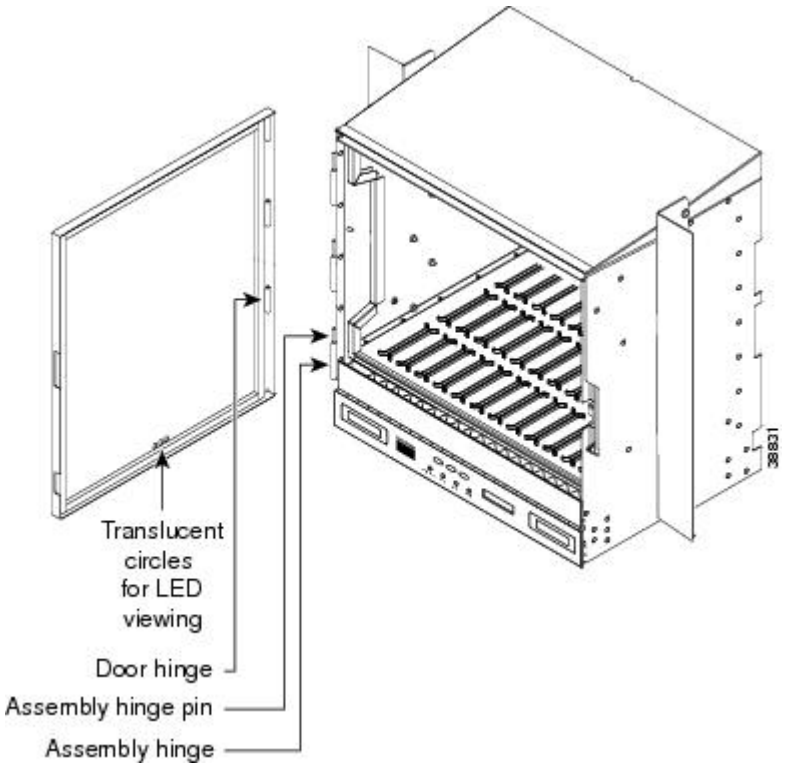
Step 2 For ONS 15454 ANSI shelves:

a) To remove the door ground strap, perform the following:

- To detach the ground strap from the front door, loosen the #6 Kepnut (49-0600-01) using the open-end wrench. Detach the end of the ground strap terminal lug (72-3622-01) from the male stud on the inside of the door.
- To detach the other end of the ground strap from the longer screw on the fiber guide, loosen the #4 Kepnut (49-0337-01) on the terminal lug using the open-end wrench. Remove the terminal lug and lock washer.

b) Lift the door from its hinges at the top left corner of the door.

Figure 39: Removing the ONS 15454 ANSI Front Door



Step 3 Return to your originating procedure (NTP).

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

Purpose	This procedure opens and removes the FMEC cover on the ONS 15454 ETSI. The ONS 15454 ETSI has a screw-in panel over the EFCA. The FMEC cover protects the FMEC cards.
Tools/Equipment	Medium slot-head screwdriver
Prerequisite Procedures	NTP-G306 Install the ONS 15454 Shelf, on page 33
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Complete the DLP-G11 Open the FMEC Cover , on page 62.

Step 2 Complete the DLP-G12 Remove the FMEC Cover , on page 63.

Step 3 Continue with the NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), on page 66.

Stop. You have completed this procedure.

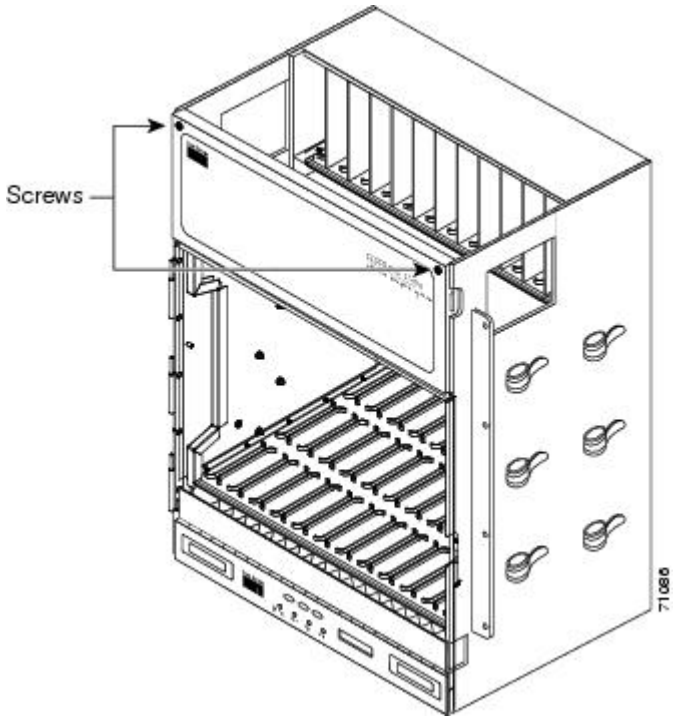
DLP-G11 Open the FMEC Cover

Purpose	This task opens the FMEC cover. The FMEC cover must be opened to install the MIC-A/P and the MIC-C/T/P.
Tools/Equipment	Medium slot-head screwdriver
Prerequisite Procedures	DLP-G9 Open the Front Cabinet Compartment (Door) , on page 58
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Unscrew the screws on the FMEC cover.

Figure 40: Unscrewing the FMEC Cover



Step 2 Use the handles to pull the cover forward.

Step 3 Return to your originating procedure (NTP).

DLP-G12 Remove the FMEC Cover

Purpose	This task removes the FMEC cover in order to install the MIC-A/P and the MIC-C/T/P.
Tools/Equipment	Medium slot-head screwdriver
Prerequisite Procedures	DLP-G11 Open the FMEC Cover , on page 62
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

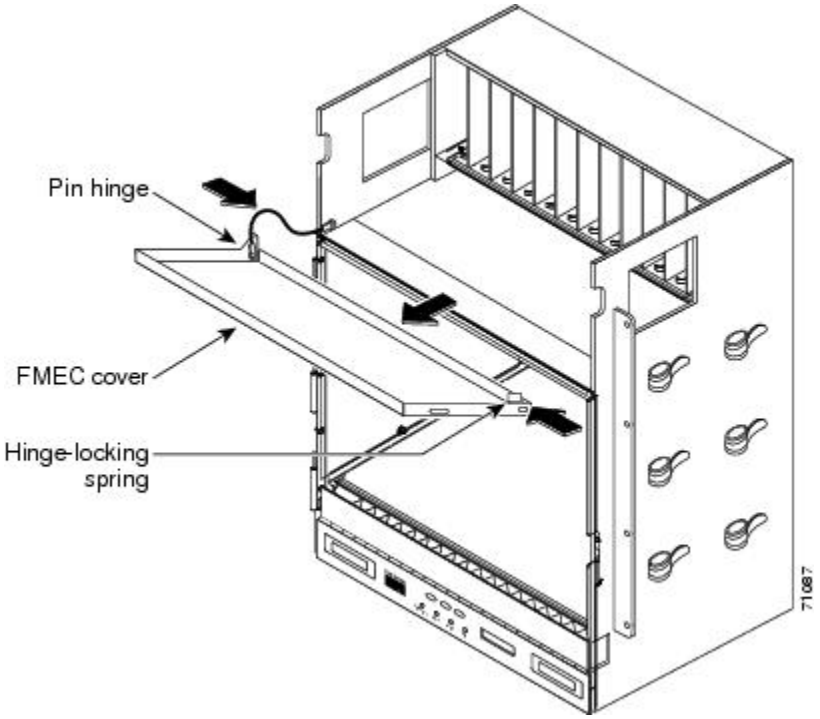
Procedure

Step 1 Unscrew the nut holding the ground wire to the shelf. Remove the nut and washer.

Step 2 Remove the ground wire from the left side of the shelf.

Step 3 Pull the right side of the hinge-locking spring.

Figure 41: Removing the ONS 15454 FMEC Cover



Step 4 Detach the cover from the pin of the hinge.

Step 5 Remove the cover carefully from the left pin of the hinge.

Step 6 Return to your originating procedure (NTP).

NTP-G5 Remove the Backplane Covers (ANSI Only)

Purpose	This procedure describes how to access the ONS 15454 ANSI backplane by removing the covers. The backplane has two sheet metal covers (one on either side) and a lower backplane cover at the bottom.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G306 Install the ONS 15454 Shelf, on page 33 NTP-G3 Open and Remove the Front Door , on page 57
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Complete the DLP-G13 Remove the Lower Backplane Cover , on page 64.

Step 2 Complete the DLP-G14 Remove the Backplane Sheet Metal Cover , on page 65.

Step 3 Continue with the NTP-G7 Install the Power and Ground , on page 68.

Stop. You have completed this procedure.

DLP-G13 Remove the Lower Backplane Cover

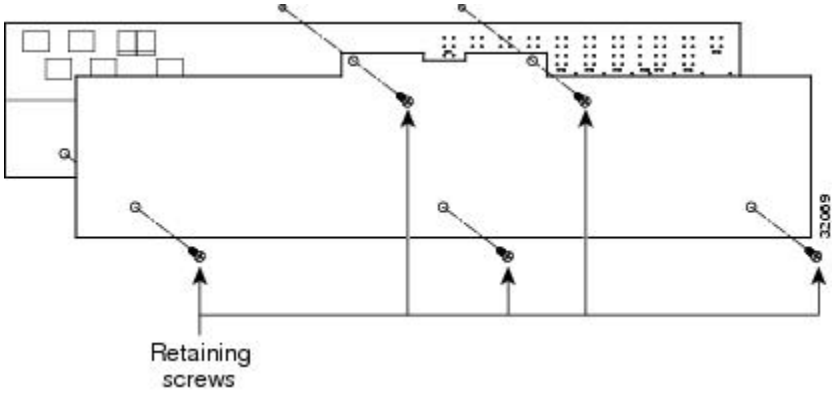
Purpose	This task removes the lower backplane cover of the ONS 15454 ANSI shelf.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	None
Required/As Needed	Required

Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Unscrew the five retaining screws that hold the cover in place as shown in the following figure.

Figure 42: Lower Backplane Cover



Step 2 Grasp the cover on each side.

Step 3 Gently pull the cover away from the backplane.

Step 4 Return to your originating procedure (NTP).

DLP-G14 Remove the Backplane Sheet Metal Cover

Purpose	This task removes the backplane sheet metal cover that is installed on the rear of the ONS 15454 ANSI shelf.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	DLP-G13 Remove the Lower Backplane Cover , on page 64
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 To remove the backplane sheet metal cover, loosen the five screws that secure it to the ONS 15454 ANSI shelf and pull it away from the shelf.

Step 2 Loosen the nine perimeter screws that hold the backplane sheet metal cover(s) in place.

Step 3 Lift the panel by the bottom to remove it from the shelf.

Step 4 Store the panel for later use. Attach the backplane cover(s) whenever electrical interface assemblies (EIAs) are not installed.

Step 5 Return to your originating procedure (NTP).

ONS 15454 ETSI Front Mount Electrical Connection

The ONS 15454 ETSI positive and negative power terminals are located on FMEC cards in the Electrical Facility Connection Assembly (EFCA). The ground connection is the grounding receptacle on the side panel of the shelf.

The ONS 15454 ETSI EFCA at the top of the shelf has 12 FMEC slots numbered sequentially from left to right (18 to 29). Slots 18 to 22 and 25 to 29 provide electrical connections. Slots 23 and 24 host the MIC-A/P and MIC-C/T/P cards, respectively. The MIC-A/P and the MIC-C/T/P cards also connect alarm, timing, LAN, and craft connections to the ONS 15454 ETSI.

For more information about the MIC-A/P and MIC-C/T/P cards, see the chapter “Install the Control Cards” in Cisco ONS 15454 DWDM Configuration Guide.

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

Purpose	This procedure installs the MIC-A/P and the MIC-T/C/P FMECs in the EFCA. The EFCA is located at the top of the ONS 15454 ETSI shelf. It provides connection for installing power, external alarms, timing input and output, and craft interface terminals.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver FMECs (the MIC-A/P and MIC-T/C/P)
Prerequisite Procedures	NTP-G4 Open and Remove the FMEC Cover (ETSI Only), on page 61
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 ETSI. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

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

Procedure

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

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

The MIC-A/P card provides connection for the BATTERY B input, one of the two possible redundant power supply inputs. It also provides connection for eight alarm outputs (coming from the TCC2/TCC2P/TCC3 card), sixteen alarm inputs, and four configurable alarm inputs/outputs.

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

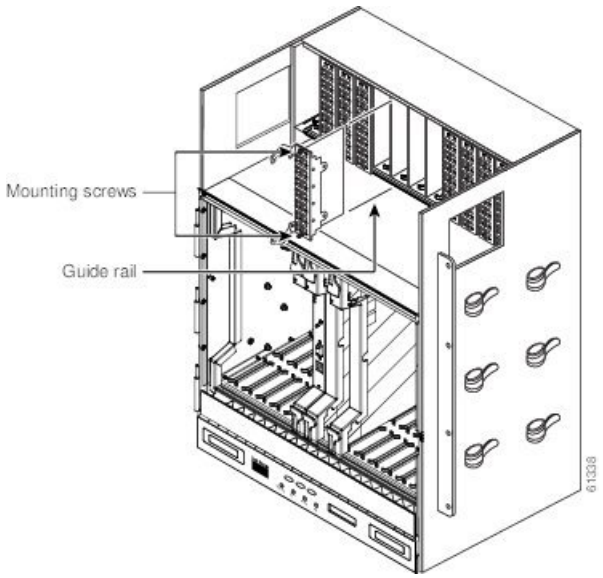
The MIC-C/T/P card provides connection for the BATTERY A input, one of the two possible redundant power supply inputs. It also provides connection for system management serial port, system management LAN port, and system timing inputs and outputs.

Step 2 Hold the FMEC by the faceplate.

Step 3 Slide the FMEC along the guide rails into the desired FMEC slot or slots.

Step 4 Push the FMEC gently into the connector. The ONS 15454 ETSI FMECs plug into electrical connectors on the back panel of the shelf when the screws are tightened. The following figure shows FMEC installation.

Figure 43: Installing FMECs on the ONS 15454 ETSI



Step 5 Tighten the screws.

Step 6 Continue with the NTP-G7 Install the Power and Ground , on page 68.

Stop. You have completed this procedure.

Power and Ground Description

Ground the equipment according to Telcordia standards or local practices. The following sections describe power and ground for the ONS 15454 shelves.

Note For detailed instructions on grounding the ONS 15454 ANSI or ONS 15454 ETSI chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

NTP-G7 Install the Power and Ground

Purpose	This procedure installs power feeds and grounds the ONS 15454.

Tools/Equipment	ANSI and ETSI: • #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws • Ground cable 13.3-mm² (#6 AWG) stranded • Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for #10 AWG copper conductors • Wire cutters • Wire strippers • Crimp tool • Fuse panel ANSI only: • Power cable (from fuse and alarm panel to assembly), #10 AWG, copper conductors, 194 degrees F [90 degrees C]) • Wire wrapper ETSI only: • Power cable (from fuse panel to MIC-A/P and to MIC-C/T/P), shipped with the ONS 15454 ETSI • Two-hole grounding lug, shipped with the ONS 15454 ETSI
Prerequisite Procedures	NTP-G4 Open and Remove the FMEC Cover (ETSI Only), on page 61 NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), on page 66 NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

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

Warning **Use copper conductors only.** Statement 1025

Warning **Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-1 based safety standards.** Statement 1033

Warning **This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. The short-circuit (overcurrent) protection rating must not exceed 30A.** Statement 1045

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

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

Caution Always use the supplied ESD wristband when working with a powered ONS 15454. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

Procedure

Step 1 Verify that the correct fuse and alarm panel is installed in the top mounting space:

- (ETSI only) Verify that the fuse rating does not exceed 30A.
- The fuse rating for ANSI chassis must not exceed 30A.

Step 2 Depending on your type of shelf, connect the office ground to the 15454 ETSI or the 15454 ANSI chassis. For detailed instructions on grounding, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

Step 3 Depending on your shelf, complete the DLP-G17 Connect Office Power to the ONS 15454 ETSI , on page 71 or the DLP-G18 Connect Office Power to the ONS 15454 ANSI, on page 72.

Step 4 Complete the DLP-G19 Turn On and Verify Office Power , on page 75.

Step 5 Continue with the NTP-G8 Install the Fan-Tray Assembly , on page 83.

Stop. You have completed this procedure.

DLP-G17 Connect Office Power to the ONS 15454 ETSI

Purpose	This task connects power to the ONS 15454 ETSI shelf.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver Wire wrapper Wire cutters Wire strippers Crimp tool Fuse panel Power cable (from fuse and alarm panel to assembly), 5.26-mm² (#10 AWG), copper conductors, 194 degrees F [90 degrees C]) Ground cable 13.3-mm² (#6 AWG) stranded Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for 5.26-mm² (#10 AWG) copper conductors
Prerequisite Procedures	Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

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

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

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

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

Note If the system loses power or if both TCC2/TCC2P/TCC3 cards are reset, you must reset the ONS 15454 ETSI clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the "Turn Up a Node" chapter in the Cisco ONS 15454 DWDM Configuration Guide.

Procedure

Step 1 Verify that the MIC-A/P FMEC is installed in Slot 23 and the MIC-C/T/P FMEC is installed in Slot 24 of the EFCA.

Step 2 Attach the connector on the end of the power cable to the power FMEC.

Step 3 Tighten the screws of the connector on the power cable.

Step 4 Connect the power cable to the fuse panel or power source. Use the pin connections in the following table. If the green-yellow cable is included in the power cable, it must be connected to ground.

Table 6: Pin Connection of the Power FMECs

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

Step 5 Return to your originating procedure (NTP).

DLP-G18 Connect Office Power to the ONS 15454 ANSI

Purpose	This task connects power to the ONS 15454 ANSI shelf.

Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver Wire wrapper Wire cutters Wire strippers Crimp tool Fuse panel Power cable (from fuse and alarm panel to assembly), #10 AWG, copper conductors, 194 degrees F [90 degrees C]) Ground cable #6 AWG stranded Listed pressure terminal connectors such as ring and fork types; connectors must be suitable for #10 AWG copper conductors
Prerequisite Procedures	Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE Issue 4 and 5.

Note If the system loses power or both TCC2/TCC2P/TCC3 cards are reset and the system is not provisioned to get the time from a Network Time Protocol/Simple Network Time Protocol (NTP/SNTP) server, you must reset the ONS 15454 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the “Turn Up a Node” chapter in the Cisco ONS 15454 DWDM Configuration Guide. If you are using the TCC2/TCC2P/TCC3 cards, the system clock will run for up to three hours. In this case, no action would be required.

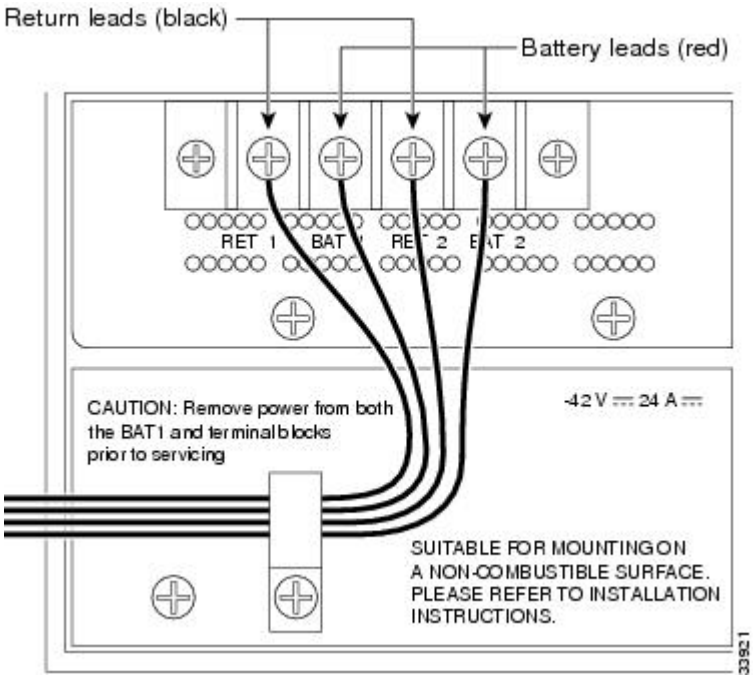
Procedure

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

Step 2 Measure and cut the cables as needed to reach the ONS 15454 from the fuse panel. The following figure shows the ONS 15454 power terminals.

Step 3 Dress the power according to local site practice.

Figure 44: Cisco ONS 15454 Power Terminals



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

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

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

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

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

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

Note When terminating battery and battery return connections as shown in Figure 44: Cisco ONS 15454 Power Terminals, on page 74, follow a torque specification of 10 in-lb.

Step 7 Terminate the return 1 lead to the RET1 backplane terminal. Use oxidation-prevention grease to keep the connections noncorrosive.

Step 8 Terminate the negative 1 lead to the negative BAT1 backplane power terminal. Use oxidation prevention grease to keep connections noncorrosive.

Step 9 If you use redundant power leads, terminate the return 2 lead to the positive RET2 terminal on the ONS 15454. Terminate the negative 2 lead to the negative BAT2 terminal on the ONS 15454. Use oxidation-preventative grease to keep connections noncorrosive.

Note The configured ONS 15454 shelf can work with a single power line since the ONS 15454 power configuration offers redundancy. When using the 15454-FTA3 fan-tray, if the ONS15454 shelf is powered by a single power line, the BAT-FAIL alarm appears, the fans run at a maximum speed, and the system does not comply with NEBS GR-63 Issue 3 and GR-1089 Issue 4 and 5 requirements. In order to meet the above mentioned NEBS requirements, the ONS 15454 shelf must be powered by both the DC power lines.

Step 10 Route the cables out below the power terminals using the plastic cable clamp, as shown in Figure 44: Cisco ONS 15454 Power Terminals, on page 74.

Step 11 Connect the return cables to earth ground at power supply side.

Step 12 Return to your originating procedure (NTP).

DLP-G19 Turn On and Verify Office Power

Purpose	This task measures the power to verify correct power and returns for the ONS 15454 shelf.
Tools/Equipment	Voltmeter
Prerequisite Procedures	ETSI: • Connect the office ground to chassis. For detailed instructions on grounding, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • DLP-G17 Connect Office Power to the ONS 15454 ETSI , on page 71 • DLP-G18 Connect Office Power to the ONS 15454 ANSI, on page 72
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Procedure

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

a) To verify the power, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side connection and verify that it is between –40.5 VDC and –57 VDC. Place the red test lead on the B-side connection and verify that it is between –40.5 VDC and –57 VDC.

Note The minimum and maximum voltages required to power the chassis are –40.5 VDC and –57 VDC respectively. The nominal steady-state voltage is -48 VDC.

b) To verify the ground, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side return ground and verify that no voltage is present. The voltmeter must read 0 VDC. Place the red test lead on the B-side return ground and verify that no voltage is present. The voltmeter must read 0 VDC.

Step 2 To power up the node, insert the fuse into the fuse position according to site practice. The fuse rating must not exceed 30A.

Step 3 At the bottom rear of the shelf, remove the cover panel to access the power connections.

Step 4 Using a voltmeter, verify the ONS 15454 shelf for –48 VDC battery and ground:

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

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

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

Step 5 Return to your originating procedure (NTP).

Shelf Voltage and Temperature

Note The temperature measured by the TCC2/TCC2P/TCC3 sensors appears on the LCD screen in the ONS 15454 chassis.

The input voltages and temperature of the ONS 15454 chassis are displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane in CTC. The voltage supplied to the shelf (in millivolts) is displayed in the Voltage area of the Voltage/Temperature pane. The temperature of the shelf (in degree Celsius) is displayed in the Temperature area of the pane.

The Voltage/Temperature pane retrieves the following values for the ONS 15454 chassis:

- Voltage A—Voltage of the shelf that corresponds to power supply A, in millivolts.
- Voltage B—Voltage of the shelf that corresponds to power supply B, in millivolts.
- Chassis Temperature—Temperature of the shelf, in degrees Celsius.

In multishelf configuration, the voltage and temperature of each shelf is displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane.

NTP-G230 View Shelf Voltage and Temperature

Purpose	This procedure displays the shelf voltage and temperature of the ONS 15454 chassis in CTC.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As Needed
Onsite/Remote	Remote
Security Level	Provisioning or higher

Note The temperature measured by the TCC2/TCC2P/TCC3 sensors appears on the LCD screen in the ONS 15454 chassis.

Procedure

Step 1 In node view (single-node mode) or multishelf view (multishelf mode), click the **Provisioning** > **General** > **Voltage/Temperature** tabs. The Voltage/Temperature pane appears.

Step 2 The Voltage/Temperature pane retrieves the following values:

- Voltage A—Voltage of the shelf that corresponds to power supply A, in millivolts.
- Voltage B—Voltage of the shelf that corresponds to power supply B, in millivolts.
- Chassis Temperature—Temperature of the shelf in degrees Celsius.

Step 3 Click the **Reset** button to refresh the voltage and temperature values.

Stop. You have completed this procedure.

Fan-Tray Assembly

The fan-tray assembly is located at the bottom of the ONS 15454 shelf. The fan-tray is a removable drawer that holds fans and fan-control circuitry for the ONS 15454. The front door can be left in place or removed before installing the fan-tray assembly. After you install the fan-tray, you should only need to access it if a fan failure occurs or if you need to replace or clean the fan-tray air filter. Refer to the “Maintain the Node” chapter in the Cisco ONS 15454 DWDM Configuration Guide to clean and replace the fan-tray assembly.

The front of the fan-tray assembly has an LCD screen that provides slot- and port-level information for all card slots, including the number of Critical, Major, and Minor alarms.

The fan-tray assembly features an air filter at the bottom of the tray that you can install and remove by hand. Remove and visually inspect this filter every 30 days and keep spare filters in stock. Refer to the "Maintain the Node" chapter in the Cisco ONS 15454 DWDM Configuration Guide for information about cleaning and maintaining the fan-tray air filter. Figure 45: Position of the ONS 15454 ETSI Fan-Tray Assembly, on page 79 shows the position of the ONS 15454 ETSI fan-tray assembly. (The fan-tray assembly on the ONS 15454 ANSI is located in a similar position.)

Caution Do not operate an ONS 15454 without the mandatory fan-tray air filter.

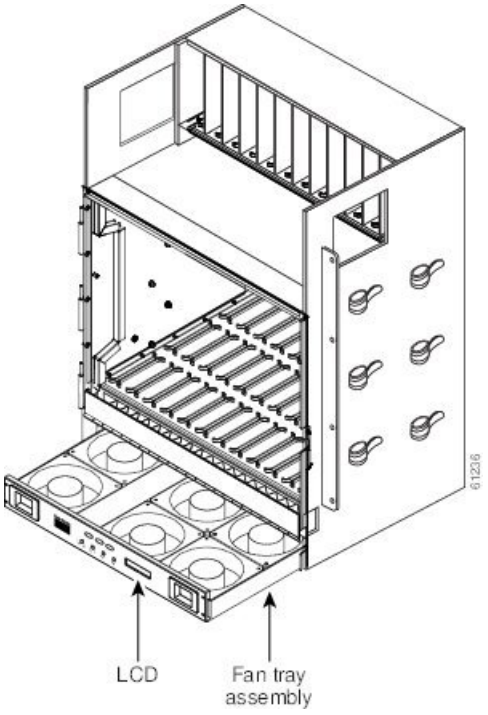
Caution Fan-tray assembly 15454E-CC-FTA (ETSI shelf)/15454-CC-FTA (ANSI shelf) is required when any of the following cards are used in an ONS 15454 DWDM application: ADM-10G, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ML-MR-10, and CE-MR-10.

Caution The 15454-FTA3-T fan-tray assembly can only be installed in ONS 15454 Release 3.1 and later shelf assemblies (15454-SA-ANSI, P/N: 800-19857; 15454-SA-HD, P/N: 800-24848). The fan-tray assembly includes a pin that prevents it from being installed in ONS 15454 shelf assemblies released before ONS 15454 Release 3.1 (15454-SA-NEBS3E, 15454-SA-NEBS3, and 15454-SA-R1). Equipment damage can result from attempting to install the 15454-FTA3 in an incompatible shelf.

Note 15454-CC-FTA is compatible with Software Release 2.2.2 and greater and shelf assemblies 15454-SA-HD and 15454-SA-ANSI. 15454E-CC-FTA is compatible with Software Release 4.0 and greater and shelf 15454-SA-ETSI.

Note Fan-tray assembly 15454E-CC-FTA (ETSI shelf)/15454-CC-FTA (ANSI shelf) is required when the 80-WXC-C card is placed near MXP or TXP units.

Figure 45: Position of the ONS 15454 ETSI Fan-Tray Assembly



Fan-tray Units for ONS 15454 Cards

The following table lists the applicable fan-tray units supported for ONS 15454 cards:

Table 7: Fan-tray Units for ONS 15454 Cards

ONS 15454 Cards	15454E-FTA-48V (ETSI shelf)/ 15454-FTA3-T (ANSI shelf)	15454E-CC-FTA (ETSI shelf)/ 15454-CC-FTA (ANSI shelf)
TCC2/TCC2P	Yes	Yes
AIC-I	Yes	Yes
MS-ISC-100T	Yes	Yes
AEP	Yes	Yes
MIC-A/P	Yes	Yes
MIC-C/T/P	Yes	Yes
TCC3	Yes	Yes
OSCM	Yes	Yes
OSC-CSM	Yes	Yes
OPT-PRE	Yes	Yes

ONS 15454 Cards	15454E-FTA-48V (ETSI shelf)/ 15454-FTA3-T (ANSI shelf)	15454E-CC-FTA (ETSI shelf)/ 15454-CC-FTA (ANSI shelf)
OPT-BST	Yes	Yes
OPT-BST-E	Yes	Yes
OPT-BST-L	Yes	Yes
OPT-AMP-L	Yes	Yes
OPT-AMP-17-C	Yes	Yes
OPT-AMP-C	Yes	Yes
OPT-RAMP-C	Yes	Yes
OPT-RAMP-CE	Yes	Yes
32MUX-O	Yes	Yes
32DMX-O	Yes	Yes
4MD-xx.x	Yes	Yes
TDC-CC	Yes	Yes
TDC-FC	Yes	Yes
PSM	Yes	Yes
AD-1C-xx.x	Yes	Yes
AD-2C-xx.x	Yes	Yes
AD-4C-xx.x	Yes	Yes
AD-1B-xx.x	Yes	Yes
AD-4B-xx.x	Yes	Yes
32-WSS	Yes	Yes
32-DMX	Yes	Yes
32-WSS-L	Yes	Yes
32-DMX-L	Yes	Yes
MMU	Yes	Yes
40-DMX-C	Yes	Yes
40-DMX-CE	Yes	Yes
40-MUX-C	Yes	Yes

ONS 15454 Cards	15454E-FTA-48V (ETSI shelf)/ 15454-FTA3-T (ANSI shelf)	15454E-CC-FTA (ETSI shelf)/ 15454-CC-FTA (ANSI shelf)
40-WSS-C	Yes	Yes
40-WSS-CE	Yes	Yes
40-WXC-C	Yes	Yes
40-SMR1-C/40-SMR2-C	Yes	Yes
80-WXC-C	Yes	Yes
TXP_MR_10G	Yes	Yes
TXP_MR_2.5G	Yes	Yes
TXPP_MR_2.5G	Yes	Yes
MXP_2.5G_10G	Yes	Yes
TXP_MR_10E	Yes	Yes
MXP_2.5G_10E	Yes	Yes
MXP_MR_2.5G	Yes	Yes
MXPP_MR_2.5G	Yes	Yes
TXP_MR_10E_C	Yes	Yes
TXP_MR_10E_L	Yes	Yes
MXP_2.5G_10E_C	Yes	Yes
MXP_2.5G_10E_L	Yes	Yes
MXP_MR_10DME_C	Yes	Yes
MXP_MR_10DME_L	Yes	Yes
GE_XP/10GE_XP	No	Yes
ADM-10G	No	Yes
GE_XPE/10GE_XPE	No	Yes
OTU2_XP	No	Yes
40G-MXP-C	No	Yes
MLSE UT	Yes	Yes
TXP_MR_10EX_C	Yes	Yes
MXP_2.5G_10EX_C	Yes	Yes

ONS 15454 Cards	15454E-FTA-48V (ETSI shelf)/ 15454-FTA3-T (ANSI shelf)	15454E-CC-FTA (ETSI shelf)/ 15454-CC-FTA (ANSI shelf)
MXP_MR_10DMEX_C	Yes	Yes
40G-MXP-C	No	Yes
40E-MXP-C	No	Yes
40ME-MXP-C	No	Yes
40E-TXP-C	No	Yes
40ME-TXP-C	No	Yes
AR-MXP	No	Yes
AR-XP	No	Yes

Note The 15454-M2-FTA and 15454-M2-FTA2 are installed in the ONS 15454-M2 shelf assembly. For information on the ONS 15454 M2 fan-tray assembly, see the Fan-Tray Assembly, on page 243. The 15454-M6-FTA and 15454-M6-FTA2 are installed in the ONS 15454-M6 shelf assembly. For information on the ONS 15454 M6 fan-tray assembly, see the Fan-Tray Assembly , on page 400.

Fan Speed

Fan speed is controlled by the TCC2/TCC2P/TCC3 card's temperature sensors. The sensors measure the input air temperature at the fan-tray assembly. Fan speed options are low, medium, and high. If the TCC2/TCC2P/TCC3 card fails, the fans automatically shift to high speed. The temperature measured by the TCC2/TCC2P/TCC3 sensors appears on the LCD screen.

Fan Failure

If one or more fans fail on the fan-tray assembly, replace the entire assembly. You cannot replace individual fans. The red Fan Fail LED on the front of the fan-tray illuminates when one or more fans fail. The red Fan Fail LED clears after you install a working fan-tray.

Caution As with the FTA3, the 15454E-CC-FTA (for ETSI) and 15454-CC-FTA (for ANSI) Fan Fail LED on the front of the fan-tray assembly illuminates when one or more fans fail to indicate that a fan-tray assembly or AIP replacement is required. But the Fan Fail LED on the 15454E-CC-FTA and 15454-CC-FTA will also illuminate when only one power source is connected to the chassis, and or any fuse blows. In such conditions, the Fan Alarm is triggered and the fans run at maximum speed.

Air Filter

The ONS 15454 contains a reusable air filter (for ANSI: 15454-FTF2; for ETSI: 15454E-ETSI-FTF) that is installed either below the fan-tray assembly or, for the ONS 15454 ANSI, in the optional external filter brackets.

The reusable filter is made of a gray, open-cell, polyurethane foam that is specially coated to provide fire and fungi resistance. All versions of the ONS 15454 can use the reusable air filter. Spare filters should be kept in stock. Inspect the air filter every 30 days, and clean the filter every three to six months. Replace the air filter every two to three years. Avoid cleaning the air filter with harsh cleaning agents or solvents.

Earlier versions of the ONS 15454 ANSI shelf used a disposable air filter that is installed beneath the fan-tray assembly only. However, the reusable air filter is backward compatible.

NTP-G8 Install the Fan-Tray Assembly

Purpose	This procedure installs the fan-tray assembly.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G3 Open and Remove the Front Door , on page 57 NTP-G7 Install the Power and Ground , on page 68
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

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

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

Note 15454-CC-FTA is compatible with Software Release 2.2.2 and greater and shelf assemblies 15454-SA-HD and 15454-SA-ANSI. 15454E-CC-FTA is compatible with Software Release 4.0 and greater and shelf 15454-SA-ETSI.

Caution If you install the air filter below 15454E-CC-FTA or 15454-CC-FTA, only filters with part numbers 700-23193-01 and 700-23194-01 can be used in this configuration.

Note Error messages appear on the TCC2/TCC2P/TCC3 card, the fan-tray LED, and in Cisco Transport Controller (CTC) when the fan-tray assembly is removed from the shelf or when one fan is not working.

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

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

Note If the fan-tray assembly is removed from the shelf, wait for at least 5 seconds before plugging it back into the shelf. In the event the LCD display in the fan-tray assembly appears blank, remove the unit from the shelf, wait for at least 5 seconds and reinsert the unit into the shelf.

Procedure

Step 1 Install the air filter. The air filter can be installed internally between the fan-tray and shelf, or externally by mounting the air filter bracket on the bottom of the shelf. Slide the air filter into the bracket.

Caution Although the air filter can work with older fan-trays if it is installed with either side facing up, Cisco recommends that you install it with the metal bracing facing up to preserve the surface of the filter. You must install the air filter with the metal bracing facing up with 15454E-CC-FTA or 15454-CC-FTA.

Step 2 Install the fan-tray assembly. Figure 46: Installing the Fan-Tray Assembly on the ONS 15454 ETSI, on page 85 shows the fan-tray assembly location on the ONS 15454 ETSI. Figure 47: Installing the Fan-Tray Assembly on the ONS 15454 ANSI, on page 86 shows the fan-tray assembly location on the ONS 15454 ANSI.

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

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

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

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

Figure 46: Installing the Fan-Tray Assembly on the ONS 15454 ETSI

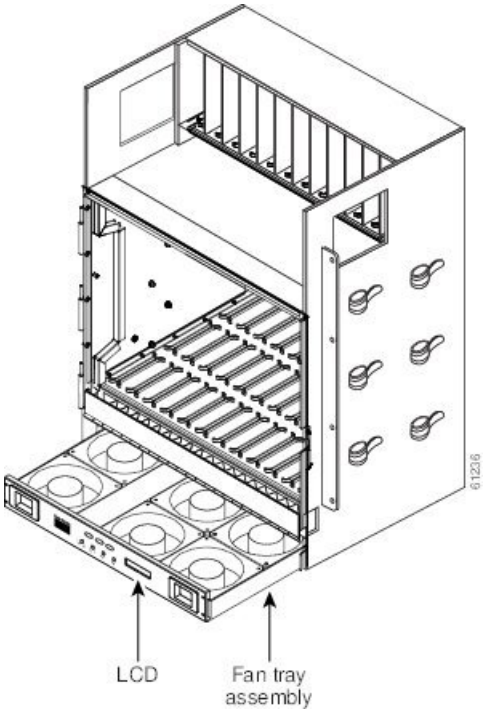
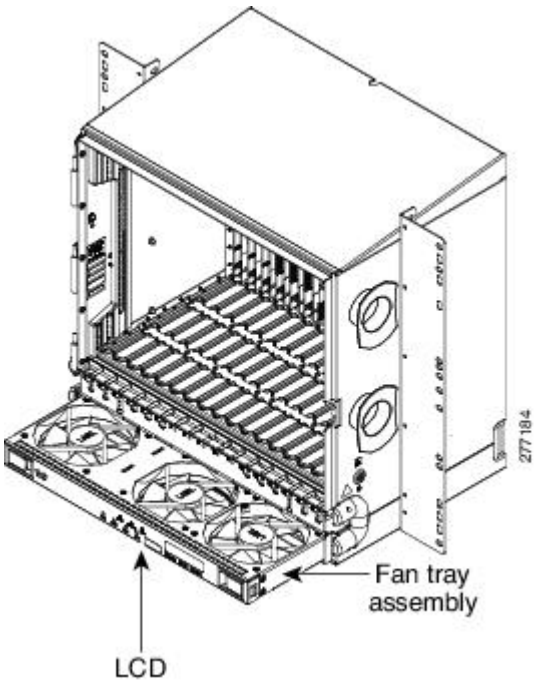


Figure 47: Installing the Fan-Tray Assembly on the ONS 15454 ANSI



Step 3 To verify that the tray has plugged into the assembly, look at the fan-tray and listen to determine that the fans are running.

Step 4 If you want to install an alarm expansion panel on the ONS 15454 ANSI shelf, continue with the NTP-G9 Install the Alarm Expansion Panel (ANSI Only), on page 92. Otherwise, continue with the ONS 15454 ANSI Alarm, Timing, LAN, and Craft Pin Connections, on page 95.

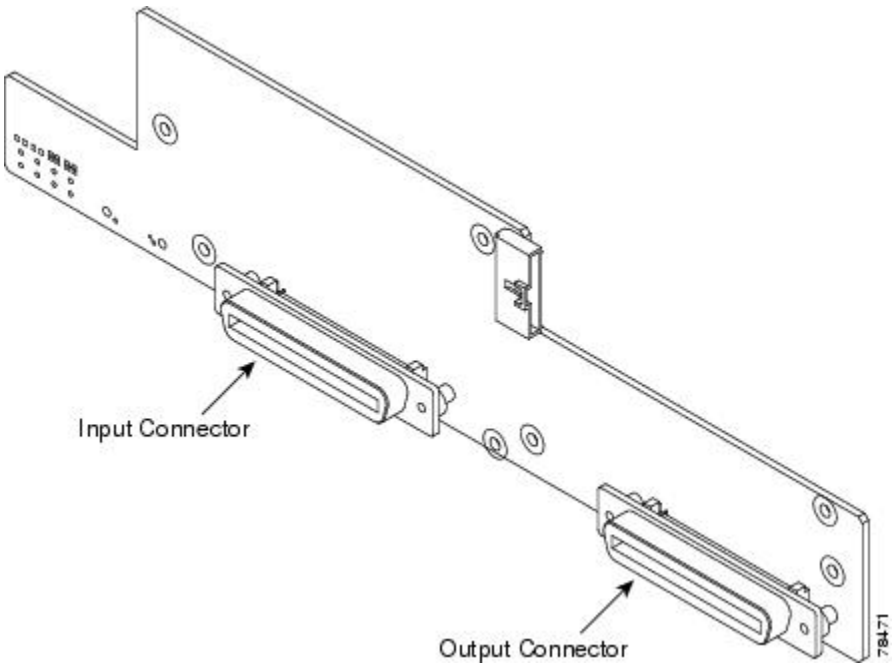
Stop. You have completed this procedure.

ONS 15454 ANSI Alarm Expansion Panel

The optional ONS 15454 ANSI alarm expansion panel (AEP) can be used with the AIC-I card to provide an additional 48 dry alarm contacts for the ONS 15454 ANSI: 32 inputs and 16 outputs. The AEP is a printed circuit board assembly that is installed on the backplane. The following figure shows the AEP board; the left connector is the input connector and the right connector is the output connector.

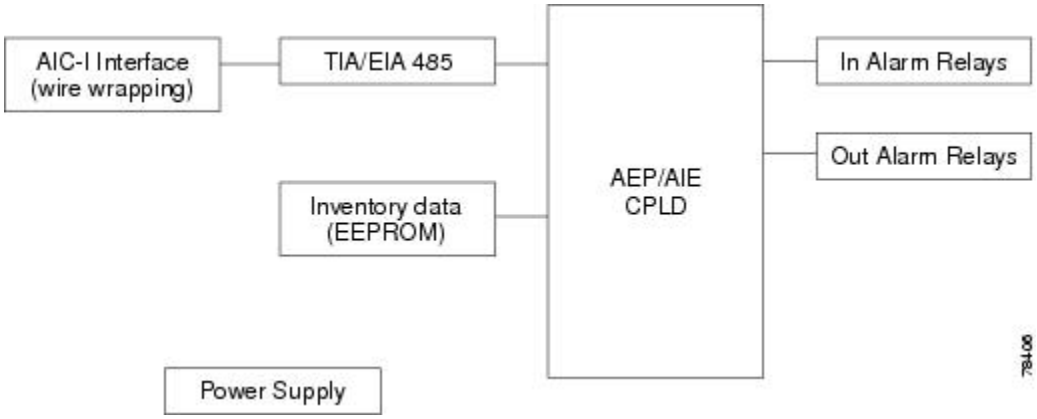
The AIC-I without an AEP already contains direct alarm contacts. These direct AIC-I alarm contacts are routed through the backplane to wire-wrap pins accessible from the back of the shelf. If you install an AEP, you cannot use the alarm contacts on the wire-wrap pins. For more information about the AIC-I, see the “Install the Control Cards” chapter in the Cisco ONS 15454 DWDM Configuration Guide.

Figure 48: AEP Printed Circuit Board Assembly



The following figure shows the AEP block diagram.

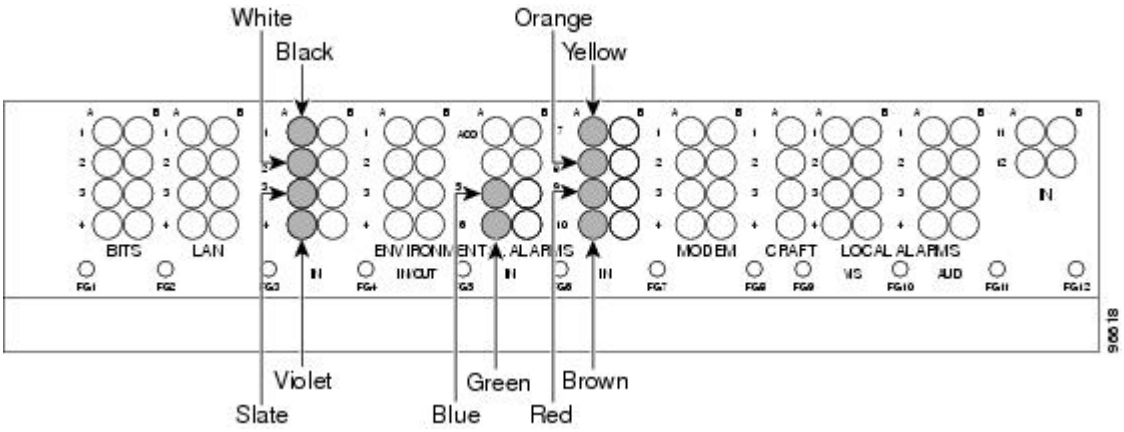
Figure 49: AEP Block Diagram



Each AEP alarm input port has a provisionable label and severity. The alarm inputs have optocoupler isolation. They have one common 32-VDC output and a maximum of 2 mA per input. Each opto-metal oxide semiconductor (MOS) alarm output can operate by definable alarm condition, a maximum open circuit voltage of 60 VDC, and a maximum current of 100 mA. See the “External Alarms and Controls” section of the “Install the Control Cards” chapter in the Cisco ONS 15454 DWDM Configuration Guide for further information.

The following figure shows the wire-wrapping connections on the shelf backplane used to connect to the AEP.

Figure 50: AEP Wire-Wrap Connections to Backplane Pins



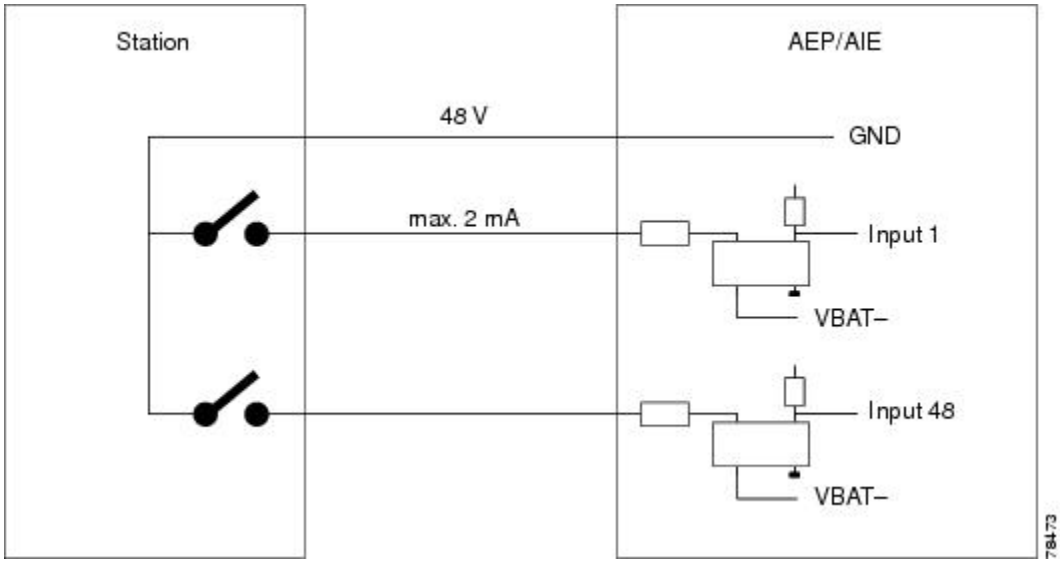
The following table shows the backplane pin assignments and corresponding signals on the AIC-I and AEP.

Table 8: Pin Assignments for the AEP

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

The following figure is a circuit diagram of the alarm inputs. (Inputs 1 and 48 are shown in the example.)

Figure 51: Alarm Input Circuit Diagram



The following table lists the connections to the external alarm sources.

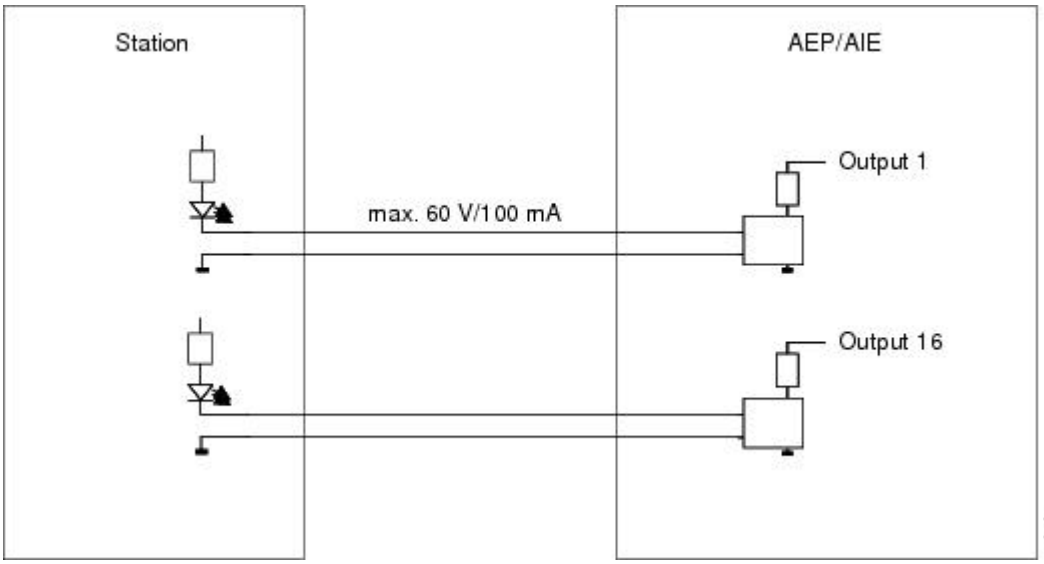
Table 9: Alarm Input Pin Association

AMP Champ Pin Number	Signal Name	AMP Champ Pin Number	Signal Name
1	ALARM_IN_1–	27	GND
2	GND	28	ALARM_IN_2–
3	ALARM_IN_3–	29	ALARM_IN_4–
4	ALARM_IN_5–	30	GND
5	GND	31	ALARM_IN_6–
6	ALARM_IN_7–	32	ALARM_IN_8–
7	ALARM_IN_9–	33	GND
8	GND	34	ALARM_IN_10–
9	ALARM_IN_11–	35	ALARM_IN_12–
10	ALARM_IN_13–	36	GND
11	GND	37	ALARM_IN_14–
12	ALARM_IN_15–	38	ALARM_IN_16–
13	ALARM_IN_17–	39	GND
14	GND	40	ALARM_IN_18–
15	ALARM_IN_19–	41	ALARM_IN_20–

AMP Champ Pin Number	Signal Name	AMP Champ Pin Number	Signal Name
16	ALARM_IN_21–	42	GND
17	GND	43	ALARM_IN_22–
18	ALARM_IN_23–	44	ALARM_IN_24–
19	ALARM_IN_25–	45	GND
20	GND	46	ALARM_IN_26–
21	ALARM_IN_27–	47	ALARM_IN_28–
22	ALARM_IN_29–	48	GND
23	GND	49	ALARM_IN_30–
24	ALARM_IN_31–	50	—
25	ALARM_IN_+	51	GND1
26	ALARM_IN_0–	52	GND2

The following figure is a circuit diagram of the alarm outputs. (Outputs 1 and 16 are shown in the example.)

Figure 52: Alarm Output Circuit Diagram



Use the pin numbers in the following table to connect to the external elements being switched by external controls.

Table 10: Pin Association for Alarm Output Pins

AMP Champ Pin Number	Signal Name	AMP Champ Pin Number	Signal Name
1	—	27	COM_0

AMP Champ Pin Number	Signal Name	AMP Champ Pin Number	Signal Name
2	COM_1	28	—
3	NO_1	29	NO_2
4	—	30	COM_2
5	COM_3	31	—
6	NO_3	32	NO_4
7	—	33	COM_4
8	COM_5	34	—
9	NO_5	35	NO_6
10	—	36	COM_6
11	COM_7	37	—
12	NO_7	38	NO_8
13	—	39	COM_8
14	COM_9	40	—
15	NO_9	41	NO_10
16	—	42	COM_10
17	COM_11	43	—
18	NO_11	44	NO_12
19	—	45	COM_12
20	COM_13	46	—
21	NO_13	47	NO_14
22	—	48	COM_14
23	COM_15	49	—
24	NO_15	50	—
25	—	51	GND1
26	NO_0	52	GND2

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

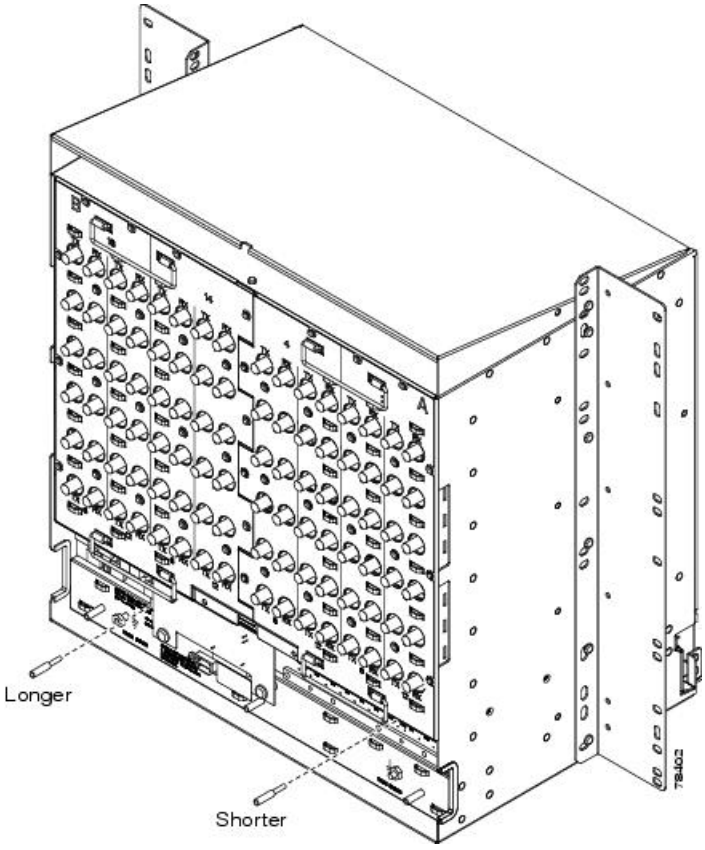
Purpose	This procedure installs an AEP onto the 15454-SA-ANSI or 15454-SA-HD shelf backplane. The AEP provides alarm contacts (32 inputs, 16 outputs) in addition to the 16 provided by the AIC-I card. Typically, the AEP is preinstalled when ordered with the ONS 15454 ANSI; however, the AEP can be ordered separately. The AIC-I card must be installed before you can provision the alarm contacts enabled by the AEP.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver Wire wrapper 6-pair #29 AWG double-shielded cable Standoffs (4)
Prerequisite Procedures	DLP-G13 Remove the Lower Backplane Cover , on page 64
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

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

Procedure

Step 1 Remove the two backplane screws. Replace the two screws with standoffs. Insert the longer standoff on the left, and the shorter standoff on the right as shown in the following figure.

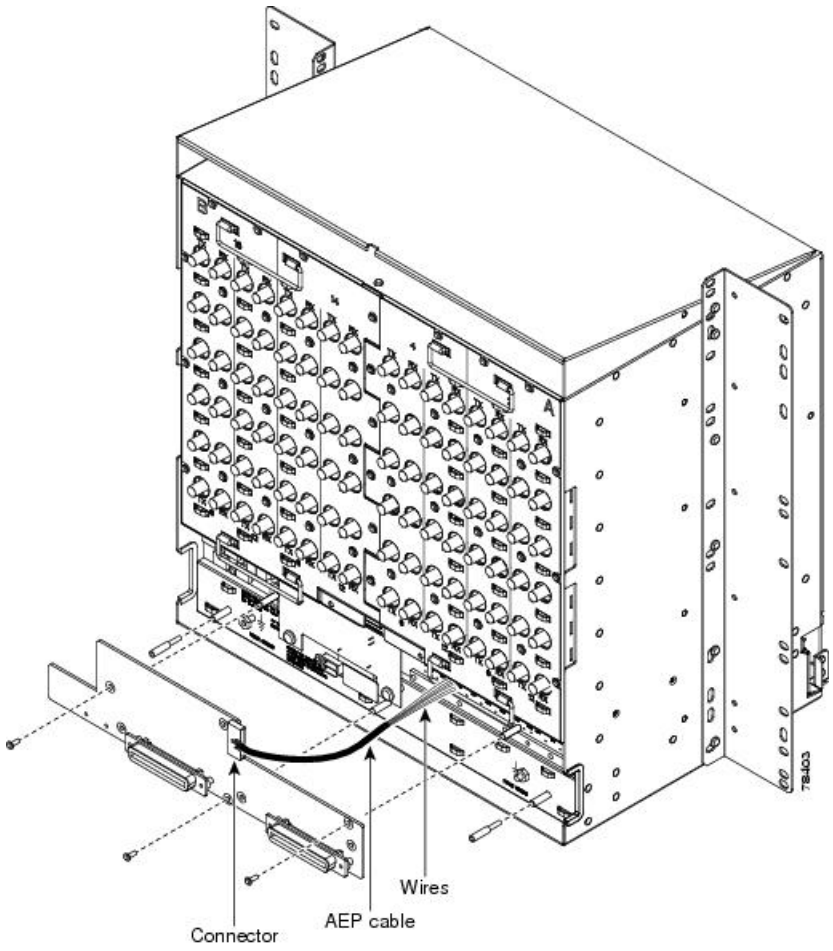
Figure 53: Replace Backplane Screws with Standoffs



Step 2 Attach the remaining two standoffs on either side of the backplane as shown in the following figure.

Step 3 Position the AEP board over the standoffs.

Figure 54: Installing Standoffs and the AEP



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

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

a) Connect the 10 colored wires to the wire-wrap pins on the backplane. The following figure shows where the cable wires are connected. Table 11: Pin Assignments for the AEP, on page 95 shows AEP and AIC-I signals that each wire carries.

b) Plug the other end of the AEP cable into AEP connector port.

Figure 55: AEP Wire-Wrap Connections to Backplane Pins

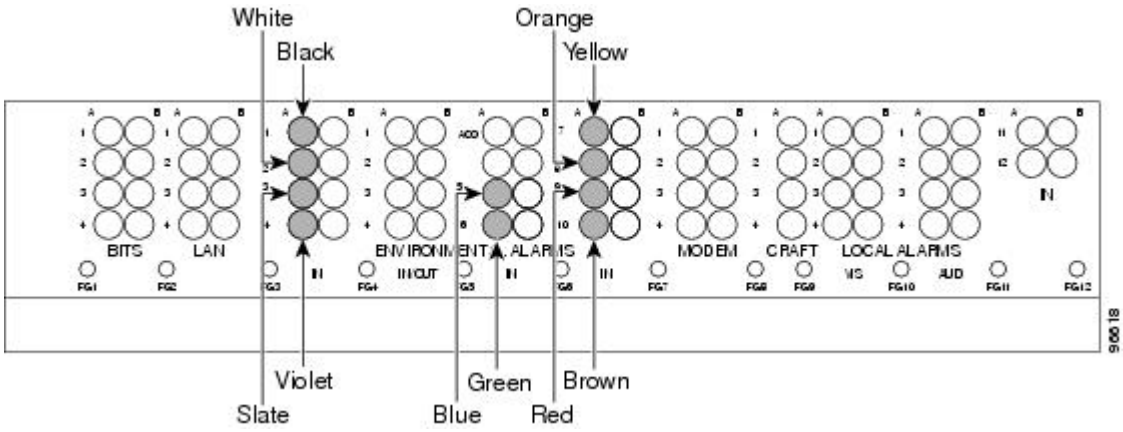


Table 11: Pin Assignments for the AEP

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

Step 6 Continue with the ONS 15454 ANSI Alarm, Timing, LAN, and Craft Pin Connections, on page 95.

Stop. You have completed this procedure.

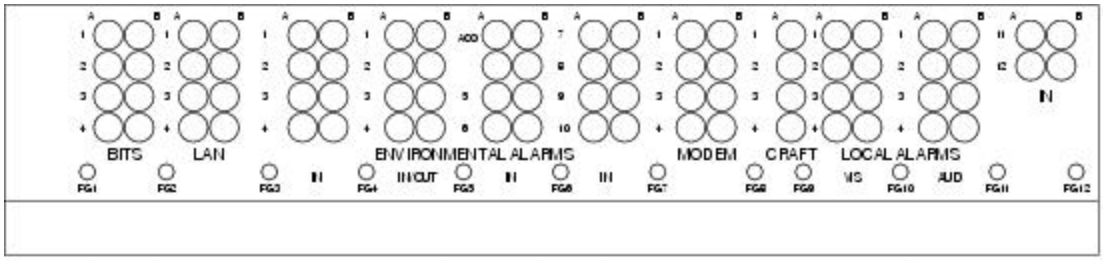
ONS 15454 ANSI Alarm, Timing, LAN, and Craft Pin Connections

Pin connections are provided on the ONS 15454 ANSI backplane. For information about ONS 15454 ETSI connections, see the ONS 15454 ETSI Front Mount Electrical Connection, on page 66.

The ONS 15454 ANSI has a backplane pin field located at the bottom of the backplane. The backplane pin field provides 0.045 inch2 (29 mm2) wire-wrap pins for enabling external alarms, timing input and output, and craft interface terminals. This section describes the backplane pin field and the pin assignments for the field. Figure 57: ONS 15454 ANSI Backplane Pinouts, on page 98 shows the wire-wrap pins on the backplane pin field. Beneath each wire-wrap pin is a frame ground pin. Frame ground pins are labeled FG1, FG2, FG3, etc. Install the ground shield of the cables connected to the backplane to the ground pin that corresponds to the pin field used.

Note The AIC-I requires a shelf running Software R3.4.0 or later. The backplane of the ANSI shelf contains a wire-wrap field with pin assignment according to the layout in Figure 56: Cisco ONS 15454 Backplane Pinouts (Release 3.4 or Later), on page 97. The shelf might be an existing shelf that has been upgraded to Software R3.4 or later. In this case, the backplane pin labeling appears as indicated in Figure 57: ONS 15454 ANSI Backplane Pinouts, on page 98, but you must use the pin assignments provided by the AIC-I card as shown in Figure 56: Cisco ONS 15454 Backplane Pinouts (Release 3.4 or Later), on page 97.

Figure 56: Cisco ONS 15454 Backplane Pinouts (Release 3.4 or Later)



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

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

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

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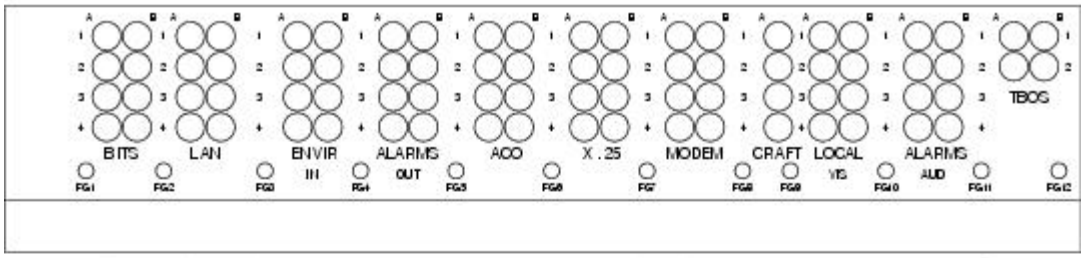
Figure 57: ONS 15454 ANSI Backplane Pinouts



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

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

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Alarm Contact Connections

The alarm pin field supports up to 17 alarm contacts, including four audible alarms, four visual alarms, one alarm cutoff (ACO), and four user-definable alarm input and output contacts.

Audible alarm contacts are in the LOCAL ALARM AUD pin field and visual contacts are in the LOCAL ALARM VIS pin field. Both of these alarms are in the LOCAL ALARMS category. User-definable contacts are in the ENVIR ALARM IN (external alarm) and ENVIR ALARM OUT (external control) pin fields. These alarms are in the ENVIR ALARMS category; you must have the AIC-I card installed to use the ENVIR ALARMS. Alarm contacts are Normally Open (N/O), meaning that the system closes the alarm contacts when the corresponding alarm conditions are present. Each alarm contact consists of two wire-wrap pins on the shelf backplane. Visual and audible alarm contacts are classified as Critical, Major, Minor, and Remote. Figure

56: Cisco ONS 15454 Backplane Pinouts (Release 3.4 or Later), on page 97 and Figure 57: ONS 15454 ANSI Backplane Pinouts, on page 98 show alarm pin assignments.

Visual and audible alarms are typically wired to trigger an alarm light or bell at a central alarm collection point when the corresponding contacts are closed. You can use the ACO pins to activate a remote ACO for audible alarms. You can also activate the ACO function by pressing the ACO button on the TCC2/TCC2P/TCC3 card faceplate. The ACO function clears all audible alarm indications. After clearing the audible alarm indication, the alarm is still present and viewable in the Alarms tab in CTC.

Timing Connections

The ONS 15454 ANSI backplane supports two building integrated timing supply (BITS) clock pin fields. The first four BITS pins, rows 3 and 4, support output and input from the first external timing device. The last four BITS pins, rows 1 and 2, perform the identical functions for the second external timing device. The following table lists the pin assignments for the BITS timing pin fields.

Note For timing connection, use 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² [0.020 inch] or 0.64 mm² [0.0252 inch]), twisted-pair T1-type.

Table 12: BITS External Timing Pin Assignments

External Device	Contact	Tip and Ring	Function
First external device	A3 (BITS 1 Out)	Primary ring (–)	Output to external device
	B3 (BITS 1 Out)	Primary tip (+)	Output to external device
	A4 (BITS 1 In)	Secondary ring (–)	Input from external device
	B4 (BITS 1 In)	Secondary tip (+)	Input from external device
Second external device	A1 (BITS 2 Out)	Primary ring (–)	Output to external device
	B1 (BITS 2 Out)	Primary tip (+)	Output to external device
	A2 (BITS 2 In)	Secondary ring (–)	Input from external device
	B2 (BITS 2 In)	Secondary tip (+)	Input from external device

Note Refer to Telcordia SR-NWT-002224 for rules about provisioning timing references.

LAN Connections

Use the LAN pins on the ONS 15454 ANSI backplane to connect the ONS 15454 ANSI to a workstation or Ethernet LAN, or to a LAN modem for remote access to the node. You can also use the LAN port on the TCC2/TCC2P/TCC3 faceplate to connect a workstation or to connect the ONS 15454 ANSI to the network. The following table shows the LAN pin assignments.

Before you can connect an ONS 15454 ANSI to other ONS 15454 ANSI shelves or to a LAN, you must change the default IP address that is shipped with each ONS 15454 ANSI (192.1.0.2).

Table 13: LAN Pin Assignments

Pin Field	Backplane Pins	RJ-45 Pins
LAN 1 Connecting to data circuit-terminating equipment (DCE[1], a hub or switch)	B2	1
	A2	2
	B1	3
	A1	6
LAN 1Connecting to data terminal equipment (DTE) (a PC/workstation or router)	B1	1
	A1	2
	B2	3
	A2	6

[1] The Cisco ONS 15454 ANSI is DCE.

TL1 Craft Interface Installation

You can use the craft pins on the ONS 15454 ANSI backplane or the EIA/TIA-232 port on the TCC2/TCC2P/TCC3 faceplate to create a VT100 emulation window to serve as a TL1 craft interface to the ONS 15454 ANSI. Use a straight-through cable to connect to the EIA/TIA-232 port. The following table shows the pin assignments for the CRAFT pin field.

Note You cannot use the craft backplane pins and the EIA/TIA-232 port on the TCC2/TCC2P/TCC3 card simultaneously.

Note To use the serial port craft interface wire-wrap pins on the backplane, the DTR signal line on the backplane port wire-wrap pin must be connected and active.

Table 14: Craft Interface Pin Assignments

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

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

Purpose	This procedure installs alarm, timing, LAN, and craft wires on the ONS 15454 shelf. These wires are attached to the mechanical interface card (MIC) FMECs on the ETSI shelf and are attached to the backplane on the ANSI shelf.
Tools/Equipment	Connectors according to function Twisted #22 or #24 AWG (0.51 mm² or 0.64 mm²) shielded wires for LAN or craft 75-ohm coaxial cable with 1.0/2.3 miniature coax connector 0.51 mm² or 0.64 mm² (#22 or #24 AWG) alarm wires
Prerequisite Procedures	NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), on page 66 NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 ETSI. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 For an ONS 15454 ETSI shelf, complete the following tasks as necessary:

- Complete the DLP-G20 Install Alarm Wires on the MIC-A/P (ETSI Only), on page 102if you want to provision external alarms and/or controls with the AIC-I card.
- Complete the DLP-G21 Install Timing Wires on the MIC-C/T/P (ETSI Only), on page 105 if you are provisioning external timing.
- Complete the DLP-G22 Install LAN Wires on the MIC-C/T/P (ETSI Only), on page 106 to create an external LAN connection. You must either install LAN wires on the MIC-C/T/P or connect a CAT-5 Ethernet cable to the LAN port on the TCC2/TCC2P/TCC3 card to create an external LAN connection.

Step 2 For an ONS 15454 ANSI shelf, complete the following tasks as necessary:

- Complete the DLP-G23 Install Alarm Wires on the Backplane (ANSI Only), on page 107 if you are using an AIC-I card and are not using an AEP.

- Complete the DLP-G24 Install Timing Wires on the Backplane (ANSI Only), on page 110 if you are provisioning external timing.
- Complete the DLP-G25 Install LAN Wires on the Backplane (ANSI Only), on page 111 to create an external LAN connection. You must either install LAN wires on the backplane or connect a CAT-5 Ethernet cable to the LAN port on the TCC2/TCC2P/TCC3 card to create an external LAN connection.
- Complete the TL1 Craft Interface Installation, on page 100 to access Transaction Language One (TL1) using the craft interface. Craft wires or the EIA/TIA-232 port on the TCC2/TCC2P/TCC3 card are required to access TL1.

Stop. You have completed this procedure.

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

Purpose	This task installs alarm cables on the MIC-A/P on the ONS 15454 ETSI so that you can provision external (environmental) alarms and controls with the AIC-I card.
Tools/Equipment	DB-62 connector 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wires
Prerequisite Procedures	NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), on page 66
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

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

Table 15: Alarm Pin Assignments

DB-62 Pin Connector	Signal Name	Function
1	ALMCUTOFF–	Alarm cutoff
2	ALMCUTOFF+	Alarm cutoff
3	ALMINP0–	Alarm input pair number 1
4	ALMINP0+	Alarm input pair number 1
5	ALMINP1–	Alarm input pair number 2

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

DB-62 Pin Connector	Signal Name	Function
34	EXALM10+	Extra alarm 10
35	EXALM11–	Extra alarm 11
36	EXALM11+	Extra alarm 11
37	ALMOUP0–	Normally open output pair number 1
38	ALMOUP0+	Normally open output pair number 1
39	FGND	Ground
40	ALMOUP1–	Normally open output pair number 2
41	ALMOUP1+	Normally open output pair number 2
42	ALMOUP2–	Normally open output pair number 3
43	ALMOUP2+	Normally open output pair number 3
44	ALMOUP3–	Normally open output pair number 4
45	ALMOUP3+	Normally open output pair number 4
46	AUDALM0–	Normally open minor audible alarm
47	AUDALM0+	Normally open minor audible alarm
48	AUDALM1–	Normally open major audible alarm
49	AUDALM1+	Normally open major audible alarm
50	AUDALM2–	Normally open critical audible alarm
51	AUDALM2+	Normally open critical audible alarm
52	FGND	Ground
53	AUDALM3–	Normally open remote audible alarm
54	AUDALM3+	Normally open remote audible alarm
55	VISALM0–	Normally open minor visible alarm
56	VISALM0+	Normally open minor visible alarm
57	VISALM1–	Normally open major visible alarm
58	VISALM1+	Normally open major visible alarm
59	VISALM2–	Normally open minor visible alarm
60	VISALM2+	Normally open minor visible alarm
61	VISALM3–	Normally open minor visible alarm

DB-62 Pin Connector	Signal Name	Function
62	VISALM3+	Normally open minor visible alarm

Step 2 Connect the other end of the alarm and control wires according to local site practice.

Step 3 Connect the DB-62 connector to the ALARM IN/OUT connector on the MIC-A/P faceplate.

Step 4 Tighten the screws of the connector on the alarm cable.

Step 5 Return to your originating procedure (NTP).

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

Purpose	This task installs the timing cables on the MIC-C/T/P FMEC.
Tools/Equipment	75-ohm coaxial cable with a 1.0/2.3 miniature coax connector on the MIC-C/T/P side
Prerequisite Procedures	NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), on page 66
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

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

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

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

Table 16: MIC-C/T/P Clock Connector Pin Assignment

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

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

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

Step 3 Connect the other end of the cable to the external source of the timing signal according to Table 16: MIC-C/T/P Clock Connector Pin Assignment, on page 105.

Step 4 Repeat Step 3 for each cable that is required.

Step 5 Return to your originating procedure (NTP).

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

Purpose	This task installs the LAN wires on the ONS 15454 ETSI MIC-C/T/P.
Tools/Equipment	Standard CAT-5 Ethernet cable (straight-through for data terminating equipment [DTE] or cross-over for data circuit-terminating equipment [DCE]) or RJ-45 connector Crimping tool for RJ-45 connector 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wire, preferably CAT-5
Prerequisite Procedures	NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), on page 66
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note Rather than using the LAN connection port on the MIC-C/T/P, you can use the LAN connection port on the TCC2/TCC2P/TCC3 card if preferred. Use either the MIC-C/T/P connection or the TCC2/TCC2P/TCC3 card connection. You cannot use the LAN connection port on the MIC-C/T/P and the LAN connection port on the TCC2/TCC2P/TCC3 card simultaneously; however, it is possible for you to make a direct connection from a computer to the LAN connection port on the TCC2/TCC2P/TCC3 card while the LAN connection port on the MIC-C/T/P is in use as long as the computer connected directly to the TCC2/TCC2P/TCC3 card is not connected to the same LAN.

Procedure

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

Table 17: LAN Pin Assignments

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

[2] The Cisco ONS 15454 ETSI is DCE.

Step 2 Return to your originating procedure (NTP).

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

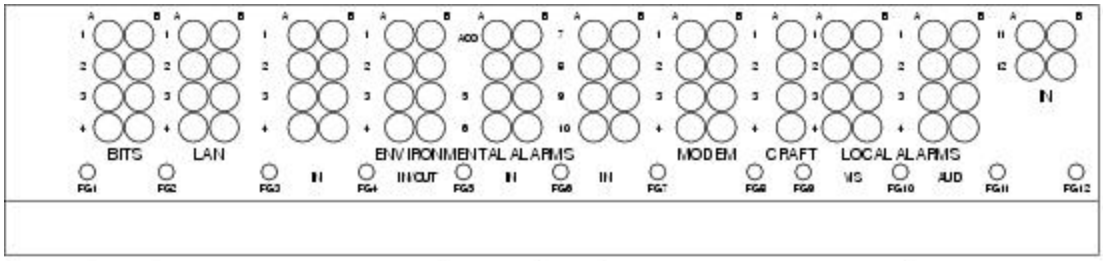
Purpose	This task installs alarm wires on the backplane so that you can provision external (environmental) alarms and controls with the AIC-I card. If you are using the AEP, do not perform this task.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm² or 0.64 mm²) wires 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64

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

Procedure

Step 1 Using 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm^2 or 0.64 mm^2) twisted-pair T1-type wires, wrap the alarm wires on the appropriate wire-wrap pins according to local site practice. Ground the shield of the BITS Input cable at the BITS end. For BITS Output, wrap the ground shield of the BITS cable to the frame ground pin (FG1) located below the column of BITS pins.

Figure 58: Cisco ONS 15454 Backplane Pinouts (Release 3.4 or Later)



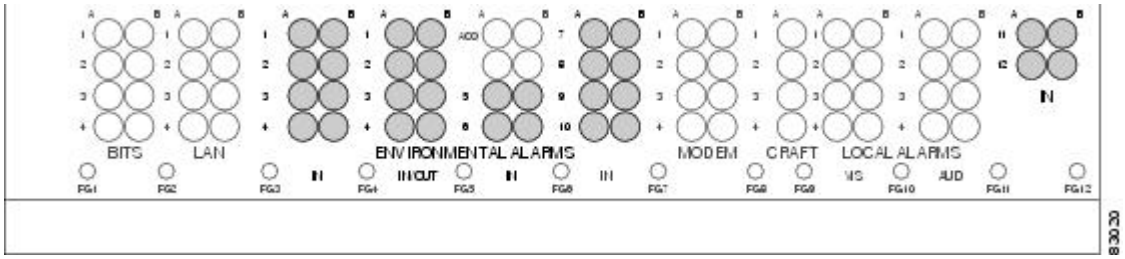
Field	Pin	Function
BITS	A1	BITS Output 2 negative (–)
	B1	BITS Output 2 positive (+)
	A2	BITS Input 2 negative (–)
	B2	BITS Input 2 positive (+)
	A3	BITS Output 1 negative (–)
	B3	BITS Output 1 positive (+)
	A4	BITS Input 1 negative (–)
	B4	BITS Input 1 positive (+)
LAN	Connecting to a hub, or switch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

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

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

83020

Figure 59: Highlighted Environmental Alarms



Step 2 Return to your originating procedure (NTP).

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

Purpose	This task installs the BITS timing wires on the ONS 15454 ANSI backplane.
Tools/Equipment	Wire wrapper 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² or 0.64 mm²), twisted-pair T1-type
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

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

Ground the shield of the BITS input cable at the BITS end. For BITS output, wrap the ground shield of the BITS cable to the frame ground pin (FG1) located beneath the column of BITS pins. Table 12: BITS External Timing Pin Assignments, on page 99 lists the pin assignments for the BITS timing pin fields.

Table 18: External Timing Pin Assignments for BITS

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

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

Note For more detailed information about timing and to set up system timing, see the "NTP-G53 Set Up Timing" procedure of the "Turn Up a Network" chapter in the Cisco ONS 15454 DWDM Configuration Guide.

Step 2 Return to your originating procedure (NTP).

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

Purpose	This task installs the LAN wires on the ONS 15454 ANSI backplane.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm² or 0.64 mm²) wire, preferably CAT-5
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note Rather than using the LAN wires, you can use the LAN connection port on the TCC2/TCC2P/TCC3 if preferred. Use either the backplane connection or the TCC2/TCC2P/TCC3 front connection. You cannot use the LAN backplane pins and the LAN connection port on the TCC2/TCC2P/TCC3 simultaneously; however, it is possible for you to make a direct connection from a computer to the LAN connection port on the TCC2/TCC2P/TCC3 while the LAN backplane pins are in use as long as the computer that is connected directly to the TCC2/TCC2P/TCC3 is not connected to the same LAN.

Procedure

Step 1 Using #22 or #24 AWG (0.51 mm² or 0.64 mm²) wire or CAT-5 Ethernet cable, wrap the wires on the appropriate wire-wrap pins according to local site practice.

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

A frame ground pin is located beneath each pin field (FG2 for the LAN pin field). Wrap the ground shield of the LAN interface cable to the frame ground pin. Table 13: LAN Pin Assignments, on page 100 shows the LAN pin assignments.

Table 19: LAN Pin Assignments for the ONS 15454 ANSI Shelf

Pin Field	Backplane Pins	RJ-45 Pins	Function/Color
LAN 1 Connecting to DCE[3] (a hub or switch);	B2	1	TX+ white/green
	A2	2	TX– green
	B1	3	RX+ white/orange
	A1	6	RX– orange
LAN 1Connecting to DTE (a PC/workstation or router)	B1	1	RX+ white/green
	A1	2	RX– green
	B2	3	TX+ white/orange
	A2	6	TX– orange

[3] The ONS 15454 ANSI is a DCE.

Note The TCC2/TCC2P/TCC3 does not support Ethernet polarity detection. If your Ethernet connection has incorrect polarity (this can only occur with cables that have the receive wire pairs flipped), a LAN Connection Polarity Reversed (LAN-POL-REV) condition is raised. This condition usually occurs during an upgrade or initial node deployment. To correct the situation, ensure that your Ethernet cable has the correct mapping of the wire-wrap pins.

Step 2 Return to your originating procedure (NTP).

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

Purpose	This task installs the TL1 craft interface on the ONS 15454 ANSI shelf using the craft backplane pins. You can also use a LAN cable connected to the TCC2/TCC2P/TCC3 EIA/TIA-232 port to access a TL1 craft interface.
Tools/Equipment	Wire wrapper #22 or #24 AWG (0.51 mm² or 0.64 mm²) alarm wires
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note Rather than using the craft pins, you can use a LAN cable connected to the TCC2/TCC2P/TCC3 EIA/TIA-232 port to access a TL1 craft interface.

Procedure

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

Step 2 Wrap the ground shield of the craft interface cable to the frame-ground pin.

Wrap the ground wire of your computer cable to pin A3 on the craft pin field.

Note You cannot use the craft backplane pins and the EIA/TIA-232 port on the TCC2/TCC2P/TCC3 card simultaneously. Using a combination prevents access to the node or causes a loss in connectivity.

Table 20: Craft Interface Pin Assignments

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

Step 3 Return to your originating procedure (NTP).

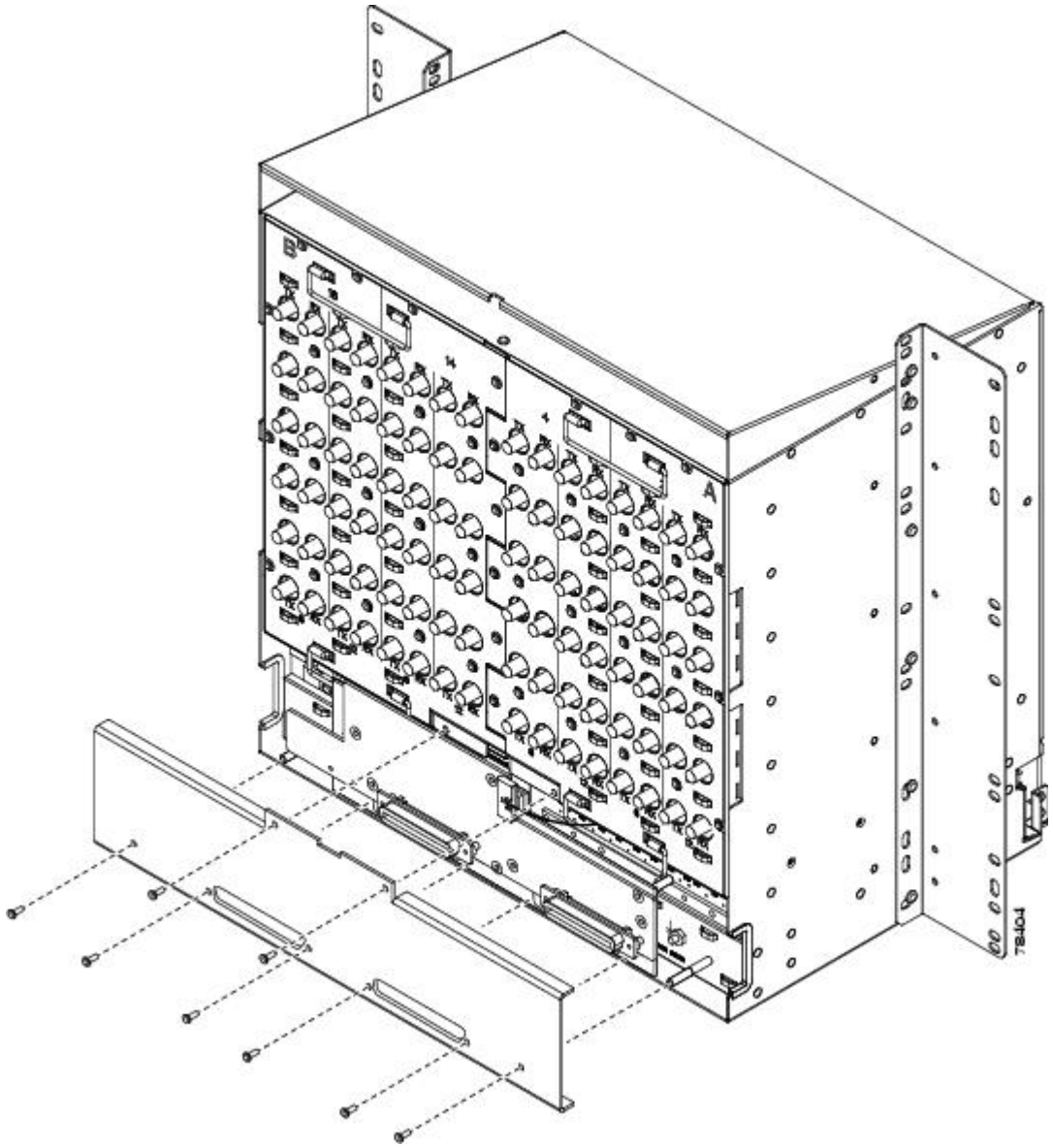
NTP-G11 Install an External Wire-Wrap Panel on the AEP (ANSI Only)

Purpose	This procedure connects an external wire-wrap panel to the ONS 15454 ANSI AEP to provide the physical alarm contacts for the AEP.
Tools/Equipment	External wire-wrap panel
Prerequisite Procedures	NTP-G9 Install the Alarm Expansion Panel (ANSI Only), on page 92
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Position the lower cover over the AEP. Make sure that the AEP AMP Champ connectors protrude through the cutouts in the lower cover as shown in the following figure.

Figure 60: Installing the AEP Cover



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

Step 3 Connect the cables from the external wire-wrap panel to the AMP Champ connectors on the AEP. The following table lists the alarm input pin assignments.

Table 21: Alarm Input Pin Assignments

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

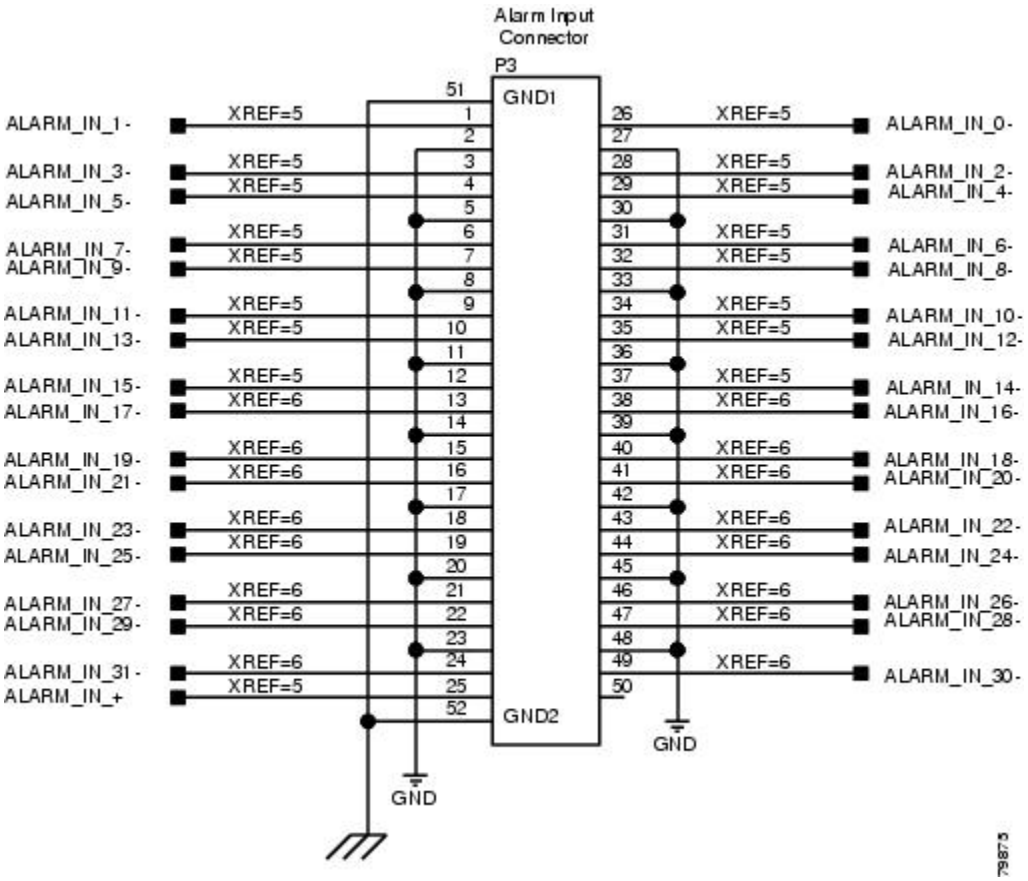
The following table lists the alarm output (external control) pin assignments.

Table 22: Alarm Output Pin Assignments

AMP Champ Pin	Signal Name	AMP Champ Pin	Signal Name
1	—	27	COM_0
2	COM_1	28	—
3	NO_1	29	NO_2
4	—	30	COM_2
5	COM_3	31	—
6	NO_3	32	NO_4
7	—	33	COM_4
8	COM_5	34	—
9	NO_5	35	NO_6
10	—	36	COM_6
11	COM_7	37	—
12	NO_7	38	NO_8
13	—	39	COM_8
14	COM_9	40	—
15	NO_9	41	NO_10
16	—	42	COM_10
17	COM_11	43	—
18	NO_11	44	NO_12
19	—	45	COM_12
20	COM_13	46	—
21	NO_13	47	NO_14
22	—	48	COM_14
23	COM_15	49	—
24	NO_15	50	—
25	—	51	GND1
26	NO_0	52	GND2

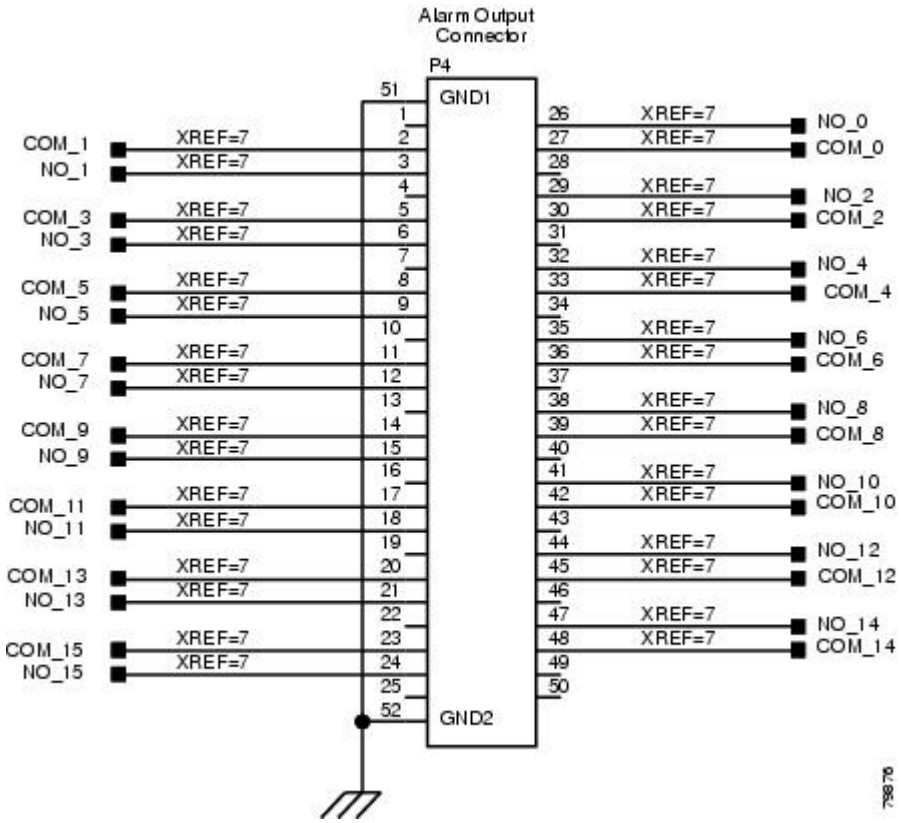
The following figure illustrates the alarm input connectors.

Figure 61: Alarm Input Connector



The following figure illustrates the alarm output connectors.

Figure 62: Alarm Output Connector



Step 4 Continue with the NTP-G13 Install the Rear Cover (ANSI Only), on page 119 as needed.

Stop. You have completed this procedure.

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

Purpose	This procedure installs and closes the ONS 15454 ETSI FMEC cover.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G4 Open and Remove the FMEC Cover (ETSI Only), on page 61
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

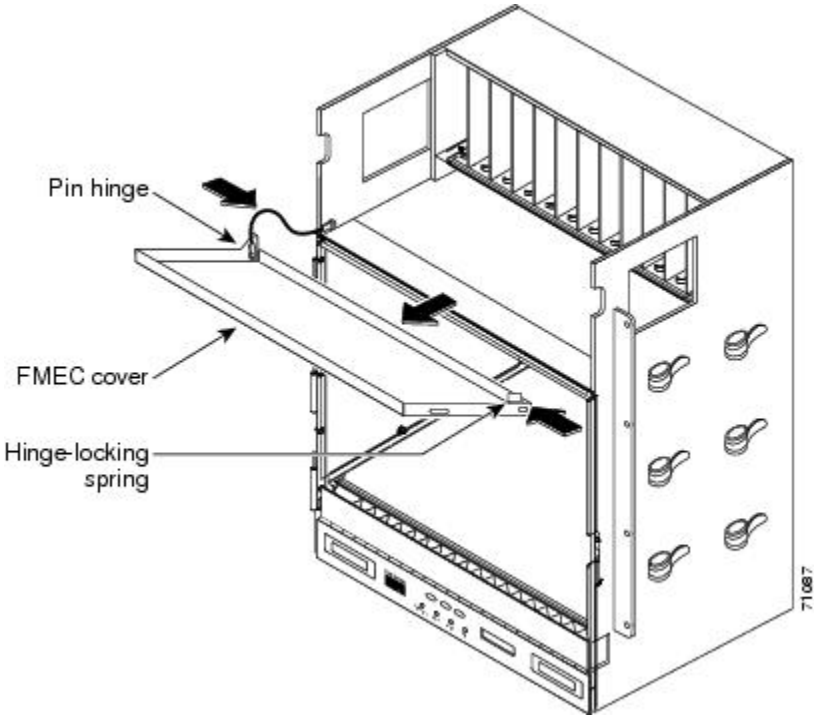
Procedure

Step 1 Insert the cover carefully onto the left pin of the hinge as shown in the following figure.

Step 2 Move the cover to the right side towards the right pin of the hinge.

Step 3 Pull the right side of the hinge-locking spring. Push the cover onto the right pin until the spring snaps into place.

Figure 63: ONS 15454 ETSI FMEC Cover



Step 4 Attach the ground wire to the shelf.

Step 5 Attach the washer and nut.

Step 6 Attach the cover to the shelf using the screws on the top of the cover.

Step 7 Continue with the NTP-G14 Install DWDM Equipment, on page 124.

Stop. You have completed this procedure.

NTP-G13 Install the Rear Cover (ANSI Only)

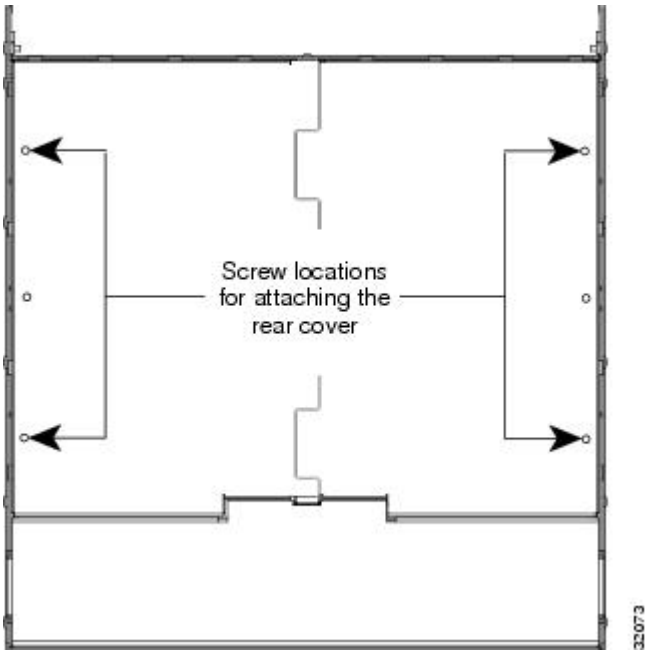
Purpose	The following procedure explains how to install the rear cover on an ONS 15454 ANSI shelf.

Tools/Equipment	#2 Phillips Dynamometric screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Locate the three screws that run vertically along on each side of the backplane. See the following figure.

Figure 64: Backplane Attachment for the Rear Cover



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

Step 2 Loosen the top and bottom screws on one edge of the backplane to provide room to slide the mounting brackets into place using the U-shaped screw slots on each end.

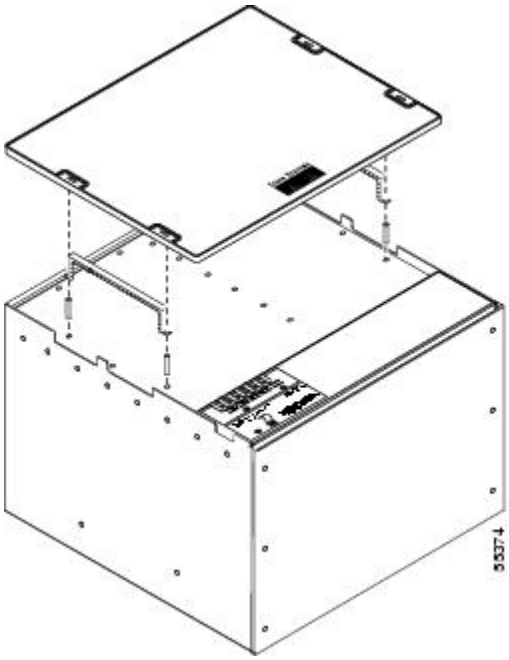
Step 3 Slide one of the mounting brackets into place and tighten the screws.

Step 4 Repeat Steps 2 and 3 for the second mounting bracket.

Step 5 Attach the cover by hanging it from the mounting screws on the back of the mounting brackets and pulling it down until it fits snugly into place.

The following figure shows rear cover installation.

Figure 65: Installing the Rear Cover



Step 6 Continue with the NTP-G14 Install DWDM Equipment, on page 124.

Stop. You have completed this procedure.

Typical DWDM Rack Layouts

Typical dense wavelength division multiplexing (DWDM) applications might include:

- 3 ONS 15454 shelves
- 1 Dispersion Compensating Unit (DCU)
- 7 patch panels (or fiber-storage trays), in either 1rack unit (RU) or 2 RU sizes
  - 1RU: Fiber-storage tray and 64-channel patch panel
  - 2 RU: Y-cable patch panel, 64-channel patch panel, 80-channel patch panel, and mesh patch panel (4 or 8 degree)

Or, alternatively:

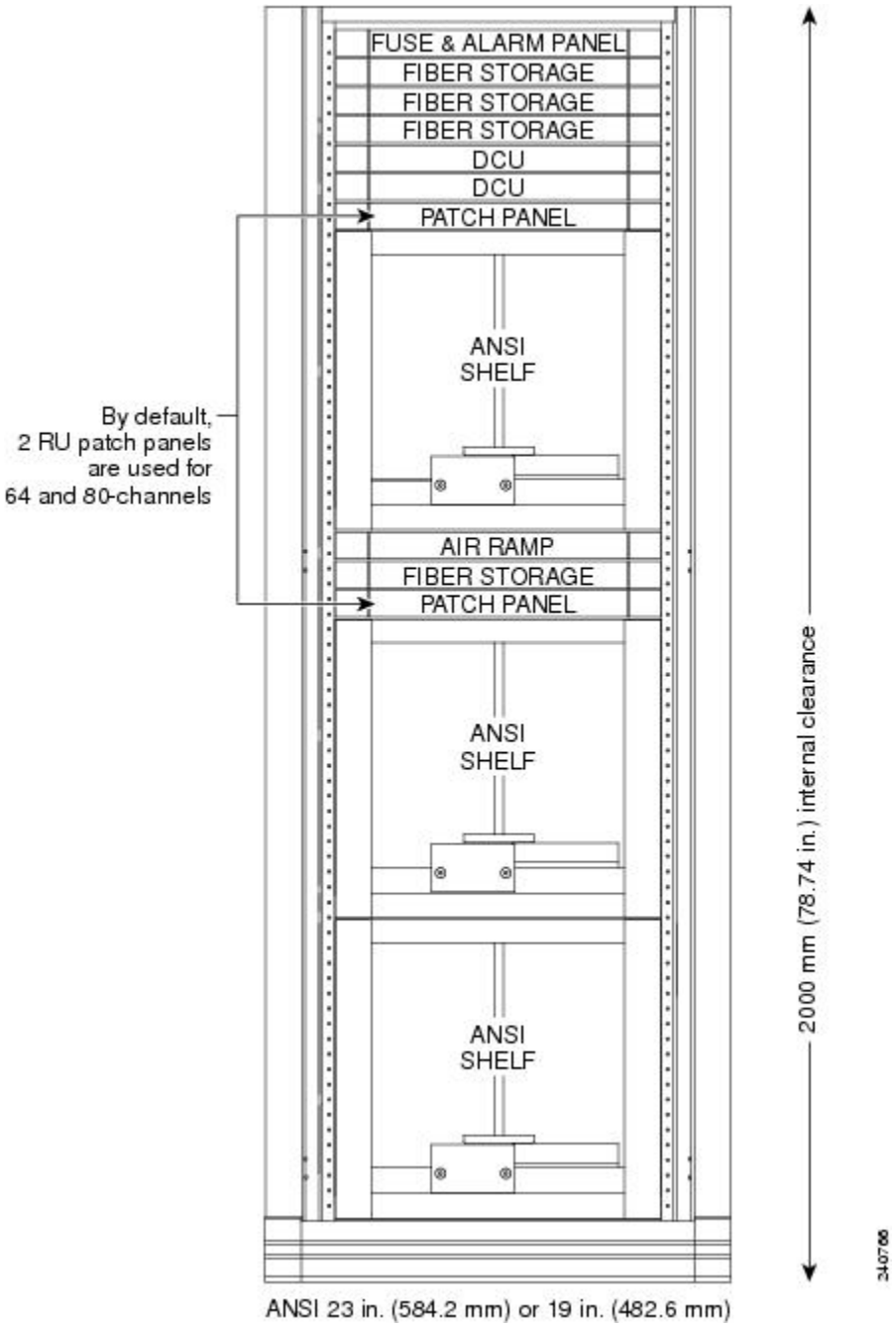
- 3 ONS 15454 shelves
- 2 DCUs
- 6 standard patch-panel trays (or fiber-storage trays), or 3 deep patch-panel trays, in either 1 RU or 2 RU sizes
  - 1RU: Fiber-storage tray and 64-channel patch panel

- 2 RU: Y-cable patch panel, 64-channel patch panel, 80-channel patch panel, and mesh patch panel (4 or 8 degree)

See the following figure for a typical rack layout.

Note Use the rack layout generated by Cisco TransportPlanner to determine your exact shelf layout.

Figure 66: Typical DWDM Equipment Layout in an ONS 15454 ANSI Rack



If you are installing a patch-panel or fiber-storage tray below the ONS 15454 shelf, you must install the air ramp between the shelf and patch-panel tray/fiber-management tray, or leave one rack unit (RU) space open.

NTP-G14 Install DWDM Equipment

Purpose	This procedure installs the optional DWDM assemblies.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Crimping tool (large enough for #10 to #14 AWG) #14 AWG wire
Prerequisite Procedures	NTP-G306 Install the ONS 15454 Shelf, on page 33
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Complete the DLP-G27 Install the DCU Shelf , on page 124 as needed.

Step 2 Complete the DLP-G28 Install the Fiber Patch-Panel Tray, on page 125 as needed.

Step 3 Complete the DLP-G29 Install the Fiber-Storage Tray, on page 126 as needed.

Step 4 Complete the DLP-G371 Install the Ethernet Adapter Panel, on page 127 as needed.

Step 5 Complete the DLP-G352 Install the Y-Cable Module Tray, on page 127 as needed.

Step 6 Complete the DLP-G30 Install the FlexLayer Shelf, on page 128 as needed.

Note Procedures for installing FlexLayer hardware in this chapter require that you have a network plan calculated for your DWDM network with Cisco Transport Planner, Release 9.2. Cisco TransportPlanner is a DWDM planning tool that is available from your Cisco account representative. Cisco TransportPlanner prepares a shelf plan for each network node and calculates the power and attenuation levels for the DWDM cards installed in the node. For information about Cisco TransportPlanner, refer to the Cisco TransportPlanner DWDM Operations Guide, Release 9.2.

Step 7 Complete the DLP-G31 Install the FlexLayer Modules, on page 129 as needed.

Step 8 Complete the DLP-G32 Install the Y-Cable Protection Modules in the FlexLayer Shelf, on page 130 as needed.

Step 9 Complete the DLP-G377 Install the Y-Cable Protection Modules in the Y-Cable Module Tray, on page 131 as needed.

Stop. You have completed this procedure.

DLP-G27 Install the DCU Shelf

Purpose	This task installs the Dispersion Compensation Unit (DCU) chassis.

Tools/Equipment	#2 Phillips Dynamometric screwdriver Crimping tool #14 AWG wire and lug
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 The DCU chassis requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan.

Step 2 Two sets of mounting brackets are included with the DCU mounting kit, one set each for 19-inch (482.6-mm) or 23-inch (584.2-mm) racks. Verify that your chassis is equipped with the correct set of brackets for your rack. Change the brackets as required.

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

Step 4 Connect a frame ground to the ground terminal provided on either side of the chassis. Use minimum #14 AWG wire.

Step 5 Return to your originating procedure (NTP).

DLP-G28 Install the Fiber Patch-Panel Tray

Purpose	This task installs the fiber patch-panel tray. Install the appropriate L-band or C-band patch-panel tray as necessary. The sticker on the front of the tray indicates for which band the tray is used.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Crimping tool #14 AWG wire and lug
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 The fiber patch-panel tray requires 1 to 2 RUs of space in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack, depending on whether you are installing a standard or deep patch-panel tray. (The standard tray requires 1 RU, and the deep 32-channel, 40-channel, and mesh patch panel trays each require 2 RUs.) Locate the RMU space specified in your site plan.

Step 2 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only), on page 35 as required.

Step 3 Align the tray chassis with the rack mounting screw holes, then insert and tighten the four screws.

Step 4 Connect a frame ground to the ground terminal provided on either side of the chassis. Use minimum #14 AWG wire.

Step 5 Repeat Steps 2 through 4 for each patch-panel tray you want to install.

Step 6 Return to your originating procedure (NTP).

DLP-G29 Install the Fiber-Storage Tray

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

Procedure

Step 1 The fiber-storage tray requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan.

Step 2 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete the DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only), on page 35 as required.

Step 3 Align the chassis with the rack mounting screw holes, insert the four screws, and tighten.

Step 4 Return to your originating procedure (NTP).

DLP-G371 Install the Ethernet Adapter Panel

Purpose	This task installs an Ethernet adapter panel (EAP) in an ANSI or ETSI equipment rack. The EAP is used in multishelf node configurations to connect the MS-ISC-100T and the TCC2/TCC2P/TCC3 cards in the subtending nodes. Two EAPs are required in a multishelf configuration, one for each MS-ISC-100T card.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 The EAP requires 1 RU in a standard 19-inch (482.6-mm), 23-inch (584.2-mm)/600 mm x 600mm, or 600 mm x 300 mm rack. Locate the RMU space specified in your site plan.

Step 2 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete the DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only), on page 35 as required.

Step 3 Align the chassis with the rack mounting screw holes, insert the four screws, and tighten.

Caution Any paint between the EAP mounting ears and the frame of the metal rack must be removed. The area must then be cleaned and coated with an antioxidant.

Step 4 Repeat Steps 1 to 3 for the second EAP.

Step 5 Return to your originating procedure (NTP).

DLP-G352 Install the Y-Cable Module Tray

Purpose	This task installs the Y-cable tray. The Y-cable tray can store up to eight Y-cable protection units.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Y-cable module tray(s) (15454-YCBL-LC) Cisco TransportPlanner Internal Connections Report
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 The Y-cable module tray requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan. Use the Cisco TransportPlanner Internal Connections Report to determine how many Y-cable modules you need to install.

Step 2 Verify that the mounting brackets attached to the unit are correct for your rack size. Complete DLP-G3 Reverse the Mounting Bracket to Fit a 19-inch (482.6-mm) Rack (ANSI Only), on page 35 as required.

Step 3 Align the chassis with the rack mounting screw holes, insert the four screws, and tighten.

Step 4 Return to your originating procedure (NTP).

DLP-G30 Install the FlexLayer Shelf

Purpose	This task installs the FlexLayer shelf. Perform this task if you are installing any FlexLayer modules.
Tools/Equipment	#2 Phillips Dynamometric screwdriver FlexLayer shelf (15216-FL-SA) #14 AWG wire (minimum) for frame grounding
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 The FlexLayer shelf requires 1 RU in a standard 19-inch (482.6-mm) or 23-inch (584.2-mm) rack. Locate the RMU space specified in your site plan.

Step 2 A set of mounting brackets are included with the FlexLayer mounting kit, one set each for 19-inch (482.6-mm) or 23-inch (584.2-mm) racks. Verify that your chassis is equipped with the correct set of brackets for your rack. Change the brackets as required.

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

Step 4 Connect a frame ground to the ground terminal provided on either side of the chassis. Use minimum #14 AWG wire.

Step 5 Repeat this task as necessary for each FlexLayer shelf you want to install.

Step 6 Return to your originating procedure (NTP).

DLP-G31 Install the FlexLayer Modules

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

Procedure

Step 1 Determine the FlexLayer modules that you want to install in the FlexLayer shelf. The FlexLayer shelf can house up to four Add/Drop FlexLayer modules or four Y-cable splitter modules. The following table lists the two-channel FlexLayer modules and part numbers.

Table 23: ONS 15xxx Two-Channel Add/Drop FlexLayer Module Hardware Part Numbers

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

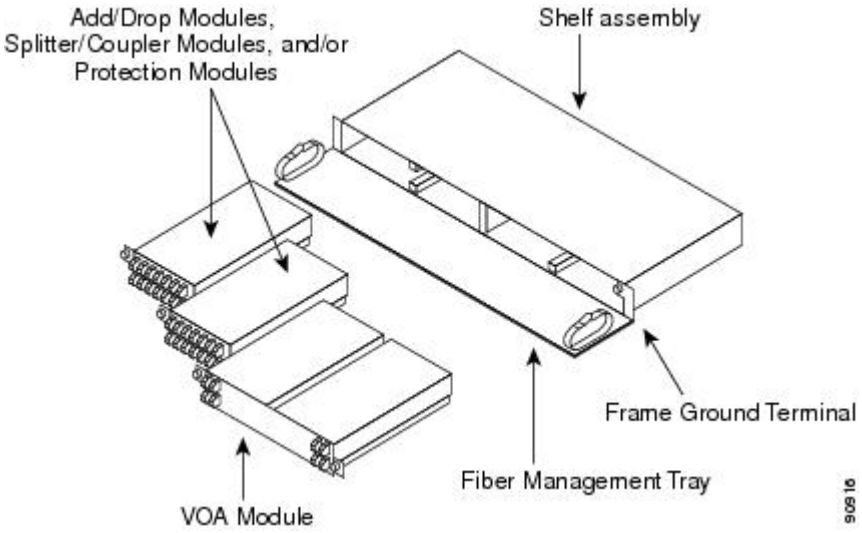
Part Number	Description
15216-FLB-2-58.9=	ITU-100 GHz 2 Ch, FlexMod - 1558.17 and 1558.98
15216-FLB-2-60.6=	ITU-100 GHz 2 Ch, FlexMod - 1559.79 and 1560.61

Step 2 Insert the appropriate module into the FlexLayer shelf.

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

The following figure shows the FlexLayer shelf and how the FlexLayer modules can be installed.

Figure 67: ONS 15xxx FlexLayer Shelf



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

Step 5 Return to your originating procedure (NTP).

DLP-G32 Install the Y-Cable Protection Modules in the FlexLayer Shelf

Purpose	This task installs the Y-cable protection modules in the FlexLayer shelf.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Y-cable module(s): Multi-Mode Y-Cable Protection FlexModule(s) (15216-CS-MM-Y) or Single-Mode Y-Cable Protection FlexModule(s) (15216-CS-SM-Y), as appropriate
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 According to the Cisco TransportPlanner Internal Connections Report, determine the Y-cable modules that you want to install in the FlexLayer shelf.

Step 2 Insert the appropriate Y-cable module into the FlexLayer shelf. Use a Phillips Dynamometric screwdriver to install the two accompanying screws.

Step 3 Repeat Steps 1 and 2 as necessary for each Y-cable module you want to install. The FlexLayer shelf can hold up to four Y-cable modules, and the Y-cable tray can hold up to eight Y-cable modules.

Step 4 Return to your originating procedure (NTP).

DLP-G377 Install the Y-Cable Protection Modules in the Y-Cable Module Tray

Purpose	This task installs the Y-cable protection modules in the Y-cable module tray. The Y-cable module tray can hold up to eight Y-cable modules.
Tools/Equipment	#2 Phillips Dynamometric screwdriver Y-cable modules: Multi-Mode Y-Cable Protection Module(s) (15454-YCM-MM-LC) or Single-Mode Y-Cable Protection Module(s) (15454-YCM-SM-LC), as appropriate Cisco TransportPlanner Internal Connections Report
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

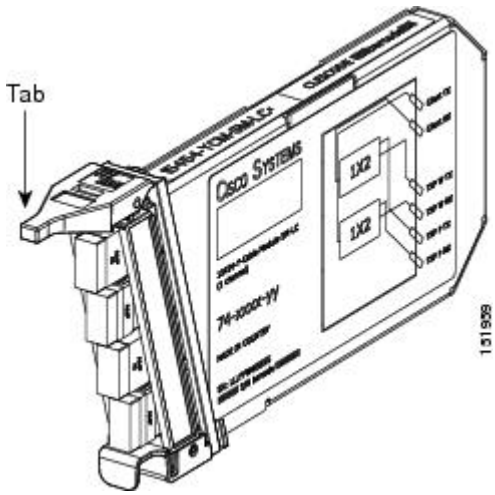
Step 1 According to the Cisco TransportPlanner Internal Connections Report, determine which slots you will use to install the Y-cable modules.

Step 2 Open the drawer of the tray by pushing inward on the latches located at the left and right front of the tray.

Step 3 In the tray, pull up the latches on either side of the module frame and slide the frame upward until it is fully extended.

Step 4 Line up the first Y-cable module that you want to install with the desired slot, pull the latch at the bottom of the Y-cable module to enable the Y-cable module to slide onto the guides, and slide the module down until it is fully installed in the slot. The following figure shows the Y-cable module that can be installed in the Y-cable module tray.

Figure 68: Y-Cable Module



Step 5 Return to your originating procedure (NTP).

NTP-G15 Install the Common Control Cards

Purpose	This procedure describes how to install the common control cards.
Tools/Equipment	Redundant TCC2/TCC2P/TCC3 cards on Cisco ONS 15454 shelf (required) AIC-I card (optional) MS-ISC-100T (optional; for multishelf node configurations)
Prerequisite Procedures	NTP-G7 Install the Power and Ground , on page 68 NTP-G14 Install DWDM Equipment, on page 124
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

Caution Always use the supplied ESD wristband when working with a powered ONS 15454. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

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

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

Procedure

Step 1 (Cisco ONS 15454 only) Complete the DLP-G33 Install the TCC2, TCC2P, or TCC3 Card , on page 133.

Note If you install the wrong card in a slot, see the NTP-G107 Remove Permanently or Remove and Replace DWDM Cards procedure.

Step 2 (Cisco ONS 15454 only) Complete the DLP-G34 Install the AIC-I Card, on page 136, if necessary.

Step 3 (Cisco ONS 15454 only) Complete the DLP-G309 Install the MS-ISC-100T Card , on page 137, if necessary.

Stop. You have completed this procedure.

DLP-G33 Install the TCC2, TCC2P, or TCC3 Card

Purpose	This task installs redundant TCC2/TCC2P/TCC3 cards. The first card you install in the ONS 15454 must be a TCC2/TCC2P/TCC3 card, and it must initialize before you install any cross-connect or traffic cards. Cross-connect cards are only required in hybrid nodes.
Tools/Equipment	Two TCC2/TCC2P/TCC3 cards
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Caution Do not remove a TCC2/TCC2P/TCC3 card during the software transfer process, which is indicated by alternate flashing FAIL and ACT/STBY LEDs. Removing a TCC2/TCC2P/TCC3 during the software transfer process will corrupt the system memory.

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

Procedure

Step 1 Open the latches/ejectors of the first TCC2/TCC2P/TCC3 card that you will install.

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

Note In Step 4, you will be instructed to watch the LED activity (sequence) on the front of the TCC2/TCC2P/TCC3 card. This activity begins immediately after you close the latches in Step 3.

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

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

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

Step 4 Verify the LED activity on the TCC2/TCC2P/TCC3 cards as appropriate.

a) For the TCC2 card:

- All LEDs turn on briefly. The red FAIL LED and the yellow ACT/STBY LED turn on for about 15 seconds. (For TCC3 card it takes around 20 to 25 seconds)
- The red FAIL LED and the green ACT/STBY LED turn on for about 40 seconds.
- The red FAIL LED blinks for about 15 seconds.
- The red FAIL LED turns on for about 15 seconds. All LEDs turn on for about 3 seconds before turning off for about 3 seconds.
- Both green PWR LEDs turn on for 10 seconds. The PWR LEDs then turn red for 2 to 3 minutes before going to steady green.
- While the PWR LEDs are red for two to three minutes, the ACT/STBY turn on.
- The boot-up process is complete when the PWR LEDs turn green and the ACT/STBY remains on. (The ACT/STBY LED will be green if this is the first TCC2 card installed, and amber if this is the second TCC2 card installed.)

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

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

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

Note If the FAIL LED is on continuously, see the tip in Step 8 about the TCC2 card automatic upload.

b) For the TCC2P card:

- All LEDs turn on briefly. The red FAIL LED, the yellow ACT/STBY LED, the green SYNC LED, and the green ACO LED turn on for about 15 seconds.
- The red FAIL LED and the green ACT/STBY LED turn on for about 30 seconds.
- The red FAIL LED blinks for about 3 seconds.
- The red FAIL LED turns on for about 15 seconds.
- The red FAIL LED blinks for about 10 seconds and then becomes solid.
- All LEDs (including the CRIT, MAJ, MIN, REM, SYNC, and ACO LEDs) blink once and turn off for about 5 seconds.

- Both green PWR LEDs turn on for 10 seconds. The PWR LEDs then turn red for 2 to 3 minutes before going to steady green. During this time, the ACT/STBY, MJ, and MN LEDs might turn on, followed by the SNYC LED briefly.
- The boot-up process is complete when the PWR LEDs turn green and the yellow ACT/STBY remains on. (The ACT/STBY LED will be green if this is the first TCC2P card installed, and yellow if this is the second TCC2P card installed.)

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

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

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

Note If the FAIL LED is on continuously, see the tip in Step 8 about the TCC2P card automatic upload.

c) For the TCC3 card:

- All LEDs turn on briefly. The red FAIL LED, the yellow ACT/STBY LED, the green SYNC LED, and the green ACO LED turn on for about 25 seconds.
- The red FAIL LED and the green ACT/STBY LED turn on for about 15 seconds.
- The red FAIL LED blinks for about 3 seconds.
- The red FAIL LED turns on for about 60 seconds.
- The red FAIL LED blinks for about 15 seconds and then becomes solid (the LED is turned on for about 20 seconds).
- All LEDs (including the CRIT, MAJ, MIN, REM, SYNC, and ACO LEDs) blink once and turn off for about 5 seconds.
- Both green PWR LEDs turn on for 10 seconds. The PWR LEDs then turn red for 2 to 3 minutes before going to steady green. During this time, the ACT/STBY, MJ, and MN LEDs might turn on, followed by the SNYC LED briefly.
- The boot-up process is complete when the PWR LEDs turn green and the yellow ACT/STBY remains on. (The ACT/STBY LED will be green if this is the first TCC3 card installed, and yellow if this is the second TCC3 card installed.)

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

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

Note If you are logged into CTC, the SFTWDOWN alarm might appear as many as two times while the TCC3 card initializes. The alarm should clear after the card completely boots.

Note If the FAIL LED is on continuously, see the tip in Step 8 about the TCC3 card automatic upload.

Step 5 Verify that the ACT/STBY LED is green if this is the first powered-up TCC2/TCC2P/TCC3 card installed, or yellow for standby if this is the second powered-up TCC2/TCC2P/TCC3. The IP address, temperature of the node, and time of day appear on the LCD. The default time and date is 12:00 AM, January 1, 1970.

Step 6 The LCD cycles through the IP address (the default is 192.1.0.2), node name, and software version. Verify that the correct software version is shown on the LCD. The software text string indicates the node type (SDH or SONET) and software release. (For example: SDH 09.20-05L-20.10 indicates it is an SDH software load, Release 9.2. The numbers following the release number do not have any significance.)

Step 7 If the LCD shows the correct software version, continue with Step 8. If the LCD does not show the correct software version, refer to your next level of technical support, upgrade the software, or remove the TCC2/TCC2P/TCC3 card and install a replacement card.

Refer to the release-specific software upgrade document to replace the software. To replace the TCC2/TCC2P/TCC3 card, refer to the Cisco ONS 15454 DWDM Troubleshooting Guide.

Step 8 Repeat Steps 1 through 7 for the redundant TCC2/TCC2P/TCC3 card. If both TCC2/TCC2P/TCC3 cards are already installed, proceed to Step 9.

Tip If you install a standby TCC2/TCC2P/TCC3 card that has a different software version than the active TCC2/TCC2P/TCC3 card, the newly installed standby TCC2/TCC2P/TCC3 card automatically copies the software version from the active TCC2/TCC2P/TCC3 card. You do not need to do anything in this situation. However, the loading TCC2/TCC2P/TCC3 card does not boot up in the normal manner. When the standby card is first inserted, the LEDs follow most of the normal boot-up sequence. However, after the red FAIL LED turns on for about 5 seconds, the FAIL LED and the ACT/STBY LED begin to flash alternately for up to 30 minutes while the new software loads onto the active TCC2/TCC2P/TCC3 card. After loading the new software, the upgraded TCC2/TCC2P/TCC3 card's LEDs repeat the appropriate bootup sequence, and the amber ACT/STBY LED turns on.

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

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

Step 9 Return to your originating procedure (NTP).

DLP-G34 Install the AIC-I Card

Purpose	This task installs the AIC-I card. The AIC-I card provides connections for external alarms and controls (environmental alarms).
Tools/Equipment	AIC-I card
Prerequisite Procedures	DLP-G33 Install the TCC2, TCC2P, or TCC3 Card , on page 133
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

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

Procedure

Step 1 Open the latches/ejectors on the card.

Step 2 Use the latches/ejectors to firmly slide the card along the guide rails in Slot 9 until the card plugs into the receptacle at the back of the slot.

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

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

Step 4 Verify the following:

- The red FAIL LED blinks for up to 10 seconds.

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

- The PWR A and PWR B LEDs become red, the two INPUT/OUTPUT LEDs become amber, and the ACT LED turns green for approximately 5 seconds.
- The PWR A and PWR B LEDs turn green, the INPUT/OUTPUT LEDs turn off, and the green ACT LED remains on.

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

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

Note If the red FAIL LED is on continuously or the LEDs act erratically, the card is not installed properly. Remove the card and repeat all the steps.

Step 5 Return to your originating procedure (NTP).

DLP-G309 Install the MS-ISC-100T Card

Purpose	This task installs redundant MS-ISC-100T cards. The MS-ISC-100T card is required for a multishelf node configuration. It provides LAN redundancy on the node controller shelf. An alternative to using the MS-ISC-100T card is the Cisco Catalyst 2950, although Cisco recommends using the MS-ISC-100T. For more information on the Catalyst 2950 installation, refer to the Catalyst 2950 product documentation.
Tools/Equipment	MS-ISC-100T card (2)
Prerequisite Procedures	DLP-G33 Install the TCC2, TCC2P, or TCC3 Card , on page 133
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

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

Note The MS-ISC-100T is not supported in a subtended shelf.

Procedure

Step 1 Open the latches/ejectors on the card.

Step 2 Use the latches/ejectors to firmly slide the card along the guide rails into the appropriate slot in the node controller shelf until the card plugs into the receptacle at the back of the slot. The card can be installed in any slot from Slot 1 to 6 or 12 to 17. Cisco recommends that you install the MS-ISC-100T cards in Slot 6 and Slot 12.

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

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

Step 4 Verify the LED activity:

- The red FAIL LED blinks for 35 to 45 seconds.
- The red FAIL LED turns on for 15 to 20 seconds.
- The red FAIL LED blinks for approximately 3 minutes.
- The red FAIL LED turns on for approximately 6 minutes.
- The green ACT or ACT/STBY LED turns on. The SF LED can persist until all card ports connect to their far end counterparts and a signal is present.

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

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

Step 5 Repeat all the steps for the redundant MS-ISC-100T card.

Step 6 Return to your originating procedure (NTP).

Multishelf Management

The maximum number of shelves that can be aggregated under a single IP address is 30 shelves. It is recommended to use TCC3 card in the node controller if the number of subtended shelves exceed 12 shelves.

Multishelf LAN Topologies

The following sections describe various multishelf LAN topologies in Cisco ONS 15454 shelves.

ONS 15454 Multishelf Node and Subtending Shelves

When ONS 15454 node is used as node controller, upto 29 shelves can be subtended using four 24-port Cisco Catalyst 3560 switch or two 48-port Cisco Catalyst 3560 switch. Usage of TCC3 card as the node controller is recommended if the number of subtended shelves is more than 12 shelves. This topology supports both the non-secure and secure mode configuration.

ONS 15454 Multishelf Node and Subtending Shelves—Upgrade

Scenario 1: When ONS 15454 is connected to MS-ISC-100T card:

When an ONS 15454 node is connected to an MS-ISC-100T card, connect Port 1 of the Cisco Catalyst 3560 switch to Port 8 of the MS-ISC-100T card to upgrade the number of shelves. When you connect Cisco Catalyst 3560 switch to the MS-ISC-100T card, disconnect the shelves subtended to MS-ISC-100T card and re-connect them to Cisco Catalyst 3560 switch. Usage of TCC3 card as the node controller is recommended if the number of subtended shelves is more than 12 shelves. This topology supports both the non-secure and secure mode configuration.

Scenario 2: When ONS 15454 node is connected to Cisco Catalyst 2950 switch:

When an ONS 15454 node is connected to a Cisco Catalyst 2950 switch, subtend the Cisco Catalyst 3560 switch to Cisco Catalyst 2950 switch to upgrade the number of shelves. Assign VLAN ID as VLANint to Port 21 of the Cisco Catalyst 2950 switch and connect to Port 1 of the Cisco Catalyst 3560 switch. This topology supports both the non-secure and secure mode configuration.

ONS 15454 Multishelf Node Controller, ONS 15454 M6 and ONS 15454 Subtending Shelves

When an ONS 15454 is used as the node controller, a mix of ONS 15454 and ONS 15454 M6 shelves can be subtended through the Cisco Catalyst 3560 switch connected to the node controller or the MS-ISC-100T card connected to the node controller. In this topology, ONS 15454 M6 shelves can be diasy chained. Usage of TCC3 card as the node controller is recommended if the number of subtended shelves is more than 12 shelves. This topology supports both the non-secure and secure mode configuration.

The ONS 15454 multishelf node controller cannot be converted to the subtended shelf controller using the LCD. Hence, use CTC to perform the conversion.

NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card

Purpose	Use this procedure to connect a ONS 15454 multishelf node and subtending shelves to two MS-ISC-100T cards.
Tools/Equipment	5.9 in. (0.15 m) CAT-5 LAN cable (2) 19.69 in. (0.5 m) CAT-5 LAN cable (1) Cross-over (CAT-5) LAN cables (2 for each subtending shelf) 84 in. (2.13 m) EAP cables (2)

Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132 DLP-G371 Install the Ethernet Adapter Panel, on page 127 (Optional) "DLP-G264 Enable Node Security Mode" in "Turn Up a Node" chapter of the Cisco ONS 15454 DWDM Configuration Guide.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 To connect the MS-ISC-100T cards to the node controller shelf and set up protection, complete the following substeps (see Figure 69: Connecting the EAP to the Node Controller and Subtending Shelf, on page 141). For more information on MS-ISC-100T card port assignments, refer to the "Install the Control Cards" chapter in the Cisco ONS 15454 DWDM Configuration Guide.

a) Using the 5.9 in. (0.15 m) CAT-5 LAN cable, plug one connector into the NC port of the MS-ISC-100T card located on the left side of the node controller shelf (Slots 1 to 6) and plug the other connector into the front panel (RJ-45 connector) of the TCC2/TCC2P/TCC3 card in Slot 7.

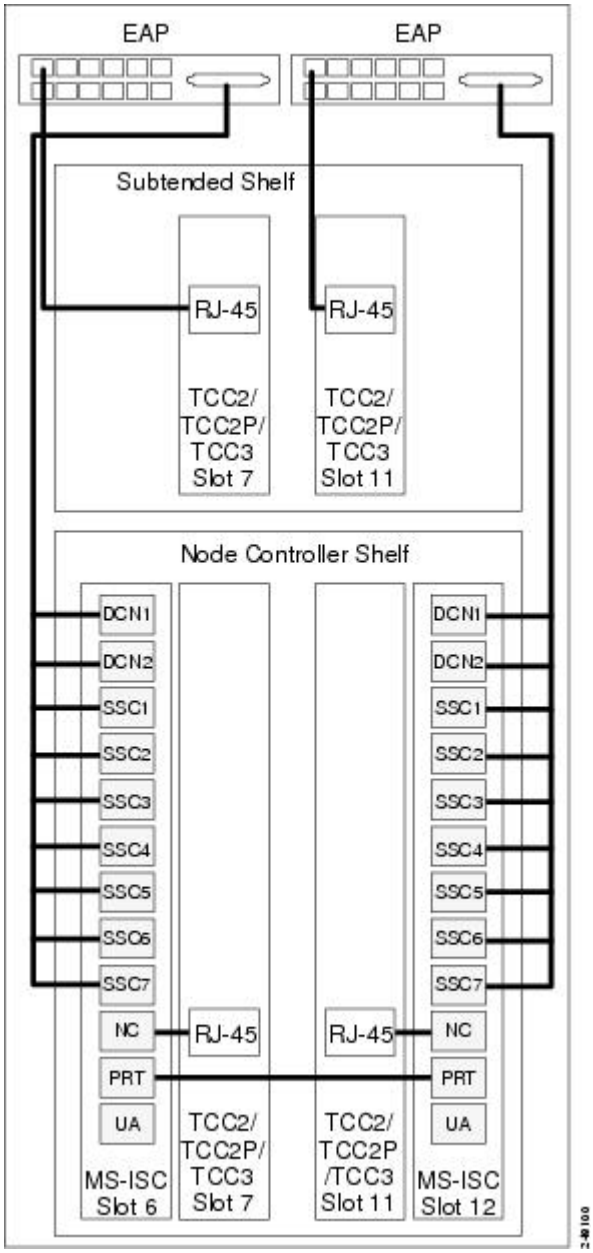
b) Using the 5.9 in. (0.15 m) CAT-5 LAN cable, plug one connector into the NC port of the MS-ISC-100T card located on the right side of the node controller shelf (Slots 12 to 17) and the other end into the front panel (RJ-45 connector) of the TCC2/TCC2P/TCC3 card in Slot 11.

c) Using the 19.69 in. (0.5 m) CAT-5 LAN cable, plug one connector into the PRT port of the MS-ISC-100T card located on the left side of the node controller shelf (Slots 1 to 6) and plug the other connector into the PRT port of the MS-ISC-100T card located on the right side of the node controller shelf (Slots 12 to 17).

d) Plug the nine connectors on one end of the EAP cable into the two DCN ports and the seven subtending shelf controller (SSC) ports of the MS-ISC-100T card located on the left side of the node controller shelf (Slots 1 to 6). Plug the other end of the EAP cable into the multishelf port on the left EAP.

e) Plug the nine connectors on one end of the EAP cable into the two DCN ports and the seven SSC ports of the MS-ISC-100T card in the right side of the NC shelf (Slots 12 to 17). Plug the other end of the EAP cable into the multishelf port on the right EAP.

Figure 69: Connecting the EAP to the Node Controller and Subtending Shelf



Step 2 To connect a subtending shelf to the EAP, complete the following (see Figure 69: Connecting the EAP to the Node Controller and Subtending Shelf, on page 141):

a) Using a cross-over (CAT-5) LAN cable, plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7 and plug the other end into the SSC1 port on the left EAP.

b) Using a cross-over (CAT-5) LAN cable, plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11 and plug the other end into the SSC1 port on the right EAP.

c) Repeat Steps a and b for each subtending shelf in the multishelf configuration. Use the same SSC port number (2 through 8) on the left and right EAP for each subtending shelf.

Stop. You have completed this procedure.

NTP-G304 Configure the MS-ISC-100T Card for a ONS 15454 Multishelf Node for Non-Default Public and Private VLAN IDs

Purpose	Use this procedure to configure the MS-ISC-100T Card for a multi-shelf node for non-default public and private VLAN IDs.
Tools/Equipment	Voltmeter
Prerequisite Procedures	Applicable procedures in Installing the ONS 15454 M12 (ANSI and ETSI) Shelf, on page 25
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 At the Cisco IOS command line interface (CLI) for the MS-ISC-100T card, enter the following spanning tree commands:

Example:

```
Router(config)# bridge public VLAN ID protocol rstp
Router(config)# bridge public VLAN ID forward-time 5
Router(config)# bridge public VLAN ID max-age 10
Router(config)# bridge private VLAN ID protocol rstp
Router(config)# bridge private VLAN ID forward-time 5
Router(config)# bridge private VLAN ID max-age 10
```

Step 2 Enter the following commands to configure the ports DCN 1 and DCN 2:

Example:

```
(Router(config)# interface FastEthernet0
(Router(config-if)# no ip address
(Router(config-if)# no ip route-cache
(Router(config-if)# bridge-group public VLAN ID
(Router(config)# interface FastEthernet1
(Router(config-if)# no ip address
(Router(config-if)# no ip route-cache
(Router(config-if)# bridge-group public VLAN ID
```

Step 3 Enter the following commands to configure ports SSC 1 through SSC 7. Replace *port* with the port number (2 to 8) and repeat for each port.

Example:

```
(Router(config)#interface FastEthernet port
(Router(config-if)# no ip address
(Router(config-if)# no ip route-cache
(Router(config-if)# bridge-group private VLAN ID
```

Step 4 Enter the following commands to configure port NC (port 9):

Example:

```
Router(config)# interface FastEthernet9
Router(config-if) no ip address
(Router(config-if) no ip route-cache
Router(config)# interface FastEthernet9.2
(Router(config-if)dot1Q public VLAN ID native
(Router(config-if) no ip route-cache
(Router(config-if) no snmp trap link-status
(Router(config-if)bridge-group public VLAN ID
Router(config)# interface FastEthernet9.2
(Router(config-if) encapsulation dot1Q private VLAN ID
(Router(config-if) no ip route-cache
(Router(config-if) no snmp trap link-status
(Router(config-if)bridge-group private VLAN ID
```

Step 5 Enter the following commands to configure port PRT (port 10):

Example:

```
Router(config)# interface FastEthernet10
(Router(config-if)# no ip address
(Router(config-if)# no ip route-cache
Router(config)# interface FastEthernet10.1
(Router(config-if)encapsulation dot1Q public VLAN ID native
(Router(config-if)# no ip route-cache
(Router(config-if)# no snmp trap link-status
(Router(config-if)bridge-group public VLAN ID
(Router(config-if)# bridge-group public VLAN ID priority 0
!
Router(config)# interface FastEthernet10.2
(Router(config-if)encapsulation dot1Q private VLAN ID
(Router(config-if)# no ip route-cache
(Router(config-if)# no snmp trap link-status
(Router(config-if)# bridge-group private VLAN ID
(Router(config-if)# bridge-group private VLAN ID priority 0
Router(config)# interface FastEthernet11
Router(config)# no ip address
Router(config)# no ip route-cache
Router(config)# shutdown
```

Step 6 Enter the following interface commands:

Example:

```
(Router(config)# interface POS0
(Router(config)# no ip address
(Router(config)# no ip route-cache
(Router(config)# shutdown
(Router(config)# crc 32
(Router(config)# interface POS1
(Router(config)# no ip address
(Router(config)# no ip route-cache
(Router(config)# shutdown
(Router(config)# crc 32
(Router(config)# ip classless
(Router(config)# no ip http server
```

Stop. You have completed this procedure.

NTP-G307 Perform the ONS 15454 Shelf Installation Acceptance Test

Purpose	Use this procedure to perform a shelf installation acceptance test for the ONS 15454 ETSI or ONS 15454 ANSI.
Tools/Equipment	Voltmeter
Prerequisite Procedures	Applicable procedures in Installing the ONS 15454 M12 (ANSI and ETSI) Shelf, on page 25
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 If you installed an ONS 15454 ETSI shelf, complete the following table by verifying that each applicable procedure was completed.

Table 24: ONS 15454 ETSI Shelf Installation Task Summary

Description	Completed
NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21	

Description	Completed
NTP-G306 Install the ONS 15454 Shelf, on page 33	
NTP-G3 Open and Remove the Front Door , on page 57	
NTP-G4 Open and Remove the FMEC Cover (ETSI Only), on page 61	
NTP-G6 Install the MIC-A/P and MIC-T/C/P FMECs (ETSI Only), on page 66	
NTP-G7 Install the Power and Ground , on page 68	
NTP-G8 Install the Fan-Tray Assembly , on page 83	
ONS 15454 ANSI Alarm, Timing, LAN, and Craft Pin Connections, on page 95	
NTP-G12 Install and Close the FMEC Cover (ETSI Only), on page 118	
NTP-G14 Install DWDM Equipment, on page 124	
NTP-G15 Install the Common Control Cards, on page 132	
NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card, on page 139 or NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560, on page 147	
NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153 (if you completed NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560, on page 147)	

Step 2 If you installed an ONS 15454 ANSI shelf, complete the following table by verifying that each applicable procedure was completed.

Table 25: ONS 15454 ANSI Shelf Installation Task Summary

Description	Completed
NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21	
NTP-G306 Install the ONS 15454 Shelf, on page 33	
NTP-G3 Open and Remove the Front Door , on page 57	
NTP-G5 Remove the Backplane Covers (ANSI Only), on page 64	
NTP-G7 Install the Power and Ground , on page 68	
NTP-G8 Install the Fan-Tray Assembly , on page 83	
NTP-G9 Install the Alarm Expansion Panel (ANSI Only), on page 92	
ONS 15454 ANSI Alarm, Timing, LAN, and Craft Pin Connections, on page 95	
NTP-G11 Install an External Wire-Wrap Panel on the AEP (ANSI Only), on page 113	

Description	Completed
NTP-G13 Install the Rear Cover (ANSI Only), on page 119	
NTP-G14 Install DWDM Equipment, on page 124	
NTP-G15 Install the Common Control Cards, on page 132	
NTP-G301 Connect the ONS 15454 Multishelf Node and Subtending Shelves to an MS-ISC-100T Card, on page 139 or NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560, on page 147	
NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153 (if you completed NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560, on page 147)	

Step 3 Complete the DLP-G35 Inspect the Shelf Installation and Connections , on page 146.

Step 4 Complete the DLP-G36 Measure Voltage , on page 147.

Step 5 Continue with " Connect the PC and Log into the GUI " document.

Stop. You have completed this procedure.

DLP-G35 Inspect the Shelf Installation and Connections

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

Procedure

Step 1 Make sure all external wiring connections on the backplane (that is, power, ground, alarms, etc.) are secure. If a wire or cable is loose, return to the appropriate procedure in this chapter to correct it.

Step 2 (ETSI only) To check that the FMEC cover is seated correctly, verify that it can be easily closed without disturbing cables.

Step 3 Return to your originating procedure (NTP).

DLP-G36 Measure Voltage

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

Procedure

Step 1 Using a voltmeter, verify the office ground and power:

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

b) Place the red lead (negative) on the fuse power points on the third-party power distribution panel to verify that they read between –40.5 VDC and –57 VDC (power) and 0 (return ground).

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

a) Place the black lead (positive) on the RET1 and the red lead on the BAT1 point. Verify a reading between –40.5 VDC and –57 VDC. If there is no voltage, check the following and correct if necessary:

- Battery and ground are reversed to the shelf.
- Battery is open or missing.
- Return is open or missing.

Step 3 Repeat Steps 1 and 2 for the RET2 and BAT2 of the redundant power supply input.

Step 4 Return to your originating procedure (NTP).

NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560

Purpose	Use this procedure to connect a multishelf node and subtending shelves to two Cisco Catalyst 2950s or two Cisco Catalyst 3560s and configure the Cisco Catalyst 2950 or Catalyst 3560.
Tools/Equipment	• Two Cisco Catalyst 2950 or Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; refer to the Cisco Catalyst 2950 or Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables
Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132

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

Note This procedure explains the steps to connect the ONS 15454 multishelf node and subtending shelves to a 24-port Catalyst 2950 or Catalyst 3560 switch. Follow the steps provided in this procedure to connect the multishelf node to the 48-port Catalyst 2950 or Catalyst 3560 switch.

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 1 of the active Catalyst 2950 or Catalyst 3560.

b) Plug the other connector into the front panel of the node controller TCC2/TCC2P/TCC3 card in Slot 7.

Step 2 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 1 of the standby Catalyst 2950 or Catalyst 3560.

b) Plug the other end into the front panel of the node controller TCC2/TCC2P/TCC3 card in Slot 11.

Step 3 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 22 of the active Catalyst 2950 or Catalyst 3560.

b) Plug the other connector into Port 22 of the standby Catalyst 2950 or Catalyst 3560.

Step 4 To connect a subtending shelf to the Catalyst 2950 or Catalyst 3560 switches, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other end into Port 2 of the active Catalyst 2950 or Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other end into Port 2 of the standby Catalyst 2950 or Catalyst 3560.

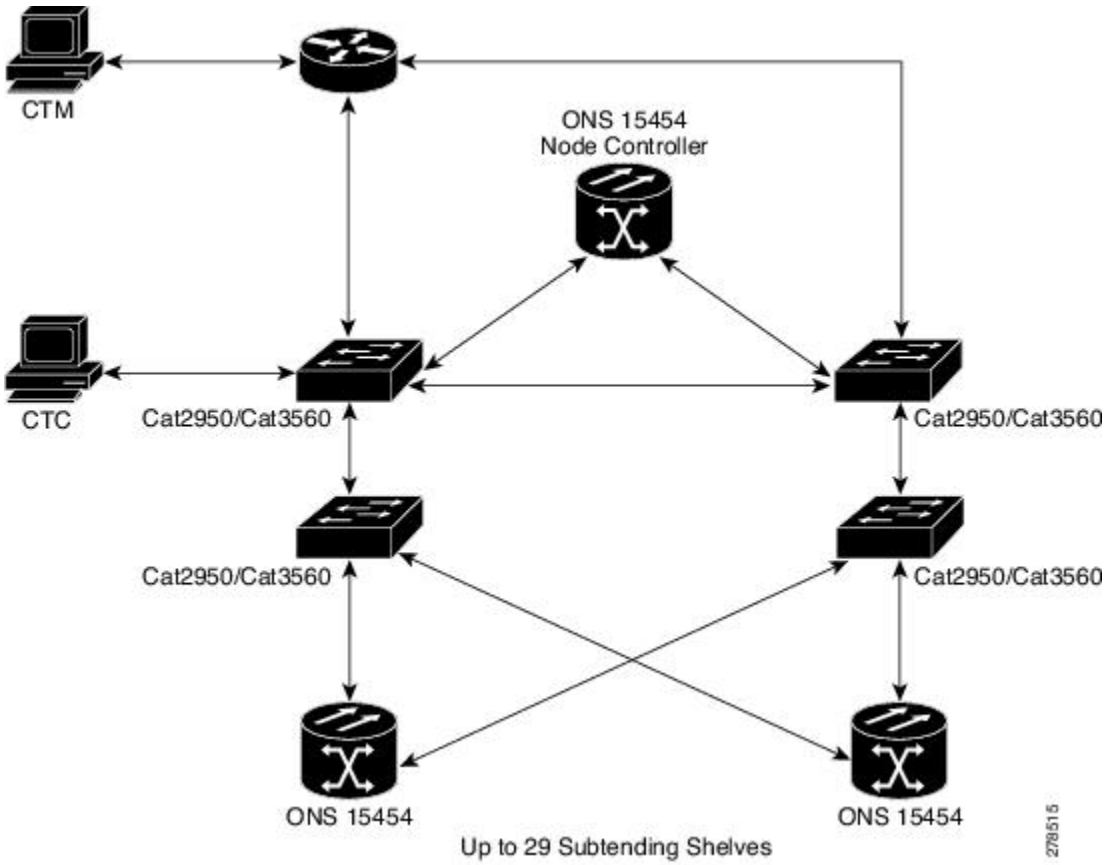
c) Repeat Steps a and b to connect the additional ONS 15454 subtending shelves in the multishelf configuration using Ports 3 through Port 21 on the Catalyst 2950 or Catalyst 3560 switches.

Note If the number of subtending shelves exceed 12, it's recommended to use the TCC3 cards.

Step 5 To configure the active and standby Catalyst 2950 or Catalyst 3560, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.

The following figure shows the ONS 15454 multishelf and subtending shelves connected to the Catalyst 2950 or Catalyst 3560.

Figure 70: Connecting ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560



NTP-G296 Upgrade the ONS 15454 Multishelf with MS-ISC Card Configuration Using the Catalyst 3560

Purpose	Use this procedure to upgrade the existing ONS 15454 multishelf configuration that uses an MS-ISC card with the Catalyst 3560 and configure the Cisco Catalyst 3560.
Tools/Equipment	• Two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; refer to the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables (3, plus 2 for each subtending shelf)
Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132
Required/As Needed	As needed
Onsite/Remote	Onsite

Security Level	None

Procedure

Step 1 Disconnect the ONS 15454 subtending shelf from the EAPs:

a) Remove the cross-over (CAT 5) LAN cable (connecting the ONS 15454 subtending shelf) from the SSC8 port of the right EAP.

b) Remove the cross-over (CAT 5) LAN cable (connecting the ONS 15454 subtending shelf) from the SSC8 port of the left EAP.

Step 2 Connect the EAPs to the Catalyst 3560:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to the SSC8 port of the right EAP.
  • Plug the other connector to Port 1 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to the SSC8 port of the left EAP.
  • Plug the other connector to Port 1 of the standby Catalyst 3560.

Step 3 Reconnect the ONS 15454 subtending shelf disconnected in Step 1 to the Catalyst 3560 switches:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other connector into Port 2 of the active Catalyst 3560.

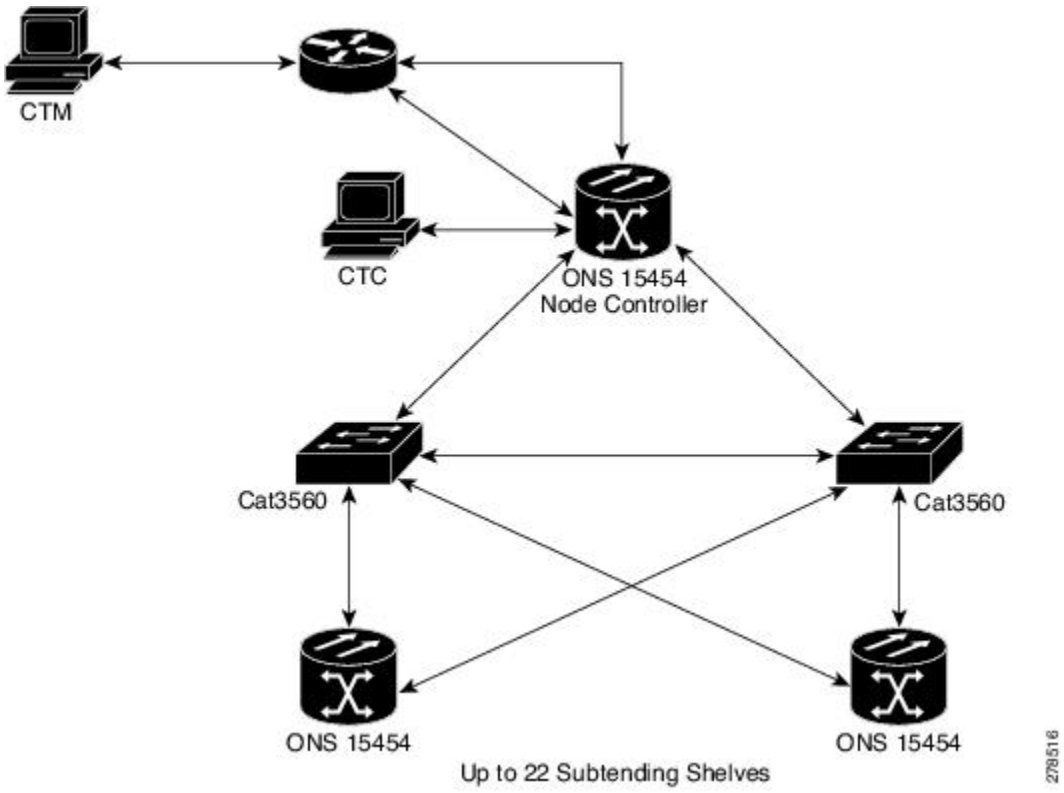
b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other connector into Port 2 of the standby Catalyst 3560.

Step 4 Repeat Step 3a and 3b to connect the additional ONS 15454 subtending shelves in the multishelf configuration from Port 3 through Port 24 on the Catalyst 3560 switches.

Step 5 To configure the Catalyst 3560 in case of upgrade, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.

Figure 71: Upgrade the ONS 15454 Multishelf with MS-ISC Card Configuration Using the Catalyst 3560



NTP-G297 Upgrade the ONS 15454 Multishelf with Catalyst 2950 Configuration Using the Catalyst 3560

Purpose	Use this procedure to upgrade the existing ONS 15454 multishelf configuration that uses the Catalyst 2950 with the Catalyst 3560
Tools/Equipment	• Two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; refer to the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables (3, plus 2 for each subtending shelf)
Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Disconnect the subtending shelf at Port 21 of the active and standby Catalyst 2950:

a) Remove the cross-over (CAT 5) LAN cable from Port 21 of the active Catalyst 2950.

b) Remove the cross-over (CAT 5) LAN cable from Port 21 of the standby Catalyst 2950.

Step 2 Connect the extended Catalyst 3560 (active and standby) to the Catalyst 2950:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to Port 1 of the extended Catalyst 3560 (active).
  • Plug the other connector to Port 21 of the active Catalyst 2950.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to Port 1 of the extended Catalyst 3560 (standby).
  • Plug the other connector to Port 21 of the standby Catalyst 2950.

Step 3 Reconnect the ONS 15454 subtending shelf disconnected in Step 1 to the Catalyst 3560 switches:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other connector into Port 2 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other connector into Port 2 of the standby Catalyst 3560.

Step 4 Repeat Step 3a and Step 3b to connect additional subtending shelves using Port 3 through Port 24 on the extended Catalysts 3560.

Note If the number of subtending shelves exceed four, it's recommended to use the TCC3 cards.

Step 5 To configure the Catalyst 2950 in case of upgrade, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.

Step 6 To configure the Cisco Catalyst 3560, refer to the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.

Stop. You have completed this procedure.

NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node

Purpose	This procedure uses Cisco IOS to configure the Cisco Catalyst 2950 or Cisco Catalyst 3560 for a multishelf node configuration. For more information about the Catalyst 2950 or Catalyst 3560, refer to the Catalyst 2950 or Catalyst 3560 product documentation.
Tools/Equipment	None
Prerequisite Procedures	NTP-G295 Connect the ONS 15454 Multishelf Node and Subtending Shelves to a Catalyst 2950 or Catalyst 3560, on page 147
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Superuser

Note When Cisco Catalysts are used in a multishelf node configuration, the Cisco Catalysts can be used for other applications as long as they do not interfere with the VLAN settings of the multishelf node configuration.

- The ONS 15454 works with any VLAN ID type. The ONS 15454 M6 works with public VLAN ID of 1 and private VLAN ID of 2.
- Public and Private VLAN IDs are specified in the multishelf configuration of ONS 15454 node controller.

Procedure

Step 1 At the Cisco IOS command line interface (CLI) for the Catalyst switch, enter the following spanning tree commands:

Example:

```
Switch(config)# spanning-tree mode rapid-pvst
Switch(config)# no spanning-tree optimize bpdu transmission
Switch(config)# spanning-tree extend system-id
```

Step 2 Enter the following commands to configure Port 1:

Example:

```
Switch(config)# interface FastEthernet0/1
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport trunk allowed vlan public VLAN ID,private VLAN ID
Switch(config-if)# switchport mode trunk
Switch(config-if)# switchport nonegotiate
```

Step 3 For a 24-port catalyst switch, enter the following commands to configure Ports 2 through 20. Replace *port* with the port number (2 through 20) and repeat for each port:

Example:

```
Switch(config)# interface FastEthernet0/port
Switch(config-if)# switchport access vlan private VLAN ID
Switch(config-if)# switchport mode access
```

Step 4 For a 24-port catalyst switch, enter the following commands to configure Ports 21, 22, and 23:

Example:

```
Switch(config)# interface FastEthernet0/21
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport trunk allowed vlan public VLAN ID ,private VLAN ID
Switch(config-if)# switchport mode trunk
Switch(config-if)# spanning-tree port-priority 0

Switch(config)# interface FastEthernet0/22
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport trunk allowed vlan public VLAN ID ,private VLAN ID
Switch(config-if)# switchport mode trunk
Switch(config-if)# spanning-tree port-priority 0

Switch(config)# interface FastEthernet0/23
Switch(config-if)# switchport trunk encapsulation dot1q
Switch(config-if)# switchport trunk allowed vlan public VLAN ID ,private VLAN ID
Switch(config-if)# switchport mode trunk
Switch(config-if)# spanning-tree port-priority 0
```

Step 5 For a 24-port catalyst switch, enter the following commands to configure Port 24. Replace *port* with the port number.

Example:

```
Switch(config)# interface FastEthernet0/port
Switch(config-if)# switchport mode access
```

Step 6 Enter the following interface commands:

Example:

```
Switch(config)# interface GigabitEthernet0/1
Switch(config)# no ip address
Switch(config)# ip http server
Switch(config)# interface GigabitEthernet0/2
Switch(config)# no ip address
Switch(config)# ip http server
Switch(config)# interface Vlan public VLAN ID
Switch(config)# no ip address
Switch(config)# no ip route-cache
Switch(config)# ip http server
```

Step 7 Enter the following commands to configure authentication:

Example:

```
Switch(config)# line con 0
Switch(config)# line vty 0 4
Switch(config-line)# password yyyyyy
Switch(config-line)# login
Switch(config-line)# line vty 5 15
Switch(config-line)# password yyyyyy
Switch(config-line)# login
Switch(config-line)# end
```

Stop. You have completed this procedure.

Ethernet Adapter Panel

An ethernet adapter panel (EAP) is required in an ANSI or ETSI equipment rack for multishelf configurations. Two EAPs are required in a multishelf configuration, one for each MS-ISC-100T card. Figure 72: Connecting the EAP to the Node Controller and Subtending Shelf, on page 156 shows an example of two installed EAPs and the connection between each EAP and a node controller shelf and a subtending shelf.

An EAP cable is used to connect the MS-ISC-100T card ports to the EAP (Figure 73: EAP Cable, on page 156). The nine connector ends plug into Ports 0 through 8 of the MS-ISC-100T card, and the multiport connector plugs into the EAP. Ports 0 and 1 on the MS-ISC-100T card are the DCN ports; Ports 2 through 7 are the SSC ports. A cross-over (CAT-5) LAN cable is used to connect the DCN port on the EAP to the front panel of the TCC2/TCC2P/TCC3 cards in the subtending shelves.

Figure 72: Connecting the EAP to the Node Controller and Subtending Shelf

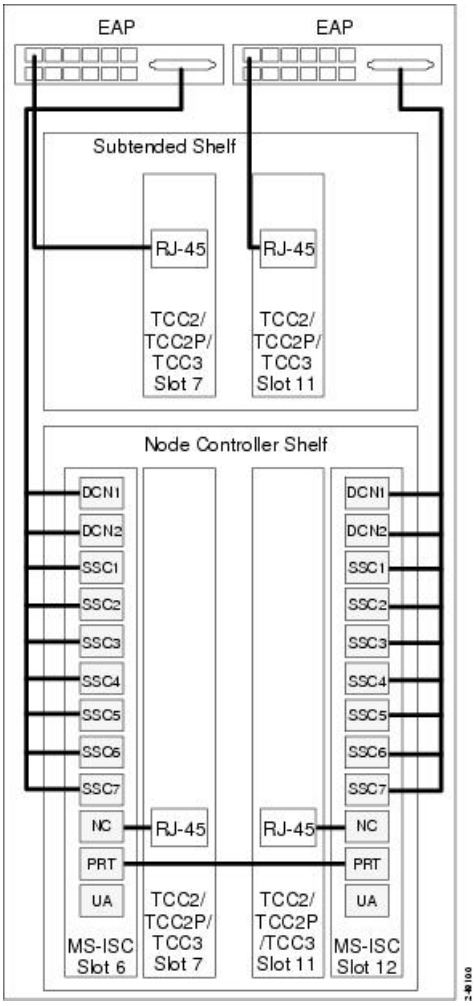
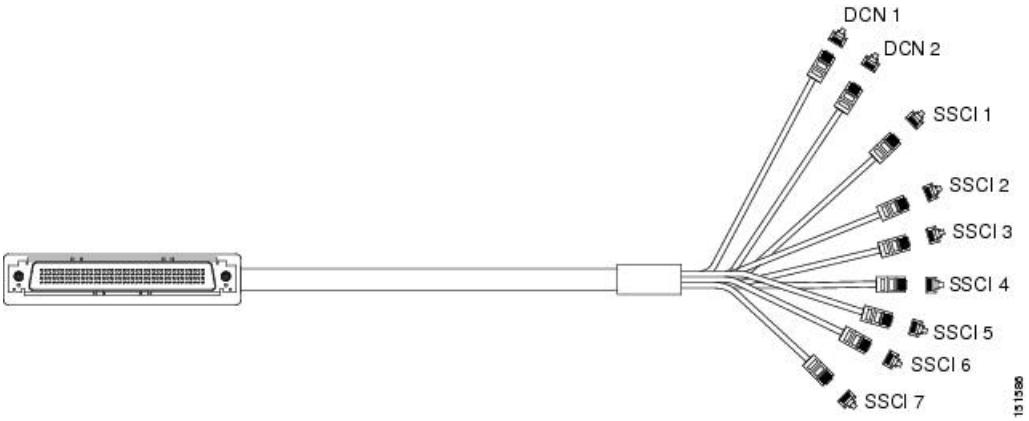


Figure 73: EAP Cable



Filler and Blank Cards

The filler card (15454- FILLER) is designed to occupy empty multiservice and AIC-I slots in the Cisco ONS 15454 (Slots 1 to 6, 9, and 12 to17). The filler card cannot operate in the cross-connect (XC) slots (Slots 8 and 10) or TCC2/TCC2P/TCC3 slots (Slots 7 and 11). The filler card is detected by CTC.

When installed, the filler card aids in maintaining proper air flow and EMI requirements.

Note Do not use 15454-M-FILLER or 15454-M-T-FILLER filler cards in the Cisco ONS 15454 M12 shelf.

The following figure shows the card faceplate. The filler card has no card-level LED indicators.

Blank cards (15454-BLANK) can be installed in any empty slot in the shelf. CTC does not detect blank cards.

Figure 74: Filler Card Faceplate

Cable Routing and Management

The ONS 15454 cable management facilities include the following:

- Fiber patch panels
- A cable-routing channel (behind the fold-down door) that runs the width of the shelf (Figure 75: Managing Cables on the Front Panel, on page 159)
- Plastic horseshoe-shaped fiber guides at each side opening of the cable-routing channel that ensure that the proper bend radius is maintained in the fibers (Figure 76: Fiber Capacity, on page 160)

Note You can remove the fiber guide, if necessary, to create a larger opening (if you need to route CAT-5 Ethernet cables out the side, for example). To remove the fiber guide, take out the three screws that anchor it to the side of the shelf.

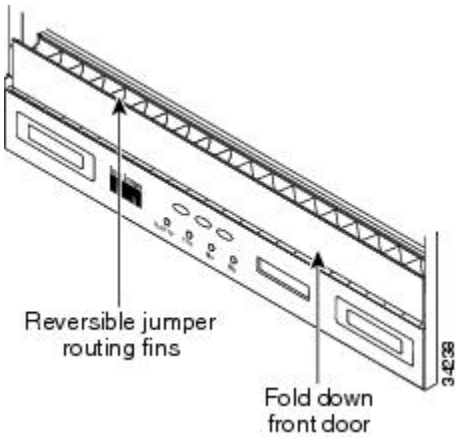
- Cable tie-wrap facilities on EIAs that secure cables to the cover panel (ANSI only)
- Reversible jumper routing fins that enable you to route cables out either side by positioning the fins as desired
- Jumper slack storage reels (2) on each side panel that reduce the amount of slack in cables that are connected to other devices

Note To remove the jumper slack storage reels, take out the screw in the center of each reel.

- Optional fiber-storage tray (recommended for DWDM nodes)
- Optional tie-down bar (ANSI only)

The following figure shows the cable management facilities that you can access through the fold-down front door, including the cable-routing channel and the jumper routing fins.

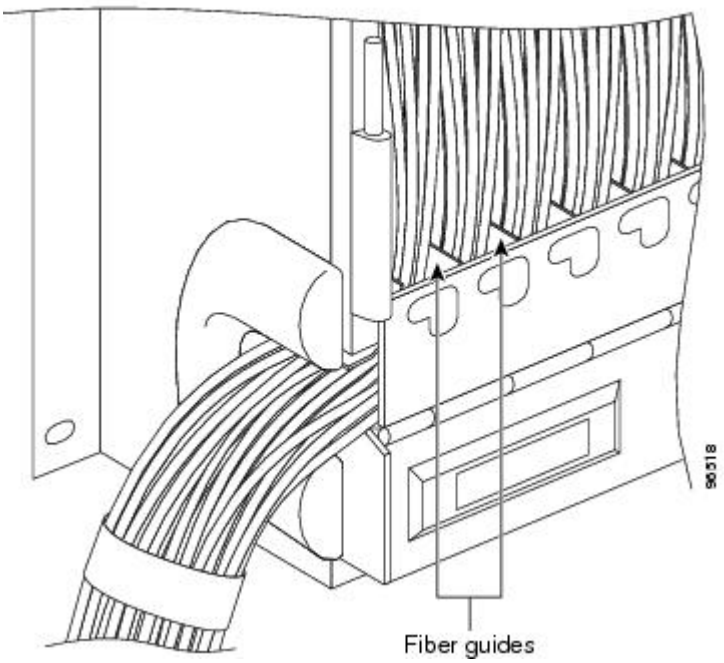
Figure 75: Managing Cables on the Front Panel



Fiber Management

The jumper routing fins are designed to route fiber jumpers out of both sides of the shelf. Slots 1 to 6 exit to the left, and Slots 12 to 17 exit to the right. The following figure shows fibers routed from cards in the left slots, down through the fins, then exiting out the fiber channel to the left. The maximum capacity of the fiber routing channel depends on the size of the fiber jumpers.

Figure 76: Fiber Capacity



The following table provides the maximum capacity of the fiber channel for one side of an ANSI shelf, depending on fiber size and number of Ethernet cables running through that fiber channel.

Table 26: ANSI Fiber Channel Capacity (One Side of the Shelf)

Fiber Diameter	Maximum Number of Fibers Exiting Each Side		
No Ethernet Cables	One Ethernet Cable	Two Ethernet Cables	
0.6 inch (1.6 mm)	144	127	110
0.7 inch (2 mm)	90	80	70
0.11 inch (3 mm)	40	36	32

The following table provides the maximum capacity of the fiber channel for one side of an ETSI shelf, depending on fiber size and number of Ethernet cables running through that fiber channel.

Table 27: ETSI Fiber Channel Capacity (One Side of the Shelf)

Fiber Diameter	Maximum Number of Fibers Exiting Each Side		
No Ethernet Cables	One Ethernet Cable	Two Ethernet Cables	
0.6 inch (1.6 mm)	126	110	94
0.7 inch (2 mm)	80	70	60
0.11 inch (3 mm)	36	31	26

Determine your fiber size according to the number of cards/ports installed in each side of the shelf. For example, if your port combination requires 36 fibers, 3-mm (0.11-inch) fiber is adequate. If your port combination requires 68 fibers, you must use 2-mm (0.7-inch) or smaller fibers.

Fiber Management Using the Patch-Panel Trays

The optional patch-panel trays manage the connections between multiplexer/demultiplexer and TXP cards by splitting multiple fiber push-on (MPO) cables into single fiber connections (LC cables). The patch-panel tray consists of a metal shelf, a pull-out drawer, a drop-in patch-panel module, and various cable routing mechanisms.

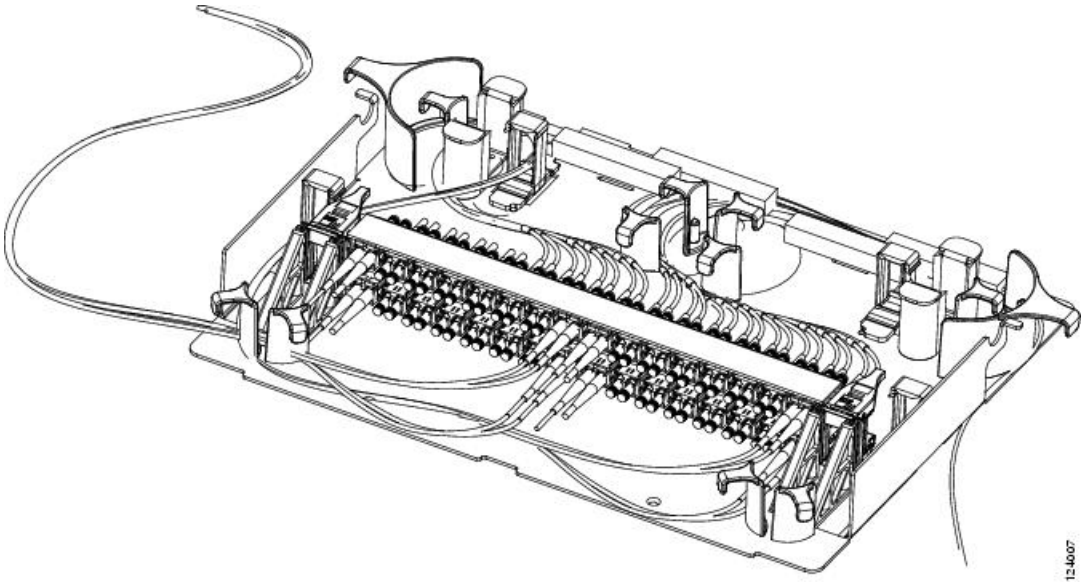
Standard and Deep Patch-Panel Trays (32-Channel)

There are two patch-panel trays intended for use with 32-channel cards, the standard tray (1 RU deep) and the deep tray (2 RUs deep). Both the standard patch-panel tray can host up to eight ribbon cables (with eight fibers each) entering the drawer, or 64 cables (with a maximum outer diameter of 2 mm [0.079 in.]). The deep patch-panel has the bulkheads organized in 8 packs, each housing 8 LC adapters, which allows for more room for internal fiber routing as well as more clearance for ingress and egress of the cables. The deep patch-panel comes with the MPO-LC cables preinstalled.

Because the standard and deep patch-panel tray can each host 64 connections, hub and ROADM nodes will typically require two standard patch-panel modules each, and other DWDM nodes might require one. (Only one standard or deep patch-panel tray is necessary for terminal nodes.) The module fits 19- and 23-inch (482.6-mm and 584.2-mm) ANSI racks and 600 mm (23.6 inch) x 300 mm (11.8 inch) ETSI racks, using reversible brackets.

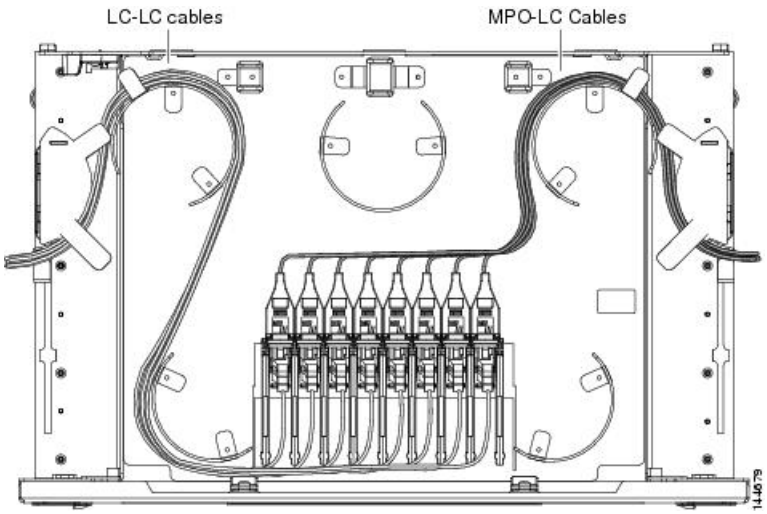
The following figure shows a partially fibered standard patch-panel tray.

Figure 77: Standard Patch-Panel Tray



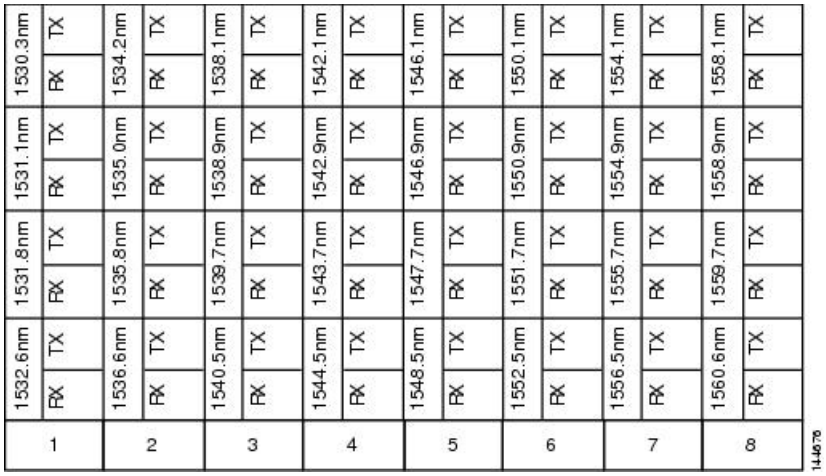
The following figure shows a partially fibered deep patch-panel tray.

Figure 78: Deep Patch-Panel Tray



The following figure shows the label on the patch panel that identifies the wavelength for each port.

Figure 79: Patch-Panel Port Wavelength



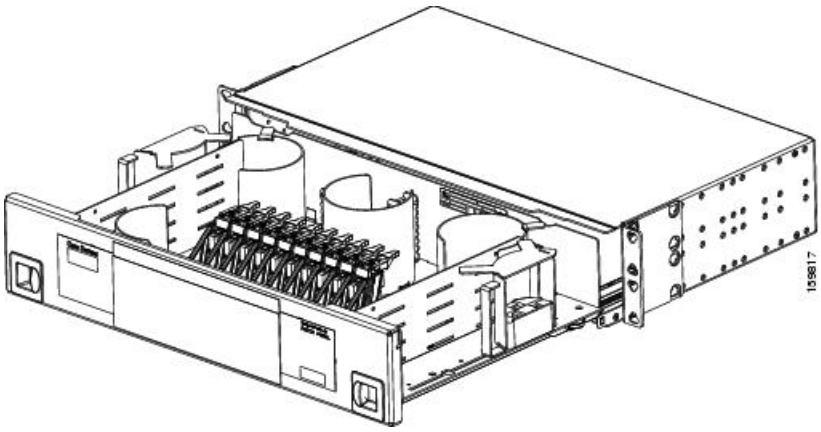
40-Channel Patch-Panel Tray

The 40-channel patch panel tray is 2 RUs deep and comes preinstalled with MPO-LC cables. The 40-channel patch-panel tray can host up to 10 ribbon cables (with eight fibers each), for a total of 80 connections, and is used with expanded ROADM, terminal, hub, and mesh nodes. Expanded hub and ROADM nodes will typically require two 40-channel patch-panel modules each; terminal nodes require one 40-channel patch-panel tray; and one 40-channel patch-panel tray is needed for mesh nodes for each direction.

The module fits 19- and 23-inch (482.6-mm and 584.2-mm) ANSI racks and 600 mm (23.6 inch) x 300 mm (11.8 inch) ETSI racks, using reversible brackets.

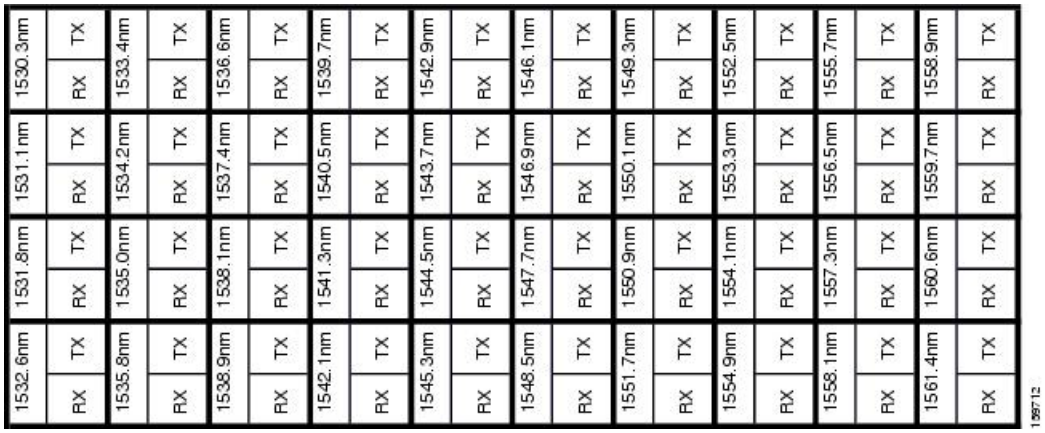
The following figure shows a 40-channel patch-panel tray.

Figure 80: 40-Channel Patch-Panel Tray, Side View



The following figure shows the 40-channel patch-panel ports and corresponding wavelengths.

Figure 81: 40-Channel (15454-PP-80) Patch-Panel Port Wavelengths

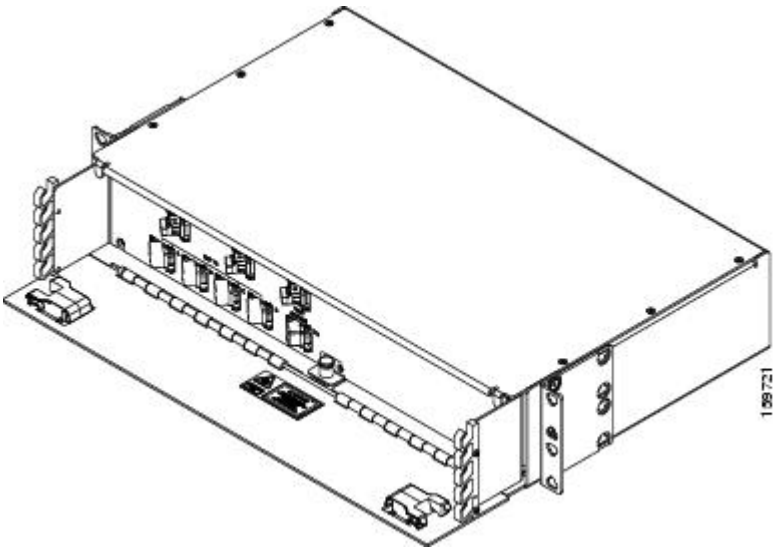


Mesh Patch-Panel Tray

There are two mesh patch-panel trays, four-degree (PP-MESH-4) and eight-degree (PP-MESH-8), which are intended for use with mesh nodes. Both trays are 2 RUs deep. The four-degree patch panel allows up to 4 sides to be used per mesh node, while the eight-degree patch panel allows up to 8 sides to be used per mesh node. The 4-degree patch-panel tray can host up to 4 MPO-MPO and 4 LC-LC cables, and the 8-degree patch-panel tray can host up to 8 MPO-MPO and 8 LC-LC cables. The module fits 19- and 23-inch (482.6-mm and 584.2-mm) ANSI racks and 600 mm (23.6 inch) x 300 mm (11.8 inch) ETSI racks, using reversible brackets.

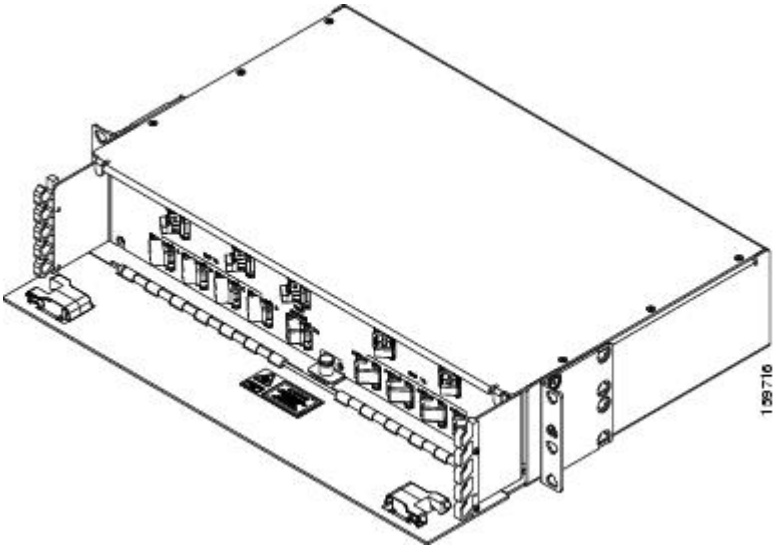
The following figure shows a four-degree patch-panel tray.

Figure 82: Four-Degree Patch-Panel Tray



The following figure shows an eight-degree patch-panel tray.

Figure 83: Eight-Degree Patch-Panel Tray



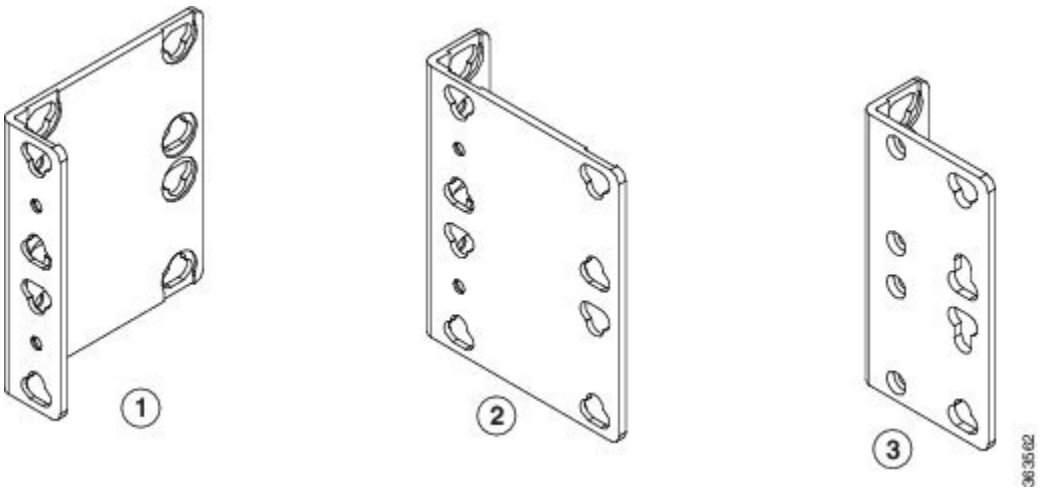
Install PP-Mesh

The PP-Mesh is an ONS 15454 unit that can be installed either above or below the DWDM generating equipment according to the local site practice.

The PP-Mesh is a 2 rack unit (RU) high. Each package includes one set of the following brackets:

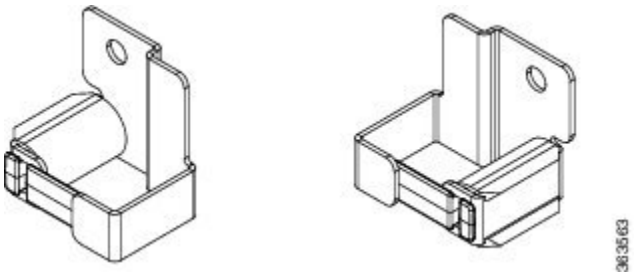
- 19-inch (482.6-mm) or 23-inch (584.2-mm) reversible (two-way) mounting brackets that can be rotated to fit either rack size. These reversible brackets are used for EIA and IEC standard racks.
- ETSI brackets that are used for ETSI standard racks.

Figure 84: ANSI and ETSI Brackets



Serial Number	Specifications
1	ANSI Version- 19” Configuration: Long side mated to unit
2	ANSI Version- 23” Configuration: Short side mated unit
3	ETSI Version

Figure 85: Vertical Cable Guides (Left and Right)



Install PP-Mesh on an ANSI 19" Configuration

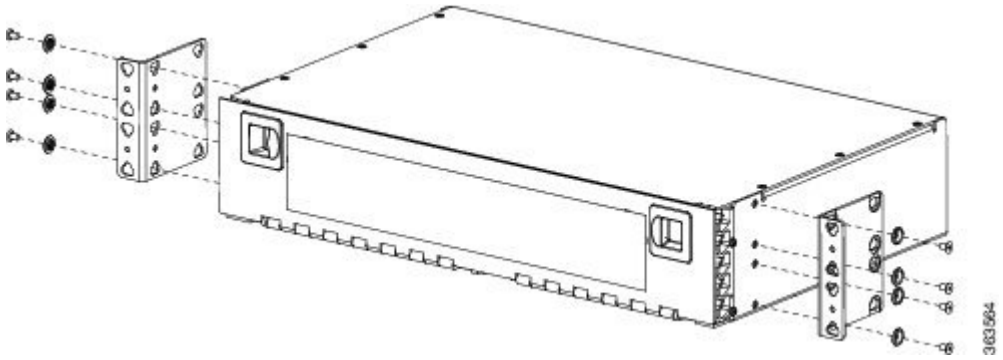
This procedure describes the steps to install the PP-Mesh on an ANSI 19" configuration:

Procedure

Step 1 Set the mounting brackets to the rack you are using.

Step 2 Install the right and left ANSI 19" bracket to the unit using the four washer and the screws provided with the installation kit.

Figure 86: Right and Left ANSI 19″ Bracket



Step 3 Install the right Mesh Panel unit in the ANSI 19" rack. To ensure safe unit mounting, use at least two screws on each side.

Figure 87: Mesh Panel Unit

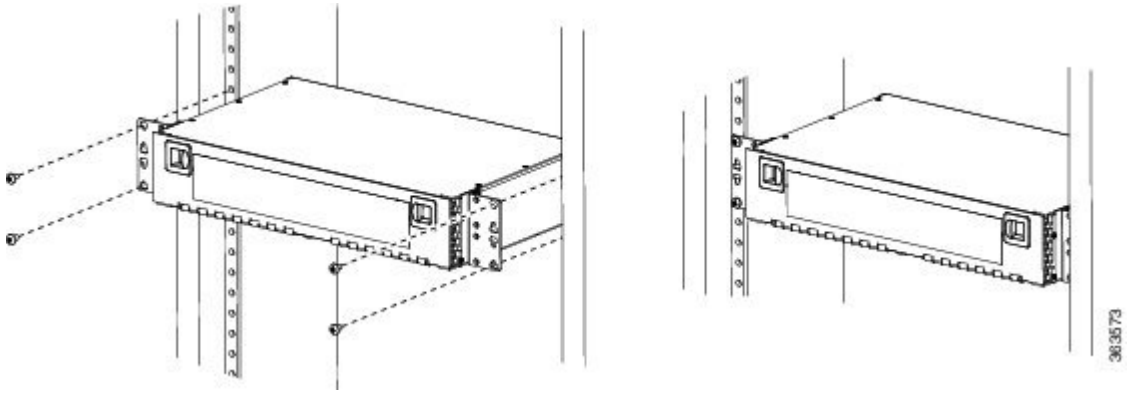
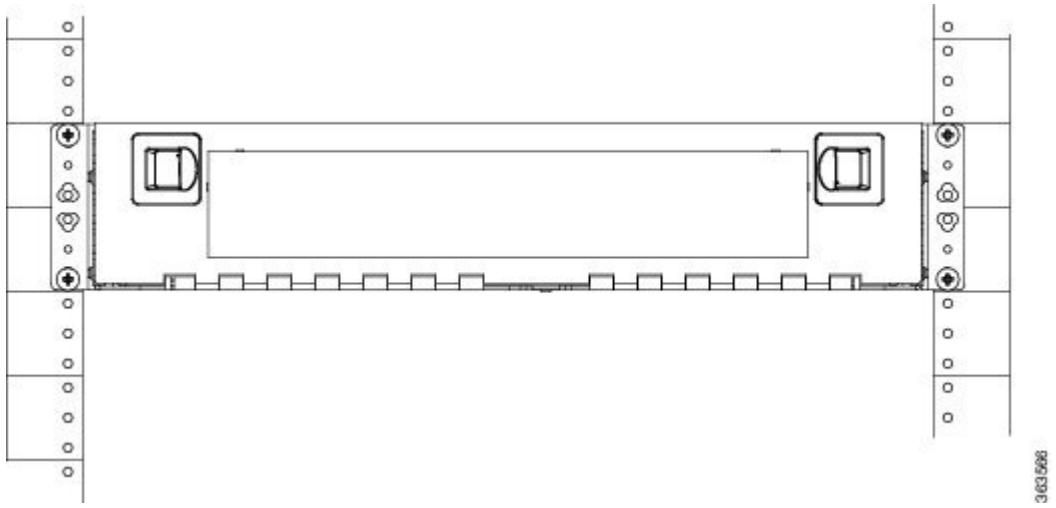


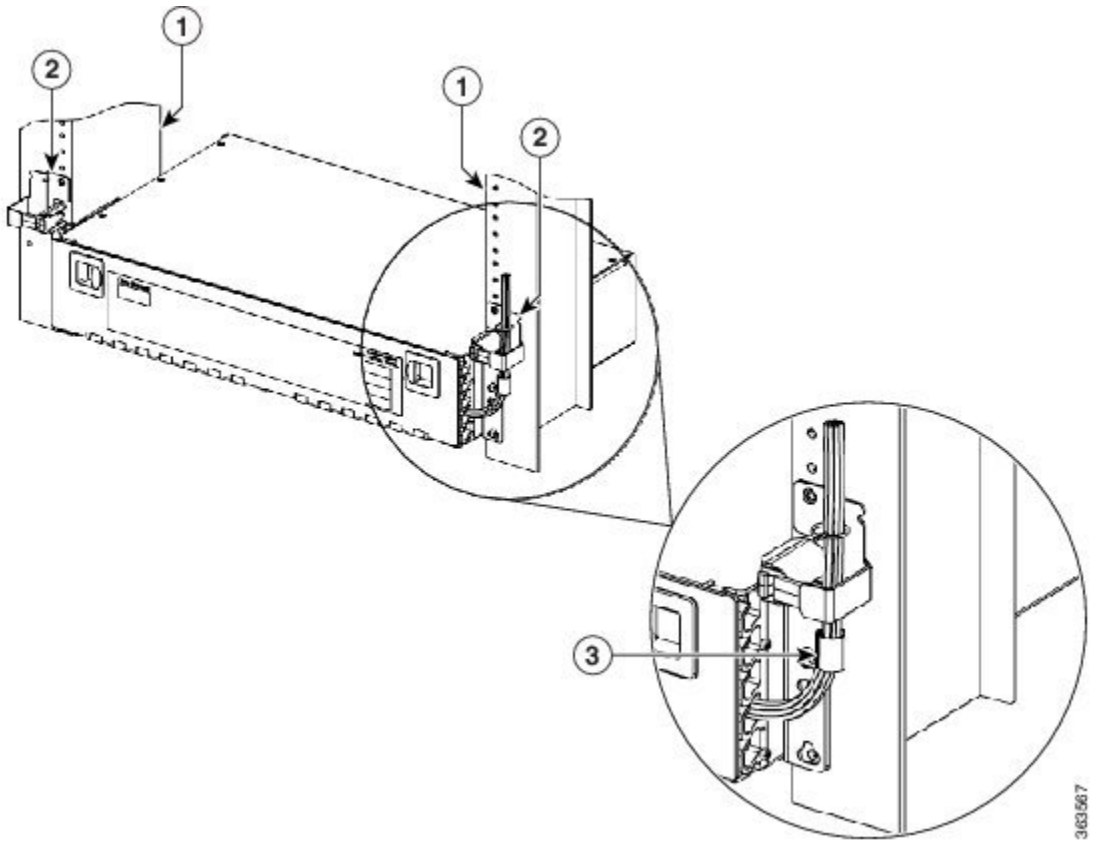
Figure 88: Mesh Panel Unit, Front View



Step 4 Install the right Vertical cable guide (VCG) using the washer and the screw provided with the installation kit.

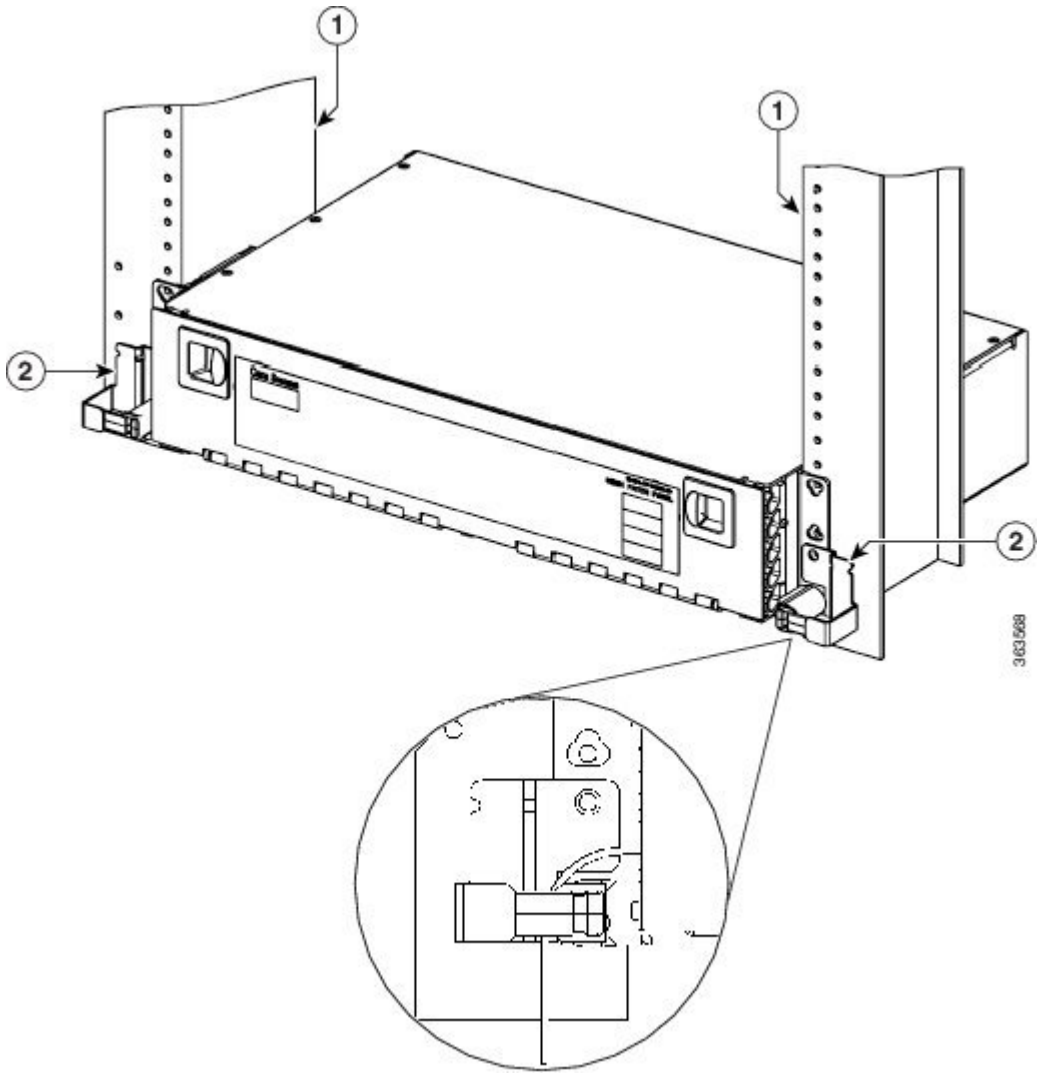
The Vertical Cable Guide can be installed in top position (Figure A), if the fibers are connected from the top, or they can be installed in bottom position (Figure B), if the fibers are connected from the bottom.

Figure 89: Figure A



Serial Number	Specifications
1	Rack
2	Vertical Cable Guide
3	Velcro Tie Wrap

Figure 90: Figure B



Serial Number	Specifications
1	Rack
2	Vertical Cable Guide

Install PP-Mesh on an ANSI 23" Configuration

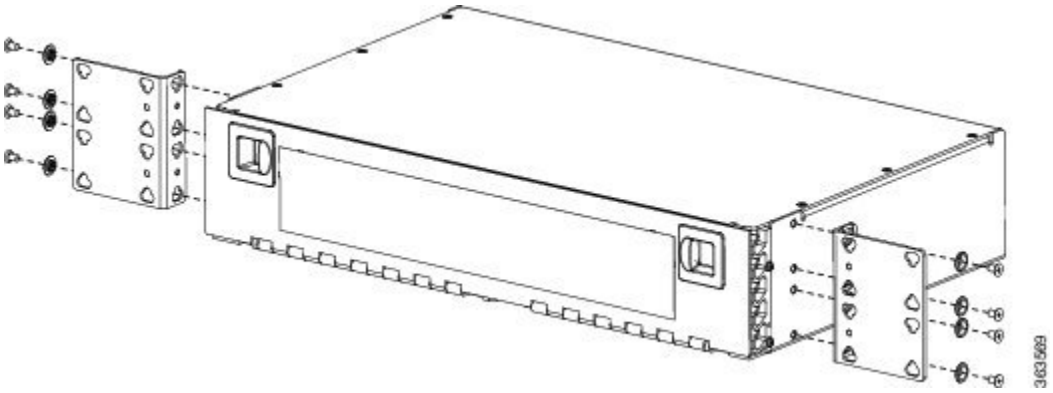
This procedure describes the steps to install the PP-Mesh on an ANSI 23" configuration:

Procedure

Step 1 Set the mounting brackets to the rack you are using.

Step 2 Install the right and left ANSI 23" bracket to the unit using the four washer and the screws provided with the installation kit.

Figure 91: Right and Left ANSI 23" Bracket



Step 3 Install the right Mesh Panel unit in the ANSI 23" rack. To ensure safe unit mounting, use at least two screws on each side.

Figure 92: Mesh Panel Unit

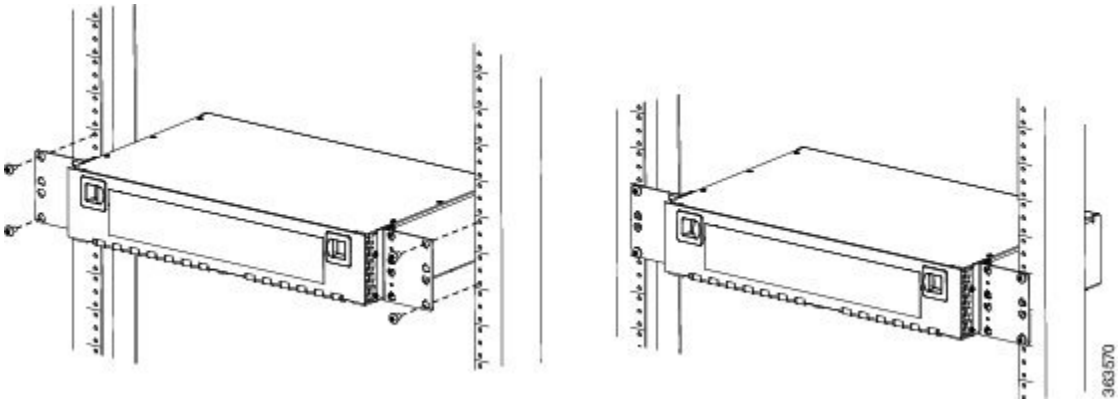
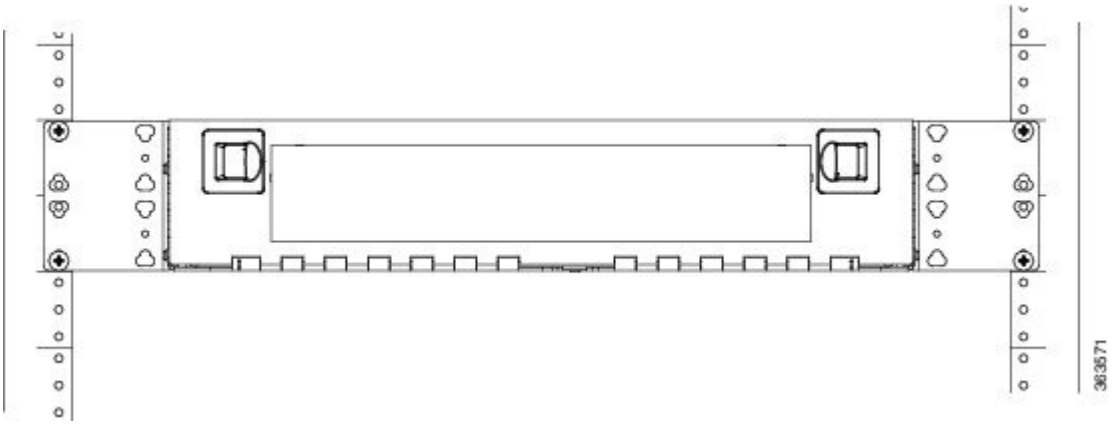


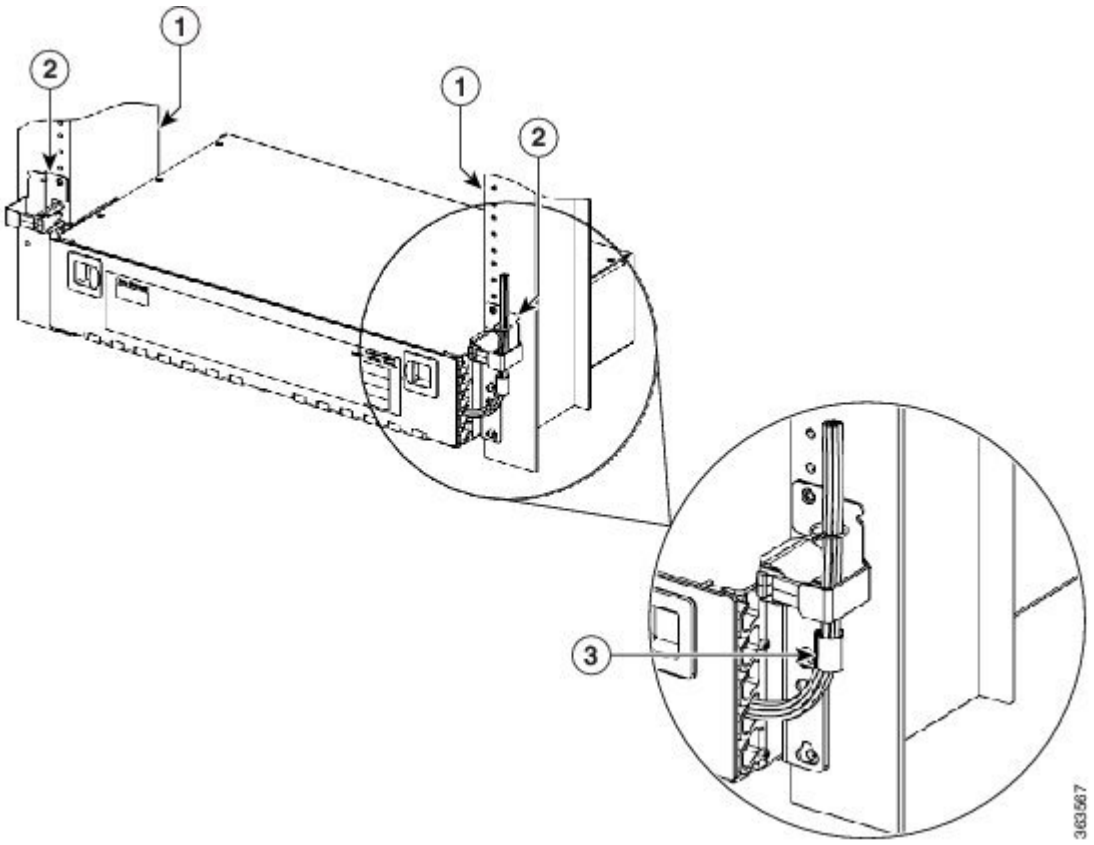
Figure 93: Mesh Panel Unit, Front View



Step 4 Install the right Vertical cable guide (VCG) using the washer and the screw provided with the installation kit.

The Vertical Cable Guide can be installed in top position (Figure A), if the fibers are connected from the top, or they can be installed in bottom position (Figure B), if the fibers are connected from the bottom.

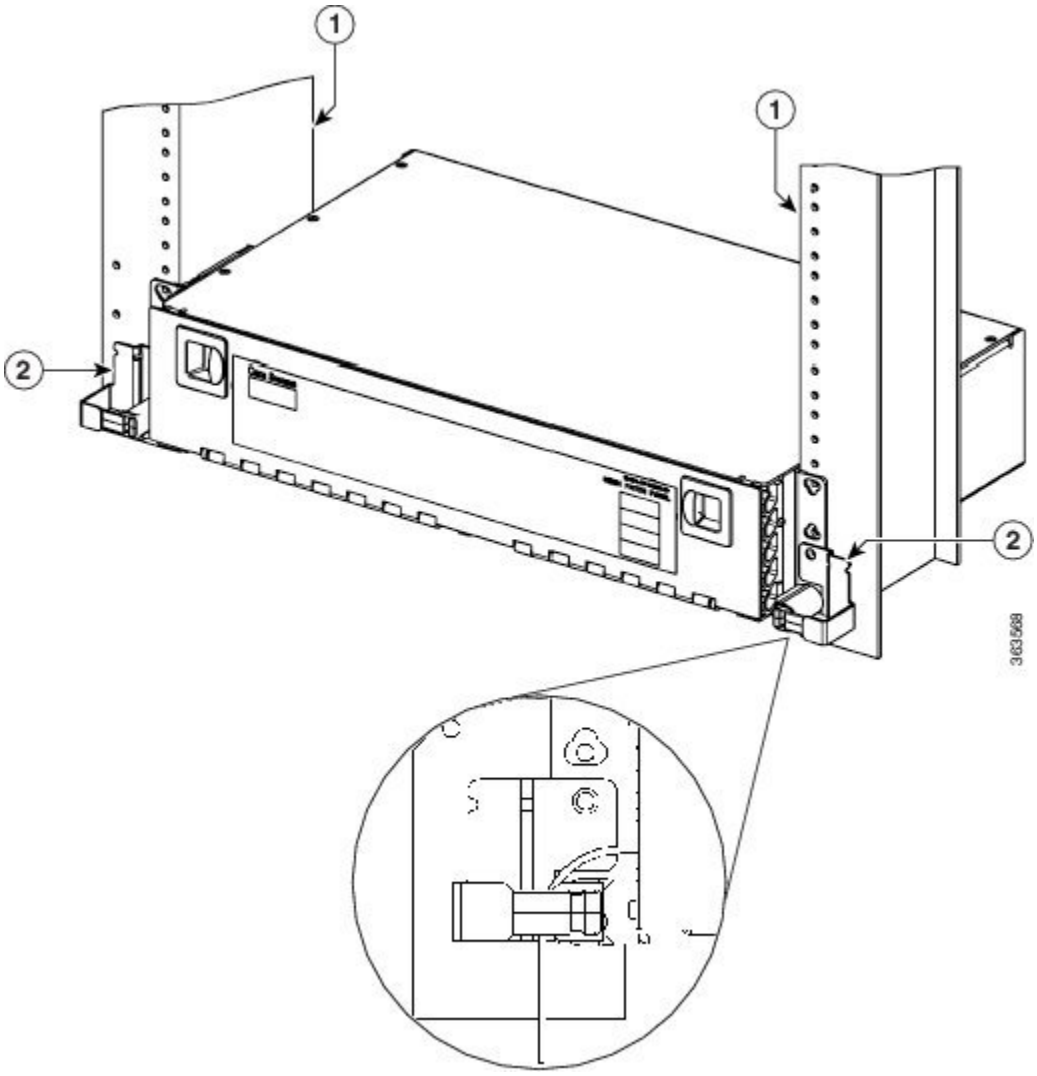
Figure 94: Figure A



Serial Number	Specifications
1	Rack

Serial Number	Specifications
2	Vertical Cable Guide
3	Velcro Tie Wrap

Figure 95: Figure B



Serial Number	Specifications
1	Rack
2	Vertical Cable Guide

Install PP-Mesh on an ETSI Configuration

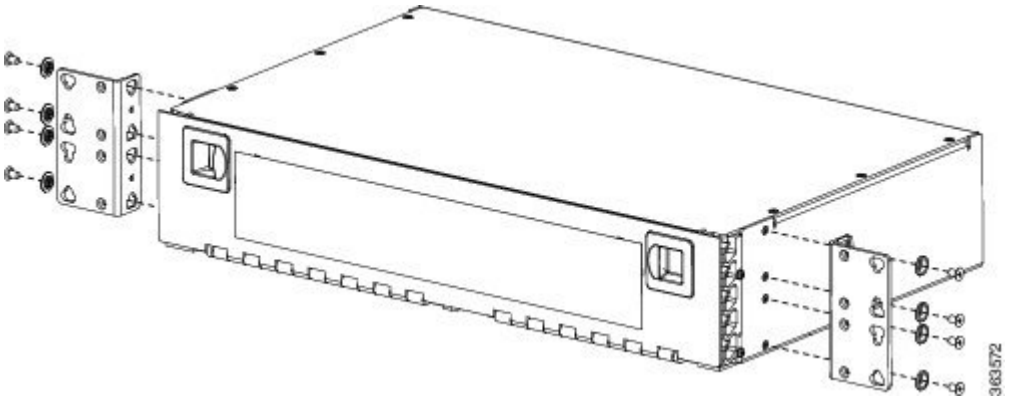
This procedure describes the steps to install the PP-Mesh on an ETSI configuration:

Procedure

Step 1 Set the mounting brackets to the rack you are using.

Step 2 Install the right and left ETSI bracket to the unit using the four washer and the screws provided with the installation kit.

Figure 96: Right and Left ETSI Bracket



Step 3 Install the right Mesh Panel unit in the ETSI rack. To ensure safe unit mounting, use at least two screws on each side.

Figure 97: Mesh Panel Unit in ETSI Rack

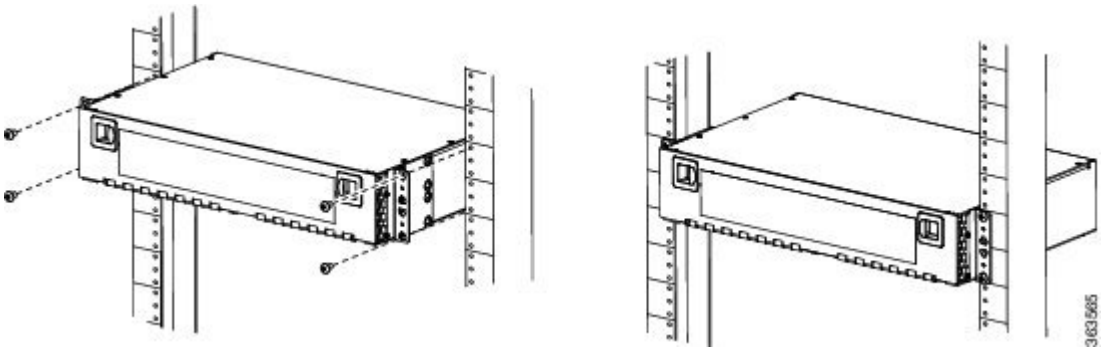
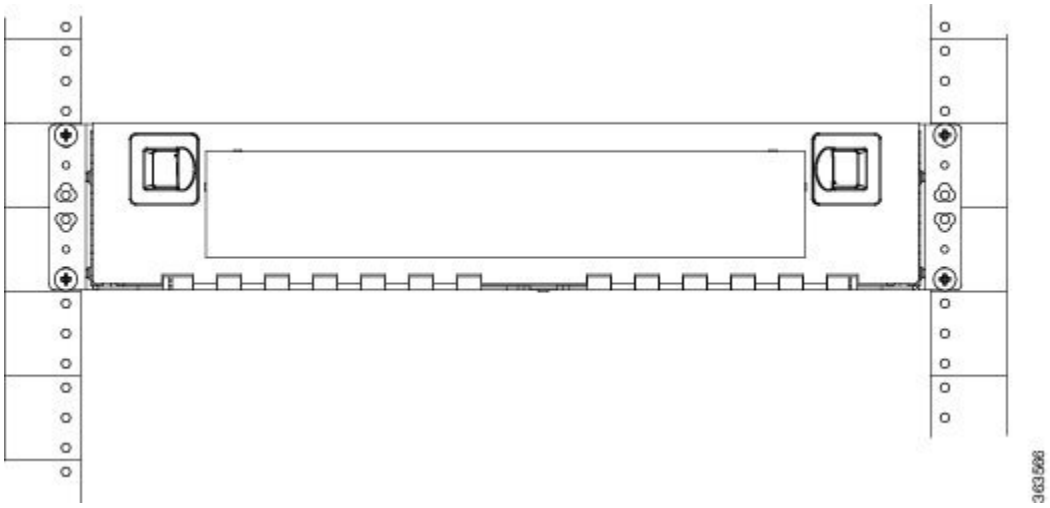
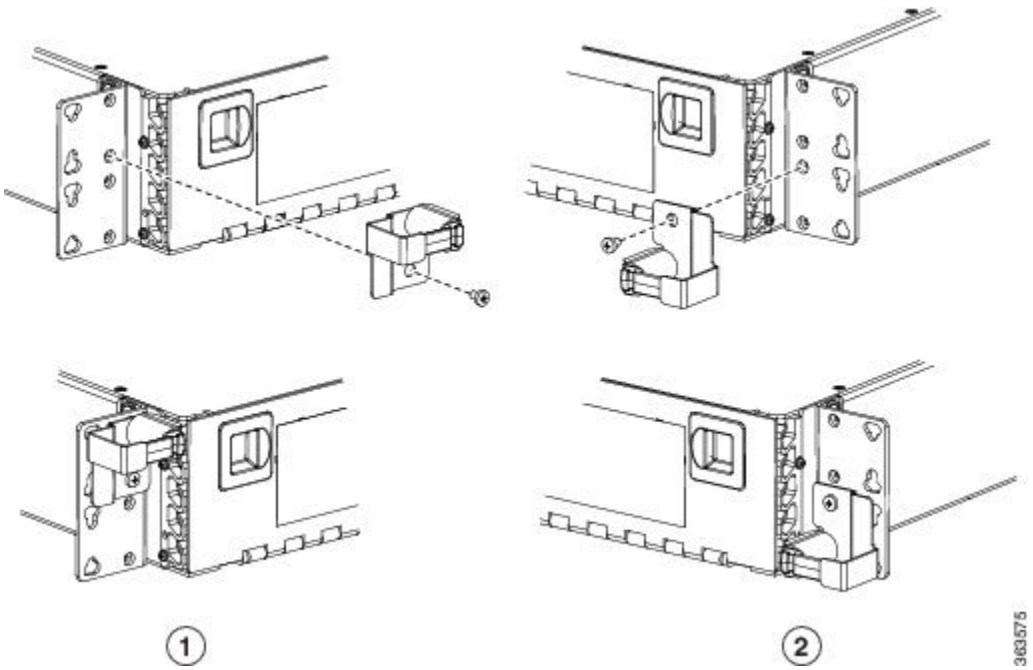


Figure 98: Mesh Panel Unit in ETSI Rack, Front View



Step 4 Install the right Vertical cable guide (VCG) using the washer and the screw provided with the installation kit.

Figure 99: Vertical Cable Guide



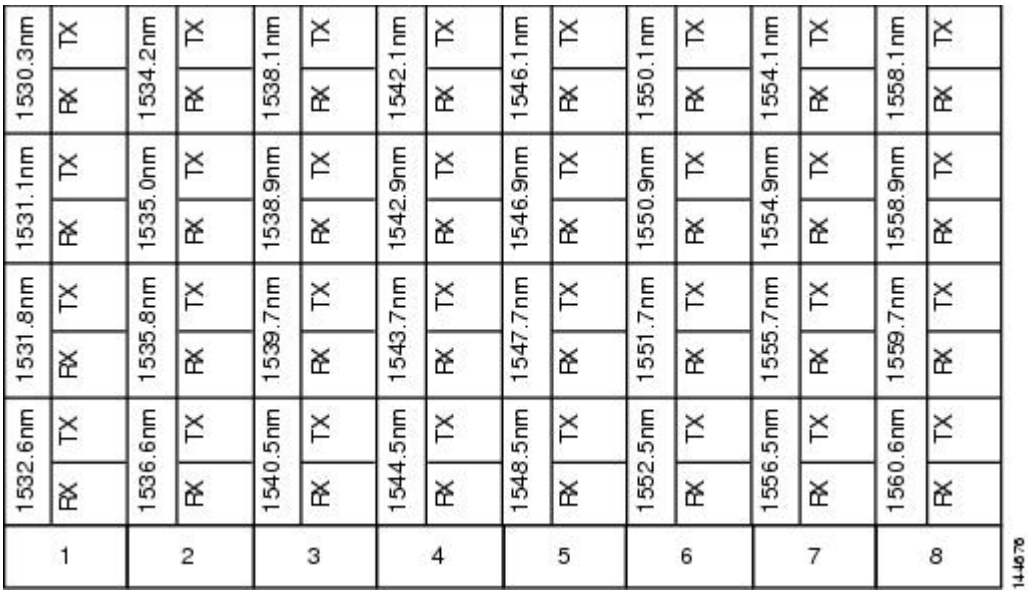
Note The Vertical Cable Guide can be installed in top position (left illustration), if the fibers are connected from the top, or they can be installed in bottom position (right illustration), if the fibers are connected from the bottom.

Fiber Management Using the Y-Cable Module Tray

The optional Y-cable module tray manages the connections between TXP cards by splitting patchcords into single connections. The patch-panel tray consists of a metal shelf, a pull-out drawer, and up to eight Y-cable modules.

The following figure shows a fibered Y-cable module tray.

Figure 100: Y-Cable Module Tray



To ensure diversity of the fiber coming from different cards in the Y-cable scheme, one pair of fibers (e.g. from the active transponder) should come out on the opposite side from the second pair of fibers (e.g. standby transponder), according to local site practice.

Fiber Management Using the Fiber-Storage Tray

Cisco recommends installing at least one fiber-storage tray in multinode racks to facilitate fiber-optic cable management for DWDM applications. This tray is usually used to store slack cable from cables installed between cards within a single node. Refer to Figure 66: Typical DWDM Equipment Layout in an ONS 15454 ANSI Rack, on page 123 for typical mounting locations.

Optical fibers without exposed metallic ferrule must be used with all the products and platforms covered by this document (see the following figures). Electrostatic discharge is more easily coupled into the equipment through exposed metallic ferrules near the fiber connectors.

Figure 101: Optical Fiber With Exposed Ferrule

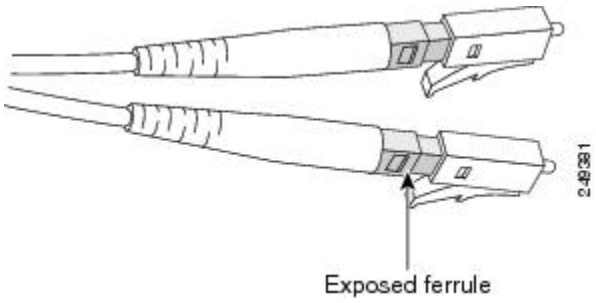
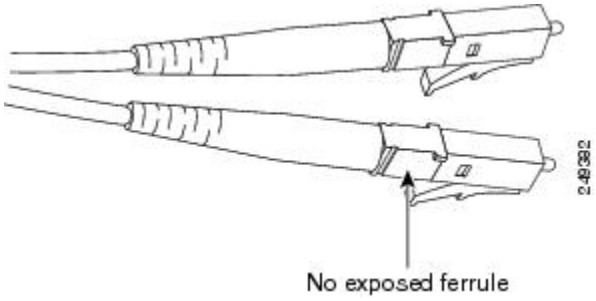


Figure 102: Optical Fiber Without Exposed Ferrule



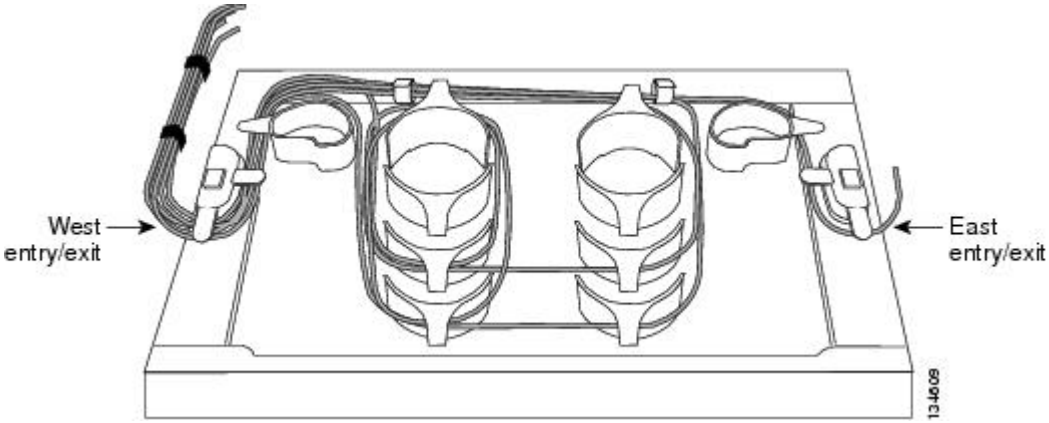
The following table provides the fiber capacity for each tray.

Table 28: Fiber-Storage Tray Capacity

Fiber Diameter	Maximum Number of Fibers Exiting Each Side
0.6 inch (1.6 mm)	62
0.7 inch (2 mm)	48
0.11 inch (3 mm)	32

The following figure shows an example of a fiber-management tray with fiber-optic cables routed through it. You can route cables around the cable rounders, entering and exiting from either side, as necessary. Route fibers as necessary for your site configuration.

Figure 103: Fiber-Storage Tray

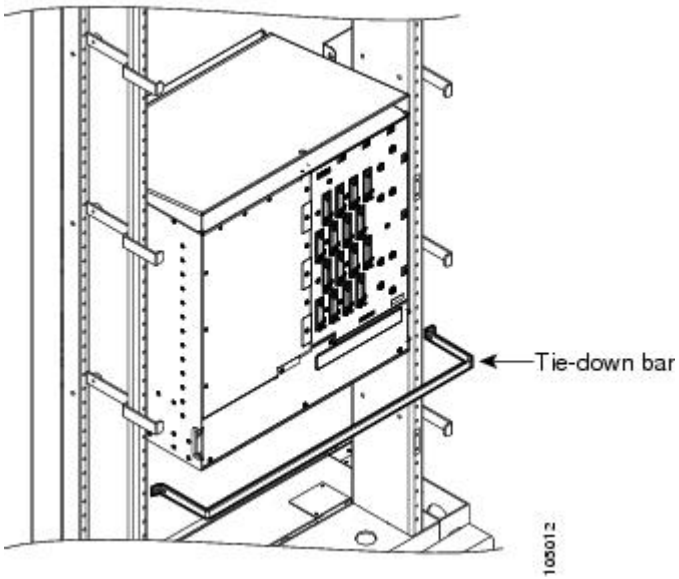


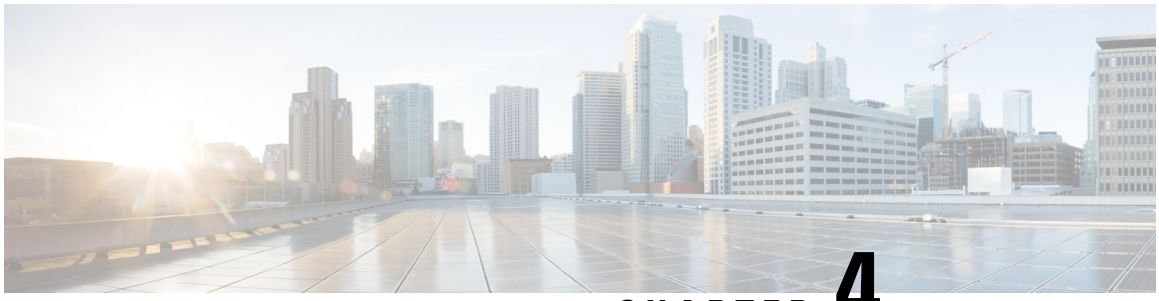
Fiber Management Using the Optional ANSI Tie-Down Bar

You can install a 5-inch (127-mm) tie-down bar on the rear of the ANSI chassis. You can use tie-wraps or other site-specific material to bundle the cabling and attach it to the bar so that you can more easily route the cable away from the rack.

The following figure shows the tie-down bar, the ONS 15454 ANSI, and the rack.

Figure 104: Tie-Down Bar on the Cisco ONS 15454 ANSI Shelf





CHAPTER 4

Installing the ONS 15454 M2 Shelf

This chapter explains how to install the ONS 15454 M2 shelf.

Installing the ONS 15454 M2 Shelf

This chapter explains how to install the ONS 15454 M2 shelf.

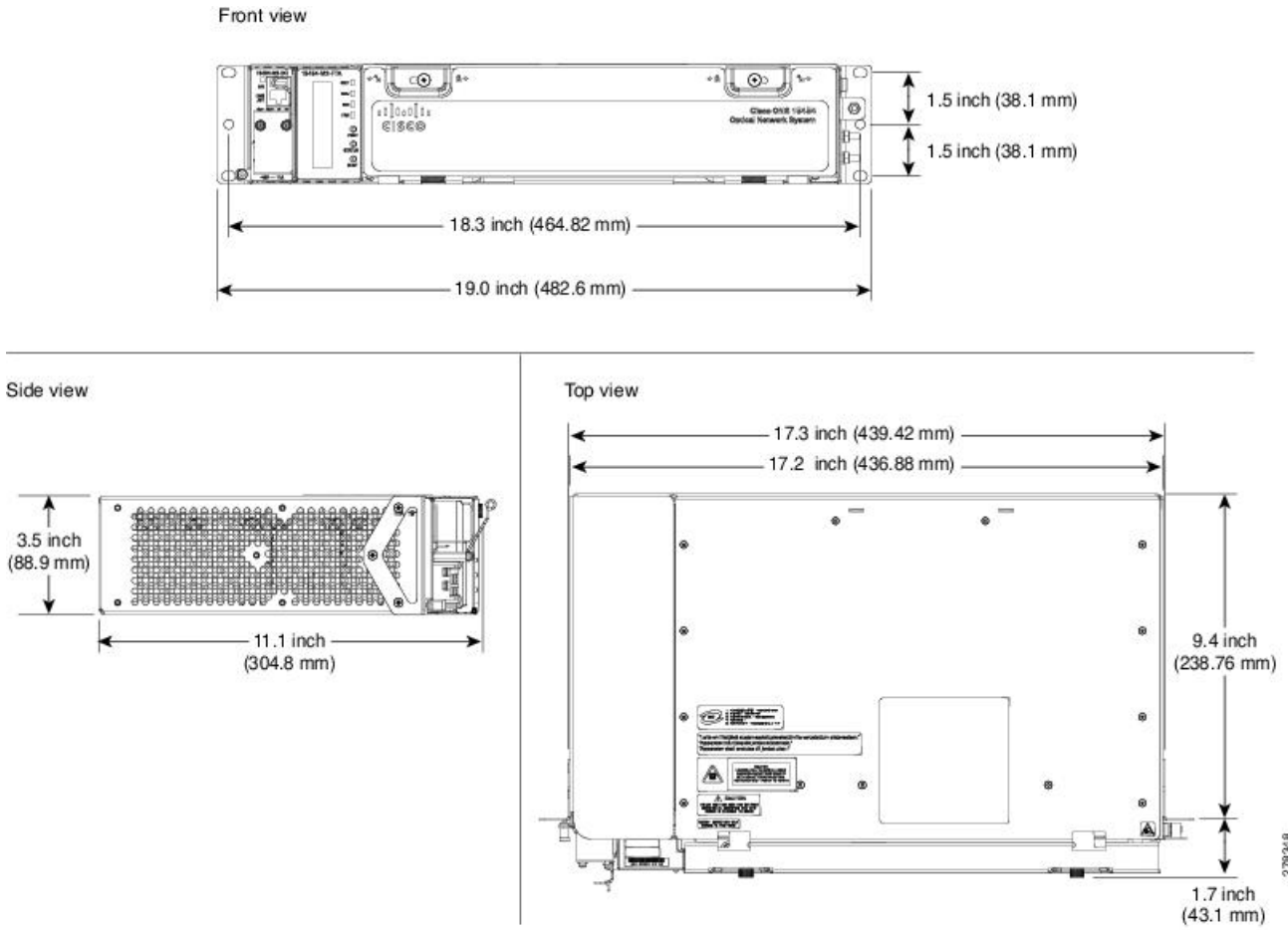
ANSI Rack Installation

The ONS 15454 M2 shelf is mounted on a 19-inch (482.6-mm) or 23-inch (584.2-mm) equipment rack. Make sure that the correct type of 19-inch ANSI rack is used for mounting the ONS 15454 M2 shelf as shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5. If the shelf is mounted in the front position, then it projects 1.7 inches (43.18 mm) from the front of the rack. If the shelf is mounted in the middle position, then it projects 5.1 inches (129.54 mm) from the front of the rack. The shelf mounts in both Electronic Industries Alliance (EIA) standard and Telcordia-standard racks. The shelf is a total of 17.2 inches (431.8 mm) wide with no mounting ears attached. Ring runs are not provided by Cisco and might hinder side-by-side installation of shelves where space is limited.

The ONS 15454 M2 shelf measures 3.5 inches (88.9 mm) high, 19 or 23 inches (482.6 or 584.2 mm) wide (depending on which way the mounting ears are attached), and 11.1 inches (304.8 mm) deep.

The following figure shows the dimensions of the ONS 15454 M2 shelf in a 19-inch configuration with brackets mounted in the front position.

Figure 105: Cisco ONS 15454 M2 Shelf Dimensions for a 19-inch ANSI Rack Configuration



Mounting Brackets

Caution Use only the fastening hardware provided with the ONS 15454 M2 shelf to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the ONS 15454 M2 shelf in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 M2 shipping kit, or remove the coating from the threads to ensure electrical continuity.

The mounting brackets (19-inch or 23-inch) are used to mount the shelf on a 19-inch (482.6 mm) rack or a 23-inch (584.2 mm) rack.

Mounting a Single Node

Mounting the ONS 15454 M2 shelf on a rack requires a minimum of 3.5 inches (88.9 mm) of vertical rack space. To ensure the mounting is secure, use two to three #12-24 mounting screws for each side of the shelf. For an ANSI rack, the brackets can be mounted in the front or middle position. The shelf should be empty for easier lifting. For information on the ONS 15454 M2 shelf weight, refer to the Dimensions , on page 486.

The ONS 15454 M2 shelves can be mounted above each other without any space between the shelves. This method of mounting does not restrict the air flow because the air vents are on either sides of the ONS 15454 M2 shelves.

ETSI Rack Installation

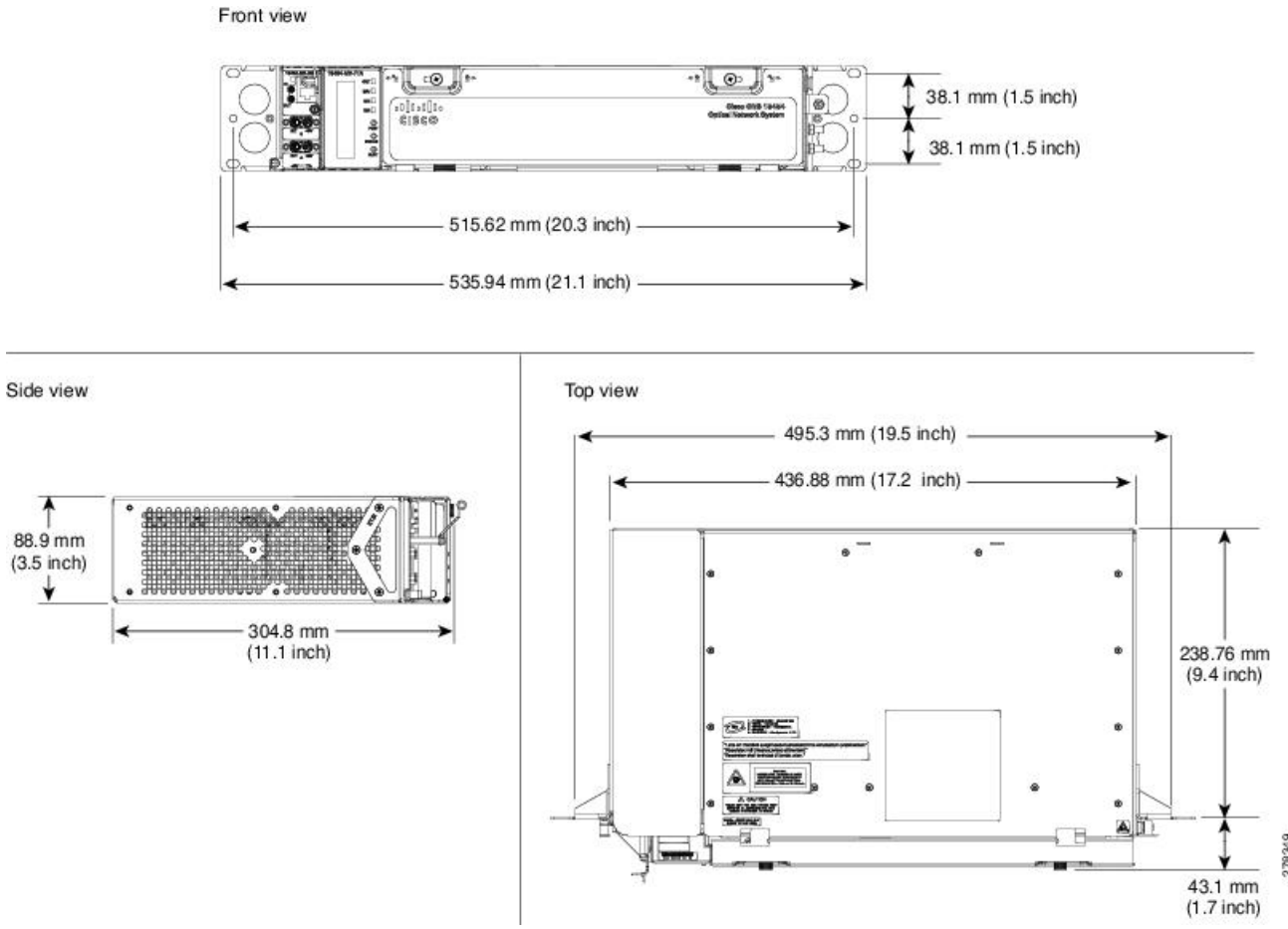
The ONS 15454 M2 shelf is mounted on a 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) ETSI standard equipment rack. In an ETSI rack, the shelf can be mounted only in the front position. The shelf projects 1.7 inches from the front of the rack. The shelf is a total of 17.2 inches (431.8 mm) wide with no mounting ears attached. Cisco does not provide ring runs, which might hinder side-by-side installation of shelves where space is limited.

The ONS 15454 M2 shelf measures 88.9 mm (3.5 inches) high, 535 mm (21.06 inches) wide, and 11.1 inches (304.8 mm) deep.

The following figure provides the dimensions of the ONS 15454 M2 shelf installed on a 600 x 600-mm (23.6 x 23.6-inch) ETSI standard equipment rack.

Caution When mounting a shelf in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack. If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Figure 106: ONS 15454 M2 Shelf Dimensions for an ETSI Rack Configuration



Mounting a Single Node

The ONS 15454 M2 requires 3.5 inches (88.9 mm) minimum of vertical rack space. To ensure the mounting is secure, use two to three M6 mounting screws for each side of the shelf.

In an ETSI rack, the brackets can be mounted only in the front position.

The ONS 15454 M2 shelves can be mounted above each other without any space between the shelves. This method of mounting does not restrict the air flow because the air vents are on either sides of the ONS 15454 M2 shelves.

Wall Mounting the ONS 15454 M2 Shelf

The ONS 15454 M2 shelf can be mounted on the wall using the wall mount brackets. The type of screws used to mount the brackets on the wall depends on the wall-type and are not provided by Cisco.

After the ONS 15454 M2 shelf is mounted on the wall, a fire protective tray is installed on the wall mount bracket to support the shelf.

Desktop Mounting the ONS 15454 M2 Shelf

The ONS 15454 M2 shelf can be mounted on the desktop for easy access.

Air Deflector

An air deflector is a sheet-metal part that is mounted on the ONS 15454 M2 shelf to orient the air flow in a specific direction.

The air deflectors can be mounted in different positions to control the air flow:

- Front to Front— Only ETSI rack
- Front to Back— For ANSI and ETSI racks
- Front to Top— Only ETSI rack

In an ANSI rack, the air deflectors are mounted only on the 23-inch rack configuration.

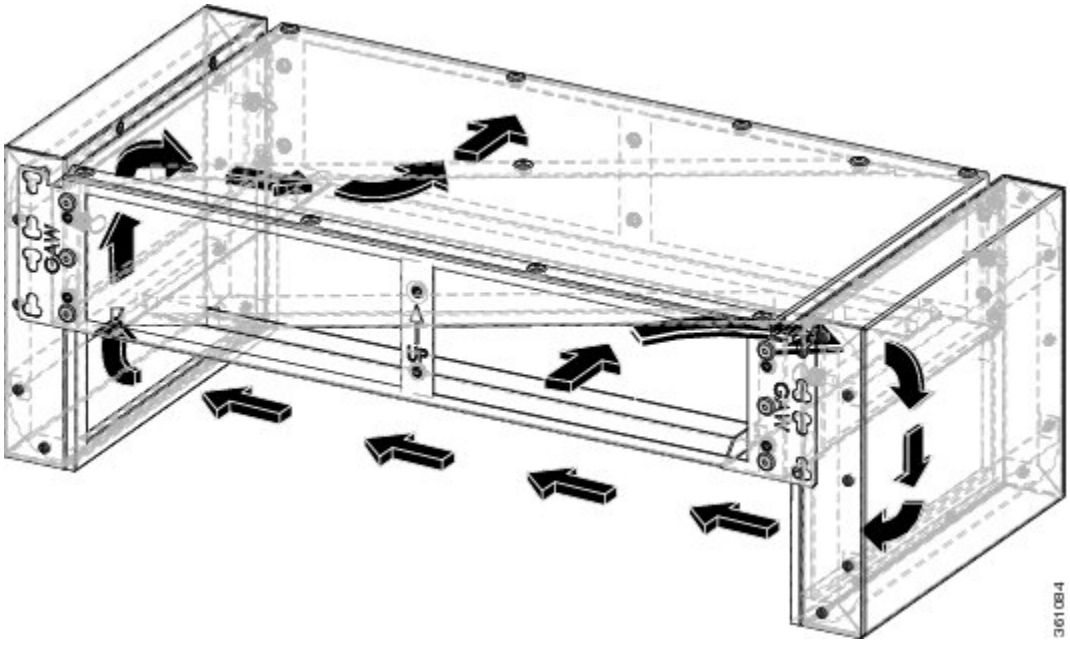
Air Plenum

Air plenum orients the air flow in the front-to-back direction inside the equipment to be compliant with GR-63 issue 4 requirement.

The air plenum kit has one horizontal and two vertical air plenums. The air that flows from the front top inlet are channelized to the right vertical plenum, inside the equipment, and then to the exhaust air channel towards the left vertical air plenum. The air flow is deflected by 90 degrees and exited out in the rear end.

The following figure shows the air flow inside the cabinet.

Figure 107: Air flow within the air plenum in the cabinet



The following figures show the dimensions of the air plenum relative to the cabinet or rack.

Figure 108: Dimension of Cisco ONS 15454 M2 chassis relative to the air plenum

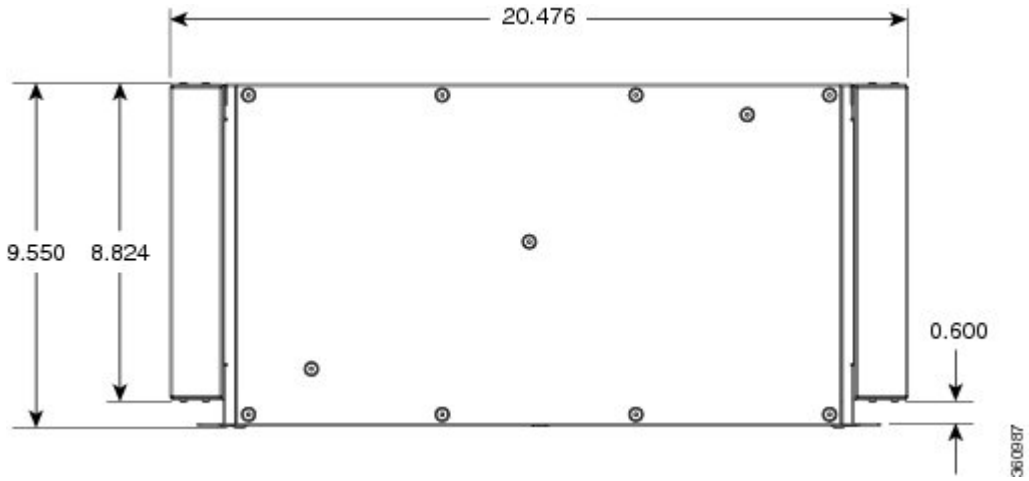
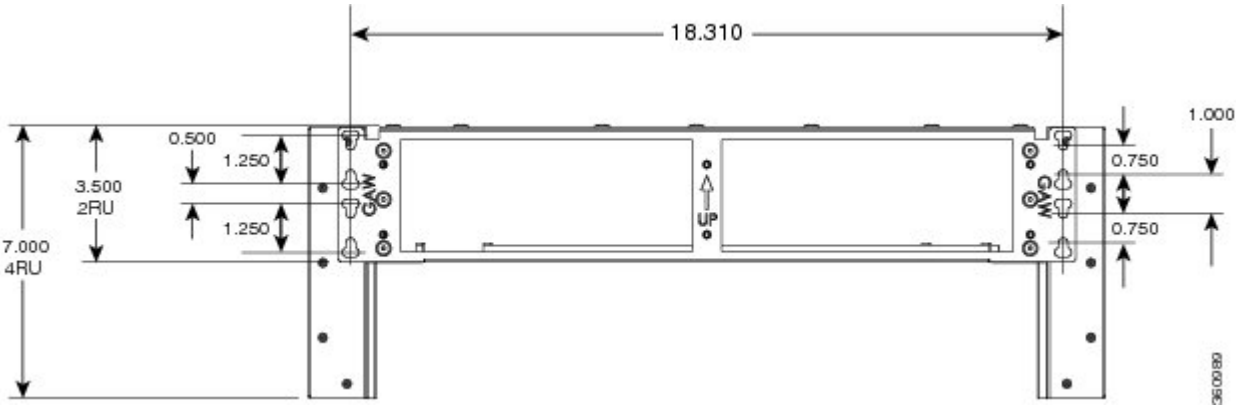


Figure 109: Dimension on Cisco ONS 15454 M2 relative to the air plenum



Air Plenum Rack and Cabinet Compatibility

The table shows the compatibility of air plenum with the ANSI and ETSI racks and cabinets. The chassis can be installed with brackets in front position only.

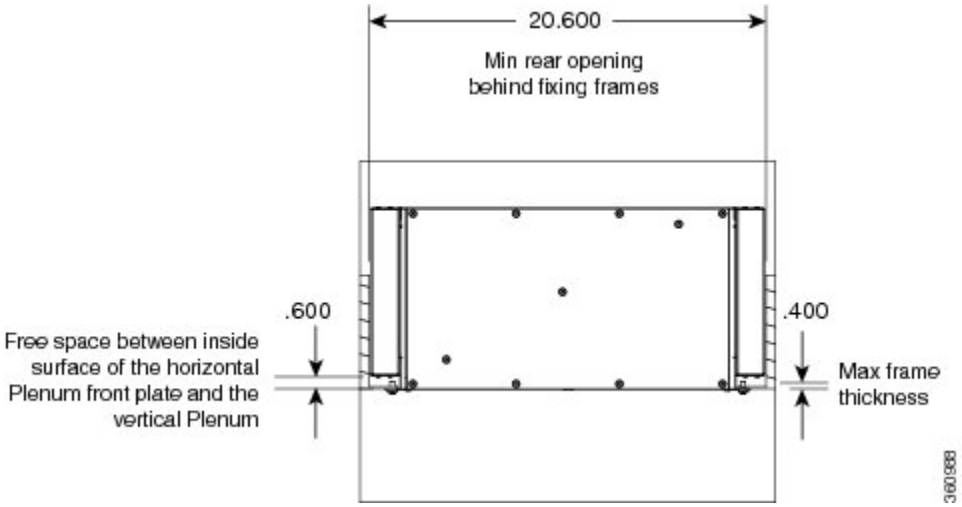
Table 29: Air plenum compatibility with racks and cabinets

Rack / Cabinet	Front-to-back air flow
ANSI 19-inch rack	Supported 1
ANSI 19-inch cabinet	Supported 1
ANSI 23-inch rack	Supported
ANSI 23-inch cabinet	Supported
ETSI cabinet	Supported 1

1 A minimum opening of 20.600 inches is required to install the vertical air plenum behind the front rails.

Note The ANSI 19-inch two post rack that is compatible with air plenum installation is available from Telect, with part number 12545-301.

Figure 110: Minimum rear opening for ANSI 19-inch and ETSI configuration



NTP-G343 Install the Air Plenum in ONS 15454 M2 Shelf

Purpose	This procedure installs the air plenum to orient the air flow from front-to- back direction in the ONS 15454 M2 shelf.

Tools/Equipment	• #2 Phillips Dynamometric screwdriver
	• Medium slot-head screwdriver
	• Small slot-head screwdriver
	• Screws
	  • ANSI: #12-24 x 0.50 pan-head Phillips screws
	  • ETSI: M6.0 x 20 pan-head Phillips screws
	• Wing head screws (4)
	• Adapter plates
	• One air plenum kit (horizontal and vertical air plenums)

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

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1074

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units.** Statement 246

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

Note For nominal voltage of -60 VDC, the input voltage range is from -40 to -72 VDC.

Note Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

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

Warning **The air plenum is installed on a rack or a cabinet using thread-forming screws that remove any paint or non-conductive coatings inside the hole threads, and establish a metal-to-metal contact. Also, clean both surfaces outside the screw points that come in contact, so that they are free of paint and other nonconductive coating. Apply an appropriate antioxidant compound to the surfaces.**

Procedure

Depending on the rack or cabinet, complete the necessary tasks:

- DLP-G763 Install Air Plenum for ONS 15454 M2 Shelf in ANSI 19-inch Configuration, on page 185
- DLP-G764 Install Air Plenum in ONS 15454 M2 Shelf for ANSI 23-inch Configuration, on page 187
- DLP-G765 Install Air Plenum for ONS 15454 M2 Shelf in ETSI Configuration, on page 191

Stop. You have completed this procedure.

DLP-G763 Install Air Plenum for ONS 15454 M2 Shelf in ANSI 19-inch Configuration

Purpose	This task installs the air plenum for the ONS 15454 M2 shelf in ANSI 19-inch cabinet or rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws: #12-24 x 0.50 pan-head Phillips screws (4) • Wing head screws (4) • One air plenum kit (horizontal and vertical air plenum)
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

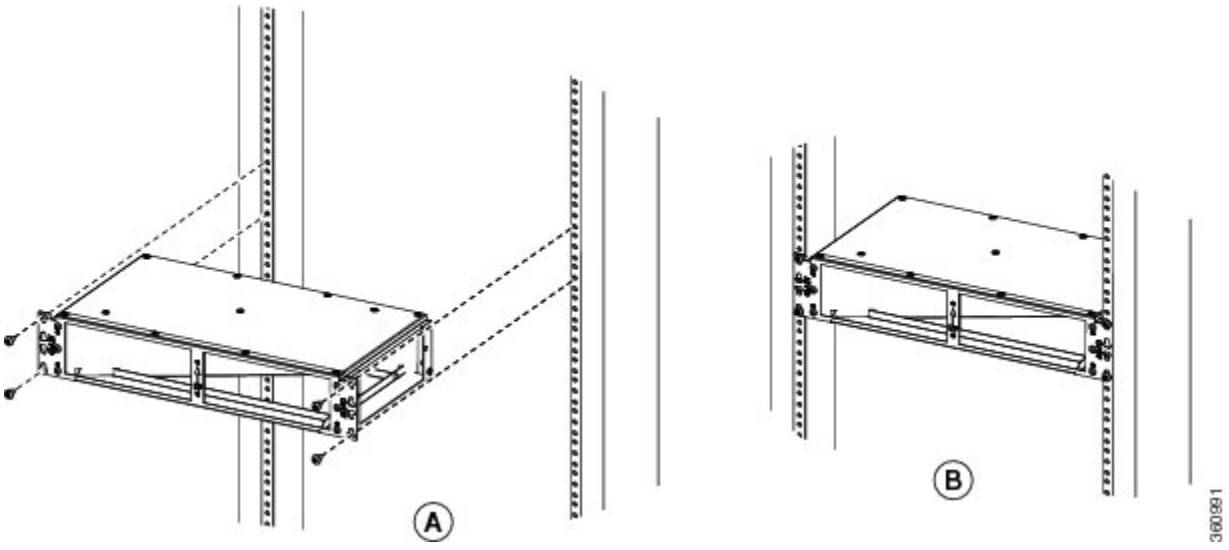
Note In the 19-inch rack and cabinet, the air plenum can be mounted only if the minimum opening is 20.600 inches to install the vertical air plenums behind the front rails.

Procedure

Step 1 Place the horizontal air plenum above the shelf slot in the ANSI 19-inch cabinet or rack.

Step 2 Insert the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m).

Figure 111: Installing the horizontal air plenum in the ANSI 19-inch configuration

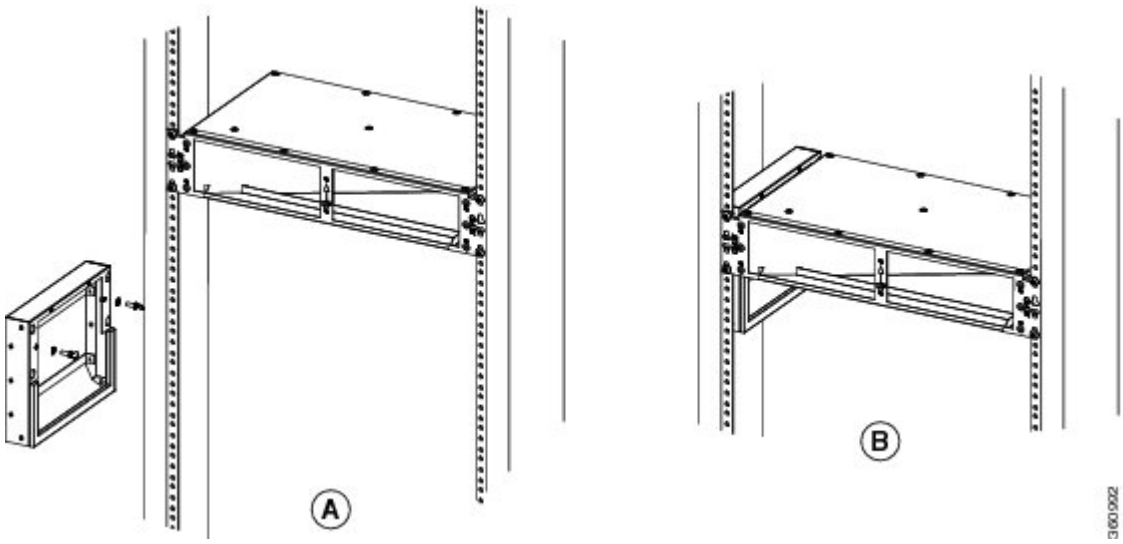


Step 3 Install the vertical air plenum to the left of the horizontal air plenum:

a) Insert the vertical plenum in the free space between the horizontal plenum and cabinet.

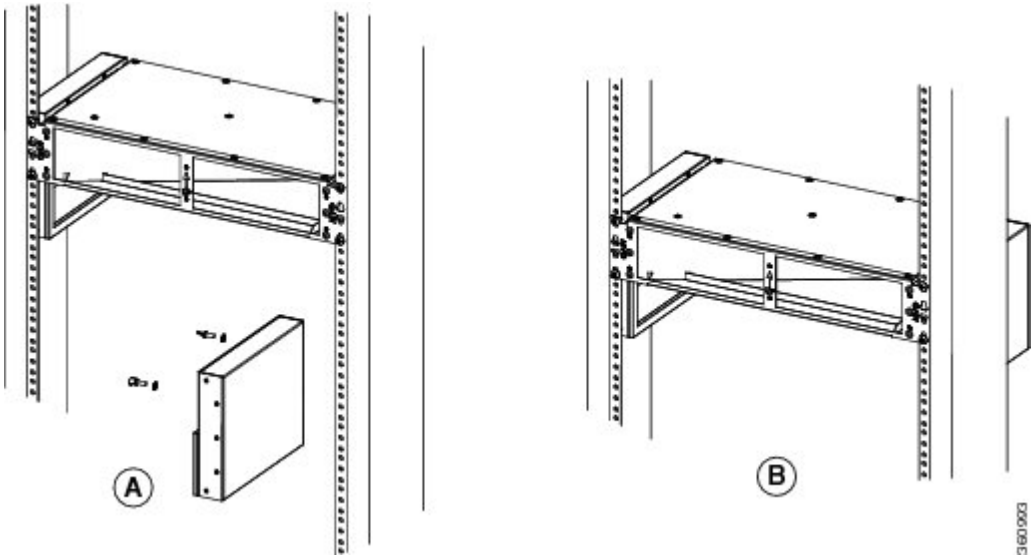
b) Install the wing head screws from the internal side of the horizontal plenum as shown in the following figure.
c) Tighten the screws to a torque value of 11.5 in-lb (1.3 N-m).

Figure 112: Installing the left vertical air plenum



Step 4 Install the vertical air plenum to the right of the horizontal air plenum. Follow step 3a to 3c.

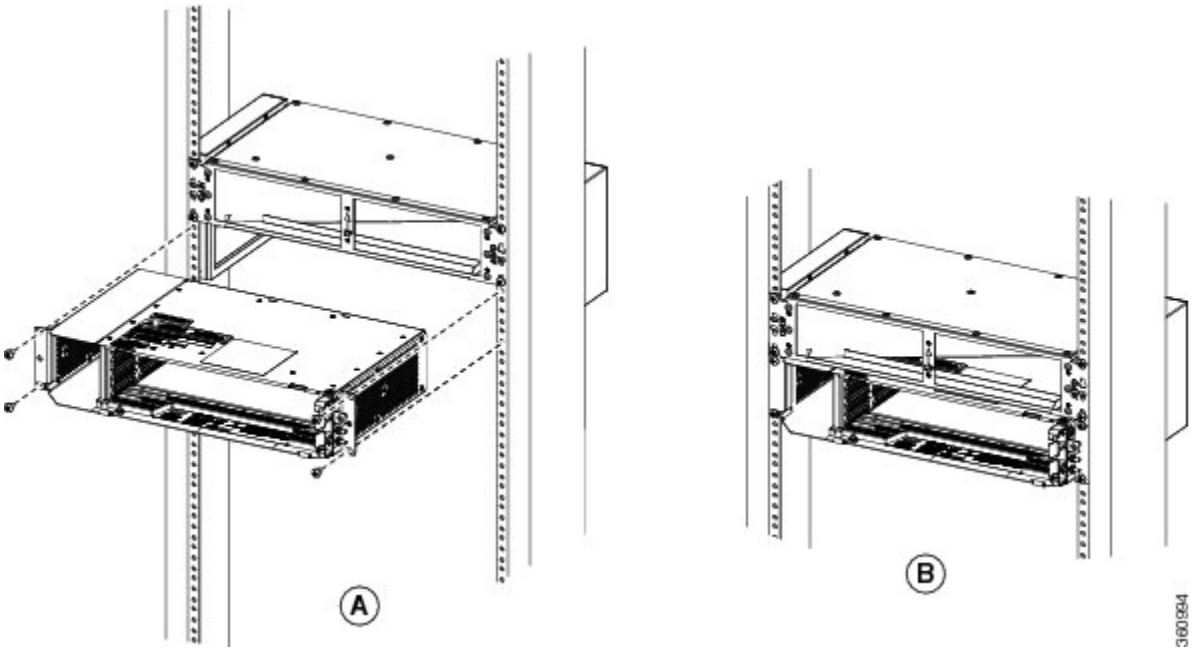
Figure 113: Installing the right vertical air plenum



Step 5 Install the 19-inch standard brackets on both sides of the chassis in the front position. See DLP-G582 Mounting the 19-inch Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 197.

Step 6 Install the ONS 15454 M2 empty chassis below the horizontal plenum.

Figure 114: Installing the ONS 15454 M2 chassis below the horizontal air plenum



Step 7 Return to your originating procedure (NTP).

DLP-G764 Install Air Plenum in ONS 15454 M2 Shelf for ANSI 23-inch Configuration

Purpose	This task installs the air plenum for the ONS 15454 M2 shelf in the ANSI 23-inch cabinet or rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws: #12-24 x 3/4 pan-head Phillips mounting screws (4) • Wing head screws (4) • Adapter plates • One air plenum kit (horizontal and vertical air plenum)
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

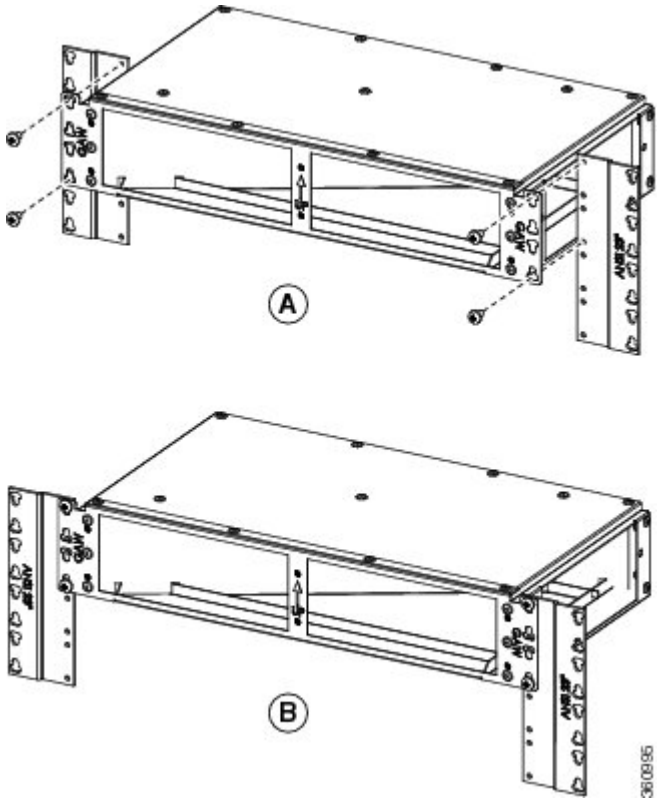
Note The airplenums for ANSI 23-inch configuration can be pre-assembled outside the cabinet and then installed inside the cabinet.

Procedure

Step 1 Install the ANSI 23-inch adapter plates on the horizontal air plenum.

Step 2 Align the screws to fix the adapter plates to the shelf. Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

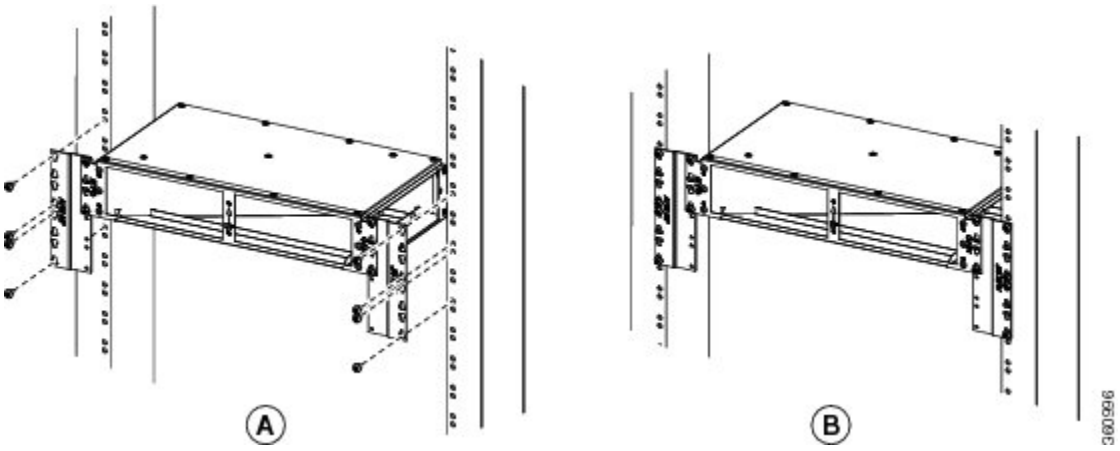
Figure 115: Installing the adapter plates on the horizontal air plenum



Step 3 Place the horizontal air plenum above the shelf slot in the ANSI 23-inch cabinet or rack.

Step 4 Insert the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m).

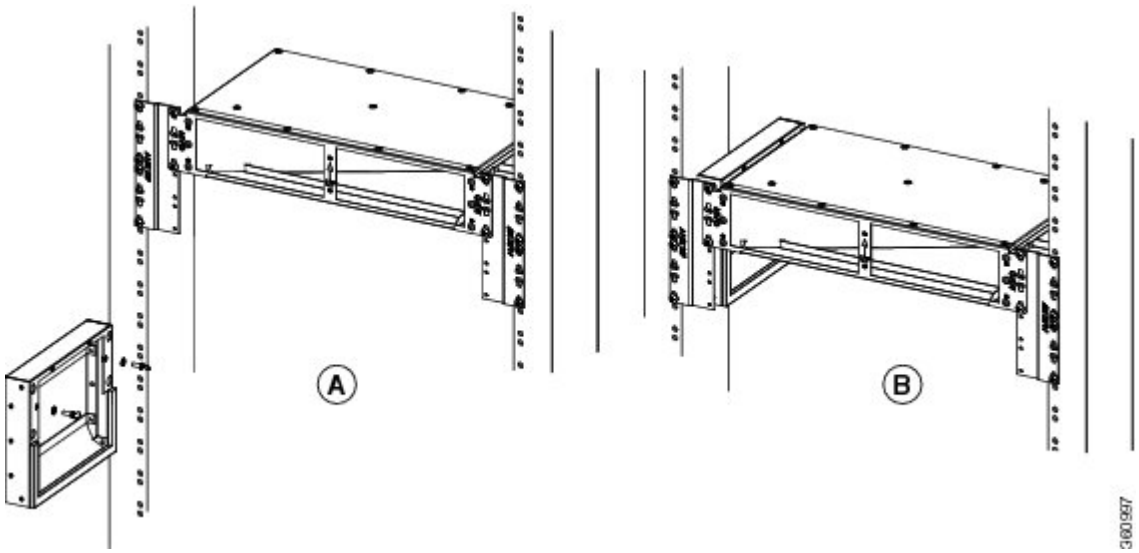
Figure 116: Installing the horizontal air plenum in the ANSI 23-inch configuration



Step 5 Install the vertical air plenum to the left of the horizontal air plenum:

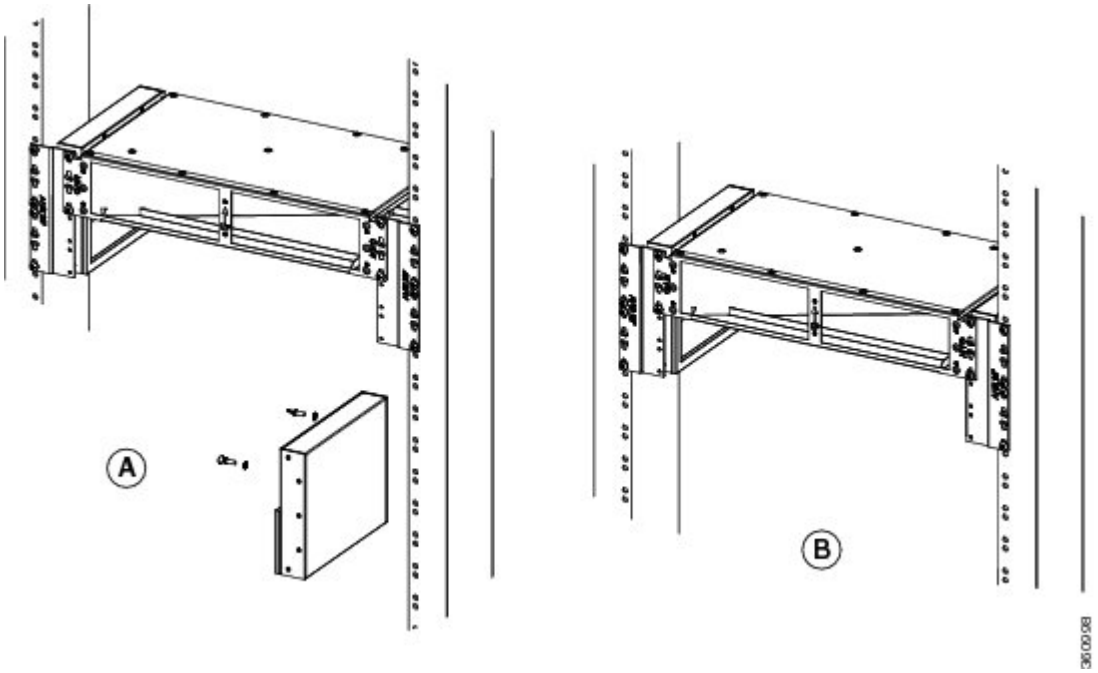
a) Insert the vertical air plenum in the free space between the horizontal air plenum and cabinet.
b) Install the wing head screws from the internal side of the horizontal plenum as shown in the following figure.
c) Tighten the screws to a torque value of 11.5 in-lb (1.3 N-m).

Figure 117: Installing the left vertical air plenum



Step 6 Install the vertical plenum to the right of the horizontal air plenum. Follow step 5a to 5c.

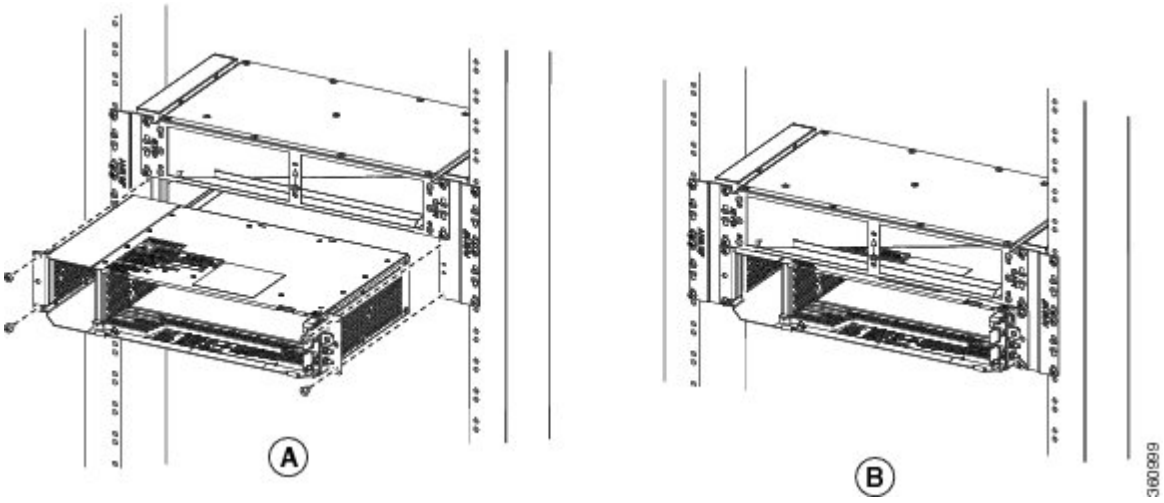
Figure 118: Installing the right vertical air plenum



Step 7 Install ANSI 19-inch standard brackets on both sides of the chassis in front position. See DLP-G582 Mounting the 19-inch Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 197

Step 8 Install the ONS 15454 M2 empty chassis below the horizontal plenum.

Figure 119: Installing the ONS 15454 M2 chassis below the horizontal air plenum



Step 9 Return to your originating procedure (NTP).

DLP-G765 Install Air Plenum for ONS 15454 M2 Shelf in ETSI Configuration

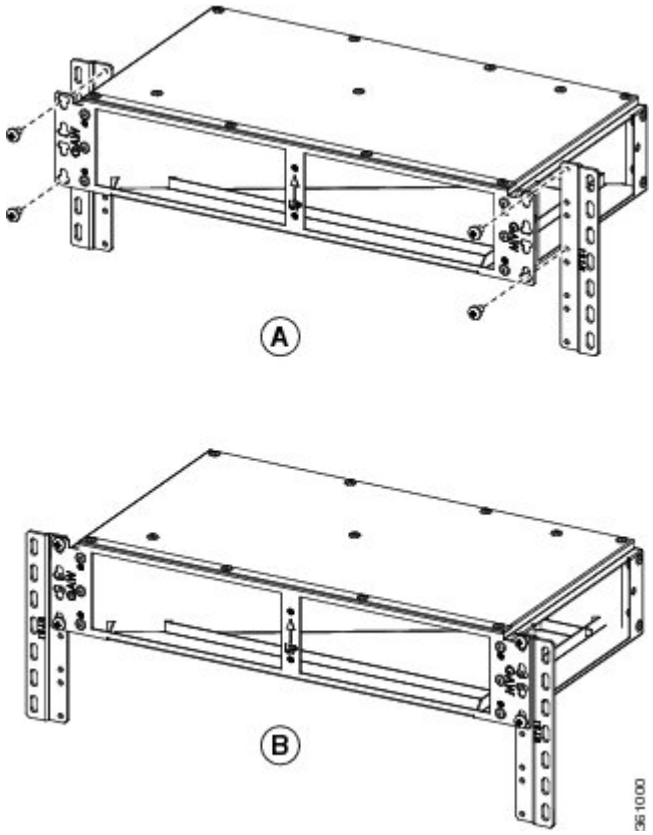
Purpose	This task installs the air plenum for the ONS 15454 M2 shelf in the ETSI configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws: M6.0 x 20 pan-head Phillips screws (4) • Wing head screws (4) • Adapter plates • One air plenum kit (horizontal and vertical air plenum)
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Install the ETSI adapter plates on the horizontal air plenum.

Step 2 Align the screws to fix the adapter plates to the horizontal air plenum. Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m) as shown in the following figure.

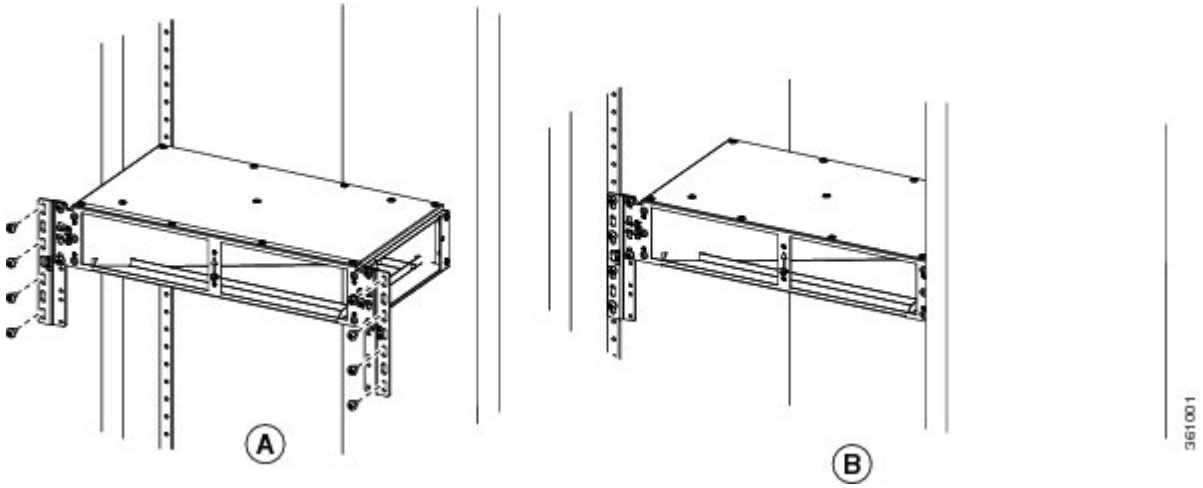
Figure 120: Installing the adapter plates on the horizontal air plenum



Step 3 Place the horizontal plenum above the chassis slot in the ETSI cabinet.

Step 4 Insert the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m).

Figure 121: Installing the horizontal air plenum in the ETSI configuration

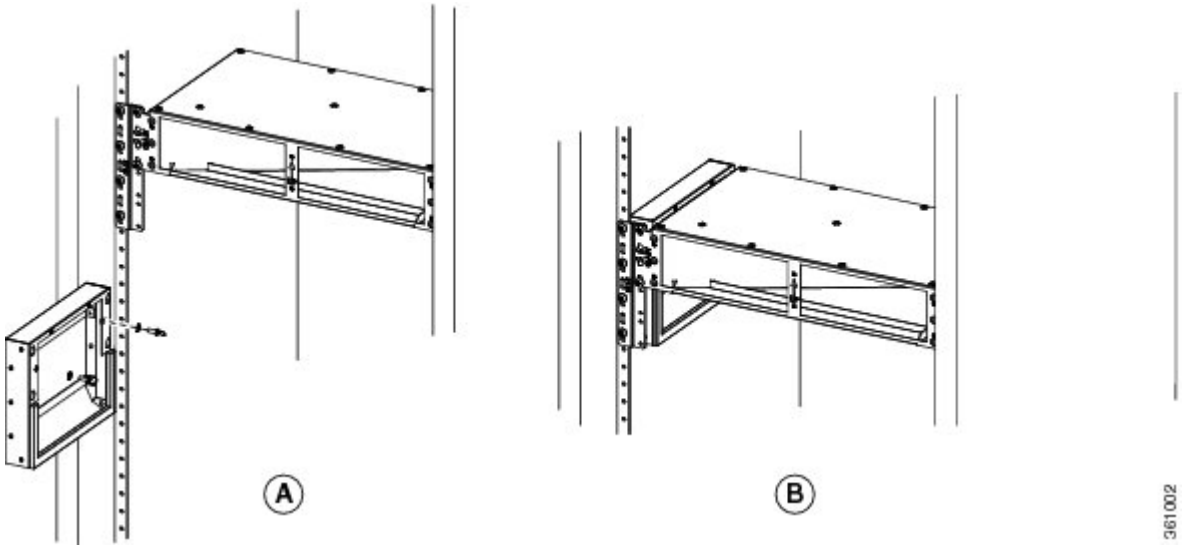


Step 5 Install the vertical air plenum to the left of the horizontal air plenum:

a) Insert the vertical plenum in the free space between the horizontal plenum and cabinet.

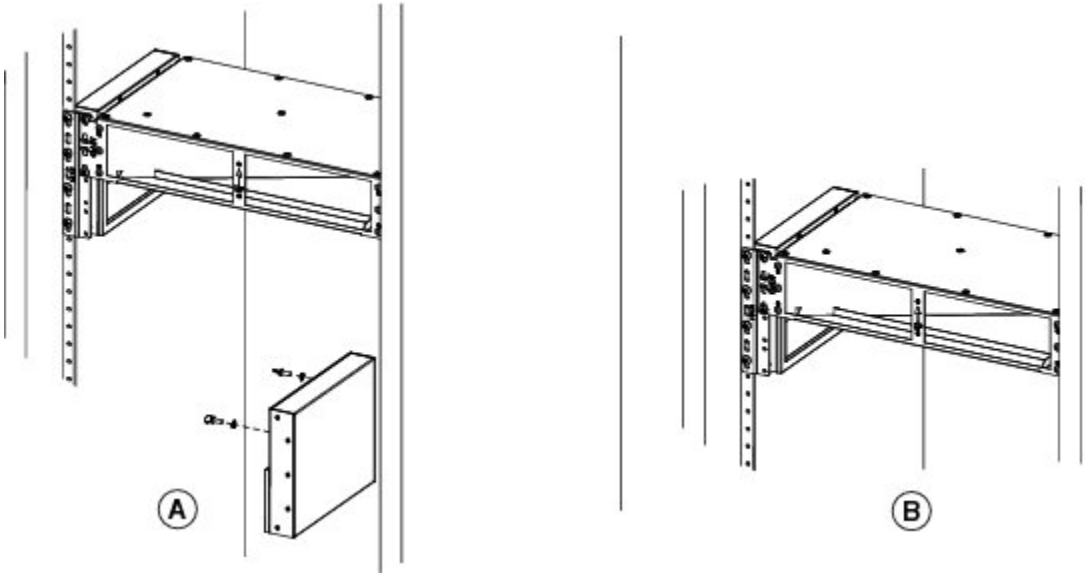
b) Install the wing head screws from the internal side of the horizontal plenum as shown in the following figure.
c) Tighten the screws to a torque value of 11.5 in-lb (1.3 N-m).

Figure 122: Installing the left vertical air plenum



Step 6 Install the vertical air plenum to the right of the horizontal air plenum. Follow step 5a to 5c.

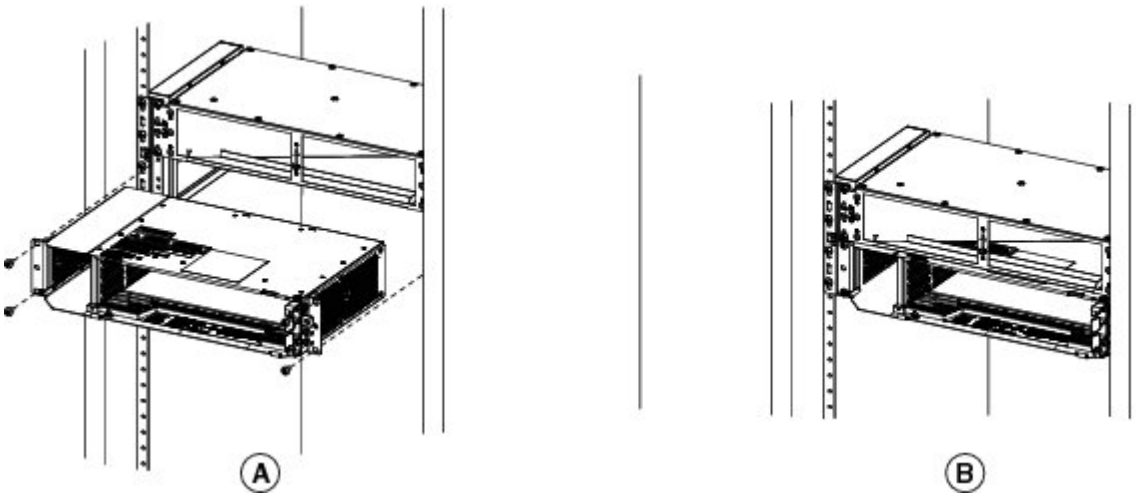
Figure 123: Installing the right vertical air plenum



Step 7 Install the ANSI 19-inch mounting brackets on both sides of the chassis in front position. See DLP-G588 Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 208.

Step 8 Install the ONS 15454 M2 empty chassis below the horizontal plenum.

Figure 124: Installing the ONS 15454 M2 chassis below the horizontal air plenum



Step 9 Return to your originating procedure (NTP).

NTP-G266 Install the ONS 15454 M2 Shelf

Purpose	This procedure installs the shelf.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • ETSI only: • Two M6 x 20 pan-head Phillips mounting screws • ANSI only: • Two #12-24 x 3/4 pan-head Phillips mounting screws
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

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

Warning **Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security.** Statement 1072

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A-20A, 100-240 VAC~.** Statement 1005

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 131°F (55°C).** Statement 1047

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

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

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

Warning **To prevent airflow restriction, allow clearance around the ventilation openings to be at least:1 inch (25.4 mm)** Statement 1076

Note Make sure that the correct type of 19-inch ANSI rack is used for mounting the ONS 15454 M2 shelf as shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5.

Note During installation, do not use the door to handle the chassis.

Note Remove the door from the ONS 15454 M2 shelf and reinstall it after installation of all the other modules is complete.

Procedure

Step 1 Complete the necessary task as applicable:

- DLP-G582 Mounting the 19-inch Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 197
- DLP-G583 Mounting the 23-inch Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 198
- DLP-G584 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration , on page 199
- DLP-G585 Mounting the Brackets on the ONS 1545 M2 Shelf for ETSI Rack Configuration, on page 202
- DLP-G586 Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 203
- DLP-G587 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205
- DLP-G588 Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 208

Step 2 Complete the necessary mounting task as applicable:

- DLP-G589 Mount the ONS 15454 M2 Shelf on a Rack (One Person), on page 209.
- DLP-G590 Mount the ONS 15454 M2 Shelf on the Wall, on page 211
- DLP-G591 Mount the ONS 15454 M2 Shelf on the Desktop, on page 214

Step 3 Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Step 4 Continue with NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf, on page 218.

Stop. You have completed this procedure.

DLP-G582 Mounting the 19-inch Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration

Purpose	This task installs the 19-inch mounting brackets to the ONS 15454 M2 shelf for ANSI rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the ONS 15454 M2 in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 M2 ship kit, or remove the coating from the threads to ensure electrical continuity.

Note The mounting brackets can be installed in the front or the middle position of the chassis.

Procedure

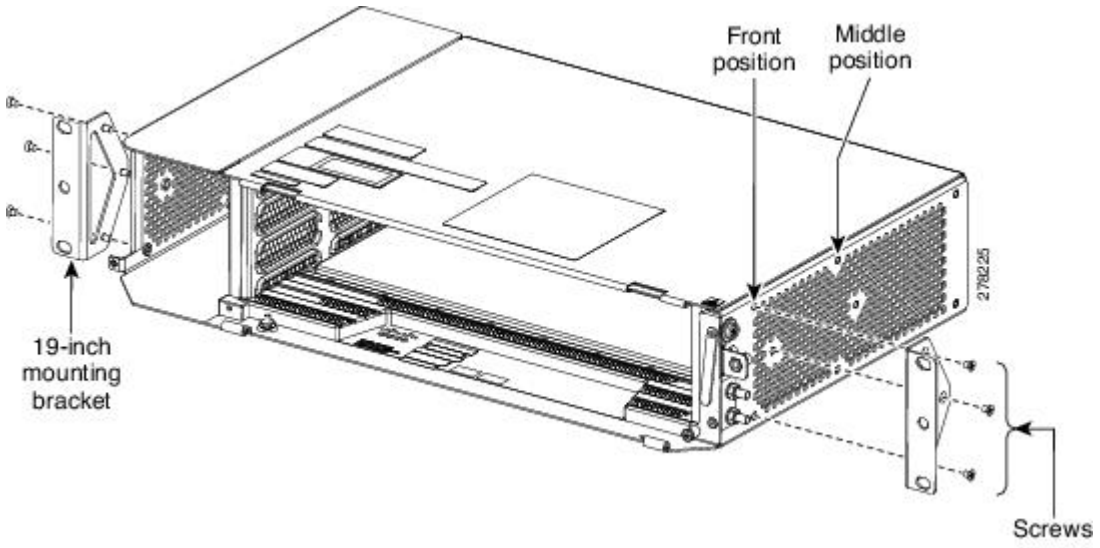
Step 1 Place the wider side of the 19-inch mounting bracket flush against the shelf (see the following figure). The narrow side of the mounting bracket should be towards the front of the shelf.

Step 2 Align the mounting bracket screw holes against the shelf screw holes.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Repeat steps 1 through 3 for the mounting bracket on the opposite side.

Figure 125: Mounting the Brackets on the ONS 15454 M2 shelf for a 19-inch (482.6-mm) ANSI Configuration



Step 5 Return to your originating procedure (NTP).

DLP-G583 Mounting the 23-inch Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration

Purpose	This task installs the 23-inch mounting brackets on the ONS 15454 M2 shelf for ANSI rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the ONS 15454 M2 in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 M2 ship kit, or remove the coating from the threads to ensure electrical continuity.

Note The mounting brackets can be installed in the front or the middle position of the chassis.

Procedure

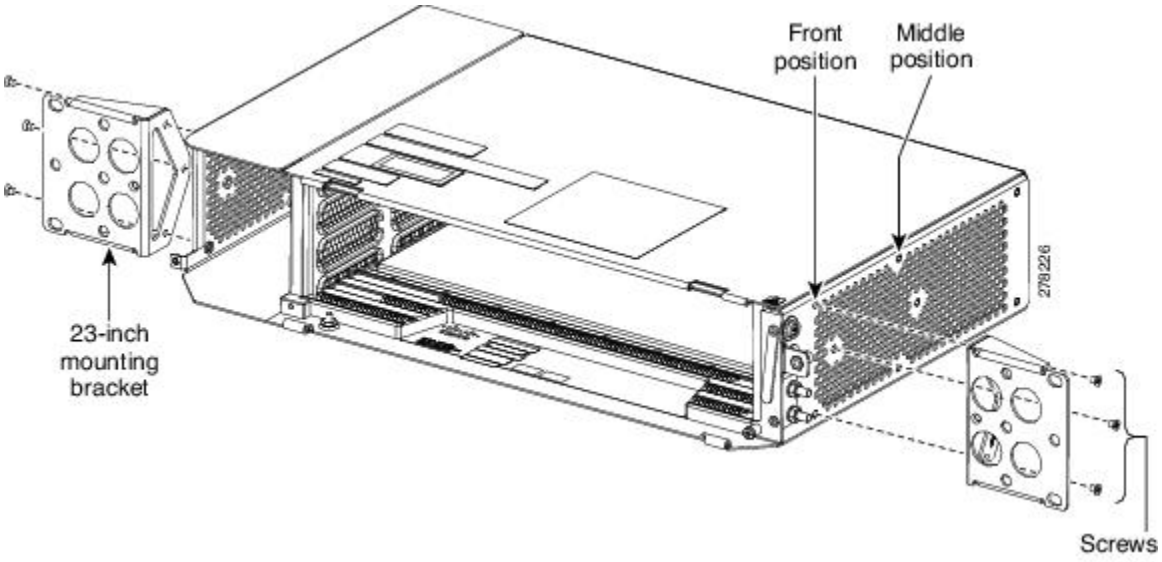
Step 1 Place the narrow side of the 23-inch mounting bracket flush against the shelf (see the following figure). The wider side of the mounting bracket should be towards the front of the shelf.

Step 2 Align the mounting bracket screw holes against the shelf screw holes.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Repeat steps 1 through 3 for mounting the bracket on the opposite side.

Figure 126: Mounting the Brackets on the ONS 15454 M2 shelf for a 23-inch (584.2-mm) ANSI Configuration



Step 5 Return to your originating procedure (NTP).

DLP-G584 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration

Purpose	This task mounts the 23-inch brackets with air deflectors (front-to-back) on the ONS 15454 M2 shelf for ANSI rack configuration. **Note** In an ANSI rack, the air deflectors can be mounted only in the 23-inch rack configuration and in the front position of the chassis.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver

Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Procedure

Step 1 Place the right front air deflector flush against the right side of the chassis as shown in Diagram 1 of Figure 127: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201.

Step 2 Align the screw holes on the right front air deflector with the screw holes on right side of the chassis.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 2 of Figure 127: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201.

Step 4 Place the left back air deflector flush against the chassis as shown in Diagram 1 of Figure 127: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201.

Note If the 100G-LC-C, 10x10G-LC, or CFP-LC cards are to be installed in the ONS 15454 M2 shelf, do not mount the left back deflector (exhaust air deflector). Use the standard brackets directly to mount the ONS 15454 M2 shelf.

Step 5 Align the screw holes on the left back air deflector with the screw holes on the chassis.

Step 6 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 2 of Figure 127: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201.

Step 7 Place the air deflector covers on the front and rear ends of the chassis as shown in Diagram 3 of Figure 127: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201.

Step 8 Align the screw holes on the air deflector covers with the screw holes on the chassis.

Step 9 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 4 of Figure 127: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201.

Step 10 Place the 23-inch mounting bracket flush in the front position (see Diagram 1 of Figure 128: Mounting the Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201) or in the middle position (see Diagram 3 of Figure 128: Mounting the Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201) against the right side of the chassis.

Step 11 Align the screw holes on the 23-inch mounting bracket with the screw holes on the right side of the chassis.

Step 12 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 13 Place the 23-inch mounting bracket flush in the front position (see Diagram 1 of Figure 128: Mounting the Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201) or in the middle position (see Diagram 3 of Figure 128: Mounting the Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration, on page 201) against the left side of the chassis.

Step 14 Align the screw holes on the 23-inch mounting bracket with the screw holes on the left side of the chassis.

Step 15 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Figure 127: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ANSI Rack Configuration

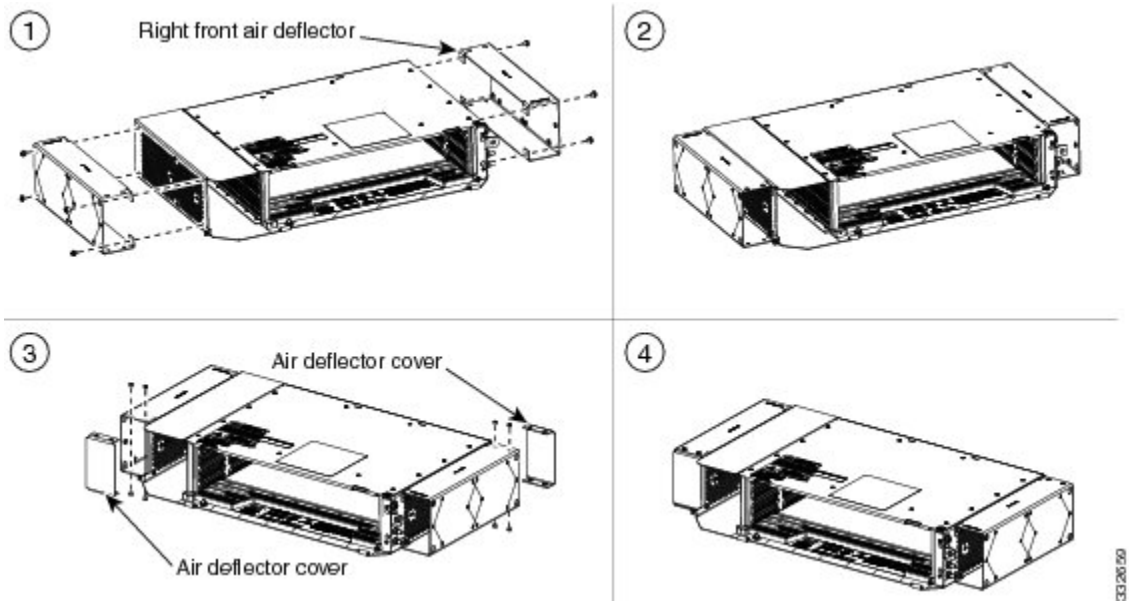
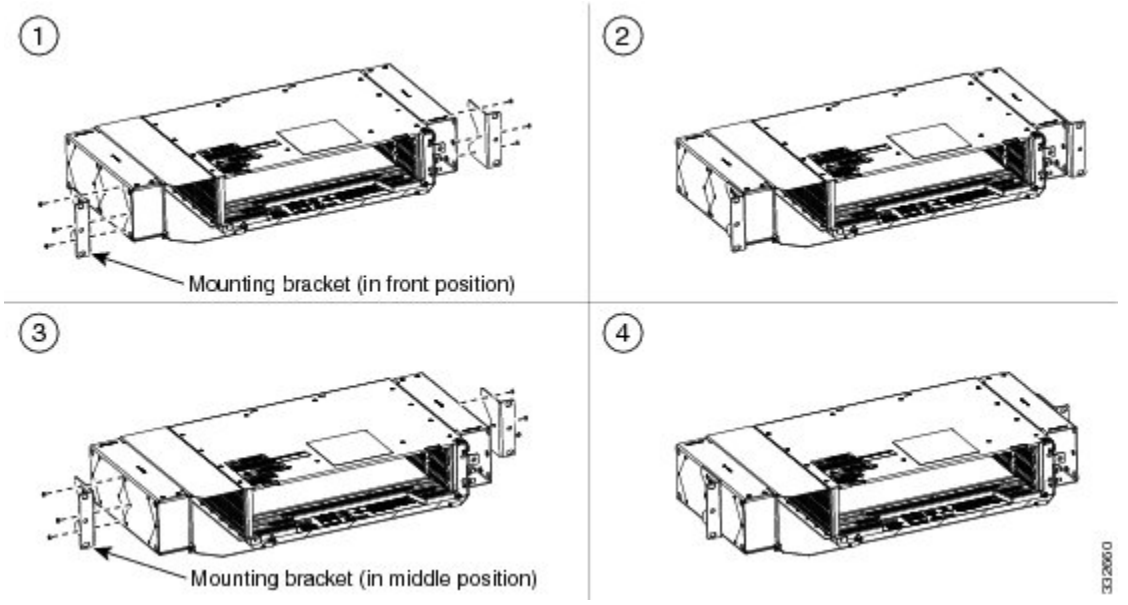


Figure 128: Mounting the Brackets on the ONS 15454 M2 Shelf for ANSI Rack Configuration



Step 16 Return to your originating procedure (NTP).

DLP-G585 Mounting the Brackets on the ONS 1545 M2 Shelf for ETSI Rack Configuration

Purpose	This task installs the mounting brackets on the ONS 15454 M2 shelf for ETSI rack configuration. **Note** In an ETSI rack, the air deflectors can be mounted only in the front position of the chassis.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the ONS 15454 M2 in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 M2 ship kit, or remove the coating from the threads to ensure electrical continuity.

Procedure

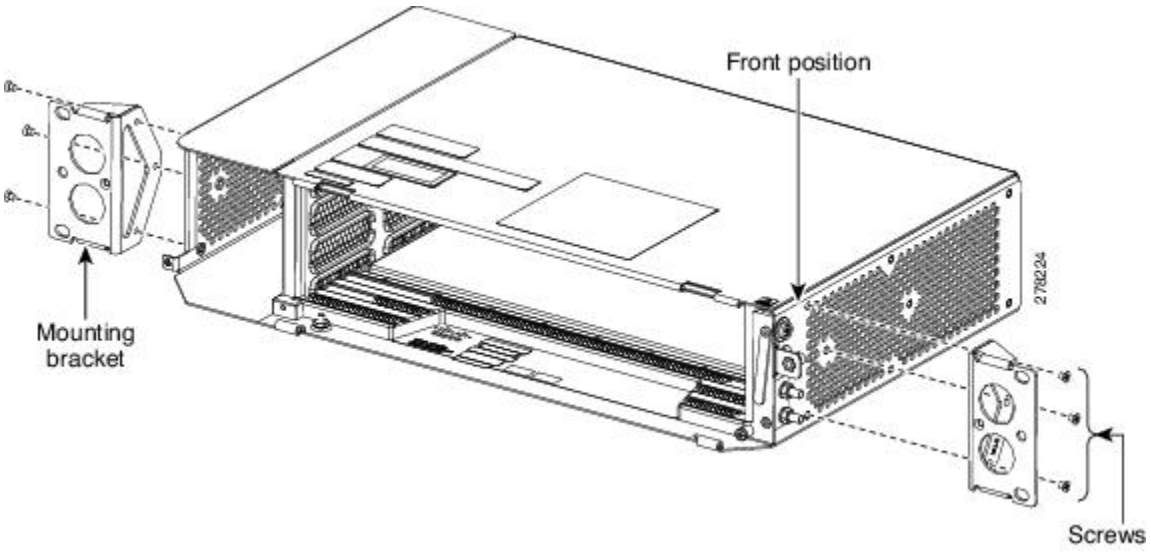
Step 1 Place the mounting bracket flush against the shelf as shown in Figure 129: Mounting the Brackets on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 203.

Step 2 Align the mounting bracket screw holes against the shelf screw holes.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Repeat steps 1 through 3 for the mounting bracket on the opposite side.

Figure 129: Mounting the Brackets on the ONS 15454 M2 Shelf for ETSI Rack Configuration



Step 5 Return to your originating procedure (NTP).

DLP-G586 Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration

Purpose	This task mounts the air deflectors (front-to-front) on the ONS 15454 M2 shelf for ETSI rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Note The air deflectors can be installed only in the front position of the chassis.

Procedure

Step 1 Place the right front air deflector flush against the right side of the chassis as shown in Diagram 1 of Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205.

Step 2 Align the screw holes on the right front air deflector with the screw holes on right side of the chassis.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 1 of Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205.

Step 4 Place the left front air deflector flush against the chassis as shown in Diagram 1 of Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205.

Note If the 100G-LC-C, 10x10G-LC, or CFP-LC cards are to be installed in the ONS 15454 M2 shelf, do not mount the left front deflector (exhaust air deflector). Use the standard brackets directly to mount the ONS 15454 M2 shelf.

Step 5 Align the screw holes on the left back air deflector with the screw holes on the chassis.

Step 6 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 1 of Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205.

Step 7 Place the air deflector covers on the rear ends of the chassis as shown in Diagram 2 of Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205.

Step 8 Align the screw holes on the air deflector covers with the screw holes on the chassis.

Step 9 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 10 Place the mounting bracket flush in the front position (see Diagram 3 of Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205) against the right side of the chassis.

Step 11 Align the screw holes on the mounting bracket with the screw holes on the right side of the chassis.

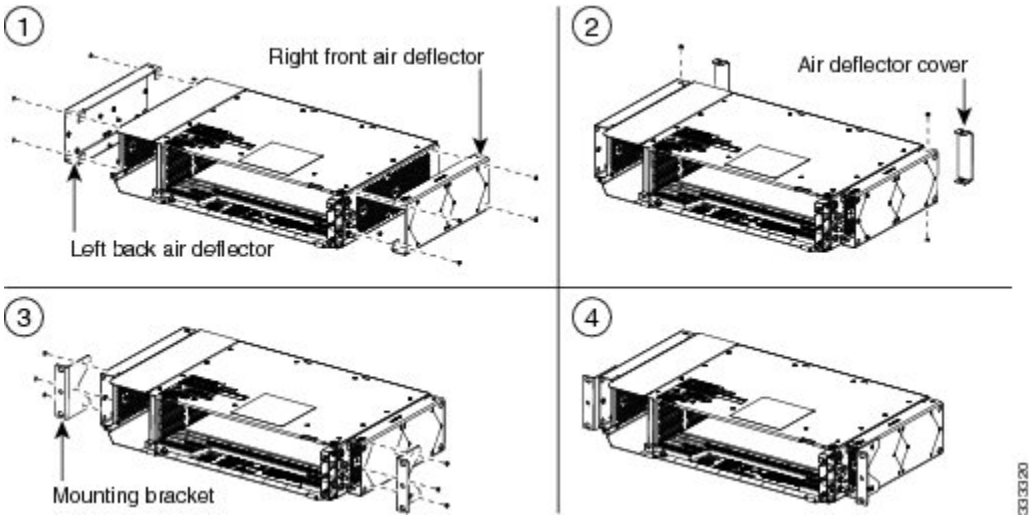
Step 12 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 13 Place the other mounting bracket flush in the front position (see Diagram 3 of Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 205) against the left side of the chassis.

Step 14 Align the screw holes on the mounting bracket with the screw holes on the left side of the chassis.

Step 15 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Figure 130: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M2 Shelf for ETSI Rack Configuration



Step 16 Return to your originating procedure (NTP).

DLP-G587 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration

Purpose	This task installs the bracket with air deflectors (front-to-back) on the ONS 15454 M2 shelf for ETSI rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Note The air deflectors can be installed only in the front position of the chassis.

Procedure

Step 1 Place the right front air deflector flush against the right side of the chassis as shown in Diagram 1 of Figure 131: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207.

Step 2 Align the screw holes on the right front air deflector with the screw holes on right side of the chassis.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 2 of Figure 131: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207.

Step 4 Place the left back air deflector flush against the chassis as shown in Diagram 1 of Figure 131: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207.

Note If the 100G-LC-C, 10x10G-LC, or CFP-LC cards are to be installed in the ONS 15454 M2 shelf, do not mount the left back deflector (exhaust air deflector). Use the standard brackets directly to mount the ONS 15454 M2 shelf.

Step 5 Align the screw holes on the left back air deflector with the screw holes on the chassis.

Step 6 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 2 of Figure 131: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207.

Step 7 Place the air deflector covers on the front and rear ends of the chassis as shown in Diagram 3 of Figure 131: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207.

Step 8 Align the screw holes on the air deflector covers with the screw holes on the chassis.

Step 9 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 4 of Figure 131: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207.

Step 10 Place the mounting bracket flush in the front position (see Diagram 1 of Figure 132: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207) or in the middle position (see Diagram 3 of Figure 132: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207) against the right side of the chassis.

Step 11 Align the screw holes on the 23-inch mounting bracket with the screw holes on the right side of the chassis.

Step 12 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 13 Place the mounting bracket flush in the front position (see Diagram 1 of Figure 132: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207) or in the middle position (see Diagram 3 of Figure 132: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 207) against the left side of the chassis.

Step 14 Align the screw holes on the 23-inch mounting bracket with the screw holes on the left side of the chassis.

Step 15 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Figure 131: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration

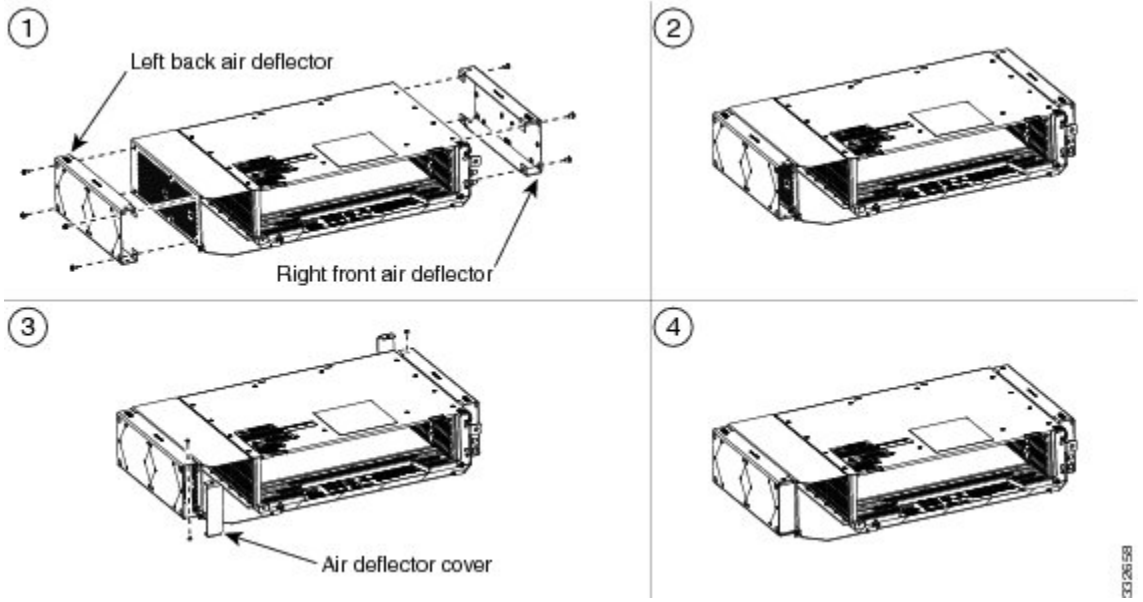
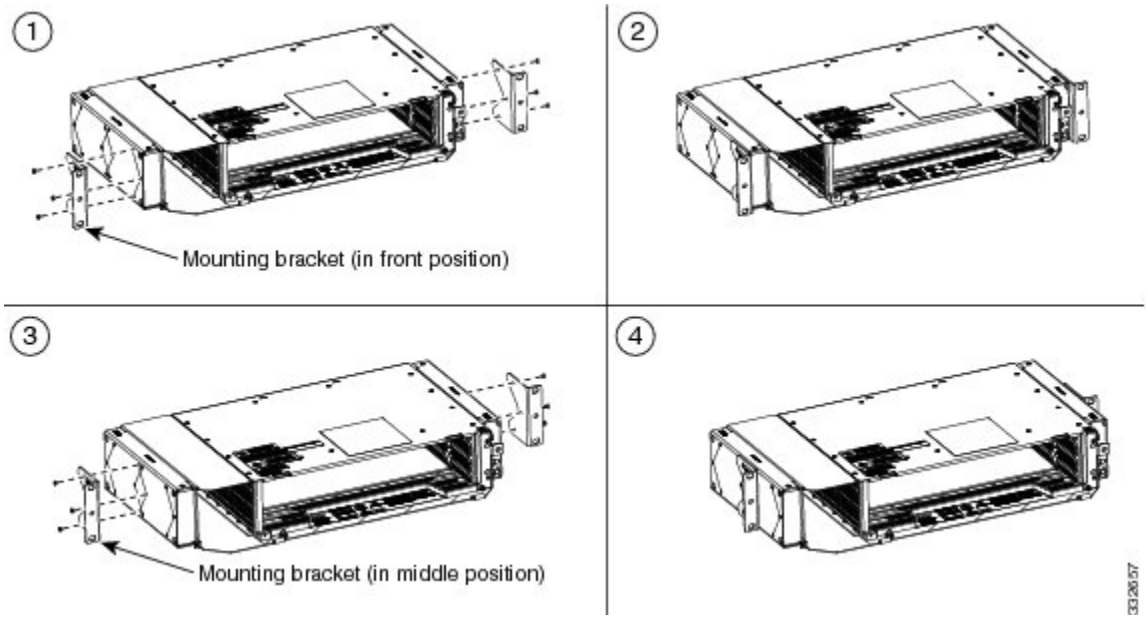


Figure 132: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M2 Shelf for ETSI Rack Configuration



Step 16 Return to your originating procedure (NTP).

DLP-G588 Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration

Purpose	This task installs the bracket with air deflectors (front-to-top configuration) on the ONS 15454 M2 shelf.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M2 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Note The air deflectors can be installed only in the front position of the chassis.

Procedure

Step 1 Place the right front air deflector flush against the right side of the chassis (see Diagram 1 of Figure 133: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 209).

Step 2 Align the screw holes on the right front air deflector with the screw holes on right side of the chassis.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Place the air deflector cover on the rear end of the chassis.

Step 5 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 2 of Figure 133: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 209).

Step 6 Place the mounting bracket flush against the left side of the chassis (see Diagram 2 of Figure 133: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 209).

Step 7 Align the screw holes on the mounting bracket with the screw holes on the left side of the chassis.

Step 8 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 9 Place the mounting bracket flush against the right side of the chassis (see Diagram 2 of Figure 133: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 209).

Step 10 Align the screw holes on the mounting bracket with the screw holes on the left side of the chassis.

Step 11 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

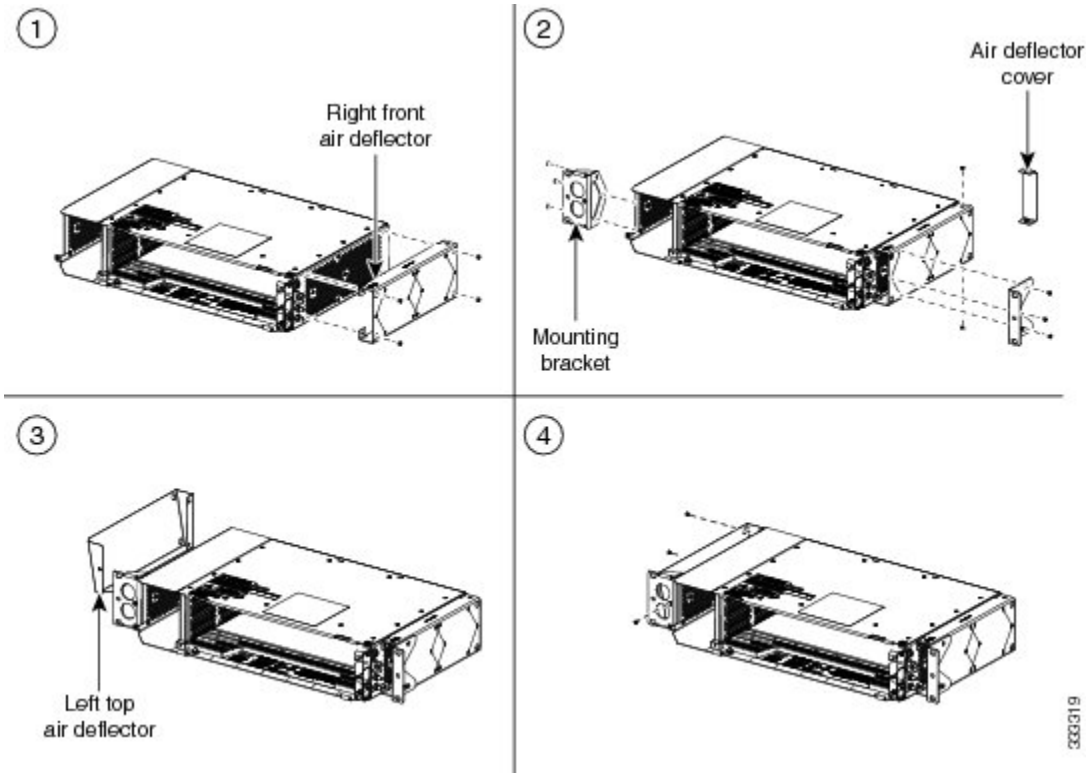
Step 12 Place the left top air deflector flush against the left side of the chassis as shown in Diagram 3 of Figure 133: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 209.

Note If the 100G-LC-C, 10x10G-LC, or CFP-LC cards are to be installed in the ONS 15454 M2 shelf, do not mount the left top deflector (exhaust air deflector). Use the standard brackets directly to mount the ONS 15454 M2 shelf.

Step 13 Align the screw holes with the screw holes of the mounting bracket and the chassis.

Step 14 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 4 of Figure 133: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration, on page 209.

Figure 133: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M2 Shelf for ETSI Rack Configuration



Step 15 Return to your originating procedure (NTP).

DLP-G589 Mount the ONS 15454 M2 Shelf on a Rack (One Person)

Purpose	This task allows one person to mount the shelf in a rack.

Tools/Equipment	• # 2 Phillips Dynamometric screwdriver • ANSI—Two #12-24 x 3/4 pan-head Phillips mounting screws • ETSI—Two M6 x 20 mounting screws
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The ONS 15454 M2 requires a minimum of 3.5 inches (88.9 mm) of vertical rack space. To ensure that the mounting is secure, use two to three M6 mounting screws on each side of the shelf. A shelf should be mounted at the bottom of the rack if it is the only unit in the rack.

Note In an ANSI rack, the chassis can be installed in the front or the middle position. In an ETSI rack, the chassis is installed only in the front position.

Procedure

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

- For a DC power supply, the fuse rating must not exceed 15A.
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes.

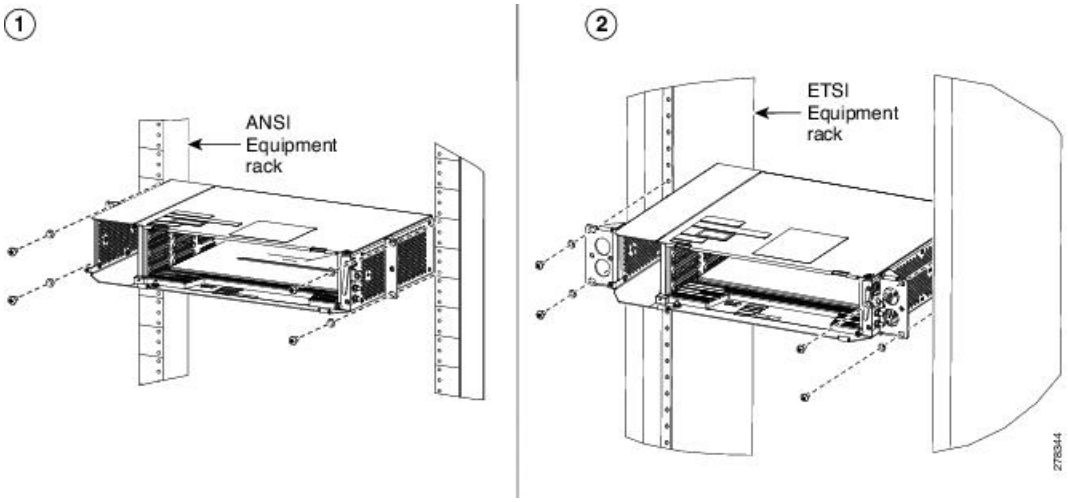
Step 2 Ensure that the shelf is mounted on the appropriate rack equipment:

- 23 inches (584.2 mm) or 19 inches (482.6 mm) for ANSI racks. The recommended 19-inch ANSI rack for the ONS 15454 M2 shelf is shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5.
- 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) for ETSI racks.

Diagram 1 of Figure 134: Mounting an ONS 15454 M2 in a Rack, on page 211 shows the ONS 15454 M2 shelf mounted on an ANSI rack in the middle position using 19-inch mounting brackets

Diagram 2 of Figure 134: Mounting an ONS 15454 M2 in a Rack, on page 211 shows the ONS 15454 M2 shelf mounted on an ETSI rack in the front position using mounting brackets

Figure 134: Mounting an ONS 15454 M2 in a Rack



Step 3 Lift the shelf to the desired position in the rack.

Note To ensure proper cooling of the ONS 15454 M2 shelf, make sure that the space in front of the air flow vents are free of cables, fibers, and mechanical fixtures for fiber and cable management.

Step 4 Align the screw holes on the mounting brackets with the mounting holes in the rack.

Step 5 Using the Phillips Dynamometric screwdriver, install one mounting screw in each side of the assembly. Tighten the screw to a torque value of 22 in-lb (2.5 N-m).

Step 6 When the shelf is secured to the rack, install the remaining two mounting screws on either sides of the shelf.

Step 7 Return to your originating procedure (NTP).

DLP-G590 Mount the ONS 15454 M2 Shelf on the Wall

Purpose	This task explains how to mount the ONS 15454 M2 shelf on the wall.
Tools/Equipment	• # 2 Phillips Dynamometric screwdriver • 6 pan-head Phillips mounting screws
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The ONS 15454 M2 requires a minimum of 20.4-inches (518.16-mm) vertical length and a minimum of 25.5-inches (647.69-mm) horizontal width on the wall. Wall mount brackets are used to mount the ONS 15454 M2 shelf assembly on the wall. The type of screws used to mount the brackets on the wall depends on the wall-type and are not provided by Cisco. The screws used must be able to sustain an overall weight of at least 20 kg (44 lb).

Procedure

Step 1 Verify that the proper fuse panel has been installed. If a fuse panel is not present, you must install one according to manufacturer instructions:

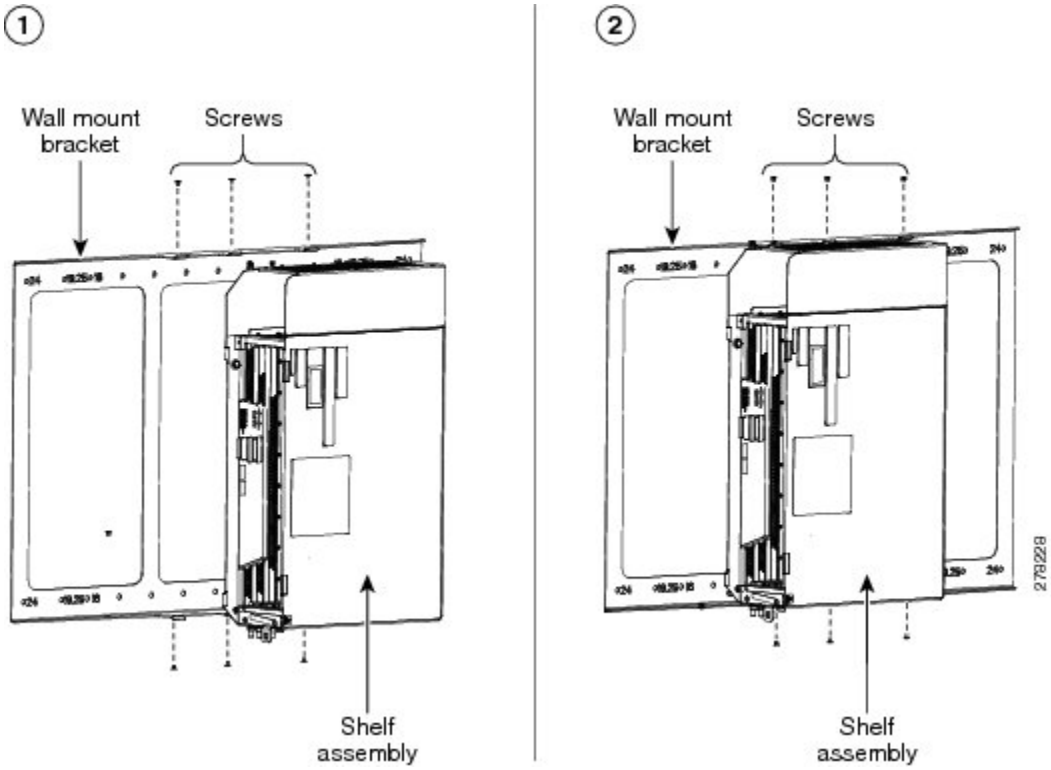
- For a DC power supply, the fuse rating must not exceed 15A.
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes.

Step 2 Mount the bracket on the wall as shown in Figure 135: Wall Mounting of the ONS 15454 M2 Shelf, on page 213. To mount the bracket on a non-concrete wall, choose the bracket holes based on the wall structure. At least four screws must be used to mount the bracket on the wall.

Step 3 Align the mounting bracket screw holes against the shelf screw holes (see diagram 1 of Figure 135: Wall Mounting of the ONS 15454 M2 Shelf, on page 213).

Step 4 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See diagram 2 of Figure 135: Wall Mounting of the ONS 15454 M2 Shelf, on page 213.

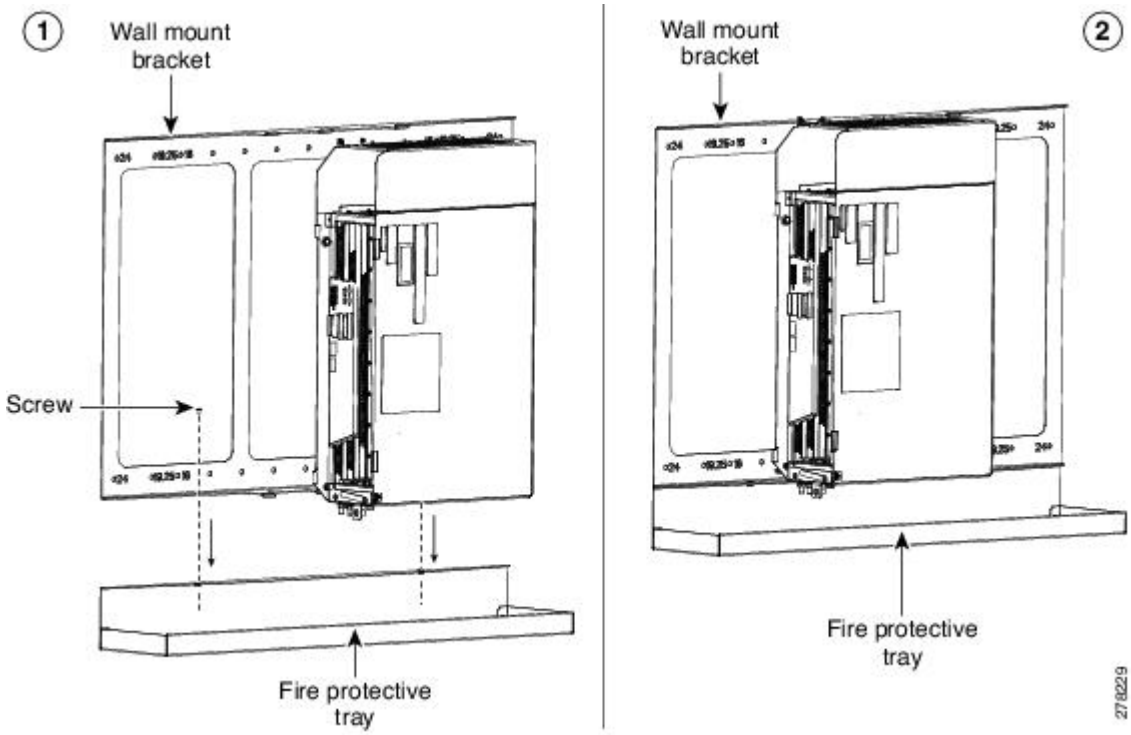
Figure 135: Wall Mounting of the ONS 15454 M2 Shelf



Step 5 Align the fire protective drip tray screw holes against the wall mounting bracket screw holes (see diagram 1 of Figure 134: Mounting an ONS 15454 M2 in a Rack, on page 211). The fire protective drip tray is present in the wall mount accessory kit provided by Cisco.

Step 6 Insert the screws and tighten them (see diagram 2 of Figure 134: Mounting an ONS 15454 M2 in a Rack, on page 211).

Figure 136: Mounting the Fire Protective Cover



Step 7 Return to your originating procedure (NTP).

DLP-G591 Mount the ONS 15454 M2 Shelf on the Desktop

Purpose	This task explains mount the shelf on the desktop.
Tools/Equipment	None
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Verify that the proper fuse panel has been installed. If a fuse panel is not present, you must install one according to manufacturer instructions:

- For a DC power supply, the fuse rating must not exceed 15A.

- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes.

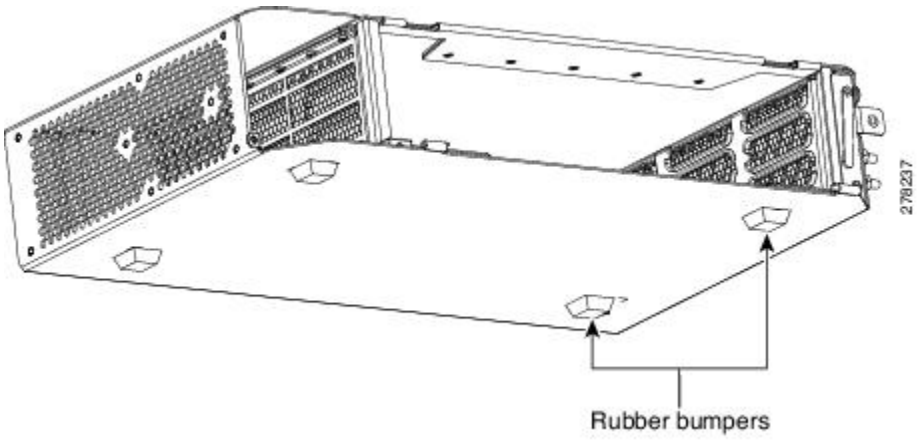
Step 2 Locate the rubber bumpers provided in the accessory tool kit.

Step 3 Place the ONS 15454 M2 shelf upside down on a smooth, flat surface.

Note To ensure proper cooling of the ONS 15454 M2 shelf, make sure that the space in front of the air flow vents are free of cables, fibers, and mechanical fixtures for fiber and cable management.

Step 4 Peel off the rubber bumpers from the adhesive strip and place it adhesive-side down onto all the four corners of the surface.

Figure 137: Desktop Mounting of the ONS 15454 M2 Shelf



Step 5 Place the ONS 15454 M2 shelf on a desktop, or other flat and secure surface.

Step 6 Return to your originating procedure (NTP).

Front Door

The front door of the ONS 15454 M2 provides access to the shelf and air-filter.

There are two types of front doors that act as protective panels—standard door and deep-front panel. The deep-front panel provides additional space in front of the shelf to accommodate cables that do not fit inside the standard door. The deep-front panel does not have a hinge and cannot be rotated like the standard door.

If a standard front door was ordered, the ONS 15454 M2 is shipped with a preinstalled standard door. If a deep-front panel was ordered, it is shipped in a separate package.

You can remove the door to provide unrestricted access to the front of the shelf.

An erasable label is pasted on the inside of the front door. You can use the label to record slot and port assignments, card types, node ID, rack ID, and serial number of the ONS 15454 M2 shelf.

The following figure shows the erasable label on the ONS 15454 M2 shelf.

Figure 138: ONS 15454 M2 Front-Door Erasable Label

The laser warning label is placed on top of the chassis.

The following figure shows the label placed on the ONS 15454 M2 surface, inside the shelf close to the door hinges, below Slot 1.

Figure 139: ONS 15454 M2 Label

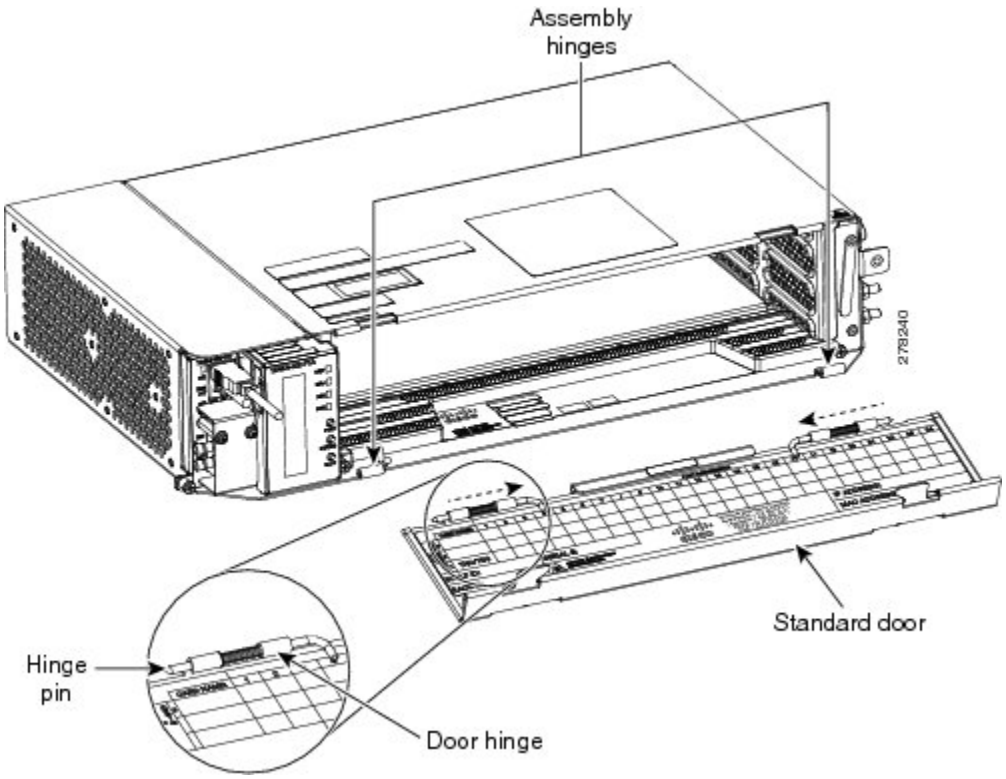
NTP-G269 Install the Standard Door of the ONS 15454 M2 Shelf

Purpose	This procedure installs the standard door of the ONS 15454 M2
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235 • NTP-G268 Install the Fan-Tray Assembly in the ONS 15454 M2 Shelf, on page 244 • NTP-G271 Install the Power and Ground to the ONS 15454 M2 Shelf, on page 248 • NTP-G291 Attach Wires to Timing, LAN, and Craft Pin Connections in ONS 15454 M2, on page 266
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Pull the hinge pins on the standard door in the opposite directions.

Figure 140: Installing the Standard Door



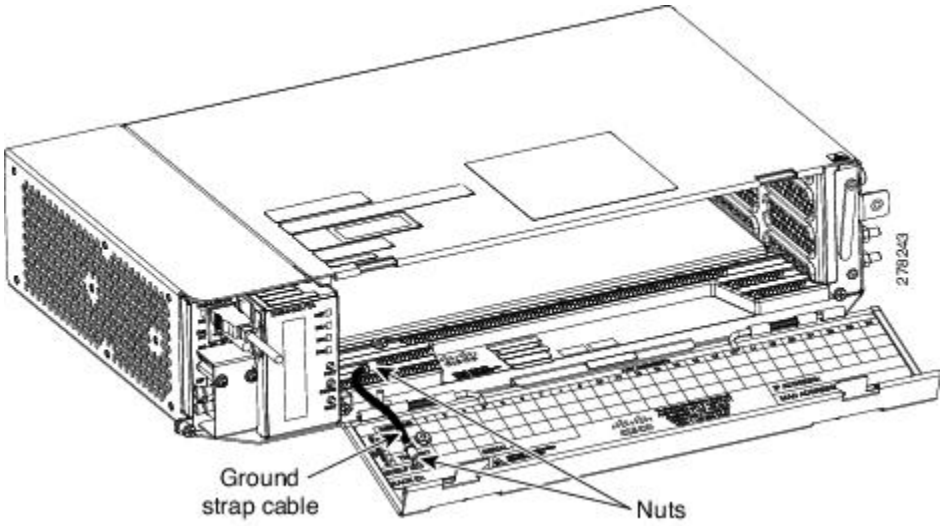
Step 2 Align the standard door hinges with the chassis hinges.

Step 3 Release the hinge pins.

Note Reinstall the door after installing all the other modules.

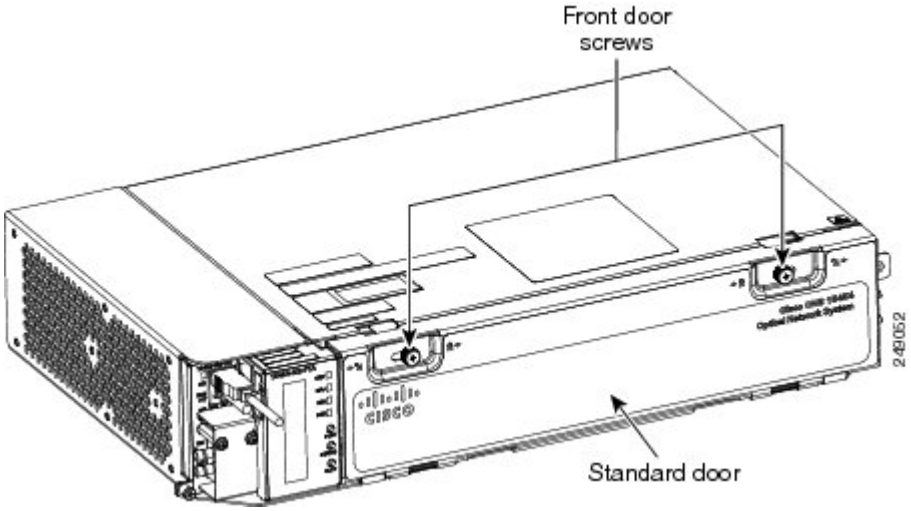
Step 4 Place the ground strap cable on the door and the chassis and tighten the nuts.

Figure 141: Ground Strap Cable—Standard Door



Step 5 Tighten the door screws to a torque value of 6.5 in-lb (0.75 N-m) to close the standard door as shown in the following figure.

Figure 142: Close the Standard Door of ONS 15454 M2 Shelf



Stop. You have completed this procedure.

NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf

Purpose	This procedure opens and removes the standard door of the ONS 15454 M2.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • NTP-G269 Install the Standard Door of the ONS 15454 M2 Shelf, on page 216. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Complete the DLP-G594 Open the Standard Door of the ONS 15454 M2 Shelf, on page 219.

Step 2 Complete the DLP-G595 Remove the Standard Door of the ONS 15454 M2 Shelf, on page 220.

Stop. You have completed this procedure.

DLP-G594 Open the Standard Door of the ONS 15454 M2 Shelf

Purpose	This task opens the standard door of the ONS 15454 M2 system.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • NTP-G269 Install the Standard Door of the ONS 15454 M2 Shelf, on page 216. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer here.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

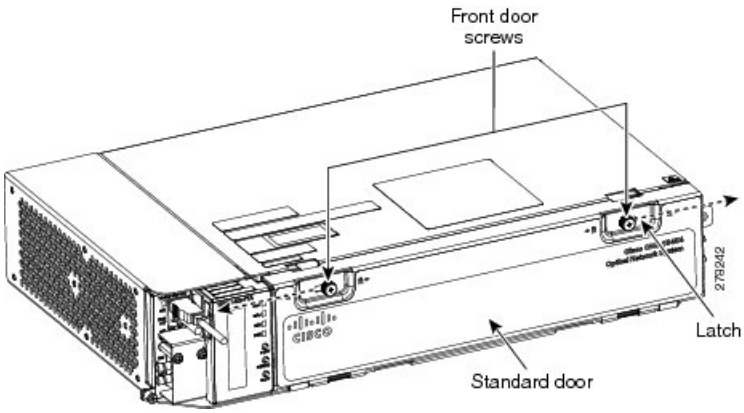
Caution The ONS 15454 M2 shelf has an ESD plug input and is shipped with an ESD wrist strap. The ESD plug input is located on the outside of the shelf on the right side. It is labeled "ESD" on the top and bottom. Always wear an ESD wrist strap and connect the strap to the ESD plug when working on the ONS 15454 M2. For detailed instructions on how to wear the ESD wristband, refer to the http://www.cisco.com/en/us/docs/optical/esd_grounding/guide/esd_grounding.html .

Procedure

Step 1 Loosen the standard door screws.

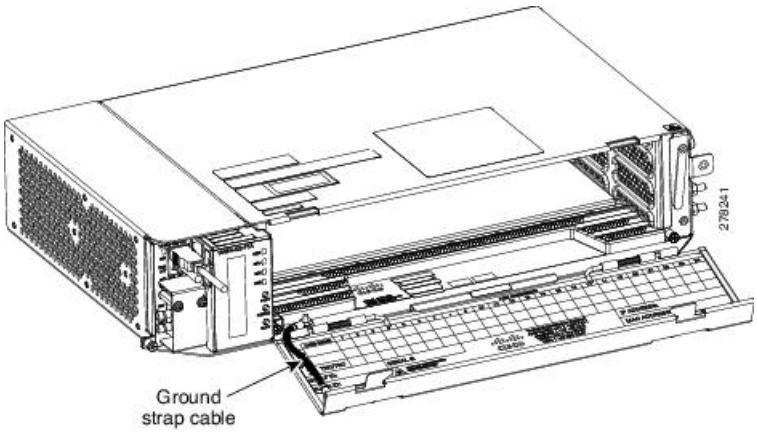
Step 2 Push the latches in the opposite direction as shown in the following figure.

Figure 143: Opening the Standard Door



Step 3 Swing the door open.

Figure 144: Cisco ONS 15454 M2 Standard Door—Opened



Step 4 Return to your originating procedure (NTP).

DLP-G595 Remove the Standard Door of the ONS 15454 M2 Shelf

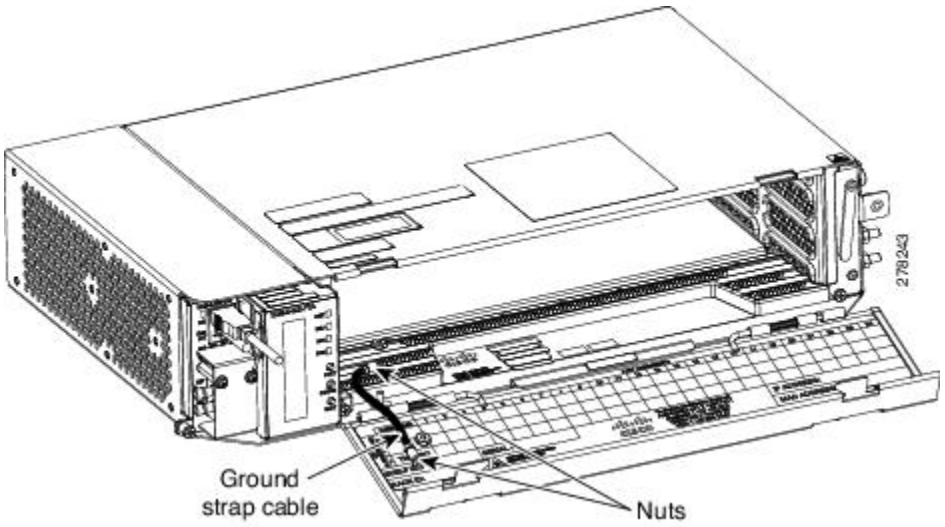
Purpose	This task removes the standard door of the ONS 15454 M2 system.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• DLP-G594 Open the Standard Door of the ONS 15454 M2 Shelf, on page 219. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Unscrew the nut holding the ground cable to the shelf. Remove the nut.

Step 2 Remove the ground cable from the shelf as shown in the following figure

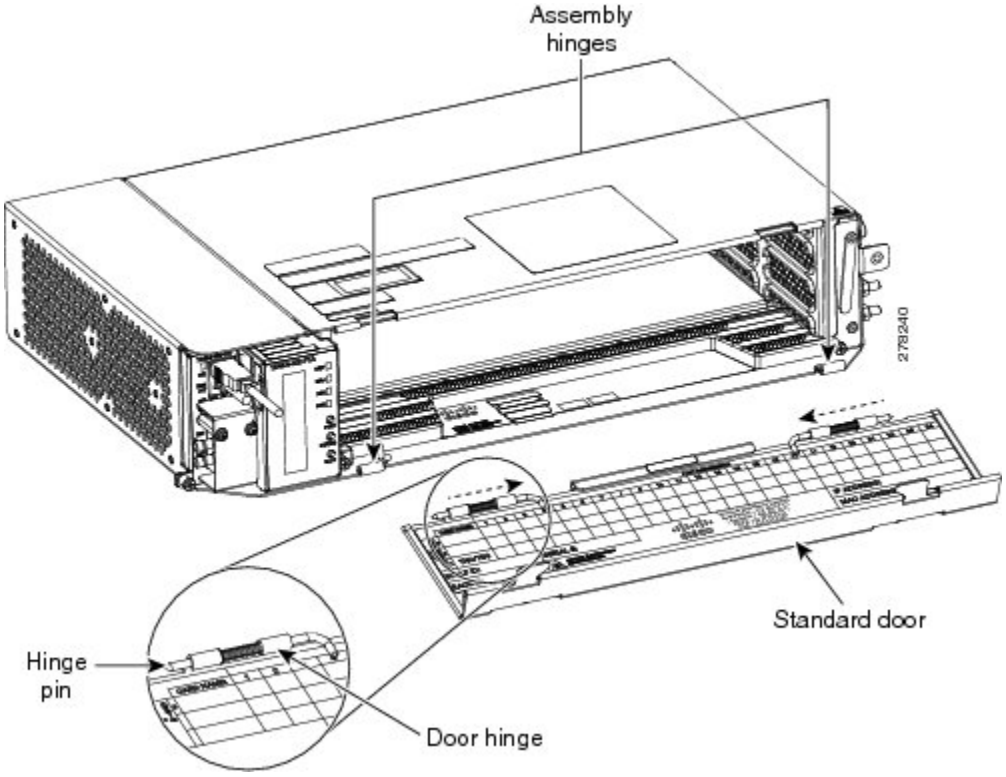
Figure 145: Removing the Standard Door



Step 3 Pull the hinge pins holding the door to the chassis, in the opposite direction.

Step 4 Remove the door from its hinges as shown in the following figure.

Figure 146: Removing the Standard Door



Step 5 Return to your originating procedure (NTP).

NTP-G343 Install the Deep-Front Panel of the ONS 15454 M2 Shelf

Purpose	This procedure installs the deep-front panel of the ONS 15454 M2 shelf.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Socket (6/32 standard) and socket wrench to tighten or loosen the ground nut
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms . • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235 • NTP-G268 Install the Fan-Tray Assembly in the ONS 15454 M2 Shelf, on page 244 • NTP-G271 Install the Power and Ground to the ONS 15454 M2 Shelf, on page 248 • NTP-G291 Attach Wires to Timing, LAN, and Craft Pin Connections in ONS 15454 M2, on page 266
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note Use the deep front panel when ONS-SC+-10G-C pluggables are installed on ONS 15454 M2 shelf.

Caution The deep-front panel does not have a hinge and cannot be rotated like a standard door. Rotating the deep front panel can damage the deep-front panel, shelf hinges, other devices and cables placed below the ONS 15454 M2 shelf.

Procedure

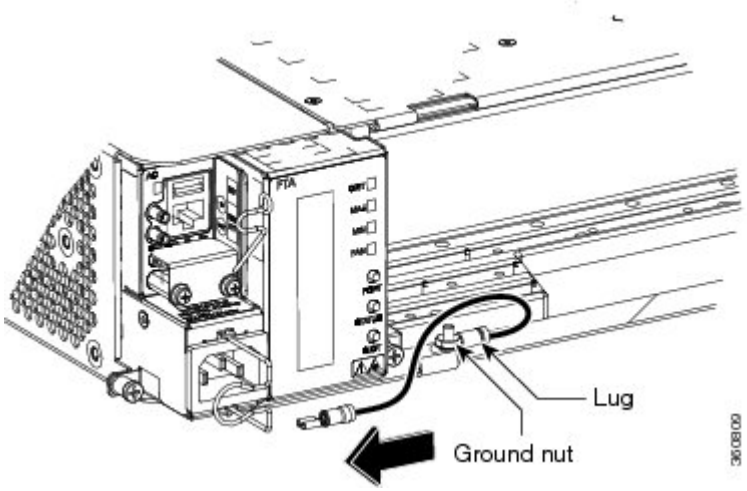
Step 1 Connect the ground strap cable:

a) Loosen the ground nut from the shelf (see the following figure).

b) Insert the lug of the ground strap cable and tighten the nut on the shelf to a torque value of 11.5 in-lb (1.3 N-m) (see the following figure).

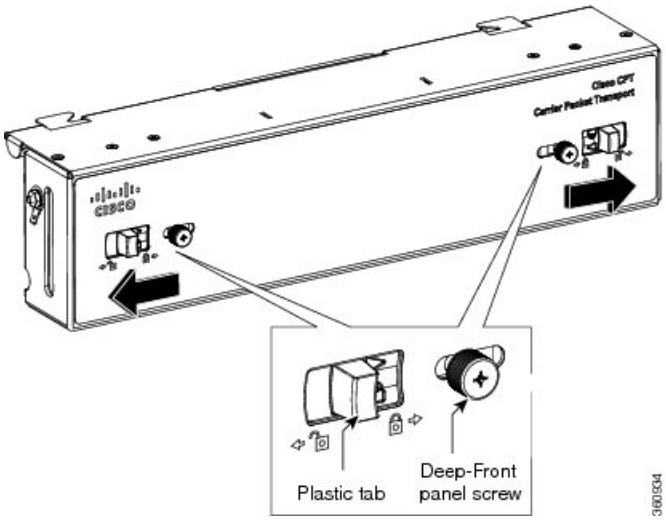
c) Route the other end of the ground strap cable outside the shelf at an angle of 180 degrees towards the left.

Figure 147: Inserting the Lug to the Shelf



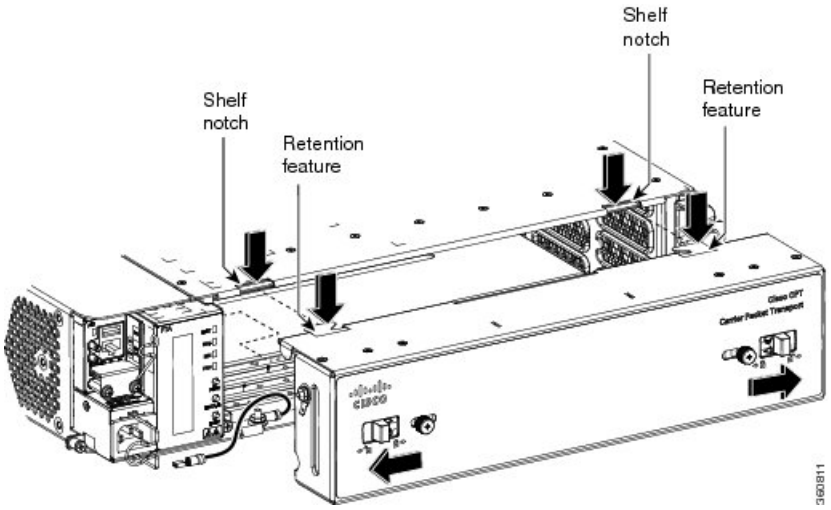
Step 2 Loosen the deep-front panel screws and slide them outwards using the plastic tabs (see the following figure).

Figure 148: Loosening the Deep-Front Panel screws



Step 3 Place the deep-front panel close to the shelf so that the shelf notches, and the deep-front panel retention features are in line (see the following figure).

Figure 149: Moving Deep-Front Panel and Shelf in line

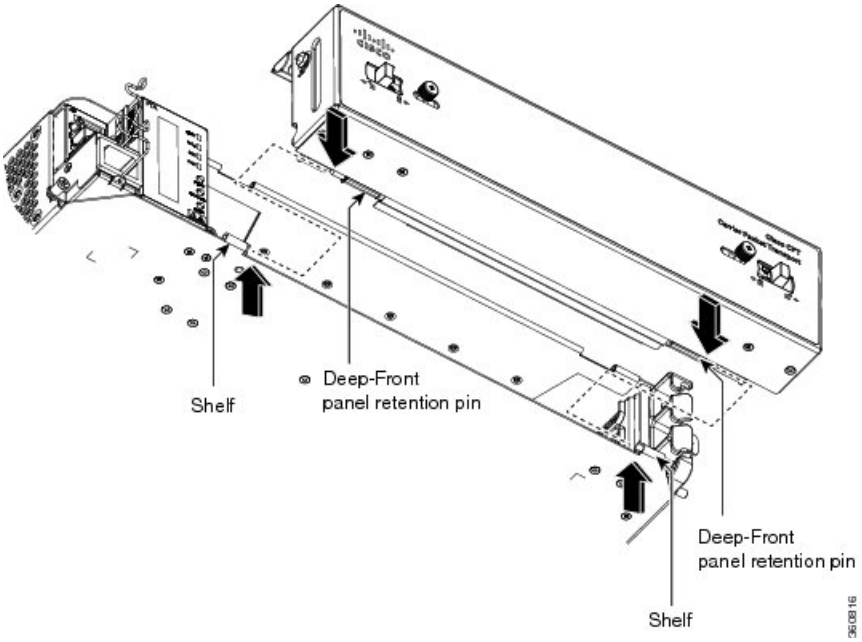


Step 4 Align the deep-front panel with the shelf by performing these sub-steps at the same time:

a) Align the right and left retention features of the deep-front panel with the right and left notches present on the top of the shelf (see Figure 149: Moving Deep-Front Panel and Shelf in line, on page 224).

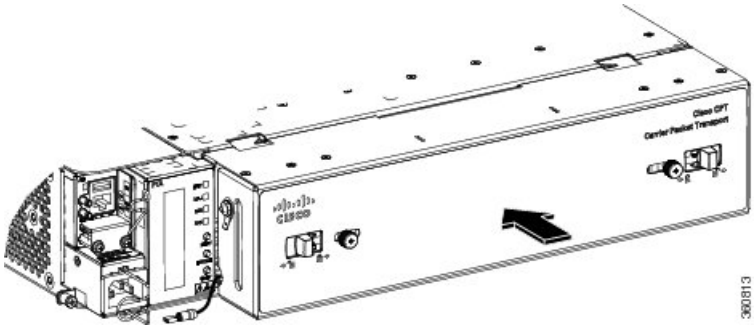
b) Align the deep-front panel pins present at the bottom of the panel with the shelf hinges (see the following figure).

Figure 150: Aligning the Deep-Front Panel and Shelf



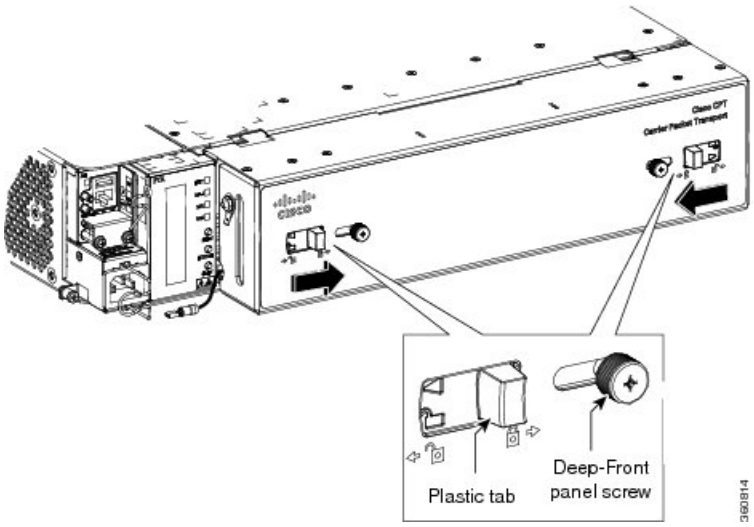
The following figure shows the deep-front panel aligned with the shelf.

Figure 151: Engaging the Deep-Front Panel and Shelf



Step 5 Slide the deep-front panel screws inwards using the plastic tabs to engage the retention features and the pins with the shelf notches and hinges (see the following figure). Verify the engagement by gently applying outward pressure to the panel.

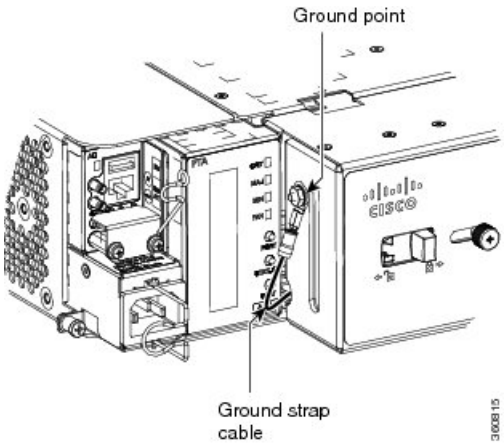
Figure 152: Engaging the Deep-Front Panel and Shelf



Step 6 Lock the deep-front panel by tightening the screws to a torque value of 6.5 in-lb (0.75 N-m).

Step 7 Connect the other end of the ground strap cable to the ground point present on the deep-front panel exterior.

Figure 153: Connecting the Ground Strap Cable



Stop. You have completed this procedure.

NTP-G331 Remove the Deep-Front Panel of the ONS 15454 M2 Shelf

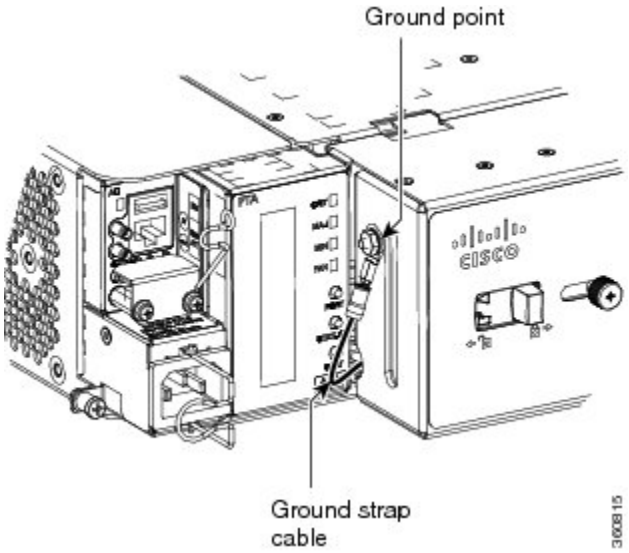
Purpose	This procedure removes the deep-front panel of the ONS 15454 M2 system.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Socket (6/32 standard) and socket wrench to tighten or loosen the ground nut
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194 • NTP-G343 Install the Deep-Front Panel of the ONS 15454 M2 Shelf, on page 222 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Caution The deep-front panel does not have a hinge and cannot be rotated like a standard door. Rotating the deep front panel can damage the deep-front panel, shelf hinges, other devices and cables placed below the ONS 15454 M2 shelf.

Procedure

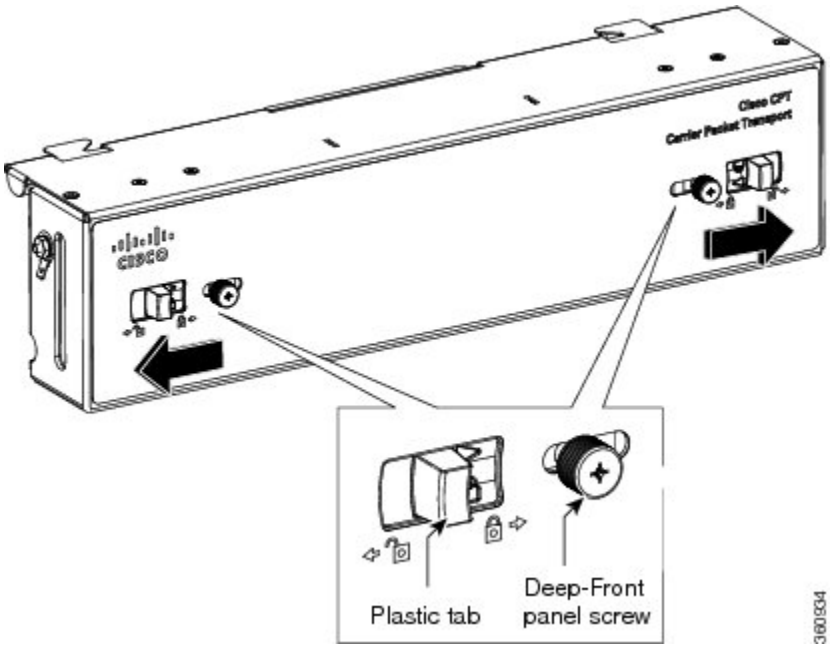
Step 1 Remove the end of the ground strap cable that is connected to the exterior of the deep-front panel (see the following figure).

Figure 154: Removing the end of the ground strap cable



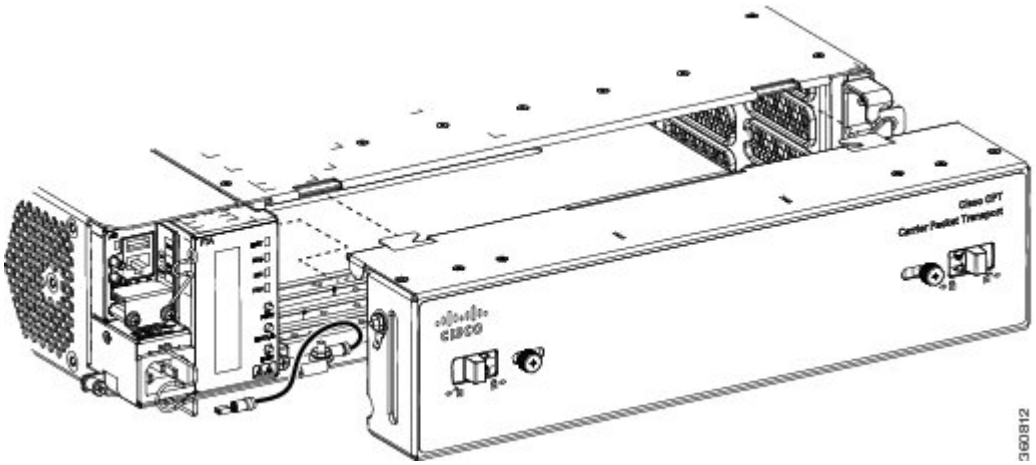
Step 2 Loosen the deep-front panel screws and slide them outwards using the plastic tabs as shown in the following figure to open the deep-front panel.

Figure 155: Moving the deep-front panel to disengage



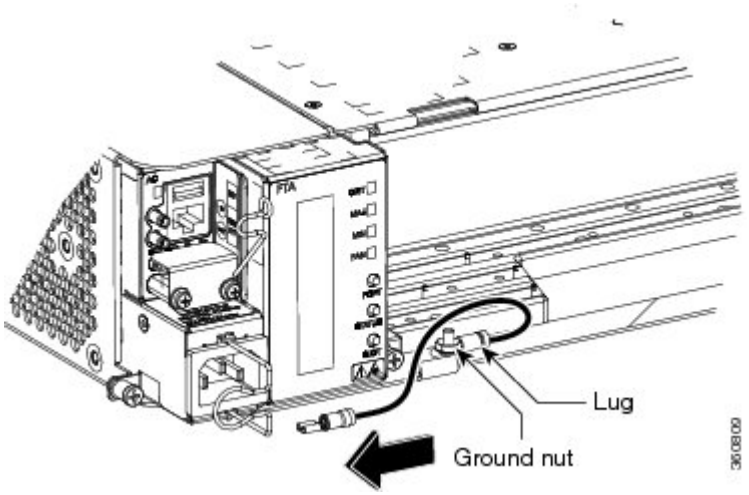
Step 3 Move the deep-front panel away from the shelf (see the following figure).

Figure 156: Moving the deep-front panel away



Step 4 Remove the ground strap cable from the shelf (see the following figure):

Figure 157: Removing the ground strap cable



a) Loosen the ground nut on the shelf.
b) Remove the lug and tighten the nut on the shelf to a torque value of 11.5 in-lb (1.3 N-m).

Stop. You have completed this procedure.

Power Modules

The ONS 15454 M2 system contains the following pluggable power modules:

- AC power module
- DC power module

In addition to supplying power to the ONS 15454 M2 shelf, the power modules support the following connections:

- LAN Connection—An Ethernet port (RJ-45) that supports the element manager system (EMS) connection. The RJ-45 port is used to connect the EMS or the craft interface terminal to access the ONS 15454 M2 shelf.
- Passive Unit Inventory Interfaces (USB port)—The passive unit inventory interfaces are used to retrieve inventory information from passive devices such as, fiber trays, FBG DCU, patch panels, passive muxponder and demuxponder and so on. The inventory details are displayed in the **Inventory** tab in CTC.
- Timing Connections—The BITS-IN port receives input from third party external sources called SSU (Synchronization Supply Unit) to synchronize the timing of the ONS 15454 M2 shelf. The BITS-OUT port provides output to external devices (other Cisco or third party shelves) to synchronize the timing signals with the ONS 15454 M6 shelf.

The ONS 15454 M2 shelf has a BITS-IN and BITS-OUT port on the power module. The BITS-IN and BITS-OUT connections are supported by:

-
  - Wire-wrap pins and mini-BNC connectors on the AC power module.
  - Mini-BNC connectors on the ETSI DC power module.
  - Wire-wrap pins on the ANSI DC power module.

Note For timing connection, use 100-ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm² [0.020 inch] or 0.64 mm² [0.0252 inch]) twisted-pair T1-type.

Note Refer to Telcordia SR-NWT-002224 for rules about provisioning timing references.

AC Power Module

The AC power module converts the AC input current to DC output current.

Each AC power module has:

- One AC single phase three poles (line L, Neutral N, and Protective Earth PE) input connector
- One RJ-45 port for EMS connection
- One USB port to support passive unit remote inventory connection
- Two BITs connections (IN and OUT) for network synchronization supported by mini BNC
- Two BITs connections (IN and OUT) for network synchronization supported by four wire-wrap pins

The AC power module has a single dual-color (red and green) LED on the faceplate. When the AC power line is not connected, the LED is OFF. Green LED indicates that the AC power line is connected and the power module is functioning properly. Red LED indicates that the AC power line is connected but an alarm is present due to secondary (48 V) fuse break. The shelf controller card controls the conditions that result in triggering the LED. The LED can be overwritten by the shelf controller card (TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE) in all the three states (OFF/red/green). The AC power module supports the lamp test procedure and the LED changes its color or state. The fans in the ONS 15454 M2 shelf cool the AC module and guarantee proper operation across the complete operating temperature or output power range.

DC Power Module

The ONS 15454 M2 system can be powered by redundant DC power lines, however a single power line can power the entire ONS 15454 M2 system. The DC power module draws the power from the batteries to turn on the ONS 15454 M2.

Each ETSI DC power module has:

- Two input battery connectors (two poles): -48V, RET for power terminals A and B.
- One RJ-45 port for EMS connection
- One USB port to support passive unit remote inventory connection
- Two BITS connections (IN and OUT) for network synchronization that is supported by mini BNC

Each ANSI DC power module has:

- Two terminal block connectors with -48V, RET for power terminals A and B
- One RJ-45 port for EMS connection
- One USB port to support passive unit remote inventory connection
- Two BITS connections (IN and OUT) for network synchronization supported by four wire-wrap pins

The DC power module has a single dual-color (red and green) LED on the faceplate. When the battery is not connected, the LED is OFF. Green LED indicates that the battery is connected and the power module functions properly. Red LED indicates that the battery is connected but an alarm is present due to secondary fuse break (48 V). The DC power module does not support the lamp test procedure.

The fork or ring terminals used on the DC power modules are not available from Cisco, but they are available commercially. Ensure that the hole size of the fork terminal or ring terminal is greater than 3.5 mm and width is less than or equal to 7 mm. The minimum acceptable cable size is #14 AWG. The fork terminal must be insulated and UL listed.

Modular DC Power Module

Table 30: Feature History

Feature Name	Release Information	Feature Description
New Modular DC Power Module for M2 Chassis	Cisco NCS 2000 Release 11.13	The design of the DC Power module is enhanced to make the power system modular. The modular units comprise a primary frame and two replaceable DC PSUs (available for both ETSI and ANSI variants), each with unique PIDs. The PSUs are field replaceable and provide redundancy to the power system.

The modular DC Power module has three main components, one primary frame and two field replaceable DC PSUs (PSUA and PSUB). There are two variants of the PSUs, for ETSI and ANSI connectors. The DC Frame is common for both variants of the PSUs.

- Main frame (PID: NCS2002-PSU-DC)—Includes two input slots to insert the PSUs, One RJ-45 port for EMS connection, One USB port to support passive unit remote inventory connection, two BITS connections (IN and OUT) for network synchronization.

- PSUs—Field Replaceable Units (FRU) that can be inserted into the slots of the Main frame. The PSU has
  - The ETSI variant (PID: NCS2002-DC2-E) has two input battery connectors (two poles): -48V, RET for power terminals A and B.
  - The ANSI variant (PID: NCS2002-DC2-PSU-NA) has two terminal block connectors with -48V, RET for power terminals A and B.

In this modular DC power module, the input connector, DC filter and fuses for each battery are separated into two independent and field replaceable PSUs. In this case, if there is a failure on the protection block of one battery, it can be replaced without interrupting the functioning of the chassis.

Figure 158: Front View of the DC Frame

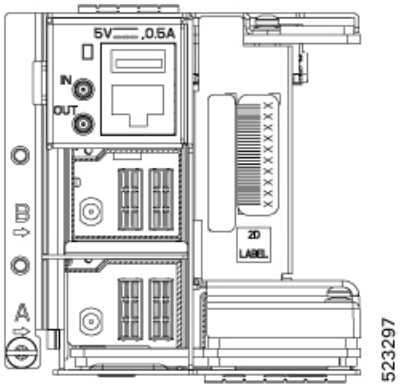


Figure 159: Perspective View of the DC Frame

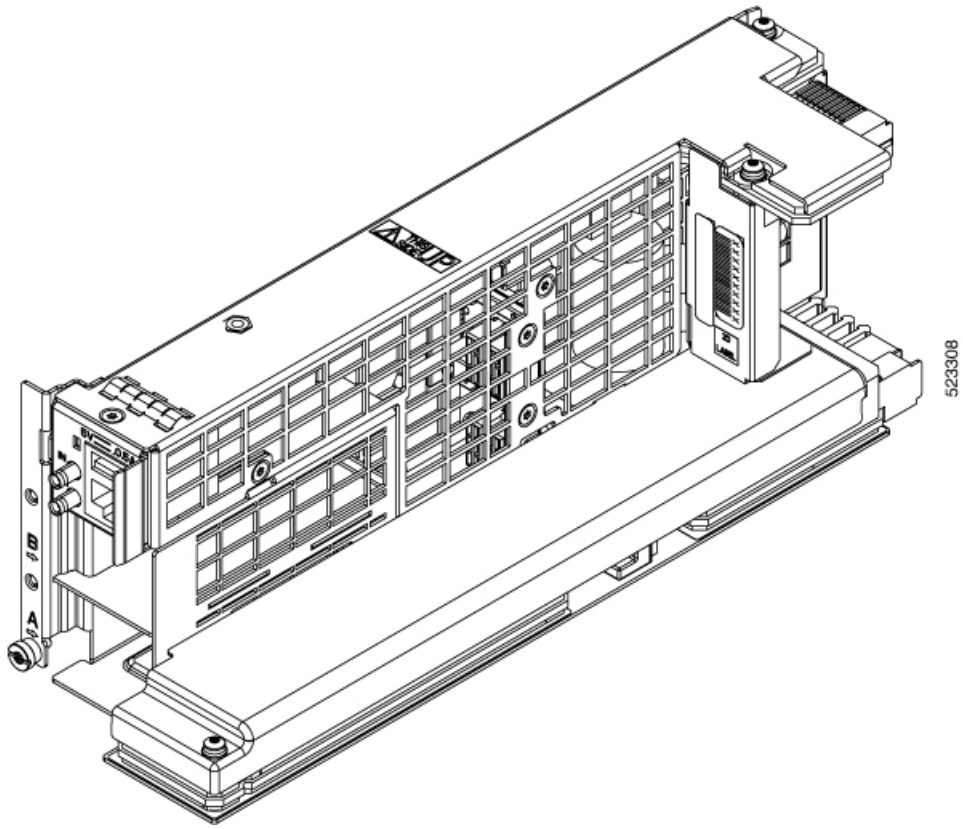


Figure 160: Front View of the ETSI PSU

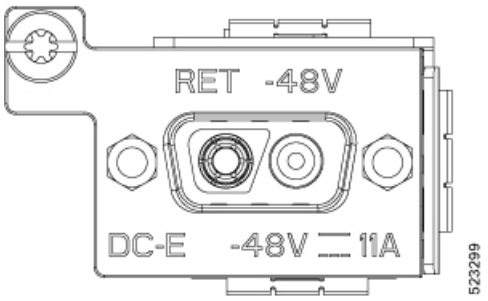


Figure 161: Perspective Views of ETSI PSU

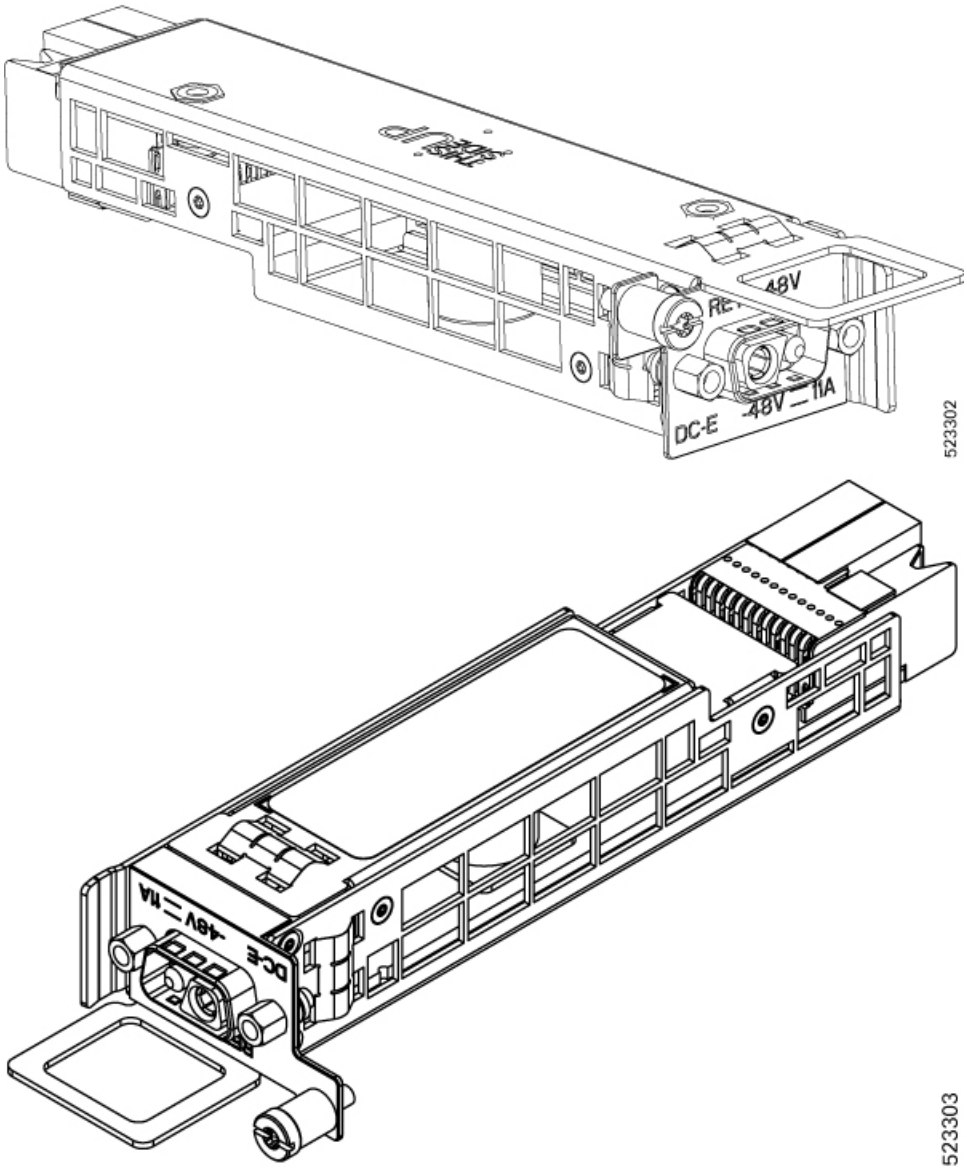


Figure 162: Front View of the ANSI PSU

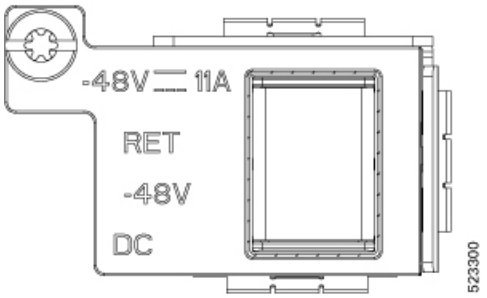
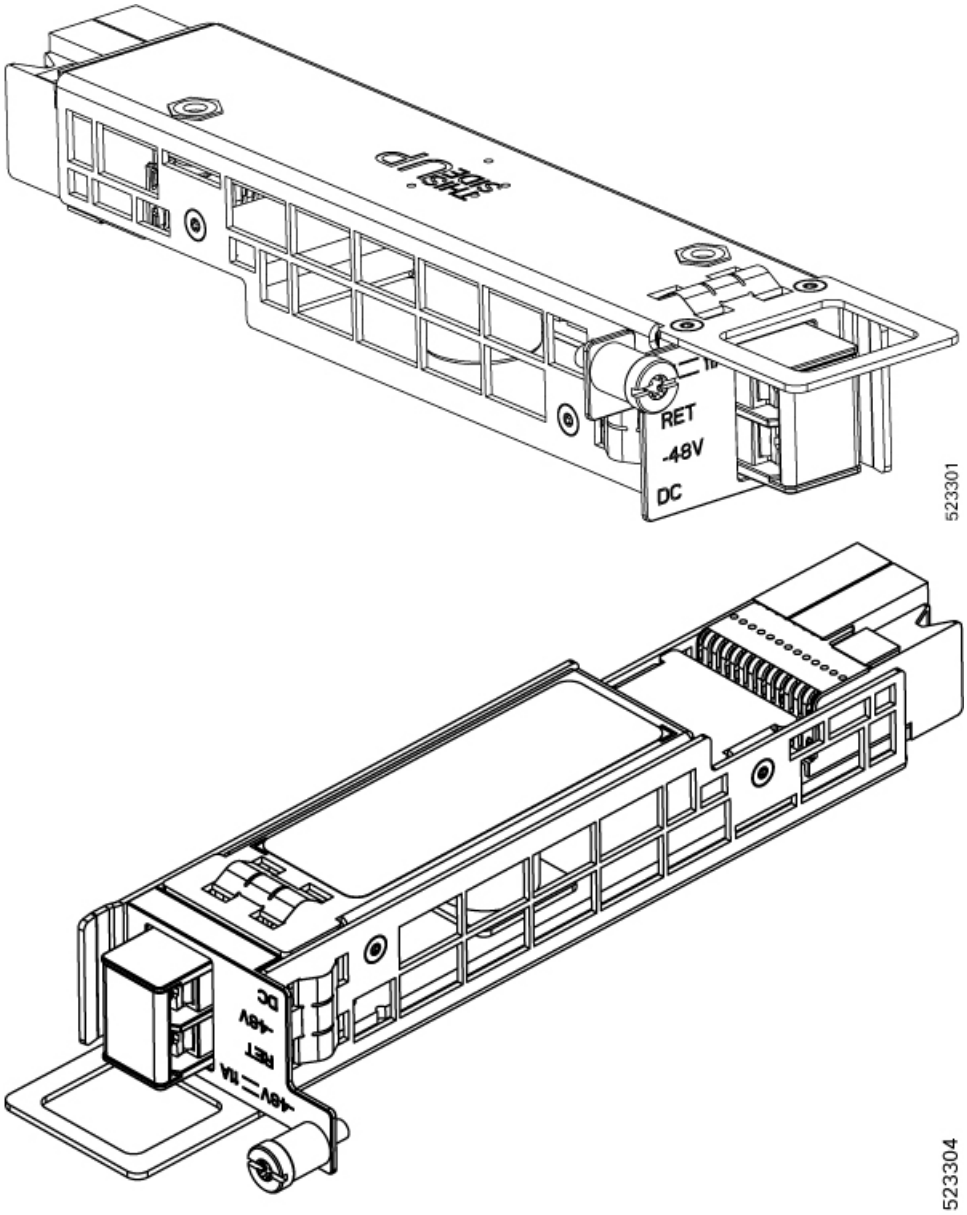


Figure 163: Perspective Views of the ANSI PSU



Note When you plug out the PSU and plug it in again, the control card requires a minimum of five seconds to read the voltage. During this period, although the PSU is in place, the BAT-FAIL (Battery Fail) alarm will be raised followed by the ELWBATVG (Extreme Low Voltage) alarm. These alarms are raised after each plug out and plug in operation. However, these alarms will get cleared one after the other after few minutes.

NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf

Purpose	This procedure installs the power module in the ONS 15454 M2 system.
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **The plug-socket combination must be accessible at all times because it serves as the main disconnecting device.** Statement 1019

Note During the system startup or fan-tray replacement, the inventory data of the fan-tray assembly and the power module is displayed in the **Inventory** tab of CTC after a delay of approximately 6 minutes.

Procedure

Step 1 Complete the necessary task as applicable:

- DLP-G592 Install the AC Power Module in the ONS 15454 M2 Shelf, on page 235
- DLP-G593 Install the DC Power Module in the ONS 15454 M2 Shelf, on page 237

Step 2 Complete the NTP-G271 Install the Power and Ground to the ONS 15454 M2 Shelf, on page 248.

Stop. You have completed this procedure.

DLP-G592 Install the AC Power Module in the ONS 15454 M2 Shelf

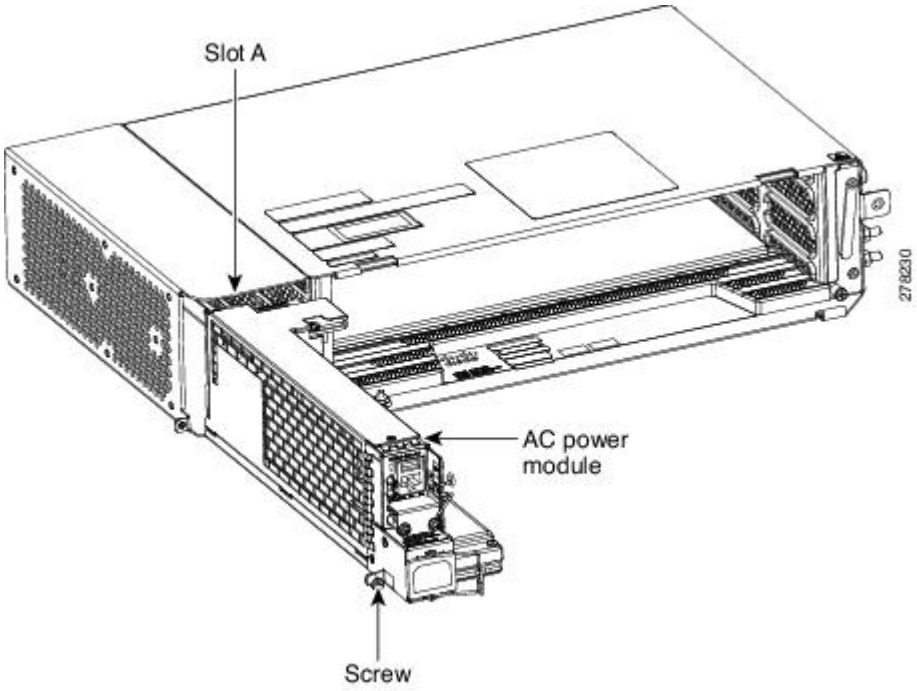
Purpose	This procedure installs the AC power module in the ONS 15454 M2 system.
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

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

Procedure

Step 1 Insert the AC power module in Slot A.

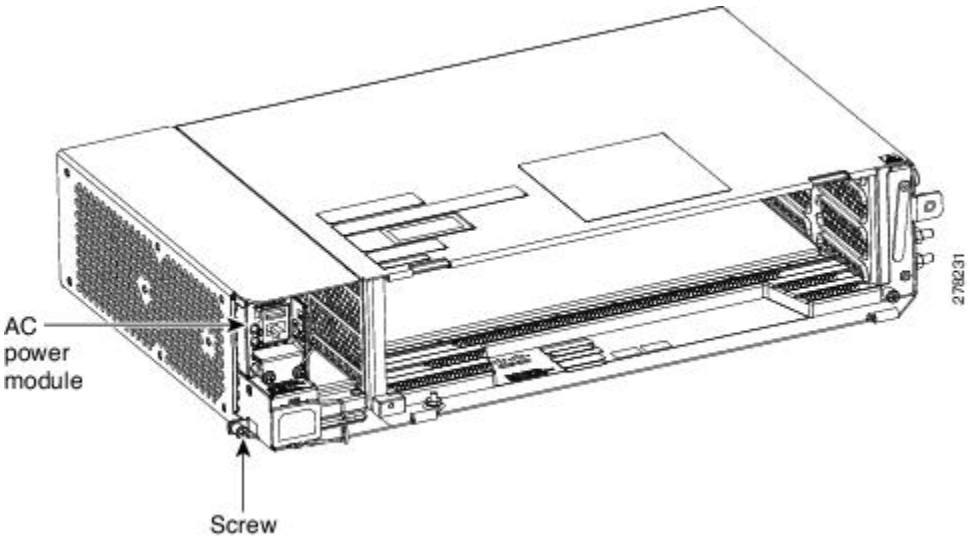
Figure 164: Installing the AC Power Module



Step 2 Plug the AC power module completely into the chassis.

Step 3 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the power module in the chassis (see the following figure).

Figure 165: AC Power Module Installed in the ONS 15454 M2 Shelf



Stop. You have completed this procedure.

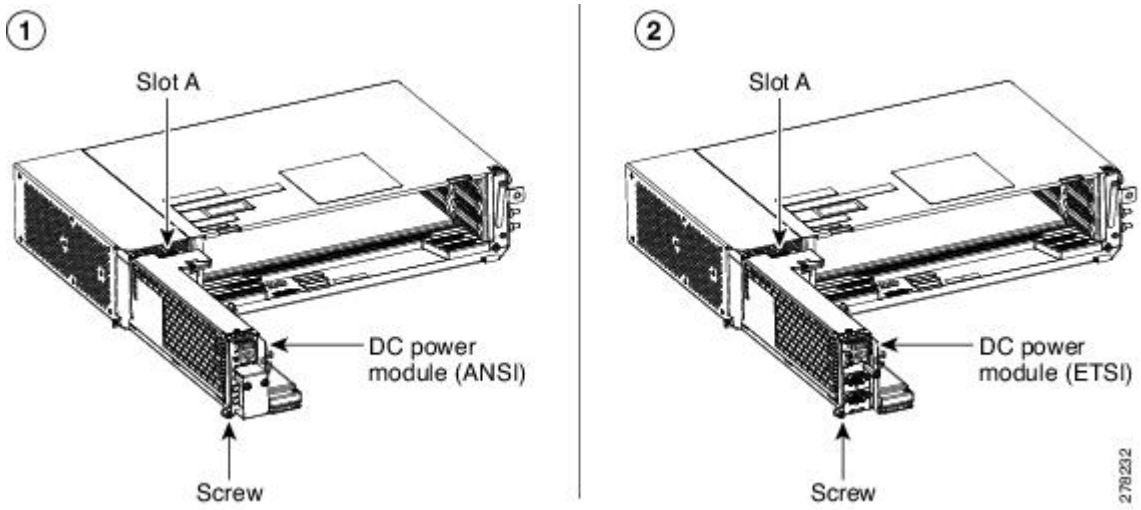
DLP-G593 Install the DC Power Module in the ONS 15454 M2 Shelf

Purpose	This task installs the DC power module in the ONS 15454 M2 system.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Insert the DC power module in Slot A (see the following figure).

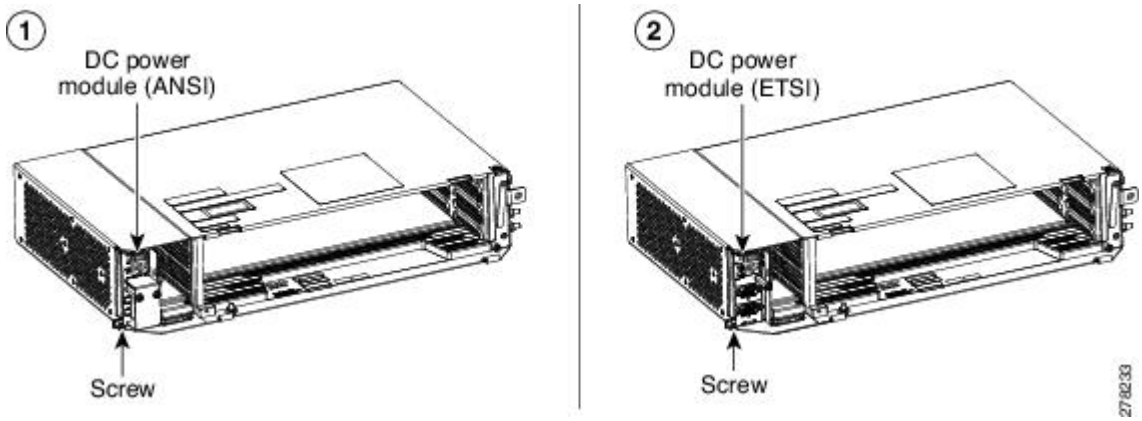
Figure 166: Installing the DC Power Module



Step 2 Plug the DC power module completely into the chassis.

Step 3 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the power module in the chassis (see the following figure).

Figure 167: DC Power Modules Installed in the ONS 15454 M2 Shelf



Step 4 Return to your originating procedure (NTP).

Installing the Modular DC Power Module

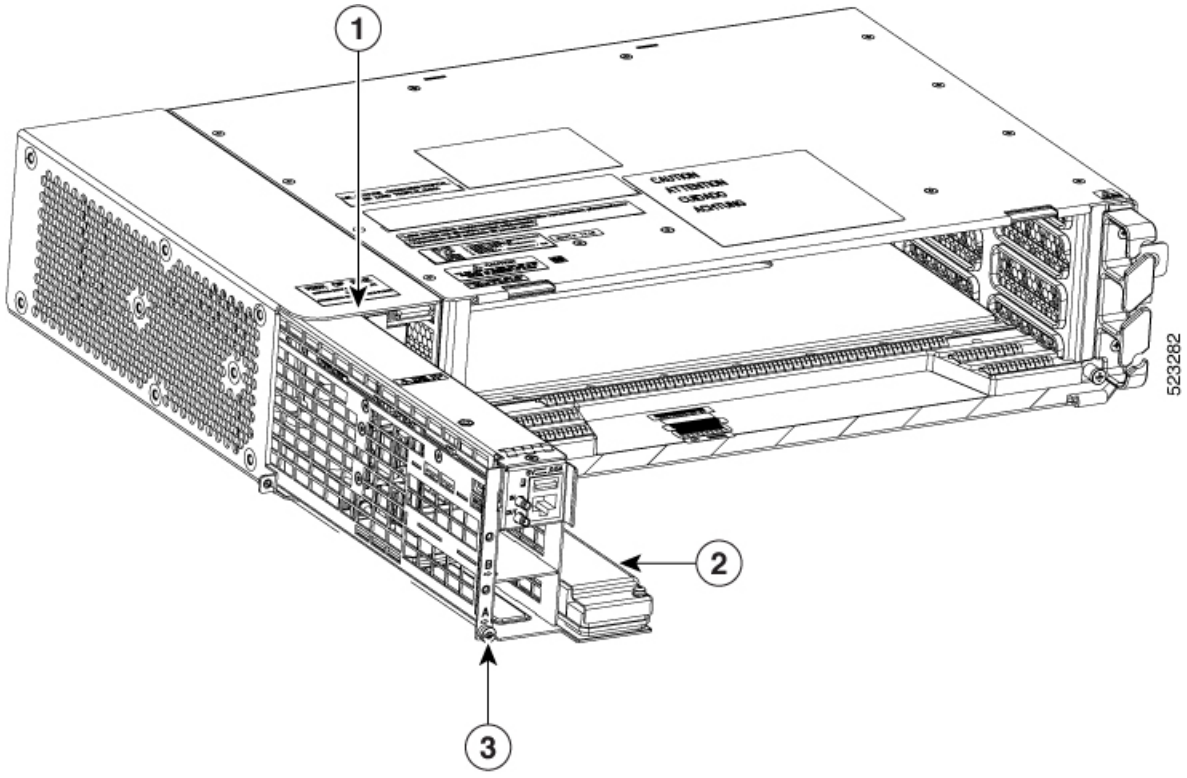
Purpose	This task installs the modular DC power module in the ONS 15454 M2 system.
Tools/Equipment	Torque screwdriver or Flat screwdriver

Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Insert the DC Frame in Slot A (see the figure below).

Figure 168: Inserting the DC Frame

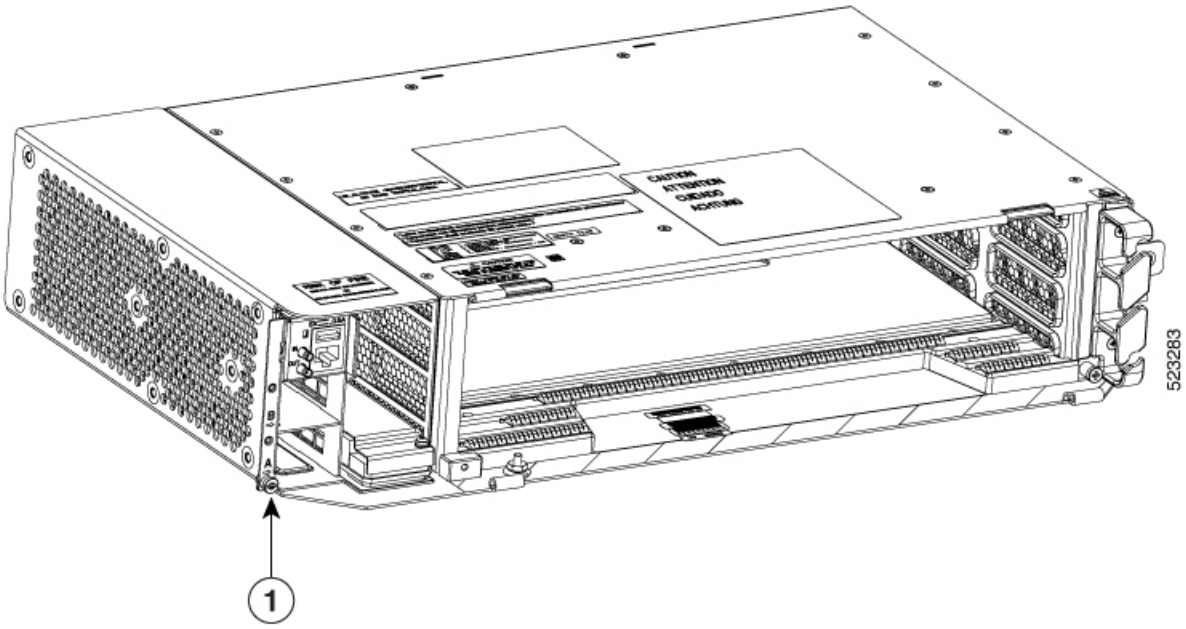


1	Slot A
2	DC Frame
3	Captive screw

Step 2 Plug the DC frame completely into the chassis.

Step 3 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the DC frame in the chassis (see the figure below).

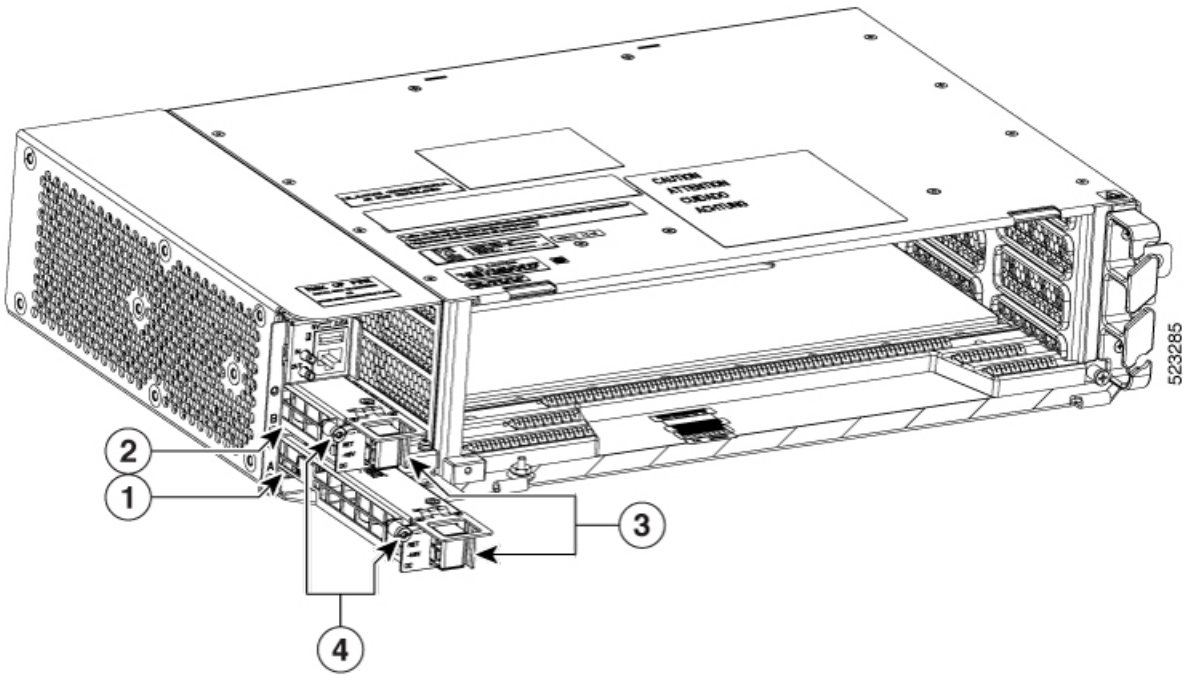
Figure 169: DC Frame Installed in the ONS 15454 M2 Shelf



1	Captive screw

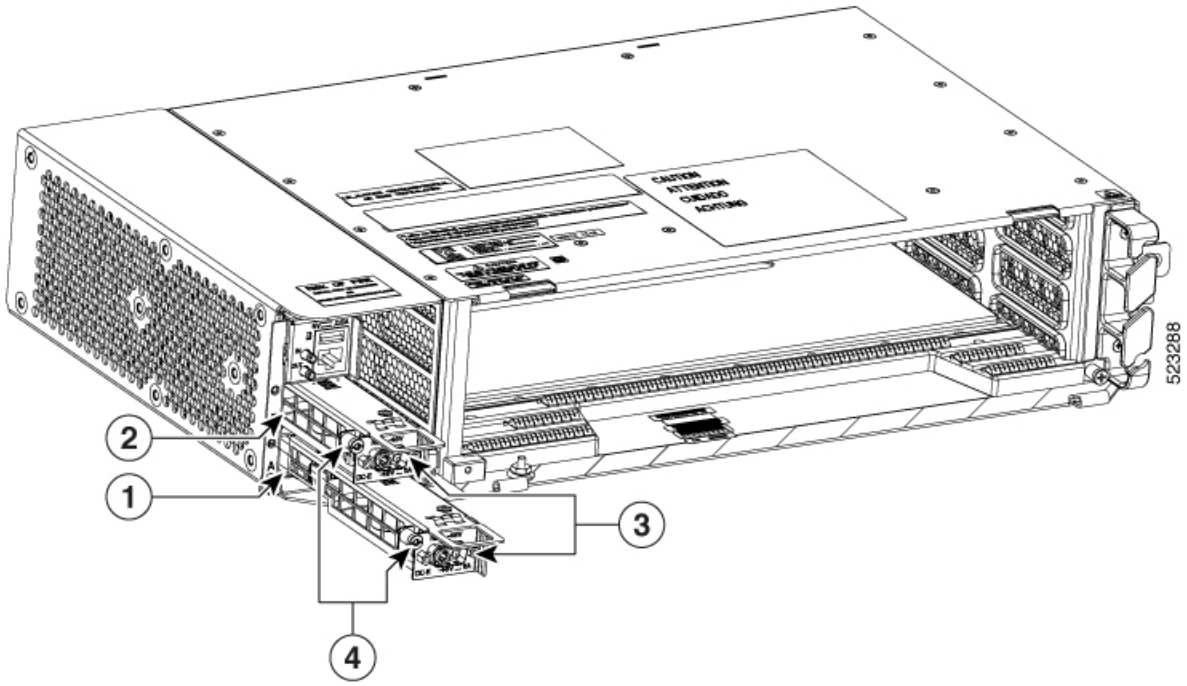
Step 4 Insert the PSU A and PSU B (ETSI or ANSI variant).

Figure 170: Inserting ANSI PSU in the DC Frame



1	PSU A
2	PSU B
3	Terminal block connectors
4	Captive screw

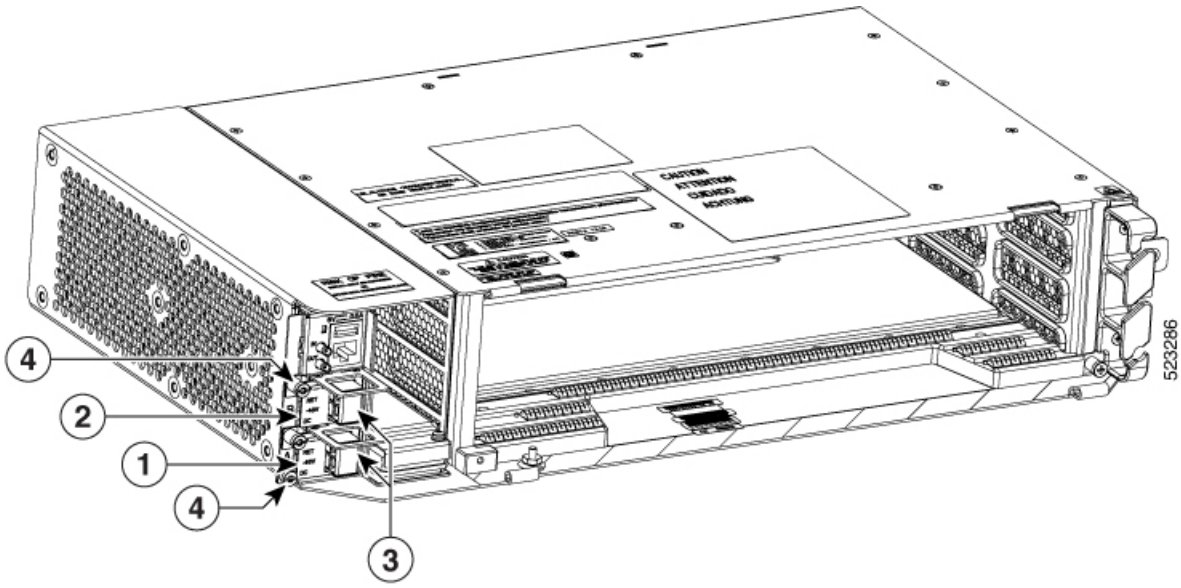
Figure 171: Inserting ETSI PSU in the DC Frame



1	PSU B
2	PSU A
3	D-sub connectors
4	Captive screws

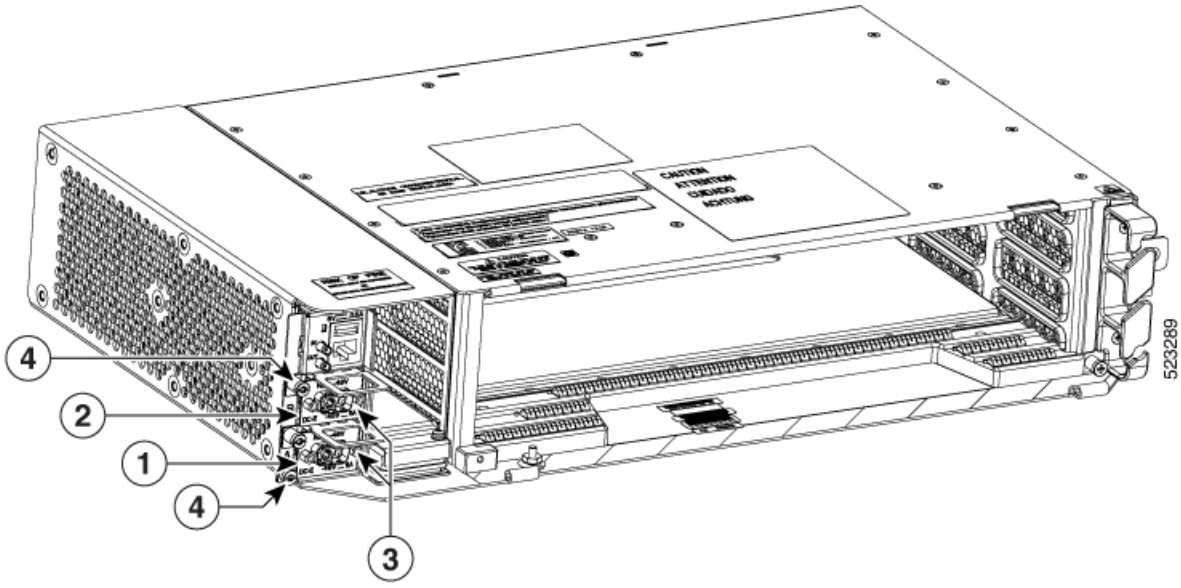
Step 5 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the PSUs into the DC frame (see the figures below).

Figure 172: ANSI PSU Installed into the DC Frame



1	PSU A
2	PSU B
3	Terminal Block Connectors
4	Captive screws

Figure 173: ETSI PSU Installed in the DC Frame



1	PSU A

2	PSU B
3	D-sub connectors
4	Captive screw

Step 6 Return to your originating procedure (NTP).

Fan-Tray Assembly

The fan-trays supported on the Cisco ONS 15454 M2 shelf are 15454-M2-FTA and 15454-M2-FTA2. The 15454-M2-FTA2 fan-tray provides increased airflow when compared to the 15454-M2-FTA fan-tray. The 15454-M2-FTA2 is compatible with R9.2.0 and later releases.

The fan-tray assembly is installed on the left side of the ONS 15454 M2 shelf. The fan-tray assembly is removable and holds the fan-control circuitry and the fans for the ONS 15454 M2 shelf.

There are four LEDs on the fan-tray assembly:

- Three alarm LEDs (CRIT, MAJ, and MIN) that indicate whether a critical, major, or minor alarm is present anywhere on the ONS 15454 M2 shelf.
- One fan fail LED that indicates fan failure.

When the fan-tray assembly is not functioning and the power line is not connected, the LED is OFF. A red LED indicates an alarm in the fan-tray assembly. A green LED indicates that the fan-tray assembly is functioning, the power line is connected, and the power module is functioning properly, the LED is green. When the power line is connected and if there is no TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE card installed in the ONS 15454 M2 shelf, then the LED is OFF.

The shelf controller card controls the conditions that result in triggering the LEDs. The LED can be overwritten by the shelf controller card (TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE) in all the three states (OFF/red/green). The fan-tray assembly supports the lamp test procedure.

The fan-tray assembly has an LCD screen that provides slot and port-level information for all card slots, and the number of critical, major, and minor alarms. The shelf controller card (TSC, TSCE, TNC, TNCS-2, TNCS-2O, or TNCE) drives the 16 X 2 character LCD screen. The LCD screen displays the shelf name, IP address, and software version that is currently used. The display contrast is automatically adjusted for clear view. The three accessible push buttons (SLOT, STATUS, and PORT) on the fan-tray assembly are used to set the slot and port level parameters.

Note The fan-tray assembly should be installed only after installing the power module. During the system startup or fan-tray replacement, the inventory data of the fan-tray assembly and the power module is displayed in the **Inventory** tab of CTC after a delay of approximately 6 minutes.

After you install the fan-tray, you should only access it if a fan failure occurs. To clean and replace the fan-tray assembly, see the “Maintain the Node” chapter in the Cisco ONS 15454 DWDM Configuration Guide.

Note If the fan-tray assembly is removed from the shelf, wait for at least 5 seconds before plugging it back into the shelf. In the event the LCD display on the fan-tray assembly appears blank, remove the unit from the shelf, wait for at least 5 seconds and reinsert the unit into the shelf.

A back-up flash memory is fitted into the fan-tray assembly to support the database (DB) and image back-up in the single mode operation of the ONS 15454 M2.

Fan Speed

Fan speed is controlled by the TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE card temperature sensors. The sensors measure the input air temperature at the fan-tray assembly. Fan speed options are low, medium, and high. If the TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE card fails, the fans automatically shift to high speed. The temperature measured by the TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE sensors appears on the LCD screen.

Fan Failure

If one or more fans fail on the fan-tray assembly, replace the entire assembly. You cannot replace individual fans. The red Fan Fail LED on the front of the fan-tray illuminates when one or more fans fail. The red Fan Fail LED clears after you install a working fan-tray.

NTP-G268 Install the Fan-Tray Assembly in the ONS 15454 M2 Shelf

Purpose	This procedure installs the 15454-M2-FTA or 15454-M2-FTA2 fan-tray assembly in the ONS 15454 M2 system.
Tools/Equipment	Small slot-head screwdriver
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note The 15454-M2-FTA2 is compatible with R9.2.0 and later releases.

Caution Do not operate an ONS 15454 M2 shelf without an air filter. For information on the air filter, see NTP-G114 Inspect and Replace the Air Filter, on page 449.

Caution Do not force a fan-tray module into place. Doing so can damage either the connectors on the fan-tray or the connectors on the backpanel of the shelf, or both.

Note Error messages appear on the TNC, TNCE, TSC, or TSCE card, the fan-tray LED, and in the Cisco Transport Controller (CTC) when the fan-tray module is removed from the shelf or when one fan is not working.

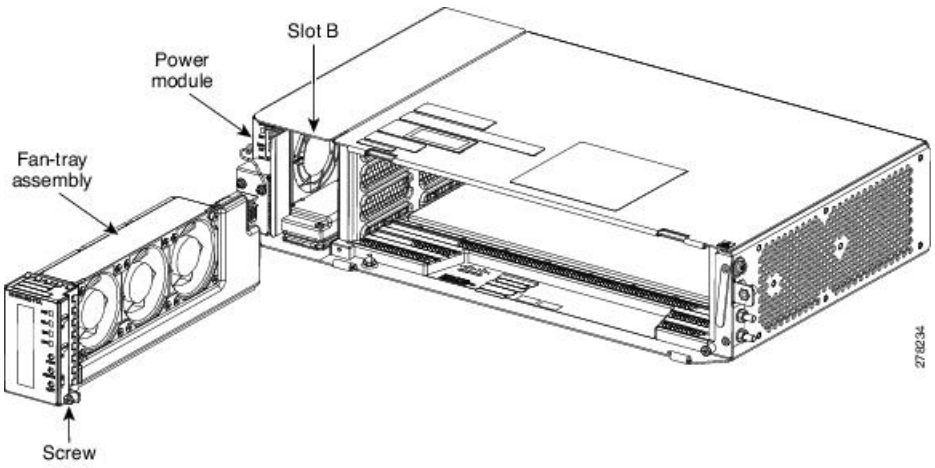
Note During the system startup or fan-tray replacement, the inventory data of the fan-tray assembly and the power module is displayed in the **Inventory** tab of CTC after a delay of approximately 6 minutes.

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

Procedure

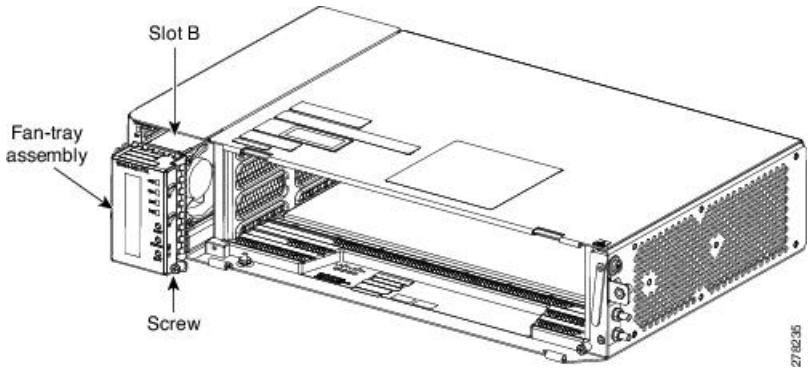
Step 1 Insert the fan-tray assembly in Slot B of the ONS 15454 M2 chassis (see the following figure).

Figure 174: Installing the Fan-Tray Assembly



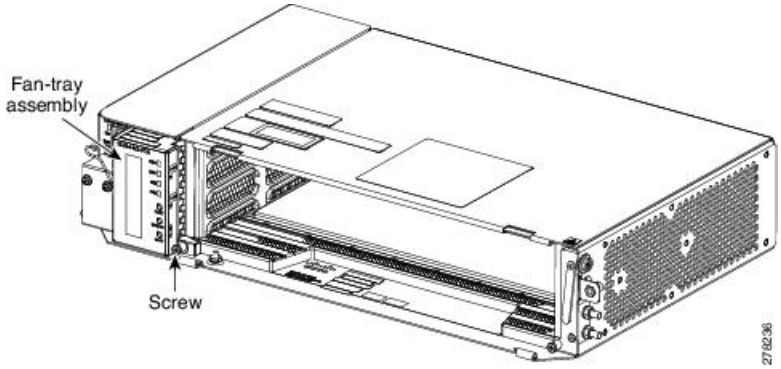
Step 2 Push the fan-tray assembly such that the backplane connector is completely engaged (see the following figure).

Figure 175: Inserting the Fan-Tray Assembly in the ONS 15454 M2 Chassis



Step 3 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the unit (see the following figure).

Figure 176: Fan-Tray Assembly Installed in the ONS 15454 M2 Shelf



Step 4 To verify that the tray has plugged into the assembly, check the fan-tray and listen to determine if the fans are running.

Note If the fan-tray assembly is removed from the shelf, wait for at least 5 seconds before plugging it back into the shelf. In the event the LCD display on the fan-tray assembly appears blank, remove the unit from the shelf, wait for at least 5 seconds and reinsert the unit into the shelf.

Stop. You have completed this procedure.

Power and Ground Description

Ground the equipment according to Telcordia standards or local practices.

The grounding configuration is mandatory for ANSI and ETSI chassis for both AC and DC configurations.

The following sections describe power and ground for the ONS 15454 M2 shelves.

For detailed instructions on grounding the ONS 15454 M2 chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

ANSI Power and Ground

For AC power feed, use the power cable shipped with the ONS 15454 M2 and one ground cable. For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For low input voltage ranges, 100V to 127Vac, the branch circuit protection must not be rated more than 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes. The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries. This product is intended for use on the TN and TT power systems.

The ONS 15454 M2 has redundant –48 VDC #12 single-hole lug power terminals. The terminals are labeled RET(A), RET(B), -48V(A), and -48V(B) on the power module.

To install redundant DC power feeds, use four power cables and one ground cable. For a single power feed, only two power cables (#12 AWG or larger, copper conductor, 194 degrees F [90 degrees C] minimum) and one ground cable (#6 AWG or larger) are required. Use a conductor with low impedance to ensure circuit overcurrent protection. However, the conductor must have the capability to safely conduct any faulty current that might be imposed. For a DC power supply, the fuse rating must not exceed 15A. The voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -48 VDC.

Note Functionality is guaranteed at –40 VDC input voltage, as defined in Telcordia GR-1089-CORE, Issue 5.

We recommend the following wiring conventions, but customer conventions prevail:

- Red wire for battery connections (–48 VDC).
- Black wire for battery return connections (RET).
- The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE, Issue 3.

The ground lug must be a dual-hole type, UL Listed, CSA certified and rated to accept the #6 AWG cable. Two ground posts with two M5 nuts are provided on the ONS 15454 M2 to accommodate the dual-hole lug.

ETSI Power and Ground

For AC power feed, use the power cable shipped with the ONS 15454 M2 and one ground cable. For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For low input voltage ranges, 100V to 127Vac, the branch circuit protection must not be rated more than 20A.

The overcurrent/short circuit protection must be in accordance with local and national electrical codes. The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries. This product is intended for use on the TN and TT power systems.

The ONS 15454 M2 for ETSI has redundant –48 VDC power connectors (DSUB for DC power module) on the DC power module. To install redundant power feeds, use the two power cables shipped with the ONS 15454 M2 shelf and one ground cable. For a DC power supply, the fuse rating must not exceed 15A. The voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -48 VDC.

The ground lug must be a dual-hole type, UL Listed, CSA certified and rated to accept the #6 AWG cable. Two ground posts with two M5 nuts are provided on the ONS 15454 M2 to accommodate the dual-hole lug.

Caution Only use the power cables shipped with the ONS 15454 M2 shelf.

NTP-G271 Install the Power and Ground to the ONS 15454 M2 Shelf

Purpose	This procedure installs power feeds and grounds the ONS 15454 M2 system.
Tools/Equipment	ANSI and ETSI: • #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws • Ground cable 13.3-mm² (#6 AWG) stranded • Listed pressure dual-holes lugs suitable for #6 AWG copper conductors • Wire cutters • Wire strippers • Crimp tool • Fuse panel ANSI only: • Power cable (from fuse panel to assembly), #12 AWG, copper conductors, 194 degrees F [90 degrees C]) • Wire wrapper • Two-hole grounding lug, shipped with the ONS 15454 M2 ETSI only: • Power cable (from fuse panel to power modules), shipped with the ONS 15454 M2 ETSI • Two-hole grounding lug, shipped with the ONS 15454 M2
Prerequisite Procedures	• NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module.** Statement 390

Warning **Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, power modules, and faceplates are in place.** Statement 261

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

Warning **Never install an AC power module and a DC power module in the same chassis.** Statement 1050

Warning **When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.** Statement 1002

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

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units.** Statement 246

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

Warning **Use copper conductors only.** Statement 1025

Warning **Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-1 based safety standards.** Statement 1033

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

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A-20A, 100-240 VAC~.** Statement 1005

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

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

Caution Always use the supplied ESD wristband when working with a powered ONS 15454. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 Verify that the correct fuse panel is installed in the top mounting space:

- For a DC power supply, the fuse rating must not exceed 15A.
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For low input voltage ranges, 100V to 127Vac, the branch circuit protection must not be rated more than 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes.

Step 2 Depending on the shelf and the power module installed, complete the necessary tasks:

- DLP-G596 Connect Office Power (AC) to the ONS 15454 M2 Shelf, on page 250
- DLP-G597 Connect Office Power (DC) to the ONS 15454 M2 Shelf (ANSI Only), on page 253
- DLP-G598 Connect Office Power (DC) to the ONS 15454 M2 Shelf (ETSI Only), on page 259

Step 3 Connect the office ground to the ONS 15454 M2 shelf. For detailed instructions on grounding, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

Step 4 Complete the DLP-G600 Turn On and Verify DC Office Power on the ONS 15454 M2 Shelf, on page 264.

Step 5 Continue with the NTP-G268 Install the Fan-Tray Assembly in the ONS 15454 M2 Shelf, on page 244.

Stop. You have completed this procedure.

DLP-G596 Connect Office Power (AC) to the ONS 15454 M2 Shelf

Purpose	This task connects AC power to the ONS 15454 M2 shelf.

Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Wire wrapper • Wire cutters • Wire strippers • Crimp tool • Fuse panel • Ground cable 13.3-mm² (#6 AWG) stranded. The PIDs of the power cables are listed in Table 31: PIDs for AC Power Cables, on page 253.
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms . • NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf, on page 218. • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note This product is intended for use on the TN and TT power systems.

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

Warning **This equipment shall be connected to AC mains provided with a surge protective device (SPD) at the service equipment complying with NFPA 70, the National Electrical Code (NEC).** Statement 7012

Caution The ONS 15454 M2 relies on the protective devices in the building installation to protect against short circuit, overcurrent and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

Note Not more than 7 feet (2 m) of the power supply cable should be exposed between the equipment and the fiber storage tray.

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

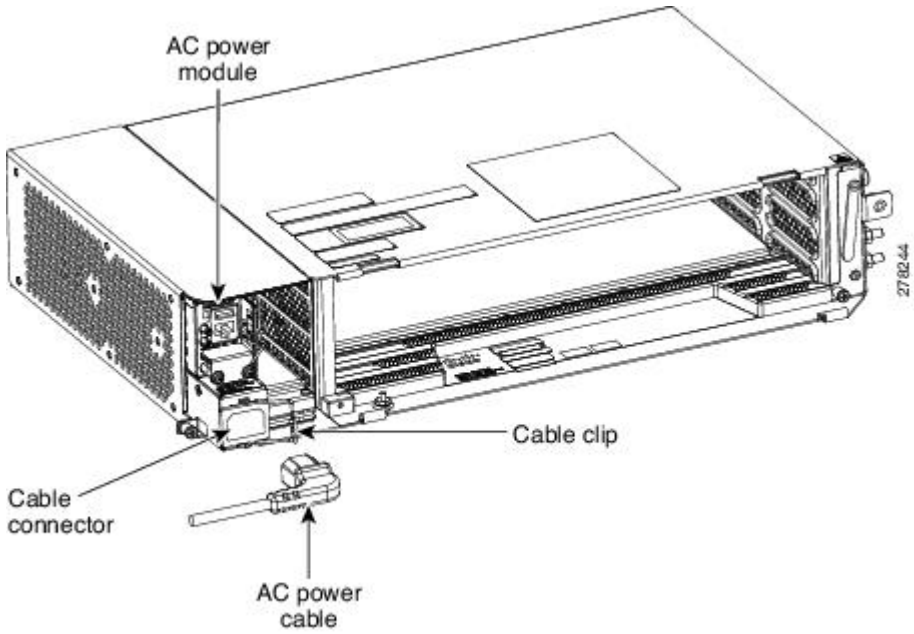
Note If the system loses power or if both TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE cards are reset, you must reset the ONS 15454 M2 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the NTP-G24 Setting Up Node Identification Information.

Procedure

Step 1 Verify that the AC power module is installed in Slot A of the ONS 15454 M2.

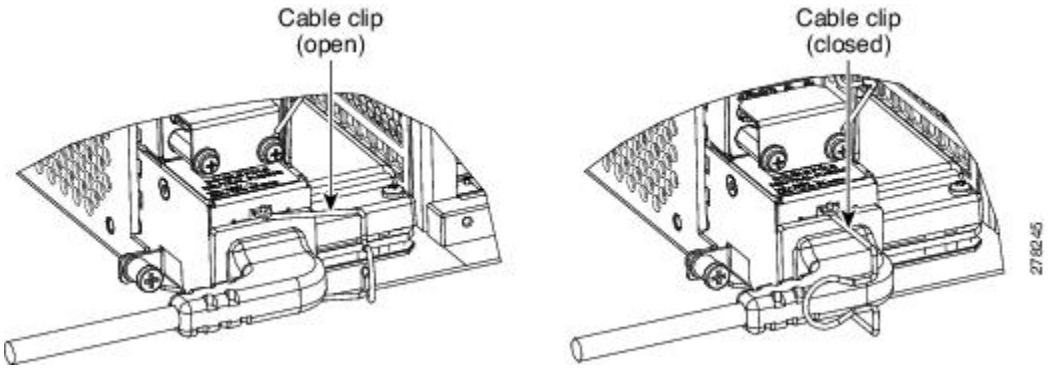
Step 2 Attach the AC power cable to the cable connector in the AC power module (see the following figure).

Figure 177: Connecting Office Power—AC Power Modules



Step 3 Close the cable clip to secure the power cable (see the following figure).

Figure 178: Cable Clip to Secure the Power Cable



Step 4 Connect the power cable to the fuse panel or power source.

Note The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries.

Note Turn on the power after installing the power cables.

Step 5 Return to your originating procedure (NTP).

Table 31: PIDs for AC Power Cables

Cable	PID
AC power cable - Japan right exit	15454-M-CBL-R-JPN=
AC power cable - China right exit	15454-M-CBL-R-CHI=
AC power cable - India right exit	15454-M-CBL-R-IND=
AC power cable - EU right exit	15454-M-CBL-R-EU=
AC power cable - ARG right exit	15454-M-CBL-RARG=
AC power cable - AUS right exit	15454-M-CBL-RAUS=
AC power cable - UK right exit	15454-M-CBL-R-UK=
AC power cable - KOR right exit	15454-M-CBL-RKOR=
AC power cable ANSI 110VAC right exit	15454-M-ACCBL-R=
AC power cable ANSI 220VAC right exit	15454-M-ACCBL-R2=
AC power cable for data center right exit	15454-M-ACL6-R=

DLP-G597 Connect Office Power (DC) to the ONS 15454 M2 Shelf (ANSI Only)

Purpose	This task connects DC power to the ONS 15454 M2 shelf (ANSI Only).

Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Wire wrapper • Wire cutters • Wire strippers • Crimp tool • Open-end wrench or hex tube screw driver • Fuse panel • Power cable (from fuse panel to assembly), #12 AWG, copper conductors, 194 degrees F [90 degrees C]) • Ground cable #6 AWG stranded • Listed pressure dual-holes lugs suitable for #6 AWG copper conductors
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms . • NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf, on page 218. • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place.** Statement 1075

Caution The ONS 15454 M2 relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

Note The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE Issue 5.

Note If the system loses power or both TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE cards are reset and the system is not provisioned to get the time from a Network Time Protocol/Simple Network Time Protocol (NTP/SNTP) server, you must reset the ONS 15454 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the NTP-G24 Setting Up Node Identification Information. If you are using the TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE cards, the system clock will run for up to three hours. In this case, no action would be required.

Procedure

Step 1 Connect the return cables of the power supply to the Earth ground located at the power supply side.

Step 2 Connect the office power according to the fuse panel engineering specifications.

Step 3 Measure and cut the cables as needed to reach the ONS 15454 M2 from the fuse panel.

Step 4 Dress the power according to local site practice.

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

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

Step 7 Verify that the DC power module is installed in Slot A.

Step 8 Remove the screws from the terminal block protective cover from the DC power module (see the following figure).

Figure 179: Connecting Office Power—DC Power Module (ANSI Only)

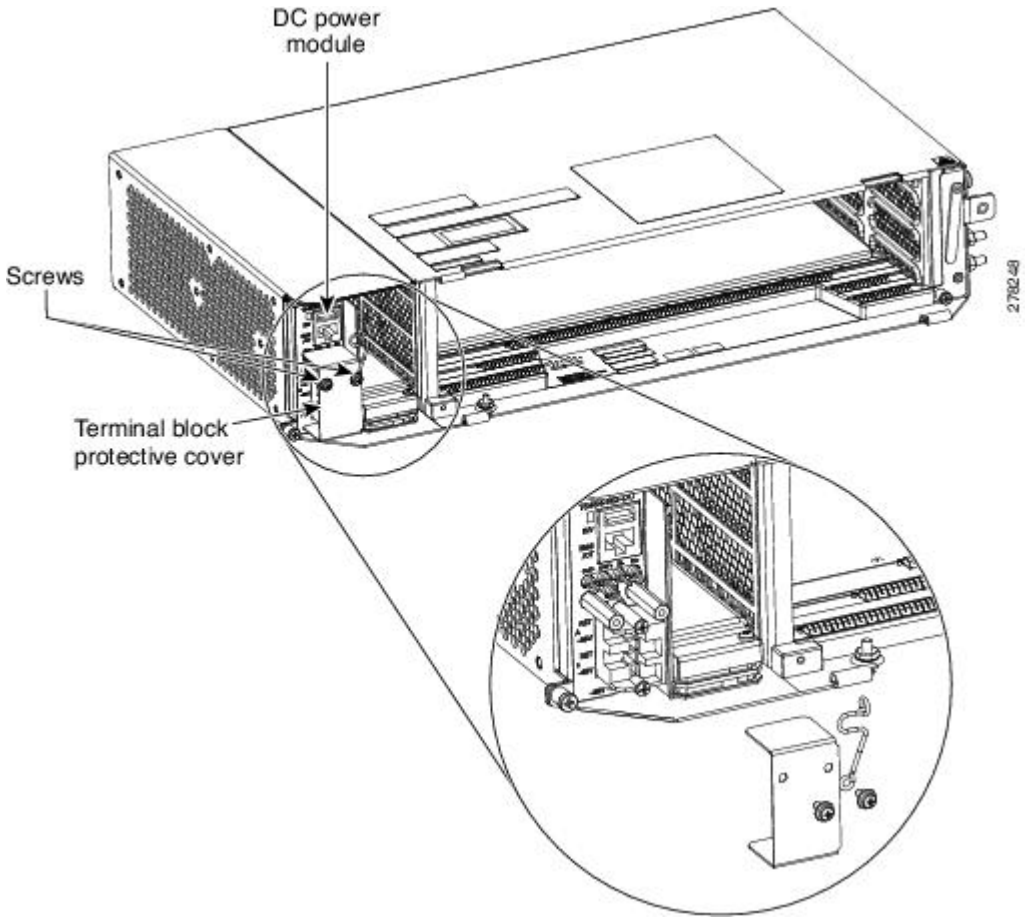
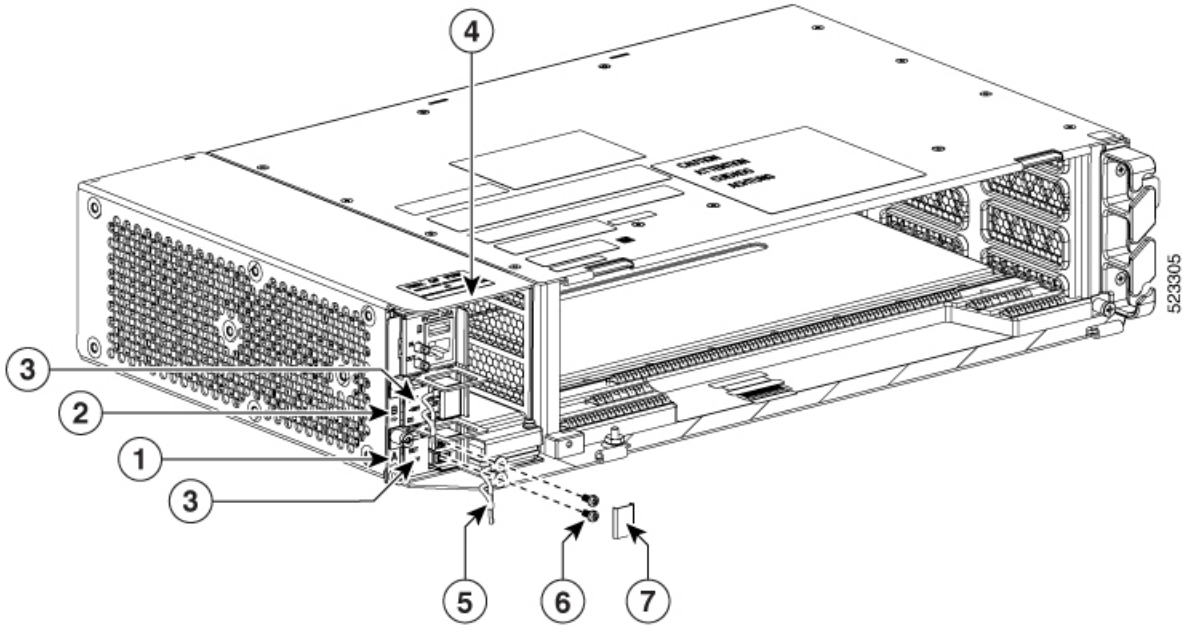


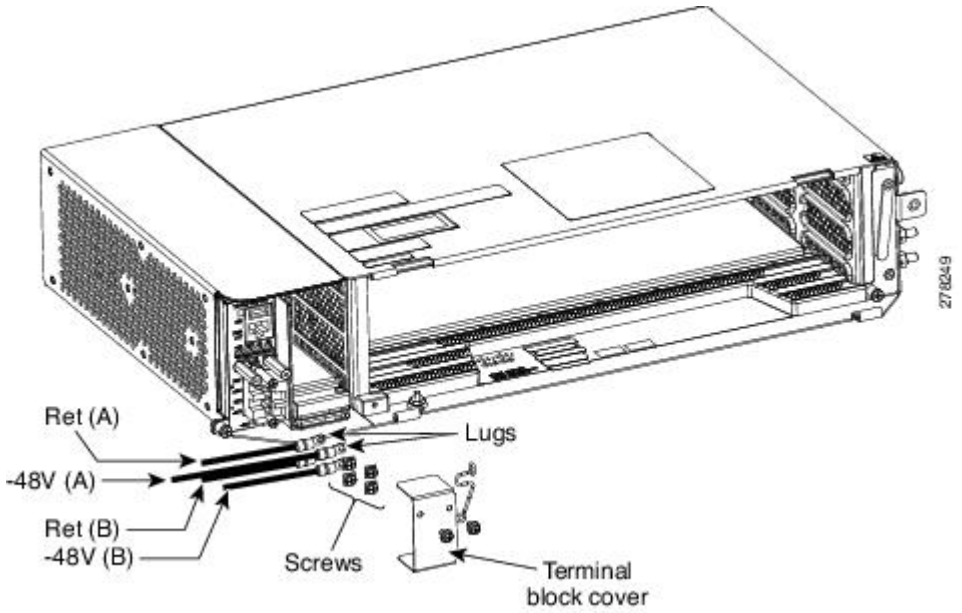
Figure 180: Connecting Office Power—Modular DC Power Module (ANSI Only)



1	PSU A
2	PSU B
3	Terminal block connectors
4	Slot A
5	Lugs
6	Screws
7	Terminal block cover

Step 9 Insert the lugs as shown in the following figure.

Figure 181: Connecting Office Power—DC Power Module (ANSI Only)



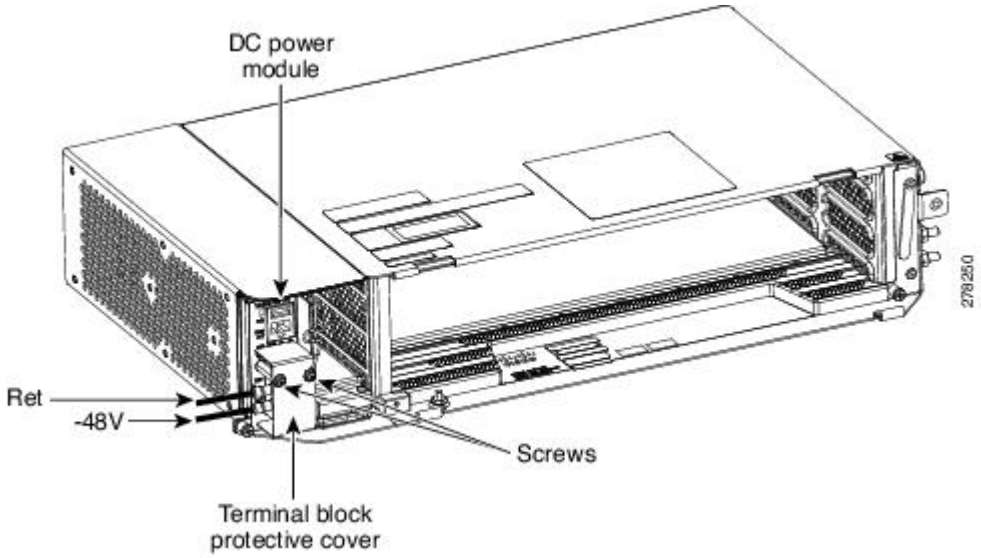
Note There are two DC power terminals—A and B. Each power terminal is connected with two cables—One for RET and the other for -48V.

Step 10 Tighten the screws to a torque value of 7 in-lb (0.79 N-m) to lock the lugs.

Step 11 Tighten the screws to a torque value of 4 in-lb (0.45 N-m) of the terminal block protective cover on the DC power module (see the following figure).

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

Figure 182: Connecting Office Power—DC Power Modules (ANSI Only)



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

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

Step 12 Return to your originating procedure (NTP).

DLP-G598 Connect Office Power (DC) to the ONS 15454 M2 Shelf (ETSI Only)

Purpose	This task connects power to the ONS 15454 M2 shelf (ETSI Only).
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Wire wrapper • Wire cutters • Wire strippers • Crimp tool • Fuse panel • Ground cable #6 AWG stranded. The PID of the DC power cable for ETSI left exit is 15454-M2-DCCBL-LE=.
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms . • NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf, on page 218. • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place.** Statement 1075

Note The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE Issue 5.

Caution The ONS 15454 M2 relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

Note If the system loses power or both TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE cards are reset and the system is not provisioned to get the time from a Network Time Protocol/Simple Network Time Protocol (NTP/SNTP) server, you must reset the ONS 15454 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the see the NTP-G24 Setting Up Node Identification Information. If you are using the TNC, TNCE, TSC, TNCS-2, TNCS-2O, or TSCE cards, the system clock will run for up to three hours. In this case, no action would be required.

Procedure

Step 1 Connect the return cables of the power supply to the Earth ground located at the power supply side.

Step 2 Verify that the DC power module is installed in Slot A of the ONS 15454 M2.

Figure 183: Connecting Office Power—DC Power Module (ETSI Only)

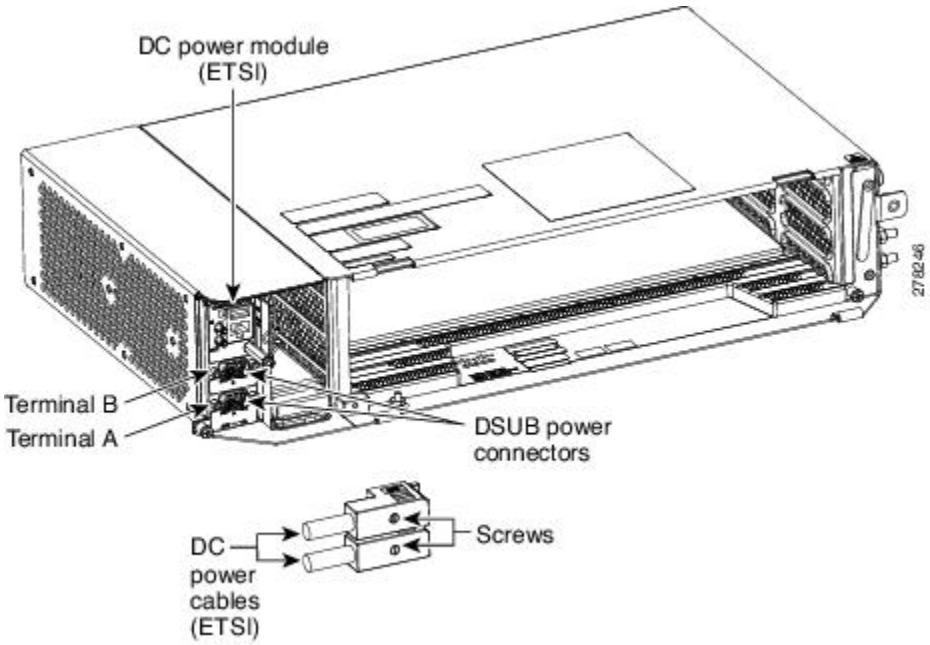
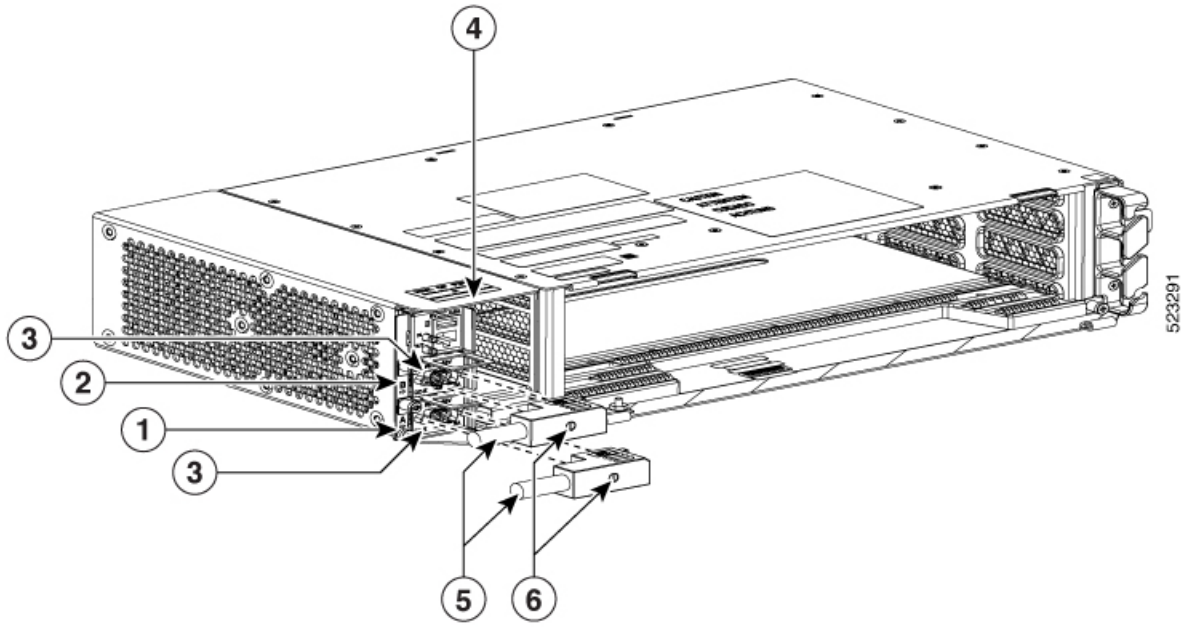


Figure 184: Connecting Office Power—Modular DC Power Module (ETSI Only)



1	PSU A
2	PSU B
3	D-sub connectors
4	Slot A

5	DC power cables
6	Screws

Step 3 Attach the DC ETSI power cables to the DSUB power connectors of the DC power module (see the following figure).

Step 4 Tighten the screws to a torque value of 4 in-lb (0.45 N-m) to secure the cable.

Figure 185: Connecting Office Power—DC Power Module (ETSI Only)

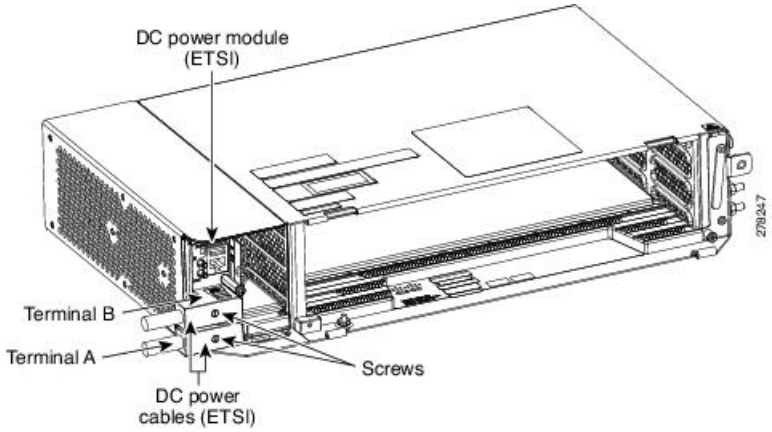
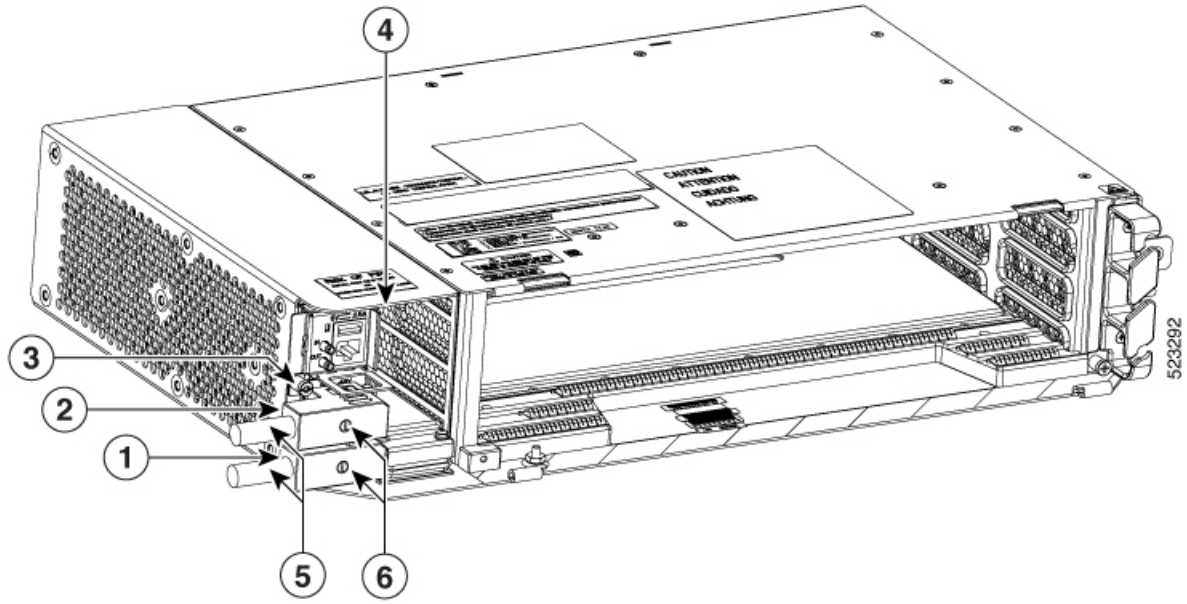


Figure 186: Connecting Office Power—Modular DC Power Module (ETSI Only)



1	PSU A
2	PSU B
3	D-sub connectors

4	Slot A
5	DC power cables
6	Screws

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

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

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

Step 5 Return to your originating procedure (NTP).

DLP-G599 Turn On and Verify AC Office Power on the ONS 15454 M2 Shelf

Purpose	This task measures the power to verify correct power and returns for the ONS 15454 M2 shelf.
Tools/Equipment	Voltmeter
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the office ground to chassis. For detailed instructions on grounding, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms . • NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf, on page 218. • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235. • DLP-G596 Connect Office Power (AC) to the ONS 15454 M2 Shelf, on page 250
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module.** Statement 390

Procedure

Step 1 To power up the node, insert the fuse into the fuse position according to site practice. The fuse rating must not exceed 15A in case of AC power.

Step 2 If the ONS 15454 M2 does not power up, check the voltage at the power source using a voltmeter. The voltage should be 100 to 240 VAC +/-10 percent.

Step 3 Return to your originating procedure (NTP).

DLP-G600 Turn On and Verify DC Office Power on the ONS 15454 M2 Shelf

Purpose	This task measures the power to verify correct power and returns for the ONS 15454 M2 shelf.
Tools/Equipment	Voltmeter
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194. • Connect the office ground to chassis. For detailed instructions on grounding, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms . • NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf, on page 218. • NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235. • DLP-G597 Connect Office Power (DC) to the ONS 15454 M2 Shelf (ANSI Only), on page 253 (or) • DLP-G598 Connect Office Power (DC) to the ONS 15454 M2 Shelf (ETSI Only), on page 259.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module.** Statement 390

Procedure

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

a) To verify the power, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side connection and verify that it is between –40.5 VDC and –57.6 VDC. Place the red test lead on the B-side connection and verify that it is between –40.5 VDC and –57.6 VDC.

Note The voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis. The nominal steady state voltage is -48 VDC.

b) To verify the ground, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side return ground and verify that no voltage is present. Place the red test lead on the B-side return ground and verify that no voltage is present.

Step 2 To power up the node, insert the fuse into the fuse position according to site practice. The fuse rating must not exceed 15A.

Step 3 Using a voltmeter, verify the ONS 15454 M2 shelf for –48 VDC battery and ground:

a) To verify the A-side of the shelf, place the black lead of the voltmeter to the frame ground. Place the red test lead to the -48V (A-side battery connection) red cable. Verify that it reads between –40.5 VDC and –57.6 VDC. Then place the red test lead of the voltmeter to the RET1 (A-side return ground) black cable and verify that no voltage is present.

Note The voltages –40.5 VDC and –57.6 VDC are, respectively, the minimum and maximum voltages required to power the chassis.

b) To verify the B-side of the shelf, place the black test lead of the voltmeter to the frame ground. Place the red test lead to the -48V (B-side battery connection) red cable. Verify that it reads between –40.5 VDC and –57.6 VDC. Then place the red test lead of the voltmeter to the RET2 (B-side return ground) black cable and verify that no voltage is present.

Note To view the shelf voltage and temperature, refer to the NTP-G230 View Shelf Voltage and Temperature, on page 77.

Step 4 Return to your originating procedure (NTP).

NTP-G291 Attach Wires to Timing, LAN, and Craft Pin Connections in ONS 15454 M2

Purpose	This procedure attaches wires to the Timing, LAN, and Craft Pin connections in the ONS 15454 M2 shelf.
Tools/Equipment	Twisted #22 or #24 AWG (0.51 mm² or 0.64 mm²) shielded wires for LAN or craft 75-ohm coaxial cable with DIN 1.0/2.3 miniature coax connector.
Prerequisite Procedures	NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Always use the supplied Electrostatic Discharge (ESD) wristband when working with a powered ONS 15454 M2. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

Note To route the copper cables from the SFPs or RJ-45 ports in a ONS 15454 M2 shelf, removal of the shelf door is mandatory.

Note The minimum distance between the fiber LC connector and the bulk attenuator must be at least 50 cm. This is the minimum distance required to place the bulk attenuator outside the shelf from any port of a card.

Procedure

Step 1 Complete either DLP-G292 Install Timing Wires in ONS 15454 M2 - ANSI, on page 266 or DLP-G293 Install Timing Wires in ONS 15454 M2 - ETSI, on page 269 if you are provisioning external timing.

Step 2 Complete DLP-G294 Install LAN Wires in ONS 15454 M2, on page 273 to create an external LAN connection. You must connect a CAT-5 Ethernet cable to the LAN port on the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card to create an external LAN connection.

Stop. You have completed this procedure.

DLP-G292 Install Timing Wires in ONS 15454 M2 - ANSI

Purpose	This task installs the timing wires in the DC-2 or AC-2 Power Module of ONS 15454 M2 (ANSI).

Tools/Equipment	100-ohm wire wrap cable, wire wrap tool
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Locate the timing BITS connectors in the DC-2 or AC-2 Power Module, as shown in the following two figures.

Figure 187: DC-2 Power Module ANSI BITS connectors

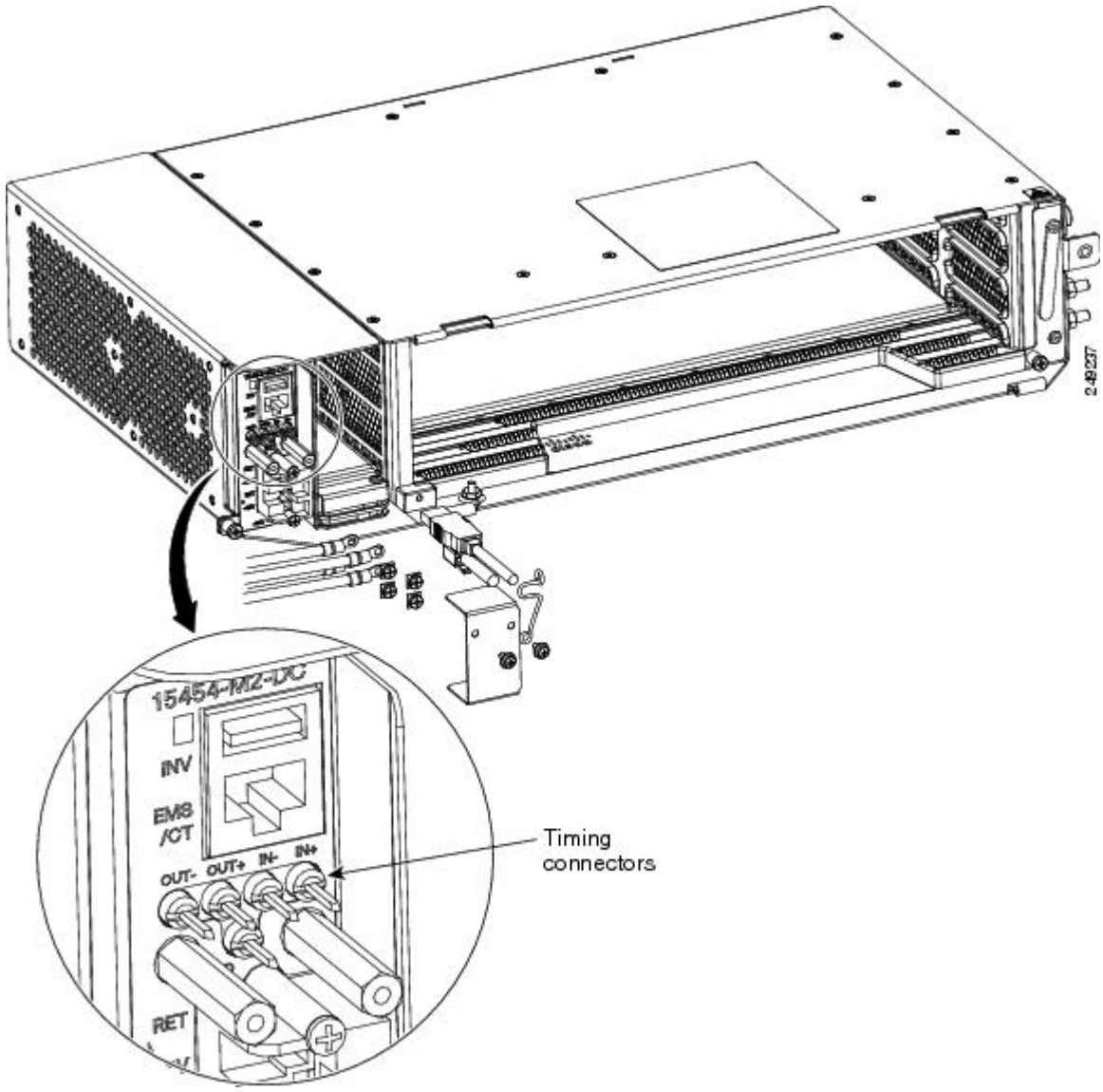
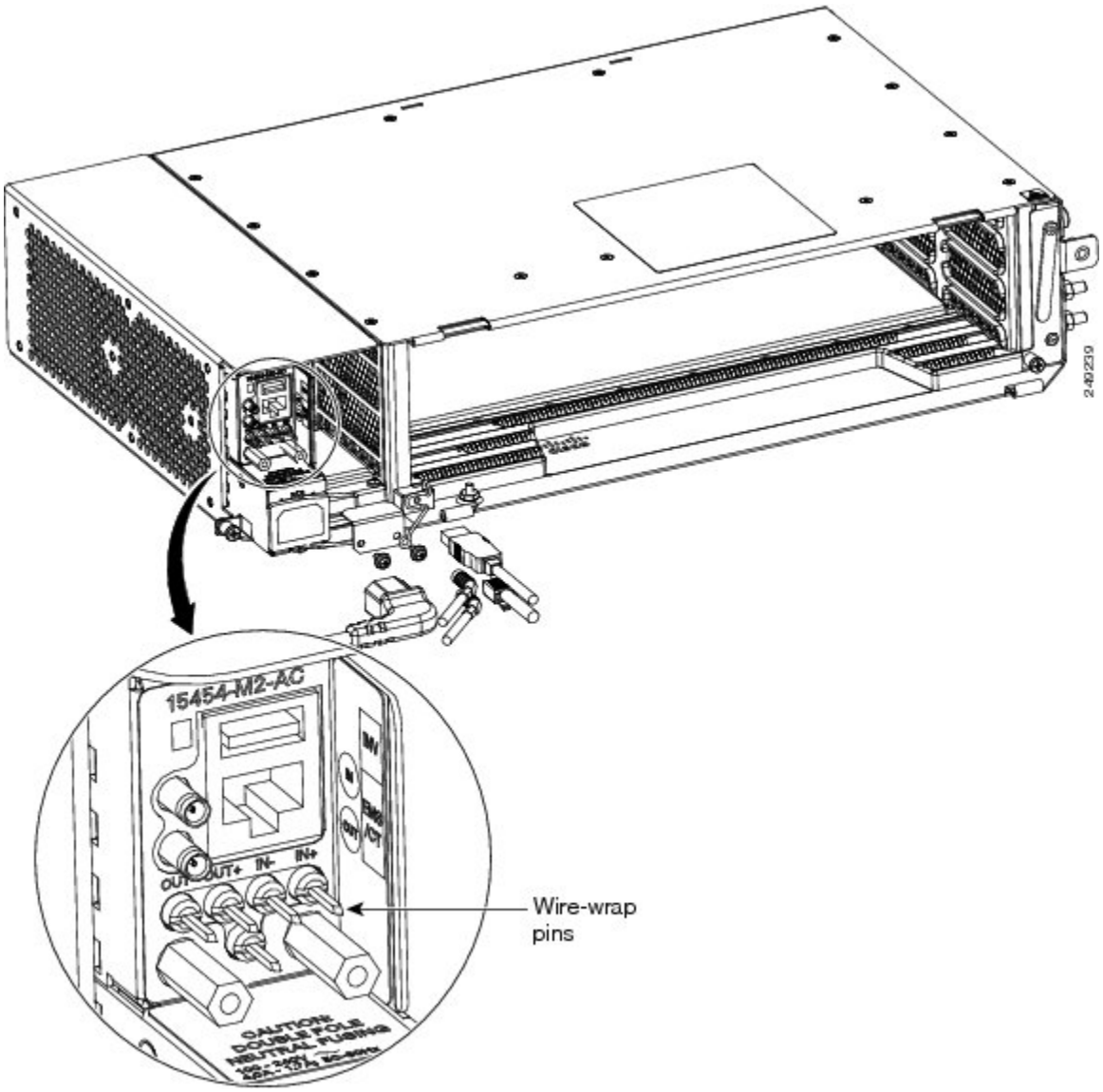


Figure 188: AC-2 Power Module ANSI BITS Connectors



Step 2 Connect the wire wrap cable to the appropriate timing connector in the Power Module.

Step 3 Connect the other end of the cable to the external source of the timing.

Repeat step 3 for each cable that is needed.

Step 4 Return to your originating procedure (NTP).

DLP-G293 Install Timing Wires in ONS 15454 M2 - ETSI

Purpose	This task installs the timing wires in the AC-2 or DC-2E Power Module of ONS 15454 M2 (ETSI).

Tools/Equipment	75-ohm coaxial cable with a DIN 1.0/2.3 miniature coax connector. The PID for the BITS IN/OUT cable is 15454-M-TMGCBL=.
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Locate the timing BITS connectors in the DC-2E or AC-2 Power Module, as shown in the following two figures.

Figure 189: DC-2E Power Module ETSI BITS Connectors

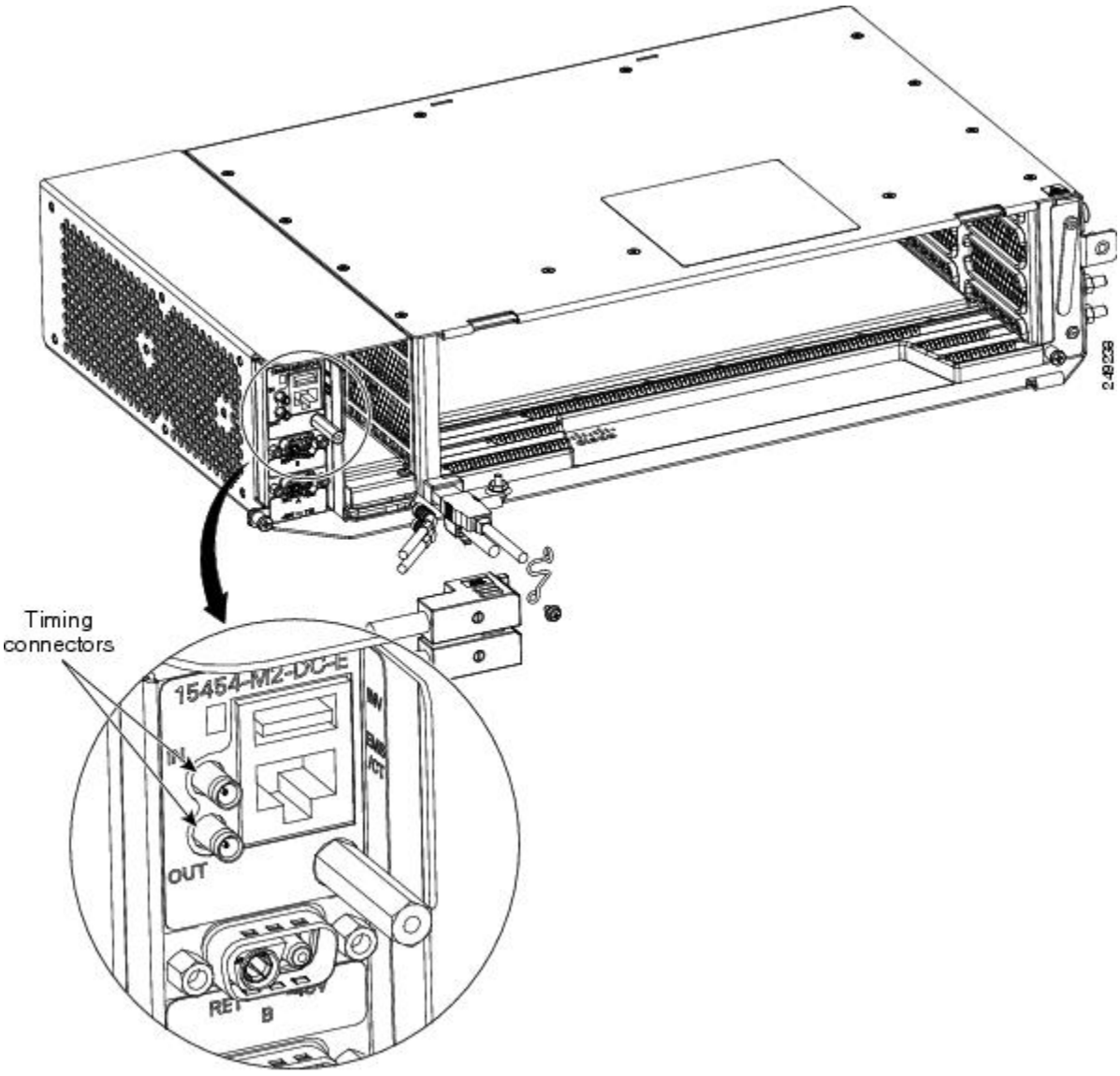
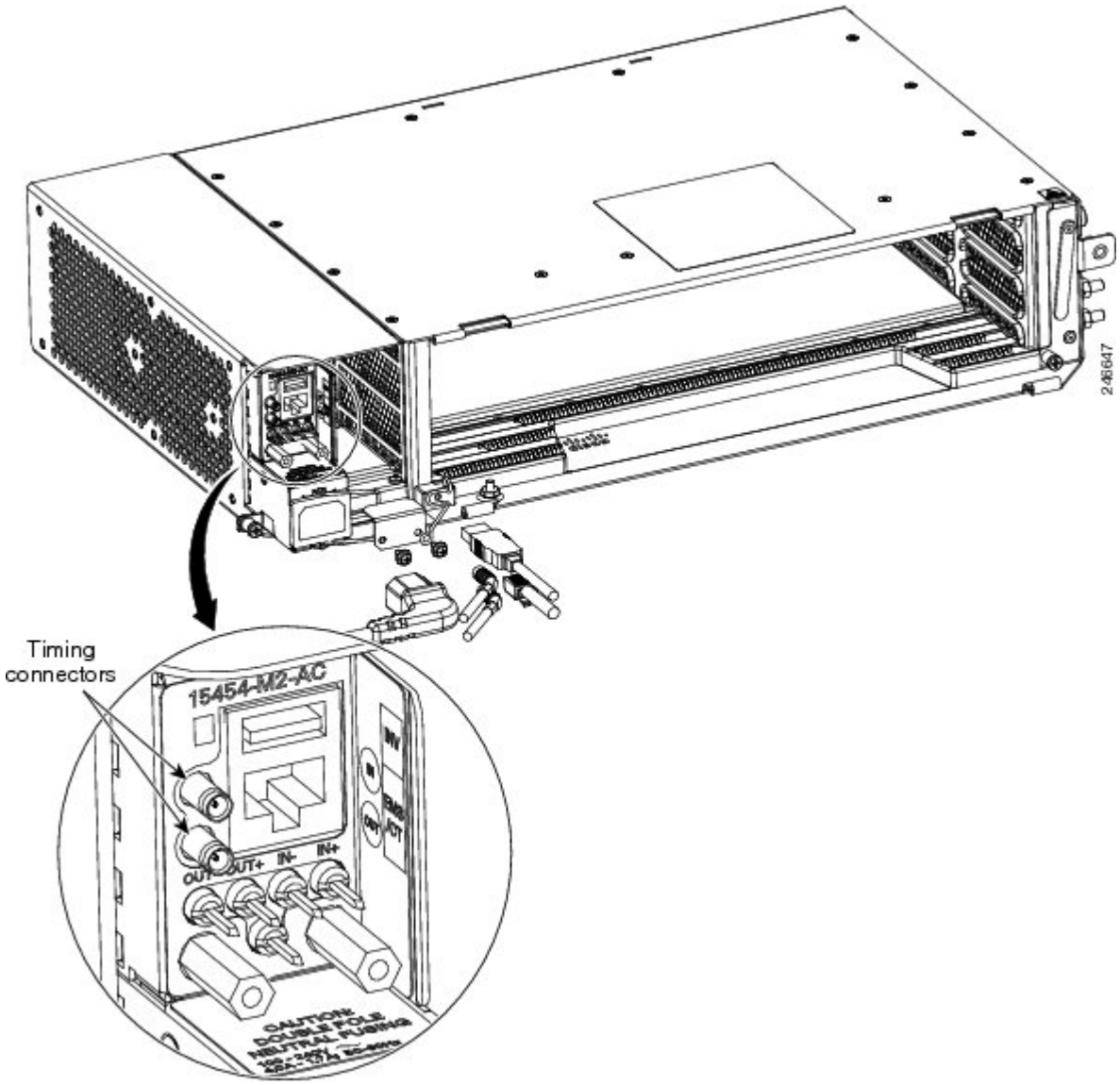


Figure 190: AC-2 Power Module ETSI BITS Connectors



Step 2 Using a coaxial cable with DIN 1.0/2.3 miniature coax connectors, connect the clock cable to the appropriate connector in the Power Module.

Step 3 Gently push the cable with the DIN 1.0/2.3 miniature coax connector down until the cable connector slides into the DIN 1.0/2.3 miniature coax connector on the Power Module with a click. The Power Module provides DIN 1.0/2.3 miniature coax connectors that are used for timing input and output. The input connectors for timing provide a 75-ohm termination. System cables that can convert timing clocks from 75 ohms to 100/120 ohms are available.

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

Step 4 Connect the other end of the cable to the external source of the timing.

Repeat step 3 for each cable that is needed.

Step 5 Return to your originating procedure (NTP).

DLP-G294 Install LAN Wires in ONS 15454 M2

Purpose	This task installs the LAN wires in ONS 15454 M2.
Tools/Equipment	Standard CAT-5 Ethernet cable straight-through for data terminal equipment (DTE) or crossover for data circuit-terminating equipment (DCE) or RJ-45 connector Crimping tool for RJ-45 connector 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wire, preferably standard CAT-5
Prerequisite Procedures	NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Using a 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wire or a standard CAT-5 Ethernet cable, connect the wires to the RJ-45 connector.

Step 2 Return to your originating procedure (NTP).

NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card

Purpose	This procedure describes how to install and configure the TNC, TNCE, TSC, or TSCE card.
Tools/Equipment	Redundant TNC/TNCE/TSC/TSCE cards on Cisco ONS 15454 M6 shelf (required) Stand-alone TNC/TNCE/TSC/TSCE card on Cisco ONS 15454 M2 shelf (required)
Prerequisite Procedures	NTP-G271 Install the Power and Ground to the ONS 15454 M2 Shelf, on page 248 NTP-G14 Install DWDM Equipment, page 1-66
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	Provisioning or higher

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the card. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 94

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M2 and ONS 15454 M6 shelf assemblies. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

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

Procedure

Step 1 Complete the DLP-G604 Install the TNC, TNCE, TSC, or TSCE Card, on page 274.

Note If you install the wrong card in a slot, see the NTP-G107 Remove Permanently or Remove and Replace DWDM Cards .

Step 2 Complete the DLP-G605 Provision PPM and Port for the TNC and TNCE Cards, on page 277.

Step 3 Complete the DLP-G606 Configure UDC and VoIP for the TNC and TNCE Cards, on page 278.

Stop. You have completed this procedure.

DLP-G604 Install the TNC, TNCE, TSC, or TSCE Card

Purpose	(ONS 15454 M2 and ONS 15454 M6 only) This task installs redundant TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards on the ONS 15454 M6 shelf and a stand-alone TNC/TNCE/TSC/TSCE/TNCs-2/TNCS-2O card on the ONS 15454 M2 shelf. Install and initialize the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card before installing any other line cards into the shelf assemblies. On the ONS 15454 M6 shelf, install the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards in slots 1 and 8 for redundancy. On the ONS 15454 M2 shelf, install the stand-alone TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card in slot 1.
Tools/Equipment	Two TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards for the ONS 15454 M6 shelf and one TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card for the ONS 15454 M2 shelf
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite

Security Level	None

Caution Do not remove the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards during the software installation process, which is indicated by alternate flashing FAIL and ACT/STBY LEDs. Removing the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards during the software installation process will corrupt the system memory.

Note Allow each TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card to boot completely before installing the redundant TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card.

Note On the ONS 15454 M6 shelf, install the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards in slots 1 and 8 for redundancy. On the ONS 15454 M2 shelf, install the stand-alone TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card in slot 1. For more information, see the Card Slot Requirements, on page 17.

Note You cannot insert the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards in other slots due to mechanical constraints. To identify the card slot, match the symbol placed on the lower side of the card front panel with the symbol in the shelf.

Caution To achieve redundancy, two TNC or TNCE cards or two TSC or TSCE cards must be installed in the ONS 15454 M6 shelf. Do not install one TNC or TNCE card and a redundant TSC or TSCE card in the same shelf.

Procedure

Step 1 Open the latches/ejectors of the first TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card that you will install.

Step 2 Use the latches/ejectors to firmly slide the card horizontally along the guide rails until the card plugs into the receptacle at the back of the slot (slot 1 or 8 in the ONS 15454 M6 shelf and slot 1 in the ONS 15454 M2 shelf).

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

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

Step 4 As needed, verify the LED activity on the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card.

- The red FAIL LED, PWR LED turn on briefly.
- The red FAIL LED turns on for about 10 seconds.
- The red FAIL LED and the amber ACT/STBY LED turn on for about 30 seconds.
- The red FAIL LED blinks for about 10 seconds.

- The red FAIL LED turns on for about 15 seconds.
- All the LEDs including the CRIT, MAJ, MIN, REM, SYNC, and ACO LEDs blink once and turn off for about 10 seconds.
- ACT/STBY LED blinks for about 1 second.
- All the LEDs including the CRIT, MAJ, MIN, REM, SYNC, and ACO LEDs turn off for about 10 seconds.
- The ACT/STBY, ACO, and PWR LEDs turn on.
- The boot-up process is complete when the PWR LEDs turn green and the amber ACT/STBY remains on. The ACT/STBY LED turns green if this is the first TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card installed, and amber if this is the second TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card installed.

Note It might take up to four minutes for the power alarms to clear.

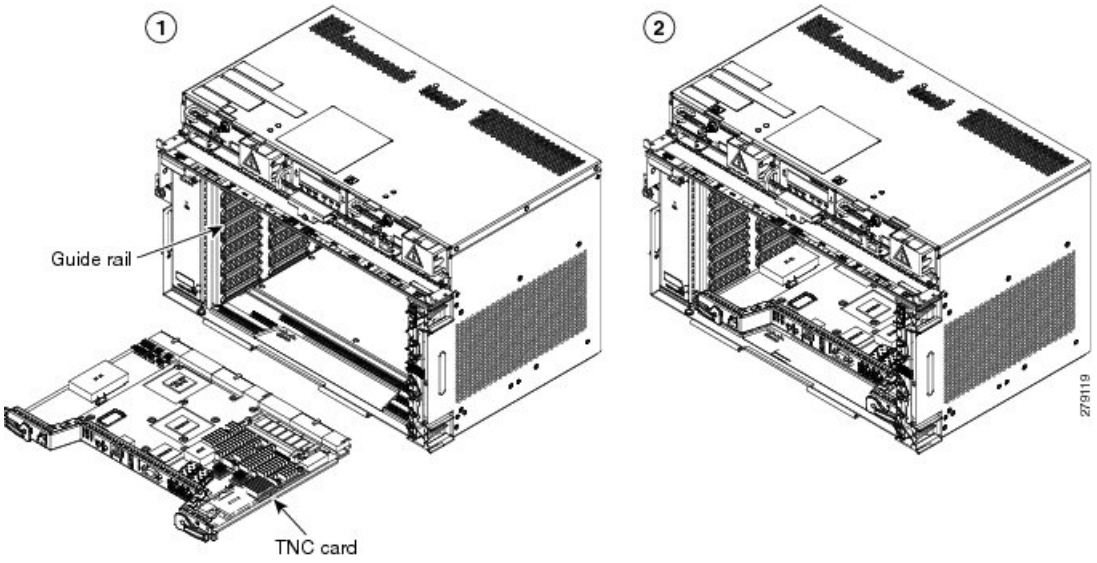
Note Alarm LEDs might be on. After completing the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card installation, log in to CTC and click the Alarms tab to display the alarms raised on the card. For procedure to clear the alarm, see the *Cisco ONS 15454 DWDM Troubleshooting Guide*.

Note During the TNC/TNCE/TSC/TSCE card initialization, the SFTWDOWN alarm appears twice. The alarm clears after the TNC/TNCE/TSC/TSCE card boots completely.

Note If the FAIL LED is on continuously, see the tip in step 8 about the TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card automatic upload.

The following figure illustrates the installation of TNC and TNCE cards on ONS 15454 M6 shelf.

Figure 191: Installing TNC and TNCE cards on ONS 15454 M6 Shelf



Step 5 Verify that the ACT/STBY LED is green if this is the first powered-up TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card installed or amber if this is the second powered-up TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O. The IP address, temperature of the node, and time of day appear on the LCD. The default time and date is 12:00 AM, January 1, 1970.

Step 6 The LCD cycles through the IP address (the default is 192.1.0.2), node name, and software version. Verify that the correct software version is shown on the LCD. The software text string indicates the node type (SDH or SONET) and software release. (For example: SDH 09.20-05L-20.10 indicates it is an SDH software load, Release 9.2. The numbers following the release number do not have any significance.)

Step 7 If the LCD shows the correct software version, continue with the next step. If the LCD does not show the correct software version, refer to your next level of technical support, upgrade the software, or remove the TNC/TNCE/TSC/TSCE card and install a replacement card. Refer to the release-specific software upgrade document to replace the software.

Step 8 (ONS 15454 M6 shelf only) Repeat Steps 1 through 7 for the redundant TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card.

Tip If you install a standby TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card that has a different software version than the active TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card, the standby TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card copies the software version from the active TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O card. When the standby card is first inserted, the LEDs follow the normal boot-up sequence. However, after the red FAIL LED turns on for about 5 seconds, the FAIL LED and the ACT/STBY LED begin to flash alternately for up to 30 minutes. After loading the new software, the upgraded TNC/TNCE/TSC/TSCE/TNCS-2/TNCS-2O cards LEDs repeat the appropriate bootup sequence, and the amber ACT/STBY LED turns on.

Step 9 Return to your originating procedure (NTP).

DLP-G605 Provision PPM and Port for the TNC and TNCE Cards

Purpose	(ONS 15454 M2 and ONS 15454 M6 only) This task provisions a PPM and port on a TNC and TNCE cards. PPMs are created to support the OSC function.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	None

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TNC and TNCE cards where you want to provision PPM and port settings.

Step 2 Click the **Provisioning** > **Pluggable Port Modules** tabs.

Step 3 In the Pluggable Port Modules area, click Create. The Create PPM dialog box appears.

Step 4 In the Create PPM dialog box, complete the following:

- PPM—Choose 1 or 2 from the PPM drop-down list.
- PPM Type—Displays the PPM associated with the chosen PPM in the above step.

Step 5 Click **OK**. The newly created PPM appears in the Pluggable Port Modules area. The row in the Pluggable Port Modules area becomes white when the PPM is inserted and the Actual Equipment Type column lists the name of PPM.

Step 6 In the Pluggable Ports area, click Create. The Create Port dialog box appears.

Step 7 In the Create Ports dialog box, complete the following:

- Port—Choose the port you want to configure from the Port drop-down list.
- Port Type—Choose the port type, such as OC-3, FE, or ONE-GE from the Port Type drop-down list.

Note OC-3 can be configured only on PPM port 1. FE and ONE-GE can be configured on both the ports.

Step 8 Click **OK**. The newly created port appears in the Pluggable Ports area. The port type you provisioned is listed in the Rate column.

Step 9 Repeat Steps 3 through 8 to provision another PPM and port on the TNC and TNCE cards.

Step 10 Return to your originating procedure (NTP).

DLP-G606 Configure UDC and VoIP for the TNC and TNCE Cards

Purpose	(ONS 15454 M2 and ONS 15454 M6 only) This task configures UDC and VoIP traffic for the TNC and TNCE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC NTP-G38 Provisioning OSC Terminations DLP-G605 Provision PPM and Port for the TNC and TNCE Cards, on page 277
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	None

Note Each TNC and TNCE cards support UDC/VoIP configuration. You can configure UDC or VoIP on the two SFP ports present on the TNC and TNCE cards. The TNC and TNCE cards support the UDC/VoIP configuration only when OSC is provisioned on the SFP ports.

Note If two nodes are connected through the fiber and if the TNC and TNCE cards in one node has UDC configuration, the TNC and TNCE cards in the other node must also have UDC configuration. The same rule applies to VoIP configuration.

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TNC and TNCE cards where you want to configure UDC and VoIP.

Step 2 Click the **Provisioning** > **UDC / VOIP** tabs.

Step 3 From the Service Type drop-drop list, choose UDC or VOIP.

Note You can configure UDC or VoIP on only one SFP port at a time per TNC and TNCE cards. If you want to configure UDC or VoIP on the second SFP port, choose NONE from the Service Type drop-down list for the first port and then choose UDC or VoIP for the second port.

Step 4 Click Apply.

Step 5 Return to your originating procedure (NTP).

NTP-G275 Perform the ONS 15454 M2 Shelf Installation Acceptance Test

Purpose	Use this procedure to perform a shelf installation acceptance test for the ONS 15454 M2.
Tools/Equipment	Voltmeter
Prerequisite Procedures	Applicable procedures in Installing the ONS 15454 M2 Shelf, on page 177
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 If you installed an ONS 15454 M2 shelf, complete the following table by verifying that each applicable procedure was completed.

Table 32: ONS 15454 M2 ETSI Shelf Installation Task Summary

Description	Completed
NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21	
NTP-G266 Install the ONS 15454 M2 Shelf, on page 194	
Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .	
NTP-G270 Open and Remove the Standard Door of the ONS 15454 M2 Shelf, on page 218	
NTP-G267 Install the Power Module in the ONS 15454 M2 Shelf, on page 235	
NTP-G271 Install the Power and Ground to the ONS 15454 M2 Shelf, on page 248	
NTP-G268 Install the Fan-Tray Assembly in the ONS 15454 M2 Shelf, on page 244	

Description	Completed
DLP-G604 Install the TNC, TNCE, TSC, or TSCE Card, on page 274	
NTP-G269 Install the Standard Door of the ONS 15454 M2 Shelf, on page 216	

Step 2 Complete the DLP-G601 Inspect the ONS 15454 M2 Shelf Installation and Connections , on page 280.

Step 3 Complete the DLP-G602 Measure DC Voltage on the ONS 15454 M2 Shelf, on page 280.

Step 4 Continue with Connect the PC and Log into the GUI

Stop. You have completed this procedure.

DLP-G601 Inspect the ONS 15454 M2 Shelf Installation and Connections

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

Procedure

Step 1 Make sure all external wiring connections (that is, power, ground, alarms, and so on) are secure. If a wire or cable is loose, return to the appropriate procedure in this chapter to correct it.

Step 2 Return to your originating procedure (NTP).

DLP-G602 Measure DC Voltage on the ONS 15454 M2 Shelf

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

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

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module**. Statement 390

Procedure

Step 1 Using a voltmeter, verify the office ground and power:

- Place the black lead (positive) on the frame ground on the bay.
- Place the red lead (negative) on the fuse power points on the third-party power distribution panel to verify that they read between –40.5 VDC and –57.6 VDC (power) and 0 (return ground).

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

- Place the black lead (positive) on the RET1(A) and the red lead on the -48V (A) point. Verify a reading between –40.5 VDC and –57.6 VDC. If there is no voltage, check the following and correct if necessary:
- Battery and ground are reversed to the shelf.
- Battery is open or missing.
- Return is open or missing.

Step 3 Repeat the above steps for the RET2 (B) and -48V (B) of the redundant power supply input.

Step 4 Return to your originating procedure (NTP).

Filler and Blank Cards

Filler cards must be installed in unused and empty slots to ensure proper air flow and electromagnetic interference (EMI) requirements during the ONS 15454 M2 operation.

There are two types of card fillers:

- Line card fillers (15454-M-FILLER) that operate in slots 2 and 3.
- Timing and Control Card fillers (15454-M-T-FILLER) for control cards that operate in slot 1.

CTC detects filler cards from R10.6 onwards. Figure 303: Line Card Filler—Faceplate, on page 445 shows the line card filler. The filler cards have no card-level LED indicators.

Blank cards (15454-BLANK) can be installed in any empty slot in the shelf. CTC does not detect blank cards.

Air Filter

The ONS 15454 M2 contains a preinstalled reusable air filter (15454 M2-FTF) on the right side of the shelf.

The reusable filter is made up of a gray, open-cell, polyurethane foam that is specially coated to provide fire and fungi resistance. Spare filters should be kept in stock. Inspect the air filter every 30 days, and clean the filter every three to six months. The air filter can be replaced without removing the fan-tray assembly. However, the fan-tray must be turned off to remove the air filter. Replace the air filter every two to three years. Avoid cleaning the air filter with harsh cleaning agents or solvents.

Caution Do not operate an ONS 15454 M2 without the mandatory air filter.

Shelf Voltage and Temperature

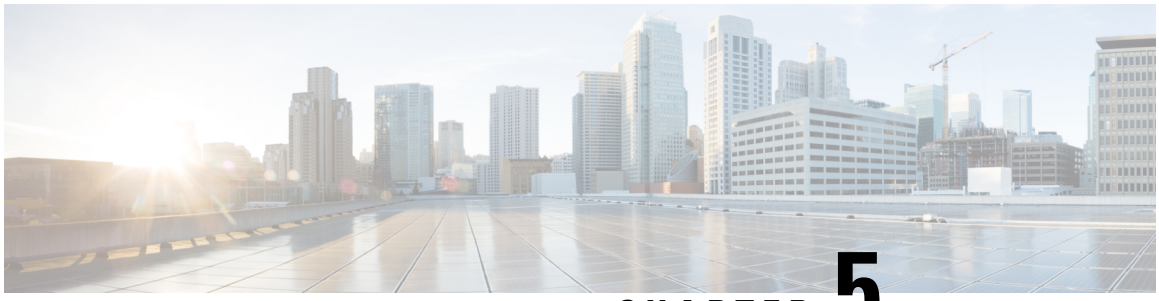
Note The temperature measured by the TNC, TNCE, TSC, or TSCE sensors appears on the LCD screen in the ONS 15454 M2 chassis.

The input voltages and temperature of the ONS 15454 M2 chassis are displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane in CTC. The voltage supplied to the shelf (in millivolts) is displayed in the Voltage area of the Voltage/Temperature pane. The temperature of the shelf (in degree Celsius) is displayed in the Temperature area of the pane.

The Voltage/Temperature pane retrieves the following values for the ONS 15454 M2 chassis:

- Voltage A—Voltage of the shelf that corresponds to power supply A, in millivolts.
- Voltage B—Voltage of the shelf that corresponds to power supply B, in millivolts.
- Chassis Temperature—Temperature of the shelf, in degrees Celsius.

In multishelf configuration, the voltage and temperature of each shelf is displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane.



CHAPTER 5

Installing the ONS 15454 M6 Shelf

This chapter explains how to install the ONS 15454 M6 shelf.

Note Unless otherwise specified, the ECU module refers to the ECU, ECU2, ECU-S, and ECU-60V units. For details about the various ECU modules, see the External Connection Units, on page 355.

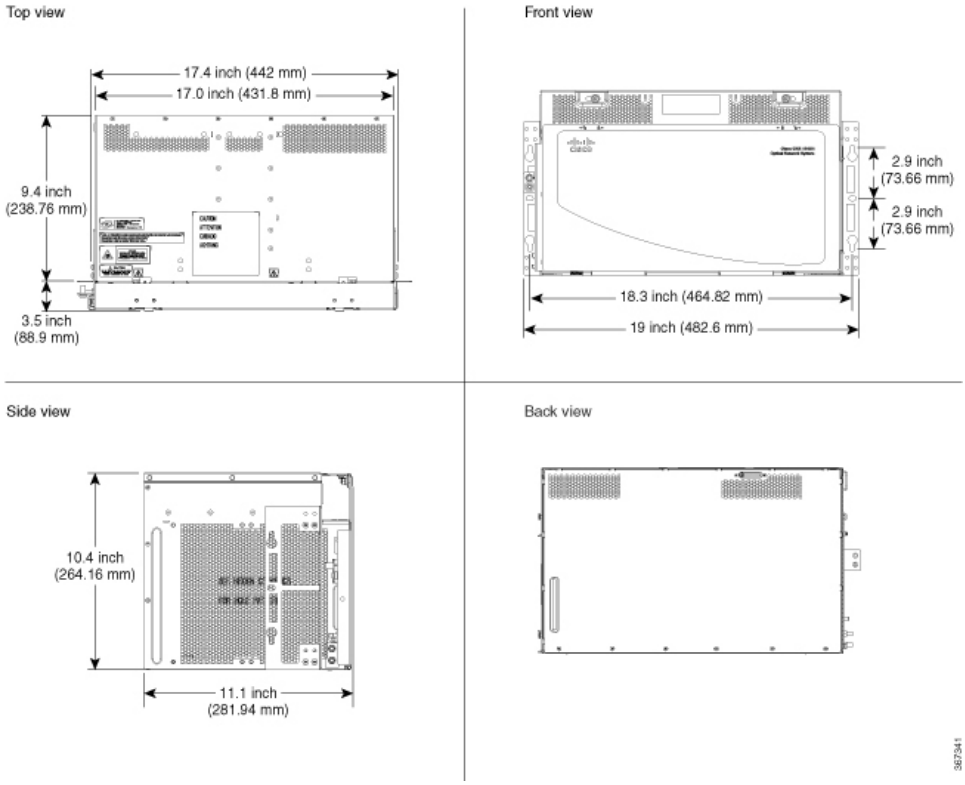
ANSI Rack Installation

The ONS 15454 M6 shelf is mounted on a 19-inch (482.6-mm) or 23-inch (584.2-mm) equipment rack. Make sure that the correct type of 19-inch ANSI rack is used for mounting the ONS 15454 M6 shelf as shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5. If the shelf is mounted in the front position, then it projects 1.7 inches (43.18 mm) from the front of the rack. If the shelf is mounted in the middle position, then it projects 5.1 inches (129.54 mm) from the front of the rack. The shelf mounts in both Electronic Industries Alliance (EIA) standard and Telcordia-standard racks. The shelf is a total of 17 inches (431.8 mm) wide with no mounting ears attached. Ring runs are not provided by Cisco and might hinder side-by-side installation of shelves where space is limited.

The ONS 15454 M6 shelf measures 10.4 inches (264.16 mm) high, 19 or 23 inches (482.6 or 584.2 mm) wide (depending on which way the mounting ears are attached), and 11.1 inches (304.8 mm) deep. You can install up to seven ONS 15454 M6 shelves in a 7-foot (2133.6 mm) equipment rack.

The following figure shows the dimensions of the ONS 15454 M6 shelf on a 19-inch (482.6 mm) ANSI rack configuration with brackets mounted in the front position.

Figure 192: Cisco ONS 15454 M6 Shelf Dimensions for a 19-inch ANSI Rack Configuration



Reversible Mounting Bracket

Caution Use only the fastening hardware provided with the ONS 15454 M6 shelf to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the ONS 15454 M6 shelf in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 M6 shipping kit, or remove the coating from the threads to ensure electrical continuity.

The reversible mounting bracket is used to mount the shelf on a 19-inch or 23-inch (482.6 mm or 584.2 mm) rack.

Mounting a Single Shelf

Mounting the ONS 15454 M6 shelf on a rack requires a minimum of 10.4-inches (265 mm) of vertical rack space. To ensure that the mounting is secure, use two to three #12-24 mounting screws for each side of the shelf. For an ANSI rack, the brackets can be mounted in the front or middle position.

If the ONS 15454 M6 shelf is fully loaded, then two people should install it. However, it is possible for one person to install an empty shelf. The shelf should be empty for easier lifting.

Mounting Multiple Nodes

Most standard (Telcordia GR-63-CORE, 19-inch (482.6-mm) or 23-inch (584.2-mm) 7-foot (2.133-m) racks can hold seven ONS 15454 M6 shelves and a fuse and alarm panel. However, unequal flange racks are limited to six ONS 15454 M6 shelves and a fuse and alarm panel, or seven ONS 15454 M6 shelves using a fuse and alarm panel from an adjacent rack. In an ANSI shelf, the brackets can be mounted in the front or middle position.

The ONS 15454 M6 shelves can be mounted above each other without any space between the shelves. This method of mounting does not restrict the air flow because the air vents are on either sides of the ONS 15454 M6 shelves.

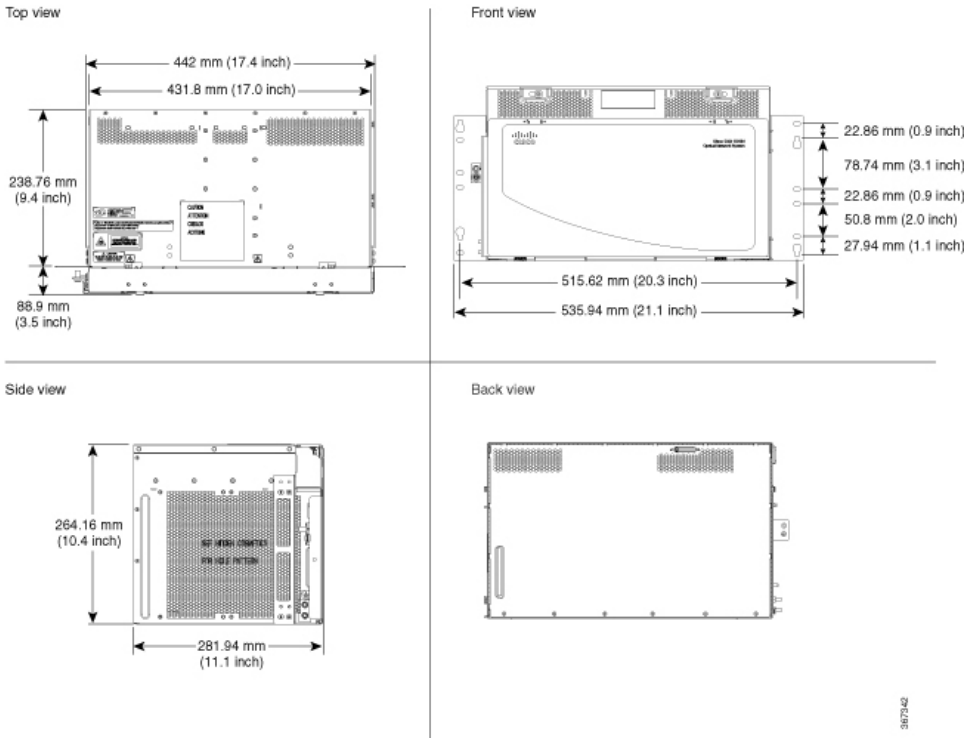
ETSI Rack Installation

The ONS 15454 M6 shelf is mounted on a 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) ETSI standard equipment rack. In an ETSI rack, the shelf can be mounted only in the front position. The shelf projects 1.7 inch (43.18 mm) from the front of the rack and is a total of 431.8 mm (17 inch) wide with no mounting ears attached. Cisco does not provide ring runs, which might hinder side-by-side installation of shelves where space is limited.

The ONS 15454 M6 shelf measures 264.16 mm (10.4 inches) high, 535 mm (21.06 inches) wide, and 304.8 mm (11.1 inches) deep. You can install up to seven ONS 15454 M6 shelves in a 7-foot (2133.6-mm) equipment rack.

The following figure provides the dimensions of the ONS 15454 M6 shelf installed on a 600 x 600-mm (23.6 x 23.6-inch) ETSI standard equipment rack.

Figure 193: Cisco ONS 15454 M6 Shelf Dimensions for an ETSI Rack Configuration



Caution The standard ETSI racks can hold seven ONS 15454 M6 shelves. When mounting a shelf in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack. If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Mounting a Single Node

The ONS 15454 M6 requires 264.16 mm (10.4-inches) minimum of vertical rack space. To ensure the mounting is secure, use two to three M6 mounting screws for each side of the shelf. A shelf should be mounted at the bottom of the rack if it is the only unit in the rack.

In an ETSI rack, the brackets are mounted only in the front position.

If the ONS 15454 M6 shelf is fully loaded, then two people should install it. However, it is possible for one person to install an empty shelf. The shelf should be empty for easier lifting. For information on the ONS 15454 M6 shelf weight, see the Dimensions, on page 491.

Mounting Multiple Nodes

Most standard (ETS 300 119) ETSI 600 x 600 x 2200 mm or 600 x 300 x 2200 mm racks can hold seven ONS 15454 M6 shelves, and a fuse and alarm panel. In an ETSI rack, the brackets are mounted only in the front position.

The ONS 15454 M6 shelves can be mounted above each other without any space between the shelves. This method of mounting does not restrict the air flow because the air vents are on either sides of the ONS 15454 M6 shelves.

Air Deflector

An air deflector is a sheet-metal part that is mounted on the ONS 15454 M6 shelf to orient the air flow in a specific direction.

The air deflectors can be mounted in different positions to control the air flow:

- Front to Front— Only ETSI rack
- Front to Back— For ANSI and ETSI racks
- Front to Top— Only ETSI rack

In an ANSI rack, the air deflectors are mounted only on the 23-inch rack configuration.

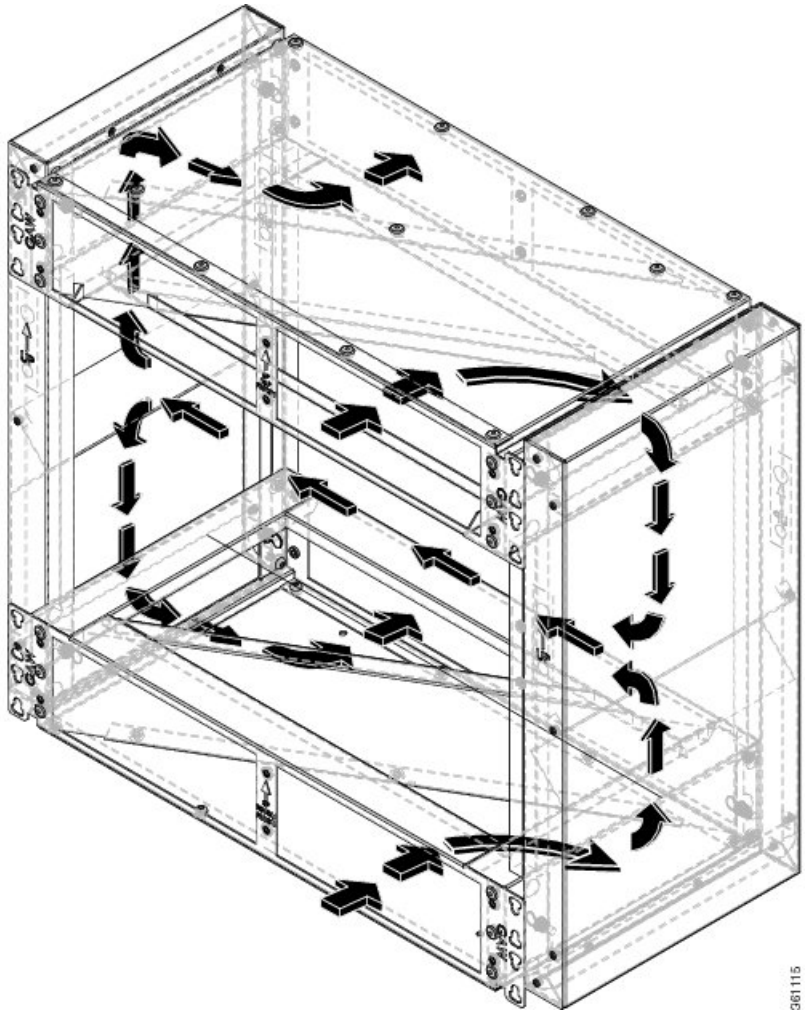
Air Plenum

Air plenum orients the air flow in the front-to-back direction inside the equipment to be compliant with GR-63 issue 4 requirement.

The air plenum kit has two horizontal and two vertical air plenums. The air that flows from the front top inlet and the front bottom inlet are channelized to the right vertical plenum, inside the equipment, and then to the exhaust air channel towards the left vertical air plenum. The air flow is deflected by 90 degrees and exited out in the rear end.

The following figure shows the air flow inside the cabinet.

Figure 194: Air flow within the air plenum in the cabinet



The following two figures shows the dimensions of the air plenum relative to the cabinet or rack.

Figure 195: Dimension of Cisco ONS 15454 M6 chassis relative to the air plenum

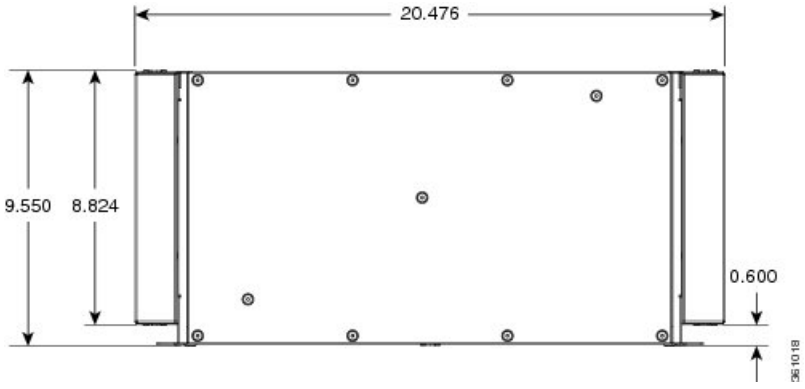
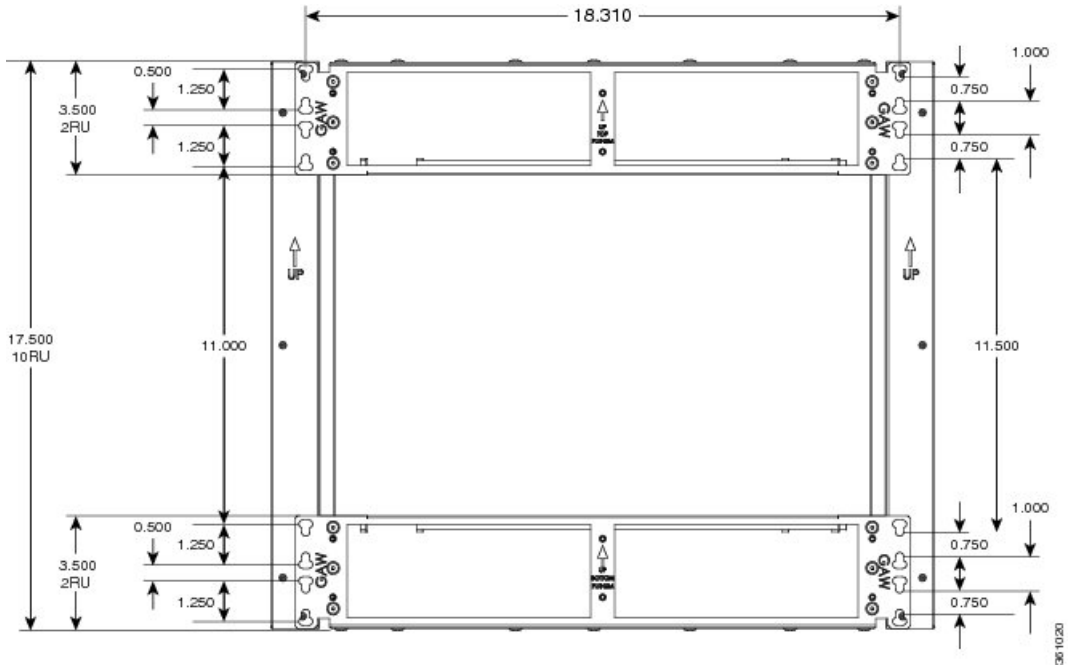


Figure 196: Dimension on Cisco ONS 15454 M6 relative to the air plenum



Air Plenum Rack and Cabinet Compatibility

The table shows the compatibility of air plenum with the ANSI and ETSI racks and cabinets. The chassis can be installed with brackets in front position only.

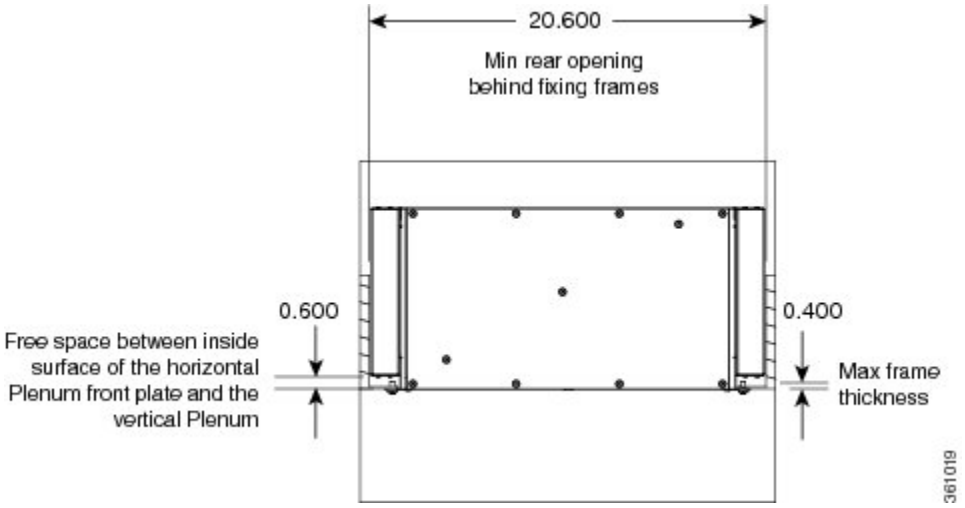
Table 33: Air plenum compatibility with racks and cabinets

Rack / Cabinet	Front-to-back air flow
ANSI 19-inch rack	Supported
ANSI 19-inch cabinet	Supported
ANSI 23-inch rack	Supported
ANSI 23-inch cabinet	Supported
ETSI cabinet	Supported

A minimum opening of 20.600 inches is required to install the vertical air plenum behind the front rails.

Note The ANSI 19-inch two post rack that is compatible with air plenum installation is available from Telect, with part number 12545-301.

Figure 197: Minimum rear opening for ANSI 19-inch and ETSI configuration



NTP-G344 Install the Air Plenum in ONS 15454 M6 Shelf

Purpose	This procedure installs the air plenum to orient the air flow from front-to- back direction in the ONS 15454 M6 shelf.

Tools/Equipment	• #2 Phillips Dynamometric screwdriver
	• Medium slot-head screwdriver
	• Small slot-head screwdriver
	• Screws
	  • ANSI: #12-24 x 0.50 pan-head Phillips screws
	  • ETSI: M6.0 x 20 pan-head Phillips screws
	• Wing head screws (8)
	• Adapter plates
	• One air plenum kit (horizontal and vertical air plenums)

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

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1074

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units.** Statement 246

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

Note For nominal voltage of -60 VDC, the input voltage range is from -40 to -72 VDC.

Note Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

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

Warning **The air plenum is installed on a rack or a cabinet using thread-forming screws that remove any paint or non-conductive coatings inside the hole threads, and establish a metal-to-metal contact. Also, clean both surfaces outside the screw points that come in contact, so that they are free of paint and other nonconductive coating. Apply an appropriate antioxidant compound to the surfaces.**

Procedure

Depending on the rack or cabinet, complete the necessary task:

- DLP-G766 Install Air Plenum for ONS 15454 M6 Shelf in ANSI 19-inch Cabinet, on page 292
- DLP-G767 Install Air Plenum in ONS 15454 M6 Shelf for ANSI 23-inch Configuration, on page 296
- DLP-G768 Install Pre-assembled Air Plenums in ANSI 23-inch Configuration, on page 299
- DLP-G769 Install Air Plenum for ONS 15454 M6 Shelf in ETSI Configuration, on page 301

Stop. You have completed this procedure.

DLP-G766 Install Air Plenum for ONS 15454 M6 Shelf in ANSI 19-inch Cabinet

Purpose	This task installs the air plenum for the ONS 15454 M6 shelf in ANSI 19-inch cabinet.

Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws: #12-24 x 0.50 pan-head Phillips screws (8) • Wing head screws (8) • One air plenum kit (horizontal and vertical air plenum)
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

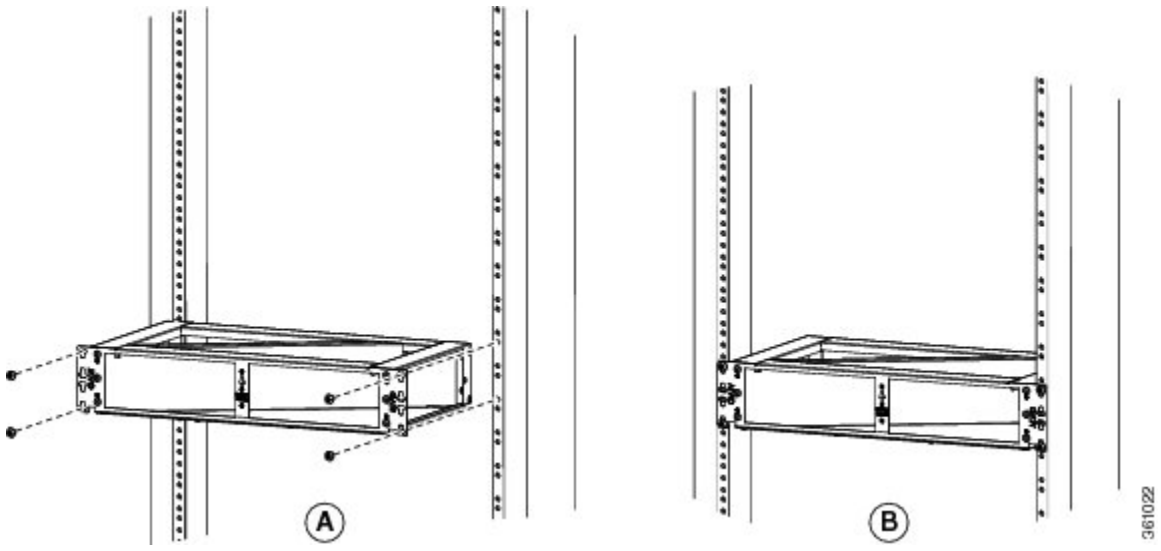
Note In the ANSI 19-inch rack or cabinet, the air plenum can be mounted only if the minimum opening is 20.600 inches to install the vertical air plenums behind the front rails.

Procedure

Step 1 Place the horizontal air plenum at the bottom of the shelf slot in the ANSI 19-inch cabinet.

Step 2 Insert the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m) as shown in the following figure.

Figure 198: Installing the bottom horizontal air plenum in the ANSI 19-inch cabinet



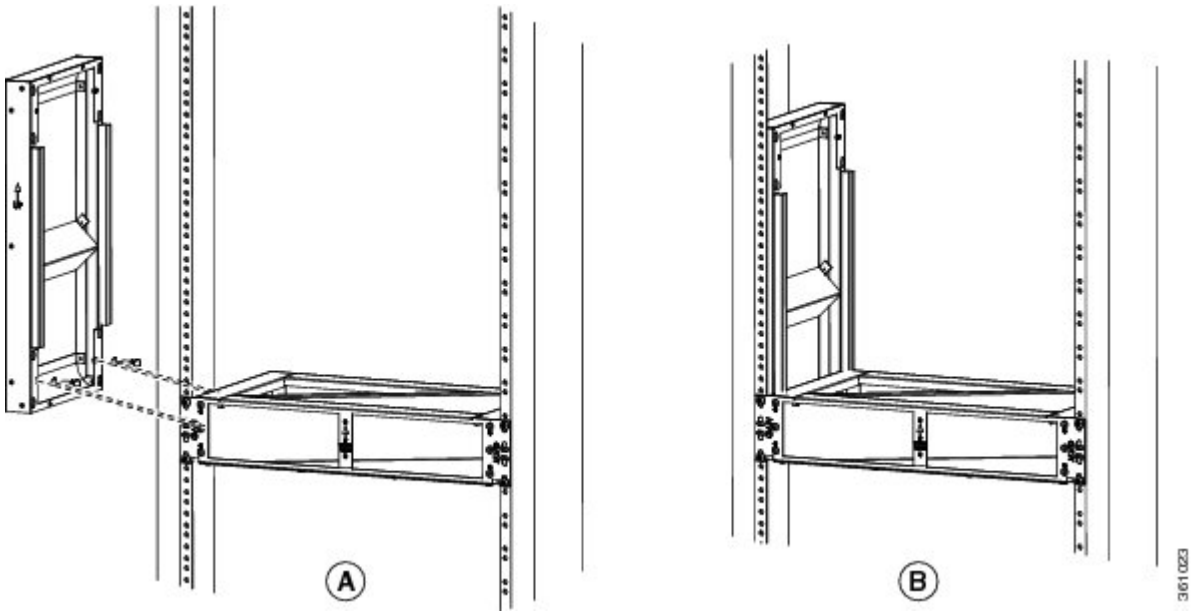
Step 3 Install the vertical air plenum to the left of the horizontal air plenum:

a) Insert the vertical plenum in the free space between the horizontal plenum and cabinet.

b) Install the wing head screws fom the internal side of the horizontal plenum as shown in the following figure.

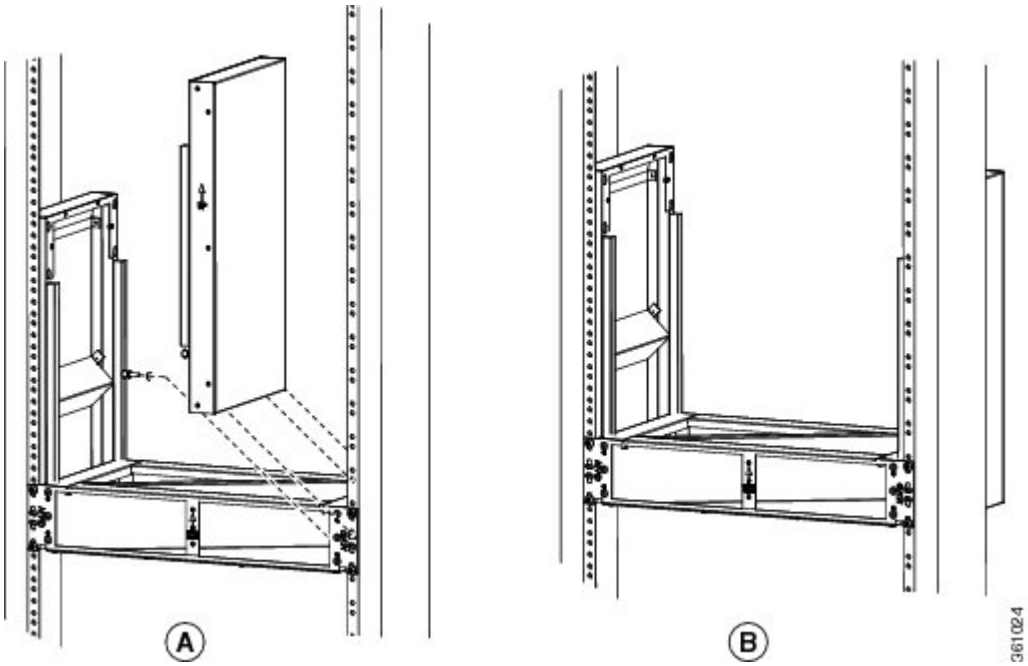
c) Tighten the screws to a torque value of 11.5 in-lb (1.3 N-m).

Figure 199: Installing the left vertical air plenum



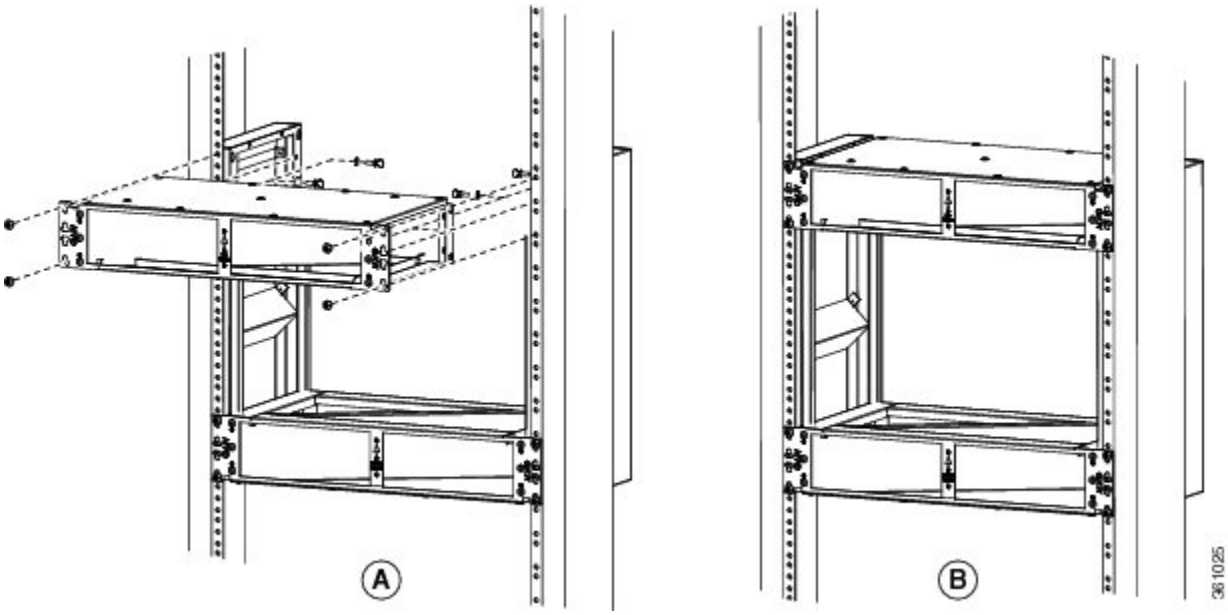
Step 4 Install the vertical air plenum to the right of the horizontal air plenum. Follow step 3a to step 3c.

Figure 200: Installing the right vertical air plenum



Step 5 Install the horizontal air plenum above the vertical plenums. Follow step 3a to step 3c.

Figure 201: Installing the horizontal air plenum above the vertical plenums

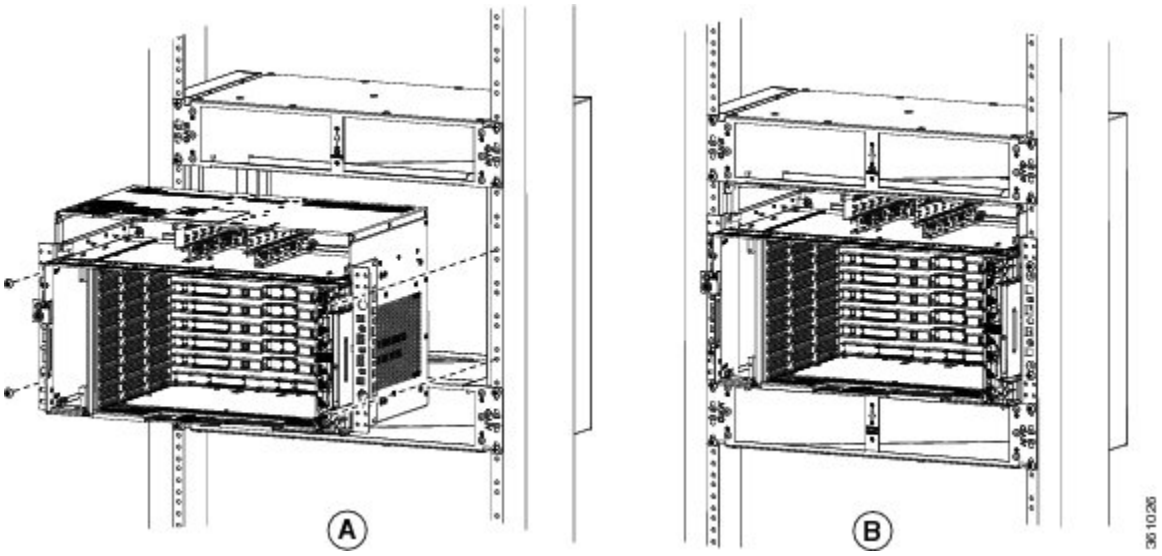


Step 6 Install the 19-inch standard brackets on both sides of the chassis in the front position. See DLP-G560 Mounting the Reversible Brackets on the ONS 15454 M6 Shelf for ANSI Rack Configuration, on page 311.

Step 7 Check the length between the top and bottom horizontal air plenums where the chassis will be installed. The length must be not less than 10.5 inches (267 mm). If the length is less, adjust the position of the top horizontal plenum.

Step 8 Install the ONS 15454 M6 empty chassis between the two horizontal plenums.

Figure 202: Installing the ONS 15454 M6 chassis between the horizontal air plenum



Step 9 Return to your originating procedure (NTP).

DLP-G767 Install Air Plenum in ONS 15454 M6 Shelf for ANSI 23-inch Configuration

Purpose	This task installs the air plenum for the ONS 15454 M6 shelf in the ANSI 23-inch cabinet or rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws: #12-24 x 3/4 pan-head Phillips mounting screws (8) • Wing head screws (8) • Adapter plates • One air plenum kit (horizontal and vertical air plenum)
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

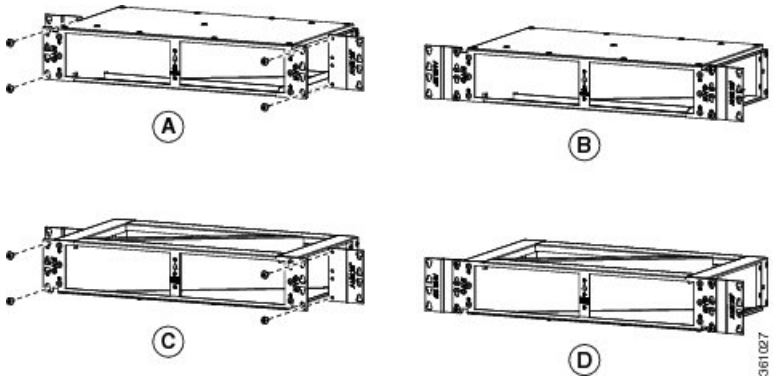
Note The airplenums for ANSI 23-inch configuration can be pre-assembled outside the cabinet and then installed inside the cabinet. See DLP-G768 Install Pre-assembled Air Plenums in ANSI 23-inch Configuration, on page 299

Procedure

Step 1 Install the ANSI 23-inch adapter plates on the horizontal air plenum.

Step 2 Align the screws to fix the adapter plates to the shelf. Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

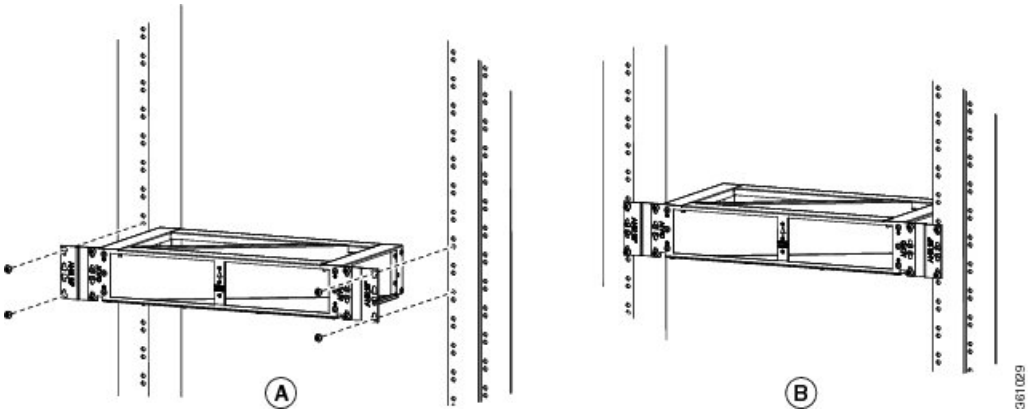
Figure 203: Installing the adapter plates on the horizontal air plenum



Step 3 Place the horizontal air plenum below the shelf slot in the ANSI 23-inch cabinet or rack.

Step 4 Insert the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m).

Figure 204: Installing the bottom horizontal air plenum in the ANSI 23-inch configuration



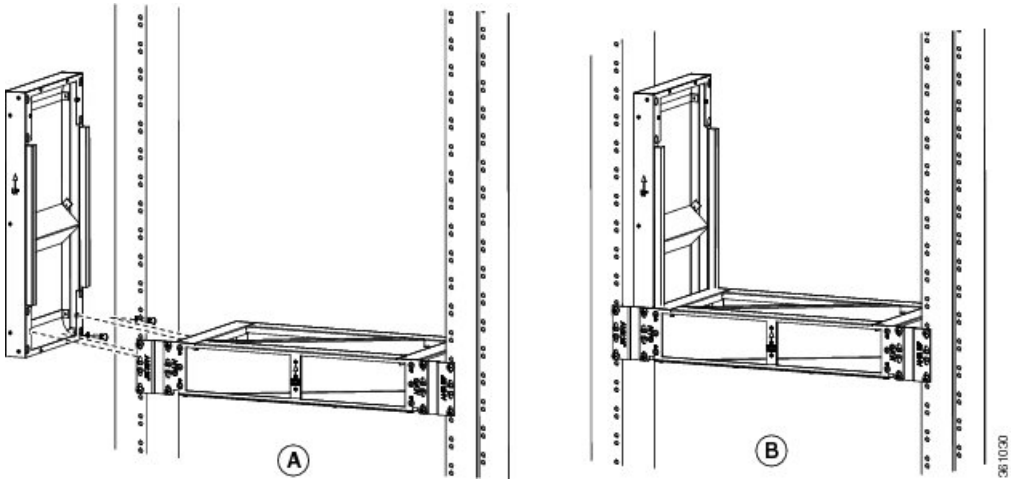
Step 5 Install the vertical air plenum to the left of the horizontal air plenum:

a) Insert the vertical air plenum in the free space between the horizontal air plenum and cabinet.

b) Install the wing head screws from the internal side of the horizontal plenum as shown in the following figure.

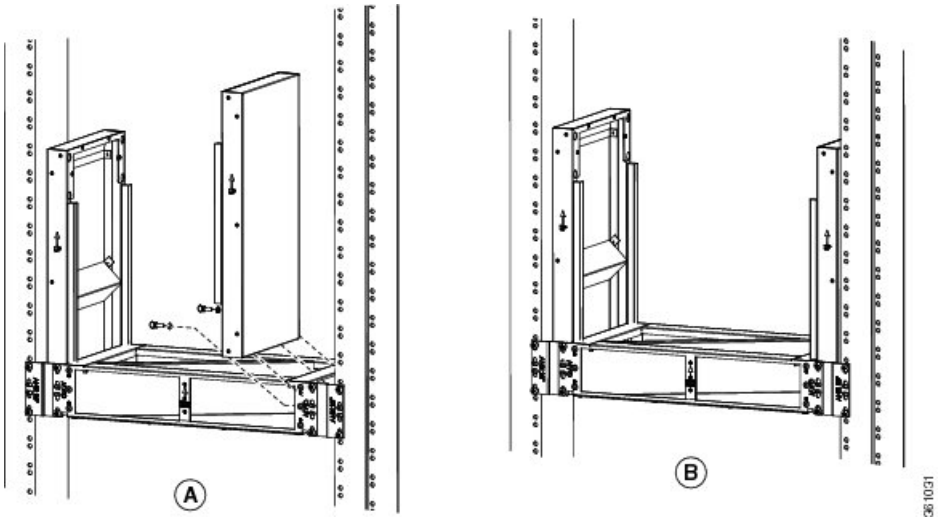
c) Tighten the screws to a torque value of 11.5 in-lb (1.3 N-m).

Figure 205: Installing the left vertical air plenum



Step 6 Install the vertical plenum to the right of the horizontal air plenum. Follow step 5a to step 5c.

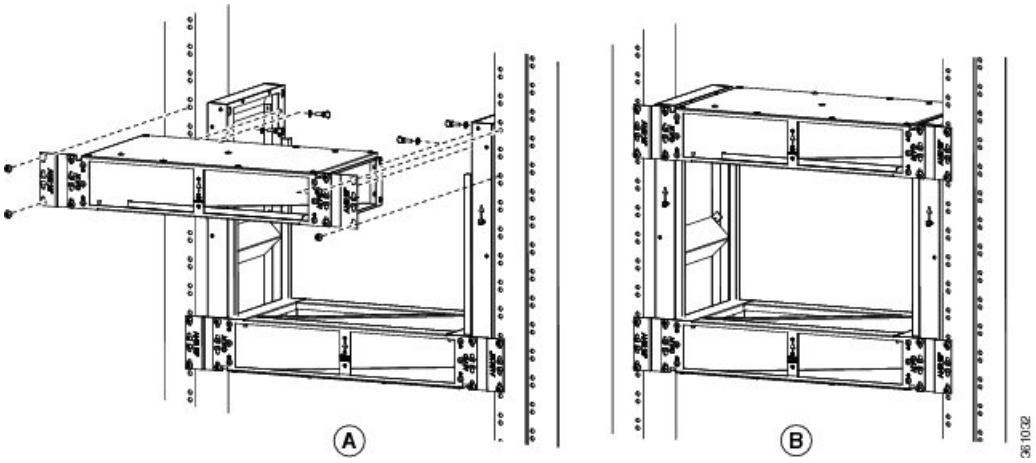
Figure 206: Installing the right vertical air plenum



Step 7 Place the horizontal air plenum above the shelf slot in the ANSI 23-inch cabinet or rack.

Step 8 Install the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m).

Figure 207: Installing the horizontal plenum above the vertical plenums

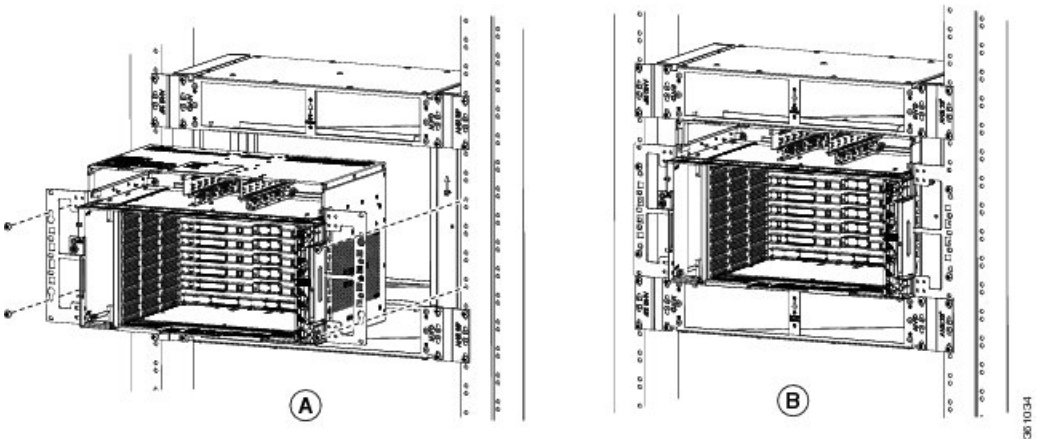


Step 9 Install ANSI 23-inch standard brackets on both sides of the chassis in front position. See DLP-G562 Mounting the Brackets on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 316.

Step 10 Check the length between the top and bottom horizontal air plenums where the chassis will be installed. The length must be not less than 10.5 inches (267 mm). If the length is less, adjust the position of the top horizontal plenum.

Step 11 Install the ONS 15454 M6 empty chassis between the horizontal plenums.

Figure 208: Installing the ONS 15454 M6 chassis between the horizontal air plenum



Step 12 Return to your originating procedure (NTP).

DLP-G768 Install Pre-assembled Air Plenums in ANSI 23-inch Configuration

Purpose	This task installs pre-assembled air plenums for the ONS 15454 M6 shelf in the ANSI 23-inch configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws: #12-24 x 3/4 pan-head Phillips mounting screws (8) • Wing head screws (8) • Adapter plates • One air plenum kit (horizontal and vertical air plenum)
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Install the ANSI 23-inch adapter plates on the horizontal air plenums.

Step 2 Align the screws to fix the adapter plates to the shelf. Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 3 Place a horizontal air plenum as the base.

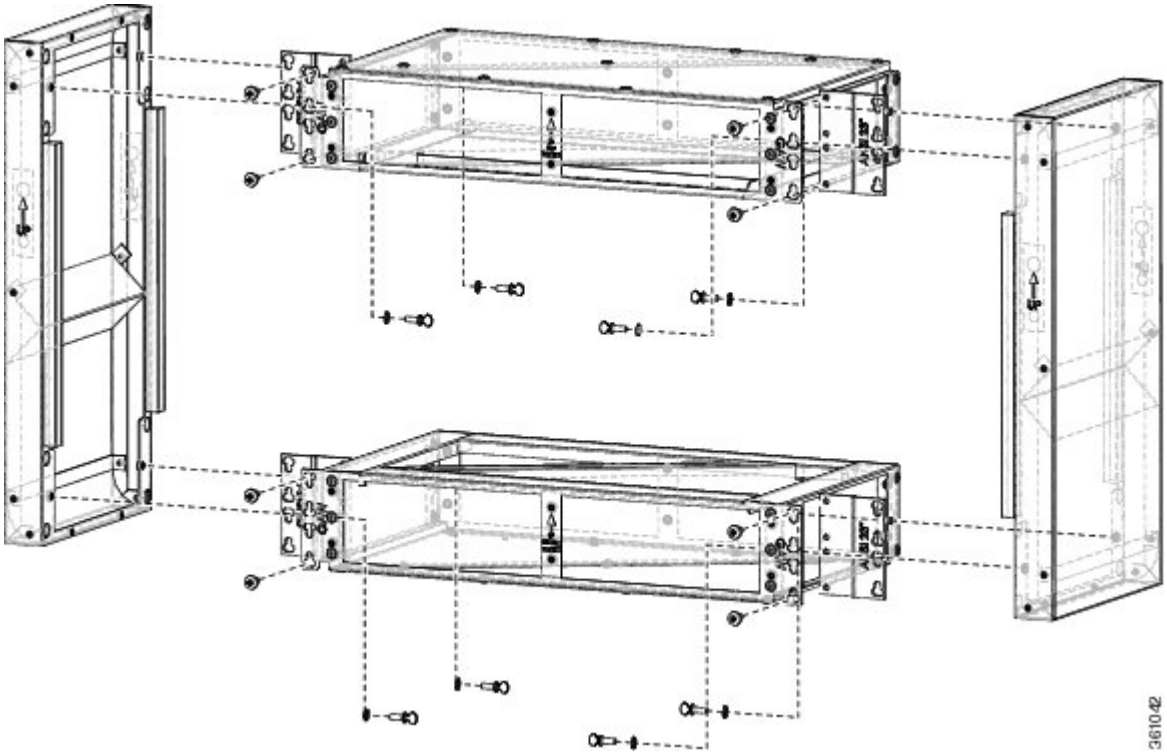
Step 4 Install the vertical air plenum to the left of the bottom horizontal plenum.

Step 5 Install the wing head screws from the internal side of the horizontal plenum and tighten the screws to a torque value of 11.5 in-lb (1.3 N-m).

Step 6 Install the vertical air plenum to the right of the horizontal air plenum. Follow step 4.

Step 7 Install the horizontal air plenum above the vertical air plenums. Follow step 4.

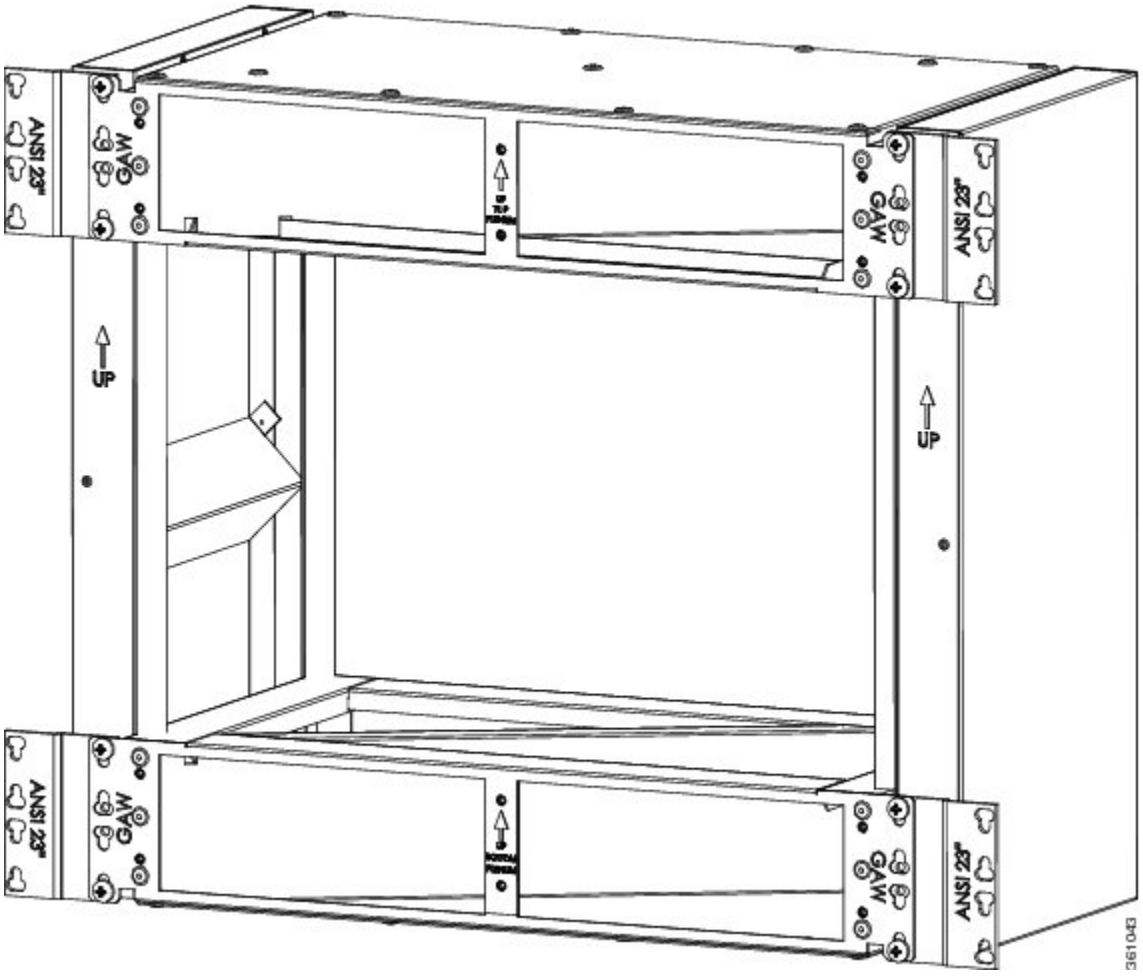
Figure 209: Pre-assembling the air plenums



Step 8 Install the ANSI 23-inch adapter plates on the horizontal air plenums.

Step 9 Install the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m).

Figure 210: Pre-assembled air plenum for ANSI 23-inch configuration



Step 10 Install the pre-assembled air plenums in the ANSI 23-inch rack or cabinet.

Step 11 Check the length between the top and bottom horizontal air plenums where the chassis will be installed. The length must be not less than 10.5 inches (267 mm). If the length is less, adjust the position of the top horizontal plenum.

Step 12 Install the empty ONS 15454 M6 chassis between the horizontal plenums.

Step 13 Return to your originating procedure (NTP).

DLP-G769 Install Air Plenum for ONS 15454 M6 Shelf in ETSI Configuration

Purpose	This task installs the air plenum for the ONS 15454 M6 shelf in the ETSI configuration.

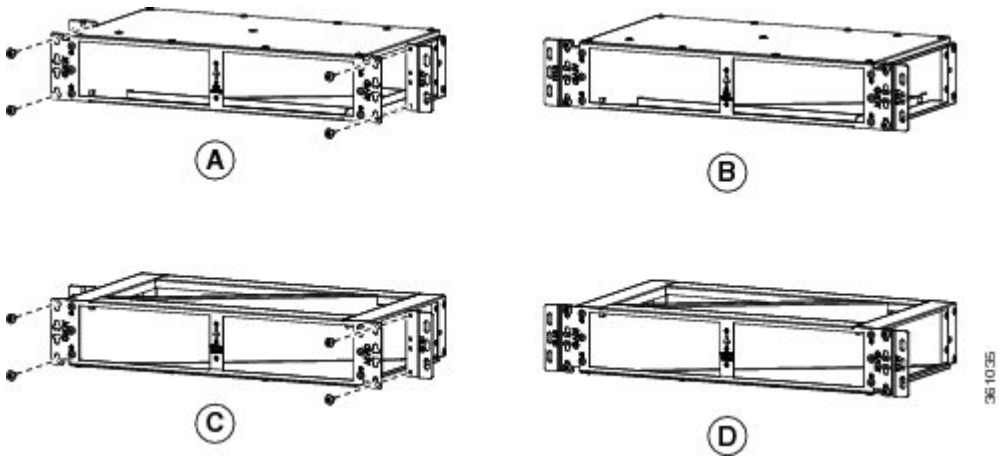
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws: M6.0 x 20 pan-head Phillips screws (8) • Wing head screws (8) • Adapter plates • One air plenum kit (horizontal and vertical air plenum)
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Install the ETSI adapter plates on the horizontal air plenums.

Step 2 Align the screws to fix the adapter plates to the shelf. Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

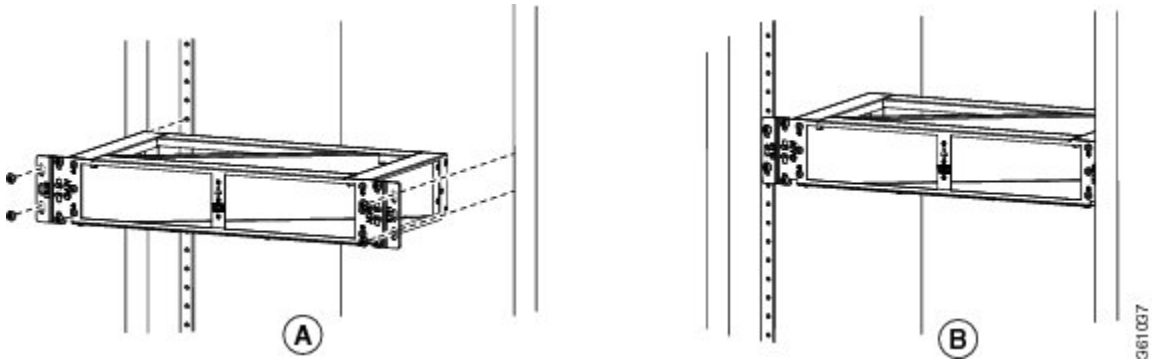
Figure 211: Installing the adapter plates on the horizontal air plenum



Step 3 Place the horizontal plenum below the chassis slot in the ETSI cabinet.

Step 4 Install the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m).

Figure 212: Installing the horizontal air plenum in the ETSI configuration



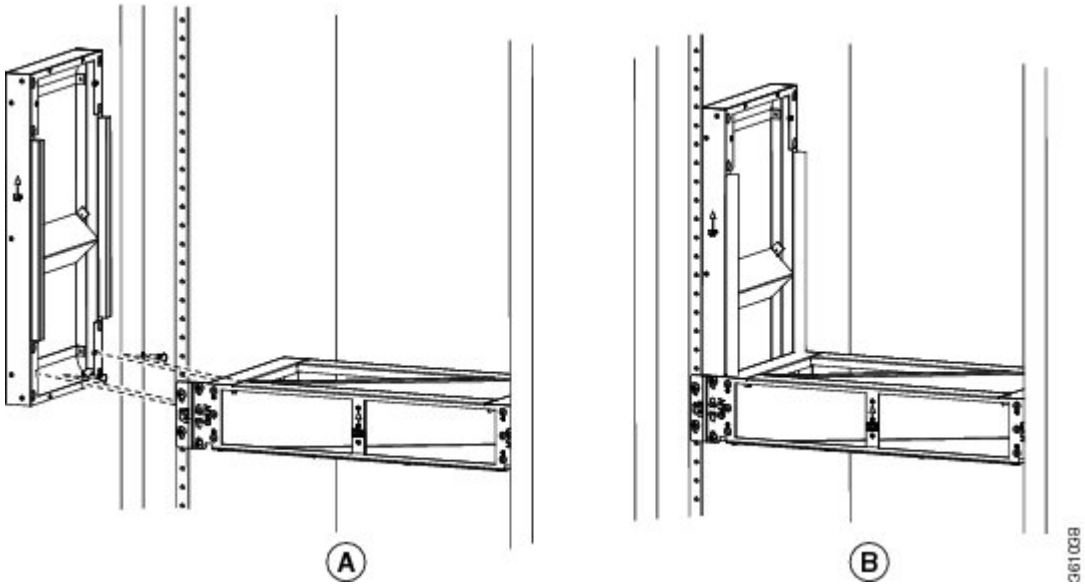
Step 5 Install the vertical air plenum to the left of the horizontal air plenum:

a) Insert the vertical plenum in the free space between the horizontal plenum and cabinet.

b) Install the wing head screws from the internal side of the horizontal plenum as shown in the following figure.

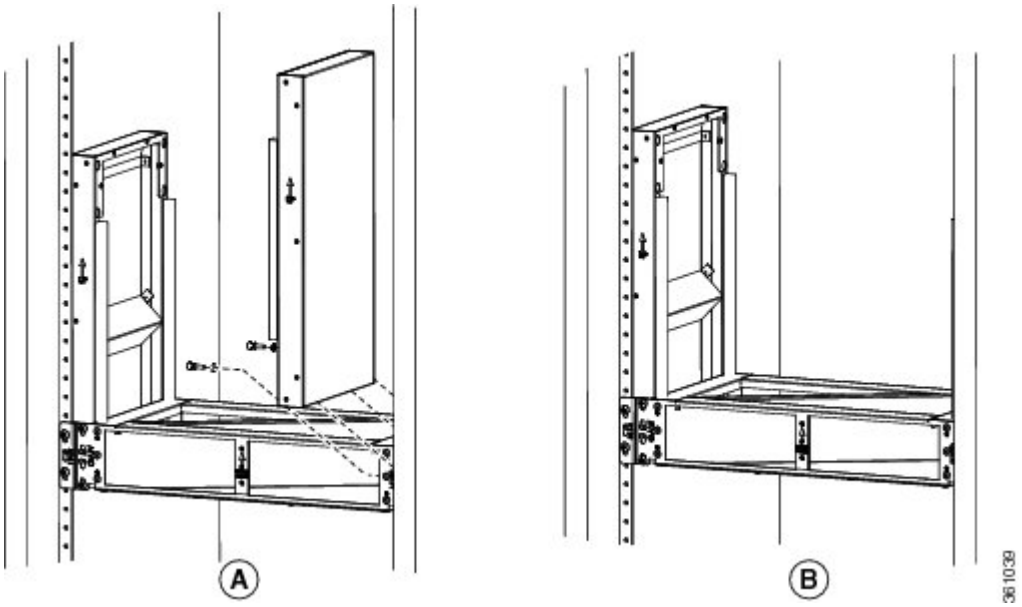
c) Tighten the screws to a torque value of 11.5 in-lb (1.3 N-m).

Figure 213: Installing the left vertical air plenum



Step 6 Install the vertical air plenum to the right of the horizontal air plenum. Follow step 5a to step 5c.

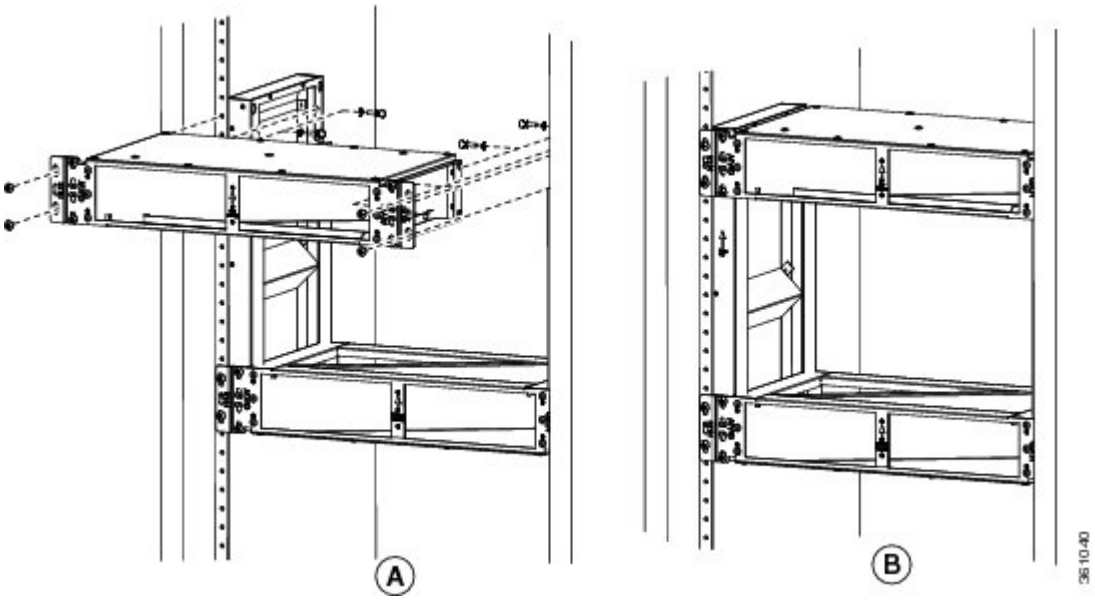
Figure 214: Installing the right vertical air plenum



Step 7 Place the horizontal plenum above the chassis slot in the ETSI cabinet.

Step 8 Install the wing head screws provided with the kit, and tighten to a torque value of 11.5 in-lb (1.3 N-m)..

Figure 215: Installing the horizontal air plenum above the vertical plenums

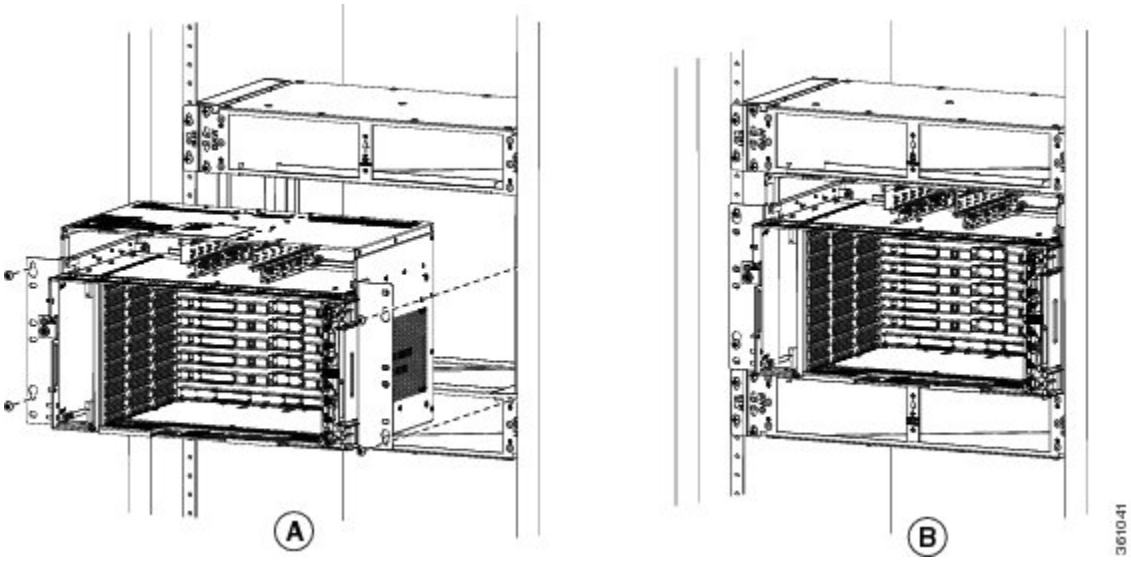


Step 9 Install the standard brackets on both sides of the chassis in front position. See DLP-G562 Mounting the Brackets on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 316.

Step 10 Check the length between the top and bottom horizontal air plenums where the chassis will be installed. The length must be not less than 10.5 inches (267 mm). If the length is less, adjust the position of the top horizontal plenum.

Step 11 Install the ONS 15454 M6 empty chassis between the horizontal plenums.

Figure 216: Installing the ONS 15454 M6 chassis below the horizontal air plenum



Step 12 Return to your originating procedure (NTP).

Air Flow Performance of ONS 15454 M6

The tables below summarizes the air flow performance of ONS 15454 M6:

Case	Deflector Configuration	Worst Line Card Slot (#7) Flow, CFM	Worst Controller Card Slot (#8) Flow, CFM		
		9600 RPM (27°C)	13500 RPM (40°C and 55°C)	9600 RPM (27°C)	13500 RPM (40°C and 55°C)
Side to Side	No deflectors	16	22.4	14.9	21
ETSI Front to Rear	Inlet and Outlet	8.2	11.2	6.9	10
ETSI Front to Side	Only Inlet	12.2	16.8	12.7	18.4
ANSI Front to Rear	Inlet and Outlet	13.4	18.7	10.6	14.7
ANSI Front to Side	Only Inlet	14.8	20.7	14.1	19.7

Case	Deflector Configuration	Bulk Chassis Flow, CFM	
		9600 RPM	13500 RPM

Case	Deflector Configuration	Bulk Chassis Flow, CFM	
Side to Side	No deflectors	215.3	295.6
ETSI Front to Rear	Inlet and Outlet	97.7	135.8
ETSI Front to Side	Only Inlet	187.7	258.6
ANSI Front to Rear	Inlet and Outlet	120.5	166.9
ANSI Front to Side	Only Inlet	193.5	268.6

NTP-G252 Install the ONS 15454 M6 Shelf

Purpose	This procedure installs the shelf.

Tools/Equipment	• #2 Phillips Dynamometric screwdriver
	• Medium slot-head screwdriver
	• Small slot-head screwdriver
	• ETSI only:
	  • Six M6 x 20 pan-head Phillips mounting screws
	• ANSI only:
	  • Six #12-24 x 3/4 pan-head Phillips mounting screws

Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

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

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 40A and between -40.5 VDC to -57.6 VDC.** Statement 1005

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A-20A, 100-240 VAC~.** Statement 1005

Warning **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 131°F (55°C).** Statement 1047

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

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

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

Warning **To prevent airflow restriction, allow clearance around the ventilation openings to be at least:1 inch (25.4 mm)** Statement 1076

Note Make sure that the correct type of 19-inch ANSI rack is used for mounting the ONS 15454 M6 shelf as shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5.

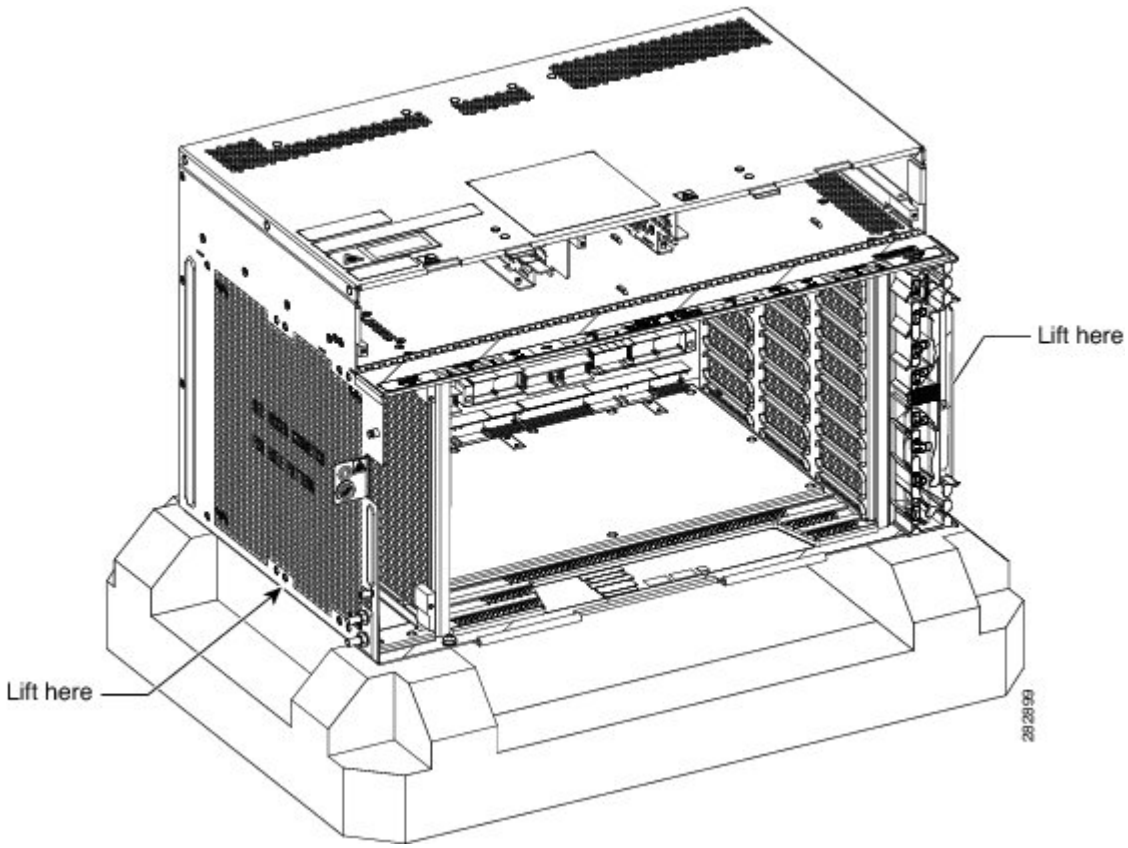
Warning **To comply with EN50121-4:2006 - Railway applications, Electromagnetic compatibility, a shielded cable must be used to connect to the EMS port. This cable must be less than 30 meters in length and not placed in the 3 meter boundary, as defined in EN50121-4:2006, Table 2, note 1.** Statement 8010

Warning **To comply with EN50121-4:2006 - Railway applications, Electromagnetic compatibility, DC power cables must be less than 30 meter long.** Statement 8011

Note During installation, do not use the door to handle the chassis.

Note Remove the door from the ONS 15454 M6 shelf and reinstall it after installing all the other modules.

Figure 217: Handling the Chassis During Installation



Procedure

Step 1 Complete the necessary task as applicable:

- DLP-G674 Verify the ONS 15454 M6 Shelf for AC Power Module Installation, on page 309
- DLP-G675 Verify the ONS 15454 M6 Shelf for DC Power Module Installation, on page 310

Step 2 Complete the necessary task as applicable:

- DLP-G560 Mounting the Reversible Brackets on the ONS 15454 M6 Shelf for ANSI Rack Configuration, on page 311

- DLP-G561 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ANSI Rack Configuration, on page 314
- DLP-G562 Mounting the Brackets on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 316
- DLP-G563 Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 318
- DLP-G564 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 319
- DLP-G565 Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 321
- DLP-G821 Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 325

Step 3 Complete the necessary rack mounting task as applicable:

- DLP-G566 Mount the ONS 15454 M6 Shelf on a Rack (One Person) , on page 327.
- DLP-G567 Mount the ONS 15454 M6 Shelf on a Rack (Two People) , on page 329.
- DLP-G568 Mount Multiple ONS 15454 M6 Shelves on a Rack , on page 330.

Step 4 Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

Step 5 Continue with NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339.

Stop. You have completed this procedure.

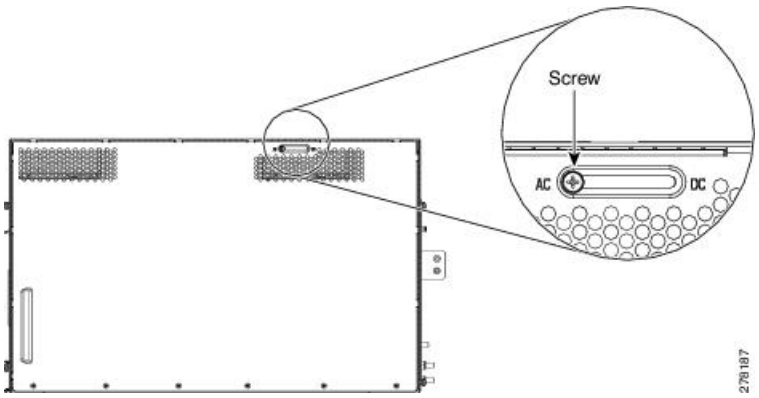
DLP-G674 Verify the ONS 15454 M6 Shelf for AC Power Module Installation

Purpose	This task verifies the shelf for AC power module installation.
Tools/Equipment	None
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Verify the position of the mechanical locking system on the rear side of the chassis. To use the AC power module, the screw must be close to the AC silk-screen text (see the following figure).

Figure 218: AC Power Module Installation—Rear Side of the ONS 15454 M6 Shelf



Step 2 Loosen the screw and move it to the left position (towards the AC silk-screen text).

Step 3 Tighten the screw again to a torque value of 4 in-lb (0.45 N-m).

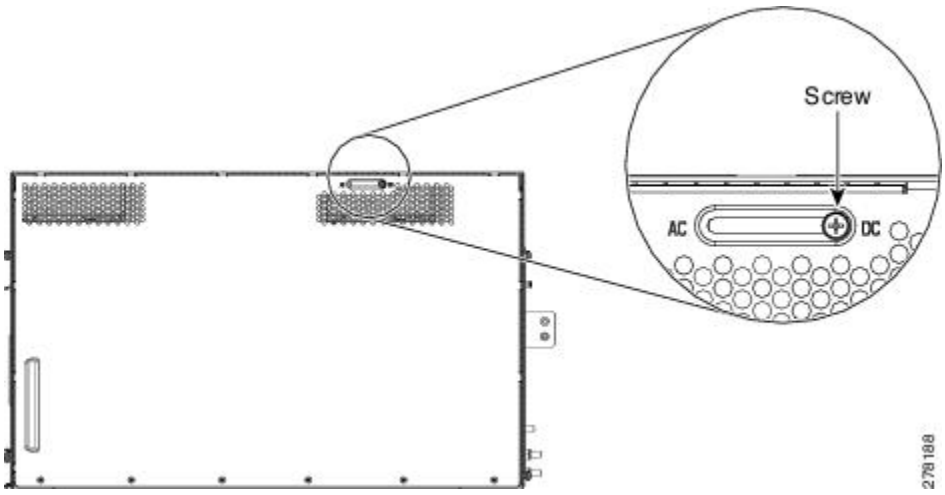
DLP-G675 Verify the ONS 15454 M6 Shelf for DC Power Module Installation

Purpose	This task verifies the shelf for DC power module installation.
Tools/Equipment	None
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Verify the position of the mechanical locking system on the rear side of the chassis. To use the DC power module the screw must be close to the DC silk-screen text (see the following figure).

Figure 219: DC Power Module Installation—Rear Side of the ONS 15454 M6 Shelf



Step 2 Loosen the screw and move it to the right position (towards the DC silk-screen text).

Step 3 Tighten the screw again to a torque value of 4 in-lb (0.45 N-m).

Step 4 Return to your originating procedure (NTP).

DLP-G560 Mounting the Reversible Brackets on the ONS 15454 M6 Shelf for ANSI Rack Configuration

Purpose	This task installs the reversible mounting brackets on the ONS 15454 M6 shelf for ANSI rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the ONS 15454 M6 in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 M6 ship kit, or remove the coating from the threads to ensure electrical continuity.

Note In an ANSI rack, reversible mounting brackets (19-inch or 23-inch) are used to install the shelf. The mounting brackets can be installed in the front or the middle position of the chassis.

Procedure

Step 1 To mount the reversible brackets:

- For a 19-inch (482.6-mm) configuration, place the widest side of the mounting bracket flush against the shelf (see Figure 220: Mounting the Brackets on the ONS 15454 M6 shelf for a 19-inch (482.6-mm) ANSI Configuration, on page 313). The narrow side of the mounting bracket should be towards the front of the shelf.
- For a 23-inch (584.2-mm) configuration, place the narrow side of the mounting bracket flush against the shelf (see Figure 221: Mounting the Brackets on the ONS 15454 M6 shelf for a 23-inch (584.2-mm) ANSI Configuration, on page 313). The widest side of the mounting bracket should be towards the front of the shelf.

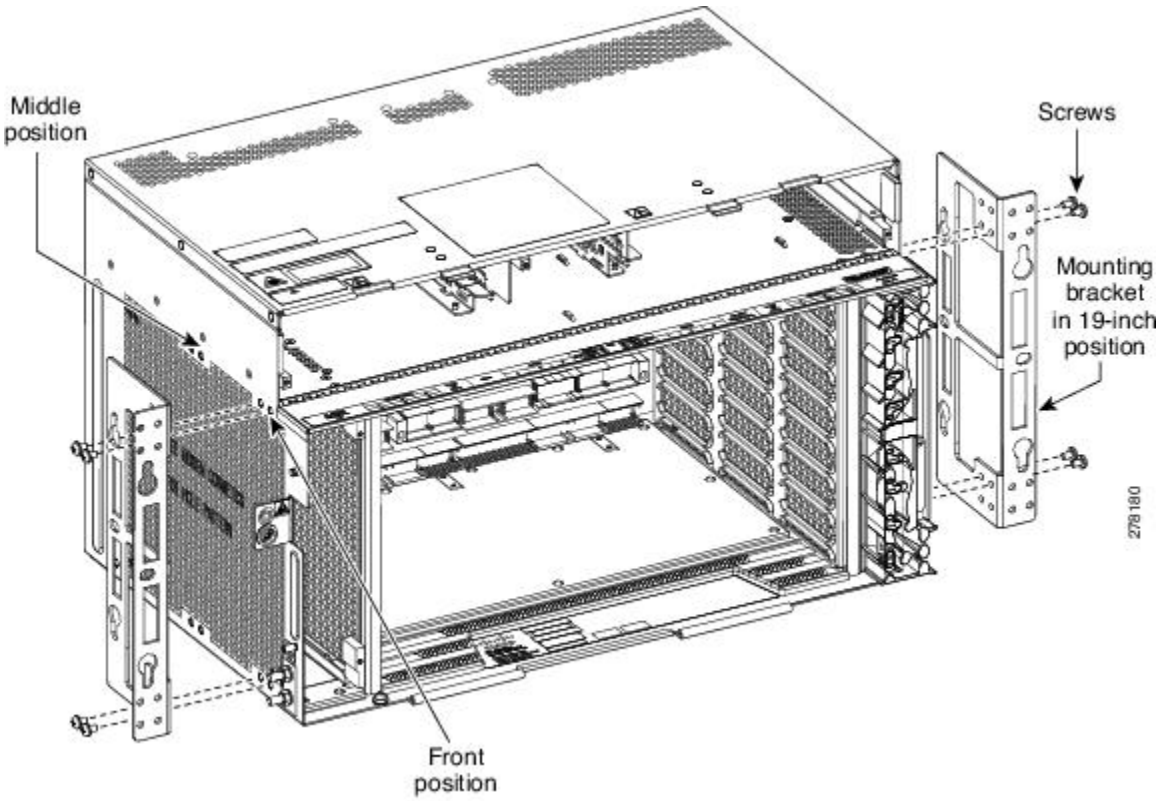
Step 2 Align the mounting bracket screw holes against the shelf screw holes.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Repeat steps 1 through 3 for the mounting bracket on the opposite side.

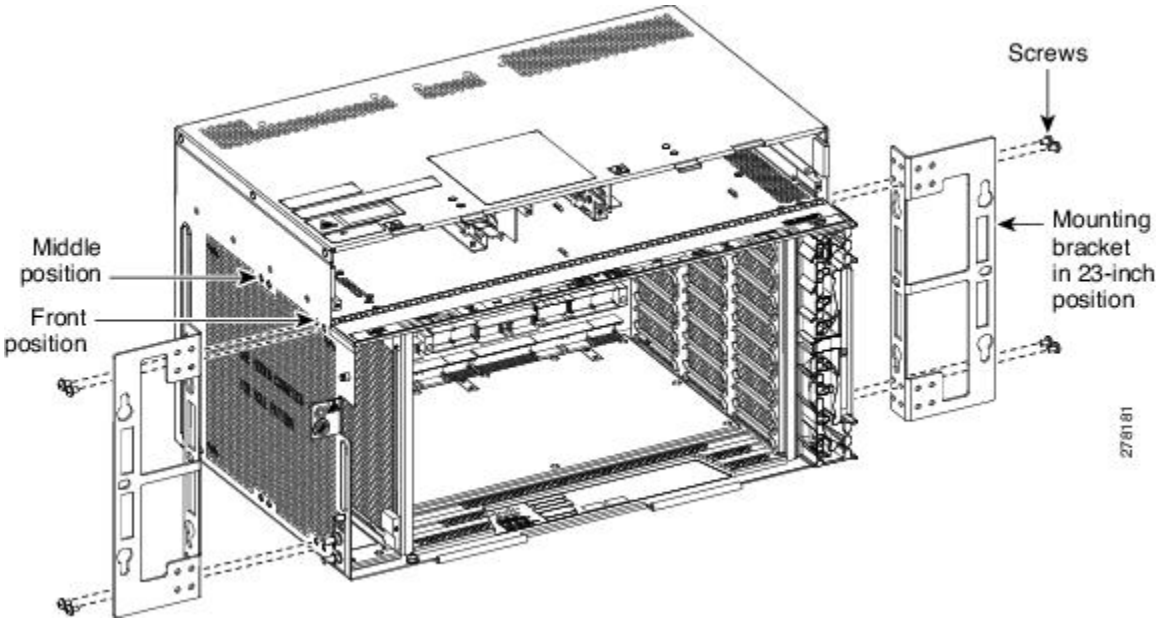
The following figure shows mounting the brackets for a 19-inch (482.6-mm) configuration.

Figure 220: Mounting the Brackets on the ONS 15454 M6 shelf for a 19-inch (482.6-mm) ANSI Configuration



The following figure shows mounting the brackets for a 23-inch (584.2-mm) configuration.

Figure 221: Mounting the Brackets on the ONS 15454 M6 shelf for a 23-inch (584.2-mm) ANSI Configuration



Step 5 Return to your originating procedure (NTP).

DLP-G561 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ANSI Rack Configuration

Purpose	This task installs the bracket with air deflectors (front-to-back) on the ONS 15454 M6 shelf for ANSI rack configuration. **Note** In an ANSI rack, the air deflectors can be mounted only in the 23-inch rack configuration and in the front position of the chassis.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Procedure

Step 1 (ANSI only) Place the right front air deflector flush against the right side of the chassis (see Diagram 1 of Figure 222: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for the ANSI rack Configuration, on page 315).

Step 2 Align the screw holes on the right front air deflector with the screw holes on the right side of the chassis.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Place the left back air deflector flush chassis as shown in Diagram 2 of Figure 222: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for the ANSI rack Configuration, on page 315.

Do not mount the left back deflector (exhaust air deflector), if these cards are to be installed in the ONS 15454 M6 shelf:

- 100G-LC-C, 10x10G-LC, or CFP-LC
- EDRA1-26, EDRA1-35, EDRA2-26, or EDRA2-35

Use the standard brackets directly to mount the ONS 15454 M6 shelf.

Step 5 Align the screw holes on the left back air deflector with the screw holes on the left side of the chassis.

Step 6 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 7 Place the 23-inch mounting bracket flush in the front position (see Diagram 1 of Figure 223: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ANSI Rack Configuration, on page 316) or in the middle position (see Diagram 3 of Figure 223: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ANSI Rack Configuration, on page 316) against the right side of the chassis.

Step 8 Align the screw holes on the 23-inch mounting bracket with the screw holes on the right side of the chassis.

Step 9 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 10 Place the 23-inch mounting bracket flush in the front position (see Diagram 1 of Figure 223: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ANSI Rack Configuration, on page 316) or in the middle position (see Diagram 3 of Figure 223: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ANSI Rack Configuration, on page 316) against the left side of the chassis.

Step 11 Align the screw holes on the 23-inch mounting bracket with the screw holes on the left side of the chassis.

Step 12 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Figure 222: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for the ANSI rack Configuration

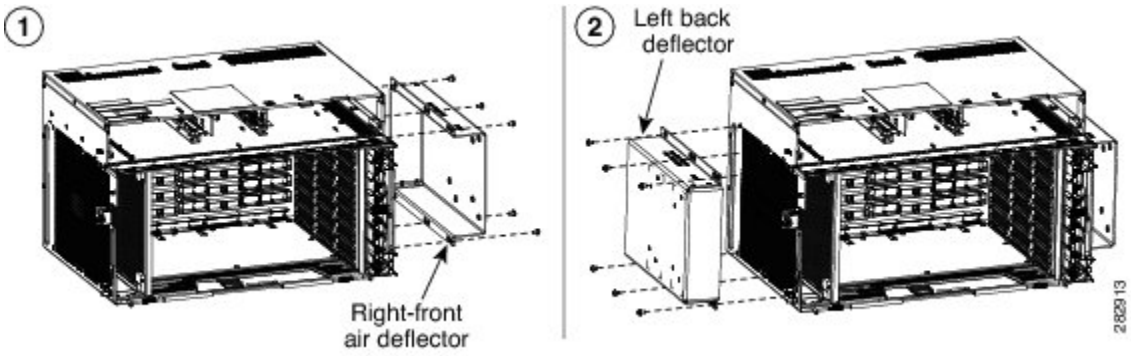
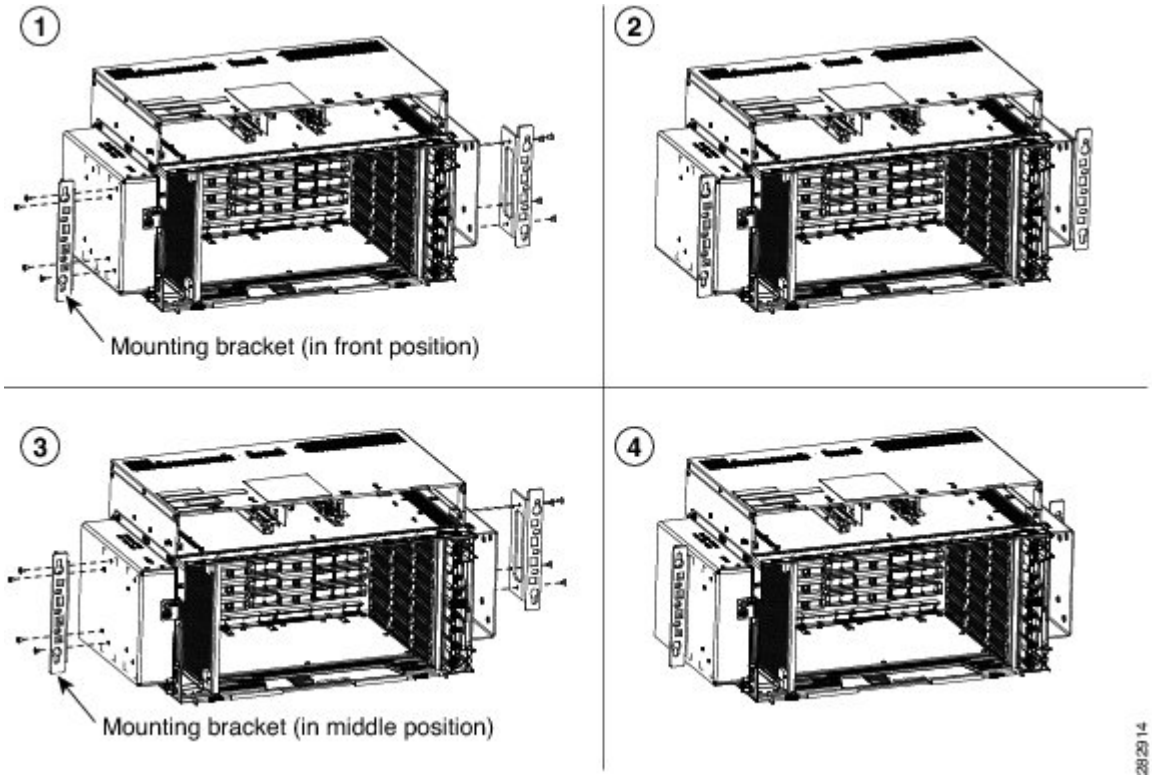


Figure 223: Mounting the Brackets with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ANSI Rack Configuration



Step 13 Return to your originating procedure (NTP).

DLP-G562 Mounting the Brackets on the ONS 15454 M6 Shelf for ETSI Rack Configuration

Purpose	This task installs the mounting brackets on the ONS 15454 M6 shelf for ETSI rack configuration. **Note** In an ETSI rack, the mounting brackets are installed only in the front position.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Caution When mounting the ONS 15454 M6 in a frame with a nonconductive coating (such as paint, lacquer, or enamel) either use the thread-forming screws provided with the ONS 15454 M6 ship kit, or remove the coating from the threads to ensure electrical continuity.

Procedure

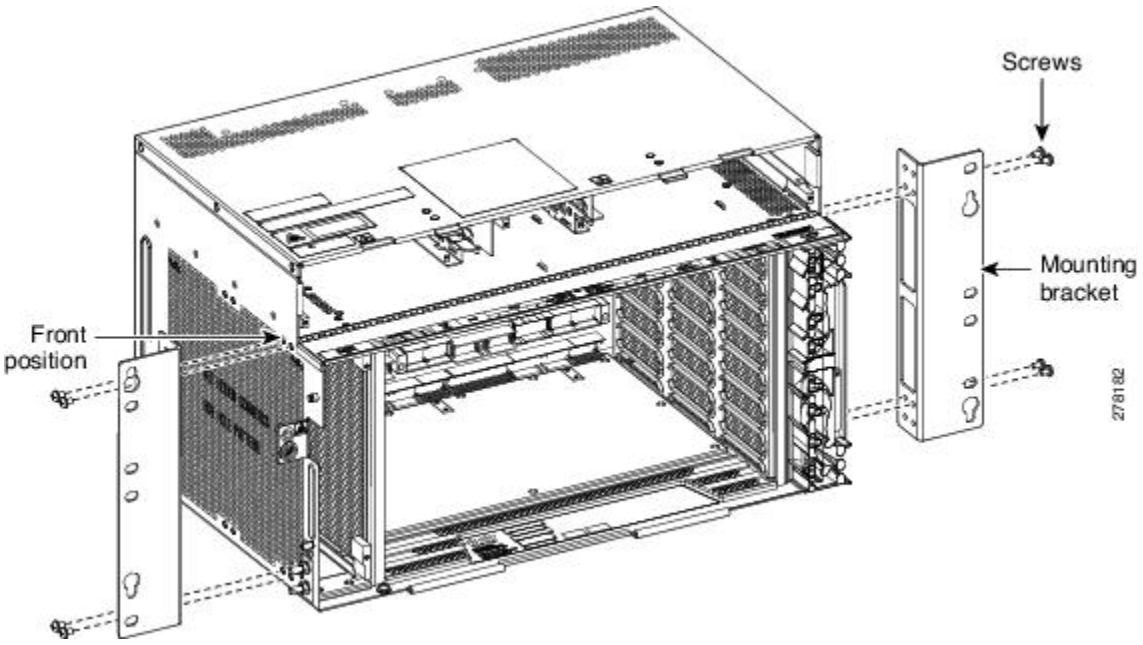
Step 1 Place the mounting bracket flush against the shelf as shown in the following figure.

Step 2 Align the mounting bracket screw holes against the shelf screw holes.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Repeat steps 1 through 3 for the mounting bracket on the opposite side.

Figure 224: Mounting the Brackets on the ONS 15454 M6 Shelf for ETSI Rack Configuration



Step 5 Return to your originating procedure (NTP).

DLP-G563 Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M6 Shelf for ETSI Rack Configuration

Purpose	This task installs the air deflectors (front-to-front) on the ONS 15454 M6 shelf for ETSI rack configuration. **Note** The air deflectors can be installed only in the front position of the chassis.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

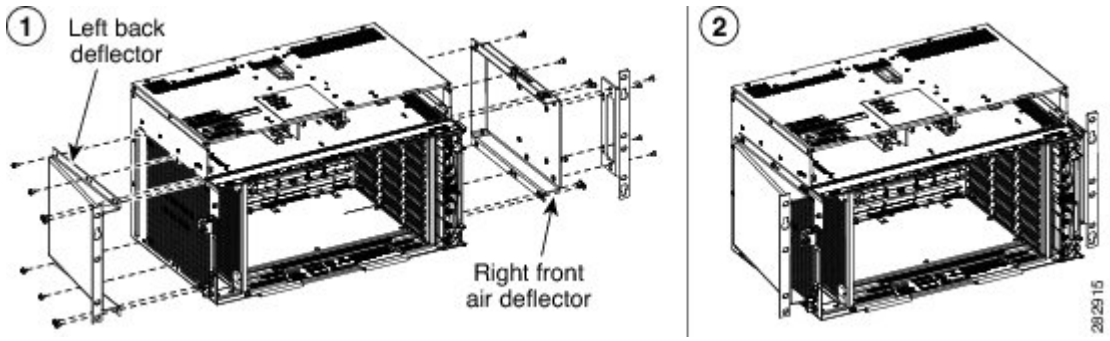
Caution Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Procedure

Step 1 Place the right front air deflector flush against the right side of the chassis (see the following figure).

Step 2 Align the screw holes on the right front air deflector with the screw holes on the right side of the chassis.

Figure 225: Mounting the Air Deflectors (Front-to-Front) on the ONS 15454 M6 Shelf for ETSI Rack Configuration



Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Place the left front air deflector flush against the left side of the chassis.

Do not mount the left front deflector (exhaust air deflector), if these cards are to be installed in the ONS 15454 M6 shelf:

- 100G-LC-C, 10x10G-LC, or CFP-LC
- EDRA1-26, EDRA1-35, EDRA2-26, or EDRA2-35

Use the standard brackets directly to mount the ONS 15454 M6 shelf.

Step 5 Align the screw holes on the left front air deflector with the screw holes on the left side of the chassis.

Step 6 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 7 Return to your originating procedure (NTP).

DLP-G564 Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration

Purpose	This task installs the bracket with air deflectors (front-to-back) on the ONS 15454 M6 shelf for ETSI rack configuration. **Note** The air deflectors can be installed only in the front position of the chassis.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Procedure

Step 1 Place the right front air deflector flush against the right side of the chassis (see Diagram 1 of Figure 226: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 320).

Step 2 Align the screw holes on the right front air deflector with the screw holes on the right side of the chassis.

Step 3 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Place the left back air deflector flush against the chassis as shown in Diagram 2 of Figure 226: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 320.

Do not mount the left back deflector (exhaust air deflector), if these cards are to be installed in the ONS 15454 M6 shelf:

- 100G-LC-C, 10x10G-LC, or CFP-LC
- EDRA1-26, EDRA1-35, EDRA2-26, or EDRA2-35

Use the standard brackets directly to mount the ONS 15454 M6 shelf.

Step 5 Align the screw holes of the left back air deflector with the screw holes on the left side of the chassis.

Step 6 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 7 Place the mounting bracket flush in the middle position (see Diagram 1 of Figure 227: Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 321) or the front position (see Diagram 3 of Figure 227: Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 321) against the right side of the chassis.

Step 8 Align the screw holes on the mounting bracket with the screw holes on the left side of the chassis.

Step 9 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 10 Place the mounting bracket flush in the middle position (see Diagram 1 of Figure 227: Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 321) or the front position (see Diagram 3 of Figure 227: Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration, on page 321) against the left side of the chassis.

Step 11 Align the screw holes on the mounting bracket with the screw holes on the left side of the chassis.

Step 12 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Figure 226: Mounting the Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration

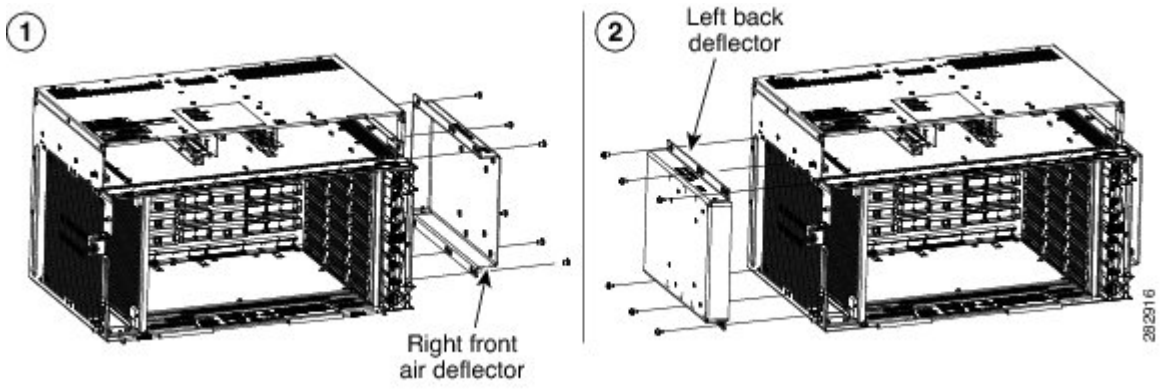
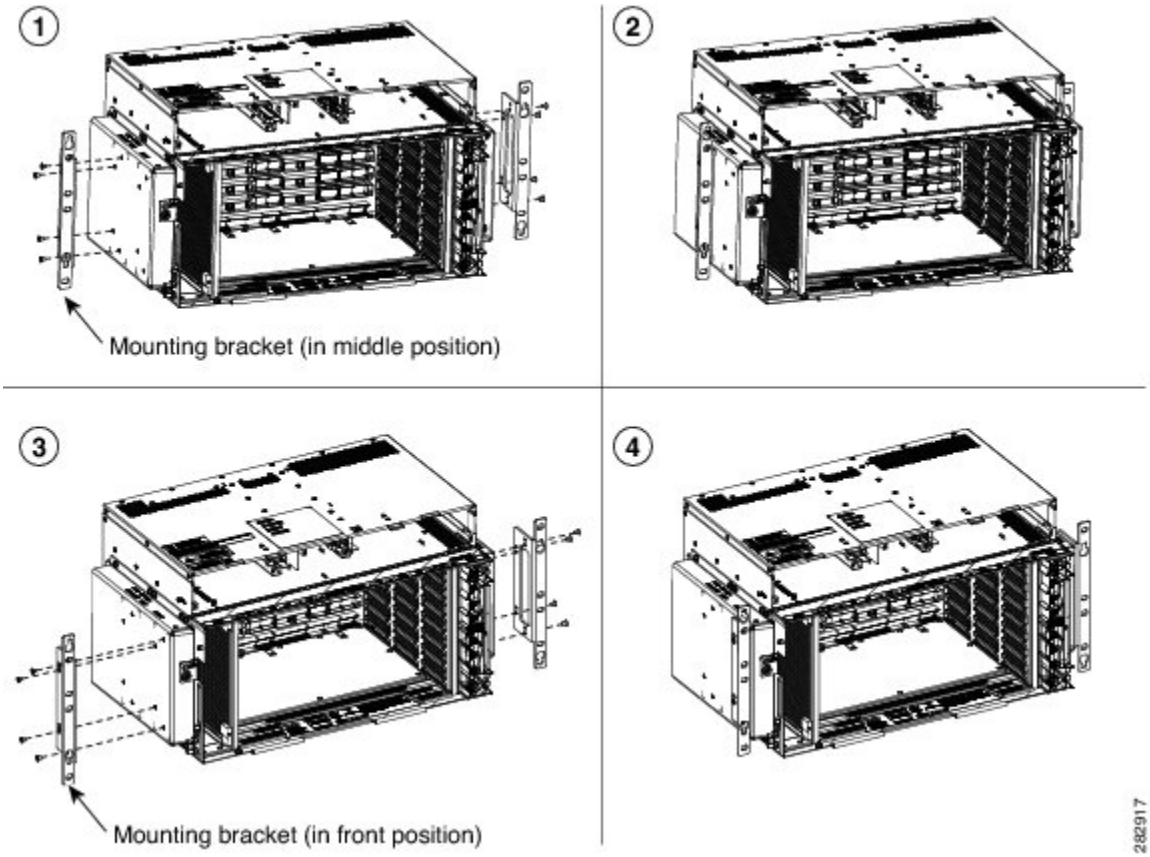


Figure 227: Mounting the Bracket with Air Deflectors (Front-to-Back) on the ONS 15454 M6 Shelf for ETSI Rack Configuration



Step 13 Return to your originating procedure (NTP).

DLP-G565 Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration

Purpose	This task installs the bracket with air deflectors (front-to-top) on the ONS 15454 M6 shelf for ETSI rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

Note The front-to-top air deflector configuration must be used only for the bottom most chassis in the rack.

Note Do not install a fan tray (exhaust) side deflector on a chassis that is installed above a chassis with a front-to-top air deflector configuration.

Note The front-to-top deflector configuration can be operated at a maximum of 50C at 1800 m altitude. Only ROADM cards can be installed for this configuration.

Note It is recommended to maintain a space of one RU between two chassis in a rack for cable management.

Note Hot and cold aisle airflow management must be planned for the installation.

Procedure

Step 1 To install the mounting bracket with air deflectors (front-to-top) in the front position, perform Step 3 through Step 11.

Step 2 To install the mounting bracket with air deflectors (front-to-top) in the middle position, perform Step 12 through Step 23.

Step 3 Place the right front air deflector flush against the right side of the chassis (see Diagram 1 of Figure 228: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration- Front Position, on page 323).

Step 4 Align the screw holes on the right front air deflector with the screw holes on right side of the chassis.

Step 5 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 6 Place a mounting bracket flush against the left and right side of the chassis (see Diagram 2 of Figure 228: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration- Front Position, on page 323).

Step 7 Align the screw holes on the mounting bracket with the screw holes on the side of the chassis.

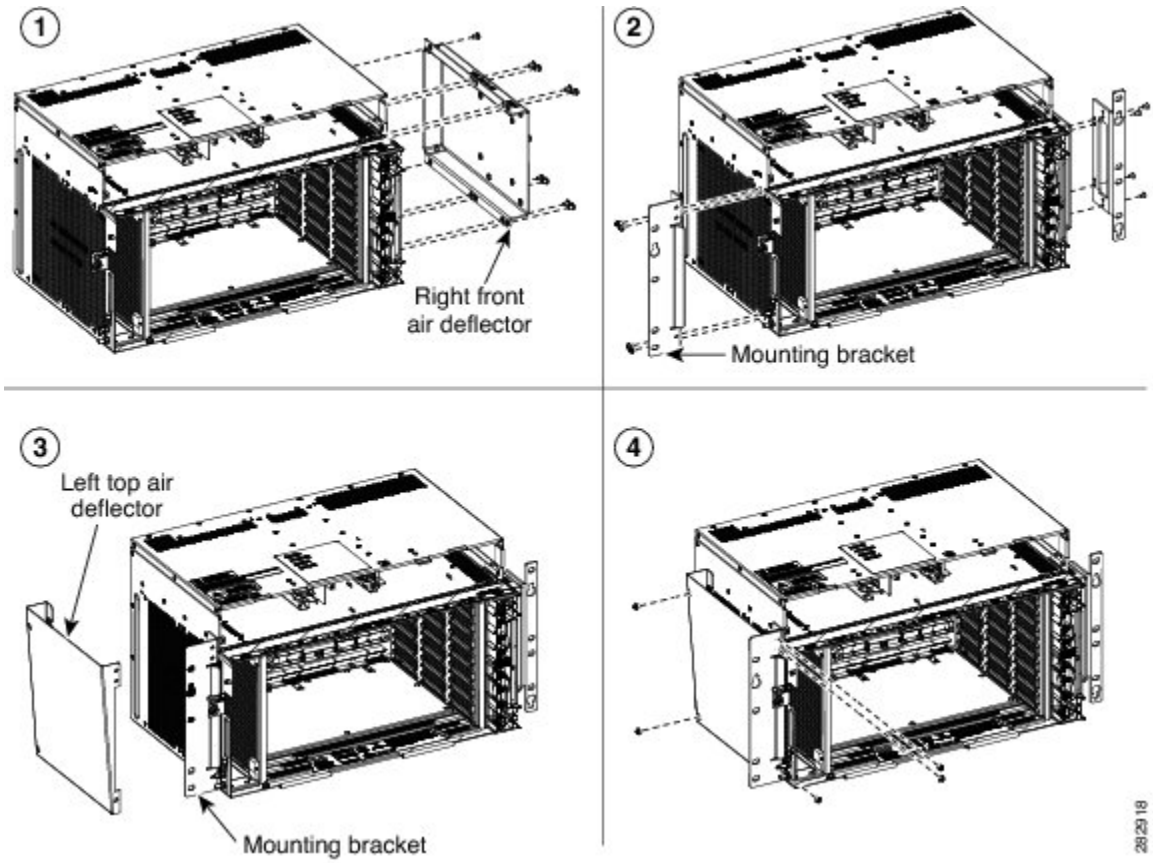
Step 8 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 9 Place the left top air deflector flush against the chassis as shown in Diagram 3 of Figure 228: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration- Front Position, on page 323.

Step 10 Align the screw holes with the screw holes of the left top air deflector and the chassis (see Diagram 4 of Figure 228: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration- Front Position, on page 323).

Step 11 Insert the screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m). See Diagram 4 of Figure 228: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration- Front Position, on page 323.

Figure 228: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration- Front Position



Step 12 Place the right front air deflector flush against the right side of the chassis (see Diagram 1 of Figure 229: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position , on page 324).

Step 13 Align the screw holes on the right front air deflector with the screw holes on the right side of the chassis.

Step 14 Insert M4 pan-head screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 15 Place the mounting bracket flush in the middle position on the right front air deflector (see Diagram 2 of Figure 229: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position , on page 324).

Step 16 Align the screw holes on the mounting bracket with the screw holes on the right front air deflector .

Step 17 Insert M4 flat-head screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 18 Place the left top air deflector flush against the left side chassis as shown in Diagram 3 of Figure 229: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position , on page 324.

Step 19 Align the screw holes on the left top air deflector with the screw holes on the left side of the chassis.

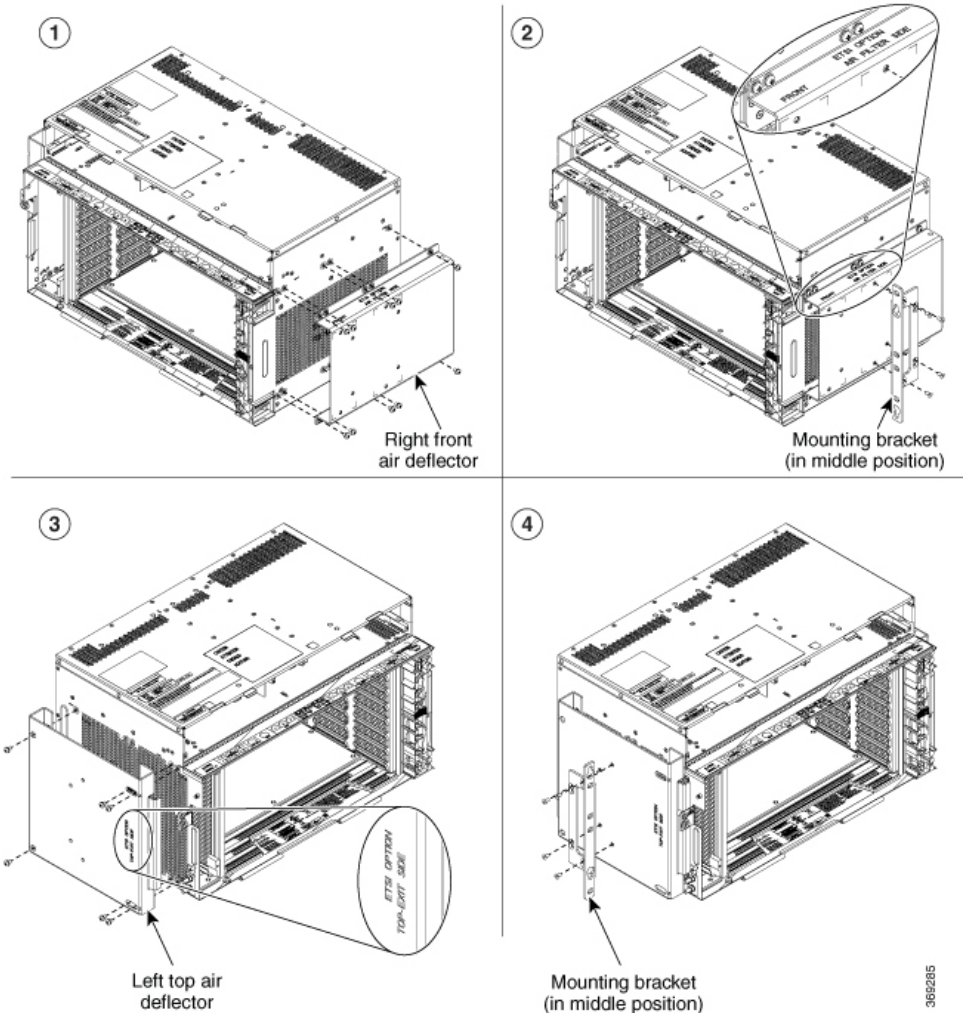
Step 20 Insert M4 pan-head screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 21 Place the mounting bracket flush in the middle position on the left top air deflector (see Diagram 4 ofFigure 229: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position , on page 324).

Step 22 Align the screw holes on the mounting bracket with the screw holes on the left top air deflector.

Step 23 Insert M4 flat-head screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Figure 229: Mounting the Bracket with Air Deflectors (Front-to-Top) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position



Step 24 Return to your originating procedure. (NTP).

DLP-G821 Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration

Purpose	This task installs the bracket with air deflectors (front-to-side) on the ONS 15454 M6 shelf for ETSI rack configuration.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Caution Use only the fastening hardware provided with the ONS 15454 M6 to prevent loosening, deterioration, and electromechanical corrosion of the hardware and joined material.

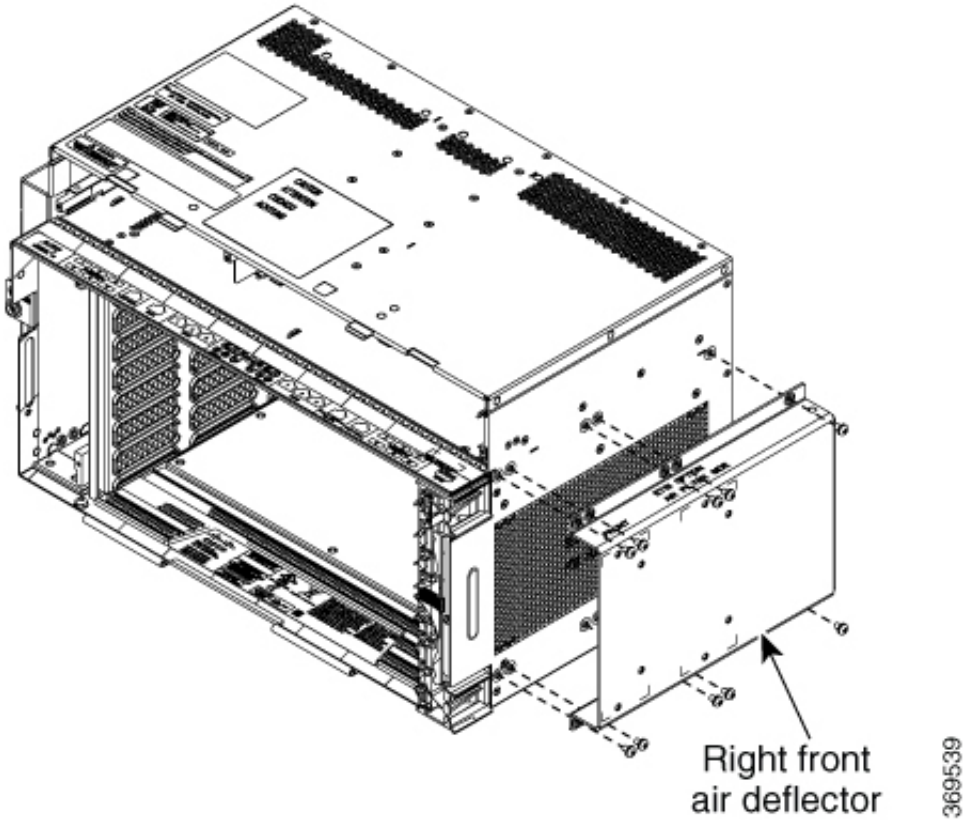
Note It is recommended to maintain a space of one RU between two chassis in a rack for cable management

Note Hot and cold aisle airflow management must be planned for the installation.

Procedure

Step 1 Place the right front air deflector flush against the right side of the chassis (see diagram below).

Figure 230: Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration



Step 2 Align the screw holes on the right front air deflector with the screw holes on the right side of the chassis.

Step 3 Insert M4 pan-head screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 4 Place the mounting bracket flush in the middle or front position of the right front air deflector (see Diagram 1 of Figure 231: Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position, on page 327 or Figure 232: Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Front Position, on page 327).

Step 5 Align the screw holes on the mounting bracket with the screw holes on the right front air deflector .

Step 6 Insert M4 flat-head screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Step 7 Place the mounting bracket flush in the middle or front position on the left side of the chassis (see Diagram 2 of Figure 231: Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position, on page 327 or Figure 232: Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Front Position, on page 327).

Step 8 Align the screw holes on the mounting bracket with the screw holes on the left side of the chassis.

Step 9 Insert M4 pan-head screws and tighten them to a torque value of 11.5 in-lb (1.3 N-m).

Figure 231: Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Middle Position

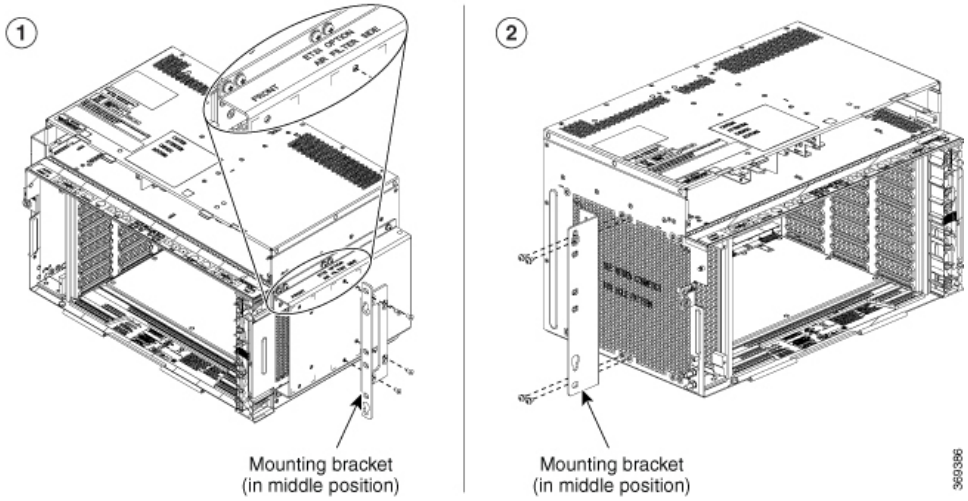
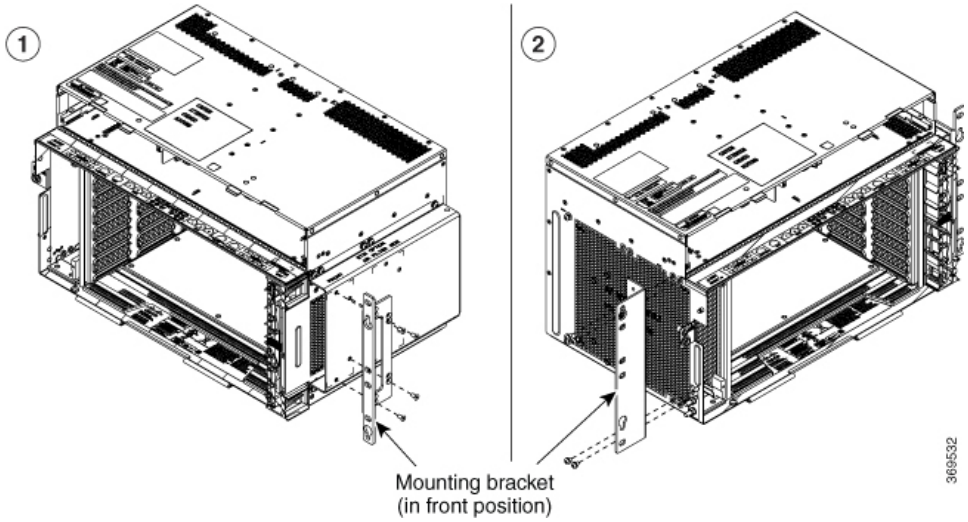


Figure 232: Mounting the Bracket with Air Deflectors (Front-to-Side) on the ONS 15454 M6 Shelf for ETSI Rack Configuration - Front Position



Step 10 Return to your originating procedure (NTP).

DLP-G566 Mount the ONS 15454 M6 Shelf on a Rack (One Person)

Purpose	This task allows one person to mount the shelf on a rack. **Note** When the chassis is installed in the middle position, in an ETSI rack, the cabinet doors must be kept open (if present).

Tools/Equipment	• # 2 Phillips Dynamometric screwdriver • ANSI—Six #12-24 x ¾ pan-head Phillips mounting screws • ETSI—Six M6 mounting screws
Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The ONS 15454 M6 requires a minimum of six RU of vertical rack space. To ensure that the mounting is secure, use two to three M6 mounting screws on each side of the shelf. A shelf should be mounted at the bottom of the rack if it is the only unit in the rack.

Procedure

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

- For a DC power supply, the fuse rating must not exceed 40A.
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes.

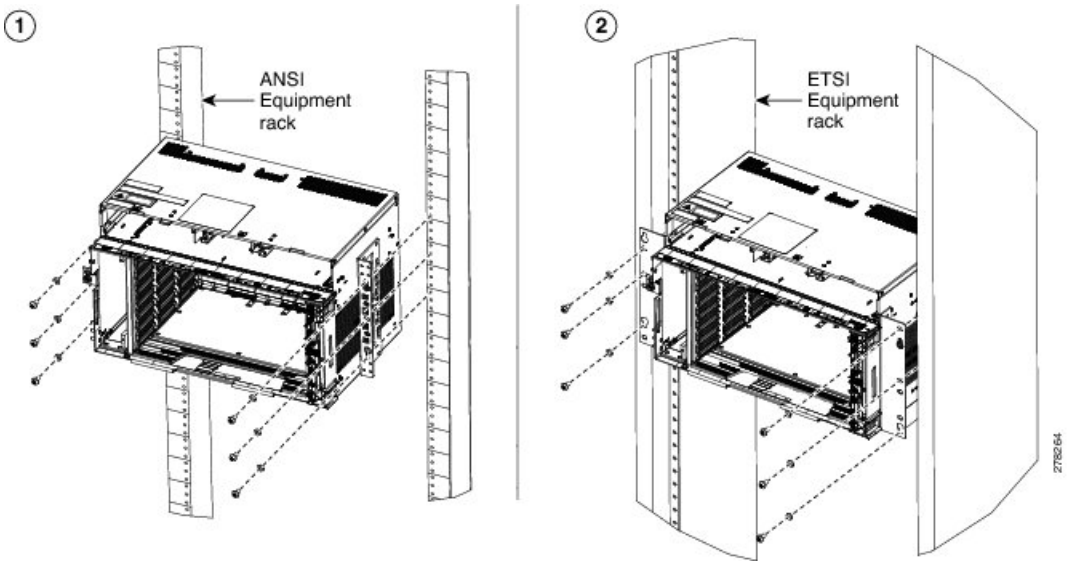
Step 2 Ensure that the shelf is mounted on the appropriate rack equipment:

- 23-inches (584.2 mm) or 19-inches (482.6 mm) for ANSI racks. The recommended 19-inch ANSI rack for the ONS 15454 M6 shelf is shown in Figure 5: 19-inch ANSI Rack Post Recommended for Cisco ONS 15454 M6 and M2 Shelves, on page 5.
- 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) for ETSI racks.

Diagram 1 of Figure 233: Mounting an ONS 15454 M6 on a Rack, on page 329 shows the ONS 15454 M6 shelf mounted on an ANSI rack in the middle position using 19-inch mounting brackets.

Diagram 2 of Figure 233: Mounting an ONS 15454 M6 on a Rack, on page 329 shows the ONS 15454 M6 shelf mounted on an ETSI rack in the front position.

Figure 233: Mounting an ONS 15454 M6 on a Rack



Step 3 Lift the shelf to the desired position in the rack. If the rack is empty, place the shelf at the bottom of the rack. The placement of the shelf is dependent on where you want to install the new equipment in the rack.

Note To ensure proper cooling of the ONS 15454 M6 shelf, make sure that the space in front of the air flow vents are free of cables, fibers, and mechanical fixtures for fiber and cable management.

Step 4 Align the screw holes on the mounting brackets with the mounting holes in the rack.

Step 5 Using the Phillips Dynamometric screwdriver, install one mounting screw in each side of the assembly. Tighten the screw to a torque value of 22 in-lb (2.5 N-m).

Step 6 When the shelf is secured to the rack, install the remaining two mounting screws on either sides.

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

Step 7 Return to your originating procedure (NTP).

DLP-G567 Mount the ONS 15454 M6 Shelf on a Rack (Two People)

Purpose	This task allows two people to mount the shelf on a rack. **Note** When the chassis is installed in the middle position, in an ETSI rack, the cabinet doors must be kept open (if present).

Tools/Equipment	• # 2 Phillips Dynamometric screwdriver
	• ETSI only:
	  • Six M6 x 20 pan-head Phillips mounting screws
	• ANSI only:
	  • Six #12-24 x 3/4 pan-head Phillips mounting screws

Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The ONS 15454 M6 requires a minimum of six RU of vertical rack space. To ensure that the mounting is secure, use two to three M6 mounting screws on each side of the shelf. A shelf should be mounted at the bottom of the rack if it is the only unit in the rack.

Procedure

Step 1 Verify that the proper fuse and alarm panel has been installed in the top mounting space. If a fuse and alarm panel is not present, you must install one as per the instructions of the manufacturer:

- For a a DC power supply, the fuse rating must not exceed 40A.
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes.

Step 2 Ensure that the shelf is mounted on the appropriate rack equipment:

- 23-inches (584.2 mm) or 19-inches (482.6 mm) for ANSI racks.
- 600 x 600-mm (23.6 x 23.6-inch) or 600 x 300-mm (23.6 x 11.8-inch) for ETSI racks.

Step 3 Lift the shelf to the desired position in the rack. If the rack is empty, place the shelf at the bottom of the rack. The placement of the shelf is dependent on where you want to install the new equipment in the rack.

Note To ensure proper cooling of the ONS 15454 M6 shelf, make sure that the space in front of the air flow vents are free of cables, fibers, and mechanical fixtures for fiber and cable management.

Step 4 Align the screw holes on the mounting brackets with the mounting holes in the rack.

Step 5 Have one person hold the shelf in place while the other person uses the Phillips Dynamometric screwdriver to install one mounting screw in each side of the assembly. Tighten the screw to a torque value of 22 in-lb (2.5 N-m).

Step 6 When the shelf is secured to the rack, install the remaining mounting screws.

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

Step 7 Return to your originating procedure (NTP).

DLP-G568 Mount Multiple ONS 15454 M6 Shelves on a Rack

Purpose	This task installs multiple shelves in a rack.

Tools/Equipment	• #2 Phillips Dynamometric screwdriver
	• ETSI only:
	  • Six M6 x 20 pan-head Phillips mounting screws, per shelf
	• ANSI only:
	  • Six #12-24 x 3/4 pan-head Phillips mounting screws, per shelf

Prerequisite Procedures	NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note A standard rack can hold six or seven ONS 15454 M6 shelves. When mounting a shelf in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack. If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Note The ONS 15454 M6 requires a minimum of six RU of vertical rack space.

Procedure

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

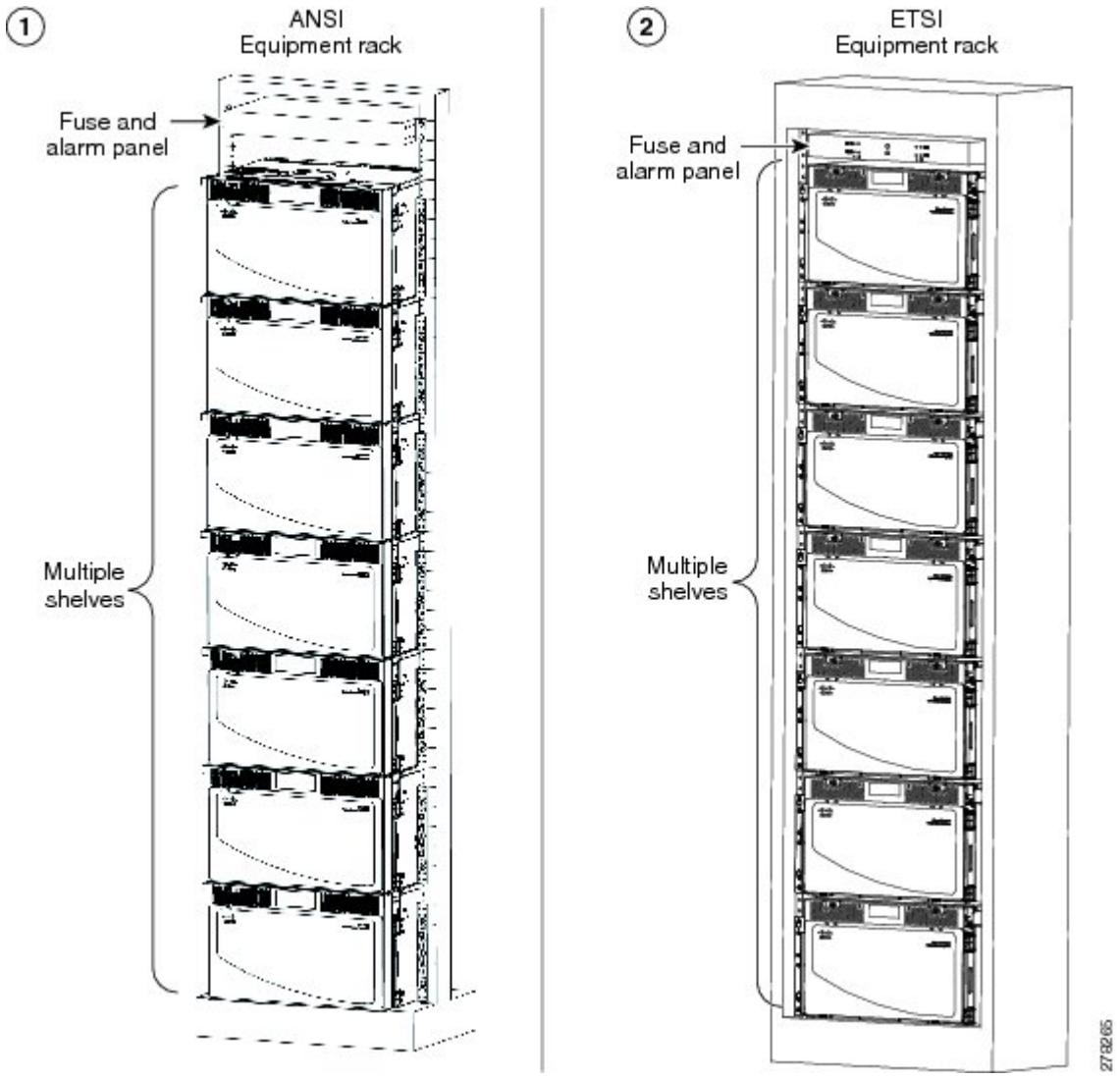
- For a DC power supply, the fuse rating must not exceed 40A.
- For AC power supply, the fuse rating must not exceed 20A.

Step 2 Mount the first shelf in the bottom of the rack using the DLP-G566 Mount the ONS 15454 M6 Shelf on a Rack (One Person) , on page 327 or the DLP-G567 Mount the ONS 15454 M6 Shelf on a Rack (Two People) , on page 329.

Diagram 1 of Figure 234: Multiple ONS 15454 M6 Shelves Mounted on the Rack, on page 332 shows multiple ONS 15454 M6 shelf assemblies mounted on the ANSI rack.

Diagram 2 of Figure 234: Multiple ONS 15454 M6 Shelves Mounted on the Rack, on page 332 shows multiple ONS 15454 M6 shelf assemblies mounted on the ETSI rack.

Figure 234: Multiple ONS 15454 M6 Shelves Mounted on the Rack



Step 3 Repeat step 2 for every shelf you need to install.

Step 4 Return to your originating procedure (NTP).

Front Door

The front door of the ONS 15454 M6 provides access to the shelf, fiber-routing tray, fan-tray assembly, and LCD screen.

There are two types of front doors that act as protective panels—standard door and deep-front panel. The deep-front panel provides additional space in front of the shelf to accommodate cables that do not fit inside the standard door. It also provides more space for fiber bend radius and to manage the line card connections.The

deep-front panel does not have a hinge and cannot be rotated like the standard door. The fiber or cable guide used in the ONS 15454 M6 shelf provides improved fiber management.

If a standard front door was ordered, the ONS 15454 M6 is shipped with a preinstalled standard door. If a deep-front panel was ordered, a temporary front door is preinstalled on the shelf and the deep-front panel is present in a separate package. If no door was ordered, a temporary front door is preinstalled on the shelf.

Note The temporary door is used only for shipping purpose and must not be used in the chassis. The temporary door can be opened by removing the tape that is present on top of the door.

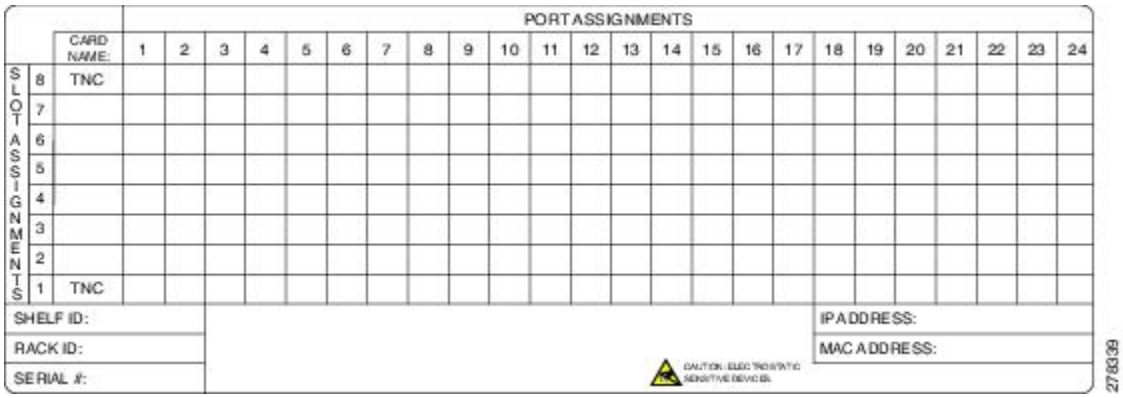
You must remove the door before proceeding with the shelf installation.

The ONS 15454 M6 door can be opened by loosening the front screws and pushing the latch in the opposite direction. You can remove the front door to provide unrestricted access to the front of the shelf.

An erasable label is pasted on the inside of the front door. You can use the label to record slot and port assignments, card types, node ID, rack ID, and serial number of the ONS 15454 M6 shelf.

The following figure shows the erasable label on the ONS 15454 M6 shelf.

Figure 235: ONS 15454 M6 Front-Door Erasable Label



The laser warning label is placed on top of the chassis.

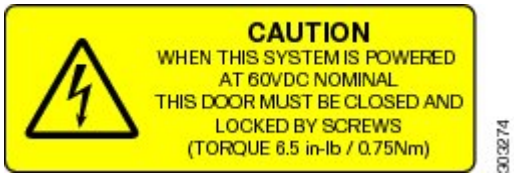
The following figure shows the ONS 15454 M6 laser warning.

Figure 236: Laser Warning on the ONS 15454 M6

The following figure shows the label that is placed on top of ONS 15454 M6:

Figure 237: ONS 15454 M6 Label

Figure 238: ONS 15454 M6 Front Door Label



NTP-G258 Install the Standard Door of the ONS 15454 M6 Shelf

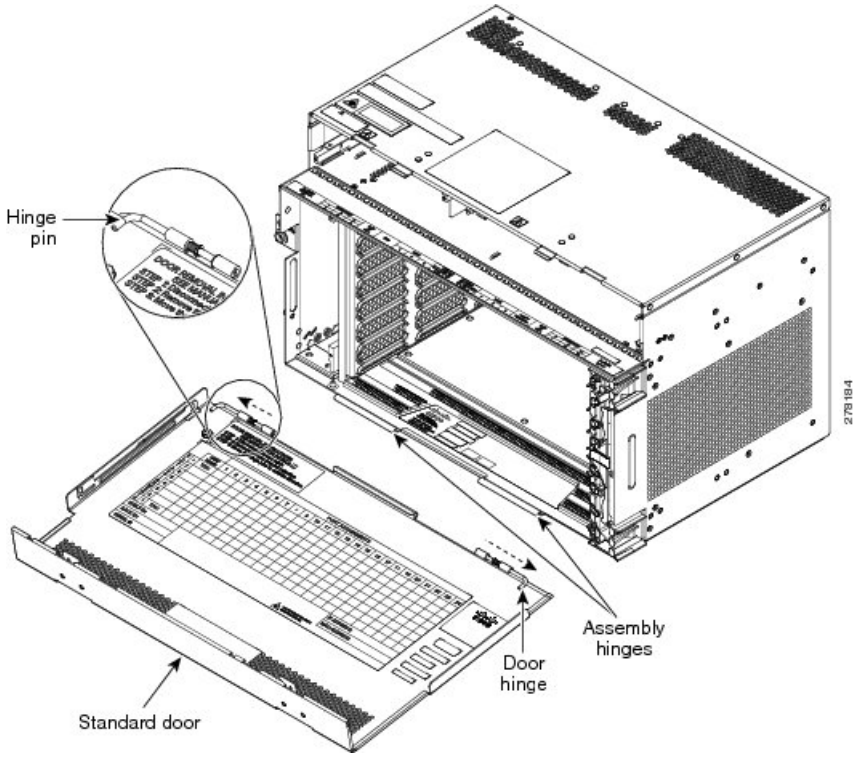
Purpose	This procedure installs the standard door of the ONS 15454 M6 shelf.
Tools/Equipment	#2 Phillips Dynamometric screwdriver

Prerequisite Procedures	• NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339 • NTP-G252 Install the ONS 15454 M6 Shelf , on page 306 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G253 Install the ECU or ECU-S Module, on page 362 • NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368 • NTP-G255 Install the LCD Module in the ONS 15454 M6 Shelf, on page 379 • NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383 • NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf, on page 401 • NTP-G290 Install the Cable and Fiber Modules, on page 404 • NTP-G312 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections in Cisco ONS 15454 M6, on page 410
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Pull the hinge pins on the standard door in the opposite directions (see the following figure).

Figure 239: Installing the Standard Door



Step 2 Align the standard door hinges with the chassis hinges.

Step 3 Release the hinge pins.

Step 4 Pull the retention feature from the door (see Figure 240: Mounting the Mechanical Stop, on page 337).

Step 5 Loosen the screws and place the mechanical stop on the retention feature. (See Diagram 1 of Figure 240: Mounting the Mechanical Stop, on page 337.)

Step 6 Place the retention feature on the pin present on the chassis. (See Diagram 2 of Figure 240: Mounting the Mechanical Stop, on page 337.)

Step 7 Raise the door to slide the pin. (See Diagram 3 of Figure 240: Mounting the Mechanical Stop, on page 337.)

Step 8 Slide the mechanical stop to lock the door position and tighten the screws. (See Diagram 4 of Figure 240: Mounting the Mechanical Stop, on page 337.)

Note Reinstall the door after installing all the other modules.

Figure 240: Mounting the Mechanical Stop

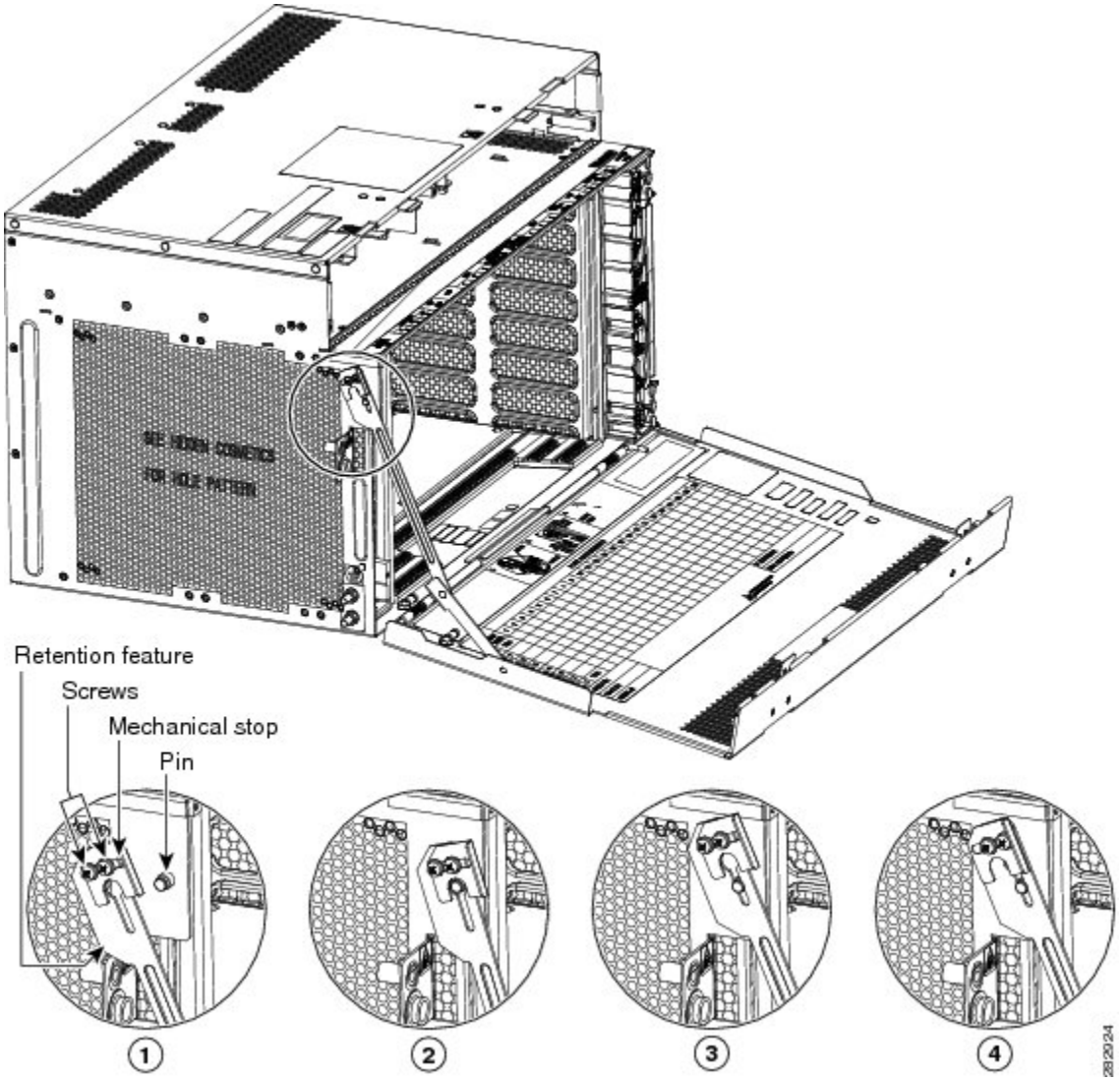
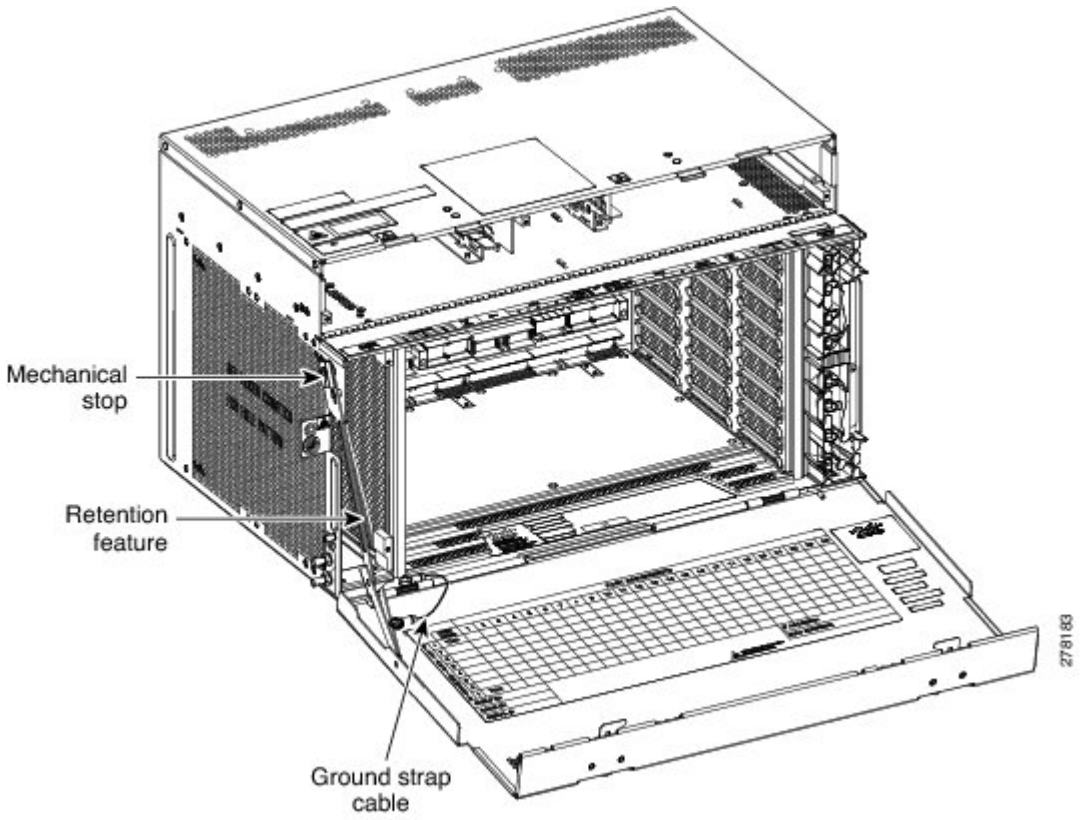


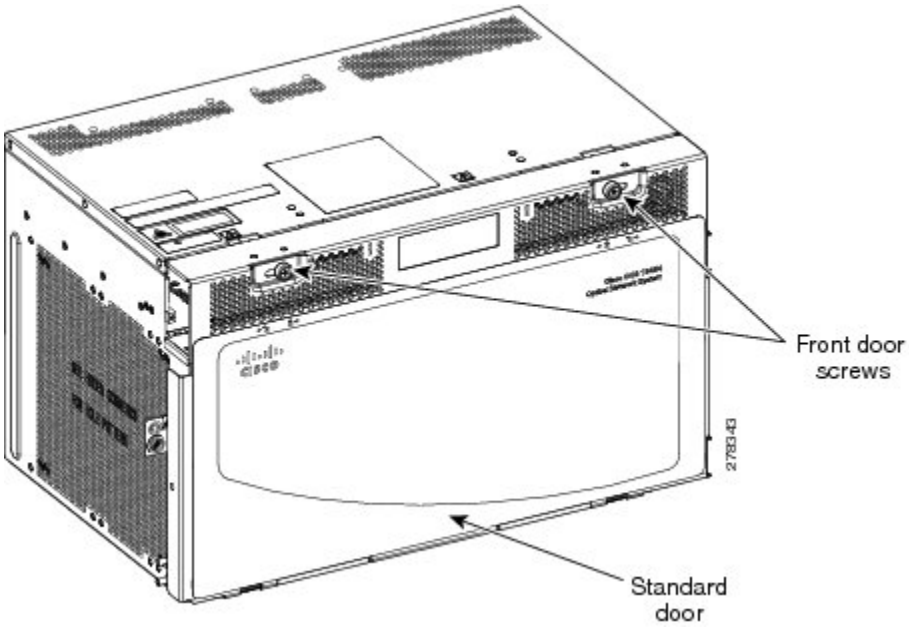
Figure 241: Retention Feature and Ground Strap Cable—Standard Door



Step 9 Place the ground strap cable (see Figure 241: Retention Feature and Ground Strap Cable—Standard Door, on page 338) on the door and the chassis and tighten the nuts to a torque value of 11.5 in-lb (1.3 N-m) to lock the cable.

Step 10 Tighten the door screws to a torque value of 6.5 in-lb (0.75 N-m) to close the standard door as shown in the following figure.

Figure 242: Closing the Standard Door of the ONS 15454 M6 Shelf



Stop. You have completed this procedure.

NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf

Purpose	This procedure opens and removes the standard door of the ONS 15454 M6 shelf.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Complete the DLP-G576 Open the Standard Door of the ONS 15454 M6 Shelf , on page 340.

Step 2 Complete the DLP-G577 Remove the Standard Door of the ONS 15454 M6 Shelf , on page 342.

Stop. You have completed this procedure.

DLP-G576 Open the Standard Door of the ONS 15454 M6 Shelf

Purpose	This task opens the standard door of the ONS 15454 M6 shelf.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

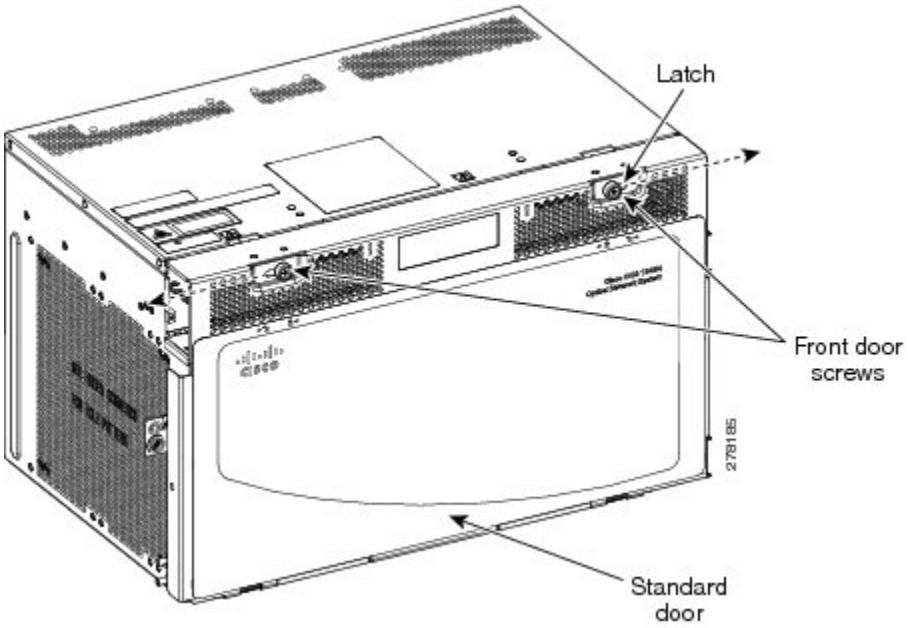
Note The ONS 15454 M6 shelf has an ESD plug input and is shipped with an ESD wrist strap. The ESD plug input is located on the outside of the shelf on the left side. It is labeled “ESD” on the top and bottom. Always wear an ESD wrist strap and connect the strap to the ESD plug when working on the ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 Loosen the standard door screws to a torque value of 6.5 in-lb (0.75 N-m) (see the following figure).

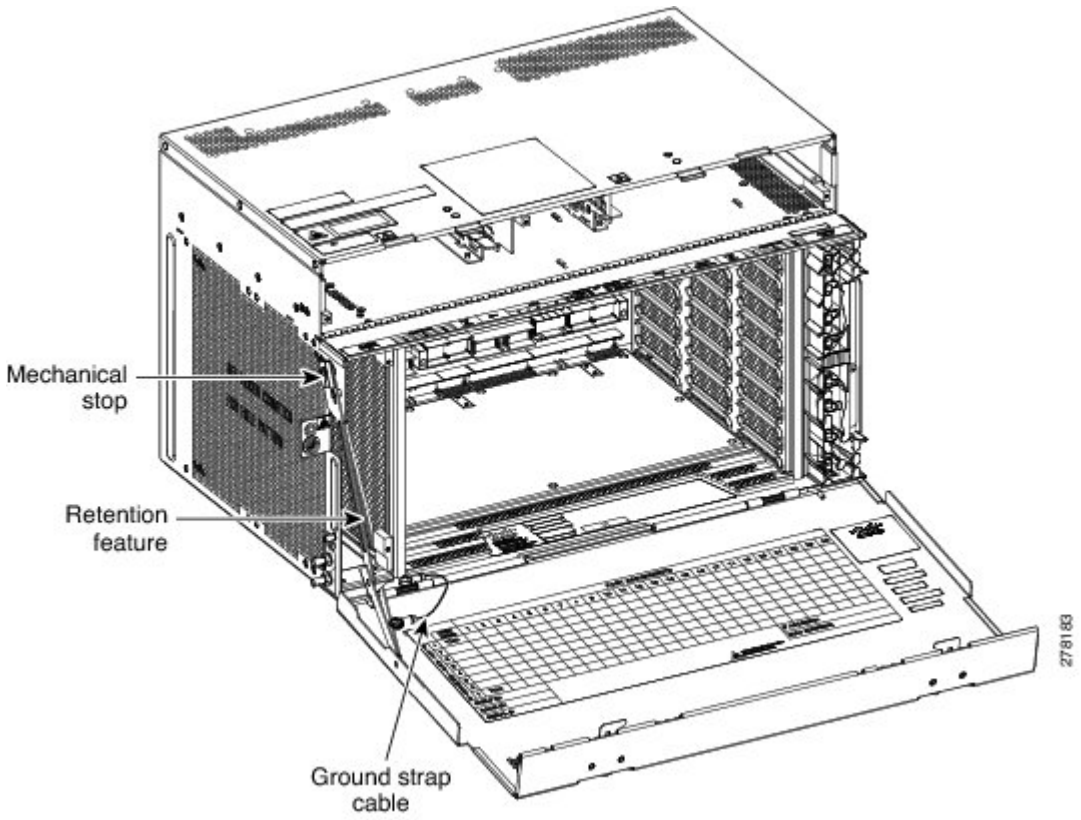
Step 2 Push the latches in the opposite direction as shown in the following figure.

Figure 243: Opening the Standard Door



Step 3 Swing the door open. The retention feature maintains the door in the horizontal position for line card insertion (see the following figure).

Figure 244: Cisco ONS 15454 M6 Standard Door—Opened



Step 4 Return to your originating procedure (NTP).

DLP-G577 Remove the Standard Door of the ONS 15454 M6 Shelf

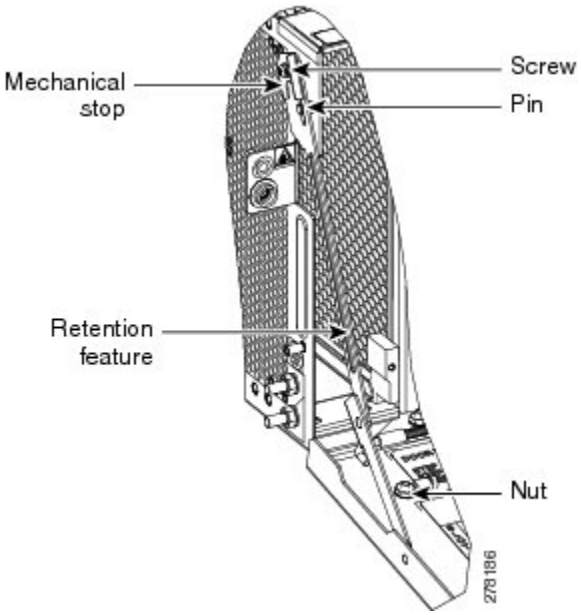
Purpose	This task removes the standard door of the ONS 15454 M6 shelf.
Tools/Equipment	None
Prerequisite Procedures	DLP-G576 Open the Standard Door of the ONS 15454 M6 Shelf , on page 340
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Unscrew the nut holding the ground cable to the shelf. Remove the nut.

Step 2 Remove the ground cable from the shelf (see the following figure).

Figure 245: Removing the ONS 15454 M6 Standard Door



Step 3 Loosen the screws and slide the mechanical stop to unlock the door.

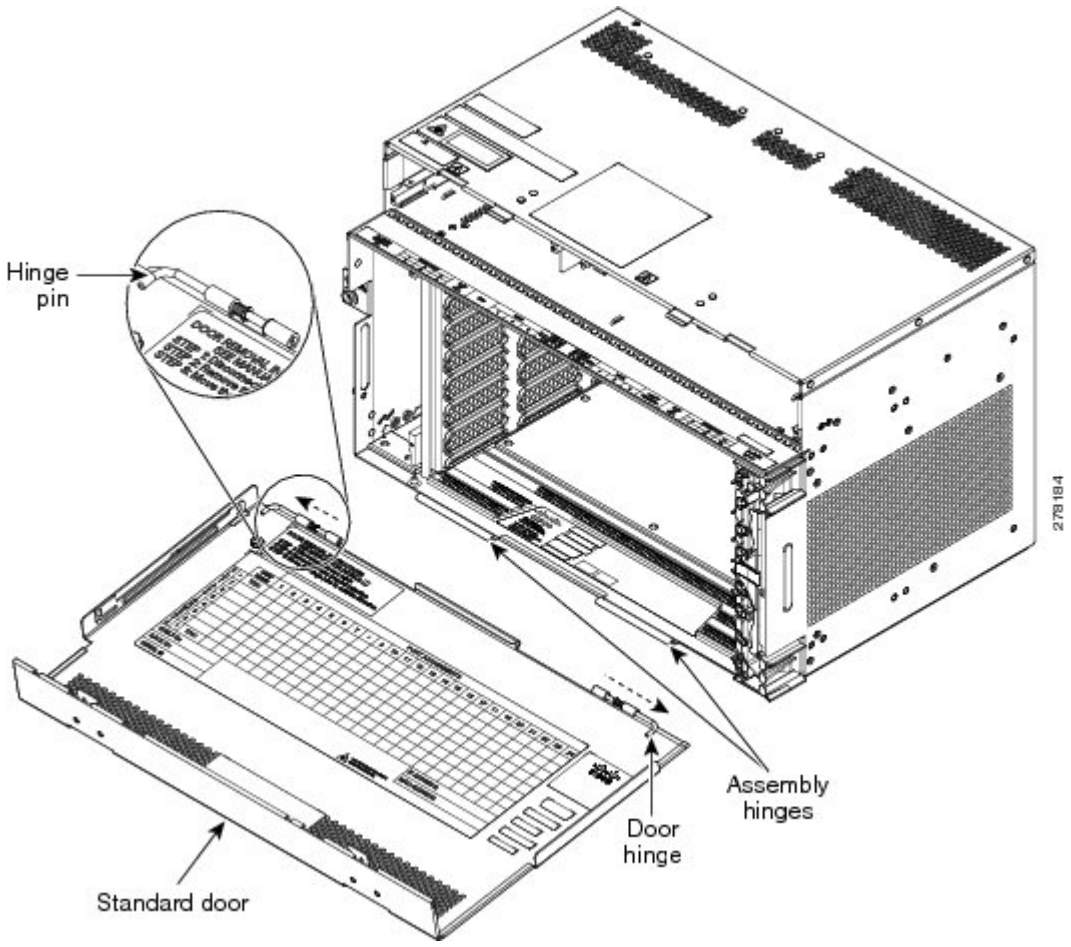
Step 4 Lower the door to slide the pin.

Step 5 Remove the retention feature from the pin present on the chassis.

Step 6 Pull the hinge pins holding the door to the chassis, in the opposite direction (see the following figure).

Step 7 Remove the door from its hinges (see the following figure).

Figure 246: Removing the ONS 15454 M6 Standard Door



Step 8 Return to your originating procedure (NTP).

NTP-G327 Install the Deep-Front Panel of the ONS 15454 M6 Shelf

Purpose	This procedure installs the deep-front panel of the ONS 15454 M6 shelf.
Tools/Equipment	2 Phillips Dynamometric screwdriver Socket (6/32 standard) and socket wrench to tighten or loosen the ground nut

Prerequisite Procedures	Remove the temporary door by removing the tape on top of the door. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339 • DLP-G576 Open the Standard Door of the ONS 15454 M6 Shelf , on page 340 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G253 Install the ECU or ECU-S Module, on page 362 • NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368 • NTP-G255 Install the LCD Module in the ONS 15454 M6 Shelf, on page 379 • NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383 • NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf, on page 401 • NTP-G290 Install the Cable and Fiber Modules, on page 404 • NTP-G312 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections in Cisco ONS 15454 M6, on page 410
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note Use the deep-front panel when ONS-SC+-10G-C pluggables are installed on ONS 15454 M6 shelf.

Note When the deep front-panel is installed, the total chassis depth is 12.9 inches. The deep front-panel extends from the rack by 1.8 inches.

Caution The deep-front panel does not have a hinge and cannot be rotated like a standard door. Rotating the deep-front panel can damage the deep-front panel, shelf hinges, other devices and cables placed below the ONS 15454 M6 shelf.

Procedure

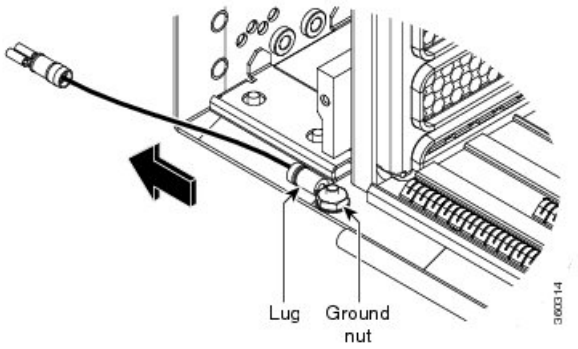
Step 1 Connect the ground strap cable to the shelf:

a) Loosen and remove the ground nut from the shelf.

b) Insert the lug of the ground strap cable and tighten the nut on the shelf to a torque value of 11.5 in-lb (1.3 N-m). See the following figure.

c) Route the other end of the ground strap cable outside the shelf at an angle of 180 degrees towards the left.

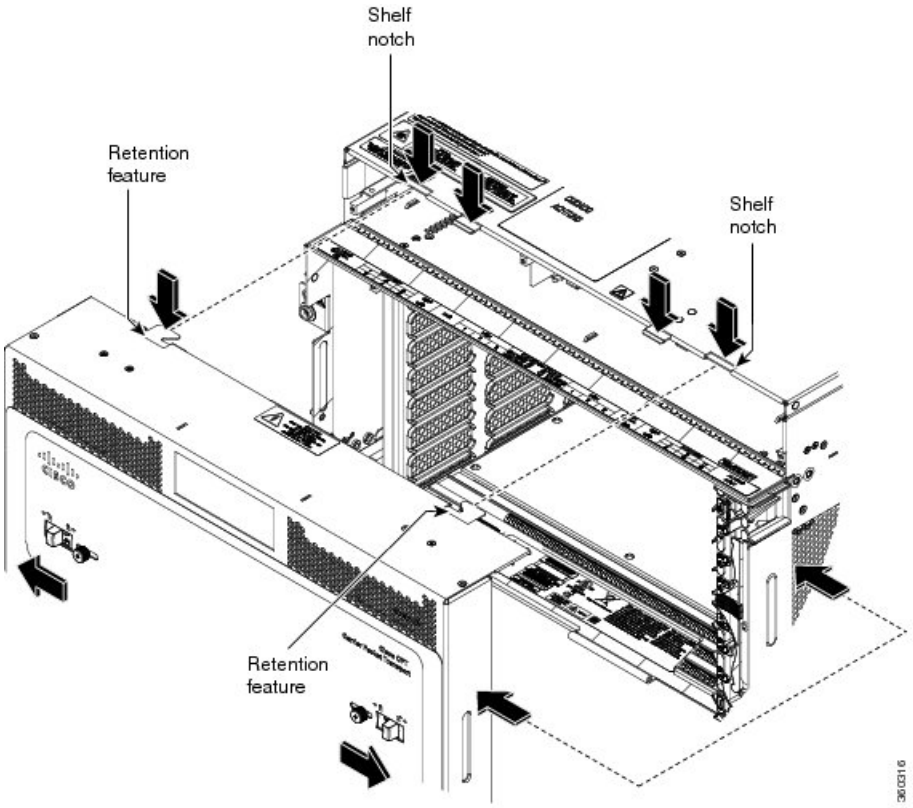
Figure 247: Insert the lug



Step 2 Loosen the deep-front panel screws and slide them outwards using the plastic tabs.

Step 3 Place the deep-front panel close to the shelf so that the shelf notches, and the deep-front panel retention features are in line, as shown in the following figure.

Figure 248: Placing Deep-Front Panel and Shelf in line

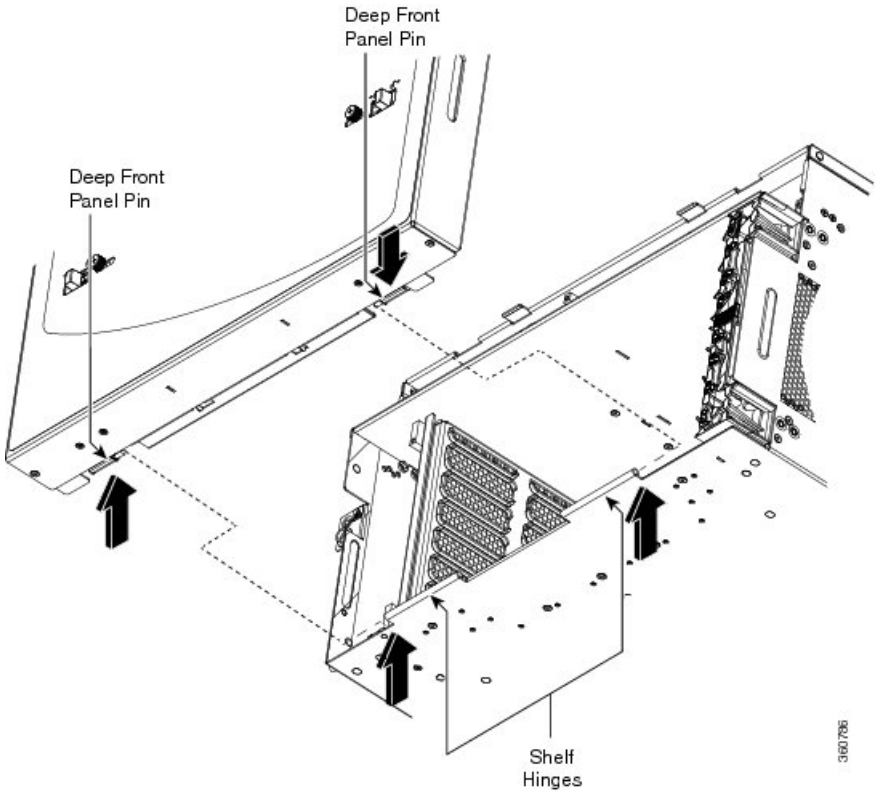


Step 4 Align the deep-front panel with the shelf by performing these sub-steps at the same time.

a) Align the right and left retention features of the deep-front panel with the right and left notches present on the top of the shelf (see the following figure).

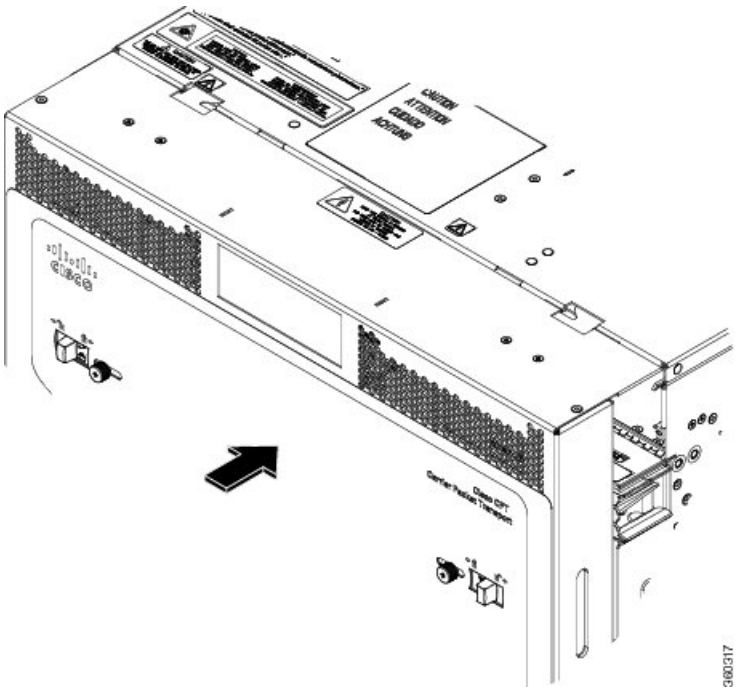
b) Align the deep-front panel pins present at the bottom of the panel with the shelf hinges (see the following figure).

Figure 249: Aligning the Deep-Front Panel Pins and Shelf hinges



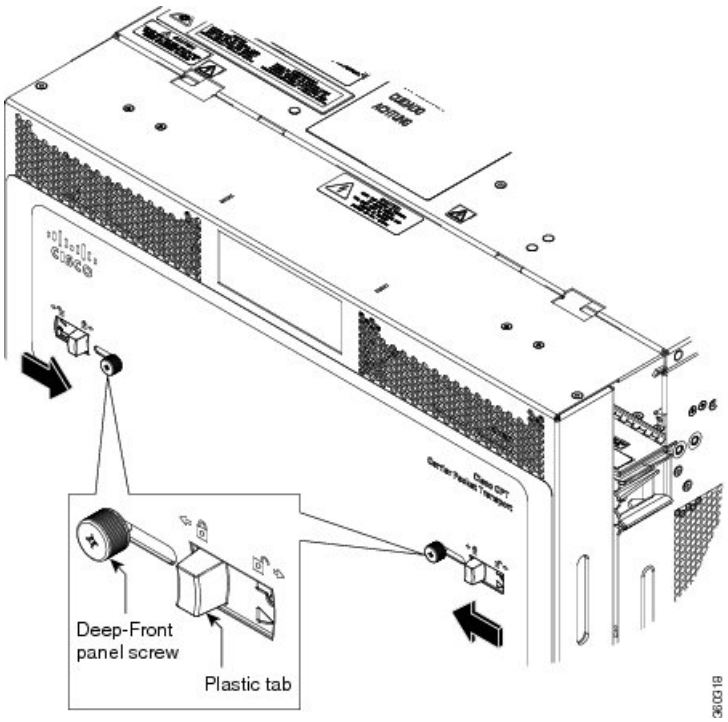
The following figure shows the deep-front panel aligned with the shelf.

Figure 250: Aligning the Deep-Front Panel and Shelf



Step 5 Slide the deep-front panel screws inwards using the plastic tabs to engage the retention features and the pins with the shelf notches and hinges (see the following figure). Verify the engagement by gently applying outward pressure to the panel.

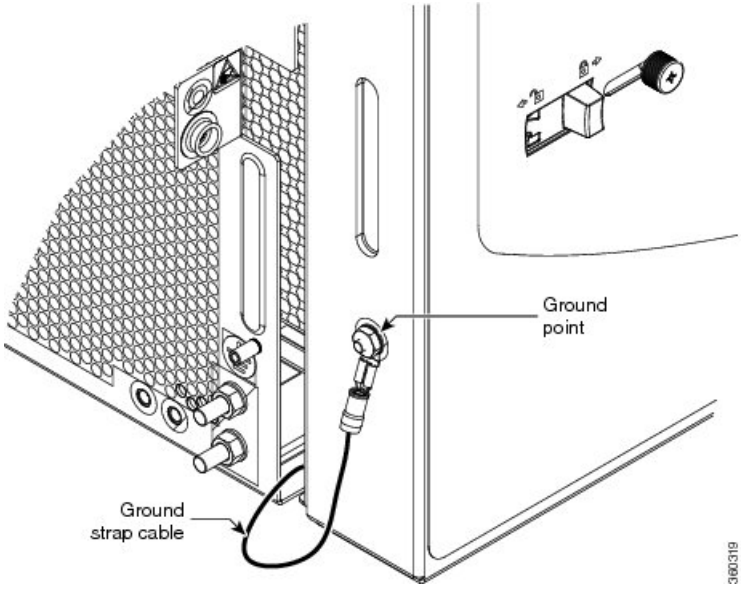
Figure 251: Engaging the Deep-Front Panel and Shelf



Step 6 Lock the deep-front panel by tightening the screws to a torque value of 6.5 in-lb (0.75 N-m).

Step 7 Connect the other end of the ground strap cable to the ground point present on the deep-front panel exterior (see the following figure).

Figure 252: Connecting ground strap cable to the ground point



Stop. You have completed this procedure.

NTP-G329 Remove the Deep-Front Panel of the ONS 15454 M6 Shelf

Purpose	This procedure removes the deep-front panel of the ONS 15454 M6 system.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Socket (6/32 standard) and socket wrench to tighten or loosen the ground nut
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306 • NTP-G327 Install the Deep-Front Panel of the ONS 15454 M6 Shelf, on page 344 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

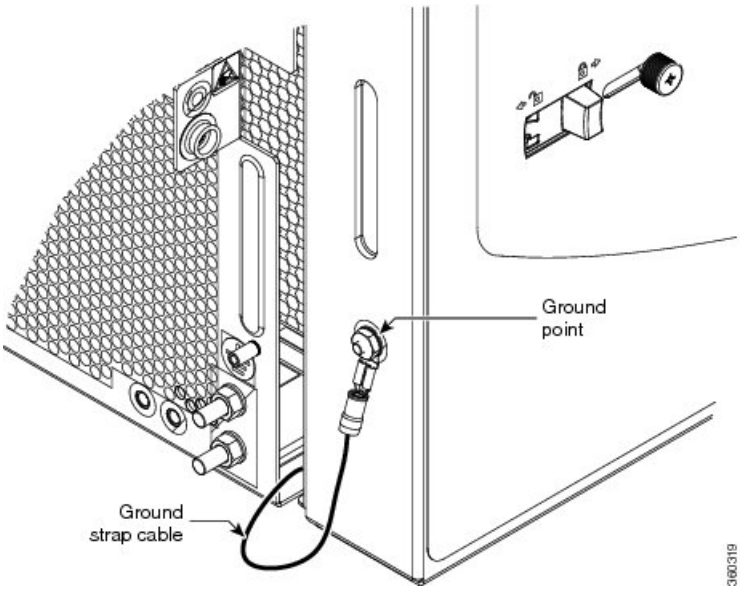
Caution The deep-front panel does not have a hinge and cannot be rotated like a standard door. Rotating the deep-front panel can damage the deep-front panel, shelf hinges, other devices and cables placed below the ONS 15454 M6 shelf.

Note When the deep front-panel is installed, the total chassis depth is 12.9 inches. The deep front-panel extends from the rack by 1.8 inches.

Procedure

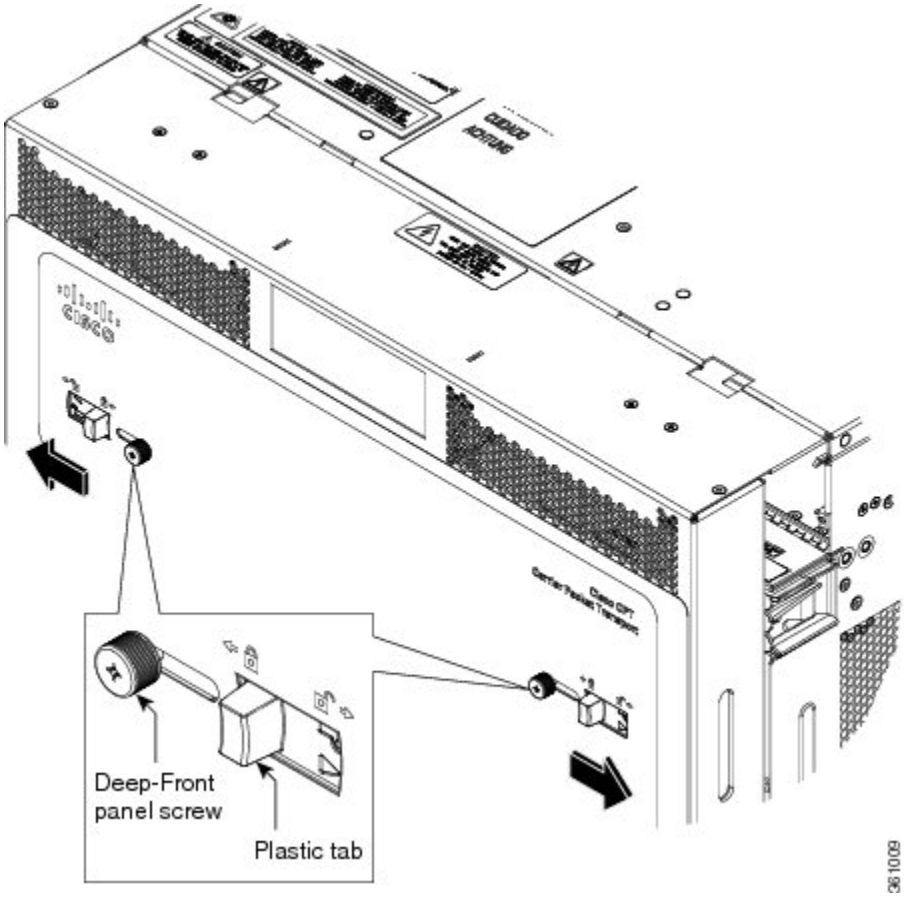
Step 1 Remove the end of the ground strap cable that is connected to the exterior of the deep-front panel (see the following figure).

Figure 253: Removing the end of the ground strap cable



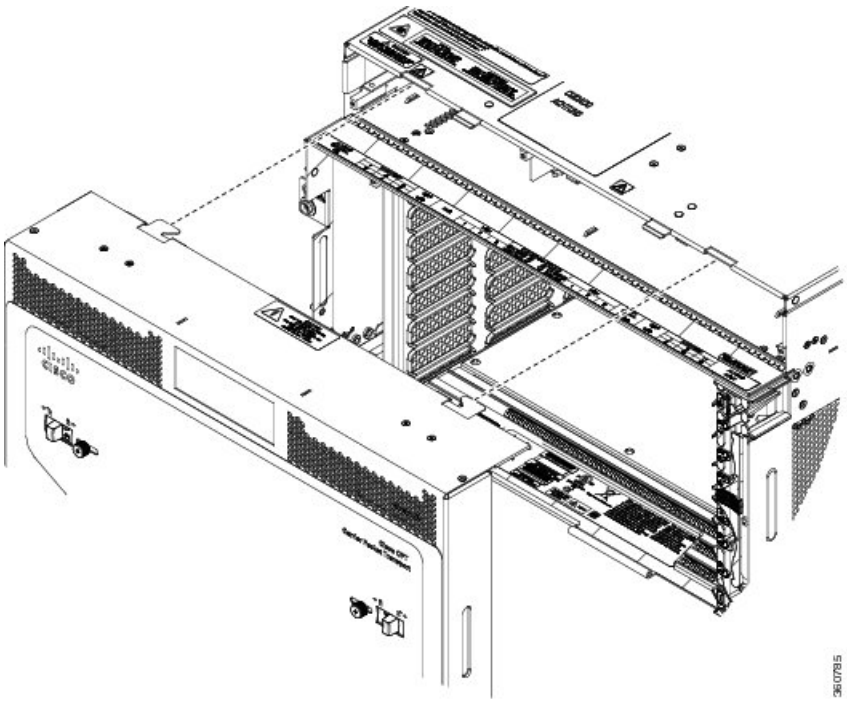
Step 2 Loosen the deep-front panel screws and slide them outwards using the plastic tabs to open the deep-front panel as shown in the following figure.

Figure 254: Moving the deep-front panel to disengage



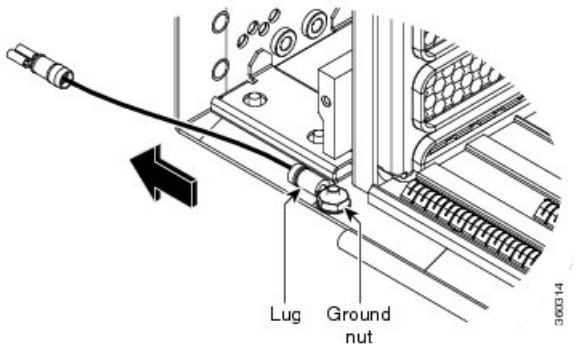
Step 3 Move the deep-front panel away from the shelf (see the following figure).

Figure 255: Moving the deep-front panel away



Step 4 Remove the ground strap cable from the shelf (see the following figure).

Figure 256: Removing the ground strap cable



a) Loosen the ground nut on the shelf.
b) Remove the lug and tighten the nut on the shelf to a torque value of 11.5 in-lb (1.3 N-m).

Stop. You have completed this procedure.

External Connection Units

The external connection unit (ECU) is a replaceable module placed on top of the ONS 15454 M6 shelf. The ECU module discovers and manages the inventory of the external shelf units. It also handles the multishelf management connections and timing synchronizations. There are three types of ECU modules available for the ONS 15454 M6 shelf, namely ECU (PN: 15454-M6-ECU=), ECU2 (PN: 15454-M6-ECU2=), ECU-60V (PN: 15454-M6-ECU-60=), ECU-S, and ECU60-S.

The ECU and ECU2 modules can be interchanged on an ONS 15454 M6 shelf without any alarms.

A label, as shown in the following figure, is present on the ONS 15454 M6 shelf indicating the connections for the ECU module.

Figure 257: Connector Label for ECU Module

ECU

The external connections of ONS 15454 M6 present on the ECU are:

- 12 remote inventory standard USB connections
- 2 BITS-OUT connections (2 subminiature version B [SMB] connectors for ETSI and 4 wire-wrap pins for ANSI)
- 2 BITS-IN connections (2 SMB connectors for ETSI and 4 wire-wrap pins for ANSI)
- 6 multishelf connections
- 1 element management system (EMS) connection
- 1 craft terminal connection
- 2 VoIP or 2 user data channel (UDC) connections, or one each of VoIP and UDC connections
- 1 SCSI with 26 poles for TNC and TNCE relay contact, including alarm cut-off (ACO) signal and digital I/O (D-I/O) signals (on the left-side connector)
- 1 SCSI with 26 poles for digital I/O signals (on the right-side connector)

The following figure shows the ECU connectors.

Figure 258: Connectors on the ECU Faceplate

Note The ECU should not be used when the shelf is powered at –60V DC nominal input voltage.

ECU2

The ECU2 is an advanced version of the ECU. The ECU2 is hardware-ready to support IEEE1588v2 PTP, time-of-day (ToD), and pulse-per-second (PPS) inputs. The external connections of ONS 15454 M6 present on the ECU2 are:

- 12 remote inventory standard USB connections
- 2 BITS-OUT connections (2 subminiature version B[SMB] connectors for ETSI and 4 wire-wrap pins for ANSI)
- 10 MHz IN and OUT and PPS IN and OUT (hardware-ready)
- 2 BITS-IN connections (2 SMB connectors for ETSI and 4 wire-wrap pins for ANSI)
- 6 multishelf connections
- 1 element management system (EMS) connection
- 1 craft terminal connection
- 1 time-of-day (ToD) connection (hardware-ready)
- 2 VoIP or 2 user data channel (UDC) connections, or one each of VoIP and UDC connections
- 1 SCSI with 26 poles for TNC relay contact, including alarm cut-off (ACO) signal and digital I/O (D-I/O) signals (on the left-side connector)
- 1 SCSI with 26 poles for digital I/O signals (on the right-side connector)

The following figure shows the ECU2 connectors.

Figure 259: Connectors on ECU2 Faceplate

Note The ECU2 should not be used when the shelf is powered at –60 VDC nominal input voltage.

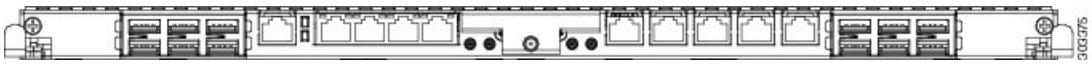
ECU-60V

The ECU-60V is used when the shelf is powered at –60 VDC nominal input voltage. The external connections of ONS 15454 M6 present on the ECU-60V are:

- 12 remote inventory standard USB connections
- 2 BITS-OUT connections (2 subminiature version B [SMB] connectors for ETSI and 4 wire-wrap pins for ANSI)
- 10 MHz IN and OUT and PPS IN and OUT (hardware-ready)
- 2 BITS-IN connections (2 SMB connectors for ETSI and 4 wire-wrap pins for ANSI)
- 6 multishelf connections
- 1 element management system (EMS) connection
- 1 craft terminal connection
- 1 time-of-day (ToD) connection (hardware-ready)
- 2 user data channel (UDC) connections

The following figure shows the ECU-60V connectors.

Figure 260: Connectors on ECU-60V Faceplate



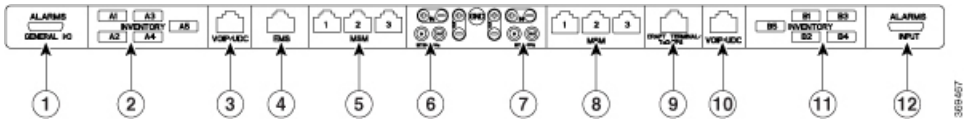
ECU-S

ECU-S is a new type of ECU introduced in Release 10.5.2 for ONS 15454 M6. The ECU-S module also discovers and manages the inventory of the external shelf units. It also handles the multishelf management connections and timing synchronizations. The ECU-S module available for the ONS 15454 M6 shelf is 15454-M6-ECU-S=. The ONS 15454 M6 ECU-S is backward-compatible with Release 10.1, 10.3, and 10.5. However, there is a small difference in the port numbers detected. The details are listed in the section below.

Note The NCS 2006 ECU-S should not be used when the shelf is powered at –60V DC nominal input voltage.

The following figure shows the ONS 15454 M6 ECU-S connectors.

Figure 261: Connectors on the ONS 15454 M6 ECU-S Faceplate



1	1 SCSI with 26 poles for TNC relay contact, including ACO signal and digital I/O signals
2	USB 2.0 ports (Ports A1, A2, A3, A4) and USB 3.0 port (Port A5)
3	VOIP/UDC port (RJ-45 port)
4	EMS port (RJ-45 port)
5	Three MSM ports
6	BITS1 input and output ports
7	BITS2 input and output ports
8	Three MSM ports
9	Craft terminal port
10	VOIP/UDC port (RJ-45 port)
11	USB 2.0 ports (Ports B1, B2, B3, B4) and USB 3.0 port (Port B5)
12	1 SCSI with 26 poles for digital I/O signal

The ONS 15454 M6 ECU-S supports IEEE1588v2 PTP, time-of-day (ToD), and pulse-per-second (PPS) inputs. To support high power USB devices, ONS 15454 M6 ECU-S provides a current of 500 mA to each of the ports. The IMPROPRMVL alarm is raised in CTC when the ECU-S is removed from the NCS 2006 shelf.

Note When ONS 15454 M6 is pre-provisioned, or plugged in without the ECU-S unit, by default, CTC uses the ECU module with the 12 USB 2.0 ports.

The fiber shuffle unit, which can be used to interface 14 single slot passive optical modules can be connected to the ONS 15454 M6 ECU-S using the USB 3.0 port.

The MPO-fan-out unit, which can be used to interface 10 double slot passive optical modules can be connected to the ONS 15454 M6 ECU-S using the USB 3.0 port.

The external connections present on the ONS 15454 M6 ECU-S are:

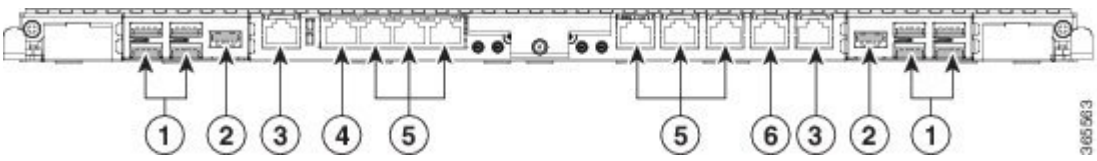
- 2 USB 3.0 connections
  - The USB 3.0 port on the left of the faceplate is detected as A5.
  - The USB 3.0 port on the left of the faceplate is detected as B5.
- 8 USB 2.0 connections
  - 4 USB 2.0 on the left of the faceplate are detected as A1, A2, A3, A4.
  - 4 USB 2.0 ports on the right of the faceplate are detected as B1, B2, B3, B4. In Release 10.1, 10.3, and 10.5, these ports are detected as A5, A6, B1, B2 respectively.
- 2 BITS-OUT connections (2 subminiature version B [SMB] connectors for ETSI and 4 wire-wrap pins for ANSI)
- 10 MHz IN and OUT and PPS IN and OUT (hardware-ready)
- 2 BITS-IN connections (2 SMB connectors for ETSI and 4 wire-wrap pins for ANSI)
- 6 multishelf connections
- 1 element management system (EMS) connection
- 1 craft terminal connection
- 1 time-of-day (ToD) connection (hardware-ready)
- 2 VoIP or 2 user data channel (UDC) connections, or one each of VoIP and UDC connections
- 1 SCSI with 26 poles for TNC relay contact, including alarm cut-off (ACO) signal and digital I/O (D-I/O) signals (on the left-side connector)
- 1 SCSI with 26 poles for digital I/O signals (on the right-side connector)

ECU60-S

ECU60-S is a new type of ECU-S introduced for the ONS 15454 M6 when the shelf is powered at –60 VDC nominal input voltage. The ECU60-S module available for the ONS 15454 M6 shelf is 15454 M6-ECU60-S=.

The following figure shows the ONS 15454 M6 ECU60-S connectors.

Figure 262: Connectors on the ONS 15454 M6 ECU60-S Faceplate



1	USB 2.0 ports (Ports 1 through 4 and ports 7 through 10)

2	USB 3.0 ports (Ports 5 and 11)
3	VOIP/UDC ports (RJ-45 port)
4	EMS port (RJ-45 port)
5	MSM ports
6	Craft terminal connection

The ONS 15454 M6 ECU60-S supports IEEE1588v2 PTP, time-of-day (ToD), and pulse-per-second (PPS) inputs. The IMPROPRMVL alarm is raised in CTC when the ECU60-S is removed from the ONS 15454 M6 shelf.

Note When ONS 15454 M6 is pre-provisioned, or plugged in without the ECU60-S unit, by default, CTC uses the ECU module with the 12 USB 2.0 ports.

The fiber shuffle unit or the NCS2K-MF-6RU unit, which can be used to interface 14 single slot passive optical modules can be connected to the ONS 15454 M6 ECU60-S using the USB 3.0 port.

The MPO-fan-out unit or the NCS2K-MF10-6RU unit, which can be used to interface 10 double slot passive optical modules can be connected to the ONS 15454 M6 ECU60-S using the USB 3.0 port.

The ONS 15454 M6 ECU60-S is backward-compatible with releases prior to 10.5.2.

The external connections present on the NCS 2006 ECU60-S are:

- 2 USB 3.0 connections
  - The USB 3.0 port on the left of the faceplate is detected as A5.
  - The USB 3.0 port on the left of the faceplate is detected as B5.
- 8 USB 2.0 connections
  - 4 USB 2.0 on the left of the faceplate are detected as A1, A2, A3, A4.
  - 4 USB 2.0 ports on the right of the faceplate are detected as B1, B2, B3, B4. In releases prior to 10.5.2, these ports are detected as A5, A6, B1, B2 respectively.
- 2 BITS-OUT connections (2 subminiature version B [SMB] connectors for ETSI and 4 wire-wrap pins for ANSI)
- 10 MHz IN and OUT and PPS IN and OUT (hardware-ready)
- 2 BITS-IN connections (2 SMB connectors for ETSI and 4 wire-wrap pins for ANSI)
- 6 multishelf connections
- 1 element management system (EMS) connection
- 1 craft terminal connection
- 1 time-of-day (ToD) connection (hardware-ready)
- 2 VoIP or 2 user data channel (UDC) connections, or one each of VoIP and UDC connections

Note POE functionality is not available for the VOIP ports.

You can upgrade to the NCS2006 ECU60-S from an older ECU (ECU/ECU-2/ECU-S) in the ONS 15454 M6 shelf. For more information, see NTP-L68 Upgrading to ONS 15454 M6 ECU60-S Module, on page 365.

Alarm Connectors

The ECU modules, except for ECU-60V, have two SCSI alarm connectors that are used to connect ONS 15454 M6 to support external alarms. The alarm connectors provide dry alarm contacts and are similar to the AIC-I card of the ONS 15454 shelf. The left alarm connector is used for TNC and TNCE relay contact, including Alarm Cut Off (ACO) signal and Digital Input/Output (D-I/O) signals. The right alarm connector is used for Digital Input/Output (D-I/O) signals. To export alarms from the ONS 15454 M6 shelf to a third party device, use the output pins of either the right alarm connector or the left alarm connector.

When external controls are not provisioned, 14 external input alarms are available. Input alarm 11 and input alarm 12 are available on the left side connector; input alarm 13 and input alarm 14 are available on the right side connector.

When external controls are provisioned, only 10 external input alarms are available.

Note In a multishelf configuration, alarms on the subtended shelves cannot be extended through the node controller.

Note ECU60-S does not support alarm connections.

See Table 37: SCSI Alarm Cable (15454-M-ALMCBL) and SCSI Alarm Patch Cable (15454-M-AEXPCBL) Connector Details , on page 413 and Table 38: SCSI Alarm Wire-Wrap Cable (15454-M-ALMCBL2) Connector Details , on page 414 for pin details of the alarm connectors.

Passive Unit Inventory Interfaces

The passive unit inventory interfaces (USB ports) are used to retrieve inventory information from passive devices such as fiber trays, FBG DCU, patch panels, passive multiplexer or demultiplexer, and so on. There are 12 USB ports on the ECU modules. The inventory details are displayed in the Inventory tab in CTC.

The USB 3.0 port delivers power to the fiber shuffle unit or the MPO-fan-out unit when they are connected to the ONS 15454 M6 2006 ECU-S.

Note The 12 passive inventory ports on the ECU modules are labeled 1 to 12. However, CTC represents the passive inventory ports as USBP_SIDE_PORT, where SIDE can be A or B, and PORT can be any value from 1 to 12. For example, Port 1 on the left side of the ECU module is represented as USBP_A_1 and Port 1 on the right side of the ECU module is represented as USBP_B_ 1. The left side of the ECU module is Side A and the right side of the ECU module is Side B.

Note The 8 passive inventory USB 2.0 ports on the NCS 2006 ECU-S module are labeled 1 through 4 and 7 through 10. The USB 3.0 port on the left of the faceplate is detected as A5. The USB 3.0 port on the left of the faceplate is detected as B5. However, CTC represents the passive inventory ports as USBP_SIDE_PORT, where SIDE can be A or B, and PORT can be any value from 1 to 5. For example, Port 1 on the left side of the ECU-S module is represented as USBP_A_1 and Port 1 on the right side of the NCS 2006 ECU-S module is represented as USBP_B_ 1. The left side of the ONS 15454 M6 2006 ECU-S module is Side A and the right side of the ONS 15454 M6 2006 ECU-S module is Side B.

VoIP or UDC

VoIP or UDC is an RJ45 port that can be configured to support UDC or VoIP service on an ONS 15454 M6 shelf. There are two VoIP or UDC ports on the ECU modules. The VoIP or UDC port on the left side is connected to the TNC or TNCE card in Slot 1 and the port on the right side is connected to the TNC or TNCE card in Slot 8. The VoIP or UDC port also supports Power over Ethernet for connecting VoIP equipments.

Note Power over Ethernet functionality is not available on ECU-60V.

MSM

The multishelf management (MSM) port is an RJ-45 port that is used to connect the ONS 15454 M6 shelf to other ONS 15454 or ONS 15454 M6 shelves that are a part of the multishelf configuration. There are six MSM ports on the ECU modules—three ports on the left side and three ports on the right side. The MSM ports on the left side correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and those on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. Three MSM ports are used as working ports, and the remaining three are used as standby ports.

Timing Connections

The ECU modules have four Building Integrated Timing Supply (BITS) connections that support both ETSI and ANSI connections. There are two BITS-IN and two BITS-OUT connections that can either be SMB connectors for ETSI connection or wire-wrap pins for ANSI connection, based on customer requirements. The BITS-IN ports receive input from third-party external sources called Synchronization Supply Unit (SSU) to synchronize the timing of the ONS 15454 M6 shelf. The BITS-OUT ports provide output to external devices (other Cisco or third-party shelves) to synchronize the timing signals with the ONS 15454 M6 shelf.

Note For timing connection, use 100 ohm shielded BITS clock cable pair #22 or #24 AWG (0.51 mm^2 [0.020 inch] or 0.64 mm^2 [0.0252 inch]), twisted-pair T1-type.

Note See Telcordia SR-NWT-002224 for rules about provisioning timing references.

NTP-G253 Install the ECU or ECU-S Module

Purpose	This procedure installs the external connection unit modules (ECU, ECU2, ECU-S, ECU60-S, or ECU-60V) in the ONS 15454 M6 shelf.
Tools/Equipment	Small slot-head screwdriver
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT metallically connect to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 5) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.** Statement 7005

Warning **To comply with the Telcordia GR-1089 NEBS standard for electromagnetic compatibility and safety, connect the serial high-speed WAN interface ports only to intra-building or unexposed wiring or cable. The intrabuilding cable must be shielded and the shield must be grounded at both ends. The intra-building port(s) of the equipment or subassembly must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.** Statement 7003

Warning **The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly MUST NOT metallically connect to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 5) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.** Statement 7018

Warning **Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security.** Statement 1072

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Note If the USB device connected to the ECU module is not detected when the ONS 15454 M6 shelf assembly is powered on, plug out (remove) the ECU module and insert it again.

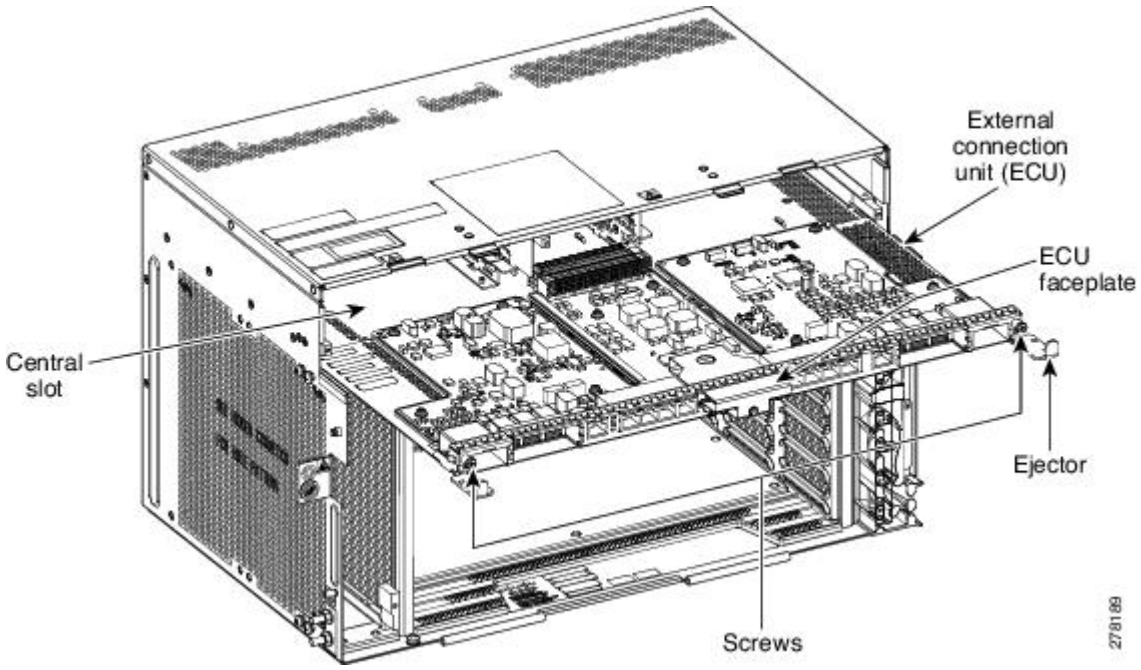
Procedure

Step 1 Insert the ECU module in the central slot of the chassis (see the following figure).

Step 2 Push the ECU module such that the backplane connector is completely engaged and the faceplate of the ECU module aligns with the edge of the chassis side wall.

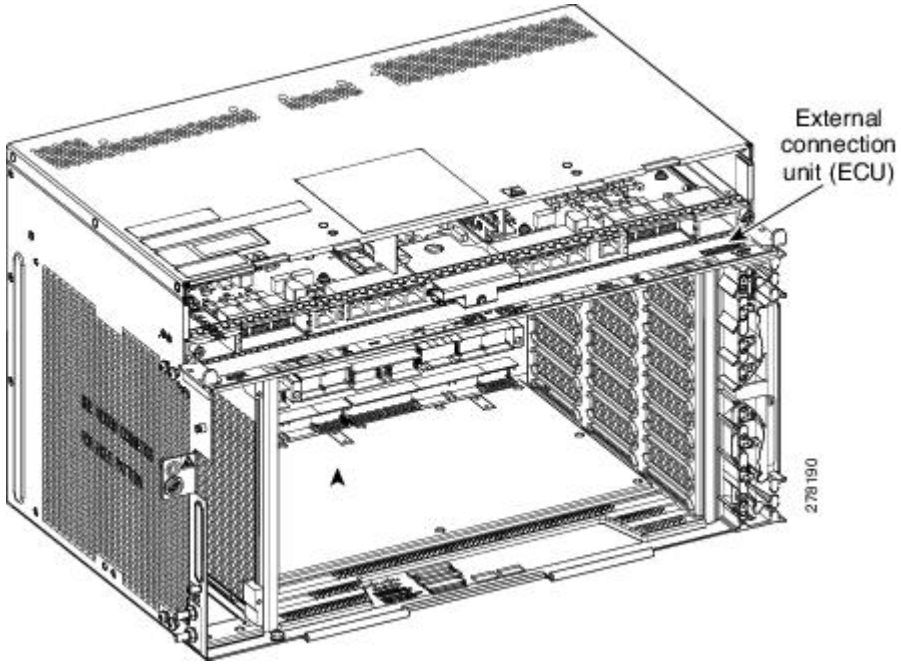
Step 3 Tighten the screws to a torque value of 4 in-lb (0.45 N-m).

Figure 263: Installing the ECU module



The following figure shows the ECU module installed in the ONS 15454 M6 shelf.

Figure 264: ONS 15454 M6 Shelf with ECU module Installed



Stop. You have completed this procedure.

NTP-L68 Upgrading to ONS 15454 M6 ECU60-S Module

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Note Do not replace the 15454-M6-DC20, or 15454-M6-DC40 power modules with the 15454-M6-DC V03 power module if the ONS 15454 M6 shelf is consuming more than 960 W of power. Refer to table A-4 to ascertain the power consumption of the shelf.

Procedure

Step 1 Power down the ONS 15454 M6 shelf.

Step 2 Remove the 15454-M6-DC20 or 15454-M6-DC40 DC power module from the ONS 15454 M6 shelf.

Step 3 Install the 15454-M6-DC V03 DC Power Module in the ONS 15454 M6 shelf as described in the DLP-G570 Install the DC Power Module in the ONS 15454 M6 Shelf, on page 373.

Step 4 Remove the ECU module (ECU/ECU-2/ECU-S) from the ONS 15454 M6 shelf.

Step 5 Install the ECU60-S module in the ONS 15454 M6 shelf as described in the NTP-G253 Install the ECU or ECU-S Module, on page 362.

Step 6 Power on the 15454-M6-DC V03 power module as described in the NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383

Stop. You have completed this procedure.

Power Modules

The ONS 15454 M6 system contains pluggable and redundant power modules for AC and DC power. The AC and DC power modules cannot be used simultaneously to power the ONS 15454 M6 system. Before installing the power module, verify the position of the mechanical locking system on the rear side of the chassis. To insert the AC power module, the screw must be next to the AC silk-screen text; to insert the DC power module the screw must be next to the DC silk-screen text.

AC Power Module

The ONS 15454 M6 system can be powered by a single AC power module or redundant AC power modules. The supported AC power modules on the ONS 15454 M6 shelf are 15454-M6-AC and 15454-M6-AC2. The AC power module converts the AC-input current to DC-output current.

The AC power module supports the lamp test procedure and has fans that are directly powered by the module. The fans cool the module and guarantees proper operation across the complete operating temperature or output power range. These fans contain replaceable air-filters.The AC power module draws power from the power lines to turn on the ONS 15454 M6 shelf. See AC Power Specifications, on page 488 for the power specifications of the AC power modules.

Each AC power module has one AC single-phase 3 poles (line L, Neutral N, and Protective Earth PE) input connector.

The AC power module has a dual color (red and green) LED on the faceplate to represent the different states of the AC power module, which are controlled by the shelf controller card. The different states are:

- LED is OFF. Indicates that the AC power line is not connected.
- LED is green. Indicates that the AC power line is functioning correctly.
- LED is red. Indicates that the AC power line is connected but there is a failure due to a secondary fuse break (48 V DC) or failure of the fan in the AC module.

However, the LED states (OFF/red/green) can be overwritten by the shelf controller card (TNC, TNCE, TSC, or TSCE).

For the 15454-M6-AC2 power module, the power consumption of the ONS-15454-M6 shelf (including ancillaries, controller cards, and line cards) is limited to 1200 W. If the power consumption of the shelf exceeds 1200 W, a new line card, when it is installed in the ONS-15454-M6 shelf, will not boot up. This is indicated by the PWR-CON-LMT alarm that is raised in the Alarms tab of CTC when the installation or pre-provisioning of a card causes the power consumption to exceed the limit of 1200W. The 15454-M6-AC2 has a maximum capacity of1500 W for 230 Vin and 1200 W for 110 Vin.

Changing the AC Power Module

It is possible to change the power modules of the ONS 15454 M6 system, from 15454-M6-AC to 15454-M6-AC2, and vice-versa, without powering down the ONS 15454 M6 system. While changing the power modules, ensure that only one power module is replaced at a time, and the other power module continues to supply power to the shelf. However, during regular operation of the node, the ONS 15454 M6 shelf must have either the 15454-M6-AC or 15454-M6-AC2 power module, but not both. See DLP-G757 Replacing 15454-M6-AC With 15454-M6-AC2 Power module, on page 371 and DLP-G758 Replacing 15454-M6-AC2 With 15454-M6-AC Power module, on page 372 for changing the power modules.

DC Power Module

The ONS 15454 M6 system can be powered by redundant DC power modules or a single DC power module. The supported DC power modules on the ONS 15454 M6 shelf are 15454-M6-DC, 15454-M6-DC20, and 15454-M6-DC40.

The DC power module does not support the lamp test procedure.

The DC power module draws power from the batteries to turn on the ONS 15454 M6 shelf. See DC Power Specifications, on page 489 for the power specifications of the DC power modules.

Each DC power module has:

- One input battery connector (three poles) —VBAT, VRET, and FGnd for ETSI installation
- Terminal block connector with VBAT and VRET for ANSI installation

The DC power module has a dual color (red and green) LED on the faceplate to represent the different states of the AC power module which are controlled by the shelf controller card. The different states are:

- LED is off when the battery is not connected
- LED turns green when the battery is connected and the power module functions correctly
- LED turns red when the battery is connected but there is a failure due to a secondary fuse break (48 V DC) or AC module fan failure.

Note When the ONS 15454 M6 shelf is powered at –60 VDC (nominal), only the TNC, OPT-AMP-C, OPT-AMP-17-C, OPT-EDFA-17, and OPT-EDFA-24, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS, SMR20 FS CV, 12-AD-FS, 16-AD-FS, 100GS-CK-LC, and MR-MXP cards, and the 15454-M6-ECU-60 can be installed.

The 15454-M6-DC40 power module is required to accommodate up to four 100GS-CK-LC cards in a ONS-15454-M6 shelf.

For the 15454-M6-DC20 power module, the power consumption of the ONS-15454-M6 shelf (including ancillaries, controller cards, and line cards) is limited to 960 W. A new line card will not boot up when it is installed in the ONS-15454-M6 shelf, if it causes the power consumption of the shelf to exceed 960 W. The PWR-CON-LMT alarm is raised in the Alarms tab in CTC when the installation or pre-provisioning of a card causes the power consumption to exceed the limit of 960 W.

For the 15454-M6-DC40 power module, the power consumption of the ONS-15454-M6 shelf (including ancillaries, controller cards, and line cards) is limited to 1920 W. A new line card will not boot up when it is installed in the ONS-15454-M6 shelf, if it causes the power consumption of the shelf to exceed 1920 W. The PWR-CON-LMT alarm is raised in the Alarms tab in CTC when the installation or pre-provisioning of a card causes the power consumption to exceed the limit of 1920 W.

Note The total power consumption of the shelf is calculated by the controller card and displayed in CTC in the Provisioning > Power Monitor tab. For details about power calculation, see Power Calculation, on page 490.

The terminal lugs used on the DC power modules are included in the accessory kit (53-3318-01) and part number of the terminal lug is 32-0603-01 (4 pieces). The accessory kit is placed under the 15454-M-SHIPKIT= PID.

Changing the DC Power Module

It is possible to change the power modules without powering down the ONS 15454 M6 system. While changing the power modules, ensure that only one power module is replaced at a time and the other power module continues to supply power to the shelf. However, during regular operation of the node, the ONS 15454 M6 shelf must have 15454-M6-DC20 or 15454-M6-DC or 15454-M6-DC40 power module. See DLP-G737 Replacing 15454-M6-DC With 15454-M6-DC20 Power Module, on page 376 and DLP-G738 Replacing 15454-M6-DC20 With 15454-M6-DC Power Module, on page 378 for changing the power modules.

Power Filler Module

For redundant power supplies, two AC or DC power modules can be installed in Slot A and Slot B of the ONS 15454 M6 shelf. However, only one power module can sustain the functioning of the entire ONS 15454 M6 system. In that case, insert a power filler module in the empty slot.

NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf

Purpose	This procedure installs the power modules in the ONS 15454 M6 system.
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **The plug-socket combination must be accessible at all times because it serves as the main disconnecting device.** Statement 1019

Procedure

Step 1 Complete the necessary task as applicable:

- DLP-G569 Install the AC Power Module in the ONS 15454 M6 Shelf, on page 368
- DLP-G757 Replacing 15454-M6-AC With 15454-M6-AC2 Power module, on page 371
- DLP-G758 Replacing 15454-M6-AC2 With 15454-M6-AC Power module, on page 372
- DLP-G570 Install the DC Power Module in the ONS 15454 M6 Shelf, on page 373
- DLP-G737 Replacing 15454-M6-DC With 15454-M6-DC20 Power Module, on page 376
- DLP-G738 Replacing 15454-M6-DC20 With 15454-M6-DC Power Module, on page 378

Step 2 Complete the NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383.

Stop. You have completed this procedure.

DLP-G569 Install the AC Power Module in the ONS 15454 M6 Shelf

Purpose	This task installs the 15454-M6-AC or 15454-M6-AC2 power module in the ONS 15454 M6 system.

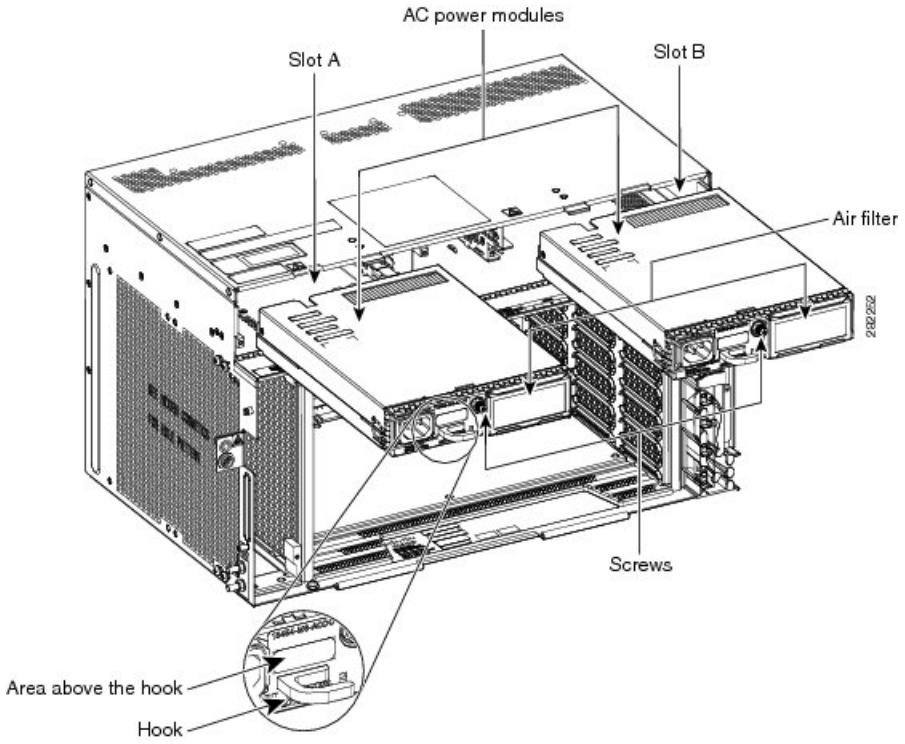
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Caution The node can temporarily work with both 15454-M6-AC and 15454-M6-AC2 power module units installed on the ONS 15454 M6 shelf. However, during regular operation, the shelf must have either the 15454-M6-AC or 15454-M6-AC2 power module, but not both.

Tip Insert the AC power module in Slot A or Slot B, or both (see the following figure).

Note While inserting the AC power module, apply insertion force only above the hook and not on the air filter (see the following figure).

Figure 265: Installing the AC Power Modules



Procedure

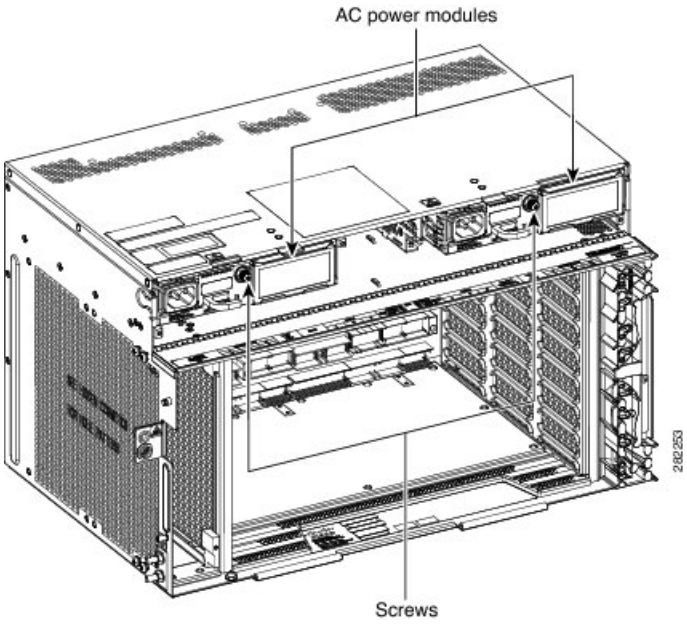
Step 1 Plug the AC power module completely into the chassis.

Step 2 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the power module in the chassis (see Figure 266: AC Power Modules Installed in the ONS 15454 M6 Shelf, on page 371).

Note For redundant power supplies, two AC power modul5es can be installed in Slot A and Slot B. However, only one power module can sustain the functioning of the entire ONS 15454 M6 system. In that case, insert a power filler module in the empty slot (for example, see Figure 269: Installing a Power Filler Module, on page 376).

Note For information on the power module air filter, see NTP-G114 Inspect and Replace the Air Filter, on page 449.

Figure 266: AC Power Modules Installed in the ONS 15454 M6 Shelf



Step 3 Return to your originating procedure (NTP).

DLP-G757 Replacing 15454-M6-AC With 15454-M6-AC2 Power module

Purpose	This procedure is used to replace the 15454-M6-AC with 15454-M6-AC2 power module.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note Refer to Power Calculation, on page 490 to ascertain the power consumption of the shelf.

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 Disconnect the power source and remove the power connections from the B-side power module (installed in slot B).

Step 2 Unscrew the holding screw that secures the 15454-M6-AC power module.

Step 3 Pull the 15454-M6-AC power module away from the ONS 15454 M6 chassis.

Step 4 Install the 15454-M6-AC2 power module as described in the DLP-G569 Install the AC Power Module in the ONS 15454 M6 Shelf, on page 368.

Step 5 Install power on the 15454-M6-AC2 power module as described in the NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383.

Note While replacing power modules, when the ONS 15454 M6 chassis is in the mixed power mode (with both 15454-M6-AC and 15454-M6-AC2 power modules installed), do not provision or install any line cards. Card provisioning and installation must be done only after both the slots have the same type of power modules.

Step 6 Perform Steps 1 to 5 for the other power module (installed in slot A).

Note To ensure that the controller card calculates the shelf power consumption correctly, reset the controller card. For details about performing card reset, see the "NTP-G106 Resetting Cards Using CTC" procedure in the *Cisco ONS 15454 DWDM Network Configuration Guide*.

Return to your originating procedure (NTP).

DLP-G758 Replacing 15454-M6-AC2 With 15454-M6-AC Power module

Purpose	This procedure is used to replace the 15454-M6-AC2 with 15454-M6-AC power module.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

⚠

Caution When mixed power modules are present, if the power consumption is more than 900W, identify and plug out the line cards so that Total power consumption is less than or equal to 900W.

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 Disconnect the power source and remove the power connections from the B-side power module (installed in slot B).

Step 2 Unscrew the holding screw that secures the 15454-M6-AC2 power module.

Step 3 Pull the 15454-M6-AC2 power module clear from the ONS 15454 M6 chassis.

Step 4 Install the 15454-M6-AC power module as described in the DLP-G569 Install the AC Power Module in the ONS 15454 M6 Shelf, on page 368.

Step 5 Install power on the 15454-M6-AC power module as described in the NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383.

Note While replacing the power modules, do not provision or install any line cards when the ONS 15454 M6 chassis is in the mixed power mode (with both 15454-M6-AC and 15454-M6-AC2 power modules installed). Card provisioning and installation must be done only after both the slots have the same type of power modules.

Step 6 Perform steps 1 to 5 for the other power module (installed in slot A).

Step 7 Return to your originating procedure (NTP).

DLP-G570 Install the DC Power Module in the ONS 15454 M6 Shelf

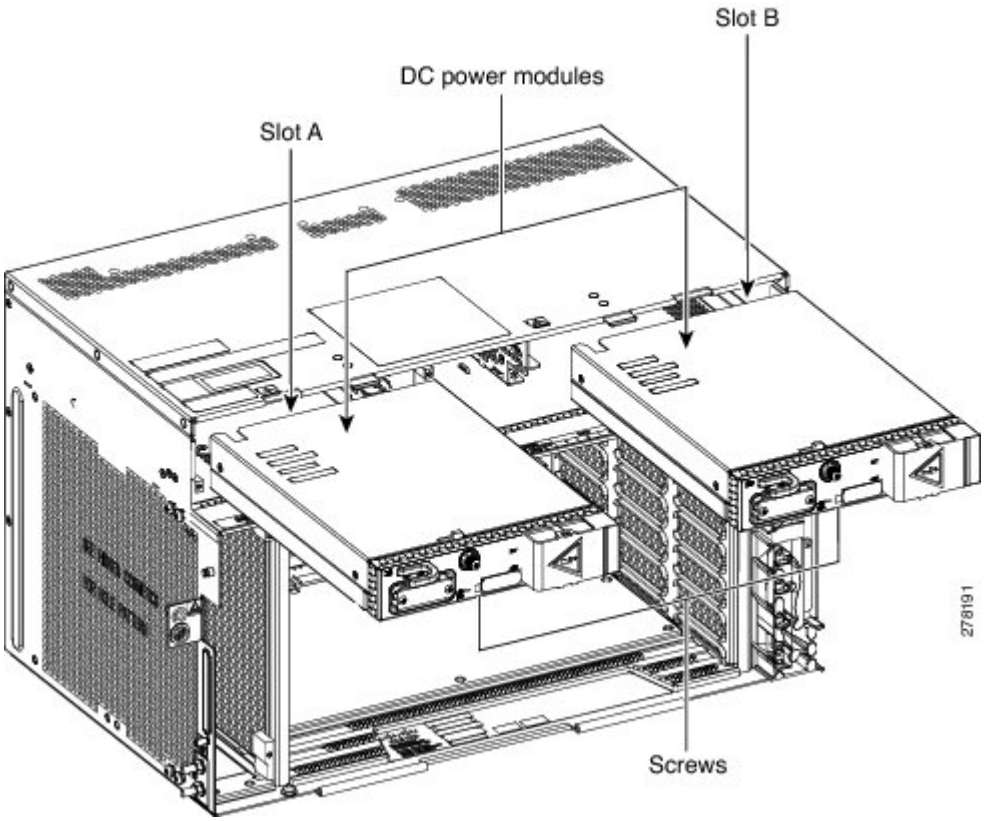
Purpose	This procedure installs the 15454-M6-DC, 15454-M6-DC20, or 15454-M6-DC40 DC power module in the ONS 15454 M6 system.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Caution While changing the power modules from 15454-M6-DC20 to 15454-M6-DC and vice-versa, the ONS 15454 M6 shelf can temporarily work with both 15454-M6-DC and 15454-M6-DC20 power modules installed. However, during regular operation, the shelf must either have the 15454-M6-DC or 15454-M6-DC20 power module, but not both.

Procedure

Step 1 Insert the DC power module in Slot A or Slot B (or both) (see the following figure).

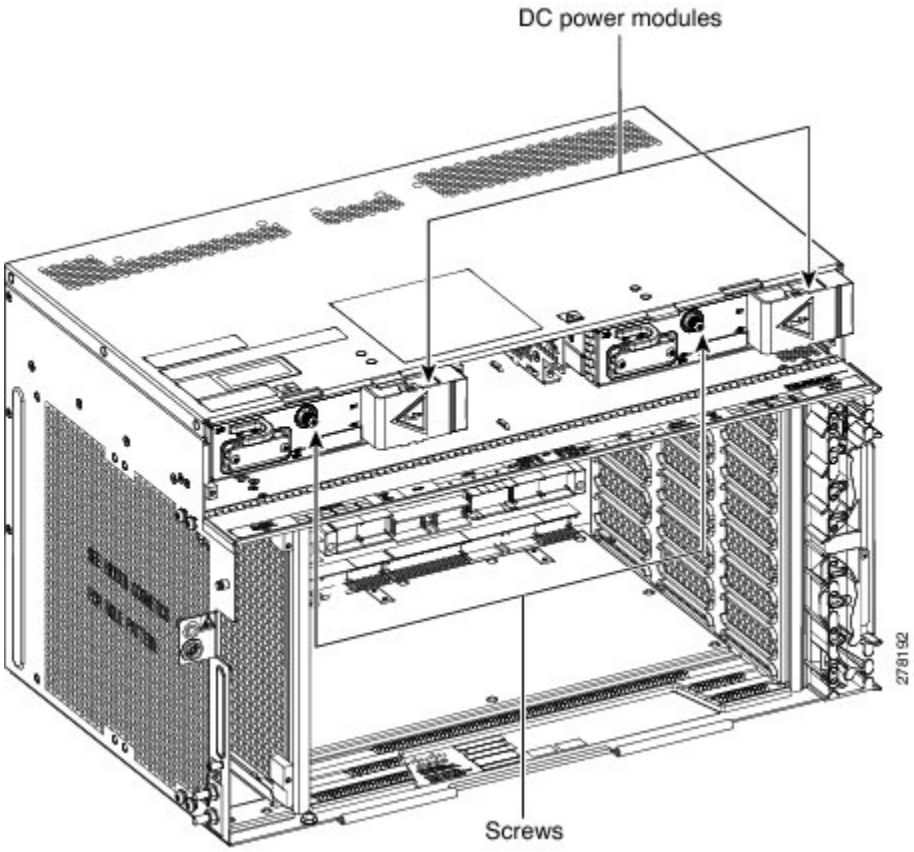
Figure 267: Installing the DC Power Modules



Step 2 Plug the DC power module completely into the chassis.

Step 3 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the power module in the chassis (see the following figure).

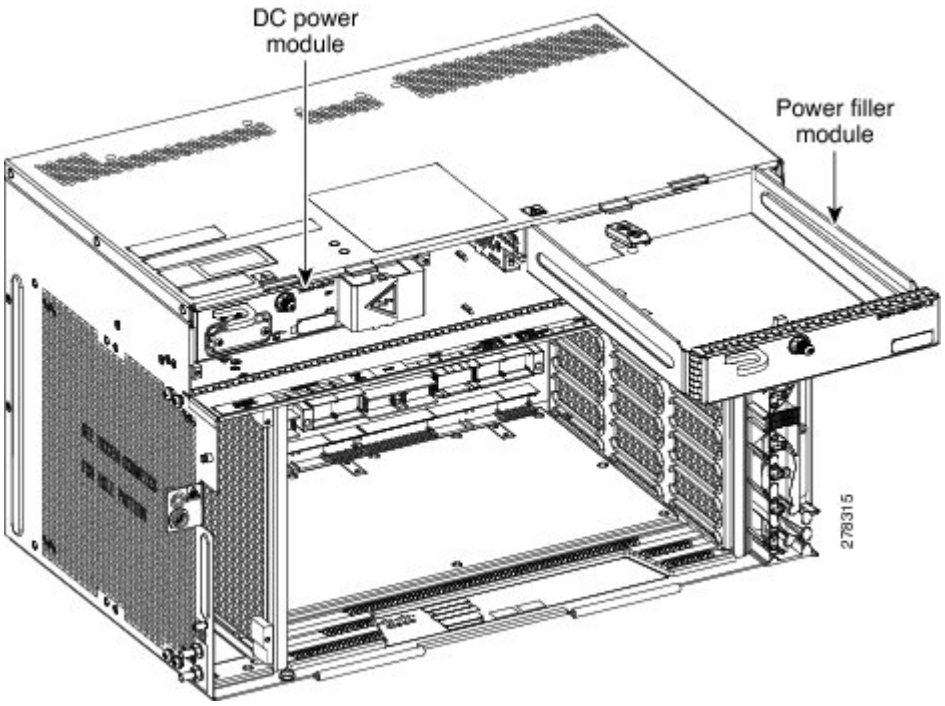
Figure 268: DC Power Modules Installed in the ONS 15454 M6 Shelf



Note For redundant power supplies, two DC power modules can be installed in Slot A and Slot B. However, only one power module can sustain the functioning of the entire ONS 15454 M6 system. In that case, insert a power filler module in the empty slot (see the following figure).

The following figure shows a DC power module installed in Slot A and a power filler module installed in Slot B.

Figure 269: Installing a Power Filler Module



Step 4 Return to your originating procedure (NTP).

Note When the ONS 15454 M6 shelf is powered at –60 VDC (nominal), only the TNC, OPT-AMP-C, OPT-AMP-17-C, OPT-EDFA-17, and OPT-EDFA-24 cards, and the 15454-M6-ECU-60 can be installed.

DLP-G737 Replacing 15454-M6-DC With 15454-M6-DC20 Power Module

Purpose	This procedure replaces the 15454-M6-DC with 15454-M6-DC20 power module.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note The procedure to replace the 15454-M6-DC power module with 15454-M6-DC40 power module is the same as this procedure. The 15454-M6-DC40 power module uses 15454-M6-DCCBL2-L= and 15454-M6-DCCBL2-R= cables.

Note Do not replace the 15454-M6-DC with the 15454-M6-DC20 power module if the ONS 15454 M6 shelf is consuming more than 960 W of power. Refer to Power Calculation, on page 490 to ascertain the power consumption of the shelf.

Caution While changing the power modules from 15454-M6-DC20 to 15454-M6-DC and vice-versa, the ONS 15454 M6 shelf can temporarily work with both 15454-M6-DC and 15454-M6-DC20 power modules installed. However, during regular operation, the shelf must either have the 15454-M6-DC or 15454-M6-DC20 power module, but not both.

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

Procedure

Step 1 Disconnect the power source opening the breaker on top of the standby power module (installed in slot B).

Step 2 Unscrew the holding screw that secures the 15454-M6-DC power module.

Step 3 Pull the 15454-M6-DC power module clear from the ONS 15454 M6 chassis.

Step 4 Remove the power connections from the standby power module.

Step 5 Install power on the 15454-M6-DC power module as described in the NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383.

Note While replacing the power modules, do not provision or install any line cards when the ONS 15454 M6 chassis is in the mixed power mode. Card provisioning and installation must be done only after both the slots have the same type of power modules.

Step 6 Install the 15454-M6-DC power module as described in the DLP-G570 Install the DC Power Module in the ONS 15454 M6 Shelf, on page 373.

Step 7 Connect the power source closing the breaker on top of the standby power module (installed in slot B).

Step 8 Perform the Step 1 to Step 7 for the active power module (installed in slot A) procedure.

Note To ensure that the controller card is calculating the shelf power consumption correctly, reset the controller card. For details about performing card reset, see the "NTP-G106 Reset Cards Using CTC" procedure in the Cisco ONS 15454 DWDM Configuration Guide.If the power consumption of the shelf is exceeding 960 W, the PWR-CON-LMT alarm is raised. Either revert to the 15454-M6-DC power module or remove and deprovsion the existing line cards to reduce the load.

Step 9 Return to your originating procedure (NTP).

DLP-G738 Replacing 15454-M6-DC20 With 15454-M6-DC Power Module

Purpose	This procedure replaces the 15454-M6-DC20 with 15454-M6-DC power module.
Tools/Equipment	#2 Phillips Dynamometric screwdriver
Prerequisite Procedures	NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note The procedure to replace the 15454-M6-DC20 power module with 15454-M6-DC40 power module is the same as this procedure. The 15454-M6-DC40 power module uses 15454-M6-DCCBL2-L= and 15454-M6-DCCBL2-R= cables.

Caution While changing the power modules from 15454-M6-DC20 to 15454-M6-DC and vice-versa, the ONS 15454 M6 shelf can temporarily work with both 15454-M6-DC and 15454-M6-DC20 power modules installed. However, during regular operation, the shelf must either have the 15454-M6-DC or 15454-M6-DC20 power module, but not both.

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .

Procedure

Step 1 Disconnect the power source and remove the power connections from the standby power module (installed in slot B).

Step 2 Unscrew the holding screw that secures the 15454-M6-DC20 power module.

Step 3 Pull the 15454-M6-DC20 power module clear from the ONS 15454 M6 chassis.

Step 4 Install the 15454-M6-DC power module as described in the DLP-G570 Install the DC Power Module in the ONS 15454 M6 Shelf, on page 373.

Step 5 Install power on the 15454-M6-DC power module as described in the NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383.

Note While replacing the power modules, do not provision or install any line cards when the ONS 15454 M6 chassis is in the mixed power mode. Card provisioning and installation must be done only after both the slots have the same type of power modules.

Step 6 Perform steps 1 to 5 for the active power module (installed in slot A).

Step 7 Return to your originating procedure (NTP).

LCD Unit

The LCD unit consists of an LCD display panel, push button, and shelf-level LED indicators on the ONS 15454 M6 system. A backup flash memory is fitted into the LCD unit to support the database (DB) and image backup in the operation of the ONS 15454 M6.

The shelf controller card (TSC, TSCE, TNC, or TNCE) powers the 16 x 2 character LCD screen. The LCD screen displays the shelf name, shelf IP address, and software version currently used. The LCD screen also provides slot-level and port-level information of all card slots, including the number of critical, major, and minor alarms. The display contrast is automatically adjusted for a clearer view. The three accessible push buttons (SLOT, STATUS, and PORT) on the LCD unit are used to set parameters at the slot-level and port-level. There are three alarm LEDs (CRIT, MAJ, and MIN) on the LCD unit that indicate whether a critical, major, or minor alarm is present anywhere on the ONS 15454 M6 shelf. The shelf controller card controls the conditions that result in triggering the LEDs. The LEDs can be overwritten by the shelf controller card (TNC, TNCE, TSC, or TSCE) in all the three states (OFF/red/green). The LCD unit supports the lamp test procedure and the LEDs changes its color or state.

Note If the LCD unit is removed from the shelf, wait for at least 5 seconds before plugging it back into the shelf. In the event the LCD display appears blank, remove the unit from the shelf, wait for at least 5 seconds and reinsert the unit into the shelf.

The LCD module must be present in the ONS 15454 M6 shelf to:

- Provision the ECU module, fan-tray assembly, or power modules.
- Retrieve alarms from the ECU module, fan-tray assembly, or power modules.

NTP-G255 Install the LCD Module in the ONS 15454 M6 Shelf

Purpose	This procedure installs the LCD module in the ONS 15454 M6 system.
Tools/Equipment	Small slot-head screwdriver

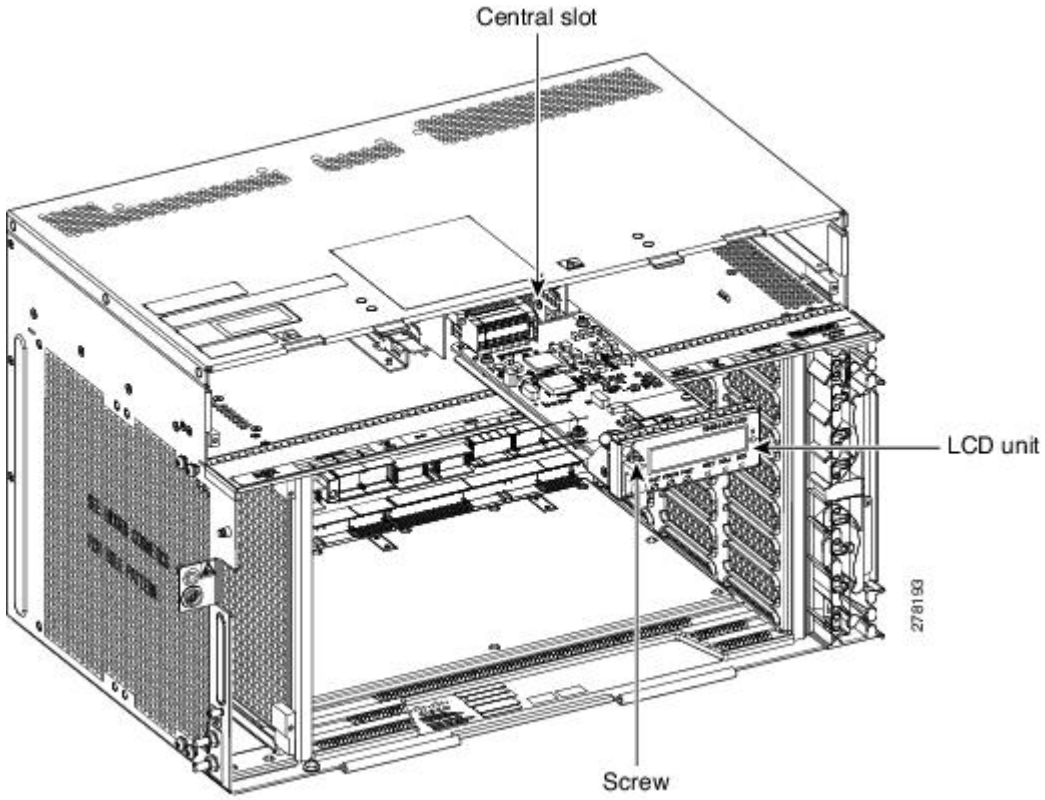
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note If the LCD unit is removed from the shelf, wait for at least 5 seconds before plugging it back into the shelf. In the event the LCD display appears blank, remove the unit from the shelf, wait for at least 5 seconds and reinsert the unit into the shelf.

Procedure

Step 1 Insert the LCD module in the central slot (between the power slots) of the chassis (see the following figure).

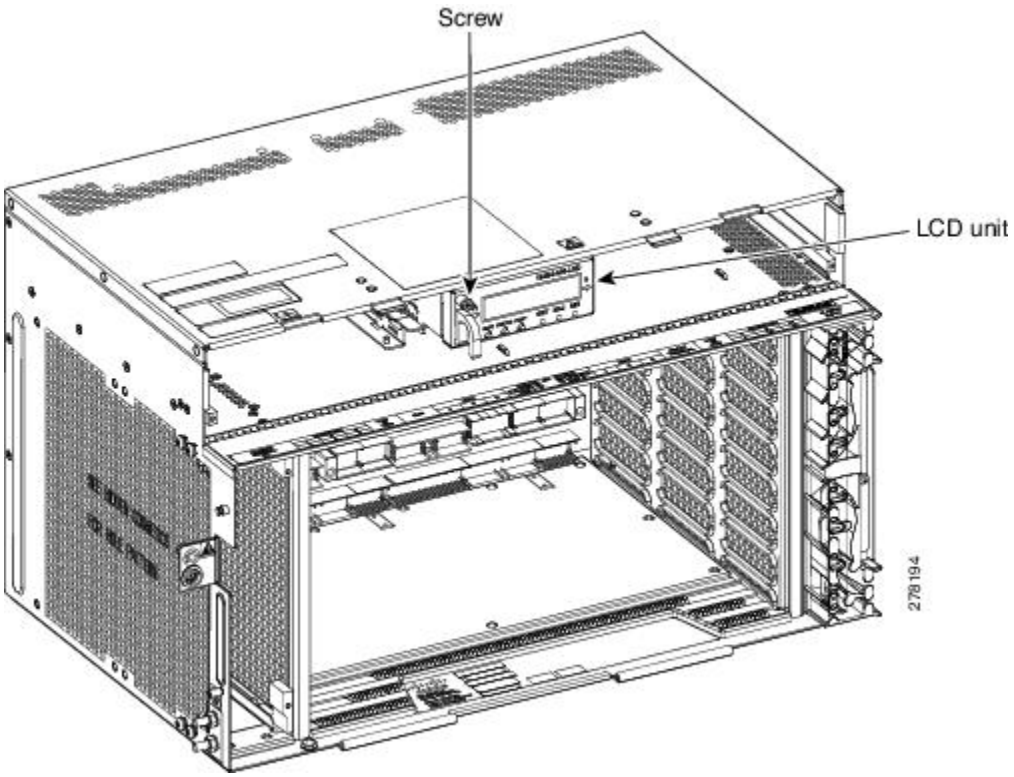
Figure 270: Installing the LCD Module



Step 2 Push the LCD module into the chassis such that the backplane connector is completely engaged (see the above figure).

Step 3 Tighten the screw to a torque value of 4 in-lb (0.45 N-m) to lock the unit (see the following figure).

Figure 271: LCD Module Installed in the ONS 15454 M6 Shelf



Stop. You have completed this procedure.

Power and Ground Description

Ground the equipment according to Telcordia standards or local practices. The following sections describe power and ground for the ONS 15454 M6 shelves.

Note For detailed instructions on grounding the ONS 15454 M6 chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

ANSI Power and Ground

The ONS 15454 M6 has redundant AC and DC power modules.

For redundant AC power feeds, install both the AC power modules and use the two power cables (right and left cables) shipped with the ONS 15454 M6 and one ground cable. For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes. The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries. This product is intended for use on the TN and TT power systems.

For redundant DC power feeds, install both the DC power modules and use four power cables and one ground cable. For a single power feed, only two power cables (#8 AWG or larger, copper conductor, 194 degrees F [90 degrees C] minimum) and one ground cable (#6 AWG or larger) are required. Use a conductor with low impedance to ensure circuit overcurrent protection. However, the conductor must have the capability to safely conduct any faulty current that might be imposed. For a a DC power supply, the fuse rating must not exceed 40A. For operating voltages, see DC Power Specifications, on page 489.

The DC power modules have –48 VDC or –60 VDC #8 dual-hole lug power terminals for ANSI. The terminals are labeled RET and –48 V or –60 V on the DC power modules.

Note When the ONS 15454 M6 shelf is powered at –60 VDC (nominal), only the TNC, OPT-AMP-C, OPT-AMP-17-C, OPT-EDFA-17, and OPT-EDFA-24 cards, and the 15454-M6-ECU-60 can be installed.

We recommend the following wiring conventions, but customer conventions prevail:

- Red wire for battery connections (–48 VDC or –60 VDC).
- Black wire for battery return connections (RET).
- The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE, Issue 3.

The ground lug must be a dual-hole type, UL Listed, CSA certified and rated to accept the #6 AWG cable. Two ground posts with two M5 nuts are provided on the ONS 15454 M6 to accommodate the dual-hole lug.

Note Only use the power cables shipped with the ONS 15454 M6 shelf.

ETSI Power and Ground

The ONS 15454 M6 for ETSI has –48 VDC or –60 VDC power connectors (DSUB for DC power module) on the DC power module. For redundant DC power feeds, install both the DC power modules and use the two power cables shipped with the ONS 15454 M6 and one ground cable. For a DC power supply, the fuse rating must not exceed 40A. For operating voltages, see DC Power Specifications, on page 489.

For redundant AC power feeds, install both the AC power modules and use the two power cables (right and left cables) shipped with the ONS 15454 M6 and one ground cable. For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes. The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries. This product is intended for use on the TN and TT power systems.

Caution Only use the power cables shipped with the ONS 15454 M6 shelf.

NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf

Purpose	This procedure installs power feeds and grounds the ONS 15454 M6 system.
Tools/Equipment	ANSI and ETSI: • #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Screws • Ground cable 13.3-mm² (#6 AWG) stranded • Listed pressure dual-holes lugs suitable for #8 AWG copper conductors • Wire cutters • Wire strippers • Crimp tool • Fuse panel ANSI only: • Power cable (from fuse and alarm panel to assembly), #8 AWG, copper conductors, 194 degrees F [90 degrees C]) • Wire wrapper ETSI only: • Power cable (from fuse panel to power modules), shipped with the ONS 15454 M6 • Two-hole grounding lug, shipped with the ONS 15454 M6
Prerequisite Procedures	• NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module.** Statement 390

Warning **Blank faceplates (filler panels) serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, power modules, and faceplates are in place.** Statement 261

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

Warning **Never install an AC power module and a DC power module in the same chassis.** Statement 1050

Warning **When stranded wiring is required, use approved wiring terminations, such as closed-loop or spade-type with upturned lugs. These terminations should be the appropriate size for the wires and should clamp both the insulation and conductor.** Statement 1002

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

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units.** Statement 246

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

Warning **Use copper conductors only.** Statement 1025

Warning **Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950-1 based safety standards.** Statement 1033

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

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 40A and between -40.5 VDC to -57.6 VDC.** Statement 1005

Note For nominal voltage of –60 VDC, the input voltage range is from -50 to -72 VDC.

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 10A-20A, 100-240 VAC~.** Statement 1005

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

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

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 Verify that the correct fuse and alarm panel is installed in the top mounting space:

- For a a DC power supply, the fuse rating must not exceed 40A.
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A. For North America, the branch circuit protection must be rated 20A. The overcurrent/short circuit protection must be in accordance with local and national electrical codes.

Step 2 Depending on the shelf and the power module installed, complete the necessary task:

- DLP-G571 Connect Office Power (AC) to the ONS 15454 M6 Shelf, on page 386
- DLP-G572 Connect Office Power (DC) to the ONS 15454 M6 Shelf (ANSI Only), on page 390
- DLP-G573 Connect Office Power (DC) to the ONS 15454 M6 Shelf (ETSI Only), on page 394

Step 3 Connect the office ground to the ONS 15454 M6 shelf. For detailed instructions on grounding, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Step 4 Complete the DLP-G575 Turn On and Verify DC Office Power on the ONS 15454 M6 Shelf, on page 399

Step 5 Continue with the NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf, on page 401.

Stop. You have completed this procedure.

DLP-G571 Connect Office Power (AC) to the ONS 15454 M6 Shelf

Purpose	This task connects AC power to the ONS 15454 M6 shelf.
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Wire wrapper • Wire cutters • Wire strippers • Crimp tool • Fuse panel • Ground cable 13.3-mm² (#6 AWG) stranded. The PIDs of the power cables are listed in Table 34: PIDs for AC Power Cables, on page 389.
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note This product is intended for use on the TN and TT power systems.

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

Warning **This equipment shall be connected to AC mains provided with a surge protective device (SPD) at the service equipment complying with NFPA 70, the National Electrical Code (NEC).** Statement 7012

Caution The ONS 15454 M6 relies on the protective devices in the building installation to protect against short circuit, overcurrent and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

Note Not more than 7 feet (2 m) of the power supply cable should be exposed between the equipment and the fiber storage tray.

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

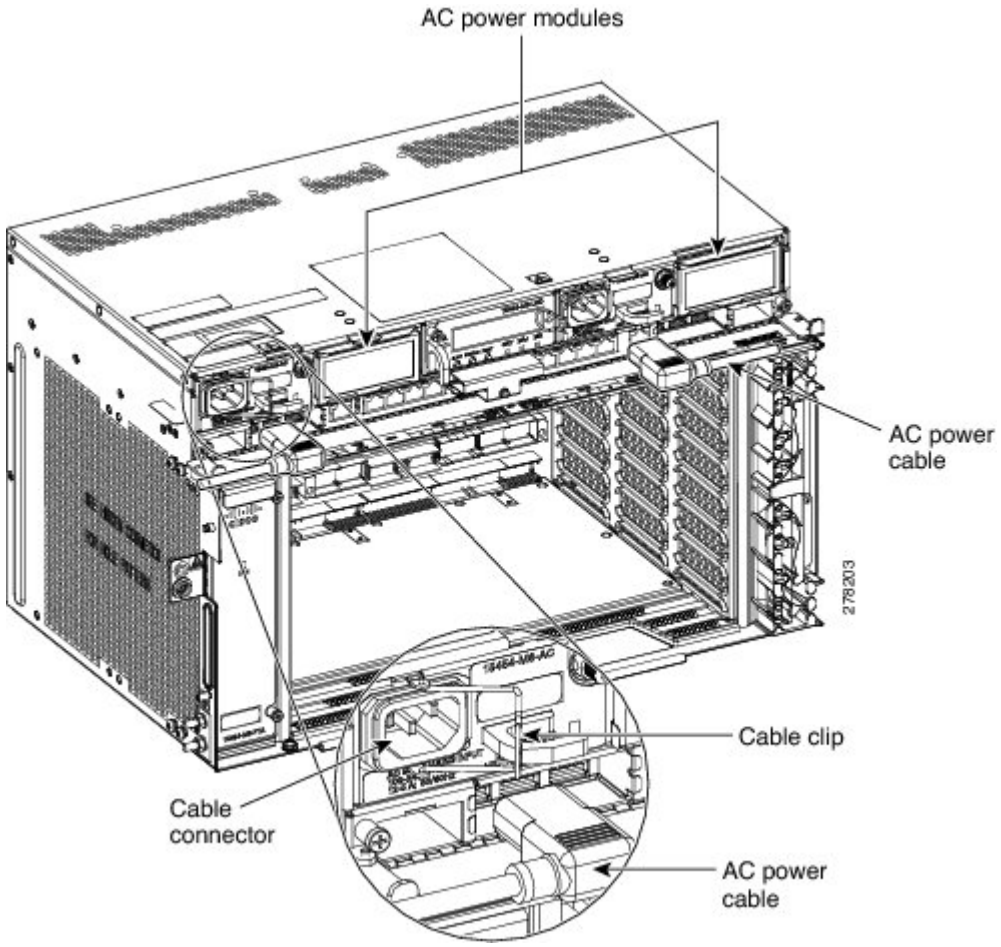
Note If the system loses power or if both the TNC, TNCE, TSC, or TSCE cards are reset, you must reset the ONS 15454 M6 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the "NTP-G24 Setting Up Node Identification Information" procedure in the *Cisco ONS 15454 DWDM Control Card and Node Configuration Guide*.

Procedure

Step 1 Verify that the AC power module is installed in Slot A or Slot B (or both) of the ONS 15454 M6.

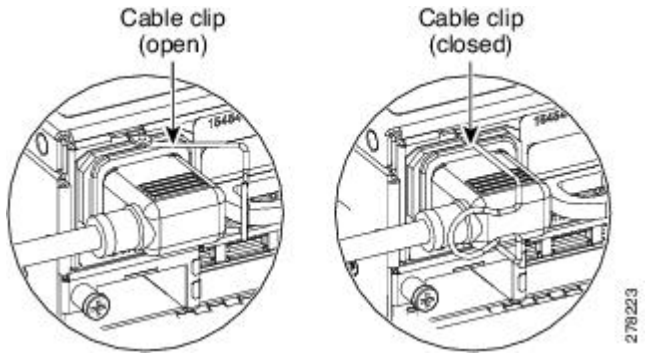
Step 2 Attach the AC power cable to the cable connector in the AC power module (see the following figure).

Figure 272: Connecting Office Power—AC Power Modules



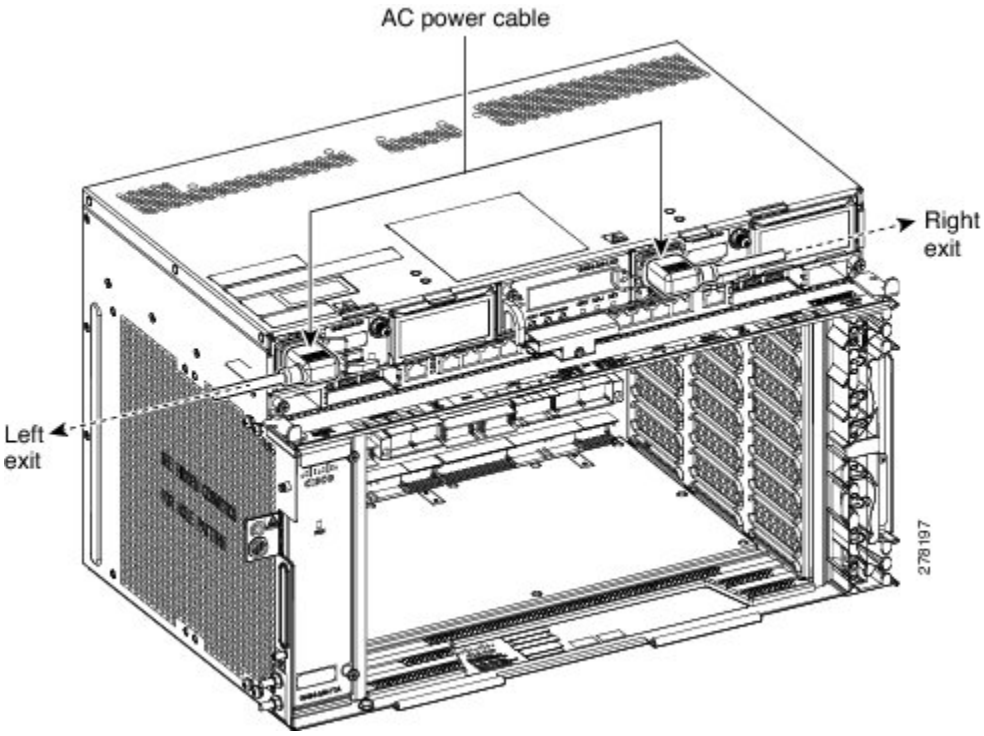
Step 3 Close the cable clip to secure the power cable (see the following figure).

Figure 273: Cable Clip to Secure the Power Cable



Note For Slot A power module, the power cable exits from the left side. For Slot B power module, the power cable exits from the right side (see the following figure).

Figure 274: Power Cable Exit



Step 4 Connect the power cable to the fuse panel or power source.

Note The voltage rating value for AC power ranges between 100 VAC to 240 VAC depending on the standards in various countries.

Note Turn on the power after installing the power cables.

Step 5 Return to your originating procedure (NTP).

Table 34: PIDs for AC Power Cables

Cable	PID
AC power cable - Japan left exit	15454-M-CBL-L-JPN=
AC power cable - Japan right exit	15454-M-CBL-R-JPN=
AC power cable - China left exit	15454-M-CBL-L-CHI=
AC power cable - China right exit	15454-M-CBL-R-CHI=
AC power cable - India left exit	15454-M-CBL-L-IND=
AC power cable - India right exit	15454-M-CBL-R-IND=
AC power cable - EU left exit	15454-M-CBL-L-EU=
AC power cable - EU right exit	15454-M-CBL-R-EU=

Cable	PID
AC power cable - ARG left exit	15454-M-CBL-LARG=
AC power cable - ARG right exit	15454-M-CBL-RARG=
AC power cable - AUS left exit	15454-M-CBL-LAUS=
AC power cable - AUS right exit	15454-M-CBL-RAUS=
AC power cable - UK left exit	15454-M-CBL-L-UK=
AC power cable - UK right exit	15454-M-CBL-R-UK=
AC power cable - KOR left exit	15454-M-CBL-LKOR=
AC power cable - KOR right exit	15454-M-CBL-RKOR=
AC power cable ANSI 110VAC left exit	15454-M-ACCBL-L=
AC power cable ANSI 110VAC right exit	15454-M-ACCBL-R=
AC power cable ANSI 220VAC left exit	15454-M-ACCBL-L2=
AC power cable ANSI 220VAC right exit	15454-M-ACCBL-R2=
AC power cable for data center left exit	15454-M-ACL6-L=
AC power cable for data center right exit	15454-M-ACL6-R=

DLP-G572 Connect Office Power (DC) to the ONS 15454 M6 Shelf (ANSI Only)

Purpose	This task connects DC power to the ONS 15454 M6 (ANSI Only).
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Wire wrapper • Wire cutters • Wire strippers • Crimp tool • Open-end wrench or hex tube screw driver • Fuse panel • Power cable (from fuse and alarm panel to assembly), #8 AWG, copper conductors, 194 degrees F (90 degrees C) • Ground cable #6 AWG stranded • Listed pressure dual-holes lugs suitable for #8 AWG copper conductors

Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place.** Statement 1075

Caution The ONS 15454 M6 relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

Note The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE Issue 5.

Note If the system loses power or both the TNC, TNCE, TSC, or TSCE cards are reset, and the system is not provisioned to get the time from a Network Time Protocol/Simple Network Time Protocol (NTP/SNTP) server, you must reset the ONS 15454 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the "NTP-G24 Setting Up Node Identification Information" procedure in the *Cisco ONS 15454 DWDM Control Card and Node Configuration Guide*. If you are using the TNC, TNCE, TSC, or TSCE cards, the system clock will run for up to three hours. In this case, no action would be required.

Procedure

Step 1 Connect the return cables of the power supply to the Earth ground located at the power supply side.

Step 2 Connect the office power according to the fuse panel engineering specifications.

Step 3 Measure and cut the cables as needed to reach the ONS 15454 M6 from the fuse panel.

Step 4 Address the power according to local site practice.

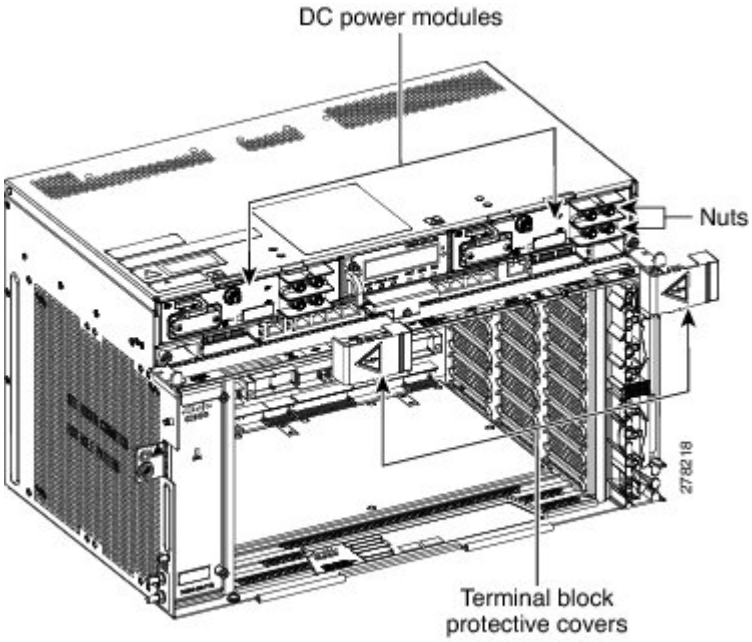
Step 5 Strip 1/2 inch (12.7 mm) of insulation from all power cables that you will use.

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

Step 7 Verify that the DC power module is installed in Slot A or Slot B (or both) of the ONS 15454 M6 shelf.

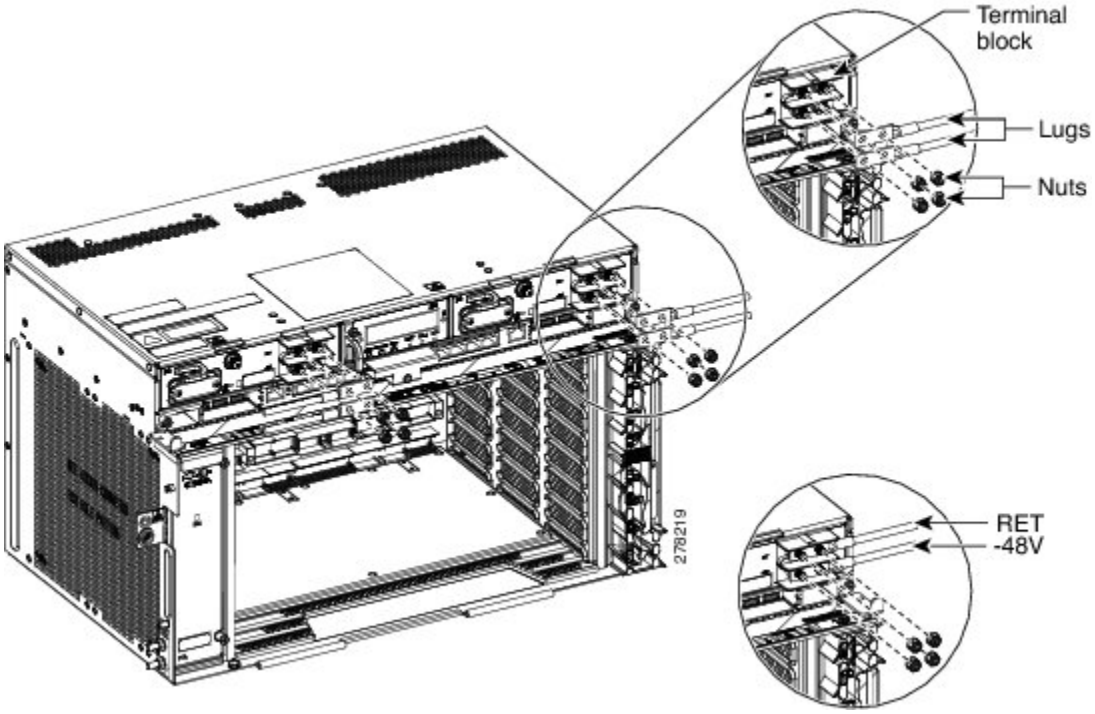
Step 8 Remove the terminal block protective covers from the DC power modules (see the following figure).

Figure 275: Connecting Office Power—DC Power Modules (ANSI Only)



Step 9 Unscrew the nuts from the terminal block (see the following figure).

Figure 276: Connecting Office Power—DC Power Modules (ANSI Only)



Step 10 Insert the lugs as shown in the above figure. The top cable is for RET and the bottom cable is for –48 V/–60 V.

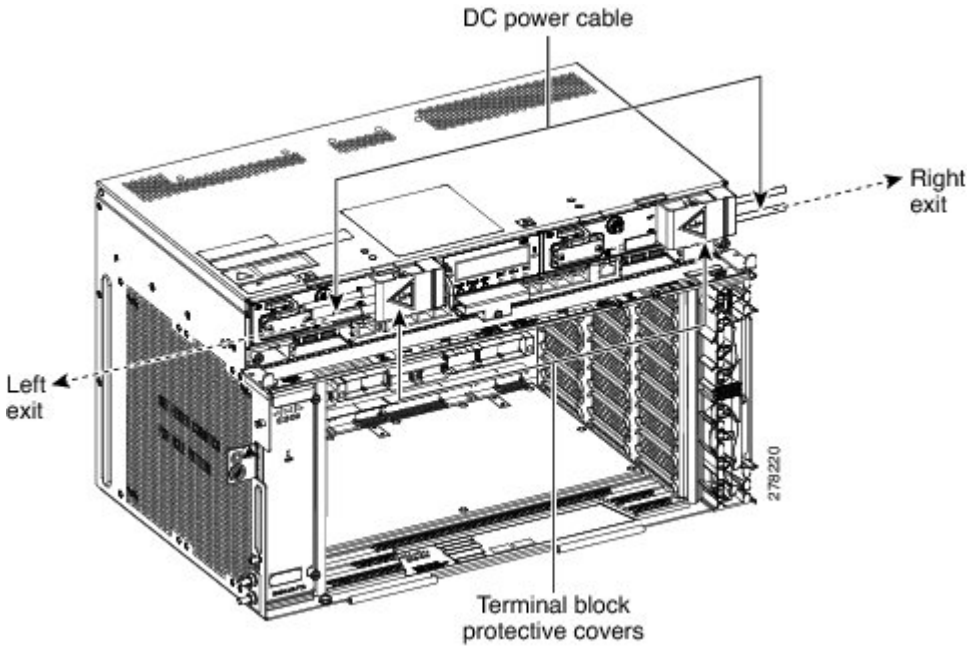
Step 11 Insert the lock washers and nuts to the terminal block. Tighten the nuts to a torque value of 20 in-lb (2.25 N-m).

Step 12 Mount the terminal block protective covers on the DC power modules (see the following figure).

Note For Slot A power module, the power cable exits from the left side. For Slot B power module, the power cable exits from the right side

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

Figure 277: Connecting Office Power—DC Power Modules (ANSI Only)



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

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

Step 13 Return to your originating procedure (NTP).

DLP-G573 Connect Office Power (DC) to the ONS 15454 M6 Shelf (ETSI Only)

Purpose	This task connects power to the ONS 15454 M6 shelf (ETSI Only).
Tools/Equipment	• #2 Phillips Dynamometric screwdriver • Medium slot-head screwdriver • Small slot-head screwdriver • Wire wrapper • Wire cutters • Wire strippers • Crimp tool • Fuse panel • Ground cable #6 AWG stranded. The PIDs of the power cables are listed in Table 35: PIDs for DC Power Cables, on page 397.

Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **Hazardous voltage or energy may be present on DC power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place.** Statement 1075

Note The battery return connection is treated as DC-I, as defined in Telcordia GR-1089-CORE Issue 5.

Caution The ONS 15454 M6 relies on the protective devices in the building installation to protect against short circuit, overcurrent, and ground faults. Ensure that the protective devices are properly rated and comply with national and local codes.

Note If the system loses power or both TNC, TNCE, TSC, or TSCE cards are reset and the system is not provisioned to get the time from a Network Time Protocol/Simple Network Time Protocol (NTP/SNTP) server, you must reset the ONS 15454 M6 clock. After powering down, the date defaults to January 1, 1970, 00:04:15. To reset the clock, see the "NTP-G24 Setting Up Node Identification Information" procedure in the *Cisco ONS 15454 DWDM Control Card and Node Configuration Guide*. If you are using the TNC, TNCE, TSC, or TSCE cards, the system clock will run for up to three hours. In this case, no action would be required.

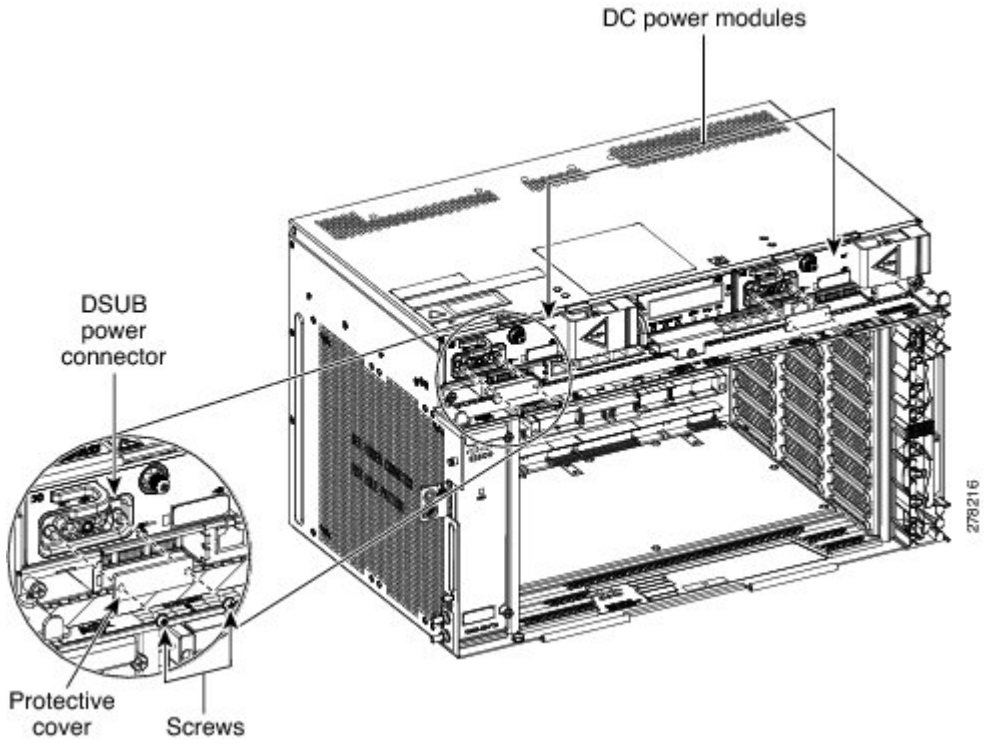
Procedure

Step 1 Connect the return cables of the power supply to the Earth ground located at the power supply side.

Step 2 Verify that the DC power module is installed in Slot A or Slot B (or both slots) of the ONS 15454 M6.

Step 3 Unscrew the screws to a torque value of 4 in-lb (0.45 N-m) to remove the protective covers from the DSUB power connector of the DC power modules (see the following figure).

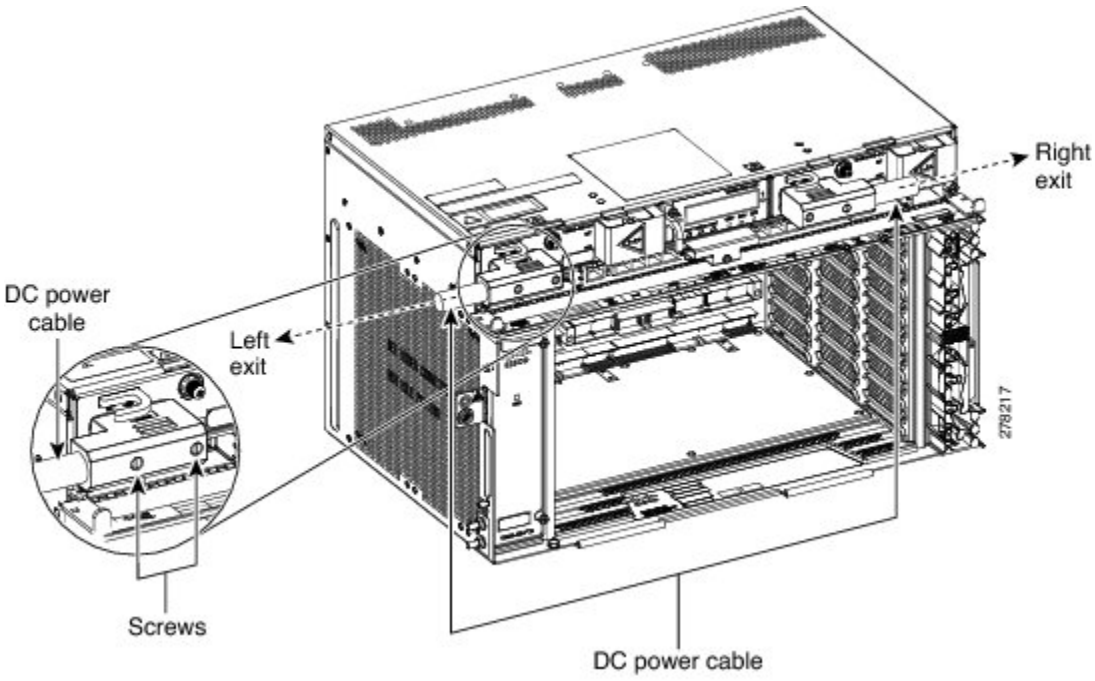
Figure 278: Connecting Office Power—DC Power Modules (ETSI Only)



Step 4 Attach the DC ETSI power cable to the cable connector in the DC power module (see the following figure).

Step 5 Tighten the screws to a torque value of 4 in-lb (0.45 N-m) to secure the cable (see the following figure).

Figure 279: Connecting Office Power—DC Power Modules (ETSI Only)



Note For slot A power module, use the left power cable—15454-M6-DCCBL-LE, and for slot B use the right power cable—15454-M6-DCCBL-RE. Use 15454-M6-DCCBL2-L and 15454-M6-DCCBL2-R cables for the 15454-M6-DC40 power module. For slot A power module, the power cable exits from the left side. For slot B power module, the power cable exits from the right side

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

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

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

Step 6 Return to your originating procedure (NTP).

Table 35: PIDs for DC Power Cables

Cable	PID
DC power cable for ETSI left exit	15454-M6-DCCBL-LE=
DC power cable for ETSI right exit	15454-M6-DCCBL-RE=

DLP-G574 Turn On and Verify AC Office Power on the ONS 15454 M6 Shelf

Purpose	This task turns on and verifies AC office power on the ONS 15454 M6 shelf.
Tools/Equipment	Voltmeter
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368. • DLP-G571 Connect Office Power (AC) to the ONS 15454 M6 Shelf, on page 386
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module.** Statement 390

Procedure

Step 1 To power up the node, insert the fuse into the fuse position according to site practice. The fuse rating must not exceed 20A.

Step 2 If the ONS 15454 M6 does not power up, check the voltage at the power source using a voltmeter. The voltage should be 100 to 240 VAC +/-10 percent.

Step 3 Return to your originating procedure (NTP).

DLP-G575 Turn On and Verify DC Office Power on the ONS 15454 M6 Shelf

Purpose	This task turns on the power and verifies correct power and returns on the ONS 15454 M6 shelf.
Tools/Equipment	Voltmeter
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms. • NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368. • DLP-G572 Connect Office Power (DC) to the ONS 15454 M6 Shelf (ANSI Only), on page 390 • DLP-G573 Connect Office Power (DC) to the ONS 15454 M6 Shelf (ETSI Only), on page 394
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

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

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module.** Statement 390

Procedure

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

a) To verify the power, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side connection and verify that it is between –40.5 VDC and –72.0 VDC. Place the red test lead on the B-side connection and verify that it is between –40.5 VDC and –72.0 VDC.

Note For nominal steady state voltage of –48 VDC, the operating voltage range for the chassis is –40.5 VDC (minimum) to –57.6 VDC (maximum).For nominal steady state voltage of –60 VDC, the operating voltage range for the chassis is –50.0 VDC (minimum) to –72.0 VDC (maximum).

b) To verify the ground, place the black test lead of the voltmeter to the frame ground. Place the red test lead on the A-side return ground and verify that no voltage is present. Place the red test lead on the B-side return ground and verify that no voltage is present.

Step 2 To power up the node, insert the fuse into the fuse position according to site practice. The fuse rating must not exceed 40 A.

Step 3 Using a voltmeter, verify the ONS 15454 M6 shelf for –48 VDC or –60 VDC battery and ground:

a) To verify the A-side of the shelf, place the black lead of the voltmeter to the frame ground. Place the red test lead to the –48 V or –60 V (A-side battery connection) red cable. Verify that it reads between –40.5 VDC and –72.0 VDC. Then place the red test lead of the voltmeter to the RET1 (A-side return ground) black cable and verify that no voltage is present.

Note For nominal steady state voltage of –48 VDC, the operating voltage range for the chassis is –40.5 VDC (minimum) to –57.6 VDC (maximum).For nominal steady state voltage of –60 VDC, the operating voltage range for the chassis is –50.0 VDC (minimum) to –72.0 VDC (maximum).

b) To verify the B-side of the shelf, place the black test lead of the voltmeter to the frame ground. Place the red test lead to the –48 V (B-side battery connection) red cable. Verify that it reads between –40.5 VDC and –72.0 VDC. Then place the red test lead of the voltmeter to the RET2 (B-side return ground) black cable and verify that no voltage is present.

Note To view the shelf voltage and temperature, see the NTP-G230 View Shelf Voltage and Temperature, on page 77.

Note If the ONS 15454 M6 shelf is being powered at –60 VDC nominal voltage, the door must be kept closed during regular operation.

Step 4 Return to your originating procedure (NTP).

Fan-Tray Assembly

The fan-trays supported on the ONS 15454 M6 shelf are 15454-M6-FTA and 15454-M6-FTA2. The 15454-M6-FTA2 fan-tray provides increased airflow when compared to the 15454-M6-FTA fan-tray. The 15454-M2-FTA2 is compatible with R9.2.0 and later releases.

The fan-tray assembly is located on the left side of the ONS 15454 M6 shelf. The fan-tray is removable and holds the fan-control circuitry and the fans for the ONS 15454 M6 shelf. It has a single dual-color LED on the faceplate. When the fan-tray assembly is not functioning or when the power line is not connected, the LED is OFF. When the power line is connected and if there is no TNC, TNCE, TSC, or TSCE card installed in the ONS 15454 M6 shelf, then the LED is OFF. A red LED indicates an alarm in the fan-tray assembly. A green LED indicates that the fan-tray assembly is functioning, the power line is connected, and the power module is functioning properly. The shelf controller card controls the conditions that result in triggering the LEDs. The LED can be overwritten by the shelf controller card (TNC, TNCE, TSC, or TSCE) in all the three states (OFF/red/green). The fan-tray assembly supports the lamp test procedure. After you install the fan tray, you should only access it if a fan failure occurs.

Fan Speed

The fan speed is controlled by the TNC, TNCE, TSC, or TSCE card temperature sensors. The sensors measure the input air temperature at the fan-tray assembly. Fan speed options are low, medium, and high. If the TNC, TNCE, TSC, or TSCE card fails, the fans automatically shift to high speed. The temperature that the TNC, TNCE, TSC, or TSCE sensors measure appear on the LCD screen.

Fan Failure

If one or more fans fail on the fan-tray assembly, replace the entire assembly. You cannot replace individual fans. The red Fan Fail LED on the front of the fan-tray illuminates when one or more fans fail. The red Fan Fail LED clears after you install a working fan-tray.

NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf

Purpose	This procedure installs the 15454-M6-FTA or 15454-M6-FTA2 fan-tray assembly in the ONS 15454 M6 system.
Tools/Equipment	Small slot-head screwdriver
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306. • NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339. • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Note The 15454-M2-FTA2 is compatible with R9.2.0 and later releases.

Caution Do not operate an ONS 15454 M6 without an air filter. For information on the air filter, see NTP-G114 Inspect and Replace the Air Filter, on page 449.

Caution Do not force a fan-tray assembly into place. Doing so can damage either the connectors on the fan tray or the connectors on the backpanel of the shelf, or both.

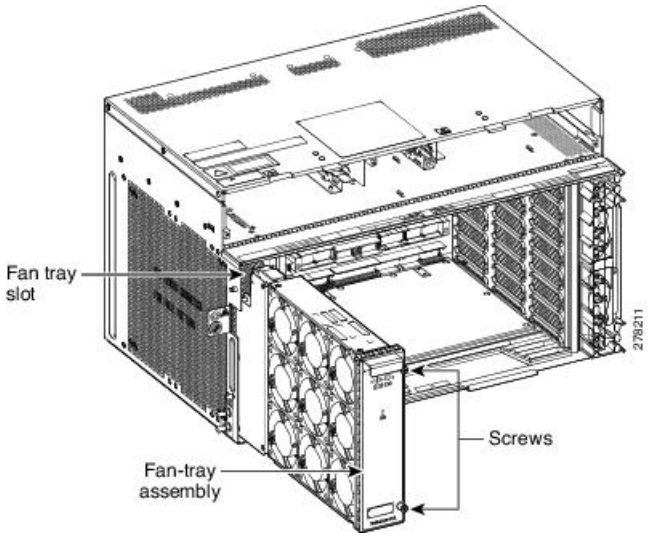
Note Error messages appear on the TNC, TNCE, TSC, or TSCE card, the fan-tray LED, and in the Cisco Transport Controller (CTC) when the fan-tray assembly is removed from the shelf or when one fan is not working.

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

Procedure

Step 1 Insert the fan-tray assembly inside the left slot (fan tray slot) of the ONS 15454 M6 chassis (see the following figure).

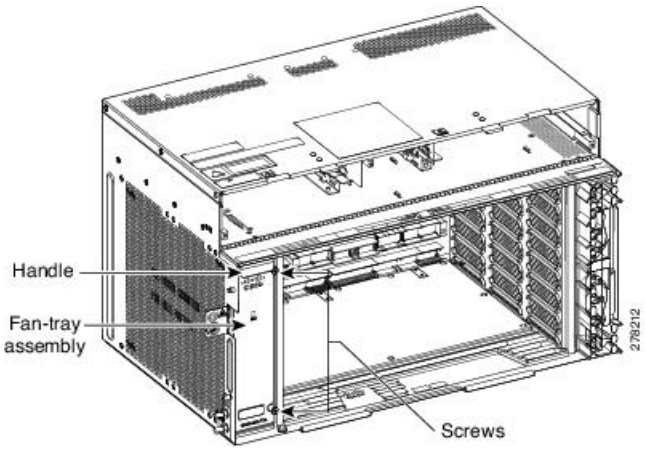
Figure 280: Installing the Fan-Tray Assembly



Step 2 Push the fan-tray assembly such that the backplane connector is engaged completely.

Step 3 Tighten the screws to a torque value of 4 in-lb (0.45 N-m) to lock the fan-tray assembly into the chassis (see the following figure).

Figure 281: Fan Tray Assembly Installed



Step 4 To verify that the tray has plugged into the assembly, check the fan tray and listen to determine if the fans are running.

Stop. You have completed this procedure.

Cable Routing and Management

The ONS 15454 M6 shelf has interchangeable fiber and cable modules. Because the ONS 15454 M6 shelf is designed to be compliant with ANSI and ETSI 600x300 standards, all the wiring and cable connections are available on the front side.

Default Module

The ONS 15454 M6 chassis is shipped with the fiber module installed. If you need to use CAT5 cables instead of optical fibers, you can replace the fiber module with the cable module.

Fiber Module

The minimum fiber bend radius is 1.5 inches. The fiber guide can be replaced with a cable guide to route the CAT-5 Ethernet cables. The maximum number of 2 mm diameter patch cords that can be managed is 144, or alternatively, 72 CAT5 cables. To manage extra length fiber and fan out, a dedicated fiber storage unit and patch panel unit can be installed inside the rack. The maximum capacity of the fiber channel for one side of the shelf depends on the fiber size and number of Ethernet cables running through that fiber channel. The details of the fibers are:

- 24 fiber x 6 line cards = 144 fibers (72 fibers for each exit point) or 12 CAT5 cables x 6 line cards = 72 RJ45 cables (36 CAT5 cables for each exit point)
- 4 fibers and 1 RJ45 cable x 2 TNC or TNCE = 8 fibers (4 fibers for each exit point) + 2 CAT5 cables (1 CAT5 cable for each exit point)

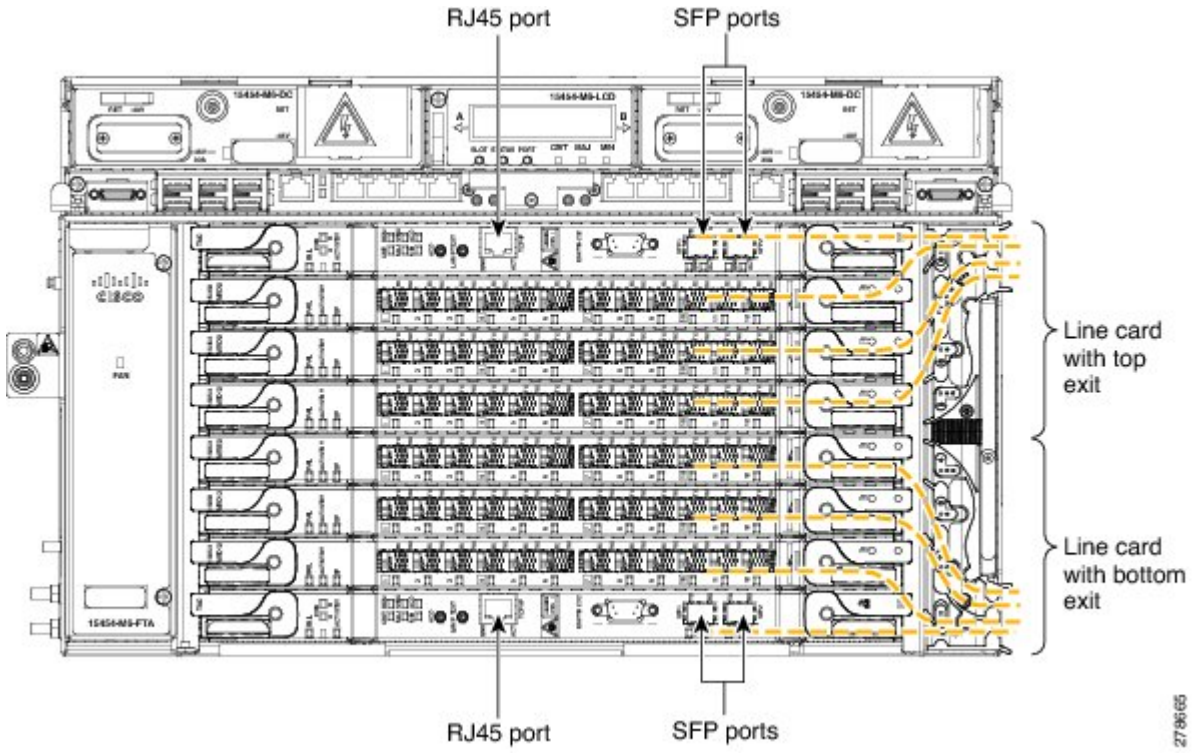
The fiber diameter is a maximum of 2 mm and the CAT5 cable diameter is a maximum of 5 to 6 mm. You need to determine your fiber size according to the number of cards and ports installed on each side of the shelf. For example, if your port combination requires 36 fibers, 3-mm (0.11-inch) fiber is adequate. If your port combination requires 68 fibers, you must use 2-mm (0.7-inch) or smaller fibers.

Note The minimum distance between the fiber LC connector and the bulk attenuator must be at least 50 cm. This is the minimum distance required to place the bulk attenuator outside the shelf from any port of a card.

Cable and Fiber Routing

Cable and fiber routing accommodates all the high-density cards for line card connections in ONS 15454 M6. The exit of the fibers and cables is split into two channels. The line card from slot 1 to 4 exits from the lower right side, and the line card from 5 to 8 exit from the upper right side. (See the following figure.)

Figure 282: Cable and fiber routing



NTP-G290 Install the Cable and Fiber Modules

Purpose	This procedure installs the cable and fiber modules in the ONS 15454 M6 system.
Tools/Equipment	#1 Phillips cross-head PH screwdriver
Prerequisite Procedures	None

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

Procedure

Step 1 Complete the DLP-G653 Remove the Fiber Module, on page 405.

Step 2 Complete the DLP-G654 Install the Cable Module, on page 406.

Step 3 Complete the DLP-G655 Route and Lock Cables, on page 407 .

Stop. You have completed this procedure.

DLP-G653 Remove the Fiber Module

Purpose	This procedure removes the default fiber module in the ONS 15454 M6 system.
Tools/Equipment	#1 Phillips cross-head PH screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

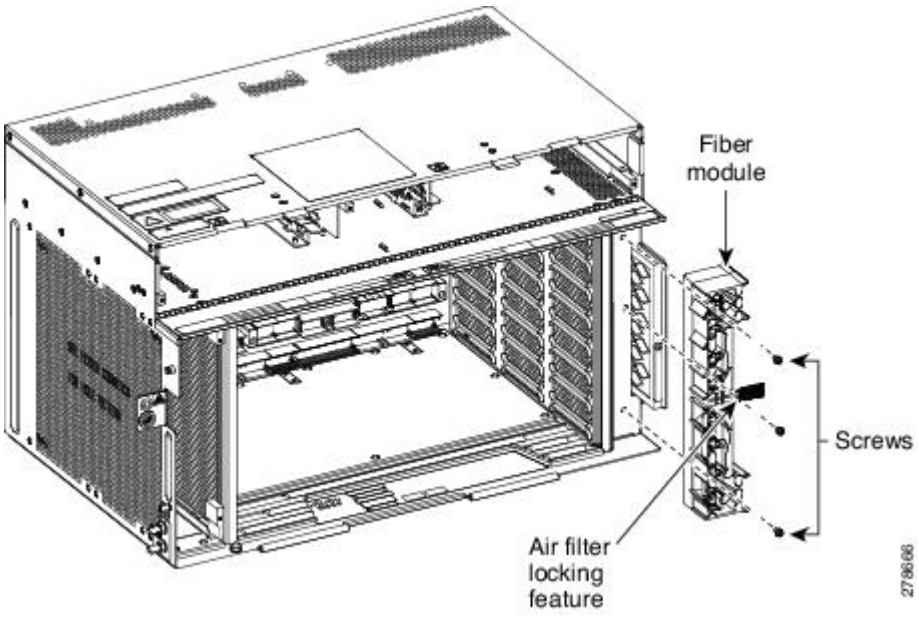
Step 1 Loosen the screws on the fiber module present on the right side of the ONS 15454 M6 assembly. (See the following figure.)

Step 2 Loosen the screw present on the air filter locking feature of the ONS 15454 M6 shelf.

Step 3 Remove the air filter locking feature by holding the air filter and gently pulling the air filter locking feature away from the shelf.

Step 4 Extract the fiber module by gently removing it from the ONS 15454 M6 shelf.

Figure 283: Removing the Fiber module



DLP-G654 Install the Cable Module

Purpose	This procedure installs the cable module in the ONS 15454 M6 system.
Tools/Equipment	Phillips cross-head PH screwdriver #1
Prerequisite Procedures	DLP-G653 Remove the Fiber Module, on page 405
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

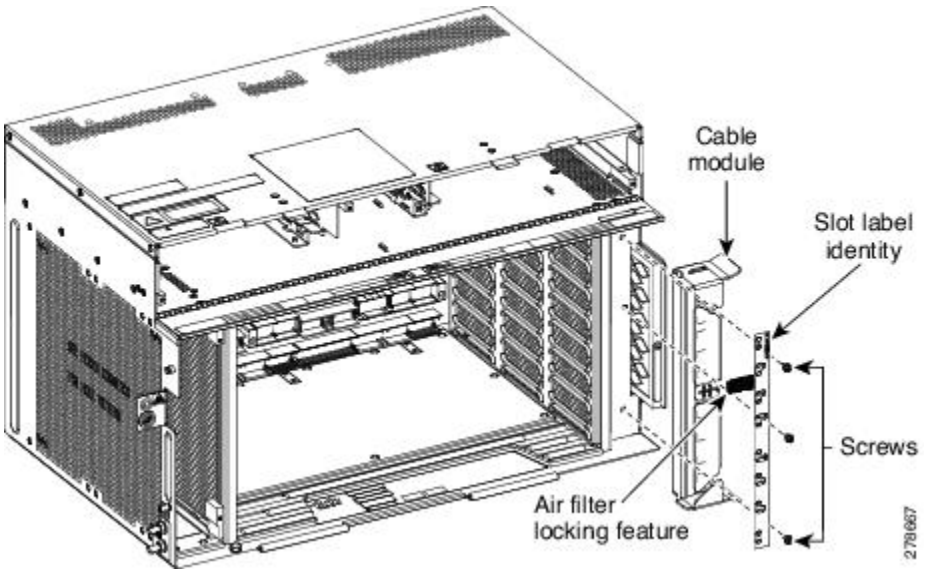
Procedure

Step 1 Insert the air filter locking feature on the cable module. (See the following figure.)

Step 2 Attach the slot label identity on the cable module, with screws.

Step 3 Mount the cable module on the chassis, and tighten the screws to a torque value of 4 in-lb (0.45 N-m) to attach the cable module to the ONS 15454 M6 shelf.

Figure 284: Installing the Cable Module



DLP-G655 Route and Lock Cables

Purpose	This procedure routes and locks the cables on the ONS 15454 M6 system.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Route the ECU cables on both the ECU ejectors. Figure 285: ECU module Cable Routing, on page 408 shows an example of ECU cable routing. This allows you to close the front door. Ensure an extra length of ECU cable is available to allow cable management during extraction of the power module. See Diagram 1 of Figure 288: Sequence to Remove the Power Module, on page 410. It is also possible to manage the extraction of the power module without adding the extra length of ECU cable by reducing the number of cables in the right exit area (see Diagram 1 of Figure 286: Cable Management, on page 408). An extra length of ECU cable is required in the left exit area to manage the USB connections (see Diagram 2 of Figure 286: Cable Management, on page 408).

Figure 285: ECU module Cable Routing

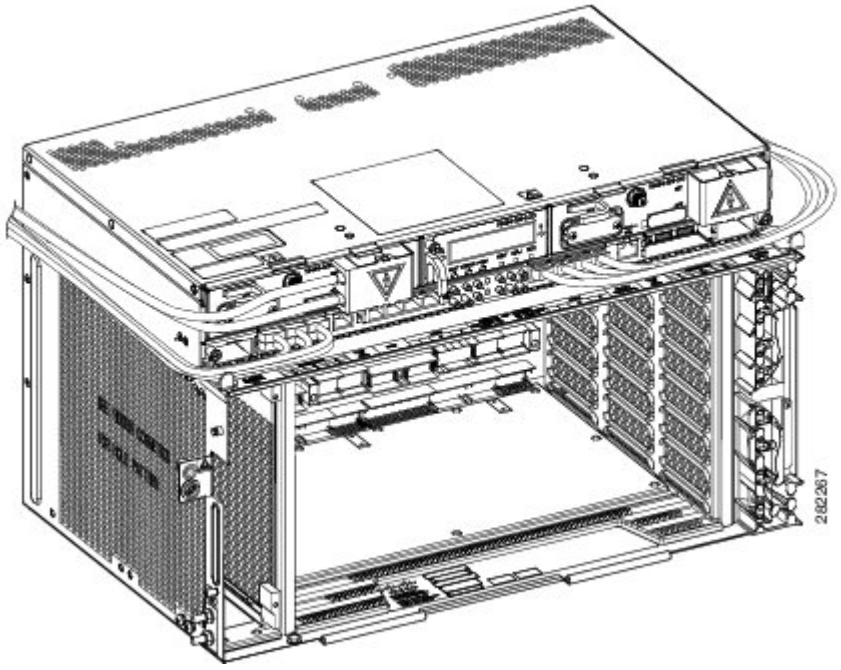
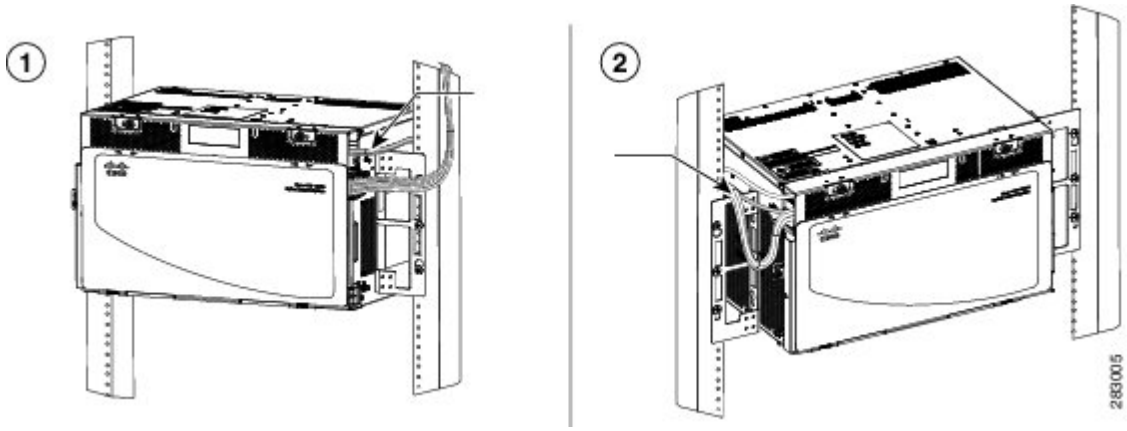


Figure 286: Cable Management

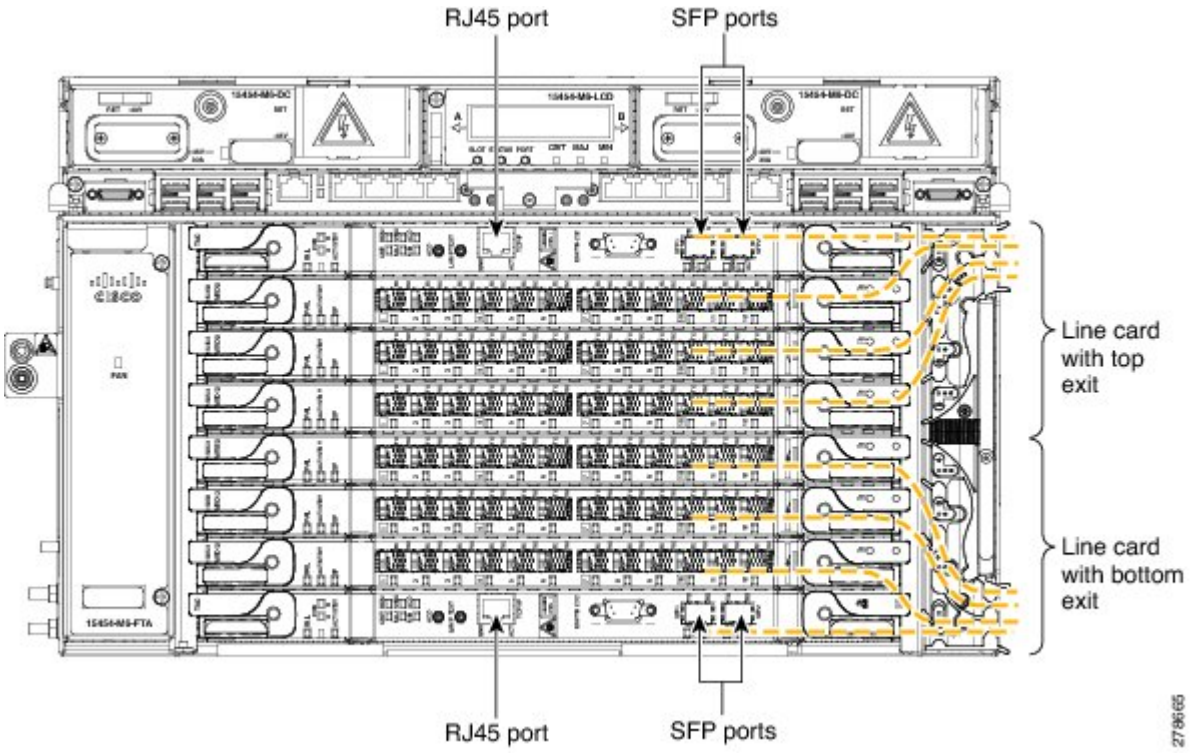


Step 2 Fix the cables using the tie-wrap provided in the accessories kit.

Step 3 To route the optical patch cords or copper cables, do the following as necessary:

a) Route the optical patch cords from the line cards through the fiber or cable module as shown in the following figure.

Figure 287: Cable Routing



b) Remove the front door and connect the copper cables to the SFP or RJ-45 ports of the cards.Do not route the copper cables from the SFPs or RJ-45 ports through the fiber or cable module.

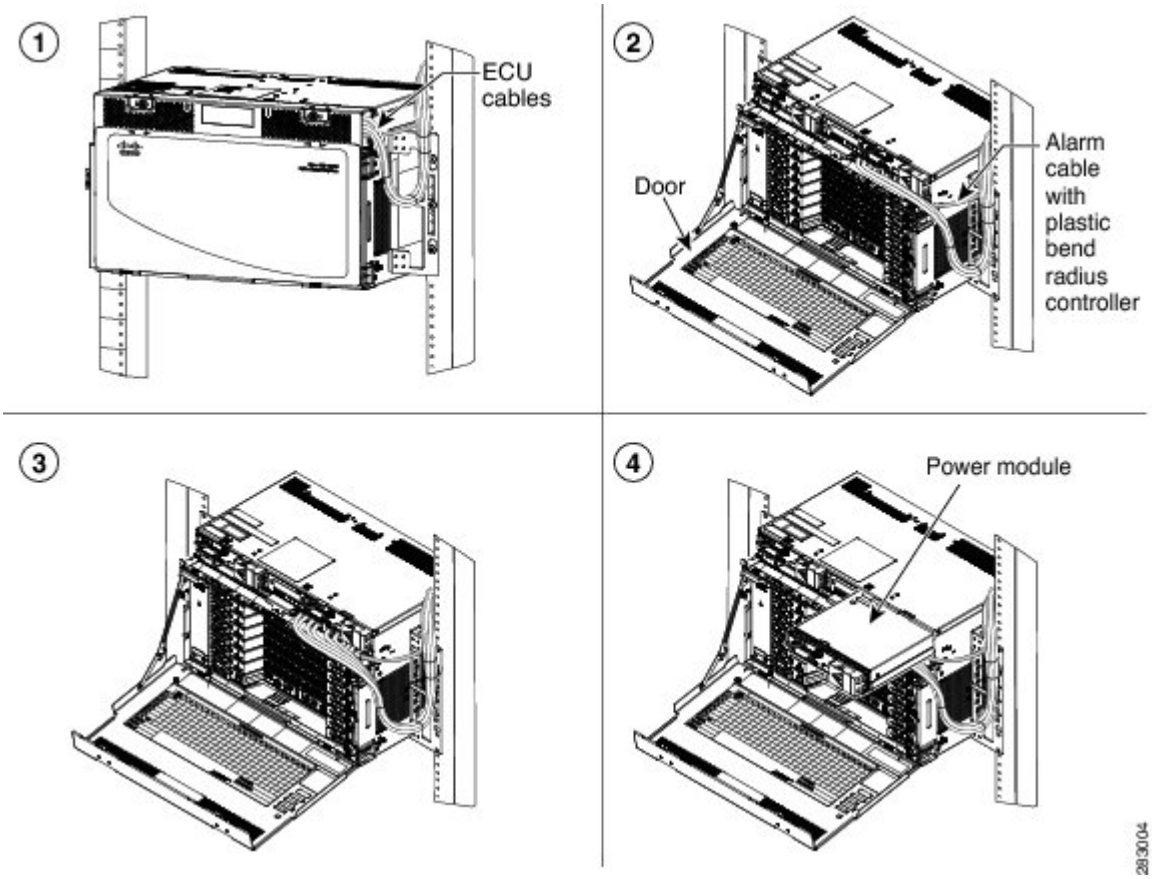
Step 4 To extract the power module, do the following:

a) Open the door of the chassis. See Diagram 2 of Figure 288: Sequence to Remove the Power Module, on page 410.

b) Move the ECU cables away from the chassis. Ensure that the alarm cable with the plastic bend radius controller is not moved. See Diagram 3 of Figure 288: Sequence to Remove the Power Module, on page 410.

c) Remove the power module. See Diagram 4 of Figure 288: Sequence to Remove the Power Module, on page 410.

Figure 288: Sequence to Remove the Power Module



Step 5 Return to your originating procedure (NTP).

NTP-G312 Attach Wires to Alarm, Timing, LAN, and Craft Pin Connections in Cisco ONS 15454 M6

Purpose	Use this procedure to attach alarm, timing, LAN, and craft wires in the ONS 15454 M6 shelf.
Tools/Equipment	Twisted #22 or #24 AWG (0.51 mm² or 0.64 mm²) shielded wires for LAN or craft 75-ohm coaxial cable with DIN-1.0/2.3 miniature coaxial connector, Alarm 26 pins SCSI cable. The PIDs of the SCSI cables are listed in Table 36: PIDs for SCSI Cables, on page 411.
Prerequisite Procedures	NTP-G253 Install the ECU or ECU-S Module, on page 362
Required/As Needed	As needed

Onsite/Remote	Onsite
Security Level	None

Caution Always use the supplied ESD wristband when working with a powered ONS 15454 M6. For detailed instructions on how to wear the ESD wristband, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Procedure

Step 1 Complete the DLP-G295 Install Alarm Wires in ONS 15454 M6, on page 411 if you are provisioning external alarms.

Step 2 Complete the DLP-G296 Install Timing Wires on ONS 15454 M6 - ANSI, on page 416 if you are provisioning external timing in ANSI.

Step 3 Complete the DLP-297 Install Timing Wires in ONS 15454 M6 - ETSI, on page 417 if you are provisioning external timing in ETSI.

Step 4 Complete the DLP-G298 Install LAN Wires in ONS 15454 M6, on page 419 to create an external LAN connection.

Stop. You have completed this procedure.

Table 36: PIDs for SCSI Cables

Cable	PID	Length	Wire Dimension
SCSI alarm cable	15454-M-ALMCBL=	20 Meter	28 AWG
SCSI alarm patch cable	15454-M-AEXPCBL=	1 Meter	28 AWG
SCSI alarm wire-wrap cable	15454-M-ALMCBL2=	20 Meter	24 AWG

Note Some wire-wrap tools require a minimum of 24 AWG wires to prevent breakage. Ensure that the SCSI alarm wire-wrap cable is used for 24 AWG wires. When the SCSI alarm wire-wrap cable is used, the number of alarms is reduced as fewer strands of wire are supported compared to the SCSI alarm and SCSI alarm patch cables. Table 38: SCSI Alarm Wire-Wrap Cable (15454-M-ALMCBL2) Connector Details , on page 414 lists alarm connector pin details for SCSI alarm wire-wrap cable.

DLP-G295 Install Alarm Wires in ONS 15454 M6

Purpose	This task installs alarm cables on the ECU module of the ONS 15454 M6 to provision external (environmental) alarms and controls.

Tools/Equipment	Alarm SCSI 26-pin cable Wire-wrap tool for ANSI BITS Screw for the alarm cable
Prerequisite Procedures	NTP-G253 Install the ECU or ECU-S Module, on page 362.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Connect one end of the SCSI cable to the input alarms or input/output alarms, and the other end to the alarm source (See Diagram 1 of Figure 289: Installing the ECU Alarm Cable—Left Exit Option, on page 413 or Figure 290: Installing the ECU Alarm Cable—Right Exit Option, on page 413). The details of the alarm connector pins are listed in Table 37: SCSI Alarm Cable (15454-M-ALMCBL) and SCSI Alarm Patch Cable (15454-M-AEXPCBL) Connector Details , on page 413 and Table 38: SCSI Alarm Wire-Wrap Cable (15454-M-ALMCBL2) Connector Details , on page 414.

Note These alarms are generic signals that the operator assigns to a definite wire (color) and name through the Craft Terminal.

Step 2 Tighten the screws of the SCSI connector to a torque value of 4 in-lb (0.45 N-m) using #2 Philips Dynamometric screwdriver. See Diagram 2 of Figure 289: Installing the ECU Alarm Cable—Left Exit Option, on page 413 or Figure 290: Installing the ECU Alarm Cable—Right Exit Option, on page 413.

Step 3 Bend the cable at an angle of 90° to exit from the left side (see Diagram 3 of Figure 289: Installing the ECU Alarm Cable—Left Exit Option, on page 413) or to exit from the right side (see Diagram 3 of Figure 290: Installing the ECU Alarm Cable—Right Exit Option, on page 413).

Step 4 Snap the cable bend controller on the cable. See Diagram 4 of Figure 289: Installing the ECU Alarm Cable—Left Exit Option, on page 413 or Figure 290: Installing the ECU Alarm Cable—Right Exit Option, on page 413.

Step 5 Return to your originating procedure (NTP).

Figure 289: Installing the ECU Alarm Cable—Left Exit Option

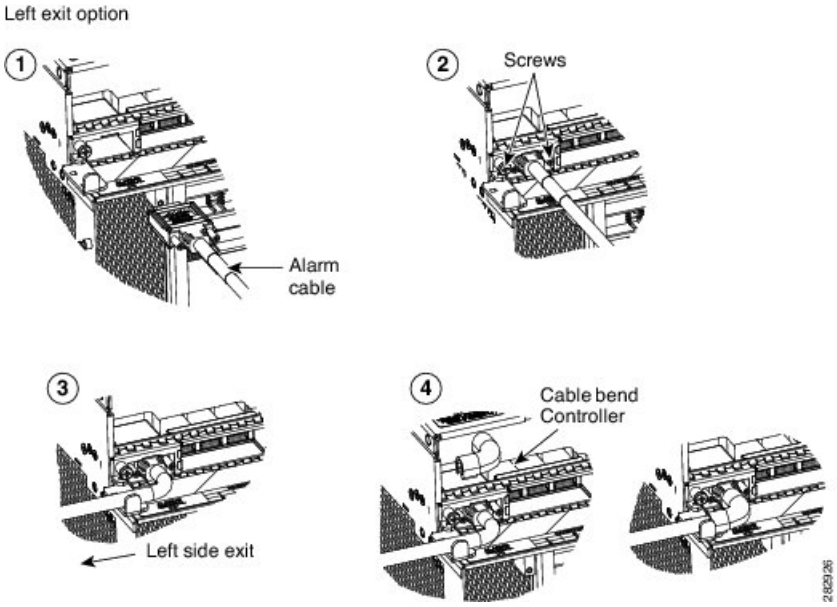


Figure 290: Installing the ECU Alarm Cable—Right Exit Option

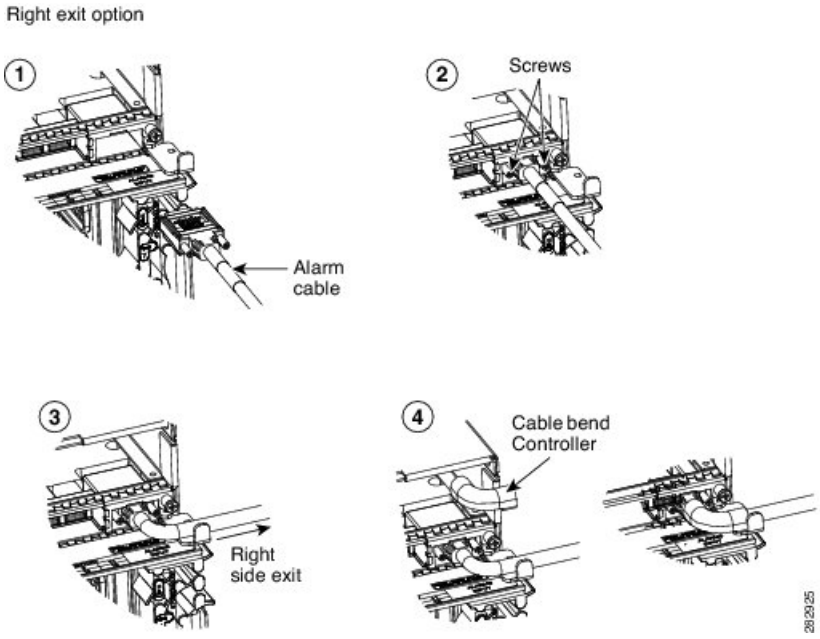


Table 37: SCSI Alarm Cable (15454-M-ALMCBL) and SCSI Alarm Patch Cable (15454-M-AEXPCBL) Connector Details

Pin Number	Color Code	Input Alarms - Right Alarm Connector	Input-Output Alarms - Left Connector
1	Black/Brown	Input Pair #1 +	Minor Audible Alarm +
2	Black/Red	Input Pair #2 +	Major Audible Alarm +

Pin Number	Color Code	Input Alarms - Right Alarm Connector	Input-Output Alarms - Left Connector
3	Black/Orange	Input Pair #3 +	Critical Audible Alarm +
4	Black/Yellow	Input Pair #4 +	Remote Audible Alarm +
5	Black/Green	Input Pair #5 +	Minor Visual Alarm +
6	Black/Blue	Input Pair #6 +	Major Visual Alarm +
7	White/Blue	Input Pair #7 +	Critical Visual Alarm +
8	White/Orange	Input Pair #8 +	Remote Visual Alarm +
9	White/Green	Input Pair #9 +	—
10	White/Brown	Input Pair #10 +	Alarm Cutoff (ACO) +
11	—	—	—
12	White/Gray	Output Pair #3 + or Input Pair #13 +	Output Pair #1 + or Input Pair #11 +
13	Black/Gray	Output Pair #4 + or Input Pair #14 +	Output Pair #2 + or Input Pair #12 +
14	Brown/Black	Input Pair #1 -	Minor Audible Alarm -
15	Red/Black	Input Pair #2 -	Major Audible Alarm -
16	Orange/Black	Input Pair #3 -	Critical Audible Alarm -
17	Yellow/Black	Input Pair #4 -	Remote Audible Alarm -
18	Green/Black	Input Pair #5 -	Minor Visual Alarm -
19	Blue/Black	Input Pair #6 -	Major Visual Alarm -
20	Blue/White	Input Pair #7 -	Critical Visual Alarm -
21	Orange/White	Input Pair #8 -	Remote Visual Alarm -
22	Green/White	Input Pair #9 -	—
23	Brown/White	Input Pair #10 -	Alarm Cutoff (ACO) -
24	—	—	—
25	Gray/White	Output Pair #3 - or Input Pair #13 -	Output Pair #1 - or Input Pair #11-
26	Gray/Black	Output Pair #4 - or Input Pair #14 -	Output Pair #2 - or Input Pair #12 -

Table 38: SCSI Alarm Wire-Wrap Cable (15454-M-ALMCBL2) Connector Details

Pin Number	Color Code	Input Alarms - Right Alarm Connector	Input-Output Alarms - Left Connector
1	Black/Brown	Input Pair #1 +	Minor Audible Alarm +

Pin Number	Color Code	Input Alarms - Right Alarm Connector	Input-Output Alarms - Left Connector
2	Black/Red	Input Pair #2 +	Major Audible Alarm +
3	—	—	—
4	Black/Yellow	Input Pair #4 +	Remote Audible Alarm +
5	Black/Green	Input Pair #5 +	Minor Visual Alarm +
6	Black/Blue	Input Pair #6 +	Major Visual Alarm +
7	White/Blue	—	—
8	White/Orange	Input Pair #8 +	Remote Visual Alarm +
9	White/Green	Input Pair #9 +	—
10	White/Brown	Input Pair #10 +	Alarm Cutoff (ACO) +
11	—	—	—
12	—	—	—
13	—	—	—
14	Brown/Black	Input Pair #1 -	Minor Audible Alarm -
15	Red/Black	Input Pair #2 -	Major Audible Alarm -
16	—	—	—
17	Yellow/Black	Input Pair #4 -	Remote Audible Alarm -
18	Green/Black	Input Pair #5 -	Minor Visual Alarm -
19	Blue/Black	Input Pair #6 -	Major Visual Alarm -
20	—	—	—
21	Orange/White	Input Pair #8 -	Remote Visual Alarm -
22	Green/White	Input Pair #9 -	—
23	Brown/White	Input Pair #10 -	Alarm Cutoff (ACO) -
24	—	—	—
25	—	—	—
26	—	—	—

DLP-G296 Install Timing Wires on ONS 15454 M6 - ANSI

Purpose	This task installs the timing cables on the ONS 15454 M6 ECU module for ANSI.
Tools/Equipment	Wire-wrap tool and 100-ohm wire-wrap cable.
Prerequisite Procedures	NTP-G253 Install the ECU or ECU-S Module, on page 362.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Locate the timing connector on the ECU module (BITS-1 or BITS-2 In/Out). The following figure shows ECU module ANSI wire-wrap pins. Table 39: ECU module Pin Assignments - ANSI, on page 416 lists the ECU module pin assignments for ANSI.

Figure 291: ECU module ANSI Wire-wrap Pins

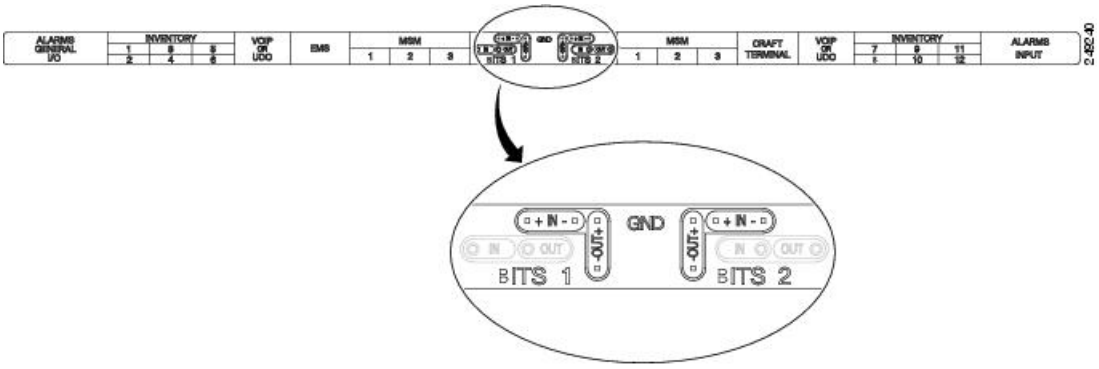


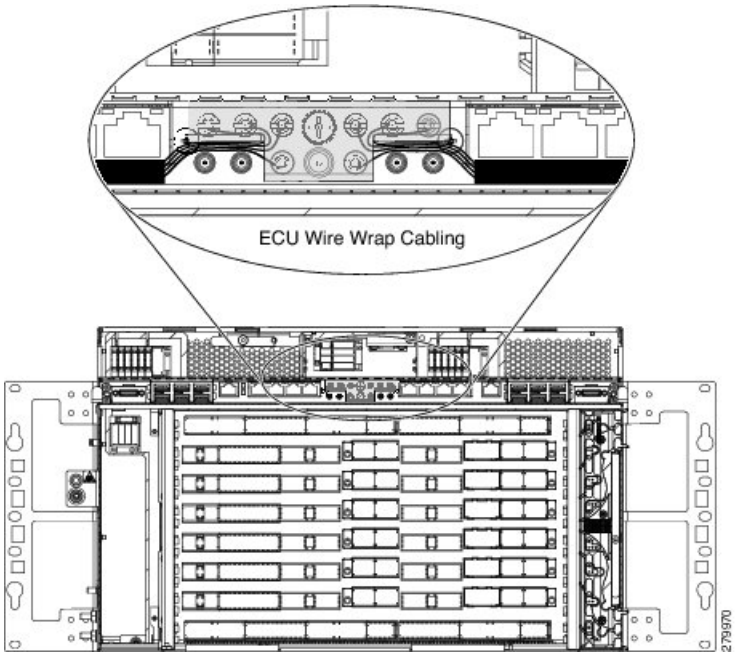
Table 39: ECU module Pin Assignments - ANSI

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

Step 2 Connect one end of the wire-wrap clock cable to the corresponding wire-wrap connector on the ECU module, and the other end to the external source of the timing. Change the timing input to high-impedance (lesser or greater than 3 ohms) using a jumper on the ECU module. Remove the P1 jumper of the BITS-1 to change the top timing input, and the P2 Jumper of the BITS-2 to change the bottom timing input.

Note Route the wire-wrap connections as shown in the following figure to prevent interference with the MSM ports.

Figure 292: ECU module Wire-wrap Cabling—ANSI



Step 3 Repeat for each cable. Refer to ITU-T G.813 for rules about provisioning timing references.

Step 4 Return to your originating procedure (NTP).

DLP-297 Install Timing Wires in ONS 15454 M6 - ETSI

Purpose	This task installs the timing cables on the ONS 15454 M6 ECU module for ETSI.
Tools/Equipment	75-ohm coaxial cable with a DIN-1.0/2.3 miniature coaxial connector. The PID for the BITS IN/OUT cable is 15454-M-TMGCBL=
Prerequisite Procedures	NTP-G253 Install the ECU or ECU-S Module, on page 362.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Connect the clock cable to the corresponding ECU module connector using a coaxial cable with DIN-1.0/2.3 miniature coaxial connectors. Figure 293: ECU module ETSI BITS connectors, on page 418 shows the ECU

module ETSI BITS connectors. Figure 294: ECU module ETSI BITS Connectors Cabling, on page 418 shows cable routing of ECU module ETSI BITS connectors. The following table lists the pin assignments on the ECU module.

Table 40: ECU module Pin Assignments - ETSI

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

Figure 293: ECU module ETSI BITS connectors

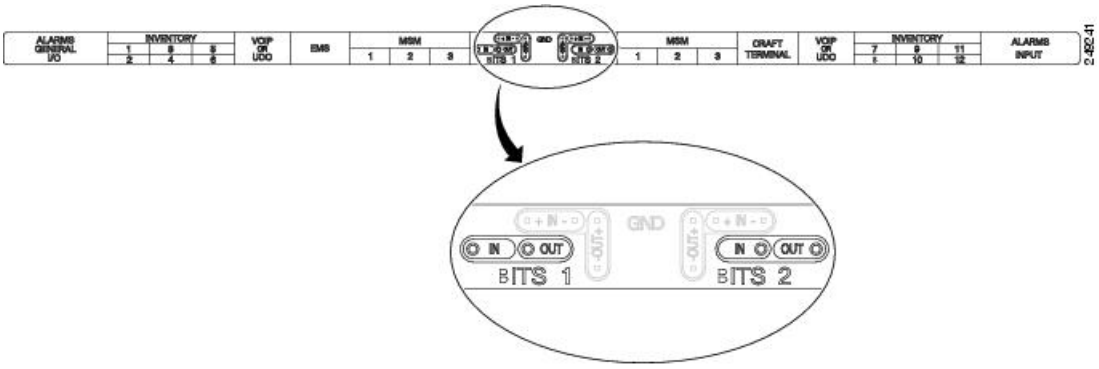
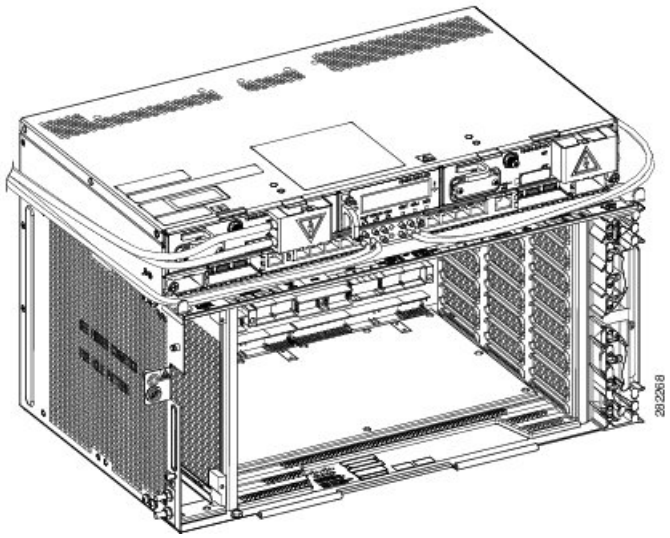


Figure 294: ECU module ETSI BITS Connectors Cabling

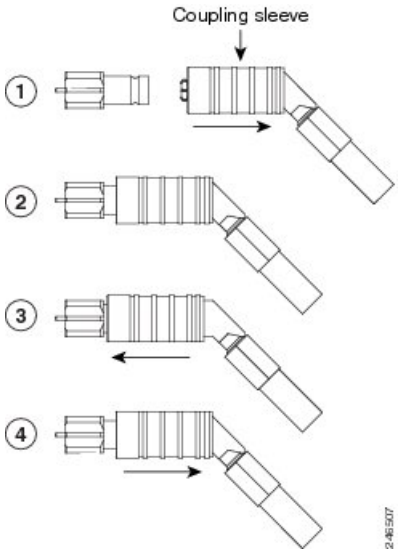


Step 2 Gently push the cable connector into the ECU module connector until you hear a click. Perform the following steps to mate the connectors:

a) Slide the coupling sleeve of the coaxial cable backward. See diagram1 of Figure 193: Cisco ONS 15454 M6 Shelf Dimensions for an ETSI Rack Configuration, on page 287.
b) Connect the cable to the ECU module connector. See diagram2 of Figure 193: Cisco ONS 15454 M6 Shelf Dimensions for an ETSI Rack Configuration, on page 287.
c) Slide the coupling sleeve forward to lock the cable connector to the ECU module connector. See diagram3 of Figure 193: Cisco ONS 15454 M6 Shelf Dimensions for an ETSI Rack Configuration, on page 287.

Note To unlock the cable connector from the ECU module connector, hold the connector and slide the coupling sleeve backward. See diagram4 of Figure 193: Cisco ONS 15454 M6 Shelf Dimensions for an ETSI Rack Configuration, on page 287.

Figure 295: Sequence to Attach the Connectors



Note The ECU modules provides 1.0/2.3 miniature coaxial connectors used for timing input and output. The top connectors are for "A" (BITS-1) timing, and the bottom connectors are for "B" (BITS-2) timing. In each case, the left connector is the input and the right connector is the output. The input connectors for timing provide a 75-ohm termination.

Step 3 Connect the other end of the cable to the external source of the timing signal according to Table 40: ECU module Pin Assignments - ETSI, on page 418. Repeat for each cable.

Step 4 Change the timing input to high-impedance (lesser or greater than 3 ohms) using a jumper on the ECU module. Remove the P1 jumper of the BITS-1 to change the top timing input, and the P2 Jumper of the BITS-2 to change the bottom timing input. Refer to ITU-T G.813 for rules about provisioning timing references.

Step 5 Return to your originating procedure (NTP).

DLP-G298 Install LAN Wires in ONS 15454 M6

Purpose	This task installs LAN wires on the ECU module of the ONS 15454 M6.

Tools/Equipment	Standard CAT-5 Ethernet cable (straight-through for data terminating equipment [DTE] or cross-over for data circuit-terminating equipment [DCE]) or RJ-45 connector Crimping tool for RJ-45 connector 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wire, preferably CAT-5
Prerequisite Procedures	NTP-G253 Install the ECU or ECU-S Module, on page 362.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

We recommend the use of RJ-45 port (craft terminal port or the EMS port) on the ECU module to establish LAN connectivity. The advantages of using the RJ-45 ports on the ECU module include:

- CAT-5 Ethernet cable connections can be managed better by routing the cable through the ECU module cable exit area.
- If the TNC, TNCE, TSC, or TSCE card fails, the LAN connection is not lost during the TNC, TNCE, TSC, or TSCE card switch over.

If the ECU module is absent, you can connect a CAT-5 Ethernet cable to the LAN port on the TNC/TNCE/TSC/TSCE card to create an external LAN connection.

Note You can use the same procedure to connect Multishelf Management ports of several chassis in MSM configurations.

Note To avoid duplex mismatch between EMS or craft terminal port and external LAN switch port, auto negotiation must be enabled on the external LAN switch port.

Procedure

Step 1 Using 0.51 mm² or 0.64 mm² (#22 or #24 AWG) wire or a standard CAT-5 Ethernet cable, connect the wires to the RJ-45 connector.

Step 2 Return to your originating procedure (NTP).

NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves

Purpose	Use this procedure to connect the ONS 15454 M6 multishelf node and the ONS 15454 M6 subtending shelves.

Tools/Equipment	Cross-over (CAT-5) LAN cables
Prerequisite Procedures	NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The multishelf management (MSM) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units, on page 355.

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1 of the ONS 15454 M6 shelf used as the node controller.

b) Plug the other connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1 of the ONS 15454 M6 shelf used as subtending shelf.

Step 2 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8 of the ONS 15454 M6 shelf used as the node controller.

b) Plug the other connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8 of the ONS 15454 M6 shelf used as subtending shelf.

Step 3 Repeat Step 1 and Step 2 to connect the remaining two MSM ports of the ONS 15454 M6 shelf, used as the node controller, to the subsequent subtending ONS 15454 M6 shelf assemblies.

Note The node controller can support up to three subtended shelves, while each of the subtended shelf can support only two more SSCs.

Step 4 To extend the number of SSCs, using a cross-over (CAT-5) LAN cable:

a) Plug one connector to any one of the remaining MSM ports of the ONS 15454 M6 SSCs in the first layer.

b) Plug the other connector to any one of the MSM ports of the ONS 15454 M6 SSCs in the next layer.

c) Repeat a and b to connect the remaining MSM ports of the ONS 15454 M6 in the first layer to the next layer.

Stop. You have completed this procedure.

NTP-G309 Connect the ONS 15454 M6 and the ONS 15454 in a Mixed Multishelf Configuration

Purpose	Use this procedure to connect the ONS 15454 M6 and the ONS 15454 with Cisco Catalyst 3560 in a mixed multishelf configuration and configure the Catalyst 3560 using IOS commands.
Tools/Equipment	• Two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; see the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables (3, plus 2 for each subtending shelf)
Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132. NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The MSM (multishelf management) ports are present on the ECU module. The MSM ports located on the left side of the ECU module corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units, on page 355.

Procedure

Step 1 Complete the necessary task as applicable:

- To connect the ONS 15454 M6 as the node controller and ONS 15454 or ONS 15454 M6 as subtending shelves with Catalyst 3560, complete the DLP-G682 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration Using the Catalyst 3560, on page 423.
- To connect the ONS 15454 M6 as the node controller and ONS 15454 or ONS 15454 M6 as subtending shelves without a Catalyst switch, complete the DLP-G729 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration without a Catalyst Switch, on page 426.
- To connect the ONS 15454 as the node controller and ONS 15454 or ONS 15454 M6 as subtending shelves with Catalyst 3560, complete the DLP-G683 Connect the ONS 15454 as the Node Controller in a Mixed Multishelf Configuration, on page 428.

Step 2 Complete the necessary task as applicable:

- To configure the Catalyst 3560 using IOS commands for the ONS 15454 shelf as the node controller, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.
- To configure the Catalyst 3560 using IOS commands for the ONS 15454 M6 shelf as the node controller, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.

Stop. You have completed this procedure.

DLP-G682 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration Using the Catalyst 3560

Purpose	Use this procedure to connect the ONS 15454 M6 as the node controller and a mix of ONS 15454 and ONS 15454 M6 as subtending shelves using a Catalyst 3560.
Tools/Equipment	• Two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; see the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables (3, plus 2 for each subtending shelf)
Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132. NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The MSM (multishelf management) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units, on page 355.

Note Use the craft terminal port or the EMS port present on the ECU module to connect the ONS 15454 M6 node controller to the LAN.

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 1 of the working Catalyst 3560.

b) Plug the other connector into any one of the MSM ports that correspond to the TNC/TNCE/TSC/TSCE card in Slot 1 of the node controller.

Step 2 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 1 of the protect Catalyst 3560.

b) Plug the other connector into any one of the MSM ports that correspond to the TNC/TNCE/TSC/TSCE card in Slot 8 of the node controller.

Step 3 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 23 of the working Catalyst 3560.

b) Plug the other end into Port 23 of the protect Catalyst 3560.

Step 4 To connect an ONS 15454 M6 subtending shelf to the Catalyst 3560 switches, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.
  • Plug the other end into Port 2 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8.
  • Plug the other end into Port 2 of the standby Catalyst 3560.

c) Repeat Step 4a and Step 4b for each subtending shelf in the multishelf configuration using Port 3 to Port 20 on the Catalyst 3560 switches.

Step 5 To connect an ONS 15454 subtending shelf to the Catalyst 3560 switches, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other end into Port 2 of the active Catalyst 3560.

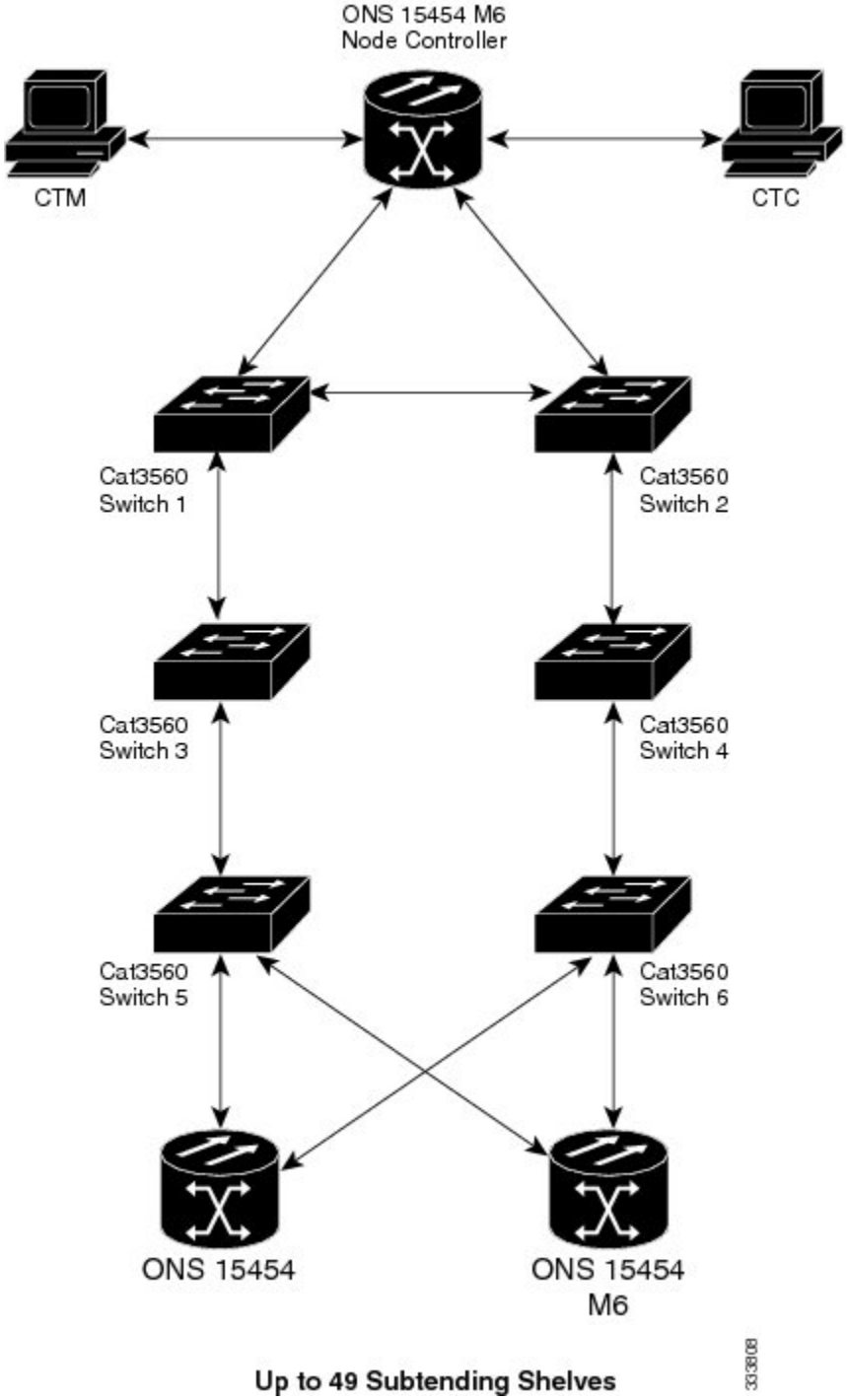
b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other end into Port 2 of the standby Catalyst 3560.

c) Repeat Step 5a and 5b for each subtending shelf in the multishelf configuration using Port 3 to Port 20 on the Catalyst 3560 switches.

Step 6 To daisy chain up to six Catalyst 3560 switches, use a cross-over (CAT-5) LAN cable to connect Port 21 of switch 1 to Port 21 of switch 3 and Port 21 of switch 2 to Port 21 of switch 4. Use another cross-over (CAT-5) LAN cable to connect Port 22 of switch 3 to Port 22 of switch 5 and Port 22 of switch 4 to Port 22 of switch 6.

Figure 296: Mixed Multishelf Configuration with the ONS 15454 M6 as the Node Controller



Note In order to connect the ONS 15454 M6 subtending shelves to the ONS 15454 M6 node controller without using a catalyst, follow the steps described in NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves, on page 420. To connect an ONS 15454 subtending shelf to the ONS 15454 M6 node controller without using a catalyst switch, connect the MSM ports that correspond to the TNC/TNCE/TSC/TSCE cards in Slot 1 and Slot 8 of the ONS 15454 M6 node controller to the ONS 15454 subtending shelf TCC2/TCC2P/TCC3 cards in Slot 7 and Slot 11.

Step 7 Return to your originating procedure (NTP).

DLP-G729 Connect the ONS 15454 M6 as the Node Controller in a Mixed Multishelf Configuration without a Catalyst Switch

Purpose	Use this procedure to connect the ONS 15454 M6 as the node controller and a mix of ONS 15454 and ONS 15454 M6 as subtending shelves without using a Catalyst switch.
Tools/Equipment	• Cross-over (CAT-5) LAN cables (3, plus 2 for each subtending shelf)
Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132. NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The MSM (multishelf management) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units, on page 355.

Note Use the craft terminal port or the EMS port present on the ECU module to connect the ONS 15454 M6 node controller to the LAN.

Procedure

Step 1 To connect an ONS 15454 M6 subtending shelf to the ONS 15454 M6 node controller, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.
  • Plug the other end into the MSM port of the node controller ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8.
  • Plug the other end into the MSM port of the node controller ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.

c) Repeat Step 1a and Step 1b to connect the remaining MSM ports on the node controller ONS 15454 M6 shelf to the MSM ports on the subtending ONS 15454 M6 shelf.

Step 2 To connect an ONS 15454 subtending shelf to the ONS 15454 M6 node controller, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other end into the MSM port of the node controller ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other end into the MSM port of the node controller ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8.

c) Repeat Step 2a and 2b for each subtending shelf in the multishelf configuration using the remaining MSM ports on the node controller ONS 15454 M6 shelf.

Step 3 To connect an ONS 15454 subtending shelf to the ONS 15454 M6 subtending shelf, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

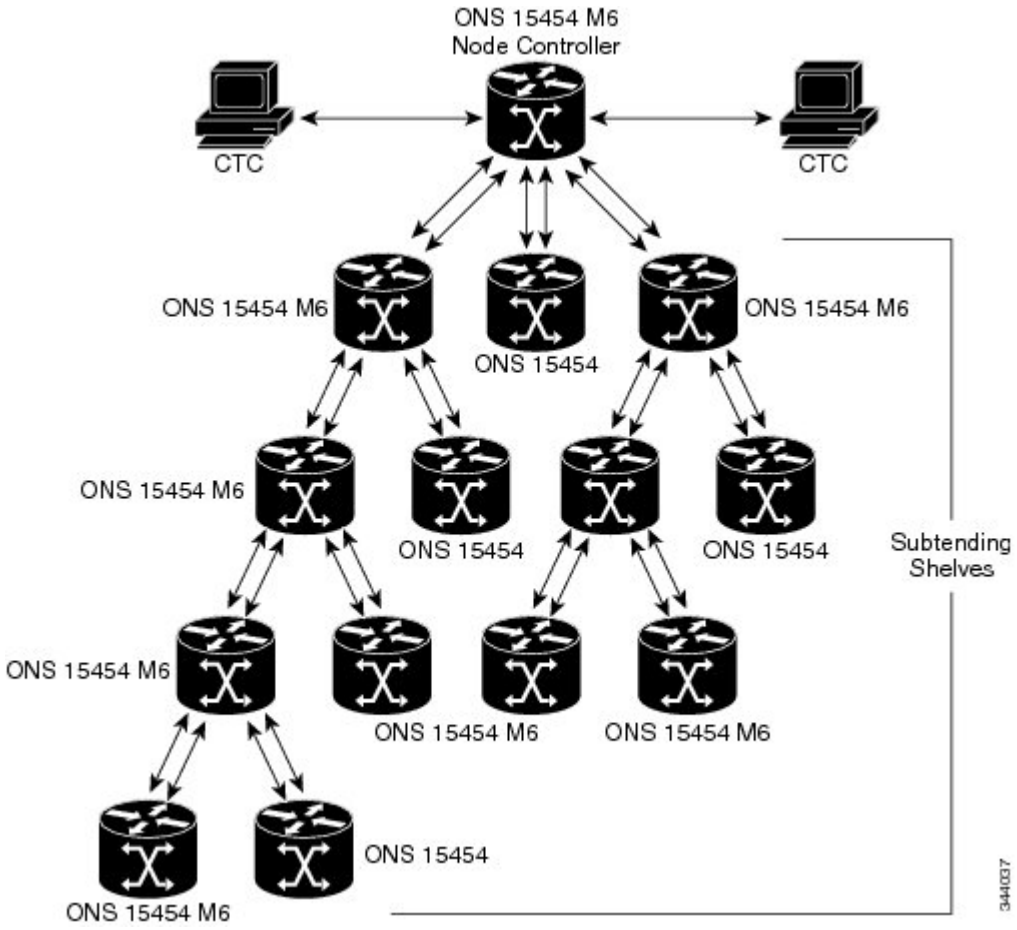
- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other end into the MSM port of the subtended ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other end into the MSM port of the subtended ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8.

c) Repeat Step 3a and 3b for each subtending shelf in the multishelf configuration using the remaining MSM ports on the subtending ONS 15454 M6 shelf.

Figure 297: Mixed Multishelf Configuration without a Catalyst Switch Using ONS 15454 M6 as the Node Controller



Step 4 Return to your originating procedure (NTP).

DLP-G683 Connect the ONS 15454 as the Node Controller in a Mixed Multishelf Configuration

Purpose	Use this procedure to connect the ONS 15454 as the node controller and a mix of ONS 15454 and ONS 15454 M6 as subtending shelves using the Catalyst 3560.
Tools/Equipment	• Two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; refer to the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables
Prerequisite Procedures	NTP-G15 Install the Common Control Cards, on page 132. NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273

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

Note The MSM (multishelf management) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units, on page 355.

Note This procedure explains the steps to connect the ONS 15454 multishelf node and subtending shelves to a 24-port Catalyst 2950 or Catalyst 3560 switch. Follow the steps provided in this procedure to connect the multishelf node to the 48-port Catalyst 2950 or Catalyst 3560 switch.

Note Cisco ONS 15454 M12 subtended shelf does not support connecting to NCS multi-shelf node.

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 1 of the active Catalyst 3560.

b) Plug the other connector into the front panel of the node controller TCC2/TCC2P/TCC3 card in Slot 7.

Step 2 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 1 of the standby Catalyst 3560.

b) Plug the other connector into the front panel of the node controller TCC2/TCC2P/TCC3 card in Slot 11.

Step 3 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into Port 23 of the active Catalyst 3560.

b) Plug the other connector into Port 23 of the standby Catalyst 3560.

Note Use TCC3 cards in the ONS 15454 node controller while connecting it to the ONS 15454 M6 subtending shelves and when there are more than 12 subtending shelves.

Step 4 To connect an ONS 15454 M6 subtending shelf to the Catalyst 3560 switches, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.
  • Plug the other connector into Port 2 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8.
  • Plug the other connector into Port 2 of the standby Catalyst 3560.

c) Repeat Steps 4a and 4b for each subtending shelf in the multishelf configuration using Port 3 to Port 20 on the Catalyst 3560 switches.

Step 5 To connect an ONS 15454 subtending shelf to the Catalyst 3560 switches, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other connector into Port 2 of the active Catalyst 3560.

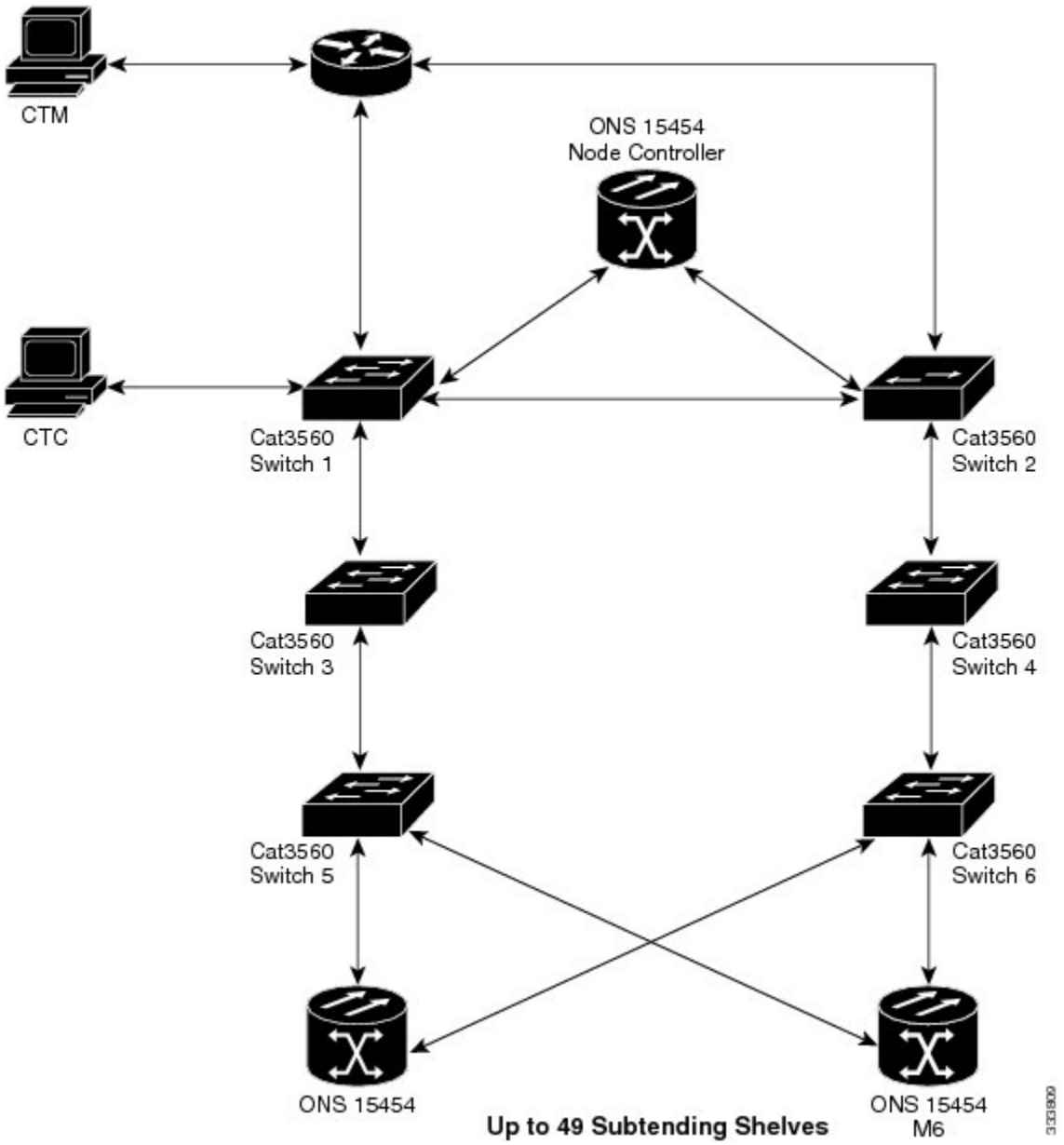
b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other connector into Port 2 of the standby Catalyst 3560.

c) Repeat Step 5a and 5b for each subtending shelf in the multishelf configuration using Port 3 to Port 20 on the Catalyst 3560 switches.

Step 6 To daisy chain up to six Catalyst 3560 switches, use a cross-over (CAT-5) LAN cable to connect Port 21 of switch 1 to Port 21 of switch 3 and Port 21 of switch 2 to Port 21 of switch 4. Use another cross-over (CAT-5) LAN cable to connect Port 22 of switch 3 to Port 22 of switch 5 and Port 22 of switch 4 to Port 22 of switch 6.

Figure 298: Mixed Multishelf Configuration with the ONS 15454 as the Node Controller



Step 7 Return to your originating procedure (NTP).

NTP-G310 Upgrade the ONS 15454 Multishelf Configuration Using the ONS 15454 M6

Purpose	Use this procedure to upgrade the existing ONS 15454 multishelf configuration using the ONS 15454 M6 as subtending shelves and configure the Catalyst switches using the IOS commands.
Tools/Equipment	• If there are no free ports in the Cisco Catalysts 2950, two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; see the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables
Prerequisite Procedures	• NTP-G15 Install the Common Control Cards, on page 132 • NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The multishelf management (MSM) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units, on page 355.

Procedure

Step 1 Complete the necessary task as applicable:

- To upgrade the existing ONS 15454 multishelf configuration that has the Cisco Catalyst 2950 switches, complete the DLP-G687 Upgrade the ONS 15454 Multishelf with the Catalyst 2950 Switch Configuration, on page 433.
- To upgrade the existing ONS 15454 multishelf configuration that has the MS-ISC card, complete the DLP-G688 Upgrade the ONS 15454 Multishelf with MS-ISC Card Configuration, on page 436.

Step 2 To configure the Catalyst 2950 switch using IOS commands, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153 .

Step 3 To configure the Catalyst 3560 switch using IOS commands, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153 .

Stop. You have completed this procedure.

DLP-G687 Upgrade the ONS 15454 Multishelf with the Catalyst 2950 Switch Configuration

Purpose	Use this task to upgrade the existing ONS 15454 multishelf with Catalyst 2950 configuration, with the ONS 15454 M6 subtending shelves and Cisco Catalyst 3950.
Tools/Equipment	• Two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; refer to the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables
Prerequisite Procedures	• NTP-G15 Install the Common Control Cards, on page 132 • NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note Use TCC3 cards in ONS 15454 node controller while connecting it to the ONS 15454 M6 subtending shelves and when there are more than 12 subtending shelves.

Procedure

Step 1 Disconnect the subtending shelf at Port 21 of the active and standby Catalyst 2950:

a) Remove the cross-over (CAT 5) LAN cable from Port 21 of the active Catalyst 2950.

b) Remove the cross-over (CAT 5) LAN cable from Port 21 of the standby Catalyst 2950.

Step 2 Connect the extended Catalyst 3560 (active and standby) to the Catalyst 2950:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to Port 1 of the extended Catalyst 3560 (active).
  • Plug the other connector to Port 21 of the active Catalyst 2950.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to Port 1 of the extended Catalyst 3560 (standby).
  • Plug the other connector to Port 21 of the standby Catalyst 2950.

Step 3 Reconnect the ONS 15454 subtending shelf disconnected in Step 1 to the Catalyst 3560 switches:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other connector into Port 2 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other connector into Port 2 of the standby Catalyst 3560.

Step 4 Repeat Step 3a and Step 3b to connect additional ONS 15454 subtending shelves using Port 3 through Port 20 on the Catalyst 3560 switches.

Step 5 To connect an ONS 15454 M6 subtending shelf to the Catalyst 3560 switches, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

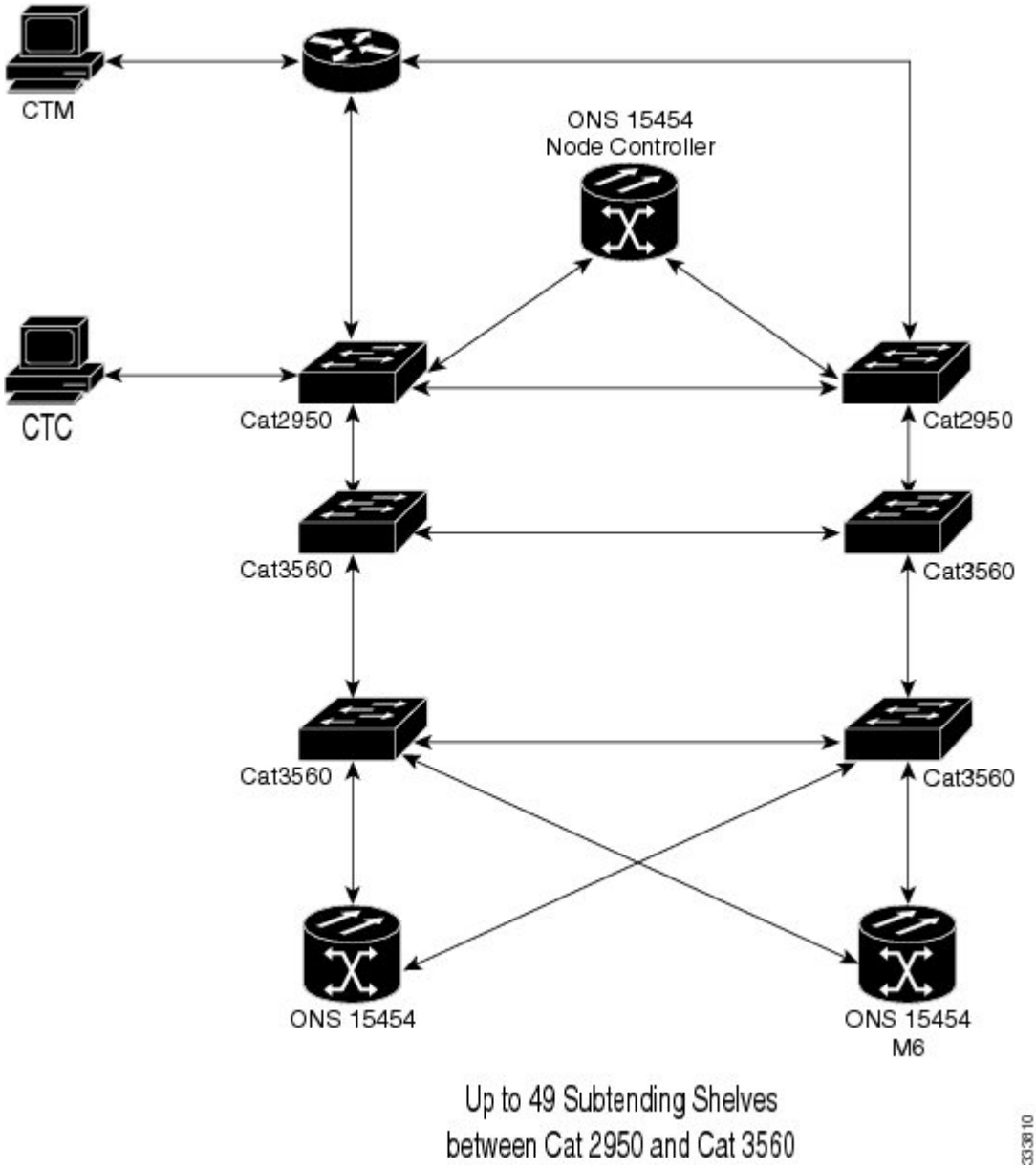
- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.
  • Plug the other connector into Port 3 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8.
  • Plug the other connector into Port 3 of the standby Catalyst 3560.

c) Repeat Step 4a and Step 4b to connect additional ONS 15454 M6 subtending shelves in the multishelf configuration using Port 4 to Port 20 on the Catalyst 3560 switches.

Figure 299: Upgrading the ONS 15454 Multishelf Configuration Connected to the Catalyst 2950



Step 6 To configure the Catalyst 3560 (extended) using IOS commands, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.

Step 7 Return to your originating procedure (NTP).

DLP-G688 Upgrade the ONS 15454 Multishelf with MS-ISC Card Configuration

Purpose	Use this task to upgrade the existing ONS 15454 multishelf configuration that has the MS-ISC card installed, with the ONS 15454 M6 subtending shelves and Cisco Catalyst 3950.
Tools/Equipment	• Two Cisco Catalyst 3560 switches must be installed in same rack as the node controller shelf; refer to the Cisco Catalyst 3560 product documentation for installation instructions. • Cross-over (CAT-5) LAN cables (3, plus 2 for each subtending shelf)
Prerequisite Procedures	• NTP-G15 Install the Common Control Cards, on page 132 • NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note Use TCC3 cards in ONS 15454 node controller while connecting it to the ONS 15454 M6 subtending shelves and when there are more than 12 subtending shelves.

Note The CTC in ONS 15454 M6 shelf view displays the three ports of the MS-ISC card, and EMS and circuit ports present on the ECU.

Procedure

Step 1 Disconnect the ONS 15454 subtending shelf from the EAPs:

a) Remove the cross-over (CAT 5) LAN cable (connecting the ONS 15454 subtending shelf) from the SSC8 port of the right EAP.

b) Remove the cross-over (CAT 5) LAN cable (connecting the ONS 15454 subtending shelf) from the SSC8 port of the left EAP.

Step 2 Connect the EAPs to the Catalyst 3560:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to the SSC8 port of the right EAP.
  • Plug the other connector to Port 1 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector to the SSC8 port of the left EAP.
  • Plug the other connector to Port 1 of the standby Catalyst 3560.

Step 3 Reconnect the ONS 15454 subtending shelf disconnected in Step1 to the Catalyst 3560 switches:

a) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 7.
  • Plug the other connector into Port 2 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the front panel of the subtending shelf TCC2/TCC2P/TCC3 card in Slot 11.
  • Plug the other connector into Port 2 of the standby Catalyst 3560.

Step 4 Repeat Step 3a and Step 3b to connect additional ONS 15454 shelves using Port 3 to Port 24 on the Catalyst 3560 switches.

Step 5 To connect an ONS 15454 M6 subtending shelf to the Catalyst 3560 switches, complete the following:

a) Using a cross-over (CAT-5) LAN cable:

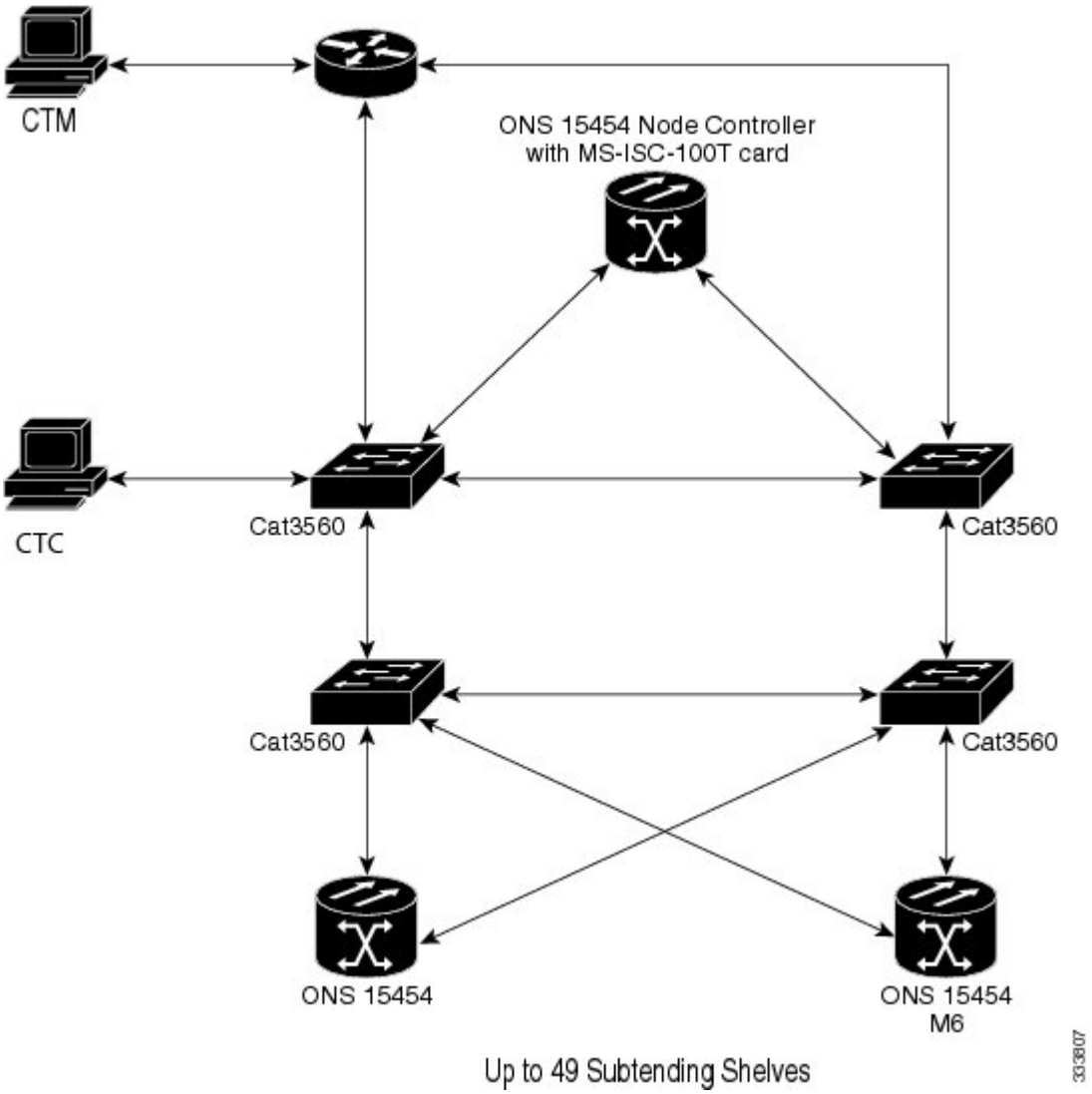
- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1.
  • Plug the other connector into Port 3 of the active Catalyst 3560.

b) Using a cross-over (CAT-5) LAN cable:

- • Plug one connector into the MSM port of the subtending ONS 15454 M6 shelf that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 8.
  • Plug the other connector into Port 3 of the standby Catalyst 3560.

c) Repeat Steps 4a and 4b to connect additional ONS 15454 M6 subtending shelves in the multishelf configuration using Port 4 to Port 24 on the Catalyst 3560 switches.

Figure 300: Upgrading the ONS 15454 Multishelf Configuration Using the MS-ISC Card



Step 6 To configure the Catalyst 3560 (extended) using IOS commands, complete the NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153.

Step 7 Return to your originating procedure (NTP).

NTP-G264 Perform the ONS 15454 M6 Shelf Installation Acceptance Test

Purpose	Use this procedure to perform a shelf installation acceptance test for the ONS 15454 M6.

Tools/Equipment	Voltmeter
Prerequisite Procedures	Applicable procedures in Installing the ONS 15454 M6 Shelf, on page 283
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 If you installed an ONS 15454 M6, complete the following table by verifying that each applicable procedure was completed.

Table 41: ONS 15454 M6 Shelf —ETSI Rack Installation Task Summary

Description	Completed
NTP-G305 Unpack and Inspect the ONS 15454, ONS 15454 M2, and ONS 15454 M6 Shelves, on page 21	
NTP-G252 Install the ONS 15454 M6 Shelf , on page 306	
Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, see the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.	
NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339	
NTP-G253 Install the ECU or ECU-S Module, on page 362	
NTP-G524 Install the Power Modules in the ONS 15454 M6 Shelf , on page 368	
NTP-G255 Install the LCD Module in the ONS 15454 M6 Shelf, on page 379	
NTP-G256 Install Power and Ground to the ONS 15454 M6 Shelf , on page 383	
NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf, on page 401	
NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card, on page 273	
NTP-G308 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves, on page 420 (as applicable)	
NTP-G309 Connect the ONS 15454 M6 and the ONS 15454 in a Mixed Multishelf Configuration, on page 422 (as applicable)	
NTP-G310 Upgrade the ONS 15454 Multishelf Configuration Using the ONS 15454 M6 , on page 432 (as applicable)	
NTP-G298 Configure a Cisco Catalyst 2950 or Catalyst 3560 (Active and Standby) for a ONS 15454 Multishelf Node, on page 153 (as applicable)	

Description	Completed
NTP-G258 Install the Standard Door of the ONS 15454 M6 Shelf , on page 334	

Note The ECU module, power modules, LCD and the fan-tray assembly can be installed in any order.

Step 2 Complete the DLP-G578 Inspect the ONS 15454 M6 Shelf Installation and Connections, on page 440.

Step 3 Complete the DLP-G579 Measure DC Voltage on the ONS 15454 M6 Shelf, on page 440.

Step 4 Continue with the Connect the PC and Log into the GUI document.

Stop. You have completed this procedure.

DLP-G578 Inspect the ONS 15454 M6 Shelf Installation and Connections

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

Procedure

Step 1 Make sure all external wiring connections on the ECU module (that is, power, ground, alarms, and so on) are secure. If a wire or cable is loose, return to the appropriate procedure in this chapter to correct it.

Step 2 Return to your originating procedure (NTP).

DLP-G579 Measure DC Voltage on the ONS 15454 M6 Shelf

Purpose	Use this task to measure DC voltage on the ONS 15454 M6 shelf.
Tools/Equipment	Voltmeter
Prerequisite Procedures	Before installing the DC power, check the voltage
Required/As Needed	Required
Onsite/Remote	Onsite

Security Level	None

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

Warning **To ensure safety of personnel and equipment, do not connect any power cables into the power module until the module is completely installed into the chassis.** Statement 389

Warning **To reduce the risk of electric shock, switch on the power only after the power cord is completely installed into the power module.** Statement 390

Procedure

Step 1 Using a voltmeter, verify the office ground and power:

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

b) Place the red lead (negative) on the fuse power points on the third-party power distribution panel to verify that they read between –40.5 VDC and –57.6 VDC (power) and 0 (return ground).

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

a) Place the black lead (positive) on the RET1 and the red lead on the –48 V point. Verify a reading between –40.5 VDC and –57.6 VDC. If there is no voltage, check the following and correct if necessary:

- Battery and ground are reversed to the shelf.
- Battery is open or missing.
- Return is open or missing.

Step 3 Repeat Step 1 and Step 2 for the RET2 and –48 V of the redundant power supply input.

Step 4 Return to your originating procedure (NTP).

NTP-G317 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves with Simplex Controllers

Purpose	Use this procedure to connect the ONS 15454 M6 multishelf node and the ONS 15454 M6 subtending shelves with simplex controllers.
Tools/Equipment	Cross-over (CAT-5) LAN cables
Prerequisite Procedures	NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card. See the Cisco ONS 15454 DWDM Configuration Guide.

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

Note The MSM (multishelf management) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see External Connection Units, on page 355.

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1 of the ONS 15454 M6 shelf used as the node controller.

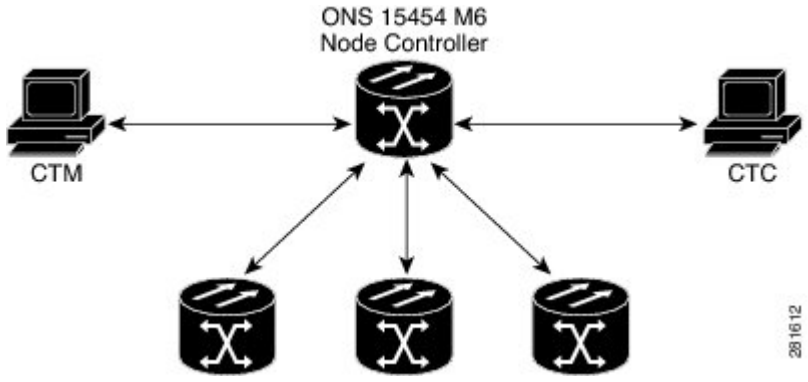
b) Plug the other connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1 of the ONS 15454 M6 shelf used as subtending shelf.

Note When connecting two shelves using the cross-over cables, it is possible to have shelves not having controller cards in same slots. Use corresponding MSM ports according to the controller card slots.

Step 2 Repeat Step 1 to connect the remaining two MSM ports of the ONS 15454 M6 shelf, used as the node controller, to the subsequent subtending ONS 15454 M6 shelf assemblies.

Note You can connect up to a maximum of 3 SSCs in the multishelf configuration.

Figure 301: Connecting the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves with Simplex Controllers



Stop. You have completed this procedure.

NTP-G318 Connect the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves in a Ring Topology

Purpose	Use this procedure to connect the ONS 15454 M6 multishelf node and the ONS 15454 M6 subtending shelves in a ring topology.
Tools/Equipment	Cross-over (CAT-5) LAN cables
Prerequisite Procedures	NTP-G313 Install and Configure the TNC, TNCE, TSC, or TSCE Card. See the Cisco ONS 15454 DWDM Configuration Guide.
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Note The MSM (multishelf management) ports are present on the ECU module. The MSM ports located on the left side of the ECU module correspond to the TNC/TNCE/TSC/TSCE card in Slot 1, and the MSM ports located on the right side correspond to the TNC/TNCE/TSC/TSCE card in Slot 8. For more information about the ECU module and MSM ports, see the External Connection Units, on page 355.

Procedure

Step 1 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1 of the ONS 15454 M6 shelf used as the node controller.

b) Plug the other connector into the MSM port that corresponds to the TNC/TNCE/TSC/TSCE card in Slot 1 of the ONS 15454 M6 shelf used as subtending shelf.

Note When connecting two shelves using the cross-over cables, it is possible to have shelves not having controller cards in same slots. Use corresponding MSM ports according to the controller card slots.

Step 2 Using a cross-over (CAT-5) LAN cable:

a) Plug one connector to any one of the remaining MSM ports of the ONS 15454 M6 SSCs in the first layer.

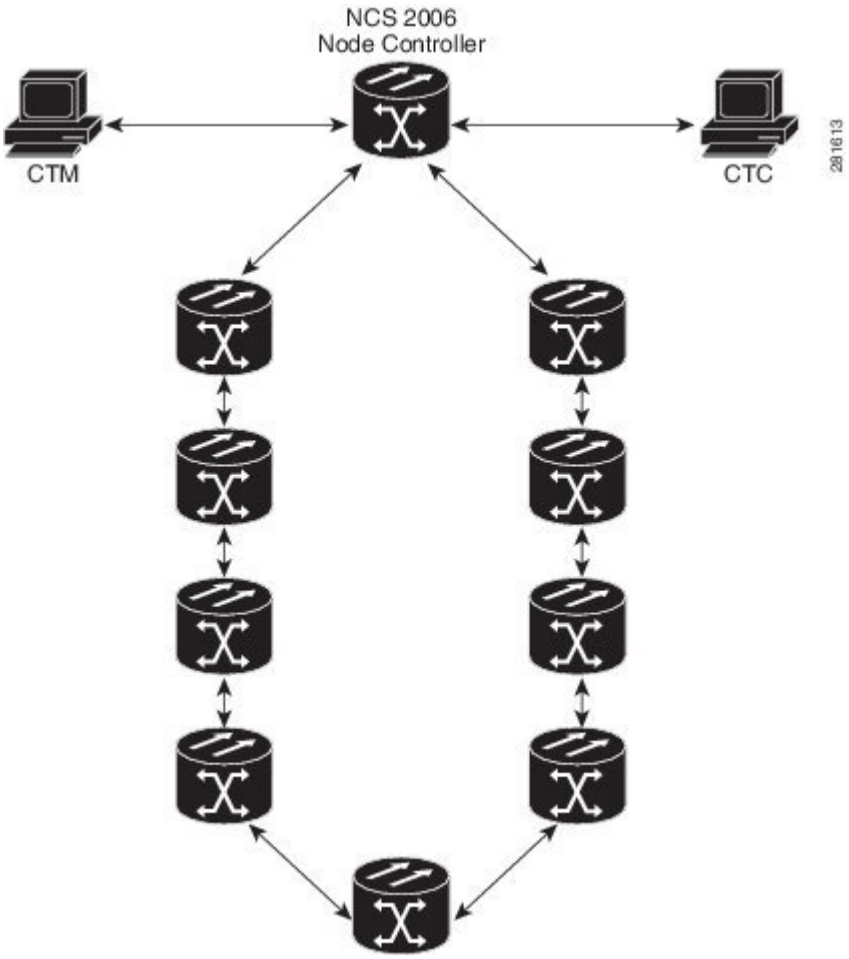
b) Plug the other connector to any one of the MSM ports of the ONS 15454 M6 SSCs in the next layer.

c) Repeat a and b to connect the remaining MSM ports of the ONS 15454 M6 SSCs.

After connecting all the SSCs as per Step 2, connect the last 15454 M6 SSC to the 15454 M6 node controller to complete the ring.

Note You can connect up to a maximum of 9 SSCs in the ring topology.

Figure 302: Connecting the ONS 15454 M6 Multishelf Node and the ONS 15454 M6 Subtending Shelves in a Ring Topology



Stop. You have completed this procedure.

Air Deflector

An air deflector is a sheet-metal part that is mounted on the ONS 15454 M6 shelf to orient the air flow in a specific direction.

Air deflectors can be mounted in different positions to control the air flow:

- Front to Front—Only ETSI rack
- Front to Back—For ANSI and ETSI racks
- Front to Top—Only ETSI rack

In an ANSI rack, the air deflectors are mounted only on the 23-inch rack configuration.

Filler and Blank Cards

Filler cards must be installed in unused and empty slots to ensure proper air flow and electromagnetic interference (EMI) requirements during the ONS 15454 M6 operation. CTC detects filler cards from R 10.6 onwards.

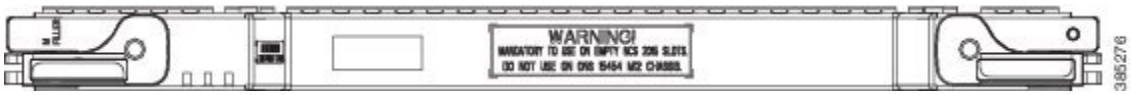
There are two types of card fillers:

- Line card fillers (15454-M-FILLER)

These filler cards operate in slots 2, 3, 4, 5, 6, and 7, and have no card-level LED indicators.

The following figure shows the faceplate of line card filler.

Figure 303: Line Card Filler—Faceplate



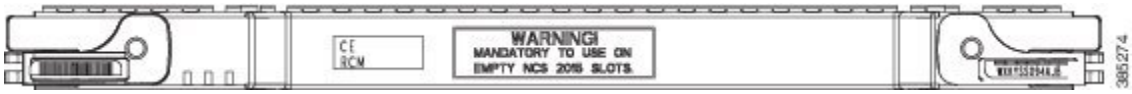
- Timing and Control Card fillers (15454-M-T-FILLER)

These filler cards are for control cards that operate in slots 1 and 8. The following figure shows the faceplate of timing and control card filler.

Figure 304: Timing and Control Card Fillers - Faceplate

Blank cards (15454-BLANK) can be installed in any empty slot in the shelf. CTC does not detect blank cards. The following figure shows the faceplate of the blank card filler.

Figure 305: Blank Card Filler - Faceplate



Air Filter

The ONS 15454 M6 contains a preinstalled reusable air filter (15454 M6-FTF) on the right side of the shelf.

The reusable filter is made up of a gray, open-cell, polyurethane foam that is specially coated to provide fire and fungi resistance. Spare filters should be kept in stock. Inspect the air filter every 30 days, and clean the filter every 3 to 6 months. The air filter can be replaced without removing the fan-tray assembly. However, the fan-tray must be turned off to remove the air filter. Replace the air filter every two to three years. Avoid cleaning the air filter with harsh cleaning agents or solvents.

Caution Do not operate an ONS 15454 M6 without the mandatory air filter.

Shelf Voltage and Temperature

Note The temperature that the TNC, TNCE, TSC, or TSCE sensors measure appear on the LCD screen in the ONS 15454 M6 chassis.

The input voltages and temperature of the ONS 15454 M6 chassis are displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane in CTC. The voltage supplied to the shelf (in millivolts) is displayed in the Voltage area of the Voltage/Temperature pane. The temperature of the shelf (in degree Celsius) is displayed in the Temperature area of the pane.

The Voltage/Temperature pane retrieves the following values for the ONS 15454 M6 chassis:

- Voltage A—Voltage of the shelf that corresponds to power supply A, in millivolts.
- Voltage B—Voltage of the shelf that corresponds to power supply B, in millivolts.
- Chassis Temperature—Temperature of the shelf, in degrees Celsius.

In a multishelf configuration, the voltage and temperature of each shelf is displayed in the **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane.

Cooling Profile

The cooling profile feature allows you to control the speed of the fans in the ONS 15454 M6 shelf depending on the I/O cards used.

CTC allows you to choose a cooling profile for ONS 15454 M6 shelf. You can change the cooling profile in **Shelf view** > **Provisioning** > **General** > **Voltage/Temperature** pane in CTC. The supported cooling profile values are Low, Medium, and High. The default cooling profile value is High. You can change the cooling profile depending on the cards used in the shelf.

If there are multiple cards in the shelf, you must choose the cooling profile of the card that requires the highest cooling profile. For example, if the shelf has two cards with low cooling profile, three cards with medium cooling profile, and one card with high cooling profile, you must choose a high cooling profile for the shelf.

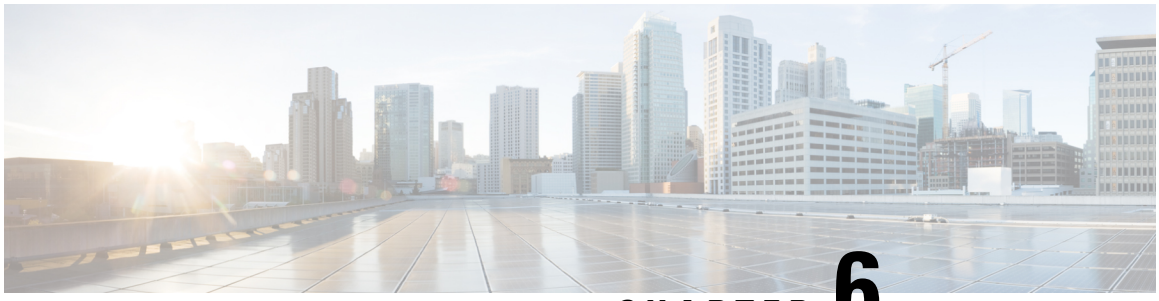
Caution The wrong cooling profile chosen for the shelf might harm the cards present in the shelf.

If a wrong cooling profile is chosen for the shelf, the COOL-MISM condition is raised on the shelf. For more information on the alarm, see the “COOL-MISM” alarm in Chapter 2, Alarm Troubleshooting of *Cisco ONS 15454 DWDM Troubleshooting Guide* .

The following table shows the cards that require high, medium, and low cooling profile.

Table 42: Cooling Profile Values for ONS 15454 M6 Cards

Cards with Low Cooling Profile	Cards with Medium Cooling Profile	Cards with High Cooling Profile
• 32-WSS • 32-WSS-L • 32-DMX • 32-DMX-L • 32-DMX-O	• 10GE-XP • 40-SMR1-C • 40-SMR2-C • 40-WSS-C • 40-WSS-L	• 100G-LC-C • 10X10G-LC • CFP-LC • EDRA1-26, EDRA1-35 • EDRA2-26, EDRA2-35
• 40-DMX-C • 40-DMX-L • 32-MUX-O • 40-MUX-C • 40-MUX-L	• 40E-MXP-C • 40E-TXP-C • 40G-MXP-C • 40G-TXP-C • ADM-10G	
• 40-WXC-C • 40-WXC-L • 80-WXC-C • AD-1B • AD-1C	• AR_MXP • AR_XP • GE-XP • MXP_2.5G_10E • MXP_2.5G_10G	
• AD-2C • AD-4B • AD-4C • MD-4 • MMU	• MXP_2.5G_10X • MXP_MR_10DME • MXP_MR_10DMEX • MXP_MR_2.5G • MXPP_MR_2.5G	
• OPT-AMP-17-C • OPT-AMP-C • OPT-AMP-L • OPT-BST • OPT-BST-E • OPT-BST-L • OPT-EDFA-17 • OPT-EDFA-24 • OPT-PRE • OSCM • OSC-CSM • PSM • TDC-CC • TDC-FC • TXP_MR_10E • TXP_MR_10EX • TXP_MR_10G • TXP_MR_2.5G • TXPP_MR_2.5G	• OPT-RAMP-C • OPT-RAMP-CE • OTU2_XP • RAMAN-COP • RAMAN-CTP	



CHAPTER 6

Maintaining the ONS 15454 M12 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6 Shelf

This chapter explains how to maintain the ONS 15454 (ANSI and ETSI), ONS 15454 M2 and ONS 15454 M6 shelf installations.

Note Unless otherwise specified, "ONS 15454" refers to both ANSI and ETSI M12 shelf assemblies.

Note Due to memory limitations, TCC2/TCC2P cards are not supported as the node controller in multi-shelf configuration from R10.5.2.6. Hence, it is recommended to use TCC3 card as the node controller in multi-shelf configuration. However, the TCC2/TCC2P cards can be used as a subtended controller and also in a stand-alone configuration.

NTP-G114 Inspect and Replace the Air Filter

Purpose	This procedure ensures that the air filter is free from dirt and dust, which allows optimum air flow and prevents dirt and dust from entering the shelf.

Tools/Equipment	New air filter, pinned hex key tool
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.** Statement 206

Note The air filters are single-use only. They must not be cleaned and reused. This is a Telcordia NEBS requirement, GR-63-CORE Issue 4.

Note Air filters must be inspected every month. If they are dirty or clogged with dust, they must be replaced with a new air filter.

Note If you install the air filter below 15454E-CC-FTA or 15454-CC-FTA, only filters with part numbers 700-23193-01 and 700-23194-01 can be used in this configuration.

Caution Although the air filter can work with older fan trays if it is installed with either side facing up, it is recommended that you install it with the metal bracing facing up to preserve the surface of the filter. You must install the air filter with the metal bracing facing up with 15454E-CC-FTA or 15454-CC-FTA.

Note To install the air filter inside the air ramp unit (15454E-AIR-RAMP or 15454-AIR-RAMP), use the ETSI version of the air filter (15454-FTF2 or 15454E-FTF4).

Procedure

Step 1 If the air filter is installed in the external filter brackets, slide the filter out of the brackets while being careful not to dislodge any dust that might have collected on the filter and proceed to Step 8. Figure 306: ANSI Shelf Fan-Tray Air Filter in an External Filter Bracket (Front Door Removed), on page 451 shows the fan-tray air filter in an external filter bracket on an ANSI shelf. Figure 307: ETSI Shelf Fan-Tray Air Filter in an External

Filter Bracket (Front Door Removed), on page 452 shows the fan-tray air filter in an external filter bracket on an ETSI shelf.

Step 2 If the filter is installed below the fan tray and not in the external filter brackets, open the front door of the shelf assembly. If the front door is already open, proceed to Step 3.

a) Open the front door lock.

The ONS 15454 comes with a pinned hex key for locking and unlocking the front door. Turn the key counterclockwise to unlock the door and clockwise to lock it.

b) Press the door button to release the latch.

c) Swing the door open.

Step 3 (Optional) Remove the front door using the DLP-G10 Remove the Front Door , on page 59. If you do not want to remove the door or it is already removed, proceed to Step 4.

Figure 306: ANSI Shelf Fan-Tray Air Filter in an External Filter Bracket (Front Door Removed)

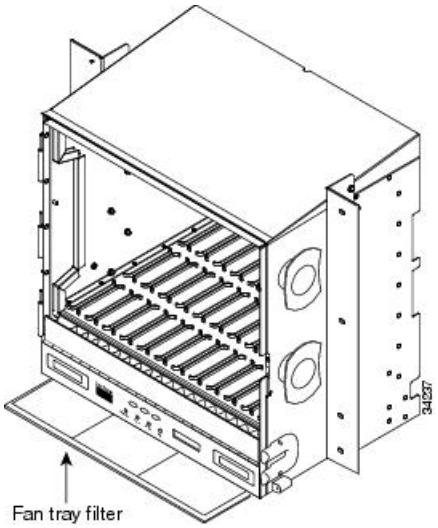
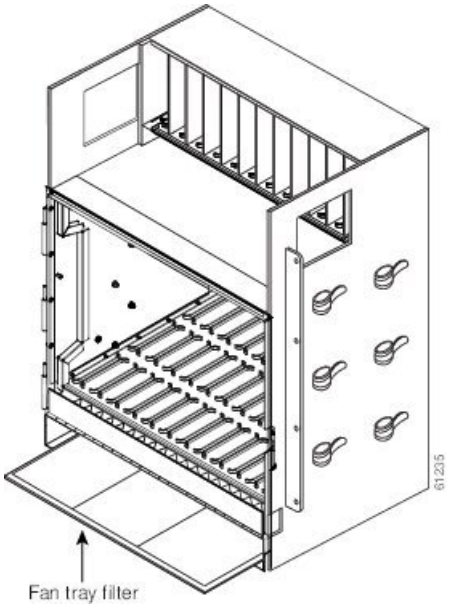


Figure 307: ETSI Shelf Fan-Tray Air Filter in an External Filter Bracket (Front Door Removed)



Step 4 Push the outer side of the handles on the fan-tray assembly to expose the handles.

Step 5 Pull the handles and slide the fan-tray assembly one half inch (12.7 mm) out of the shelf assembly and wait until the fans stop.

Step 6 When the fans have stopped, pull the fan-tray assembly completely out of the shelf assembly.

Step 7 Gently remove the air filter from the shelf assembly. Be careful not to dislodge any dust that might have collected on the filter.

Step 8 Visually inspect the air filter material for dirt and dust.

Step 9 Replace the air filter with a new one if the air filter is dirty or clogged with dust.

Caution Do not leave the fan tray out of the chassis for an extended period of time because excessive heat can damage the ONS 15454 cards.

Step 10 Replace the air filter:

a) If the air filter is installed in the external filter brackets, slide the new air filter all the way to the back of the brackets.

b) If the filter is installed below the fan-tray assembly, slide the new air filter into the recessed compartment at the bottom of the shelf assembly. Put the front edge of the air filter flush against the front edge of the recessed compartment. Push the fan tray back into the shelf assembly.

Caution If the fan tray does not slide all the way to the back of the shelf assembly, pull the fan tray out and readjust the position of the air filter until the fan tray fits correctly.

Note On a powered-up ONS 15454, the fans start immediately after the fan-tray assembly is correctly inserted.

Step 11 To verify that the tray is plugged into the backplane, ensure that the LCD on the front of the fan-tray assembly is activated and displays node information.

Step 12 Rotate the retractable handles back into their compartments.

Step 13 If you removed the door, complete the NTP-G40 Replace the Front Door , on page 462. If not, close and lock the door.

Stop. You have completed this procedure.

NTP-G274 Replace the Air Filter of the ONS 15454 M2 Shelf Assembly

Purpose	This procedure replaces the air filter of the ONS 15454 M2 shelf assembly.
Tools/Equipment	New air filter
Prerequisite Procedures	• NTP-G266 Install the ONS 15454 M2 Shelf, on page 194 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.
Required/As Needed	As Needed
Onsite/Remote	Remote
Security Level	Provisioning or higher

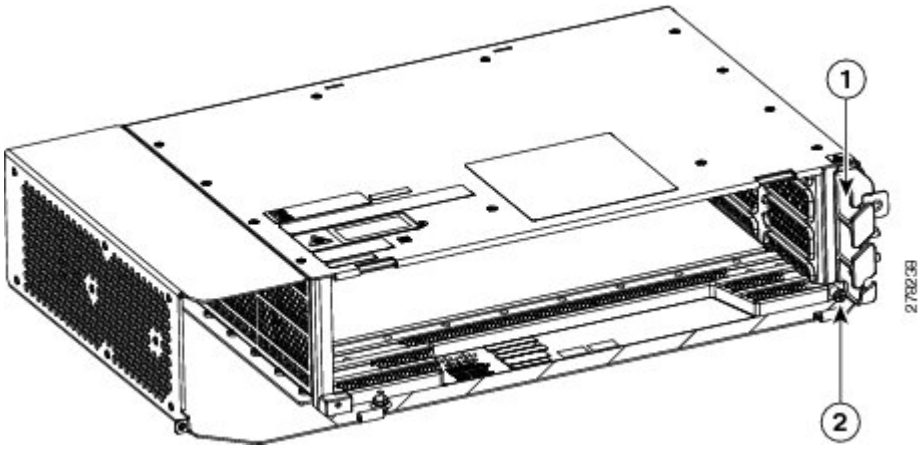
Note The air filters are single-use only. They must not be cleaned and reused. This is a Telcordia NEBS requirement, GR-63-CORE Issue 4.

Note Air filters must be inspected every month. If they are dirty or clogged with dust, they must be replaced with a new air filter.

Procedure

Step 1 Untighten the screw on the air-filter (see the following figure).

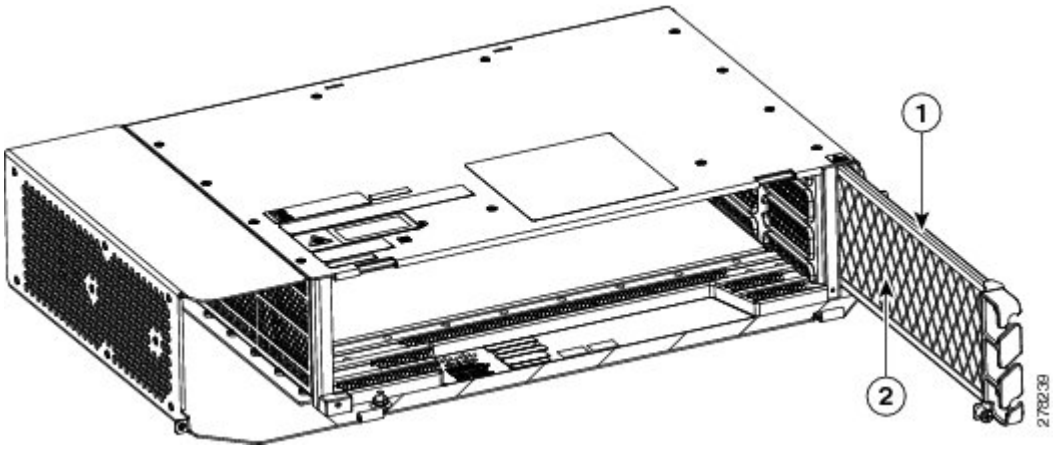
Figure 308: Replacing the Air Filter



1	Air filter	2	Screw

Step 2 Extract the air filter from the shelf assembly as shown in the following figure.

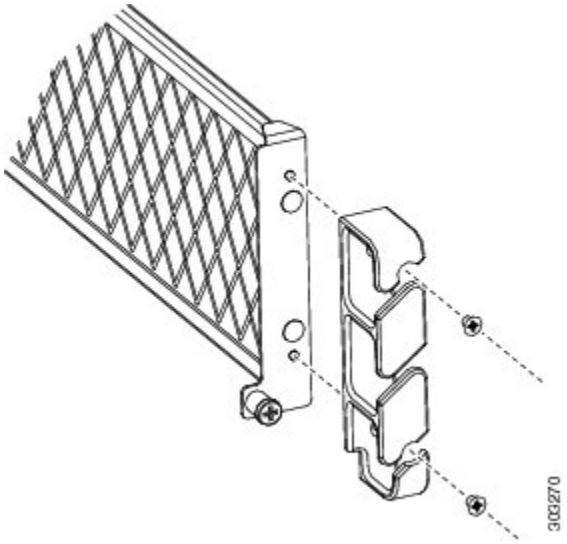
Figure 309: Replacing the Air Filter



1	Air filter	2	Filter grid

Step 3 Separate the cable guides from the air filter as shown in the following figure.

Figure 310: Replacing the Air Filter



Step 4 Replace the air filter with a new one if the air filter is dirty or clogged with dust.

Step 5 Attach the cable guide and insert the air filter into the shelf assembly.

Note The air filter must be inserted with the grid facing the shelf assembly as shown in Figure 310: Replacing the Air Filter, on page 455.

Step 6 Tighten the screw on the air-filter.

Stop. You have completed this procedure.

NTP-G262 Replace the Air Filter of the ONS 15454 M6 Shelf Assembly

Purpose	This procedure replaces the air filter of the ONS 15454 M6 shelf assembly.
Tools/Equipment	New air filter
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms .
Required/As Needed	As Needed
Onsite/Remote	Remote
Security Level	Provisioning or higher

Note The air filters are single-use only. They must not be cleaned and reused. This is a Telcordia NEBS requirement, GR-63-CORE Issue 4.

Note Air filters must be inspected every month. If they are dirty or clogged with dust, they must be replaced with a new air filter.

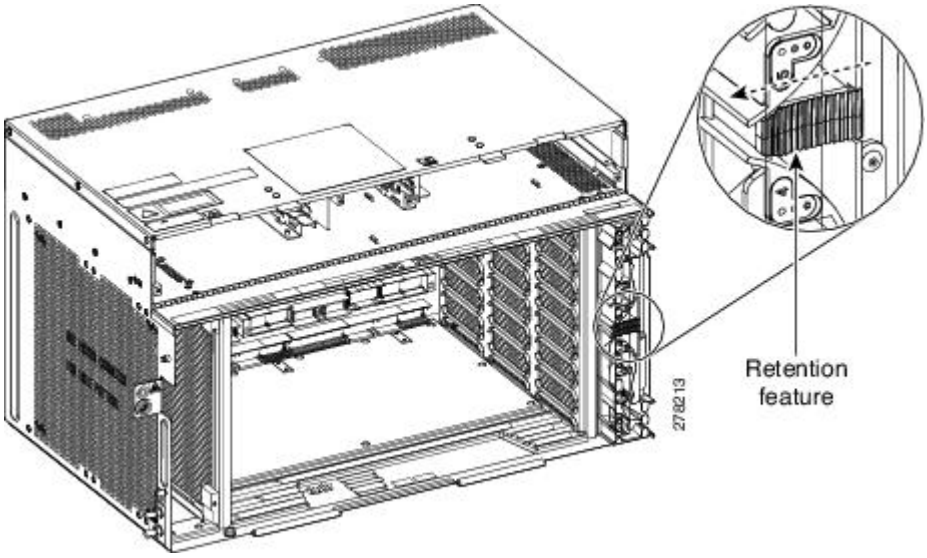
Procedure

Step 1 Open the front door of the shelf assembly (see NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339). If the shelf assembly does not have a front door, continue with Step 3.

Step 2 (Optional) Complete the DLP-G577 Remove the Standard Door of the ONS 15454 M6 Shelf , on page 342 to remove the front door. If you do not want to remove the door, proceed to Step 3.

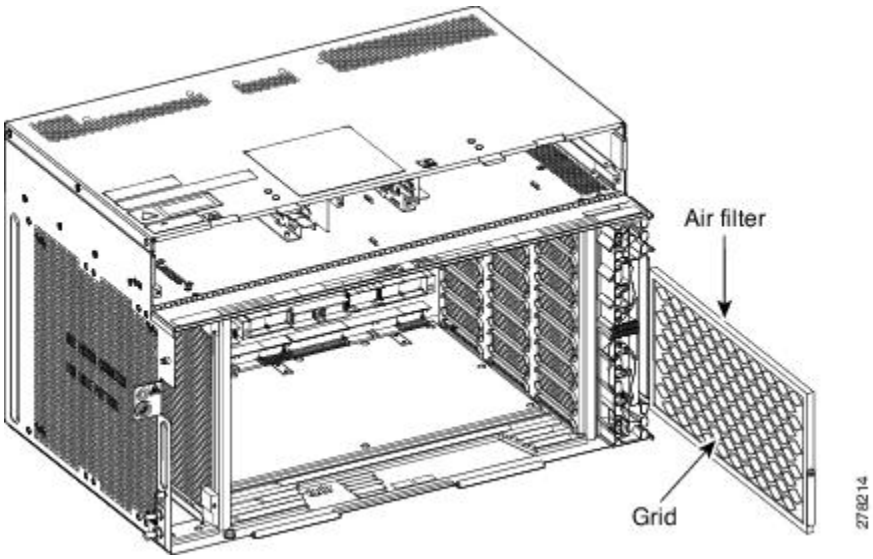
Step 3 Push the retention feature present on the right side of the shelf assembly to the left side (see the following figure).

Figure 311: Replacing the Air Filter



Step 4 Extract the air filter from the shelf assembly (see the following figure).

Figure 312: Extracting the Air Filter



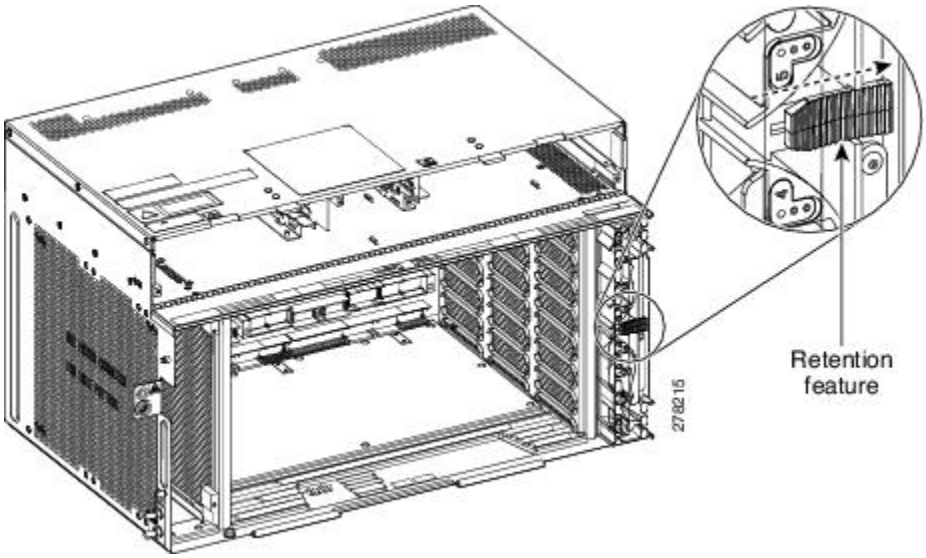
Step 5 Replace the air filter with a new one if the air filter is dirty or clogged with dust.

Step 6 Insert the air filter into the shelf assembly (see Figure 312: Extracting the Air Filter, on page 457).

Note The air filter must be inserted with the grid facing the shelf assembly as shown in Figure 312: Extracting the Air Filter, on page 457.

Step 7 Push the retention feature to the right side (see the following figure).

Figure 313: Replacing the Air Filter



Step 8 Close the front door. If you removed the door, complete the NTP-G258 Install the Standard Door of the ONS 15454 M6 Shelf , on page 334.

Stop. You have completed this procedure.

NTP-G263 Replace the Air Filter of the AC Power Module in the ONS 15454 M6 Shelf Assembly

Purpose	This procedure replaces the air filter of the AC power module in the ONS 15454 M6 shelf assembly.
Tools/Equipment	New air filter
Prerequisite Procedures	• NTP-G252 Install the ONS 15454 M6 Shelf , on page 306 • Connect the chassis to the office ground. For detailed instructions on how to ground the chassis, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms . • DLP-G569 Install the AC Power Module in the ONS 15454 M6 Shelf, on page 368
Required/As Needed	As Needed
Onsite/Remote	Remote
Security Level	Provisioning or higher

Note The air filters are single-use only. They must not be cleaned and reused. This is a Telcordia NEBS requirement, GR-63-CORE Issue 4.

Note Air filters must be inspected every month. If they are dirty or clogged with dust, they must be replaced with a new air filter.

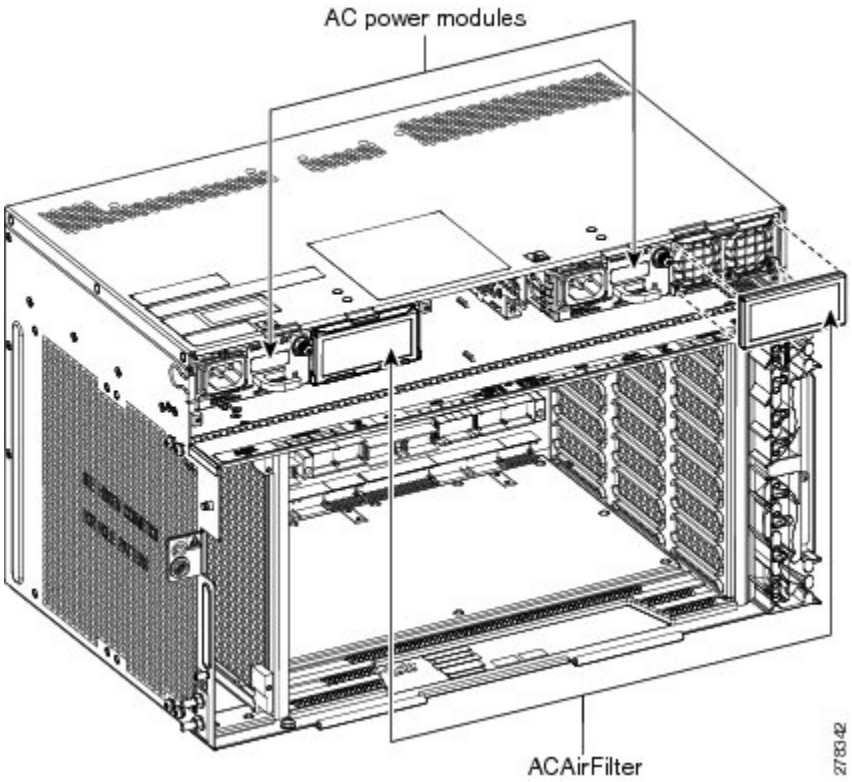
Procedure

Step 1 Open the front door of the shelf assembly (see DLP-G576 Open the Standard Door of the ONS 15454 M6 Shelf , on page 340). If the shelf assembly does not have a front door, continue with Step 3.

Step 2 (Optional) Complete the DLP-G577 Remove the Standard Door of the ONS 15454 M6 Shelf , on page 342 to remove the front door. If you do not want to remove the door, proceed to Step 3.

Step 3 Remove the air filter on the AC power module (see Figure 311: Replacing the Air Filter, on page 456).

Figure 314: Replacing the Air Filter—AC Power Module



Step 4 Replace the air filter with a new one if the air filter is dirty or clogged with dust.

Step 5 Close the front door. If you removed the door, complete the NTP-G258 Install the Standard Door of the ONS 15454 M6 Shelf , on page 334

Stop. You have completed this procedure.

NTP-G115 Clean Fiber Connectors

Purpose	This procedure cleans the fiber connectors.
Tools/Equipment	Inspection microscope Type A Fiber Optic Connector Cleaner (CLETOP reel) Optical swab Optical receiver cleaning stick
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite

Security Level	None

Warning **Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.** Statement 1056

Procedure

Step 1 Using an inspection microscope, inspect each fiber connector for dirt, cracks, or scratches.

Step 2 Replace any damaged fiber connectors.

Note Replace all dust caps whenever the equipment is unused for 30 minutes or more.

Step 3 Complete the DLP-G262 Clean Fiber Connectors with CLETOP, on page 461 as necessary.

Step 4 Complete the DLP-G263 Clean the Fiber Adapters, on page 461 as necessary.

Note To clean multi-fiber optic connectors, complete the DLP-G261 Clean Multi Fiber-Optic Cable Connectors, on page 460 as necessary.

Stop. You have completed this procedure.

DLP-G261 Clean Multi Fiber-Optic Cable Connectors

Purpose	This task cleans the multi fiber optic connectors
Tools/Equipment	Cleaning Cartridge for multi fiber optic connectors
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Procedure

Step 1 Remove the protective cap on the optical fiber cable connector.

Step 2 Read the manufacturer (cleaning cartridge) instructions to insert the connector into the cleaning cartridge.

Step 3 Slide the lever on the cartridge to swipe the connector surface.

Step 4 Insert the fiber connector into the applicable adapter or attach a dust cap to the fiber connector.

Note If you must replace a dust cap on a connector, first verify that the dust cap is clean.

Step 5 Return to your originating procedure (NTP).

DLP-G262 Clean Fiber Connectors with CLETOP

Purpose	This task cleans the fiber connectors with CLETOP.
Tools/Equipment	Type A Fiber Optic Connector Cleaner (CLETOP reel) Optical receiver cleaning stick
Prerequisite Procedures	None
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Procedure

Step 1 Remove the dust cap from the fiber connector.

Step 2 Press the lever up to open the shutter door. Each time you press the lever, you expose a clean wiping surface.

Step 3 Insert the connector into the CLETOP cleaning cassette slot, rotate one quarter turn, and gently swipe downwards.

Step 4 Use an inspection microscope to inspect each fiber connector for dirt, cracks, or scratches. If the connector is not clean, repeat Steps 1 to 3.

Step 5 Insert the fiber connector into the applicable adapter or attach a dust cap to the fiber connector.

Note If you must replace a dust cap on a connector, first verify that the dust cap is clean. To clean the dust cap, wipe the outside of the cap using a dry, lint-free wipe and the inside of the dust cap using a CLETOP stick swab (14100400).

Step 6 Return to your originating procedure (NTP).

DLP-G263 Clean the Fiber Adapters

Purpose	This task cleans the fiber adapters.
Tools/Equipment	CLETOP stick swab
Prerequisite Procedures	None

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

Procedure

Step 1 Remove the dust plug from the fiber adapter.

Step 2 Insert a CLETOP stick swab (14100400) into the adapter opening and rotate the swab.

Step 3 Place dust plugs on the fiber adapters when not in use.

Step 4 Return to your originating procedure (NTP).

NTP-G40 Replace the Front Door

Purpose	This procedure replaces the front door and door ground strap after installing cards and fiber-optic cables.
Tools/Equipment	#2 Phillips screwdriver Medium slot-head screwdriver Small slot-head screwdriver
Prerequisite Procedures	NTP-G259 Open and Remove the Standard Door of the ONS 15454 M6 Shelf , on page 339
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

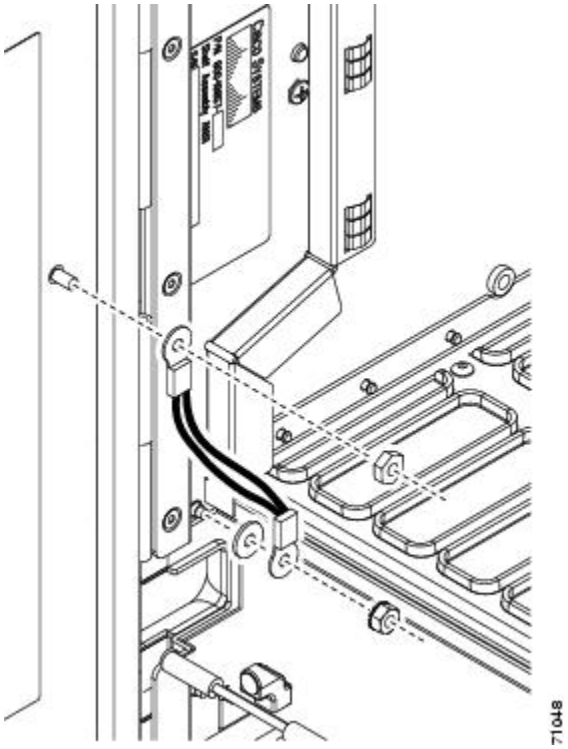
Note Be careful not to crimp any fiber cables that are connected to the MXP/TXP cards or DWDM cards. Some might not have the fiber boot attached.

Procedure

Step 1 Insert the front door into the hinges on the shelf assembly.

Step 2 (ANSI only) Attach one end of the ground strap terminal lug (72-3622-01) to the male stud on the inside of the door. Attach and tighten the #6 Kepnut (49-0600-01) using the open-end wrench.

Figure 315: Installing the Door Ground Strap Retrofit Kit



Step 3 (ANSI only) Attach the other end of the ground strap to the longer screw on the fiber guide.

a) Attach the lock washer.
b) Attach the terminal lug.
c) Using the open-end wrench, attach and tighten the #4 Kepnut (49-0337-01) on the terminal lug.

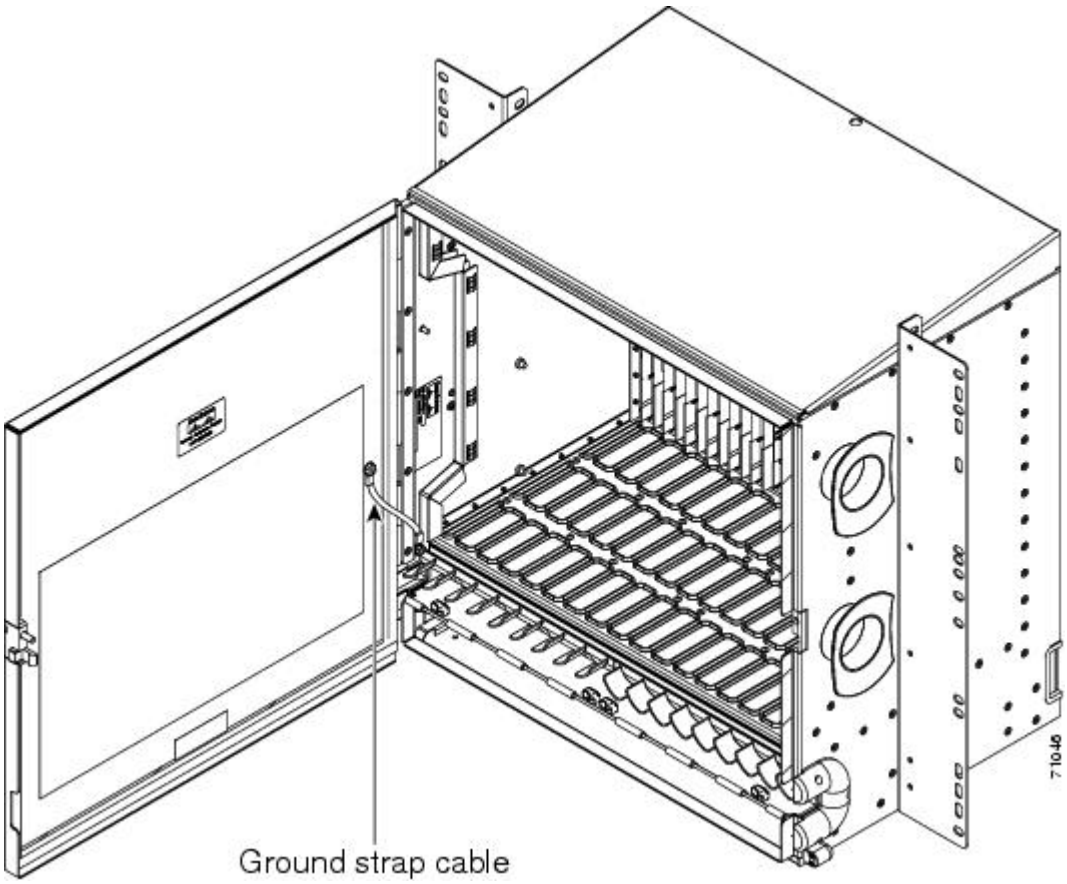
Note To avoid interference with the traffic (line) card, make sure the ground strap is in a flat position when the door is open. To move the ground strap into a flat position, rotate the terminal lug counterclockwise before tightening the Kepnut.

Step 4 Replace the left cable-routing channel if it was removed. If not, continue with Step 5.

Step 5 Using a Phillips screwdriver, insert and tighten the screws for the cable-routing channel.

The following figure shows the shelf assembly with the front door and ground strap installed.

Figure 316: Shelf Assembly with Door Ground Strap Retrofit Kit Installed (ANSI)



Step 6 Swing the door closed and lock the door with the provided pinned-hex key. Turn the key clockwise to lock the door; counterclockwise to unlock it.

Stop. You have completed this procedure.

NTP-G116 Replace the Fan-Tray Assembly of the ONS 15454 Shelf Assembly

Purpose	This procedure replaces a malfunctioning fan-tray assembly.
Tools/Equipment	None
Prerequisite Procedures	NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf, on page 401
Required/As Needed	As needed
Onsite/Remote	Onsite

Security Level	None

Caution The 15454-FTA3 fan-tray assembly can only be installed in ONS 15454 R3.1 and later shelf assemblies (15454-SA-ANSI, P/N: 800-19857; 15454-SA-HD, P/N: 800-24848). The fan-tray assembly includes a pin that prevents it from being installed in ONS 15454 shelf assemblies released before ONS 15454 R3.1 (15454-SA-NEBS3E, 15454-SA-NEBS3, and 15454-SA-R1, P/N: 800-07149). Equipment damage can result from attempting to install the 15454-FTA3 in a incompatible shelf assembly.

Caution Do not force a fan-tray assembly into place. Doing so can damage the connectors on the fan tray and/or the connectors on the backplane.

Caution 15454-CC-FTA (ANSI) is compatible with Software R2.2.2 and greater, and shelf assemblies 15454-SA-ANSI and 15454-SA-HD. 15454E-CC-FTA (ETSI) is compatible with Software R4.0 and greater, and shelf assembly 15454-SA-ETSI.

Caution As with the FTA3, the 15454E-CC-FTA and 15454-CC-FTA Fan Fail LED on the front of the fan-tray assembly illuminates when one or more fans fail to indicate that a fan-tray assembly or AIP replacement is required. But the Fan Fail LED on the 15454E-CC-FTA and 15454-CC-FTA will also illuminate when only one power source is connected to the chassis, and or any fuse blows. In such conditions, the Fan Alarm is triggered and the fans run at maximum speed.

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

Procedure

Step 1 Review Table 43: Incompatibility Alarms for ONS 15454 ANSI , on page 465 (ANSI) or Table 44: Incompatibility Alarms for ONS 15454 ETSI , on page 466 (ETSI) to ensure that you have compatible components when replacing the fan-tray assembly. Note the alarms that will be generated when an incompatibility occurs.

Note If you need to determine the hardware that has been installed on a node, click the Inventory tab in node view.

Table 43: Incompatibility Alarms for ONS 15454 ANSI

Shelf Assembly[4]	Fan Tray[5]	AIP[6]	10G Cards[7]	Ethernet Cards[8]	Alarms
—	—	No fuse	—	—	Mismatch of equipment attributes (MEA) on the alarm interface panel (AIP)

NEBS3E or NEBS3	2A	2A	No	—	None
NEBS3E or NEBS3	2A	2A	Yes	—	MEA on 10G
NEBS3E or NEBS3	2A	5A	No	—	None
NEBS3E or NEBS3	2A	5A	Yes	—	MEA on 10G
ANSI or HD	2A	2A	No	—	None
ANSI or HD	2A	2A	Yes	2.5G compatible	MEA on fan tray, AIP, and Ethernet
ANSI or HD	2A	2A	Yes	10G compatible	MEA on fan tray and AIP
ANSI or HD	2A	5A	No	Either	None
ANSI or HD	2A	5A	Yes	2.5G compatible	MEA on fan tray and Ethernet
ANSI or HD	2A	5A	Yes	10G compatible	MEA on fan tray
ANSI or HD	5A	2A	No	Either	MEA on AIP
ANSI or HD	5A	2A	Yes	2.5G compatible	MEA on AIP and Ethernet
ANSI or HD	5A	2A	Yes	10G compatible	MEA on AIP
ANSI or HD	5A	5A	No	Either	None
ANSI or HD	5A	5A	Yes	Either	None

[4] 15454-SA-NEBS3E (P/N: 800-07149-xx) or 15454-SA-NEBS3 (P/N: 800-06741-xx) = shelf assemblies released before ONS 15454 Release 3.115454-SA-ANSI (P/N: 800-19857-01) = ONS 15454 Release 3.1 and later shelf assembly15454-SA-HD (P/N: 800-24848) = ONS 15454 Release 3.1 and later shelf assembly

[5] 5A Fan Tray = 15454-FTA3 (P/N: 800-19858-xx), 15454-FTA3-T (P/N: 800-21448-xx), 15454-CC-FTA (P/N: 800-27558-xx)2A Fan Tray = 15454-FTA2 (P/Ns: 800-07145-xx, 800-07385-xx, 800-19591-xx, 800-19590-xx)

[6] 5A AIP (P/N: 73-7665-01), 2A AIP (P/N: 73-5262-01)

[7] 10G cards include the XC10G, OC192, and OC48AS.

[8] 2.5G compatible indicates cards that are compatible with the XCVT cross-connect card. 10G compatible indicates cards that are compatible with the XC10G and XC-VXC-10G cross-connect cards.

Table 44: Incompatibility Alarms for ONS 15454 ETSI

Shelf Assembly [9]	Fan Tray[10]	10G Cards[11]	Ethernet Cards	Alarms
15454E-SA-ETSI	2A	No	—	None
15454E-SA-ETSI	2A	Yes	—	MEA on 10G
15454E-SA-ETSI	2A	No	—	None
15454E-SA-ETSI	2A	Yes	—	MEA on 10G

15454E-SA-ETSI	5A	No	—	MEA on fan tray
15454E-SA-ETSI	5A	Yes	—	MEA on fan tray and 10G cards
15454E-SA-ETSI	5A	No	—	None
15454E-SA-ETSI	5A	Yes	—	MEA on 10G
ETSI	2A	No	—	None
ETSI	2A	Yes	2.5G compatible	MEA on fan tray or Ethernet
ETSI	2A	Yes	10G compatible	MEA on fan tray
ETSI	2A	No	Either	None
ETSI	2A	Yes	2.5G compatible	MEA on fan tray, Ethernet
ETSI	2A	Yes	10G compatible	MEA on fan tray
ETSI	5A	Yes	2.5G compatible	MEA on Ethernet
ETSI	5A	No	Either	None
ETSI	5A	Yes	Either	None

[9] 15454-SA-ETSI (P/N: 800-08708-XX) = ONS 15454 SDH Release 3.3 and later shelf assembly
[10] 5A Fan Tray = 15454E-FTA-60V, 15454E-CC-FTA2A Fan Tray = 15454E-FTA-48V
[11] 10G cards = XC10G, XC-VXL-10G, XC-VXC-10G

Step 2 Open the front door of the shelf assembly. If the shelf assembly does not have a front door, continue with Step 4.

a) Open the front door lock.

The ONS 15454 comes with a pinned hex key for locking and unlocking the front door. Turn the key counterclockwise to unlock the door and clockwise to lock it.

b) Press the door button to release the latch.
c) Swing the door open.

Step 3 (Optional) Complete the DLP-G577 Remove the Standard Door of the ONS 15454 M6 Shelf , on page 342 to remove the front door. If you do not want to remove the door, proceed to Step 4.

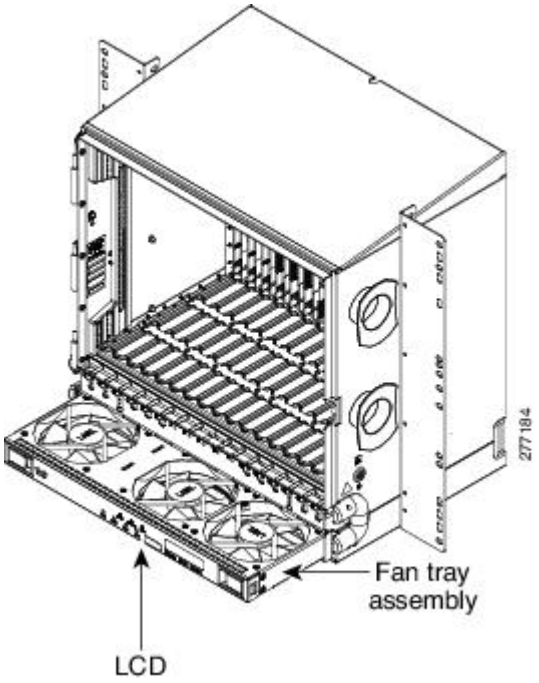
Step 4 Push the outer side of the handles on the fan-tray assembly to expose the handles.

Step 5 Fold out the retractable handles at the outside edges of the fan tray.

Step 6 Pull the handles and slide the fan-tray assembly one inch (25.4 mm) out of the shelf assembly and wait until the fans stop.

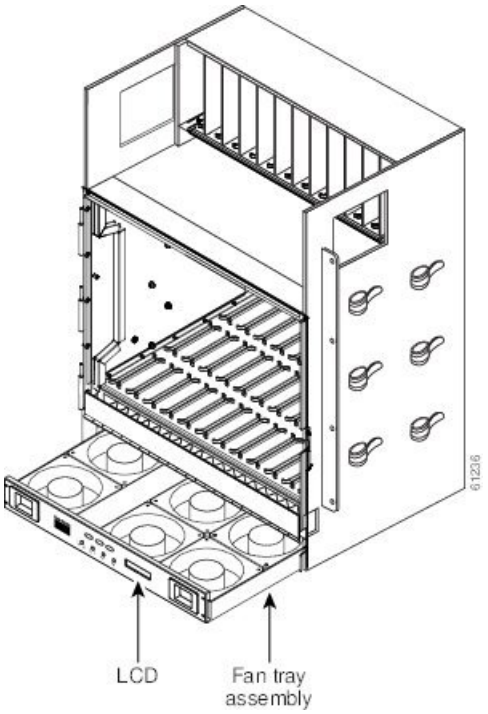
Step 7 When the fans have stopped, pull the fan-tray assembly completely out of the shelf assembly. The following figure shows the location of the fan tray on the ONS 15454 ANSI shelf.

Figure 317: Removing or Replacing the Fan-Tray Assembly (Front Door Removed) (ANSI)



The following figure shows the location of the fan tray on the ONS 15454 ETSI shelf.

Figure 318: Removing or Replacing the Fan-Tray Assembly (Front Door Removed) (ETSI)



Step 8 If you are replacing the fan-tray air filter and it is installed beneath the fan-tray assembly, slide the existing air filter out of the shelf assembly and replace it before replacing the fan-tray assembly.

If you are replacing the fan-tray air filter and it is installed in the external bottom bracket (ANSI shelf only), you can slide the existing air filter out of the bracket and replace it at anytime. For more information on the fan-tray air filter, see the NTP-G114 Inspect and Replace the Air Filter, on page 449.

Step 9 Slide the new fan tray into the shelf assembly until the electrical plug at the rear of the tray plugs into the corresponding receptacle on the backplane.

Step 10 To verify that the tray has plugged into the backplane, ensure that the LCD on the front of the fan tray is activated.

If you removed the door, complete the NTP-G40 Replace the Front Door , on page 462.

Note The estimated time of replacement by a skilled technician is 2 minutes.

Stop. You have completed this procedure.

NTP-G272 Replace the Fan-Tray Assembly of the ONS 15454 M2 Shelf Assembly

Purpose	This procedure replaces the fan-tray assembly of the ONS 15454 M2 shelf assembly.
Tools/Equipment	Small slot-head screwdriver
Prerequisite Procedures	NTP-G268 Install the Fan-Tray Assembly in the ONS 15454 M2 Shelf, on page 244
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

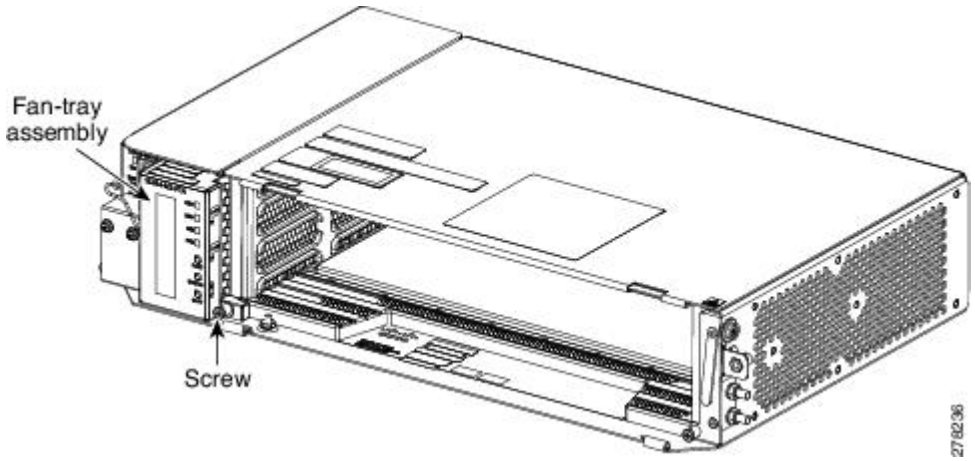
Caution Do not force a fan-tray assembly into place. Doing so can damage either the connectors on the fan tray or the connectors on the back panel of the shelf assembly, or both.

Note The estimated time required to change a fan-tray assembly is 2 minutes.

Procedure

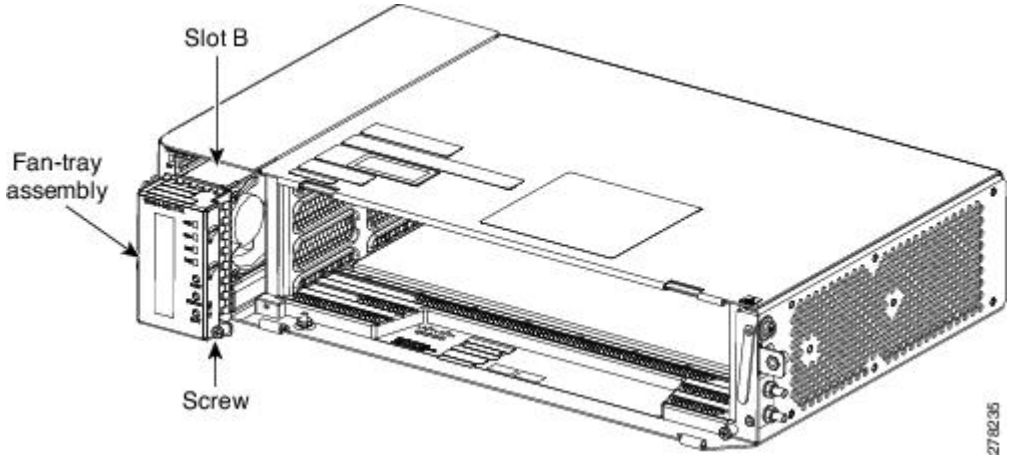
Step 1 Loosen the screw on the fan-tray assembly (see the following figure).

Figure 319: Fan-Tray Assembly installed in the ONS 15454 M2 Shelf Assembly



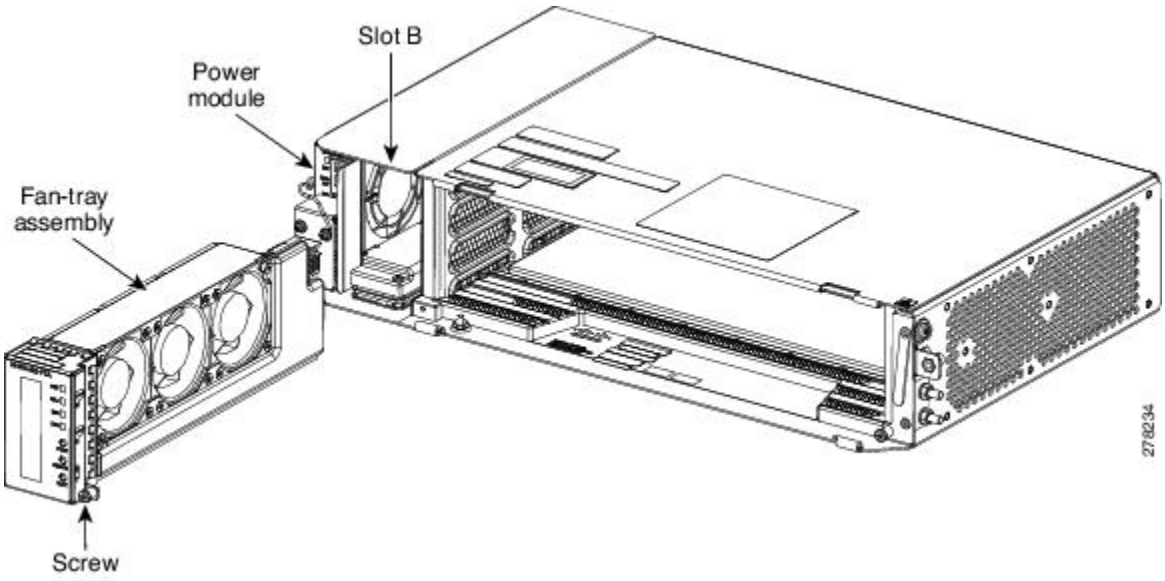
Step 2 Extract the fan-tray assembly partially to disconnect the backplane connector and wait until the fan stops (see the following figure)

Figure 320: Fan -Tray Extracted Partially with Power Connector Disconnected



Step 3 When the fans have stopped, pull the fan-tray assembly completely out of the shelf assembly (see the following figure).

Figure 321: Fan-Tray Extracted



Step 4 Slide the new fan-tray assembly into the shelf assembly until the electrical plug at the rear of the tray plugs into the corresponding receptacle on the backplane.

Step 5 To verify that the tray has plugged into the backplane, ensure that the LCD on the front of the fan-tray is activated.

Stop. You have completed this procedure.

NTP-G260 Replace the Fan-Tray Assembly of the ONS 15454 M6 Shelf Assembly

Purpose	This procedure replaces the fan-tray assembly of the ONS 15454 M6 shelf assembly.
Tools/Equipment	Small slot-head screwdriver
Prerequisite Procedures	NTP-G257 Install the Fan-Tray Assembly in the ONS 15454 M6 Shelf, on page 401
Required/As Needed	Required
Onsite/Remote	Onsite
Security Level	None

Caution Do not force a fan-tray assembly into place. Doing so can damage either the connectors on the fan tray or the connectors on the back panel of the shelf assembly, or both.

Note The estimated time required to change a fan-tray assembly is 2 minutes.

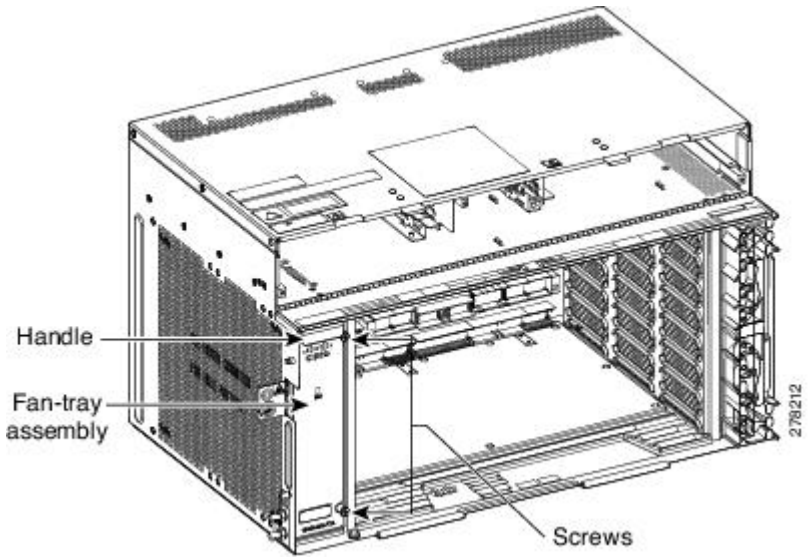
Procedure

Step 1 Open the front door of the shelf assembly (see DLP-G576 Open the Standard Door of the ONS 15454 M6 Shelf , on page 340). If the shelf assembly does not have a front door, continue with Step 3.

Step 2 (Optional) Complete the DLP-G577 Remove the Standard Door of the ONS 15454 M6 Shelf , on page 342 to remove the front door. If you do not want to remove the door, proceed to Step 3.

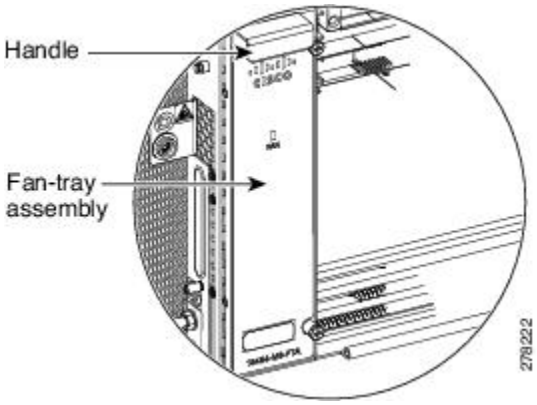
Step 3 Untighten the screws on the fan-tray assembly (see the following figure).

Figure 322: Extract the Fan-Tray Assembly



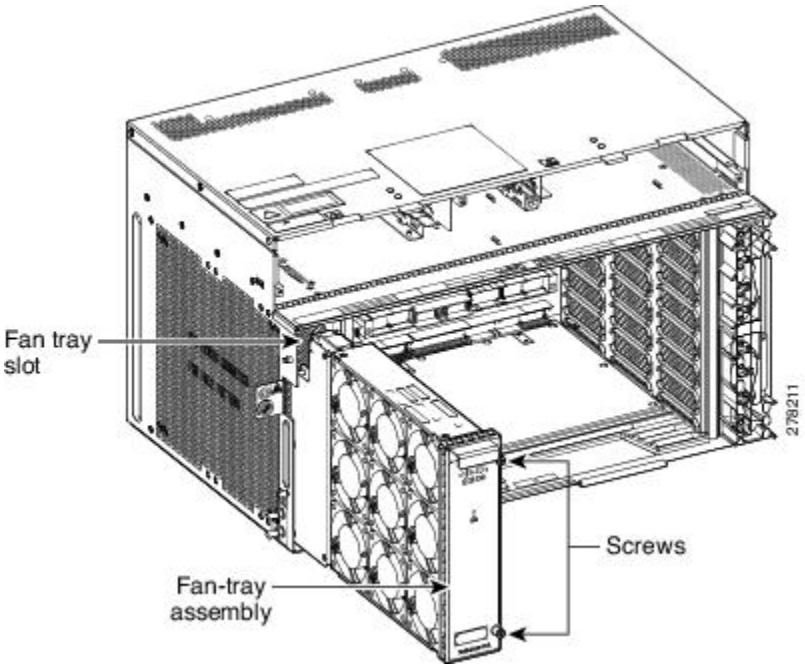
Step 4 Extract the fan tray partially using the handle in order to disconnect the backplane connector and wait until the fan stops (see the following figure)

Figure 323: Fan-Tray Assembly Extracted Partially with Power Connector Disconnected



Step 5 When the fans have stopped, pull the fan-tray assembly completely out of the shelf assembly (see the following figure).

Figure 324: Fan-Tray Extracted



Step 6 Slide the new fan-tray into the shelf assembly until the electrical plug at the rear of the tray plugs into the corresponding receptacle on the backplane.

Step 7 To verify that the tray has plugged into the backplane, ensure that the LED on the front of the fan-tray is activated.

If you removed the door, complete the NTP-G258 Install the Standard Door of the ONS 15454 M6 Shelf , on page 334 .

Stop. You have completed this procedure.

NTP-G117 Replace the ANSI Shelf Alarm Interface Panel

Purpose	This procedure replaces the AIP on the ONS 15454 ANSI shelf assembly.
Tools/Equipment	#2 Phillips screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Caution Do not use a 2A AIP with a 5A fan-tray assembly; doing so will cause a blown fuse on the AIP.

Caution Always use the supplied ESD wristband when working with a powered ONS 15454. For detailed instructions on how to wear the ESD wristband, refer to the Electrostatic Discharge and Grounding Guide for Cisco CPT and Cisco ONS Platforms.

Caution Do not perform this procedure on a node with live traffic. Hot-swapping the AIP can affect traffic and result in a loss of data. For assistance with AIP replacement, contact the Cisco TAC. See the Obtaining Documentation, Obtaining Support, and Security Guidelines, on page xxix section.

Procedure

Step 1 Review Table 43: Incompatibility Alarms for ONS 15454 ANSI , on page 465 to ensure that you have compatible components when replacing the ANSI shelf AIP and note the alarms that will occur when an incompatibility occurs.

Step 2 Ensure that all nodes in the affected network are running the same software version before replacing the AIP and repairing circuits:

a) In network view or multishelf view (multishelf mode), click, click the **Maintenance** > **Software** tabs. The working software version for each node is listed in the Working Version column.

b) If you need to upgrade the software on a node, refer to the release-specific software upgrade document. No hardware should be changed or circuit repair performed until after the software upgrade is complete. If you do not need to upgrade software or have completed the software upgrade, proceed to Step 3.

Step 3 Record the MAC address of the old AIP:

a) Log into the node where you will replace the AIP. See the DLP-G46 Log into CTC.

b) In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Network** tabs.

c) Record the MAC address shown in the General tab.

Step 4 Call Cisco TAC for assistance in replacing the AIP and maintaining the original MAC address. See the Obtaining Documentation, Obtaining Support, and Security Guidelines, on page xxix.

Step 5 Complete the "DLP-G13 Remove the Lower Backplane Cover" in the *Cisco ONS 15454 Hardware Installation Guide* .

Step 6 Unscrew the two screws that hold the AIP cover in place.

Step 7 Grip the cover and gently pull away from the backplane.

Note On the 15454-SA-HD (P/N: 800-24848), 15454-SA-NEBS3E, 15454-SA-NEBS3, and 15454-SA-R1 (P/N: 800-07149) shelves, the AIP cover is clear plastic. On the 15454-SA-ANSI shelf (P/N: 800-19857), the AIP cover is metal.

Step 8 Grip the AIP and gently pull it away from the backplane.

Step 9 Disconnect the fan-tray assembly power cable from the AIP.

Step 10 Set the old AIP aside for return to Cisco.

Caution The type of shelf that the AIP resides in determines the version of AIP that should replace the failed AIP. The 15454-SA-ANSI shelf (P/N: 800-19857) and 15454-SA-HD (P/N: 800-24848) currently use the 5A AIP, (P/N: 73-7665-01). The 15454-SA-NEBS3E, 15454-SA-NEBS3, and 15454-SA-R1 (P/N: 800-07149) shelves and earlier use the 2A AIP (P/N: 73-5262-01).

Caution Do not put a 2A AIP (P/N: 73-5262-01) into a 15454-SA-ANSI (P/N: 800-19857) or 15454-SA-HD (P/N: 800-24848) shelf; doing so will cause a blown fuse on the AIP.

Step 11 Attach the fan-tray assembly power cable to the new AIP.

Step 12 Place the new AIP on the backplane by plugging the panel into the backplane using the DIN connector.

Step 13 Replace the AIP cover over the AIP and secure the cover with the two screws.

Step 14 Replace the lower backplane cover and secure the cover with the five screws.

Step 15 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Network** tabs.

Caution Cisco recommends that TCC2/TCC2P/TCC3/TNC/TSC card resets be performed in a maintenance window to avoid any potential service disruptions.

Step 16 Reset the standby TCC2/TCC2P/TCC3/TNC/TSC card:

a) Right-click the standby TCC2/TCC2P/TCC3/TNC/TSC card and choose **Reset Card**.

b) Click **Yes** in the Resetting Card dialog box. As the card resets, a loading (Ldg) indication appears on the card in CTC.

Note The reset takes approximately five minutes. Do not perform any other steps until the reset is complete.

Step 17 Complete the "DLP-G250 Reset the TCC2/TCC2P/TCC3/TNC/TSC Card" task in the *Cisco ONS 15454 DWDM Configuration Guide* to reset the active TCC2/TCC2P/TCC3/TNC/TSC card.

Step 18 From the **File** drop-down list, choose **Exit** to exit the CTC session.

Step 19 Log back into the node. In the Login dialog box, choose **(None)** from the Additional Nodes drop-down list.

Step 20 Record the new MAC address:

a) In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Network** tabs.

b) Record the MAC address shown in the General tab.

Step 21 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Circuits** tab. Note that all circuits listed have a status of PARTIAL.

Step 22 In node view (single-shelf mode) or multishelf view (multishelf mode), choose **Repair Circuits** from the **Tools** drop-down list. The Circuit Repair dialog box appears.

Step 23 Read the instructions in the Circuit Repair dialog box. If all the steps in the dialog box have been completed, click **Next**. Ensure that you have the old and new MAC addresses.

Step 24 The Node MAC Addresses dialog box appears:

a) From the Node drop-down list, choose the name of the node where you replaced the AIP.
b) In the Old MAC Address field, enter the old MAC address that was recorded in Step 3.
c) Click **Next**.

Step 25 The Repair Circuits dialog box appears. Read the information in the dialog box and click **Finish**.

Note The CTC session freezes until all circuits are repaired. Circuit repair can take up to five minutes or more depending on the number of circuits provisioned.

When the circuit repair is complete, the Circuits Repaired dialog box appears.

Step 26 Click **OK**.

Step 27 In node view of the new node, click the **Circuits** tab. Check to ensure that all circuits listed have a status of DISCOVERED. If all circuits listed are not DISCOVERED, call the Cisco TAC at (800) 553-2447 to open a Return Material Authorization (RMA).

Stop. You have completed this procedure.

NTP-G118 Replace the ANSI Shelf Plastic Lower Backplane Cover

Purpose	This procedure replaces the metal cover with the plastic cover located at the bottom rear of the ONS 15454 ANSI shelf.
Tools/Equipment	Phillips screwdriver
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite
Security Level	None

Procedure

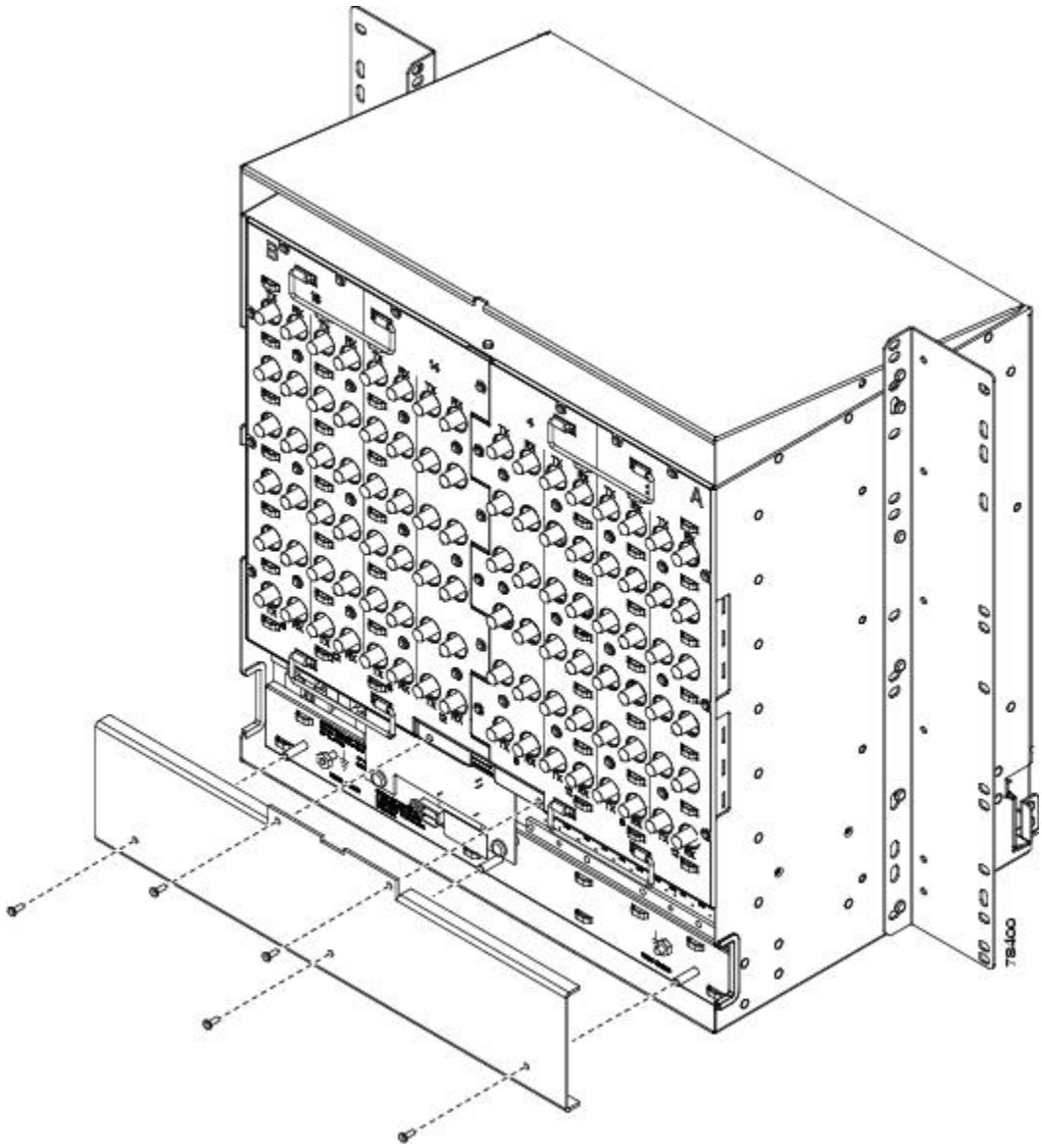
Step 1 Use the Phillips screwdriver to unscrew the five retaining screws that hold the metal cover in place.

Step 2 Grasp the metal cover on each side.

Step 3 Gently pull the metal cover away from the backplane.

Step 4 Place the plastic cover against the shelf assembly and align the screw holes on the cover and the shelf assembly.

Figure 325: Attaching Plastic Lower Backplane Cover



Step 5 Tighten the five retaining screws that hold the plastic cover in place.

Stop. You have completed this procedure.

NTP-G795 Change System Mode Using LCD

For ONS 15454 M2 and 15454 M6, the system mode can be changed from ANSI (SONET) to ETSI (SDH) or vice-versa. Changing the system mode removes the provisioned data and the system reverts to the default configuration.

This is available on the single controller and dual controller cards. The node can be in a standalone or multishelf configuration.

The system mode cannot be changed under the following conditions:

- "SHELF-COMM-FAIL" alarm is present - if this alarm does occur, the user can still proceed with the mode conversion after resetting the active controller (TNCS).
- any SSC is in limited state
- ONS 15454 chassis is present as a part of the multishelf set-up

Purpose	This task enables the user to change the system mode using the LCD module.
Tools/ Equipment	None
Required/ As Needed	As needed
Onsite/ Remote	Onsite
Security Level	Superuser only

Procedure

Step 1 On the front panel, just below the LCD display, are three buttons, marked **Slot**, **Status** and **Port**.

Step 2 Repeatedly press the **Port** button to reach the **Mode Change Configuration** option from the main menu.

Step 3 Press the **Status** button to enter the **Mode Change Configuration** option.

Controller

Status = Mode cfg

Step 4 On the left hand side of the LCD display (the **Slot** button), the ANSI option is displayed. On the right hand side of the LCD display, (the **Port** button) , the ETSI option is displayed.

Step 5 Select the required mode, either by pressing the **Slot** or **Port** button. If the user by mistake, chooses the current mode, a relevant error message is displayed.

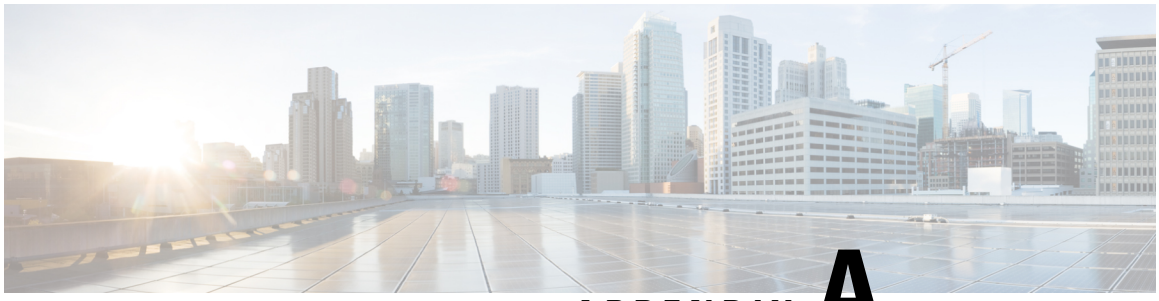
Step 6 On successful mode change, the LCD display reads:

Changing mode...

TNC may reset

Step 7 After successful mode change, the control card automatically reboots. In case of multishelf configuration, all the control cards reboot simultaneously.

Step 8 To verify mode change, go to the **System Mode** area in the **General** tab of CTC and confirm the current mode. Alternatively, use the **rtrv-ne-gen** TL1 command to check the current mode.



APPENDIX A

Hardware Specifications

This appendix contains hardware and software specifications of the ONS 15454 (ANSI and ETSI), ONS 15454 M2, and ONS 15454 M6 shelf.

Note Unless otherwise specified, “ONS 15454” refers to both ANSI and ETSI M12 shelf assemblies.

Note Unless otherwise specified, the ECU module refers to the ECU, ECU2, and ECU-60V units. For details about the various ECU modules, see the External Connection Units, on page 355.

Note Due to memory limitations, TCC2/TCC2P cards are not supported as the node controller in multi-shelf configuration from R10.5.2.6. Hence, it is recommended to use TCC3 card as the node controller in multi-shelf configuration. The TCC2P card can be used as a control card in a subtended shelf where the node controller is TCC3 card on ONS 15454 chassis or TNC/TNCE/TNCS/TNCS-O cards on ONS 15454 M6 or NCS 20015 chassis. The TCC2P card can also be used as a node controller in a stand-alone configuration.

The following sections are included:

ONS 15454 Shelf Specifications

This section provides specifications for shelf bandwidth; a list of topologies; Cisco Transport Controller (CTC) specifications; the LAN, Transaction Language One (TL1), modem, and alarm specifications; timing, power, and environmental specifications; and shelf dimensions.

Bandwidth

The ONS 15454 has these bandwidth specifications:

- Total bandwidth: 240 Gbps
- Data plane bandwidth: 160 Gbps
- SONET/SDH plane bandwidth: 80 Gbps

Configurations

The ONS 15454 can be configured for these dense wavelength division multiplexing (DWDM) topologies:

- Hubbed rings
- Multihubbed rings
- Point-to-point
- Linear
- Linear with optical add/drop multiplexing (OADM)
- Hybrid terminal node
- Hybrid OADM node
- Hybrid line amplifier node

Cisco Transport Controller

CTC, the ONS 15454 craft interface software, has these specifications:

- 10BaseT Ethernet
- TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE card access: RJ-45 connector
- Backplane access: LAN pin field (ANSI only)
- Front Mount Electrical Connection (FMEC) access: LAN connector on MIC-C/T/P faceplate (ETSI only)

External LAN Interface

The ONS 15454 external LAN interface has these specifications:

- 10BaseT Ethernet
- Backplane access: LAN pin field (ANSI only)
- FMEC access: LAN connector on MIC-C/T/P faceplate (ETSI only)

TL1 Craft Interface

The ONS 15454 TL1 craft interface has these specifications:

- Speed: 9600 bps
- TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE access: EIA/TIA-232 DB-9 type connector
- Backplane access: CRAFT pin field (ANSI only)

Modem Interface

The ONS 15454 modem interface has these specifications:

- Hardware flow control
- TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE: EIA/TIA-232 DB-9 type connector

Alarm Interface

The ONS 15454 alarm interface has these specifications:

- ETSI
  - Visual: Critical, Major, Minor, Remote
  - Audible: Critical, Major, Minor, Remote
  - FMEC access: 62-Pin DB connector on MIC-A/P faceplate
  - Alarm inputs: Common 32-VDC output for all alarm-inputs, closed contact limited to 2 mA
  - Control outputs: Open contact maximum 60 VDC, closed contact maximum 100 mA
- ANSI
  - Visual: Critical, Major, Minor, Remote
  - Audible: Critical, Major, Minor, Remote
  - Backplane access: Alarm pin fields
  - Alarm contacts: 0.045 mm, –48 V, 50 mA

EIA Interface (ANSI only)

The ONS 15454 electrical interface assembly (EIA) interface has these specifications:

- SMB: AMP #415504-3 75-ohm, 4-leg connectors
- BNC: Trompeter #UCBJ224 75-ohm 4 leg connector (King or ITT are also compatible)
- AMP Champ: AMP#552246-1 with #552562-2 bail locks

BITS Interface (ANSI only)

The ONS 15454 building integrated timing supply (BITS) interface has these specifications:

- 2 DS-1 BITS inputs
- 2 derived DS-1 outputs
- Backplane access: BITS pin field

System Timing

The ONS 15454 ANSI has these system timing specifications:

- Stratum 3 per Telcordia GR-253-CORE
- Free running accuracy: +/– 4.6 ppm
- Holdover stability: 3.7 x 10–7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

The ONS 15454 ETSI has these system timing specifications:

- Stratum 3E, per ITU-T G.813
- Free running accuracy: +/– 4.6 ppm
- Holdover stability: 3.7 exp –7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

System Power

The ONS 15454 ANSI has these power specifications:

- Nominal Input Voltage: –48 VDC
- Power consumption: Configuration dependent; 55 W (fan tray only)
- Power requirements:
  - Nominal: –48 VDC
  - Input Voltage Range: –40.5 to –57.0 VDC
- Power terminals: #6 Lug
- ANSI shelf fusing: 100–A fuse panel (minimum 30 A fuse per shelf)HD shelf fusing: 100–A fuse panel (minimum 30 A fuse per shelf)

The ONS 15454 ETSI has these power specifications:

- Nominal Input Voltage: –48 VDC
- Power consumption: Configuration dependent; 53 W (fan tray only)
- Power requirements:
  - Nominal: –48 VDC
  - Input Voltage Range: –40.5 to –57.0 VDC
- Power terminals: 3WK3 Combo-D power cable connector (MIC-A/P and MIC-C/T/P faceplates)
- Fusing: 100 A fuse panel; minimum 30 A fuse per shelf

Fan Tray

The following table lists power requirements for the fan-tray assembly.

Table 45: Fan Tray Assembly Power Requirements

Fan Tray Assembly	Watts	Amps	BTU/Hr
FTA2	53	1.21	198
FTA3 -T	86.4	1.8	295
15454E-CC-FTA/15454-CC-FTA	115	2.4	393

System Environmental Specifications

The ONS 15454 ANSI has these environmental specifications:

- Operating temperature:

  C-Temp: 32 to +131 degrees Farenheit (0 to +55 degrees Celsius)

  I-Temp: –40 to +139 degrees Farenheit (–40 to +65 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

The ONS 15454 ETSI has the following environmental specifications:

- Operating temperature: 32 to 131 degrees Fahrenheit (0 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

Dimensions

The ONS 15454 ANSI shelf assembly has these dimensions:

- Height: 18.5 in. (40.7 cm)
- Width: 19 or 23 in. (41.8 or 50.6 cm) with mounting ears attached
- Depth: 12 in. (26.4 cm) (5 in. or 12.7 cm projection from rack)
- Weight: 55 lb (24.947 kg) empty

The ONS 15454 ETSI shelf assembly has the following dimensions:

- Height: 616.5 mm (24.27 in.)
- Width: 535 mm (17 in.) without mounting ears attached
- Depth: 280 mm (11.02 in.)
- Weight: 26 kg empty (57.3 lb)

ONS 15454 M2 Shelf Specifications

This section provides specifications for shelf bandwidth; a list of topologies; Cisco Transport Controller (CTC) specifications; the LAN, Transaction Language One (TL1), modem, and alarm specifications; timing, power, and environmental specifications; and shelf dimensions.

Bandwidth

The ONS 15454 M2 has these bandwidth specifications (depending on the applications):

- Total bandwidth: 200 Gbps
- Data plane bandwidth: 100 Gbps per slot

Configurations

The ONS 15454 M2 can be configured for these dense wavelength division multiplexing (DWDM) topologies:

- Hubbed rings
- Multihubbed rings
- Point-to-point
- Linear
- Linear with optical add/drop multiplexing (OADM)
- Line amplifier node
- Transponder Shelf
- Layer 2 aggregation shelf

Cisco Transport Controller

CTC, the ONS 15454 M2 craft interface software, has these specifications:

- 10/100BaseT Ethernet
- TNC/TNCE/TSC/TSCE card access: RJ-45 LAN connector on the controller front plate

External LAN Interface for EMS

The ONS 15454 M2 external LAN interface has these specifications:

- 10/100BaseT Ethernet located on the power module

TL1 Craft Interface

The ONS 15454 M2 TL1 craft interface has these specifications:

- TNC/TNCE/TSC/TSCE access: EIA/TIA-232 DB-9 type connector

Modem Interface

The ONS 15454 M2 modem interface has these specifications:

- Hardware flow control
- TNC/TNCE/TSC/TSCE: EIA/TIA-232 DB-9 type connector

Alarm Interface

The ONS 15454 M2 does not support alarm interface.

Passive Unit Remote Inventory

The ONS 15454 M2 provides 1 standard USB port located on the power module to retrieve the passive units inventory data.

BITS Interface

The ONS 15454 M2 building integrated timing supply (BITS) interface has these specifications:

- 1 DS-1 BITS inputs wire wrap for ANSI applications
- 1 derived DS-1 outputs wire wrap for ANSI applications
- 1 E1 BITS input DIN-1.0/2.3 for ETSI applications
- 1 E1 BITS output DIN-1.0/2.3 for ETSI applications

System Timing

The ONS 15454 M2 for ANSI has these timing specifications:

- Stratum 3 per Telcordia GR-253-CORE
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 x 10-7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

The ONS 15454 M2 for ETSI has the following system timing specifications:

- Stratum 3, per ITU-T G.813
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 exp -7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

System Power

The ONS 15454 M2 has these AC power specifications:

- Input Voltage: 100V - 240V AC (+/- 10%)
- Power consumption: Configuration dependent; 35 W (Fan Tray and LCD)
- Power terminals standard 3 pole AC connector
- For an AC power supply, the fuse rating must not exceed 10A, 15A, or 20A depending on the standard in various countries. For North America, the branch circuit protection must be rated 20A
- Total maximum power consumption of 350W with ancillaries, controllers and linecards

The ONS 15454 M2 has these DC power specifications:

- Nominal Input Voltage: –48 VDC
- Power consumption: Configuration dependent; 35 W (Fan Tray and LCD)
- Power requirements:
  - Nominal: –48 VDC
  - Input Voltage Range: -40.5 to -57.6 VDC
- Power terminals: DSUB 2 poles for ETSI applications and terminal block double pole for ANSI applications
- External fuse must not exceed 15A
- Total maximum power consumption of 450W with ancillaries, controllers and linecards

Fan Tray

The following table lists power requirements for the fan-tray assembly.

Table 46: Fan-Tray Assembly Power Requirements

Fan Tray Assembly	Watts	Amps	BTU/Hr
15454-M2-FTA	35	1	120
15454-M2-FTA2	40	1	135

System Environmental Specifications

The ONS 15454 M2 for ANSI environment has these specifications:

- Operating temperature: 23 to +131 degrees Farenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

The ONS 15454 M2 for ETSI environment has the following specifications:

- Operating temperature: 23 to 131 degrees Fahrenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

Dimensions

The ONS 15454 M2 shelf assembly has these dimensions:

- Height: 3.5 inches (88.9 mm)
- Width: 19 or 23 inches (482.6 or 584.2 mm) with mounting ears attached
- Depth: 11.1 inches (281.94 mm)
- Weight:
  - 11.02 pounds (5 kg) with preinstalled air filter and no cards installed
  - 15.40 pounds (6.82 kg) with the power module, fan-tray assembly and air filter installed but with no cards.

ONS 15454 M6 Shelf Specifications

This section provides specifications for shelf bandwidth; a list of topologies; Cisco Transport Controller (CTC) specifications; the LAN, Transaction Language One (TL1), modem, and alarm specifications; timing, power, and environmental specifications; and ONS 15454 M6 shelf dimensions.

CSCts60661The ONS 15454 M6 shelf is compliant with the ETS 300-119-4 standard.

Bandwidth

The ONS 15454 M6 has the following bandwidth specifications (depending on the applications):

- Total bandwidth: 600 Gbps
- Data plane bandwidth: 100 Gbps per slot

Configurations

The ONS 15454 M6 can be configured for the following dense wavelength division multiplexing (DWDM) topologies:

- Hubbed rings
- Multihubbed rings
- Point-to-point
- Linear
- Linear with optical add/drop multiplexing (OADM)
- Hybrid terminal node
- Hybrid OADM node
- Hybrid line amplifier node
- Transponder Shelf
- Layer 2 aggregation shelf

Cisco Transport Controller

CTC, the ONS 15454 M6 craft interface software, has the following specifications:

- 10/100BaseT Ethernet
- TNC/TNCE/TSC/TSCE card access: RJ-45 LAN connector on the controller front plate
- Shelf access: RJ-45 LAN Connector located on the ECU or ECU2

External LAN Interface for EMS

The ONS 15454 M6 external LAN interface has the following specification:

- 10/100BaseT Ethernet located on the ECU or ECU2 and supports:
  - CSCts0062110/100 Mbps full duplex
  - CSCts00621Auto detection

TL1 Craft Interface

The ONS 15454 M6 TL1 craft interface has the following specifications:

- Speed: 9600 bps
- TNC/TNCE/TSC/TSCE access: EIA/TIA-232 DB-9 type connector
- An alternative RJ-45 LAN connector on TNC/TNCE/TSC/TSCE or ECU or ECU2

Modem Interface

The ONS 15454 M6 modem interface has the following specifications:

- Hardware flow control
- TNC/TNCE/TSC/TSCE: EIA/TIA-232 DB-9 type connector

Alarm Interface

The ONS 15454 M6 alarm interface has the following specifications:

- 2 SCSI Connectors located on the ECU or ECU2
- Visual: Critical, Major, Minor, Remote
- Audible: Critical, Major, Minor, Remote
- Alarm inputs: Common 32-VDC output for all alarm-inputs, closed contact limited to 2 mA
- Control outputs: Open contact maximum 60 VDC, closed contact maximum 100 mA

Passive Unit Remote Inventory

The ONS 15454 M6 provide 12 standard USB ports located on the ECU or ECU2 to retrieve the inventory data from the passive units.

BITS Interface

The ONS 15454 M6 building integrated timing supply (BITS) interface has the following specifications:

- 2 T1 BITS inputs wire wrap for ANSI applications
- 2 derived T1 outputs wire wrap for ANSI applications
- 2 E1 BITS input DIN-1.0/2.3 for ETSI applications
- 2 E1 BITS output DIN-1.0/2.3 for ETSI applications

System Timing

The ONS 15454 M6 for ANSI has the following system timing specifications:

- Stratum 3 per Telcordia GR-253-CORE
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 x 10-7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

The ONS 15454 M6 for ETSI has the following system timing specifications:

- Stratum 3, per ITU-T G.813
- Free running accuracy: +/- 4.6 ppm
- Holdover stability: 3.7 exp -7 per day, including temperature (< 255 slips in first 24 hours)
- Reference: External BITS, line, internal

System Power

AC Power Specifications

The ONS 15454 M6 has these AC power specifications:

- Shelf power consumption: Configuration dependent; 130 W (Fan Tray, LCD, and ECU module).
- Power terminals standard 3-pole AC connector.
- Fuse rating for an AC power supply must not exceed 10 A, 15 A, or 20 A depending on the standard in various countries. For North America, the branch circuit protection must be rated 20 A.

The following table lists power specifications of the AC power modules for the ONS 15454 M6 shelf.

Table 47: ONS 15454 M6 AC Power Specifications

AC Power Module	Input Voltage Range	Output Voltage	Load
15454-M6-AC	100–120 V AC (US nominal range), 60Hz	-48.0 V DC	900 W
	200–250 V AC (Europe nominal range), 50Hz	-48.0 V DC	900 W
15454-M6-AC2	100–120 V AC (US nominal range), 60Hz	-48.0 V DC	1260 W
	200–250 V AC (Europe nominal range), 50Hz	-48.0 V DC	1500 W

DC Power Specifications

The following table lists power specifications of the DC power modules for the ONS 15454 M6 shelf.

Table 48: ONS 15454 M6 DC Power Specifications

DC Power Module	Rating	Nominal Voltage	Current	Input Voltage Range	Maximum Load
15454-M6-DC	30 Amp	–48 VDC	30 Amp	–40.5 to –57.6 VDC	1440 W
		–60 VDC	24 Amp	–50 to –72 VDC	
15454-M6-DC20	20 Amp	–48 VDC	20 Amp	–40.5 to –57.6 VDC	960 W
		–60 VDC	16 Amp	–50 to –72 VDC	
15454-M6-DC40	40 Amp	-48 VDC	40 Amp	–40.5 to –57.6 VDC	1920 W
		-60 VDC	32 Amp	–50 to –72 VDC	

Note When the ONS 15454 M6 shelf is powered at –60 VDC (nominal), only these cards can be installed: TNC, OPT-AMP-C, OPT-AMP-17-C, OPT-EDFA-17, OPT-EDFA-24, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS, SMR20 FS CV, 12-AD-FS, 16-AD-FS, 100GS-CK-LC, MR-MXP cards, and the 15454-M6-ECU-60 card.

- 15454-M6-DC, 15454-M6-DC20, and 15454-M6-DC40 shelf power consumption (configuration dependent):
  - 130 W with 15454-M6-FTA Fan Tray, LCD, and ECU module
  - 140 W with 15454-M6-FTA2 Fan Tray, LCD, and ECU module
- When you use the 60V DC power module for ONS 15454 M6, you must go to CTC (shelf-view) **Provisioning > General > Power Monitor** and set the following threshold values:
  - ELWBATVG (Extreme Low Battery Voltage)=-50 Vdc
  - LWBATVG (Low Battery Voltage)=-50 Vdc
  - HIBATVG (High Battery Voltage)=-72 Vdc
  - EHIBATVG (Extreme High Battery Voltage)=-72 Vdc
- Power terminals—DSUB 3 poles for ETSI applications and terminal block, double pole for ANSI applications.
- External fuse must not exceed 40 A

Power Supply Modules Supported by ONS 15454 M6 ECU-S

Table 49: Power Supply Modules Supported by ONS 15454 M6 ECU-S

Model	TAN	PID
15454-M6-DC	800-31550-03_B0 and above	15454-M6-DC=
	800-37797-03_A0 and above	15454-M6-DC20=
15454-M6-AC	800-31560-03_C0 and above	15454-M6-AC=
15454-M6-DC6-40A	— (Supported on all models)	15454-M6-DC40=
15454-M6-AC2	— (Supported on all models)	15454-M6-AC2

Power Calculation

For the ONS 15454 M6 shelf that is powered by the 15454-M6-DC20 or the 15454-M6-DC40 power module, the controller card calculates the total power consumption of the shelf, which is displayed in the Provisioning > General > Power Monitor tab in CTC. For the power calculation to function properly ensure that:

- There is no MEA alarm on any card.
- The LCD module is properly plugged-in.

The total power consumption value for the shelf is computed by aggregating the power consumption values of individual cards and ancillary units installed or pre-provisioned in the shelf. Refer to the Individual Card Power Requirements table for the power consumption values of the line cards that are considered for power calculation.

The Actual Power is the power consumed by a line card once it has boot-up. The Typical Power is the power consumed by a line card when it is physically present in the shelf but deleted in CTC, or when it has not boot-up due to PWR-CON-LMT alarm after installation or pre-provisioning.

During power calculation, certain wattage is always reserved for ancillary units like the ECU, fan tray, and standby controller card, irrespective of whether they are present in the shelf or not. The reserved power for the ONS 15454 M6 shelf with a TNC or TNC-E controller card is 284 W, and for the TSC or TSC-E controller card it is 270 W.

Note In the shelf powered by the15454-M6-DC20 power module, a new line card will not boot if it causes the power consumption of the shelf to exceed 960 W. The PWR-CON-LMT alarm is raised in the Alarms tab in CTC when the installation or pre-provisioning of a card causes the power consumption to exceed 960 W. You must uninstall and deprovision the card that causes the PWR-CON-LMT alarm.

Note In the shelf powered by the15454-M6-DC40 power module, a new line card will not boot if it causes the power consumption of the shelf to exceed 1920 W. The PWR-CON-LMT alarm is raised in the Alarms tab in CTC when the installation or pre-provisioning of a card causes the power consumption to exceed 1920 W. You must uninstall and deprovision the card that causes the PWR-CON-LMT alarm.

Note When the node is upgraded to R11.1 with specific cards, the total power consumption value changes. Refer to the Individual Card Power Requirements table for the power consumption values of the line cards that are considered for power calculation.

Fan Tray

The following table lists power requirements for the fan-tray assembly.

Table 50: Fan-Tray Assembly Power Requirements

Fan Tray Assembly	Watts	Amps	BTU/Hr
15454-M6-FTA	120	3	410
15454-M6-FTA2	130	3.5	445

System Environmental Specifications

The ONS 15454 M6 for ANSI environment has these specifications:

- Operating temperature: 23 to +131 degrees Farenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

The ONS 15454 M6 for ETSI environment has these specifications:

- Operating temperature: 23 to 131 degrees Fahrenheit (-5 to +55 degrees Celsius)
- Operating humidity: 5 to 95 percent, noncondensing

Dimensions

The ONS 15454 M6 shelf assembly has these dimensions:

- Height: 10.4 inches (264.16 mm)
- Width: 19 or 23 inches (482.6 or 584.2 mm) with mounting ears attached
- Depth: 11.1 inches (281.94 mm)
- Weight:
  - 23.55 pounds (10.680 kg) with preinstalled air filter and no cards installed
  - 40.12 pounds (18.2 kg) with all the ancillary units (2 DC power modules, ECU or ECU2, fan-tray assembly and air filter) installed but with no cards.

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