

General Troubleshooting

This chapter provides procedures for troubleshooting the most common problems encountered when operating a DWDM shelf in ANSI or ETSI platforms. To troubleshoot specific alarms, see Alarm Troubleshooting If you cannot find what you are looking for, contact Cisco Technical Support (1 800 553-2447).

Alarms can occur even in those cards that are not explicitly mentioned in the Alarm sections. When an alarm is raised, refer to its clearing procedure.

Note Unless otherwise noted, ONS 15454 refers to the ANSI and ETSI versions of the platform.

Note For dense wavelength division multiplexing (DWDM) network acceptance tests, refer to the *Cisco ONS 15454 DWDM Procedure GuideCisco ONS 15454 DWDM Configuration Guide*.

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Document Conventions

This document uses the following conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination **^D** or **Ctrl-D** means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
bold font	Commands and keywords and user-entered text appear in **bold** font.
Italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
`Courier font`	Terminal sessions and information the system displays appear in `courier` font.
`Bold Courier font`	Bold Courier font indicates text that the user must enter.
[x]	Elements in square brackets are optional.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
|	A vertical line, called a pipe, indicates a choice within a set of keywords or arguments.
[x | y]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
{x | y}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x {y | z}]	Nested set of square brackets or braces indicate optional or required choices within optional or required elements. Braces and a vertical bar within square brackets indicate a required choice within an optional element.
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Reader Alert Conventions

This document uses the following conventions for reader alerts:



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



Tip Means *the following information will help you solve a problem.*



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



Timesaver Means *the described action saves time.* You can save time by performing the action described in the paragraph.



Warning **Means *reader be warned.* In this situation, you might perform an action that could result in bodily injury.**

IMPORTANT SAFETY INSTRUCTIONS

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. Use the statement number provided at the end of each warning to locate 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 veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing 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 käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen 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 entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen 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 persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel

VIKTIGE SIKKERHETSINSTRUKSJONER

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne 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 lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de 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 manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el 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. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta 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 ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант 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，必须充分意识到触电的危险，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找到此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

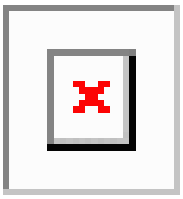
警告

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を行うときは、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。警告の各国語版は、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



Aviso

INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

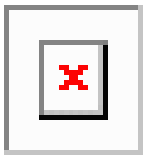
Advarsel

VIGTIGE SIKKERHEDSANVISNINGER

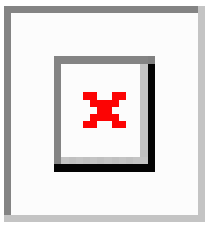
Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

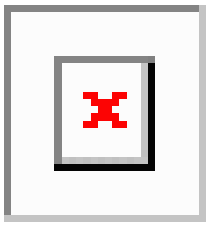
تحذير

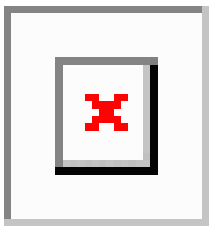


Upozorenje

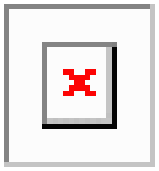


Upozornění

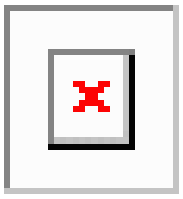




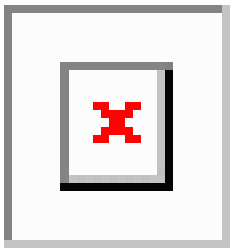
אזהרה



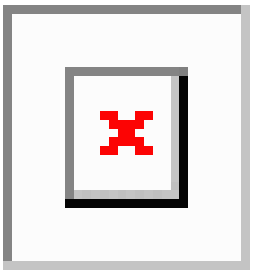
Opomena



Ostrzeżenie



Upozornenie



Loopback Description

Use loopbacks and hairpin circuits to test newly created circuits before running live traffic or to logically locate the source of a network failure. All TXP and MXP cards allow loopbacks and hairpin test circuits. The ADM-10G allows loopbacks, but does not support hairpin circuits. The OPT-AMP-C, OPT-AMP-17C to OPT-BST, OPT-PRE, OPT-BST, OPT-PRE, OSC-CSM, AD-xB-xx.x, and AD-xC-xx.x cards do not support loopbacks and hairpin test circuits.

To create a loopback on an ANSI or SONET port, the port must be in the Out-of-Service and Management, Maintenance (OOS-MA,MT) service state. After you create the loopback, the service state becomes Out-of-Service and Management, Loopback and Maintenance (OOS-MA,LPBK & MT).

To create a loopback on an a port, the port must be in the Locked, maintenance administrative state and the Locked-Enabled, loopback & maintenance administrative state.

Caution Facility or terminal loopbacks can be service-affecting. To protect traffic, apply a lockout or Force switch to the target loopback port. Basic directions for these procedures exist in Alarm Troubleshooting chapter.

Note In CTC, a facility loopback is sometimes called facility (line) loopback, and a terminal loopback is sometimes called a terminal (inward) loopback. This is done to indicate the terminating direction of the signal: a facility loopback is sent outward toward the span, whereas a terminal loopback is redirected inward toward its originating port.

Facility Loopbacks

The following sections give general information about facility loopback operations and specific information about card loopback activity.

General Behavior

A facility loopback tests the line interface unit (LIU) of a card, the electrical interface assembly (EIA), and related cabling. After applying a facility loopback on a port, use a test set to run traffic over the loopback. A successful facility loopback isolates the LIU, the EIA, or the cabling plant as the potential cause of a network problem.

To test a card LIU, connect an optical test set to a trunk or client port and perform a facility loopback. Alternately, use a loopback or hairpin circuit on a card that is farther along the circuit path. For example, Figure 1: Facility Loopback Path on a Near-End Transponder Card, on page 9 shows a facility loopback at a trunk port and at a client port on a TXP card.

Figure 1: Facility Loopback Path on a Near-End Transponder Card



Caution Before performing a facility loopback on a TXP card, be sure that the card contains at least two data communications channel (DCC) paths to the node where the card is installed. A second DCC provides a nonlooped path to log into the node after the loopback is applied, enabling you to remove the facility loopback. Ensuring a second DCC is not necessary if you are directly connected to the node containing the loopback card.

Caution Ensure that the facility being loopbacked is not being used by the node for line timing. If it is, a timing loop will be created.

Card Behavior

Port loopbacks either terminate or bridge the loopback signal. All MXP and TXP facility loopbacks are terminated as shown in the following table.

When a port terminates a facility loopback signal, the signal only loops back to the originating port and is not transmitted downstream. When a port bridges a loopback signal, the signal loops back to the originating port and is also transmitted downstream.

Note In the following table, no alarm indication signal (AIS) is injected if the signal is bridged. If the signal is terminated, an applicable AIS is injected downstream.

Table 1: DWDM Card Facility Loopback Behavior

Card/Port	Facility Loopback Signal
TXP_MR_10E/TXP_MR_10E_C/TXP_MR_10E_L client ports	Bridged
TXP_MR_10E/TXP_MR_10E_C/TXP_MR_10E_L trunk ports	Terminated
TXP_MR_2.5G/TXPP_MR_2.5G client ports	Terminated
TXP_MR_2.5G/TXPP_MR_2.5G trunk ports	Terminated
MXP_2.5G_10E_C/MXP_2.5G_10E_L client ports	Bridged
MXP_2.5G_10E_C/MXP_2.5G_10E_L trunk ports	Terminated
MXP_MR_10DME client ports	Terminated

Card/Port	Facility Loopback Signal
MXP_MR_10DME trunk ports	Terminated
MXP_MR_2.5G/MXPP_MR_2.5G client ports	Bridged
MXP_MR_2.5G/MXPP_MR_2.5G trunk ports	Terminated
GE_XP/10GE_XP client ports	Terminated
GE_XP/10GE_XP trunk ports	Terminated
ADM-10G client ports	Bridged
ADM-10G trunk ports	Terminated
40G-MXP-C/40E-MXP-C/40ME-MXP-C client ports	Bridged
40G-MXP-C/40E-MXP-C/40ME-MXP-C trunk ports	Bridged
40E-TXP-C/40ME-TXP-C client ports	Bridged
40E-TXP-C/40ME-TXP-C trunk ports	Bridged
AR_XP/AR_MXP client ports	Terminated
AR_XP/AR_MXP trunk ports	Terminated

The loopback itself is listed in the Conditions window. For example, the window would list the LPBKFACILITY condition for a tested port. (The Alarms window would show the AS-MT condition which means that alarms are suppressed on the facility during loopback unless the default is set to alarm for loopback while in AS-MT.)

With a client-side SONET or ANSI facility loopback, the client port service state is OOS-MA,LPBK & MT. However, any remaining client and trunk ports can be in any other service state. For SONET or ANSI cards in a trunk-side facility loopback, the trunk port service state is OOS-MA,LPBK & MT and the remaining client and trunk ports can be in any other service state.

With a client-side SDH or ESTI facility loopback, the client port is in the Locked-enabled,maintenance & loopback service state. However, the remaining client and trunk ports can be in any other service state. For MXP and TXP cards in a SDH or ETSI trunk-side facility loopback, the trunk port is in the Locked-enabled,maintenance & loopback service state and the remaining client and trunk ports can be in any other service state.

When you apply a facility loopback on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, the ifInDiscard counters increment continuously.

Terminal Loopbacks

The following sections give general information about terminal loopback operations and specific information about card loopback activity.

General Behavior

A terminal loopback tests a circuit path as it passes through a TXP, MXP, or ADM-10G card and loops back. For example, as shown in Figure 2: Terminal Loopback on a TXP Card, on page 11, there are two types of terminal loopbacks shown for a TXP card.

The first is a terminal loopback at the client port. In this situation, the test set traffic comes in through the TXP trunk port, travels through the card, and turns around because of the terminal loopback in effect on the card just before it reaches the LIU of the client port. The signal is then sent back through the card to the trunk port and back to the test set.

The second is a terminal loopback at the trunk port. In this situation, the test set traffic comes in through the TXP client port, travels through the card, and turns around because of the terminal loopback in effect on the card just before it reaches the LIU of the trunk port. The signal is then sent back through the card to the client port and back to the test set.

This test verifies that the terminal circuit paths are valid, but does not test the LIU on the TXP card.

Figure 2: Terminal Loopback on a TXP Card



Card Behavior

The SDH terminal port loopbacks can either terminate or bridge the signal. TXP terminal loopbacks are terminated as shown in the following table. During terminal loopbacks, if a port terminates a terminal loopback signal, the signal only loops back to the originating port and is not transmitted downstream. If the port bridges a loopback signal, the signal loops back to the originating port and is also transmitted downstream. Client card terminal loopback bridging and terminating behaviors are listed in the following table.

Note AIS signal is not injected if the signal is bridged. If the signal is terminated, an applicable AIS is injected downstream.

Table 2: DWDM Card Terminal Loopback Behavior

Card/Port	Terminal Loopback Signal
TXP_MR_10E/TXP_MR_10E_C/TXP_MR_10E_L client ports	Bridged
TXP_MR_10E/TXP_MR_10E_C/TXP_MR_10E_L trunk ports	Bridged
TXP_MR_2.5G/TXPP_MR_2.5G client ports	Bridged
TXP_MR_2.5G/TXPP_MR_2.5G trunk ports	Bridged
MXP_2.5G_10E_C/MXP_2.5G_10E_L client ports	Bridged
MXP_2.5G_10E_C/MXP_2.5G_10E_L trunk ports	Bridged
MXP_MR_10DME client ports	Bridged
MXP_MR_10DME trunk ports	Bridged

Card/Port	Terminal Loopback Signal
MXP_MR_2.5G/MXPP_MR_2.5G client ports	Bridged
MXP_MR_2.5G/MXPP_MR_2.5G trunk ports	Bridged
GE_XP/10GE_XP client ports	Bridged
GE_XP/10GE_XP trunk ports	Bridged
ADM-10G client ports	Bridged
ADM-10G trunk ports	Bridged
40G-MXP-C/40E-MXP-C/40ME-MXP-C client ports	Bridged
40G-MXP-C/40E-MXP-C/40ME-MXP-C trunk ports	Bridged
40E-TXP-C/40ME-TXP-C client ports	Bridged
40E-TXP-C/40ME-TXP-C trunk ports	Bridged
AR_XP/AR_MXP client ports	Bridged
AR_XP/AR_MXP trunk ports	Bridged

Important notes about loopback on MXP and TXP trunk and client ports:

- For SONET or ANSI TXP and TXPP cards with a client-side terminal loopback, the client port is in the OOS-MA,LPBK & MT service state and trunk port must be in IS-NR service state.
- For SONET or ANSI MXP and MXPP cards with a client-side terminal loopback, the client port is in the OOS-MA,LPBK & MT service state and the remaining client and trunk ports can be in any service state.
- For ADM-10G cards with Client Terminal Loopback on a SONET Client port, AIS-P is sent forward on client for the circuits on that port.
- For ADM-10G cards with a Terminal Loopback on a GE Client port, the client port is squelched.
- In SONET or ANSI MXP or TXP trunk-side terminal loopbacks, the trunk port is in the OOS-MA,LPBK & MT service state and the client ports must be in IS-NR service state for complete loopback functionality. A terminal loopback affects all client ports because it is performed on the aggregate signal.
- For ADM-10G cards with a Facility Loopback on the Trunk port, AIS-P is sent forward on all the SONET client ports.
- For ADM-10G cards with a Facility Loopback on the Trunk port, all the GE client ports is squelched
- For ADM-10G Terminal Loopback on the Trunk port, the signal is anyway sent downstream (drop and continue).
- For SDH or ETSI TXP and TXPP client-side facility loopbacks, the client port is in the Locked-enabled,maintenance & loopback service state and the trunk port must be in Unlocked-enabled service state.

- For SDH or ETSI MXP and MXPP cards with a client-side terminal loopback, the client port is in the Locked-enabled,maintenance & loopback service state and remaining client and trunk ports can be in any service state.
- In SDH and ETSI MXP or TXP trunk-side terminal loopbacks, the trunk port is in the Locked-enabled,maintenance & loopback service state and the client ports must be in Unlocked-enabled service state for complete loopback functionality. A facility loopback affects all client ports because it is performed on the aggregate signal.

The loopback itself is listed in the Conditions window. For example, the window would list the LPBKTERMINAL condition or LPBKFACILITY condition for a tested port. (The Alarms window would show the AS-MT condition, which indicates that all alarms are suppressed on the port during loopback testing unless the default is set to alarm for loopback while in AS-MT.)

Troubleshooting MXP, TXP, XP, or ADM-10G Circuit Paths With Loopbacks

Facility loopbacks and terminal loopbacks are often used together to test the circuit path through the network or to logically isolate a fault. Performing a loopback test at each point along the circuit path systematically isolates possible points of failure. MXP, TXP, XP, or ADM-10G card loopback tests differ from other testing in that loopback testing does not require circuit creation. MXP, TXP, and XP client ports are statically mapped to the trunk ports so no signal needs to traverse the cross-connect card (in a circuit) to test the loopback.

You can use these procedures on transponder cards (TXP, TXPP, ADM-10G), muxponder, or xponder cards (MXP, MXPP, XP, ADM-10G) cards. The example in this section tests an MXP or TXP circuit on a three-node bidirectional line switched ring (BLSR) or multiplex section-shared protection ring (MS-SPRing). Using a series of facility loopbacks and terminal loopbacks, the example scenario traces the circuit path, tests the possible failure points, and eliminates them. The logical progression contains six network test procedures:



Note MXP, TXP, XP, or ADM-10G card client ports do not appear when you click the **Maintenance > Loopback** tab unless they have been provisioned. Do this in the card view by clicking the **Provisioning > Pluggable** Port Modules tab.



Note The test sequence for your circuits will differ according to the type of circuit and network topology.

1. A facility loopback on the source-node MXP, TXP, XP, or ADM-10G port
2. A terminal loopback on the source-node MXP, TXP, XP, or ADM-10G port
3. A facility loopback on the intermediate-node MXP, TXP, XP, or ADM-10G port
4. A terminal loopback on the intermediate-node MXP, TXP, XP, or ADM-10G port
5. A facility loopback on the destination-node MXP, TXP, XP, or ADM-10G port
6. A terminal loopback on the destination-node MXP, TXP, XP, or ADM-10G port

Note Facility and terminal loopback tests require on-site personnel.

Perform a Facility Loopback on a Source-Node MXP or TXP Port

This facility loopback test is performed on the node source port in the network circuit. In the testing situation used in this example, the source muxponder, transponder, xponder, or ADM-10G port under test is located in the source node. Facility loopback can be performed at the trunk port or at a client port. Completing a successful facility loopback on this port isolates the source MXP, TXP, XP, or ADM-10G port as a possible failure point. Figure 3: Facility Loopback on a Circuit Source MXP or TXP Port, on page 14 shows the facility loopback examples on source ONS node TXP ports (client and trunk).

Figure 3: Facility Loopback on a Circuit Source MXP or TXP Port



Caution Performing a loopback on an in-service circuit is service-affecting.

Note Facility loopbacks require on-site personnel.

Complete the Create the Facility Loopback on the Source-Node MXP, TXP, XP or ADM-10G Port, on page 14.

Create the Facility Loopback on the Source-Node MXP, TXP, XP or ADM-10G Port

Procedure

Step 1 Connect an optical test set to the port you are testing.

Note
For specific procedures to connect, set up, and use the test set equipment, consult the manufacturer.

Use appropriate cabling to attach the transmit (Tx) and receive (Rx) terminals of the optical test set to the port you are testing. The Tx and Rx terminals connect to the same port.

Step 2 Adjust the test set accordingly. (Refer to manufacturer instructions for test set use.)

Step 3 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the card to display the card view.

Step 4 Click the **Maintenance** > **Loopback** tabs.

Step 5 Choose **OOS,MT (or locked,maintenance)** from the Admin State column for the port being tested. If this is a multiport card, select the appropriate row for the desired port.

Step 6 Choose **Facility (Line)** from the Loopback Type column for the port being tested. If this is a multiport card, select the appropriate row for the desired port.

Step 7 Click **Apply.**

Step 8 Click **Yes** in the confirmation dialog box.

Note
It is normal for the LPBKFACILITY (ESCON), LPBKFACILITY (FC), LPBKFACILITY (GE), LPBKFACILITY (ISC), or the LPBKFACILITY (TRUNK) to appear during loopback setup. The condition clears when you remove the loopback.

Step 9 Complete the Test and Clear the MXP, TXP, XP or ADM-10G Facility Loopback Circuit, on page 15.

Test and Clear the MXP, TXP, XP or ADM-10G Facility Loopback Circuit

Procedure

Step 1 If the test set is not already sending traffic, send test traffic on the loopback circuit.

Step 2 Examine the traffic received by the test set. Look for errors or any other signal information that the test set is capable of indicating.

Step 3 If the test set indicates no errors, no further testing is necessary with the facility loopback. Clear the facility loopback:

a) Click the **Maintenance > Loopback** tabs.
b) Choose **None** from the Loopback Type column for the port being tested.
c) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
d) Click **Apply.**
e) Click **Yes** in the confirmation dialog box.
f) Complete the Perform a Terminal Loopback on a Source-Node MXP, TXP, XP, or ADM-10G Port, on page 16.

Step 4 If the test set indicates errors, complete the Test the MXP, TXP, XP or ADM-10G Card, on page 15.

Test the MXP, TXP, XP or ADM-10G Card

Procedure

Step 1 Complete the Physically Replace a Card for the suspected bad card and replace it with a known-good one.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Caution
Removing a card that currently carries traffic on one or more ports can cause a traffic hit. To avoid this, perform an external switch if a switch has not already occurred. Refer to the procedures in the Protection

Switching, Lock Initiation, and Clearing. For more information, refer to the Maintain the Node chapter in the *Cisco ONS 15454 Network Operations Guide Cisco NCS 2002 and NCS 2006 Network Operations Guide*.

Step 2 Resend test traffic on the loopback circuit with a known-good card installed.

Step 3 If the test set indicates no errors, the problem was probably the defective card. Return the defective card to Cisco through the Return Materials Authorization (RMA) process. Contact Cisco Technical Support 1 800 553 2447.

Step 4 Clear the facility loopback:

a) Click the **Maintenance** > **Loopback** tabs.
b) Choose **None** from the Loopback Type column for the port being tested.
c) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
d) Click **Apply.**
e) Click **Yes** in the confirmation dialog box.

Step 5 Complete the Perform a Terminal Loopback on a Source-Node MXP, TXP, XP, or ADM-10G Port, on page 16.

Perform a Terminal Loopback on a Source-Node MXP, TXP, XP, or ADM-10G Port

The terminal loopback test is performed on the node source MXP, TXP, XP, or ADM-10G port. For the circuit in this example, it is the source TXP trunk port or a client port in the source node. Completing a successful terminal loopback to a node source port verifies that the circuit is through the source port. Figure 4: Terminal Loopback on a Source-Node MXP or TXP Port, on page 16 shows an example of a terminal loopback on a source TXP port and a client TXP port.

Figure 4: Terminal Loopback on a Source-Node MXP or TXP Port



Caution Performing a loopback on an in-service circuit is service-affecting.

Note Terminal loopbacks require on-site personnel.

Complete the Create the Terminal Loopback on a Source-Node MXP, TXP, XP, or ADM-10G Port, on page 17.

Create the Terminal Loopback on a Source-Node MXP, TXP, XP, or ADM-10G Port

Procedure

Step 1 Connect an optical test set to the port you are testing:

Note
For specific procedures to connect, set up, and use the test set equipment, consult the manufacturer.

a) If you just completed the Perform a Facility Loopback on a Source-Node MXP or TXP Port, on page 14, leave the optical test set hooked up to the MXP, TXP, XP, or ADM-10G port in the source node.
b) If you are starting the current procedure without the optical test set hooked up to the source port, use appropriate cabling to attach the Tx and Rx terminals of the optical test set to the port you are testing. Both Tx and Rx connect to the same port.

Step 2 Adjust the test set accordingly. (Refer to manufacturer instructions for test set use.)

Step 3 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the card that requires the loopback.

Step 4 Click the **Maintenance > Loopback** tabs.

Step 5 Select **OOS,MT (or locked,maintenance)** from the Admin State column. If this is a multiport card, select the row appropriate for the desired port.

Step 6 Select **Terminal (Inward)** from the Loopback Type column. If this is a multiport card, select the row appropriate for the desired port.

Step 7 Click **Apply.**

Step 8 Click **Yes** in the confirmation dialog box.

Step 9 Complete the Test and Clear the MXP, TXP, XP, or ADM-10G Port Terminal Loopback Circuit, on page 17.

Test and Clear the MXP, TXP, XP, or ADM-10G Port Terminal Loopback Circuit

Procedure

Step 1 If the test set is not already sending traffic, send test traffic on the loopback circuit.

Step 2 Examine the test traffic being received by the test set. Look for errors or any other signal information that the test set is capable of indicating.

Step 3 If the test set indicates no errors, no further testing is necessary on the loopback circuit. Clear the terminal loopback state on the port:

a) Double-click the card in the source node with the terminal loopback.
b) Click the **Maintenance > Loopback** tabs.
c) Select **None** from the Loopback Type column for the port being tested.
d) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
e) Click **Apply.**
f) Click **Yes** in the confirmation dialog box.

g) Complete the Create a Facility Loopback on an Intermediate-Node MXP or TXP Port, on page 18.

Step 4 If the test set indicates errors, complete the Test the MXP, TXP, XP, or ADM-10G Card, on page 18.

Test the MXP, TXP, XP, or ADM-10G Card

Procedure

Step 1 Complete the Physically Replace a Card for the suspected bad card and replace it with a known-good one.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Caution
Removing a card that currently carries traffic on one or more ports can cause a traffic hit. To avoid this, perform an external switch if a switch has not already occurred. Refer to the procedures in the Protection Switching, Lock Initiation, and Clearing.

Step 2 Resend test traffic on the loopback circuit with a known-good card.

Step 3 If the test set indicates no errors, the problem was probably the defective card. Return the defective card to Cisco through the RMA process. Contact Cisco Technical Support 1 800 553 2447.

Step 4 Clear the terminal loopback on the port before testing the next segment of the network circuit path:

a) Double-click the card in the source node with the terminal loopback.
b) Click the **Maintenance** > **Loopback** tabs.
c) Select **None** from the Loopback Type column for the port being tested.
d) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
e) Click **Apply.**
f) Click **Yes** in the confirmation dialog box.

Step 5 Complete the Create a Facility Loopback on an Intermediate-Node MXP or TXP Port, on page 18.

Create a Facility Loopback on an Intermediate-Node MXP or TXP Port

Performing the facility loopback test on an intermediate port isolates whether this node is causing circuit failure. In the situation shown in Figure 5: Facility Loopback on an Intermediate-Node MXP or TXP Port, on page 18, the test is being performed on an intermediate MXP or TXP port.

Figure 5: Facility Loopback on an Intermediate-Node MXP or TXP Port



Caution Performing a loopback on an in-service circuit is service-affecting.

Note Facility loopbacks require on-site personnel.

Complete the Create a Facility Loopback on an Intermediate-Node MXP or TXP Port, on page 19.

Create a Facility Loopback on an Intermediate-Node MXP or TXP Port

Procedure

Step 1 Connect an optical test set to the port you are testing:

Note
For specific procedures to connect, set up, and use the test set equipment, consult the manufacturer.

a) If you just completed the Perform a Terminal Loopback on a Source-Node MXP, TXP, XP, or ADM-10G Port, on page 16, leave the optical test set hooked up to the source-node port.
b) If you are starting the current procedure without the optical test set hooked up to the source port port, use appropriate cabling to attach the Tx and Rx terminals of the optical test set to the port you are testing. Both Tx and Rx connect to the same port.

Step 2 Adjust the test set accordingly. (Refer to manufacturer instructions for test set use.)

Step 3 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the intermediate-node card that requires the loopback.

Step 4 Click the **Maintenance** > **Loopback** tabs.

Step 5 Select **OOS,MT (or locked,maintenance)** from the Admin State column. If this is a multiport card, select the row appropriate for the desired port.

Step 6 Select **Facility (Line)** from the Loopback Type column. If this is a multiport card, select the row appropriate for the desired port.

Step 7 Click **Apply.**

Step 8 Click **Yes** in the confirmation dialog box.

Step 9 Complete the Test and Clear the MXP or TXP Port Facility Loopback Circuit, on page 19.

Test and Clear the MXP or TXP Port Facility Loopback Circuit

Procedure

Step 1 If the test set is not already sending traffic, send test traffic on the loopback circuit.

Step 2 Examine the traffic received by the test set. Look for errors or any other signal information that the test set is capable of indicating.

Step 3 If the test set indicates no errors, no further testing is necessary with the facility loopback. Clear the facility loopback from the port:

a) Click the **Maintenance > Loopback** tabs.
b) Choose **None** from the Loopback Type column for the port being tested.
c) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
d) Click **Apply.**
e) Click **Yes** in the confirmation dialog box.
f) Complete the Create a Terminal Loopback on Intermediate-Node MXP or TXP Ports, on page 20.

Step 4 If the test set indicates errors, complete the Test the MXP or TXP Card, on page 20.

Test the MXP or TXP Card

Procedure

Step 1 Complete the Physically Replace a Card for the suspected bad card and replace it with a known-good one.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Caution
Removing a card that currently carries traffic on one or more ports can cause a traffic hit. To avoid this, perform an external switch if a switch has not already occurred. Refer to the procedures in the Protection Switching, Lock Initiation, and Clearing.

Step 2 Resend test traffic on the loopback circuit with a known-good card installed.

Step 3 If the test set indicates no errors, the problem was probably the defective card. Return the defective card to Cisco through the RMA process. Contact Cisco Technical Support 1 800 553 2447.

Step 4 Clear the facility loopback from the port:

a) Click the **Maintenance > Loopback** tabs.
b) Choose **None** from the Loopback Type column for the port being tested.
c) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
d) Click **Apply.**
e) Click **Yes** in the confirmation dialog box.

Step 5 Complete the Create a Terminal Loopback on Intermediate-Node MXP or TXP Ports, on page 20.

Create a Terminal Loopback on Intermediate-Node MXP or TXP Ports

In the next troubleshooting test, you perform a terminal loopback on the intermediate-node port to isolate whether the intermediate client or trunk port is causing circuit trouble. In the example situation in Figure 6:

Terminal Loopback on an Intermediate-Node MXP or TXP Port, on page 21, the terminal loopback is performed on an intermediate MXP or TXP port in the circuit. If you successfully complete a terminal loopback on the node, this node is excluded from possible sources of circuit trouble.

Figure 6: Terminal Loopback on an Intermediate-Node MXP or TXP Port



Caution Performing a loopback on an in-service circuit is service-affecting.

Note Terminal loopbacks require on-site personnel.

Complete the Create a Terminal Loopback on Intermediate-Node MXP or TXP Ports, on page 21.

Create a Terminal Loopback on Intermediate-Node MXP or TXP Ports

Procedure

Step 1 Connect an optical test set to the port you are testing:

Note
For specific procedures to connect, set up, and use the test set equipment, consult the manufacturer.

a) If you just completed the Create a Facility Loopback on an Intermediate-Node MXP or TXP Port, on page 18, leave the optical test set hooked up to the source-node port.
b) If you are starting the current procedure without the optical test set hooked up to the source port, use appropriate cabling to attach the Tx and Rx terminals of the optical test set to the port you are testing. Both Tx and Rx connect to the same port.

Step 2 Adjust the test set accordingly. (Refer to manufacturer instructions for test set use.)

Step 3 Create the terminal loopback on the destination port being tested:

a) Go to node view (single-shelf mode) or shelf view (multishelf mode) of the intermediate node:
   - Choose **View > Go To Other Node** from the menu bar.
   - Choose the node (or shelf) from the drop-down list in the Select Node dialog box and click **OK**.
b) In node view (single-shelf mode) or shelf view (multishelf mode), double-click the card that requires the loopback.
c) Click the **Maintenance > Loopback** tabs.
d) Select **OOS,MT (or locked,maintenance)** from the Admin State column. If this is a multiport card, select the row appropriate for the desired port.
e) Select **Terminal (Inward)** from the Loopback Type column. If this is a multiport card, select the row appropriate for the desired port.
f) Click **Apply.**
g) Click **Yes** in the confirmation dialog box.

Step 4 Complete the Test and Clear the MXP or TXP Terminal Loopback Circuit, on page 22.

Test and Clear the MXP or TXP Terminal Loopback Circuit

Procedure

Step 1 If the test set is not already sending traffic, send test traffic on the loopback circuit.

Step 2 Examine the test traffic being received by the test set. Look for errors or any other signal information that the test set is capable of indicating.

Step 3 If the test set indicates no errors, no further testing is necessary on the loopback circuit. Clear the terminal loopback from the port:

a) Double-click the intermediate-node card with the terminal loopback to display the card view.
b) Click the **Maintenance** > **Loopback** tabs.
c) Select **None** from the Loopback Type column for the port being tested.
d) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
e) Click **Apply.**
f) Click **Yes** in the confirmation dialog box.
g) Complete the Perform a Facility Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port, on page 23.

Step 4 If the test set indicates errors, complete the Test the MXP or TXP Card, on page 22.

Test the MXP or TXP Card

Procedure

Step 1 Complete the Physically Replace a Card for the suspected bad card and replace it with a known-good one.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Caution
Removing a card that currently carries traffic on one or more ports can cause a traffic hit. To avoid this, perform an external switch if a switch has not already occurred. Refer to the procedures in the Protection Switching, Lock Initiation, and Clearing.

Step 2 Resend test traffic on the loopback circuit with a known-good card.

Step 3 If the test set indicates no errors, the problem was probably the defective card. Return the defective card to Cisco through the RMA process. Contact Cisco Technical Support 1 800 553 2447.

Step 4 Clear the terminal loopback on the port:

a) Double-click the source-node card with the terminal loopback.
b) Click the **Maintenance > Loopback** tabs.
c) Select **None** from the Loopback Type column for the port being tested.
d) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
e) Click **Apply.**
f) Click **Yes** in the confirmation dialog box.

Step 5 Complete the Perform a Facility Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port, on page 23.

Perform a Facility Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port

You perform a facility loopback test at the destination port to determine whether this local port is the source of circuit trouble. The example in Figure 7: Facility Loopback on a Destination-Node MXP or TXP Port, on page 23 shows a facility loopback being performed on a TXP client or trunk port at a destination node.

Figure 7: Facility Loopback on a Destination-Node MXP or TXP Port



Caution Performing a loopback on an in-service circuit is service-affecting.

Note Facility loopbacks require on-site personnel.

Complete the Create the Facility Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port, on page 23.

Create the Facility Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port

Procedure

Step 1 Connect an optical test set to the port you are testing:

Note
For specific procedures to connect, set up, and use the test set equipment, consult the manufacturer.

a) If you just completed the Create a Terminal Loopback on Intermediate-Node MXP or TXP Ports, on page 20, leave the optical test set hooked up to the source-node port.
b) If you are starting the current procedure without the optical test set hooked up to the source port, use appropriate cabling to attach the Tx and Rx terminals of the optical test set to the port you are testing. Both Tx and Rx connect to the same port.

Step 2 Adjust the test set accordingly. (Refer to manufacturer instructions for test set use.)

Step 3 Create the facility loopback on the destination port being tested:

a) Go to the node view (single-shelf mode) or shelf view (multishelf mode) of the destination node:

- Choose **View > Go To Other Node** from the menu bar.
- Choose the node (or shelf) from the drop-down list in the Select Node dialog box and click **OK.**

b) In node view (single-shelf mode) or shelf view (multishelf mode), double-click the card that requires the loopback.

c) Click the **Maintenance > Loopback** tabs.

d) Select **OOS,MT (or locked,maintenance)** from the Admin State column. If this is a multiport card, select the row appropriate for the desired port.

e) Select **Facility (Line)** from the Loopback Type column. If this is a multiport card, select the row appropriate for the desired port.

f) Click **Apply.**

g) Click **Yes** in the confirmation dialog box.

Step 4 Complete the Test and Clear the MXP, TXP, XP, or ADM-10G Facility Loopback Circuit, on page 24.

Test and Clear the MXP, TXP, XP, or ADM-10G Facility Loopback Circuit

Procedure

Step 1 If the test set is not already sending traffic, send test traffic on the loopback circuit.

Step 2 Examine the traffic received by the test set. Look for errors or any other signal information that the test set is capable of indicating.

Step 3 If the test set indicates no errors, no further testing is necessary with the facility loopback. Clear the facility loopback from the port:

a) Click the **Maintenance > Loopback** tabs.

b) Choose **None** from the Loopback Type column for the port being tested.

c) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.

d) Click **Apply.**

e) Click **Yes** in the confirmation dialog box.

f) Complete the Perform a Terminal Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port, on page 25.

Step 4 If the test set indicates errors, complete the Test the MXP, TXP, XP, or ADM-10G Card, on page 25.

Test the MXP, TXP, XP, or ADM-10G Card

Procedure

Step 1 Complete the Physically Replace a Card for the suspected bad card and replace it with a known-good one.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Caution
Removing a card that currently carries traffic on one or more ports can cause a traffic hit. To avoid this, perform an external switch if a switch has not already occurred. Refer to the procedures in the Protection Switching, Lock Initiation, and Clearing.

Step 2 Resend test traffic on the loopback circuit with a known-good card installed.

Step 3 If the test set indicates no errors, the problem was probably the defective card. Return the defective card to Cisco through the RMA process. Contact Cisco Technical Support 1 800 553 2447.

Step 4 Clear the facility loopback on the port:

a) Click the **Maintenance > Loopback** tabs.
b) Choose **None** from the Loopback Type column for the port being tested.
c) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
d) Click **Apply.**
e) Click **Yes** in the confirmation dialog box.

Step 5 Complete the Perform a Terminal Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port, on page 25.

Perform a Terminal Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port

The terminal loopback at the destination-node port is the final local hardware error elimination in the circuit troubleshooting process. If this test is completed successfully, you have verified that the circuit is good up to the destination port. The example in Figure 8: Terminal Loopback on a Destination-Node MXP or TXP Port, on page 25 shows a terminal loopback on an destination node TXP port.

Figure 8: Terminal Loopback on a Destination-Node MXP or TXP Port



Caution Performing a loopback on an in-service circuit is service-affecting.

Note Terminal loopbacks require on-site personnel.

Complete the Create the Terminal Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port, on page 26.

Create the Terminal Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port

Procedure

Step 1 Connect an optical test set to the port you are testing:

Note
For specific procedures to connect, set up, and use the test set equipment, consult the manufacturer.

a) If you just completed the Perform a Facility Loopback on a Destination-Node MXP, TXP, XP, or ADM-10G Port, on page 23, leave the optical test set hooked up to the source port.
b) If you are starting the current procedure without the optical test set hooked up to the source port, use appropriate cabling to attach the Tx and Rx terminals of the optical test set to the port you are testing. Both Tx and Rx connect to the same port.

Step 2 Adjust the test set accordingly. (Refer to manufacturer instructions for test set use.)

Note
It is normal for the LPBKFACILITY (ESCON), LPBKFACILITY (FC), LPBKFACILITY (GE), LPBKFACILITY (ISC), or the LPBKFACILITY (TRUNK) to appear during loopback setup. The condition clears when you remove the loopback.

Step 3 Create the terminal loopback on the destination port being tested:

a) Go to the node view (single-shelf mode) or shelf view (multishelf mode) of the destination node:
   - Choose **View > Go To Other Node** from the menu bar.
   - Choose the node (or shelf) from the drop-down list in the Select Node dialog box and click **OK**.
b) In node view (single-shelf mode) or shelf view (multishelf mode), double-click the card that requires the loopback.
c) Click the **Maintenance > Loopback** tabs.
d) Select **OOS,MT (or locked,maintenance)** from the Admin State column. If this is a multiport card, select the row appropriate for the desired port.
e) Select Terminal (Inward) from the Loopback Type column. If this is a multiport card, select the row appropriate for the desired port.
f) Click **Apply.**
g) Click **Yes** in the confirmation dialog box.

Step 4 Complete the Test and Clear the MXP, TXP, XP, or ADM-10G Terminal Loopback Circuit, on page 27.

Test and Clear the MXP, TXP, XP, or ADM-10G Terminal Loopback Circuit

Procedure

Step 1 If the test set is not already sending traffic, send test traffic on the loopback circuit.

Step 2 Examine the test traffic being received by the test set. Look for errors or any other signal information that the test set is capable of indicating.

Step 3 If the test set indicates no errors, no further testing is necessary on the loopback circuit. Clear the terminal loopback from the port:

a) Double-click the intermediate-node card with the terminal loopback.
b) Click the **Maintenance** > **Loopback** tabs.
c) Select **None** from the Loopback Type column for the port being tested.
d) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
e) Click **Apply.**
f) Click **Yes** in the confirmation dialog box.

Step 4 If the test set indicates errors, the problem might be a faulty card.

Step 5 Complete the Test the MXP, TXP, XP, or ADM-10G Card, on page 27.

Test the MXP, TXP, XP, or ADM-10G Card

Procedure

Step 1 Complete the Physically Replace a Card for the suspected bad card and replace it with a known-good one.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Caution
Removing a card that currently carries traffic on one or more ports can cause a traffic hit. To avoid this, perform an external switch if a switch has not already occurred. Refer to the procedures in the Protection Switching, Lock Initiation, and Clearing.

Step 2 Resend test traffic on the loopback circuit with a known-good card.

Step 3 If the test set indicates no errors the problem was probably the defective card. Return the defective card to Cisco through the RMA process. Contact Cisco Technical Support 1 800 553 2447.

Step 4 Clear the terminal loopback on the port:

a) Double-click the source-node card with the terminal loopback.
b) Click the **Maintenance** > **Loopback** tabs.
c) Select **None** from the Loopback Type column for the port being tested.

d) Choose the appropriate state to place the port in service, out of service and disabled, out of service for maintenance, or automatically in service from the Admin State column for the port being tested.
e) Click **Apply.**
f) Click **Yes** in the confirmation dialog box.

The entire circuit path has now passed its comprehensive series of loopback tests. This circuit qualifies to carry live traffic.

Troubleshooting DWDM Circuit Paths With ITU-T G.709 Monitoring

This section provides an overview of the optical transport network (OTN) specified in ITU-T G.709,*Network Node Interface for the Optical Transport Network* , and provides troubleshooting procedures for DWDM circuit paths in the ITU-T G.709 OTN using PM and TCAs.

ITU-T G.709 Monitoring in Optical Transport Networks

ITU-T Recommendation G.709 is part of a suite of recommendations covering the full functionality of an OTN. ITU-T G.709 enables single-wavelength SONET transparent optical wavelength-based networks. ITU-T G.709 adds the Operation, Administration, Maintenance, and Provisioning (OAM&P) functionality of SONET/SDH to DWDM optical networks. It adds extra overhead to existing SONET, Ethernet, or asynchronous transfer mode (ATM) bit streams for performance management and improvement.

Like traditional SONET networks, ITU-T G.709 optical networks have a layered design (Figure 9: Optical Transport Network Layers, on page 28). This structure enables localized monitoring that helps you isolate and troubleshoot network problems.

Figure 9: Optical Transport Network Layers



Optical Channel Layer

The optical channel (OCH) layer is the outermost part of the OTN and spans from client to client. The optical channel is built as follows:

A client signal such as SONET, Gigabit Ethernet, IP, ATM, Fibre Channel, or enterprise system connection (ESCON) is mapped to a client payload area and combined with an overhead to create the optical channel payload unit (OPUk).

A second overhead is added to the OPUk unit to create the optical channel data unit (ODUk).

A third overhead including forward error correction (FEC) is added to the ODUk to create the optical channel transport unit (OTUk).

A fourth overhead is added to the OTUk to create the entire OCH layer.

Optical Multiplex Section Layer

The optical multiplex section (OMS) of the OTN allows carriers to identify errors occurring within DWDM network sections. The OMS layer consists of a payload and an overhead (OMS-OH). It supports the ability to monitor multiplexed sections of the network, for example, the span between an optical multiplexer such as the 32MUX-O card and an optical demultiplexer such as the 32DMX-O card.

Optical Transmission Section Layer

The optical transmission section (OTS) layer supports monitoring partial spans of a network multiplexed sections. This layer consists of a payload and an overhead (OTS-OH). It is a transmission span between two elements in an optical network, such as between:

- A multiplexer such as the 32MUX-O card and an amplifier such as the OPT-PRE card
- An amplifier and another amplifier, such as the OPT-BST card and the OPT-PRE card
- An amplifier such as the OPT-BST card and a demultiplexer such as the 32DMX card

Performance Monitoring Counters and Threshold Crossing Alerts

PM counters and TCAs can be used for identifying trouble and troubleshooting problems in ITU-T G.709 optical transport networks. ITU-T Recommendation M.2401 recommends that the following PM parameters be monitored at the ODUk layer:

- SES (severely errored seconds)A one-second period that contains greater than or equal to 30 percent errored blocks or at least one defect. SES is a subset of the errored second (ES) parameter, which is a one-second period with one or more errored blocks or at least one defect.
- BBE (background block error counter)An errored block not occurring as part of an SES. BBE is a subset of the errored block (EB) parameter, which is a block in which one or more bits are in error.

Different PM count parameters are associated with different read points in a network. Figure 10: Performance Monitoring Points on ONS DWDM, on page 29 illustrates the PM read points that are useful in identifying DWDM circuit points of failure. The Performance Monitoring chapter in the *Cisco ONS 15454 DWDM Reference Manual*Monitor Performance document lists all PM parameters and provides block diagrams of signal entry points, exit points, and interconnections between the individual circuit cards. Consult these specifications to determine which PM parameters are associated with the system points you want to monitor or provision with CTC or TL1. The monitoring points might vary according to your configuration.

Note When LOS, LOS-P, or LOF alarms occur on TXP and MXP trunks, G709/SONET/SDH TCAs are suppressed. For details, see the Alarm and TCA Monitoring and Management chapter in the *Cisco ONS 15454 DWDM Procedure Guide* Alarm and TCA Monitoring and Management document.

Figure 10: Performance Monitoring Points on ONS DWDM

TCAs are used to monitor performance through the management interface by indicating whether preset thresholds have been crossed, or whether a transmission (such as a laser transmission) is degraded. TCAs are

not associated with severity levels. They are usually associated with rate, counter, and percentage parameters that are available at transponder monitoring points. The Performance Monitoring chapter in the *Cisco ONS 15454 DWDM Reference Manual*Monitor Performance document contains more information about these alerts.

Select and complete the following procedures according to your network parameters.

Set Node Default BBE or SES Card Thresholds

Complete the following procedure to provision default node ODUk BBE and SES PM thresholds for TXP cards.

Procedure

Step 1 In node view (single-shelf mode) or multishelf view (multishelf mode), click the **Provisioning** > **Defaults** tabs.

Step 2 In the Defaults Selector field, click the card you wish to provision, then click **Opticalthresholds** > **Trunk** > **Warning** > **15min** in the drop-down list.

Provision Individual Card BBE or SES Thresholds in CTC

Complete the following procedure to provision BBE or SES PM thresholds in CTC for an individual TXP card.

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the applicable card (TXP, MXP, or XP.)

Step 2 Click the **Provisioning** > **OTN** > **G.709 Thresholds** tabs.

Step 3 In the Directions area, click the **Near End** radio button.

Step 4 In the Intervals area, click the **15 Min** radio button.

Step 5 In the Types area, click the **PM (ODUk)** radio button.

Step 6 In the SES and BBE fields, enter threshold numbers, for example 500 and 10000.

Provision Card PM Thresholds Using TL1

Complete the following procedure if you wish to provision PM thresholds in TL1 rather than in CTC.

Procedure

Step 1 Open a TL1 command line (click **Tools** > **Open TL1 Connection**).

Step 2 In the TL1 command line, enter a command using the following syntax:

SET-TH-OCH:[<TID>]:<AID>:<CTAG>::<MONTYPE>,<THLEV>,[<LOCN>],,[<TMPER>];

where:

- Access Identifier (AID) identifies the NE to which the command pertains. All the OCH, STS, VT1, facility, and DS1 AIDs are supported.
- The parameter MONTYPE is the monitored type.
- The parameter THLEV is optional and indicates a threshold count value (the number of errors that must be exceeded before the threshold is crossed).
- The parameter LOCN specifies the location associated with the particular command.
- The parameter TMPER is optional and is an accumulation time period for performance counters, with possible values of 1-DAY, 1-HR, 1-MIN, 15-MIN, and RAW-DATA.

Note
For a more information about this command and a list of TL1 commands, refer to the *Cisco ONS SONET TL1 Command Guide* and *Cisco ONS SDH TL1 Command Guide* .

Provision Optical TCA Thresholds

Complete the following procedure to provision TCA thresholds in CTC.

Procedure

Step 1 In card view, click the **Provisioning > Optics Thresholds** tabs.
Step 2 In the Types area, click **TCA.**
Step 3 In the Intervals area, click **15 Min**.
Step 4 In the Laser Bias High (%) field, enter the threshold value, for example, 81.0 percent.

Forward Error Correction

In DWDM spans, FEC reduces the quantities of retiming, reshaping, and regeneration (3R) needed to maintain signal quality. The following two PM parameters are associated with FEC:

- BIT-EC: Bit errors corrected (BIT-EC) indicates the number of bit errors corrected in the DWDM trunk line during the PM time interval.
- UNC-WORDSThe number of uncorrectable words detected in the DWDM trunk line during the PM time interval.

Complete the following procedure to provision BIT-EC and UNC-WORDS PM parameters for FEC.

Provision Card FEC Thresholds

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf mode), double-click a transponder, muxponder, or xponder card to open the card view.

Step 2 Click the **Provisioning > OTN > FEC Thresholds** tabs.

Step 3 In the Bit Errors Corrected field, enter a threshold number, for example 225837.

Step 4 In the Uncorrectable Words field, enter a threshold number, for example, 2.

Step 5 In the Intervals area, click **15 Min**.

Sample Trouble Resolutions

The following sample trouble resolutions use PM and TCAs to isolate degrade points.

Problem There is a BBE TCA on a single transponder pair.

Possible Cause The transponder input power is out of range.

Solution Check the input power on the transponder. It should be within the specified/supported range.

Possible Cause There are dirty trunk connectors on the transponder.

Solution Check the connector on the trunk port.

Possible Cause There is a degraded trunk patchcord between the transponder and the DWDM port.

Solution Check the patchcord on the transponder DWDM port.

Possible Cause There are dirty client connectors on the ADxC-xx.x card transmit port or the demultiplexer (DMX) has crossed the near-end TCA.

Solution Check the connector on the OCH port of the ADxC-xx.x card.

Possible Cause There are dirty client connectors on the ADxC-xx.x card receive port or the multiplexer (MUX) has crossed the far-end TCA point.

Solution If an optical channel bypass exists along the line, check the connectors.

Problem There is a BBE TCA on all transponders connected to an ADxB-xx.x card.

Possible Cause The transponder input power is out of range.

Solution Check the input power on the transponder. It should be within the specified/supported range.

Possible Cause There is a dirty connector on the 4MD-xx.x card port.

Solution Check the connector on the drop port of the 4MD-xx.x card.

Possible Cause There is a dirty connector on the ADxB-xx.x card drop port, and it has crossed the near-end TCA point.

Solution Check the connector on the drop port of the ADxB-xx.x card.

Possible Cause There is a dirty connector on the ADxB-xx.x card add port and it has crossed the far-end TCA.

Solution Check the patchcord on the 4MD-xx.x or AD1B-xx.x card.

Possible Cause There is a degraded patchcord between the ADxB-xx.x and 4MD-xx.x cards.

Solution If an optical band bypass exists along the line, check the band connectors.

Problem There is a BBE TCA on all transponders that the OCH passes through a single OTS section.

Possible Cause This is not a transponder or channel-related issue.

Solution The problem is in the intercabinet signal path preceding the transponder.

Problem You have a laser bias current (LBC) TCA on a single transponder.

Possible Cause The laser of the transponder is degrading.

Solution The problem is within the laser circuitry. Check the OPT-PRE, OPT-BST, OPT-AMP-C, and OPT-AMP-17C optical amplifier cards.

Using CTC Diagnostics

In Software Release 9.1, CTC provides diagnostics for the following functions:

- Verifying proper card application-specific integrated circuit (ASIC) functionality
- Verifying standby card operation
- Verifying proper card LED operation
- Diagnostic circuit creation
- Customer problem notifications detected by alarms
- Provision of a downloadable, machine-readable diagnostic information file to be used by Cisco Technical Support

Some of these functions, such as ASIC verification and standby card operation, are invisibly monitored in background functions. Change or problem notifications are provided in the Alarms and Conditions windows. Other diagnostic functionsverifying card LED function, creating bidirectional diagnostic circuits, and also downloading diagnostic files for technical supportare available to the user in the node view (single-shelf mode) or shelf view (multishelf mode) **Maintenance > Diagnostic** tab. The user-operated diagnostic features are described in the following paragraphs.

Card LED Lamp Tests

A card LED lamp test determines whether card-level indication LEDs are operational. This diagnostic test is run as part of the initial turn-up, during maintenance routines, or any time you question whether an LED is in working order. Maintenance or higher-level users can complete the following tasks to verify LED operation.

Verify Card LED Operation

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf mode), click the **Maintenance > Diagnostic** tabs.

Step 2 Click **Lamp Test**.

Step 3 Watch to make sure all the port LEDs illuminate simultaneously for several seconds, with the following durations:

- For tri-color LEDs: three 5-second cycles
- For dual-color LEDs: one 5-second cycle and one 10-second cycle
- For the AIC or AIC-I: one 15-second cycle

Step 4 Click **OK** in the Lamp Test Run dialog box.

Retrieve Tech Support Logs Button

When you click the **Retrieve Tech Support Logs** button in the Diagnostics tab of the Maintenance window, CTC retrieves system data that a Retrieve or higher level user can off-load to a local directory and send to Technical Support for troubleshooting purposes. The diagnostics file is in machine language and is not human-readable, but can be used by Cisco Technical Support for problem analysis. Complete the following procedure to off-load the diagnostics file.

Note In addition to the machine-readable diagnostics file, the system stores an audit trail of all system events such as user log-ins, remote log-ins, configuration, and changes. This audit trail is considered a record-keeping feature rather than a troubleshooting feature.

Off-Load the Diagnostics File

Note The diagnostics operation is performed at a shelf level. Only single-node-related diagnostic information can be downloaded at a time.

The diagnostic files retrieved by CTC depends on the user privilege levels. Table 3: Diagnostic Files Retrieved Based on User Privilege, on page 34 lists the user privilege levels and the diagnostic retrieval operations they can perform.

Table 3: Diagnostic Files Retrieved Based on User Privilege

User Privilege Level	Diagnostic File Retrieval Operation
Retrieve	• Export the unfiltered alarm table contents • Export the unfiltered conditions table contents • Export the unfiltered history table contents • Export the inventory table contents • CTC Dump Diagnostics log

User Privilege Level	Diagnostic File Retrieval Operation
Maintenance	• All Retrieve level access operations • Save the node database
Provisioning	• All Maintenance level access operations • Retrieve and save the node-level diagnostics report. (If secure mode is not set on the node.) • Export the audit table contents. (If the NODE.security.grantPermission.RetrieveAuditLog NE Default is set to Provisioning.)
Superuser	• All Provisioning level access operations • Retrieve and save the node-level diagnostics report • Export the audit table contents

Procedure

Step 1 In the node view, click the **Maintenance > Diagnostic** tabs.

Step 2 Click **Retrieve Tech Support Logs** in the Controller area.

Step 3 In the Select a Filename for the Tech Support Logs Zip Archive dialog box, add the diagnostics file name in the format **TechSupportLogs_**<*node_name*>**.zip** by default. Substitute the last 20 alphanumeric characters of the node name for <*node_name*>. Navigate to the directory (local or network) where you want to save the file.

A message appears asking you if you want to overwrite any existing disgnostics file in the selected directory.

Step 4 Click **Save.**

CTC performs the diagnostic tasks and writes the diagnostic files in a folder named TechSupportLogs_<*node_name*> under the location selected in Step Step 3, on page 35. After all the diagnostic files are written to the TechSupportLogs_<*node_name*> **folder**, CTC archives the retrieved diagnostic files as TechSupportLogs_<*node_name*>.zip. CTC deletes the **TechSupportLogs_**<*node_name*>**folder** after the archiving process is successfully completed. CTC retains this folder if the archiving process fails. The retrieved diagnostic files can be accessed in the **TechSupportLogs_**<*node_name*> **folder.**

A progress bar indicates the percentage of the file that is being saved. The Save Tech Support Logs Completed dialog box appears when the file is saved. CTC logs any error during the retrieval and archiving of diagnostics file to the CTC Alerts Log.

Table 4: List of Diagnostic Files, on page 35 lists the diagnostic files retrieved by CTC.

Table 4: List of Diagnostic Files

Diagnostic File	Diagnostic File Content
AlarmTableLog.html	Alarm Table export

Diagnostic File	Diagnostic File Content
HistoryTableLog.html	Alarm Table export
ConditionsTableLog.html	Conditions Table export
InventoryTableLog.html	Inventory Table export
AuditTableLog.html	Audit Table export
CTCDumpDiagLog.txt	Audit Table export
NodeDiagnostics.bin	NodeDiagnostics.gz
OBFLDiagnostics.bin	OBFLDiagnostics.bin
NodeDatabaseBackup.bin	Database backup
TechSupportLogs_<*node_name*>.zip	Zip archive of all the diagnostics file

Step 5 Click **OK.**

Data Communications Network Tool

CTC contains a data communications network (DCN) tool that assists with network troubleshooting for Open Shortest Path First (OSPF) networks. It executes an internal dump command to retrieve information about all nodes accessible from the entry point.

The dump, which provides the same information as a dump executed by special networking commands, is available at the network view in the **Maintenance > Diagnostic** tab. You can select the access point node in the Select Node drop-down list. To create the dump, click **Retrieve**. (To clear the dump, click **Clear**.)

The contents of the dump file can be saved or printed and furnished to Cisco Technical Support for use in OSPF network support.

Onboard Failure Logging

Onboard Failure Logging (OBFL) records events that occur during the card operation. In the event of card failure, the stored log can assist in determining root cause of failure. The OBFL data is stored in two different formats:

- Run time log for IO cards
- Snapshot log for IO cards

The OBFL feature is supported on the following cards:

- OPT-BST
- OPT-PRE
- 40-SMR1-C

- 40-SMR2-C
- 40G-MXP-C
- 80-WXC-C

Note To determine if OBFL is supported on the OPT-BST and OPT-PRE cards running in your system, contact the Cisco Technical Assistance Center (TAC).

Note The stored logs can be retrieved only by the Cisco support team to diagnose the root cause of the card failure.

Run Time Log for IO Cards

Run time log traces events and critical information such as alarms raised and cleared, power variations and so on, during the working of the card. The stored logs help identify the cause of failure.

For legacy cards (OPT-BST and OPT-PRE), the run time logs are automatically stored in RAM and are deleted when the card is hard reset. To store the logs in the permanent memory, the user should take the snapshot of logs as explained in the Snapshot Logging in CTC, on page 38 section. For new cards (40-SMR1-C and 40-SMR2-C), the run time logs are automatically written to the flash memory and are not deleted even after reset or hard reboot of the card.

The following table lists a few run time logs captured for a specific event:

Table 5: Run Time Logging—Events and Logs

Event	Log
When the change in Rx and Tx optical power in the active stage is greater than the threshold value, the unit stores the input and output power every second. The difference between the two adjacent input power readings or two adjacent output power readings is greater than 1 db, and this event occurs more than 10 times in 30 seconds	• Input power of all the active stages (1 for the BST, 2 for the PRE) • Output power of all the active stages (1 for the BST, 2 for the PRE)
Target power not reached (0.5 dB or more difference from set point)	• Module status • Laser pump current—set point and value • Laser pump power—set point and value • DCU loss • VOA loss • Optical power values

Event	Log
Fiber Temperature Alarm	• Temperature of the case • Temperature of the laser
Laser Temperature Alarm	• Temperature of the case • Temperature of the fiber
Case Temperature Alarm	• Temperature of the case • Temperature of the fiber
Communication error with TCC	• FPGA dump • E2PROM dump

Snapshot Log for IO Cards

Snapshot log captures the board's information at any given time. In CTC, the user has an option to take a snapshot of the current status of the card. When the snapshot is taken, a log file will be created that contains the information from the card. In addition to the information stored in the run time logs, the snapshot log contains details like card parameters, alarm history, and so on. For legacy and new cards, the snapshot logs are written to the flash memory. When EQPT-FAIL alarm is detected on the card, a snapshot of the log will be automatically taken by the card. In the event of card failure due to other reasons, the users must take the snapshot of logs before swapping the card. Refer to the Snapshot Logging in CTC, on page 38 section.

Snapshot Logging in CTC

The users can take the snapshot of logs in the event of card failure, before replacing the card. This section explains the steps to take snapshot of logs in CTC:

Procedure

Step 1 Login to CTC.

Step 2 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the card to open it in the card view.

Step 3 Click the **Maintenance** > **OBFL** tabs.

Step 4 Click **Start Onboard Failure logging**. The OBFL Info dialog box is displayed.

Step 5 Click **Yes** to continue. The Onboard failure logging feature is launched.

Step 6 Click **OK**. The snapshot log will be written to the flash memory.

Restoring the Database and Default Settings

This section contains troubleshooting for node operation errors that require restoration of software data or the default node setup.

Restore the Node Database

Problem One or more nodes do not function properly or have incorrect data.

Possible Cause Incorrect or corrupted node database.

Solution Complete the procedures in the Maintain the Node chapter of the configuration guide.

PC Connectivity Troubleshooting

This section contains information about system minimum requirements, supported platforms, browsers, and Java Runtime Environments (JREs) for Software R9.2.1 and R9.2.29.6.x 9.8, and troubleshooting procedures for PC and network connectivity to the chassis. Table 1-6 lists the requirements for PCs and UNIX workstations. In addition to the JRE, the Java plug-in is also included on the software CD.

Table 6: Computer Requirements for CTC

Area	Requirements	Notes
Processor (PC only)	Pentium Dual-Core processor or equivalent	A faster CPU is recommended if your workstation runs multiple applications or if CTC manages a network with a large number of nodes and circuits.
RAM	2 GB RAM or more	We recommend a minimum of 16 GB if your workstation runs multiple applications or if CTC manages a network with a large number of nodes and circuits.
Hard drive	20 GB hard drive with 250 MB of free space required	CTC application files are downloaded from the TCC2/TCC2P/TCC3/TNC/TSC/TNCS/TNCS-O to your computer. These files occupy around 100MB (250MB to be safer) or more space depending on the number of versions in the network.

Area	Requirements	Notes
Operating System	• PC: Windows 2000, Windows XP, Windows Vista, Windows XP, Windows 7, Windows Server 2003 and 2008. • Workstation: Solaris versions 9 or 10 on an UltraSPARC-III or faster processor, with a minimum of 1 GB RAM and a minimum of 250 MB of available hard drive space. • Apple Mac OS X. CTC needs to be installed using the CacheInstaller available on CCO or the ONS CD.	Use the latest patch/Service Pack released by the OS vendor. Check with the vendor for the latest patch/Service Pack.
Java Runtime Environment	• JRE 1.8	**Note** Cisco recommends using jdk8u202, as it is a free version.
Web browser	• PC: Internet Explorer 8.x, 9.x (R9.6 and later releases), 10 (R9.4.0.3, R9.6.0.3 and later releases) 11 (R9.8 and later releases) • UNIX Workstation: Mozilla 1.7 • MacOS-X PC: Safari	For the PC, use JRE 1.6 or JRE 1.7 with any supported web browser. The supported browser can be downloaded from the Web.
Cable	• User-supplied CAT-5 straight-through cable with RJ-45 connectors on each end to connect the computer to the chassis directly or through a LAN. • User-supplied cross-over CAT-5 cable to the DCN port on the patch panel or to the Catalyst 2950 (multishelf mode)	—

Unable to Verify the IP Configuration of Your PC

Problem When connecting your PC to the system, you are unable to successfully ping the IP address of your PC to verify the IP configuration.

Possible Cause The IP address was entered incorrectly.

Solution Verify that the IP address used to ping the PC matches the IP address displayed when in the Windows IP Configuration information retrieved from the system. See the Verify the IP Configuration of Your PC, on page 41.

Possible Cause The IP configuration of your PC is not properly set.

Solution Verify the IP configuration of your PC. Complete the Verify the IP Configuration of Your PC, on page 41. If this procedure is unsuccessful, contact your network administrator for instructions to correct the IP configuration of your PC.

Verify the IP Configuration of Your PC

Procedure

Step 1 Open a DOS command window by selecting **Start > Run** from the Start menu.

Step 2 In the Open field, type **command** and then click **OK**. The DOS command window appears.

Step 3 At the prompt in the DOS window, type **ipconfig** and press the Enter key.

The Windows IP configuration information appears, including the IP address, the subnet mask, and the default gateway.

Note
The winipcfg command only returns the information above if you are on a network.

Step 4 At the prompt in the DOS window, type ping followed by the IP address shown in the Windows IP configuration information previously displayed.

Step 5 Press the **Enter** key to execute the command.

If the DOS window returns multiple (usually four) replies, the IP configuration is working properly.

If you do not receive a reply, your IP configuration might not be properly set. Contact your network administrator for instructions to correct the IP configuration of your PC.

Browser Login Does Not Launch Java

Problem The message Loading Java Applet does not appear and the JRE does not launch during the initial login.

Possible Cause The PC operating system and browser are not properly configured.

Solution Reconfigure the PC operating system Java Plug-in Control Panel and the browser settings. Complete the Reconfigure the PC Operating System Java Plug-in Control Panel, on page 42 and the Reconfigure the Browser, on page 42.

Reconfigure the PC Operating System Java Plug-in Control Panel

Procedure

Step 1 From the Windows start menu, click **Settings > Control Panel**.

Step 2 If **Java Plug-in** does not appear, the JRE might not be installed on your PC:

a) Run the software CD.
b) Open the *CD-drive*:\Windows\JRE folder.
c) Double-click the **j2re-1_6-win** icon to run the JRE installation wizard.
d) Follow the JRE installation wizard steps.

Step 3 From the Windows start menu, click **Settings > Control Panel**.

Step 4 In the Java Plug-in Control Panel window, double-click the **Java Plug-in 1.6** icon.

Step 5 Click the **Advanced** tab on the Java Plug-in Control Panel.

Step 6 Navigate to **C:\ProgramFiles\JavaSoft\JRE\1.6**.

Step 7 Select **JRE 1.6**.

Step 8 Click **Apply**.

Step 9 Close the Java Plug-in Control Panel window.

Reconfigure the Browser

Procedure

Step 1 From the Start Menu, launch your browser application.

Step 2 If you are using Netscape Navigator:

a) From the Netscape Navigator menu bar, click the **Edit > Preferences** menus.
b) In the Preferences window, click the **Advanced > Proxies** categories.
c) In the Proxies window, click the **Direct connection to the Internet** check box and click **OK.**
d) From the Netscape Navigator menu bar, click the **Edit > Preferences** menus.
e) In the Preferences window, click the **Advanced > Cache** categories.
f) Confirm that the Disk Cache Folder field shows one of the following paths:

- For Windows 98/ME: **C:\ProgramFiles\Netscape\Communicator\cache**
- For Windows NT/2000/XP: **C:\ProgramFiles\Netscape***username***Communicator\cache**

g) If the Disk Cache Folder field is not correct, click **Choose Folder**.
h) Navigate to the file listed in Step 2.f, on page 42, and click **OK**.
i) Click **OK** in the Preferences window and exit the browser.

Step 3 If you are using Internet Explorer:

a) From the Internet Explorer menu bar, click the **Tools > Internet Options** menus.
b) In the Internet Options window, click the **Advanced** tab.

c) In the Settings menu, scroll down to Java (Sun) and click the **Use Java 2 v1.4.2 for** *applet* **(requires restart)** check box.
d) Click **OK** in the Internet Options window and exit the browser.

Step 4 Temporarily disable any virus-scanning software on the computer. See the Browser Stalls When Downloading CTC JAR Files From Control Card, on page 47.

Step 5 Verify that the computer does not have two network interface cards (NICs) installed. If the computer does have two NICs, remove one.

Step 6 Restart the browser and log onto the system.

Unable to Verify the NIC Connection on Your PC

Problem When connecting your PC to the system, you are unable to verify that the NIC connection is working properly because the link LED is not illuminated or flashing.

Possible Cause The CAT-5 cable is not plugged in properly.

Solution Confirm that both ends of the cable are properly inserted. If the cable is not fully inserted due to a broken locking clip, the cable should be replaced.

Possible Cause The CAT-5 cable is damaged.

Solution Ensure that the cable is in good condition. If in doubt, use a known-good cable. Often, cabling is damaged due to pulling or bending.

Possible Cause Incorrect type of CAT-5 cable is being used.

Solution If connecting directly to your laptop, a PC, or a router, use a straight-through CAT-5 cable. When connecting the chassis to a hub or a LAN switch, use a crossover CAT-5 cable. For details on the types of CAT-5 cables, see the Crimp Replacement LAN Cables, on page 56.

Possible Cause The NIC is improperly inserted or installed.

Solution If you are using a Personal Computer Memory Card International Association (PCMCIA)-based NIC, remove and reinsert the NIC to make sure the NIC is fully inserted. (If the NIC is built into the laptop or PC, verify that the NIC is not faulty.)

Possible Cause The NIC is faulty.

Solution Confirm that the NIC is working properly. If you have no issues connecting to the network (or any other node), then the NIC should be working correctly. If you have difficulty connecting a to the network (or any other node), then the NIC might be faulty and needs to be replaced.

Verify PC Connection to the ONS 15454NCS (ping)

Problem The TCP/IP connection was established and then lost.

Possible Cause A lost connection between the PC and the system.

Solution Use a standard ping command to verify the TCP/IP connection between the PC and the card. A ping command should work if the PC connects directly to the control card or uses a LAN to access the control card. Complete the Ping the ONS 15454NCS, on page 44.

Ping the ONS 15454NCS

Procedure

Step 1 Display the command prompt:
a) If you are using a Microsoft Windows operating system, from the Start Menu choose Run, enter command in the Open field of the Run dialog box, and click **OK.**
b) If you are using a Sun Solaris operating system, from the Common Desktop Environment (CDE) click the **Personal Application** tab and click **Terminal.**

Step 2 For both the Sun and Microsoft operating systems, at the prompt enter: ping *IP-address*

For example:

ping 198.168.10.10

Step 3 If the workstation has connectivity to the ONS 15454NCS, the ping is successful and displays a reply from the IP address. If the workstation does not have connectivity, a Request timed out message appears.

Step 4 If the ping is successful, it demonstrates that an active TCP/IP connection exists. Restart CTC.

Step 5 If the ping is not successful, and the workstation connects to the ONS 15454NCS through a LAN, check that the workstation IP address is on the same subnet as the ONS node.

Step 6 If the ping is not successful and the workstation connects directly to the ONS 15454NCS, check that the link light on the workstation NIC is illuminated.

The IP Address of the Node is Unknown

Problem The IP address of the node is unknown and you are unable to login.

Possible Cause The node is not set to the default IP address.

Solution Leave one control card in the shelf. Connect a PC directly to the remaining control card and perform a hardware reset of the card. The control card transmits the IP address after the reset to enable you to capture the IP address for login. Complete the Retrieve Unknown Node IP Address, on page 44.

Retrieve Unknown Node IP Address

Procedure

Step 1 Connect your PC directly to the active control card Ethernet port on the faceplate.

Step 2 Start the Sniffer application on your PC.

Step 3 Perform a hardware reset by pulling and reseating the active control card.

Step 4 After the control card completes resetting, it broadcasts its IP address. The Sniffer software on your PC will capture the IP address being broadcast.

CTC Operation Troubleshooting

This section contains troubleshooting procedures for CTC login or operation problems.

CTC Colors Do Not Appear Correctly on a UNIX Workstation

Problem When running CTC on a UNIX workstation, the colors do not appear correctly. For example, both major and minor alarms appear in the same color.

Possible Cause When running in 256-color mode on a UNIX workstation, color-intensive applications such as Netscape might use all of the colors.

Solution CTC requires a full 24-color palette to run properly. When logging into CTC on a UNIX workstation, run as many colors as your adapter will support. In addition, you can use the -install or the -ncols 32 command line options to limit the number of colors that Netscape uses. Complete the Limit Netscape Colors, on page 45. If the problem persists after limiting Netscape colors, exit any other color-intensive applications in use.

Limit Netscape Colors

Procedure

Step 1 Close the current session of Netscape.

Step 2 Launch Netscape from the command line by entering one of the following commands:

- **netscape -install** (installs Netscape colors for Netscape use)
- **netscape -ncols 32** (limits Netscape to 32 colors so that if the requested color is not available, Netscape chooses the closest color option)

Unable to Launch CTC Help After Removing Netscape

Problem After removing Netscape and running CTC using Internet Explorer, you are unable to launch CTC Help and receive an MSIE is not the default browser error message.

Possible Cause Loss of association between browser and Help files.

Solution When the CTC software and Netscape are installed, the Help files are associated with Netscape by default. When you remove Netscape, the Help files are not automatically associated with Internet Explorer as the default browser. Reset Internet Explorer as the default browser so that CTC associates the Help files to the correct browser. Complete the Reset Internet Explorer as the Default Browser for CTCInternet Explorer resetting as default browserresetting Internet Explorer as the default browser, on page 46 to associate the CTC Help files to the correct browser.

Reset Internet Explorer as the Default Browser for CTC

Procedure

Step 1 Open the Internet Explorer browser.
Step 2 From the menu bar, click **Tools > Internet Options**. The Internet Options window appears.
Step 3 In the Internet Options window, click the **Programs** tab.
Step 4 Click the **Internet Explorer should check to see whether it is the default browser** check box.
Step 5 Click **OK.**
Step 6 Exit all open and running CTC and Internet Explorer applications.
Step 7 Launch Internet Explorer and open a new CTC session. You should now be able to access the CTC Help.

Unable to Change Node View to Network View

Problem When activating a large, multinode BLSR from Software R3.2 to Software R3.3, some of the nodes appear grayed out. Logging into the new CTC, the user is unable to change node view (single-shelf mode) or shelf view (multishelf mode) to network view on any nodes, from any workstation. This is accompanied by an Exception occurred during event dispatching: java.lang.OutOfMemoryError in the java window.

Possible Cause The large, multinode BLSR requires more memory for the graphical user interface (GUI) environment variables.

Solution Set the system or user CTC_HEAP environment variable to increase the memory limits. Complete the Set the CTC_HEAP and CTC_MAX_PERM_SIZE_HEAP Environment Variables for Windows, on page 46 or the Set the CTC_HEAP and CTC_MAX_PERM_SIZE_HEAP Environment Variables for Solaris, on page 47 to enable the CTC_HEAP variable change.

Note This problem typically affects large networks where additional memory is required to manage large numbers of nodes and circuits.

Set the CTC_HEAP and CTC_MAX_PERM_SIZE_HEAP Environment Variables for Windows

Note Before proceeding with the following steps, ensure that your system has a minimum of 4 GB of RAM. If your system does not have a minimum of 4 GB of RAM, contact the Cisco Technical Assistance Center (TAC).

Procedure

Step 1 Close all open CTC sessions and browser windows.
Step 2 From the Windows Start menu, choose **Control Panel > System.**

Step 3 In the System Properties window, click the **Advanced** tab.

Step 4 Click the **Environment Variables** button to open the Environment Variables window.

Step 5 Click the **New** button under the System variables field.

Step 6 Type `CTC_HEAP` in the Variable Name field.

Step 7 Type `896` in the Variable Value field, and then click the OK button to create the variable.

Step 8 Again, click the New button under the System variables field.

Step 9 Type `CTC_MAX_PERM_SIZE_HEAP` in the Variable Name field.

Step 10 Type `256` in the Variable Value field, and then click the **OK** button to create the variable.

Step 11 Click the **OK** button in the Environment Variables window to accept the changes.

Step 12 Click the **OK** button in the System Properties window to accept the changes.

Set the CTC_HEAP and CTC_MAX_PERM_SIZE_HEAP Environment Variables for Solaris

Procedure

Step 1 From the user shell window, kill any CTC sessions and browser applications.

Step 2 In the user shell window, set the environment variables to increase the heap size.

Example:

The following example shows how to set the environment variables in the C shell:

```
% setenv CTC_HEAP 896
% setenv CTC_MAX_PERM_SIZE_HEAP 256
```

Browser Stalls When Downloading CTC JAR Files From Control Card

Problem The browser stalls or hangs when downloading a CTC Java archive (JAR) file from the control card.

Possible Cause McAfee VirusScan software might be interfering with the operation. The problem occurs when the VirusScan Download Scan is enabled on McAfee VirusScan 4.5 or later.

Solution Disable the VirusScan Download Scan feature. Complete the Disable the VirusScan Download Scan, on page 47.

Disable the VirusScan Download Scan

Procedure

Step 1 From the Windows Start menu, choose **Programs** > **Network Associates** > **VirusScan** Console.

Step 2 Double-click the **VShield** icon listed in the VirusScan Console dialog box.

Step 3 Click **Configure** on the lower part of the Task Properties window.

Step 4 Click the **Download Scan** icon on the left of the System Scan Properties dialog box.

Step 5 Uncheck the **Enable Internet download** scanning check box.

Step 6 Click **Yes** when the warning message appears.

Step 7 Click **OK** in the System Scan Properties dialog box.

Step 8 Click **OK** in the Task Properties window.

Step 9 Close the McAfee VirusScan window.

CTC Does Not Launch

Problem CTC does not launch; usually an error message appears before the login window appears.

Possible Cause The Netscape browser cache might point to an invalid directory.

Solution Redirect the Netscape cache to a valid directory. Complete the Redirect the Netscape Cache to a Valid Directory, on page 48.

Redirect the Netscape Cache to a Valid Directory

Procedure

Step 1 Launch Netscape.

Step 2 Open the **Edit** menu.

Step 3 Choose **Preferences.**

Step 4 In the Category column on the left side, expand the Advanced category and choose the **Cache** tab.

Step 5 Change your disk cache folder to point to the cache file location.

The cache file location is usually C:\ProgramFiles\Netscape\Users*yourname*\cache. The *yourname* segment of the file location is often the same as the user name.

Slow CTC Operation or Login Problems

Problem You experience slow CTC operation or have problems logging into CTC.

Problem Table 7: Slow CTC Operation or Login Problems, on page 49 describes the potential cause of the symptom and the solution.

Table 7: Slow CTC Operation or Login Problems

Possible Problem	Solution
The CTC cache file might be corrupted or might need to be replaced.	Search for and delete cache files. This operation forces the ONS 15454NCS to download a new set of Java archive (JAR) files to your computer hard drive. Complete the Delete the CTC Cache File Automatically, on page 49 or the Delete the CTC Cache File Manually, on page 49.
Insufficient heap memory allocation.	Increase the heap size if you are using CTC to manage more than 50 nodes concurrently. See the Set the CTC_HEAP and CTC_MAX_PERM_SIZE_HEAP Environment Variables for Windows, on page 46 or the Set the CTC_HEAP and CTC_MAX_PERM_SIZE_HEAP Environment Variables for Solaris, on page 47. **Note** To avoid network performance issues, Cisco recommends managing a maximum of 50 nodes concurrently with CTC. To manage more than 50 nodes, Cisco recommends using Cisco Transport Manager (CTM). Cisco does not recommend running multiple CTC sessions when managing two or more large networks.

Delete the CTC Cache File Automatically

Before you begin

Caution All running sessions of CTC must be halted before deleting the CTC cache. Deleting the CTC cache might cause any CTC running on this system to behave in an unexpected manner.

Procedure

Step 1 Enter an ONS 15454NCS IP address into the browser URL field. The initial browser window shows a **Delete CTC Cache** button.

Step 2 Close all open CTC sessions and browser windows. The PC operating system does not allow you to delete files that are in use.

Step 3 Click **Delete CTC Cache** in the initial browser window to clear the CTC cache.

Delete the CTC Cache File Manually

Before you begin

Caution All running sessions of CTC must be halted before deleting the CTC cache. Deleting the CTC cache might cause any CTC running on this system to behave in an unexpected manner.

Procedure

Step 1 To delete the JAR files manually, from the Windows Start menu choose **Search > For Files or Folders**.

Step 2 In the Search Results dialog box, enter **ctc*.jar or cms*.jar** in the Search for Files or Folders Named field and click **Search Now**.

Step 3 Click the **Modified** column in the Search Results dialog box to find the JAR files that match the date when you downloaded the files from the control card.

Step 4 Highlight the files and press the keyboard **Delete** key.

Step 5 Click **Yes** in the Confirm dialog box.

Node Icon is Gray on CTC Network View

Problem The CTC network view shows one or more node icons as gray in color and without a node name.

Possible Cause Different CTC releases do not recognize each other.

Solution Correct the core version build as described in the Different CTC Releases Do Not Recognize Each Other, on page 51.

Possible Cause Username and password do not match.

Solution Correct the username and password as described in the Username or Password Do Not Match, on page 52.

Possible Cause A lost DCC connection.

Solution Usually accompanied by an embedded operations channel (EOC) alarm. Clear the EOC alarm and verify the DCC connection as described in the EOC.

Java Runtime Environment Incompatible

Problem The CTC application does not run properly.

Possible Cause The compatible Java JRE is not installed.

Solution The JRE contains the Java virtual machine, runtime class libraries, and Java application launcher that are necessary to run programs written in the Java programming language. The ONS 15454NCS CTC is a Java application. A Java application, unlike an applet, cannot rely completely on a web browser for installation and runtime services. When you run an application written in the Java programming language, you need the correct JRE installed. The correct JRE for each CTC software release is included on the Cisco ONS 15454NCS software CD. Complete the Launch CTC to Correct the Core Version Build, on page 51. If you are running multiple CTC software releases on a network, the JRE installed on the computer must be compatible with the different software releases. The following table shows JRE compatibility with ONS 15454NCS software releases.

Table 8: JRE Compatibility for NCS

Software Release	JRE 1.2.2	JRE 1.3	JRE 1.4	JRE 5.0	JRE 1.6	JRE 1.7
NCS R10.0	No	No	No	No	Yes	Yes

Note Software Release 4.0 notifies you if an earlier JRE version is running on your PC or UNIX workstation.

Launch CTC to Correct the Core Version Build

Procedure

Step 1 Exit the current CTC session and completely close the browser.

Step 2 Start the browser.

Step 3 Enter the ONS 15454NCS IP address of the node that reported the alarm. This can be the original IP address you logged in with or an IP address other than the original.

Step 4 Log into CTC. The browser downloads the JAR file from CTC.

Different CTC Releases Do Not Recognize Each Other

Problem Different CTC releases do not recognize each other. This situation is often accompanied by the INCOMPATIBLE-SW alarm.

Possible Cause The software loaded on the connecting workstation and the software on the control card are incompatible.

Solution This occurs when the control card software is upgraded but the PC has not yet upgraded the compatible CTC JAR file. It also occurs on login nodes with compatible software that encounter other nodes in the network that have a newer software version. Complete the Launch CTC to Correct the Core Version Build, on page 51.

Note **Solution** Remember to always log into the ONS node with the latest CTC core version first. If you initially log into an ONS node running a CTC core version of 2.2 or lower and then attempt to log into another ONS node in the network running a higher CTC core version, the lower version node does not recognize the new node.

Launch CTC to Correct the Core Version Build

Procedure

Step 1 Exit the current CTC session and completely close the browser.

Step 2 Start the browser.

Step 3 Enter the IP address of the node that reported the alarm. This can be the original IP address you logged on with or an IP address other than the original.

Step 4 Log into CTC. The browser downloads the JAR file from CTC.

Username or Password Do Not Match

Problem A username/password mismatch often occurs concurrently with a NOT-AUTHENTICATED alarm.

Possible Cause The username or password entered does not match the information stored in the control card.

Solution All ONS nodes must have the same username and password created to display every ONS node in the network. You can also be locked out of certain ONS nodes on a network if your username and password were not created on those specific ONS nodes. For initial login to the ONS 15454NCS, enter the CISCO15 user name in capital letters, click **Login**, and use the password **otbu+1**, which is case-sensitive.

Solution Complete the Verify Correct Username and Password, on page 52. If the node has been configured for Remote Authentication Dial In User Service (RADIUS) authentication, the username and password are verified against the RADIUS server database rather than the security information in the local node database. For more information about RADIUS security, refer to the Security Reference chapter in the Security Reference document.

Verify Correct Username and Password

Procedure

Step 1 Ensure that your keyboard Caps Lock key is not turned on and affecting the case-sensitive entry of the username and password.

Step 2 Contact your system administrator to verify the username and password.

Step 3 Call Cisco Technical Support 1 800 553 2447 to have them enter your system and create a new user name and password.

DCC Connection Lost

Problem DCC connection is lost. The node usually has alarms and the nodes in the network view have a gray icon. This symptom is usually accompanied by an EOC alarm.

Possible Cause A lost DCC connection.

Solution Usually accompanied by an EOC alarm. Clear the EOC alarm and verify the DCC connection as described in the Alarm Troubleshooting.

Path in Use Error When Creating a Circuit

Problem While creating a circuit, you get a Path in Use error that prevents you from completing the circuit creation.

Possible Cause Another user has already selected the same source port to create another circuit.

Solution CTC does not remove a card or port from the available list until a circuit is completely provisioned. If two users simultaneously select the same source port to create a circuit, the first user to complete circuit provisioning gets use of the port. The other user gets the Path in Use error. Cancel the circuit creation and start over, or click **Back** until you return to the initial circuit creation window. The source port that was previously selected no longer appears in the available list because it is now part of a provisioned circuit. Select a different available port and begin the circuit creation process again.

Calculate and Design IP Subnets

Problem You cannot calculate or design IP subnets on the ONS 15454NCS.

Possible Cause The IP capabilities of the ONS 15454NCS require specific calculations to properly design IP subnets.

Solution Cisco provides a free online tool to calculate and design IP subnets. Go to http://www.cisco.com/techtools/ip_addr.html.

Timing

This section provides solutions to common timing reference errors and alarms.

ONS 15454NCS Switches Timing Reference

Problem Timing references switch when one or more problems occur.

Possible Cause The optical or building integrated timing supply (BITS) input is receiving loss of signal (LOS), loss of frame (LOF), or AIS alarms from its timing source.

Possible Cause The optical or BITS input is not functioning.

Possible Cause The synchronization status messaging (SSM) message is set to do not use for synchronization (DUS).

Possible Cause SSM indicates a Stratum 3 or lower clock quality.

Possible Cause The input frequency is off by more than 15 ppm.

Possible Cause The input clock wanders and has more than three slips in 30 seconds.

Possible Cause A bad timing reference existed for at least two minutes.

Solution The ONS 15454NCS internal clock operates at a Stratum 3E level of accuracy. This gives the ONS 15454NCS a free-running synchronization accuracy of +/– 4.6 ppm and a holdover stability of less than 255 slips in the first 24 hours or 3.7 x 10–7/day, including temperature. ONS 15454NCS free-running synchronization relies on the Stratum 3 internal clock. Over an extended time period, using a higher quality Stratum 1 or Stratum 2 timing source results in fewer timing slips than a lower quality Stratum 3 timing source.

Holdover Synchronization Alarm

Problem The clock is running at a different frequency than normal and the HLDOVRSYNC appears.

Possible Cause The last reference input has failed.

Solution The clock is running at the frequency of the last known-good reference input. This alarm is raised when the last reference input fails. See the HLDOVRSYNC for a detailed description.



Note **Solution** The ONS 15454NCS supports holdover timing per Telcordia GR-436 when provisioned for external (BITS) timing.

Free-Running Synchronization Mode

Problem The clock is running at a different frequency than normal and the FRNGSYNC appears.

Possible Cause No reliable reference input is available.

,

Solution The clock is using the internal oscillator as its only frequency reference. This occurs when no reliable, prior timing reference is available. See the FRNGSYNC for a detailed description.

Daisy-Chained BITS Not Functioning

Problem You are unable to daisy chain the BITS sources.

Possible Cause Daisy-chained BITS sources are not supported on the ONS 15454NCS.

Solution Daisy-chained BITS sources cause additional wander buildup in the network and are therefore not supported. Instead, use a timing signal generator to create multiple copies of the BITS clock and separately link them to each ONS 15454NCS.

Blinking STAT LED after Installing a Card

Problem After installing a card, the STAT LED blinks continuously for more than 60 seconds.

Possible Cause The card cannot boot because it failed the Power On Shelf Test (POST) diagnostics.

The blinking STAT LED indicates that POST diagnostics are being performed. If the LED continues to blink for more than 60 seconds, the card has failed the POST diagnostics test and has failed to boot. If the card has truly failed, an Alarm Troubleshooting is raised against the slot number with an Equipment Failure description. Check the alarm tab for this alarm to appear for the slot where the card was installed. To attempt recovery, remove and reinstall the card and observe the card boot process. If the card fails to boot, replace the card. Complete the Alarm Troubleshooting.

Solution



Warning **Solution** **High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag.** Statement 201

Caution **Solution** Removing a card that currently carries traffic on one or more ports can cause a traffic hit. To avoid this, perform an external switch if a switch has not already occurred. Refer to the procedures in the Alarm Troubleshooting.

Fiber and Cabling

This section explains problems typically caused by cabling connectivity errors. It also includes instructions for crimping CAT-5 cable and lists the optical fiber connectivity levels.

Bit Errors Appear for a Traffic Card

Problem A traffic card has multiple bit errors.

Possible Cause Faulty cabling or low optical-line levels.

Solution Bit errors on line (traffic) cards usually originate from cabling problems or low optical-line levels. The errors can be caused by synchronization problems, especially if pointer justification (PJ) errors are reported. Moving cards into different error-free slots will isolate the cause. Use a test set whenever possible because the cause of the errors could be external cabling, fiber, or external equipment connecting to the ONS 15454NCS. Troubleshoot low optical levels using the Faulty Fiber-Optic Connections, on page 55.

Faulty Fiber-Optic Connections

Problem A card has multiple alarms and/or signal errors.

Possible Cause Faulty fiber-optic connections. Fiber connection problems usually occur in conjunction with alarms.

Solution Refer to the appropriate trouble-clearing procedure in Alarm Troubleshooting

Possible Cause Faulty CAT-5 cables.

Solution Faulty CAT-5 cables can be the source of alarms and signal errors. Complete the Crimp Replacement LAN Cables, on page 56.

Possible Cause Faulty Gigabit Interface Converters (GBICs).

Solution Faulty GBICs can be the source of alarms and signal errors. See the Replace Faulty SFP, SFP+, or XFP Connectors, on page 57.

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.

Warning **Laser radiation presents an invisible hazard, so personnel should avoid exposure to the laser beam. Personnel must be qualified in laser safety procedures and must use proper eye protection before working on this equipment.** Statement 300

Crimp Replacement LAN Cables

You can crimp your own LAN cables for use with the ONS 15454NCS. Use a cross-over cable when connecting an ONS 15454NCS to a hub, LAN modem, or switch, and use a LAN cable when connecting an ONS 15454NCS to a router or workstation. Use CAT-5 cable RJ-45 T-568B, Color Code (100 Mbps), and a crimping tool. Figure 11: RJ-45 Pin Numbers, on page 56 shows the wiring of an RJ-45 connector. Table 9: LAN Cable Pinout, on page 56Figure 13: Cross-Over Cable Layout, on page 57 shows a LAN cable layout, and Table 9: LAN Cable Pinout, on page 56 shows the cable pinouts. Figure 13: Cross-Over Cable Layout, on page 57 shows a cross-over cable layout, and Table 10: Cross-Over Cable Pinout, on page 57 shows the cross-over pinouts.

Figure 11: RJ-45 Pin Numbers

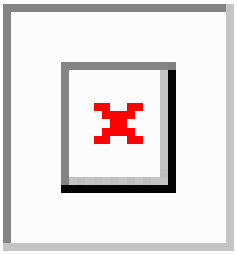


Figure 12: LAN Cable Layout

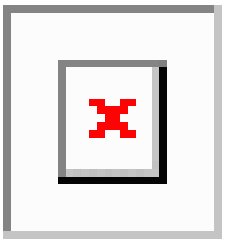


Table 9: LAN Cable Pinout

Pin	Color	Pair	Name	Pin
1	white/orange	2	Transmit Data +	1
2	orange	2	Transmit Data –	2
3	white/green	3	Receive Data +	3
4	blue	1	—	4
5	white/blue	1	—	5
6	green	3	Receive Data –	6
7	white/brown	4	—	7
8	brown	4	—	8

Figure 13: Cross-Over Cable Layout

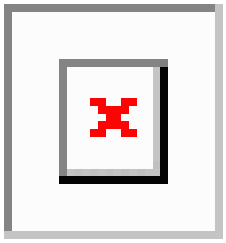


Table 10: Cross-Over Cable Pinout

Pin	Color	Pair	Name	Pin
1	white/orange	2	Transmit Data +	3
2	orange	2	Transmit Data –	6
3	white/green	3	Receive Data +	1
4	blue	1	—	4
5	white/blue	1	—	5
6	green	3	Receive Data –	2
7	white/brown	4	—	7
8	brown	4	—	8

Note Odd-numbered pins always connect to a white wire with a colored stripe.

Replace Faulty SFP, SFP+, or XFP Connectors

Small Form-factor Pluggable (SFP), Enhanced Small Form-factor Pluggable (SFP+), and 10-Gbps SFP (called XFP) modules are input/output devices that plug into some DWDM cards to link the port with the fiber-optic network. The type of SFP, SFP+, or XFP determines the maximum distance that traffic can travel from the card to the next network device. For a description of SFP, SFP+, and XFP modules and their capabilities, refer to the Installing the GBIC, SFP, SFP+, and XFP Optical Modules in Cisco ONS Platforms. SFP, SFP+, and XFP modules are hot-swappable and can be installed or removed while the card or shelf assembly is powered and running.

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.

Warning **Laser radiation presents an invisible hazard, so personnel should avoid exposure to the laser beam. Personnel must be qualified in laser safety procedures and must use proper eye protection before working on this equipment.** Statement 300

Note SFP, SFP+, and XFP modules must be matched on both ends by type: SX to SX, LX to LX, or ZX to ZX.

Remove SFP or XFP Connectors

Before you begin

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 Disconnect the network fiber cable from the SFP or XFP LC duplex connector.

Step 2 Release the SFP or XFP from the slot by simultaneously squeezing the two plastic tabs on each side.

Step 3 Slide the SFP out of the card slot. A flap closes over the SFP slot to protect the connector on the card.

Install an SFP, SFP+, or XFP Connector

Before you begin

Warning **Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard.** Statement 1056

Warning **Class 1 laser product.** Statement 1008

Procedure

Step 1 Remove the SFP, SFP+, or XFP from its protective packaging.

Step 2 Check the label to verify that you are using a compatible SFP, SFP+, or XFP for the card where you want to install the connector. For a list of the SFP, SFP+, and XFP modules that are compatible with each card, refer to the Installing the GBIC, SFP, SFP+, and XFP Optical Modules in Cisco ONS Platforms document.

Step 3 Plug the LC duplex connector of the fiber into a Cisco-supported SFP, SFP+, or XFP.

Step 4 If the new SFP, SFP+, or XFP has a latch, close the latch over the cable to secure it.

Step 5 Plug the cabled SFP, SFP+, or XFP into the card port until it clicks.

To change the payload type of an SFP, SFP+, or XFP (called pluggable port modules [PPMs] in CTC), refer to the Provision Transponder and Muxponder Cards chapter in the Configuration guide.

Power Supply Problems

This section explains problems related to loss of power or power supply low voltage.

Problem Loss of power or low voltage, resulting in a loss of traffic and causing the LCD clock to reset to the default date and time.

Possible Cause Loss of power or low voltage.

Possible Cause Improperly connected power supply.

Solution The ONS 15454NCS requires a constant source of DC power to properly function. Input power is –48 VDC. Power requirements range from –42 VDC to –57 VDC. A newly installed ONS 15454NCS that is not properly connected to its power supply does not operate. Power problems can be confined to a specific ONS 15454NCS or affect several pieces of equipment on the site. A loss of power or low voltage can result in a loss of traffic and causes the LCD clock on the ONS 15454NCS to default to January 1, 1970, 00:04:15. To reset the clock, in node view (single-shelf mode) or shelf view (multishelf mode) click the **Provisioning > General > General** tab and change the Date and Time fields. Complete the Isolate the Cause of Power Supply Problems, on page 60.

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

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 Operations that interrupt power supply or short the power connections to the ONS 15454NCS are service-affecting.

Isolate the Cause of Power Supply Problems

Procedure

Step 1 If a single ONS 15454NCS show signs of fluctuating power or power loss:

a) Verify that the –48 VDC #8 power terminals are properly connected to a fuse panel. These power terminals are located on the lower section of the backplane EIA under the clear plastic cover.
b) Verify that the power cable is #10 AWG and in good condition.
c) Verify that the power cable connections are properly crimped. Stranded #10 AWG does not always crimp properly with Staycon type connectors.
d) Verify that 20-A fuses are used in the fuse panel.
e) Verify that the fuses are not blown.
f) Verify that a rack-ground cable attaches to the frame-ground terminal (FGND) on the right side of the ONS 15454NCS EIA. Connect this cable to the ground terminal according to local site practice.
g) Verify that the DC power source has enough capacity to carry the power load.
h) If the DC power source is battery-based:

- Check that the output power is high enough. Power requirements range from –40.5 VDC to –57 VDC.
- Check the age of the batteries. Battery performance decreases with age.
- Check for opens and shorts in batteries, which might affect power output.
- If brownouts occur, the power load and fuses might be too high for the battery plant.

Step 2 If multiple pieces of site equipment show signs of fluctuating power or power loss:

a) Check the uninterruptible power supply (UPS) or rectifiers that supply the equipment. Refer to the UPS manufacturer's documentation for specific instructions.
b) Check for excessive power drains caused by other equipment, such as generators.
c) Check for excessive power demand on backup power systems or batteries when alternate power sources are used.

Power Up Problems for Node and Cards

This section explains power up problems in a node or cards typically caused an improper power supply.

Problem You are unable to power up a node or the cards in a node.

Possible Cause Improper power supply.

Solution Refer to the power information in the Hardware Specifications appendix of the *Cisco ONS 15454 DWDM Reference Manual*Hardware Specifications document.

Network Level (Internode) Problems

The following network-level troubleshooting is discussed in this section:

- Fiber cut detection
- System restart after a fiber cut
- OCHNC circuit creation failure

Fiber Cut Detection

A fiber cut is one of the most disruptive faults for a DWDM system because more than one channel is potentially affected. Fault isolation must, therefore, be quick and effective.

In the Multi-Service Transport Platform (MSTP), a dedicated alarm is unambiguously associated with the detection of a fiber cut. The alarm is LOS (OTS or AOTS) and can be raised by the OPT-BST, OSC-CSM, 40-SMR1-C, and 40-SMR2-C cards that directly interface to the span fiber. The LOS (OTS or AOTS) alarm is associated with the physical LINE-RX port of the OPT-BST, OSC-CSM, 40-SMR1-C, and 40-SMR2-C cards (in CTC, identified by Port 5 on the OPT-BST, Port 4 on the OSC-CSM, Port 9 on the 40-SMR1-C, and Port 7 on the 40-SMR2-C card). LOS (OTS or AOTS) is the combination of the two alarms LOS-P (OTS or AOTS) (applies to channel payload) and LOS-O (applies to the OC-3 overhead OSC signal).

The simultaneous failure of both the active channel (C band) and the service channel (1510 nm) coming into the node is evidence of a fiber span issue, whereas either the LOS-P (OTS or AOTS) alarm alone or the LOS-O alarm alone can only be derived from different root causes.

Note When a fiber cut occurs, the actual conditions on the affected span (for example, alarms raised on both line directions) are strictly dependent on the network automatic laser shutdown (ALS) setting. The network ALS setting is a function of the ALS mode configured on the appropriate cards in the system (OPT-BST, OPT-BST-E, OPT-BST-L, OPT-AMP-L, OPT-AMP-C, OPT-AMP-17-C, 40-SMR1-C, 40-SMR2-C, OSC-CSM, and OSCM).

Different symptoms and scenarios can occur, depending on the network ALS settings. Consider the linear network (four nodes) in Figure 14: Linear Network, With No Fiber Cut, on page 61 as a reference. The scenarios are presented after the figure.

Figure 14: Linear Network, With No Fiber Cut



Scenario A

Scenario A has the following conditions:

- ALS Mode = Auto Restart on OPT-BST (+ OSCM) and OSC-CSM
- Fiber cut on the fiber between the OLA-TX node and the ROADM-RX node

The ALS protocol (refer to the Network Optical SafetyAutomatic Laser Shutdown section in the Network Reference chapter of the *Cisco ONS 15454 DWDM Reference ManualCisco ONS 15454 DWDM Configuration Guide*) is activated in the event of a fiber cut, resulting in the shutdown of optical power on both of the fibers belonging to the affected span, even if only one of the two fibers is cut.

The final fault condition of the network is shown in Figure 15: Fiber Cut with ALS MODE = Auto Restart, on page 62.

Figure 15: Fiber Cut with ALS MODE = Auto Restart



In network view, both of the lines representing the span were formerly green and have now changed to gray. Notice also that the status of all the OCHNC circuits on the broken span have changed from Discovered to Partial.

In node view (single-shelf mode) or shelf view (multishelf mode), the alarm panel of the two nodes (reconfigurable optical add/drop multiplexing [ROADM] and optical line amplification [OLA] in the example) show the LOS (AOTS) alarm on Port 4 of the OSC-CSM (see Figure 16: LOS Indication on the ROADM Node OSC-CSM, on page 62) and the LOS (OTS) on Port 5 of the OPT-BST (see Figure 17: LOS Indication on the OLA Node OPT-BST, on page 62).

Figure 16: LOS Indication on the ROADM Node OSC-CSM



Figure 17: LOS Indication on the OLA Node OPT-BST



Note An EOC condition is always present on both nodes, because the optical service channel (OSC) link (to which the communication channel applies) is down.

Note For the OSCM card, only an LOS (OC-3) alarm is present at the SONET layer (Port 1).

Scenario B

Scenario B has the following conditions:

- ALS Mode = DISABLE on OPT-BST (+ OSCM) and OSC-CSM
- Fiber cut on the fiber between the OLA-TX node and the ROADM-RX node

Because the ALS protocol is disabled, the signal is lost on only the affected fiber (power is not shut down on both fibers).

The LOS (OTS or AOTS) alarm is raised by the ROADM-RX node that was receiving the signal coming from the broken fiber. The final fault condition of the network is shown in Figure 18: Network View Fault Condition for Fiber Cut with ALS Mode Disabled, on page 63.

Figure 18: Network View Fault Condition for Fiber Cut with ALS Mode Disabled



In network view (Figure 18: Network View Fault Condition for Fiber Cut with ALS Mode Disabled, on page 63), only the actual affected fiber becomes gray, whereas the traffic (and OSC signal as well) on the good fiber is active and fault identification is immediate.

In node view (single-shelf mode) or shelf view (multishelf mode) (Figure 19: ONS 15454 SDH ROADM Node View with Fault Condition for ALS MODE Disabled, on page 63 and Figure 20: ONS 15454 SDH OLA Node View with Fault Condition for ALS MODE Disabled, on page 63), the alarm panel of the receiving node (ROADM in this example) reports the LOS (OTS), while the transmitting node (OLA) reports only an EOC alarm.

Figure 19: ONS 15454 SDH ROADM Node View with Fault Condition for ALS MODE Disabled



Figure 20: ONS 15454 SDH OLA Node View with Fault Condition for ALS MODE Disabled



In order to troubleshoot and eventually fix a fiber cut, follow the Fix a Fiber Cut, on page 63. The basic assumption is that the MSTP system was already installed and working correctly before the alarm condition occurred. For first installation or restart from a fiber cut, refer to System Restart after a Fiber Cut, on page 64.

Fix a Fiber Cut

Before you begin

Caution When the network ALS setting is DISABLE, optical power is still present at the damaged fiber. Before fixing the span, it is highly recommended that you shut down the amplifier and the OSC laser upstream of the fiber cut.

Procedure

Step 1 Isolate the span affected by the fiber cut.

a) Go to CTC network view.

b) Identify the span connection that is gray.

Step 2 Verify the alarm is valid, then perform the following steps for both DWDM nodes connected to the span identified in Step 1.

a) Double-click the card directly connected to the span (either the OPT-BST or the OSC-CSM).

b) Click the **Alarms** tab and verify that a LOS condition is present on the LINE-RX port. If the alarm is correctly reported, move to Step 3, on page 64. If not, close the CTC application, delete the CTC cache and reopen the CTC connection.

c) Click the **Synchronize** button on the bottom left of the window.

Note
If the "gray condition" of the span persists, log into Technical Support Website at http://www.cisco.com/c/en/us/support/index.html for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 3 If the network ALS setting on the DWDM nodes that you are troubleshooting is Auto Restart, continue with Step 4, on page 64; if the network ALS setting is DISABLE, go to Step 5, on page 64.

Note
The network ALS setting is a function of the ALS mode configured on the appropriate cards in the system (OPT-BST, OPT-BST-E, OPT-BST-L, OPT-AMP-L, OPT-AMP-C, OPT-AMP-17C, OSC-CSM, and OSCM).

Step 4 Isolate the fiber affected by the fiber cut. For the two fibers belonging to the span, identify the fiber belonging to the west-to-east (W–E) line direction:

a) Go into the upstream node and identify the OSCM or OSC-CSM card managing the OSC termination referring to the faulty span.
b) Double-click the card, then click the **Maintenance Panel** tab.
c) Force the OSC-TX laser to be active by setting the ALS Mode to **DISABLE.**
d) Go into the downstream node and verify if OSC power is being received.
   - If a pair of OPT-BST + OSCM cards terminate the OSC connection, click the Provisioning > Optical Line > Parameters tabs, then verify that there is power for OSC-TX (Port 4).
   - If an OSC-CSM terminates the OSC connection, click the Provisioning > Optical Line > Parameters tabs, then verify that there is power for OSC-RX (Port 6).
e) If no power is detected and the LOS (OC-3) alarm persists, go to Step 5, on page 64; otherwise, the fiber under test is good. In this case, go to Step f to check the other fiber.
f) Repeat Steps a to d for the other fiber to verify that it is at fault.

Step 5 Repair the identified broken fiber to restore the internode link.

Warning
Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard. Statement 1056

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

System Restart after a Fiber Cut

When the network ALS setting is Auto Restart, the system automatically restarts after a fiber cut occurs. MSTP system restart after a fiber cut is a fully automatic process regulated by a chronological sequence of steps including the OSC link built-in amplifiers restart and amplifier power control (APC) regulation.

The successful completion of system restart is strictly related to possible changes of the insertion loss value of the repaired span. A change in insertion loss is dependent on many factors, including the process of physically repairing the fiber, a change in fiber length after repair, and so on.

Four different scenarios related to span loss are presented in this section:

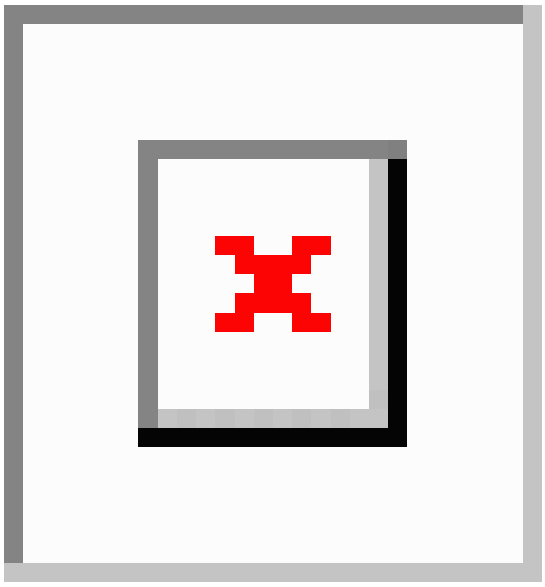
1. Span loss increased:
   - Span loss change > 5 dBm
   - OSC power value on the receiver < –42 dBm
2. Span loss increased:
   - Span loss change > 5 dBm
   - OSC power value on the receiver > –42 dBm
3. Span loss increased: 3 dBm < span loss change < 5 dBm
4. Span loss increased: span loss change < 3 dBm

Note It is also possible that span loss decreased, but this is unlikely. This condition does not prevent the MSTP system automatic restart process, but can lead (potentially) to issues downstream of the repaired span, for example, a Power Overload condition on the OSC receiver or on the Trunk-RX port of a TXP or MXP card.

These conditions are identified by specific alarms (see the HI-RXPOWER section in the *Alarm Troubleshooting* chapter).

The symptoms of the possible span loss scenarios (except for span loss decrease) are described in the following paragraphs. Refer to the linear network given below during the discussion of the scenarios.

Figure 21: Linear Network, With No Fiber Cut



The basic assumption is that the network ALS feature (for feature details, refer to the Network Optical Safety—Automatic Laser Shutdown section in the Network Reference chapter of the Configuration guide) is

active (ALS Mode = Auto Restart on the OPT-BST, OPT-AMP-C, OPT-AMP-17-C, [+ OSCM] and OSC-CSM). Given this assumption, the starting condition is as shown in Scenario A, on page 61Figure 1.

The system behavior when the network ALS Mode is DISABLE is a subcase that requires a manual restart after repairing a single fiber in only one line direction.

Note The network ALS feature is a function of the ALS Mode settings of the OPT-BST, OPT-BST-E, OPT-BST-L, OPT-AMP-L, OPT-AMP-C, OPT-AMP-17-C, OPT-RAMP-C, OSCM, and OSC-CSM cards. For the network ALS Mode to be disabled, each of these cards must have its ALS Mode set to DISABLE.

Scenario 1: Span Loss Change > 5 dBm and OSC Power Value on the Receiver less than –42 dBm

In network view, both of the lines representing the span remain gray as long as the status of the OCHNC circuits relating to the repaired span remain in Partial state.

In node view (single-shelf mode) or shelf view (multishelf mode), the alarm panels of the two nodes (ROADM and OLA in this example) show the LOS (OTS or AOTS) condition on the LINE-RX port of the OPT-BST, OPT-AMP-C, OPT-AMP-17-C, or OSC-CSM.

An EOC condition is always present on both nodes because the OSC optical link is down due to an incoming power level lower than the optical sensitivity limit (–42 dBm). The system condition remains unchanged as illustrated in Scenario A, on page 61 .

Every 100 seconds, the ALS protocol turns up the OSC TX laser in a pulse mode (pulse duration = 2 seconds), but the excessive loss on the span prevents the OSC link from synchronizing, and the MSTP system remains unoperational.

Note During the attempt to restart, a valid power value is reported by the OSC transmit card (in the example, the OSC-CSM in the OLA node), but on the OSC receive card (the OSCM in the ROADM node), the alarm condition persists.

Corrective Action for Scenario 1

Procedure

Step 1 Follow these steps to verify the alarms for both DWDM nodes that are connected to the repaired span:

a) Double-click the card directly connected to the span (either the OPT-BST, OPT-AMP-C, OPT-AMP-17-C, or OSC-CSM).
b) Click the **Alarms** tab.
c) Verify that a LOS condition is present on the LINE-RX port.
d) Click the **Synchronize** button on the bottom left of the window.
e) If the alarm is correctly reported, move to Step 2. If not, close the CTC application and delete the CTC cache. Then reopen the CTC connection, and repeat Step 1.

If the "gray condition" of the span persists, log into Technical Support Website at http://www.cisco.com/c/en/us/support/index.html for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 2 Isolate the fiber affected by the excessive insertion loss. For the two fibers belonging to the span, identify the one for the W–E line direction.

a) Go into the upstream node and identify the OSCM or OSC-CSM card that manages the OSC termination for the faulty span.
b) Double-click the card, then click the **Maintenance** tab.
c) Force the OSC-TX laser active by setting ALS Mode to DISABLE.
d) Go into the downstream node and verify the OSC Power level received.

- If a pair of OPT-BST, OPT-AMP-C, or OPT-AMP-17-C + OSCM cards terminate the OSC connection, click the Provisioning > Optical Line > Parameters tabs, then verify that there is power for OSC-TX (Port 4).
- If an OSC-CSM terminates the OSC connection, click the **Provisioning > Optical Line > Parameters** tabs, then verify that there is power for OSC-RX (Port 6).
- If no power is detected and the LOS (OC-3) alarm persists, the faulty fiber has been identified, so go to Step 3.

e) If a power value greater than –42 dBm is detected, the fiber under test has been properly repaired. However, it is recommended that you check the new fiber Insertion Loss value.

- In node view (single-shelf mode) or shelf view (multishelf mode), click the **Maintenance > DWDM > WDM Span Check** tabs.
- Retrieve the new value of fiber Insertion Loss of the repaired span.

Note
The new value of the fiber Insertion Loss of this fiber after restoration must be less than 5 dB higher than the previous Insertion Loss value. If possible, try to recover the original value by making a better fiber splice. If this is not possible, use the new value (must be less than 5 dB higher than the previous value) and rerun Cisco TransportPlanner to revalidate the new condition.

Step 3 For the two fibers belonging to the repaired span, identify one for the east to west (E–W) line direction.

Step 4 Repeat the procedure starting at Step 2 for the E–W direction.

Step 5 Clean the LINE-RX and LINE-TX connectors for the failing fiber that was identified in the previous steps.

Step 6 If the problem persists, continue with Step 7. Otherwise, the corrective action is finished.

Step 7 Repair the failing fiber again until the expected OSC link is reestablished.

Warning
Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard. Statement 1056

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Note

If the OSC link cannot be reestablished (either by splicing or replacing the fiber), and the new value of Span Loss cannot be modified, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Scenario 2: Span Loss Change > 5 dBm and OSC Power Value on the Receiver > –42 dBm

In network view, both of the lines representing the span change to green; however, the status of the OCHNC circuits relating to the repaired span remains Partial, instead of Complete (due to the fiber cut).

This change is due to the fact the physical optical power value received by the OSC transceiver is above the sensitivity limit (–42 dBm) and consequently, the OSC optical link can be rebuilt, allowing the restoration of the Section DCC (SDCC) or multiplex section DCC (MS-DCC). The network view for this condition is shown in Figure 22: Network View for Span Loss Change > 5 dBm and OSC Power Value at Receiver > –42 dBm, on page 68.

Figure 22: Network View for Span Loss Change > 5 dBm and OSC Power Value at Receiver > –42 dBm



In node view (single-shelf mode) or shelf view (multishelf mode), the EOC condition is cleared, but the alarm panels of the two nodes (ROADM and OLA in the example) continue to show LOS (OTS or AOTS) on the LINE-RX port of the OPT-BST, OPT-AMP-C, OPT-AMP-17-C, or OSC-CSM.

The network ALS protocol keeps the OCHNC traffic down along the span because the new losses of the restored span can potentially affect the optical validation of the network design done by Cisco TransportPlanner.

Corrective Action for Scenario 2

Procedure

Step 1 Verify the validity of the alarm.

Step 2 For both DWDM nodes connected to the repaired span:

a) Double-click the card directly connected with the span (either the OPT-BST, OPT-AMP-C, OPT-AMP-17-C, or OSC-CSM).
b) Click **Alarms.**
c) Click the **Synchronize** button on the bottom left of the window.
d) Verify that a LOS condition is present on the LINE-RX port.
e) If the alarm is correctly reported, move to Step 3. If not, close the CTC application, delete the CTC cache, and open the CTC connection again. Then, go back to Step 1.

If the "gray condition" of the span persists, log into Technical Support Website at http://www.cisco.com/c/en/us/support/index.html for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 3 Measure the new Span Loss value after fixing the fiber.

a) In the node view (single-shelf mode) or shelf view (multishelf mode) of both nodes for the span, click the **Maintenance > DWDM > WDM Span Check** tabs.
b) Click **Retrieve Span Loss Values** to retrieve the latest loss data.

Note
The two values retrieved at each node level (west side and east side) refer to the two fibers coming into the node from the adjacent nodes, so they apply to different spans. To complete the measurement in Step 3, the appropriate values must be taken into account.

Step 4 Compare the span measurements of Step 3 with the span losses values used during the network design with Cisco TransportPlanner.

Step 5 For the two fibers belonging to the repaired span, identify the fiber for the W–E line direction and calculate the insertion loss variation. If the span loss change is greater than 3 dBm, continue with Step 6. If not, go to Step 9.

Step 6 Clean the LINE-RX and LINE-TX connectors on the DWDM cards managing the fiber of the repaired span. If the problem persists, continue with Step 7.

Step 7 If the alarm condition is still reported, it is recommended that the fiber be repaired again to reestablish the expected span loss value. If this is not possible and the new value of span loss cannot be modified, go to Step 8 to fix the system faulty condition.

Warning
Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard. Statement 1056

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Step 8 Follow the signal flow into the network starting from the repaired fiber:

a) In the downstream node, identify the OPT-BST, OPT-AMP-C, OPT-AMP-17-C, or OSC-CSM card that manages OSC and CHS detection.
b) In card view, click the **Provisioning > Optical Line > Optic Thresholds** tabs.
c) Click the **Alarms** radio button, then click **Refresh.**
d) Decrease the current OSC and CHS Fail Low thresholds by the same amount of the span loss change calculated in Step 5.

If an OPT-BST, OPT-AMP-C, or OPT-AMP-17-C is present:

- CHS Fail Low threshold refers to Port 2.
- OSC Fail Low threshold refers to Port 4.

If an OSC-CSM is present:

- CHS Fail Low threshold refers to Port 3.
- OSC Fail Low threshold refers to Port 6.

Step 9 For the two fibers belonging to the repaired span, identify the fiber for the east to west (E–W) line direction.

Step 10 Repeat the procedure from Step 5 to Step 8 for the E–W direction.

Step 11 If the LOS alarm has cleared, the system has restarted properly. However, because a significantly different span loss value is now present, we highly recommended that you complete the following steps:

a) Go back to the Cisco TransportPlanner tool and open the network design configuration file.

b) Select **Installation Mode** to freeze the node layout and amplifier positioning.
c) Change the span value, inserting the new insertion loss that was measured in Step 3.
d) Run the Cisco TransportPlanner algorithm to validate the new design.
e) If the optical result indications (power, optical signal-to-noise ratio [OSNR], chromatic dispersion [CD], and so on) are all green, the repair procedure is complete. If not, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) and report a service-affecting problem.

If the LOS alarm is still present, continue with Step 12.

Step 12 Go back to the card where the LOS alarm is active, and set the optic thresholds (see Step 8b) to the lowest value allowed.

If an OPT-BST, OPT-AMP-C, or OPT-AMP-17-C is present:

- CHS Fail Low threshold must to be set to –30 dBm.
- OSC Fail Low threshold must to be set to –42 dBm.

If an OSC-CSM is present:

- CHS Fail Low threshold must to be set to –30 dBm.
- OSC Fail Low threshold must to be set to –40 dBm.

Note
If the LOS alarm is still present, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 13 If the LOS alarm is has cleared, the system has restarted properly, but because a Span Loss value significantly different from the design is now present, we highly recommend that you repeat the steps described in Step 11.

Scenario 3: 3 dBm less than Span Loss Change less than 5 dBm

In network view, both of the lines representing the span change to green after the rebuild of the OSC optical link and consequent restoration of the SDCC or MS-DCC. The EOC condition and the LOS alarms are cleared.

The network ALS protocol successfully restarts the amplifiers, which enables the OCHNC traffic restoration along the span.

The reactivation of the OCHNC circuits relating to the repaired span (the status changes from Partial to Complete) can lead to several final conditions that depend on the network topology and node layout.

The rebuilding of circuits automatically triggers the APC check mechanism (for details, refer to the Network Reference chapter of the Configuration guide). The APC check mechanism impacts the optical gain of the amplifiers (primarily the OPT-PRE card) and the VOA express attenuation for the optical add/drop multiplexing (OADM) cards. The APC application acts on the appropriate cards downstream of the repaired span (for each line direction), and attempts to compensate for the introduction of excess loss.

Because the loss increase exceeds the maximum variation (+/3 dBm) for which APC is allowed to compensate, an APC-CORRECTIO N-SKIPPED condition is raised by the first node along the flow detecting the event. The condition panel of the impacted node (the ROADM, in this example) reports the APC-CORRECTION-SKIPPED condition and indicates the port or card to which it applies.

Corrective Action for Scenario 3

Procedure

Step 1 Verify the alarm validity.

Step 2 For both DWDM nodes connected to the repaired span:

a) Double-click the card reporting the issue.

b) Click **Conditions.**

c) Click **Retrieve** and verify that an APC-CORRECTION-SKIPPED condition is present on an aggregate port.

d) If the alarm is correctly reported, go to Step 3, on page 71. If not, close the CTC application, delete the CTC cache, and open the CTC connection again. Then, go to Step 1, on page 71.

Note
If the discrepancy persists, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 3 Measure the new Span Loss value after the fiber has been repaired.

a) In the node view (single-shelf mode) or shelf view (multishelf mode) of both nodes of the span, click the **Maintenance > DWDM > WDM Span Check** tabs.

b) Click **Retrieve Span Loss Values** to retrieve the latest loss data.

Note
The two values retrieved at each node level (west side and east side) refer to the two fibers coming into the node from the adjacent nodes, so they apply to different spans. To complete the measurement in Step 4, on page 71, the appropriate values must be taken into account.

Step 4 Compare the Span Measurements of the previous step with the Span Losses values used during the network design with Cisco TransportPlanner.

Step 5 For the two fibers belonging to the repaired span, identify the one for the W–E line direction. If the Span Loss Change is greater than 3 dB, continue with Step 6, on page 71. If not, go to Step 9, on page 73.

Step 6 Clean the LINE-RX and LINE-TX connectors of the DWDM cards that manage the fiber of the repaired span. If the problem persists, continue with Step 7. Otherwise, you are finished with the corrective action.

Step 7 If the alarm condition is still reported, we recommend that you again repair the fiber to reestablish the expected span loss value. If this is not possible and the new value of Span Loss cannot be modified, move to Step 8 to fix the system faulty condition.

Warning
Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard. Statement 1056

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Step 8 Follow the signal flow into the network starting from the repaired fiber.

a) In the first downstream node of the restored span (W–E), check whether a DWDM card reports the APC-CORRECTION-SKIPPED condition on a port applying to the W–E direction (see Step 2, on page 71 for how to do this).
b) If the answer is yes, retrieve the following values according to the card type.
   - For pre- or booster amplifier cards, click the **Provisioning > Optical Ampli. Line > Gain Setpoint** tabs.
   - For AD-xC-xx.x or AD-xB-xx.x cards, click the **Provisioning > Optical Line > VOA Attenuation Reference** tabs.
   - Go to 8.d, on page 72.
c) If the answer is no, go to 8.d, on page 72.
d) Move along the downstream nodes until a card with the APC-CORRECTION-SKIPPED condition for a W–E port is detected.
e) From that card, retrieve parameters according to 8.b, on page 72.
f) In the first downstream node of the restored span, go to the Circuits tab and identify all the OCHNC circuits passing through the repaired span.
g) Edit all the OCHNC circuits identified in 8.a, on page 72:
   - Click the **Tools > Circuits > Set Circuit State** tabs.
   - Change the Target Circuit Admin. State to OOS,DSBLD (or Locked, disabled) and click Apply.
h) Go to the DWDM card for which the Gain or VOA Attenuation values were retrieved (the card can be either the one in substep 8.b, on page 72 or 8.e, on page 72) and verify that the administrative state of the alarmed port is now OOS (locked).
i) If the alarmed port is not OOS (locked), go to the card view, click Circuits, and identify the remaining OCHNC circuits that are still active. Put the circuits in OOS,DSBLD (or Locked, disabled) state in order to reach the OOS (locked) administrative state on the alarmed port.
j) Wait for three minutes, then switch the administrative state of only one of the circuits selected in and 8.a, on page 72 and 8.i, on page 72back to IS (**Unlocked**).
k) After the network completes the restart phase, go to the formerly alarmed card and verify that the APC-CORRECTION-SKIPPED condition has cleared and a new Gain Setpoint or VOA Attenuation Reference (compare with 8.a, on page 72) has been provisioned.

   Note
   The total variation of the above parameter setpoint must be within approximately +/– 1 dBm of the Span Loss Change measured in Step 3, on page 71.

l) If the APC-CORRECTION-SKIPPED condition has cleared and the system has restarted properly, we highly recommend that you complete the following procedure due to the fact that a Span Loss value that is significantly different than the design is now present.
   - Go back to the Cisco TransportPlanner tool and open the network design configuration file.
   - Select **Installation Mode** to freeze the node layout and amplifier positioning.
   - Change the span value, inserting the new Insertion Loss measured in Step 3, on page 71.
   - Run the Cisco TransportPlanner algorithm to validate the new design.

- If the optical result indications (power, OSNR, CD, and so on) are all green, the repair procedure is complete. If not, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

  Note
  If the APC condition persists, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 9 For the two fibers belonging to the repaired span, identify the fiber for to the east to west (E–W) line direction.

Step 10 Repeat the procedures from Step 6, on page 71 to Step 8, on page 71 for the E–W direction.

Scenario 4: Span Loss Change less than 3 dB

In network view, both the lines that represent the span turn green after the rebuilding of the OSC optical link and consequent restoration of the SDCC or MS-DCC. The EOC condition and LOS alarms are cleared.

The network ALS protocol successfully completes the amplifier restart to enable OCHNC traffic restoration along the span.

The rebuilding of circuits automatically triggers the APC check mechanism (for details, refer to the Network Reference chapter of the Configuration guide). The APC check mechanism affects the optical gain of the amplifiers (primarily the OPT-PRE) and the VOA express attenuation for the OADM cards. The APC application acts on the suitable cards downstream of the repaired span (for each line direction), and attempts to compensate for the introduction of excess loss.

The APC operation is successfully completed if enough margin during the Cisco Transport Planner network design phase has been taken into account. If not, the adjustment done by the APC application overcomes the range setting for a specific optical parameter in the first appropriate card along the flow and an APC-OUT-OF-RANGE condition is raised. The condition panel of the impacted node (the ROADM in the example) reports the APC-OUT-OF-RANGE condition and indicates the port or card to which it applies.

Corrective Action for Scenario 4

Procedure

Step 1 Verify the alarm validity.

Step 2 For both DWDM nodes on the repaired span:

a) Double-click the card reporting the issue.
b) Click **Conditions.**
c) Click **Retrieve** and verify that an APC-OUT-OF-RANGE condition is present on an aggregate port.
d) If the alarm is correctly reported, go to Step 3, on page 73. If not, close the CTC application, delete the CTC cache, and open the CTC connection again. Then, go to Step 1, on page 73.

Note
If the discrepancy persists, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 3 Measure the new Span Loss value after the fiber is repaired.

a) In the node view (single-shelf mode) or shelf view (multishelf mode) of both nodes for to the span, click the **Maintenance > DWDM > WDM Span Check** tabs.
b) Click **Retrieve Span Loss Values** to retrieve the latest loss data.

Note
The two values retrieved at each node level (west side and east side) refer to the two fibers coming into the node from the adjacent nodes, so they apply to different spans. To complete the measurement in Step 4, on page 74, the appropriate values must be taken into account.

Step 4 Compare the Span Measurements done in Step 3, on page 73 with the Span Losses values used during the network design with Cisco TransportPlanner.

Step 5 For the two fibers belonging to the repaired span, identify the one for the W–E line direction.

- If the Span Loss Change is greater than 1 dBm, continue with Step 6, on page 74.
- If the Span Loss Change is 1 dBm or less, move to Step 9, on page 74.

Step 6 Clean the LINE-RX and LINE-TX connectors of the DWDM cards that manage the fiber of the repaired span.

Step 7 If the problem persists, continue with the next step. If not, you have finished the corrective action.

Step 8 If the Span Loss Change is greater than 1 dBm and the APC-OUT-OF-RANGE condition still exists, it is mandatory to again repair the fibers to reestablish the expected span loss value.

Warning
Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard. Statement 1056

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Note
If this is not possible and the new value of Span Loss cannot be modified, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem

Step 9 For the two fibers belonging to the repaired span, identify the fiber for the east to west (E–W) line direction.

Step 10 Repeat the procedure from Step 6, on page 74 to Step 8, on page 74for the E–W direction.

OCHNC Circuits Creation Failure

OCHNC circuit creation is managed by the Cisco Wavelength Path Provisioning (WPP) network application. The WPP application helps prevent errors during new circuit activation (if the wavelength is already allocated in the path between source and destination) and also guarantees an appropriate time interval between one circuit activation and the next to enable proper amplifier gain regulation by APC.

WPP uses the network topology information carried by the OSC link among different nodes to identify the routing path of the optical wavelength (OCHNC circuits) from the source node to the destination node. WPP

also enables the card ports of the OCHNC circuits by changing the administrative state from the default (OOS or Locked) state to the final (IS or Unlocked) state.

Prerequisites for Successful OCHNC Circuit Creation

The prerequisite conditions for successfully completed circuit creation are:

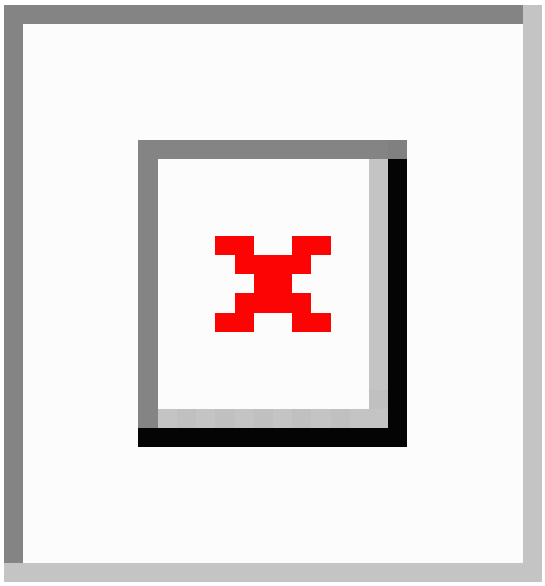
1. Internode: OSC link active among all DWDM nodes involved
2. Internode: APC enabled (or alternatively manually disabled by the user)
3. Intranode: Logical connections among cards created and provisioned on every node of the network (ANS completed)

Note For more information about these operations, refer to the NTP-G183 Diagnose and Fix OCHNC and OCH Trail Circuits section in Configuration guide.

OCHNC circuit creation is successfully completed when the CTC circuit table reports the situation shown in Figure 23: OCHNC Circuit Successfully Completed, on page 75.

- The Circuit Status has turned to DISCOVERED.
- The # of spans field shows the correct number of hops among different nodes that the OCHNC circuit passes through to reach the final destination.
- Circuit State reports IS (or unlocked).

Figure 23: OCHNC Circuit Successfully Completed



Conditions for OCHNC Circuit Creation Failure

If the OCHNC circuit creation fails, you will see one of the following conditions:

- If the WPP wizard cannot complete the circuit creation procedure, CTC displays the error message shown in Figure 24: Partial Circuits, on page 76. In the message, click Details to see the partial connections that WPP can set up. Start troubleshooting the problem in the first node that is unreachable along the path.

Figure 24: Partial Circuits

- The circuit is successfully created and reported under the Circuits tab, the Status field turns to DISCOVERED, but the Circuit State is OOS (locked). The condition is shown in Figure 25: Circuit Discovered, State OSS, on page 76 .

Figure 25: Circuit Discovered, State OSS

- The OCHNC circuit is shown under the Circuits tab, but the Status field reports PARTIAL. This applies to a circuit successfully built-up when the network falls into scenarios a. or b (OSC link fail or APC disabled), described below.

The root cause identification for the preceding conditions are found in the prerequisite conditions described in Prerequisites for Successful OCHNC Circuit Creation, on page 75.

Scenarios for OCHNC Circuit Creation Failure

The most common scenarios for failure to create an OCHNC circuit are:

1. One (or more) of the Span OSC links involving the OCHNC circuit has not been properly established. The WPP application prevents the creation of any circuit passing through the failing span. Prerequisite condition of Prerequisites for Successful OCHNC Circuit Creation, on page 75 has not been met.
   a. The APC application is internally disabled due to the presence of a Critical alarm somewhere in the network. As a consequence, no reliable information about the number of active channels can be shared among the nodes and the creation of any further OCHNC circuit is prevented until the faulty condition is fixed. Prerequisite condition 1 of Prerequisites for Successful OCHNC Circuit Creation, on page 75 has not been met.
   b. One (or more) of the intranode connections between two DWDM cards associated with the circuit have not been properly created. Prerequisite condition of 2 Prerequisites for Successful OCHNC Circuit Creation, on page 75 has not been met.
   c. One (or more) of the intranode connections between two DWDM cards associated with the circuit have not been properly provisioned. This happens when ANS application has not run in one of the involved nodes or at least one port status after the ANS run has not been successfully configured (Fail-Out of Range alarm on the ANS panel). Prerequisite condition 3 of Prerequisites for Successful OCHNC Circuit Creation, on page 75 has not been met.

To troubleshoot and eventually fix issues related to the faulty OCHNC circuit creation shown in Figure 24: Partial Circuits, on page 76, the following procedure must be performed.

Corrective Action

Procedure

Step 1 Verify OSC connectivity:

a) Go to network view and identify the MSTP nodes to which the OCHNC circuit applies.

b) Verify that all the OSC links connecting the MSTP nodes along the circuit path, from the source node to the destination node, are active (green line).

Note
Bidirectional circuits have two possible nodes, depending on the line direction being considered.

Complete one of the following actions depending on OSC connectivity:

- If the OSC link is down, focus on the affected span and troubleshoot the issue (see System Restart after a Fiber Cut, on page 64).

  Note
  If necessary, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

- If the OSC link is not down, continue with Corrective Action, on page 76.

Step 2 Verify APC status:

a) Go to node view (single-shelf mode) or shelf view (multishelf mode) on the MSTP node that is the source node for the circuit.
b) In the General Info box on the left, check the **APC state** (last row).

- If the APC state is DISABLE - INTERNAL, complete the appropriate troubleshooting procedure from Alarm Troubleshooting.

  Note
  If necessary, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

- If the APC state is not DISABLE - INTERNAL, continue with Step 3.

Step 3 Verify that the intranode connections have been built in:

a) Go to the node view (single-shelf mode) or multishelf view (multishelf mode) on the MSTP node that is the source node for the circuit.
b) Click the **Provisioning > WDM-ANS > Connections** tabs.

Step 4 Verify that all node connections have been created and that their state is Connected.

Tip
To quickly verify the connections, click the **Calculate Connection** button and check to see if any new connections come up.

If some connections are missing, perform the proper procedure according to Turn Up a Node in the Configuration guide.

Step 5 If necessary, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Node Level (Intranode) Problems

Troubleshooting for node-level optical channel (OCH) VOA start-up failure as well as internal VOA control loop problems in the amplifier cards (OPT-BST, OPT-BST-L, OPT-PRE, OPT-AMP-17-C, OPT-AMP-C, OPT-AMP-L, and OPT-BST-E); demultiplexer cards (32-DMX, 32-DMX-L, 40-DMX-C, and 40-DMX-CE) having a single variable optical attenuator (VOA); and optical add/drop multiplexer cards (AD-1C-xx.x, AD-2C-xx.x, AD-4C-xx.x, AD-1B-xx.x, and AD-4B-xx.x) that occur due to counter-propagating light are discussed in this section.

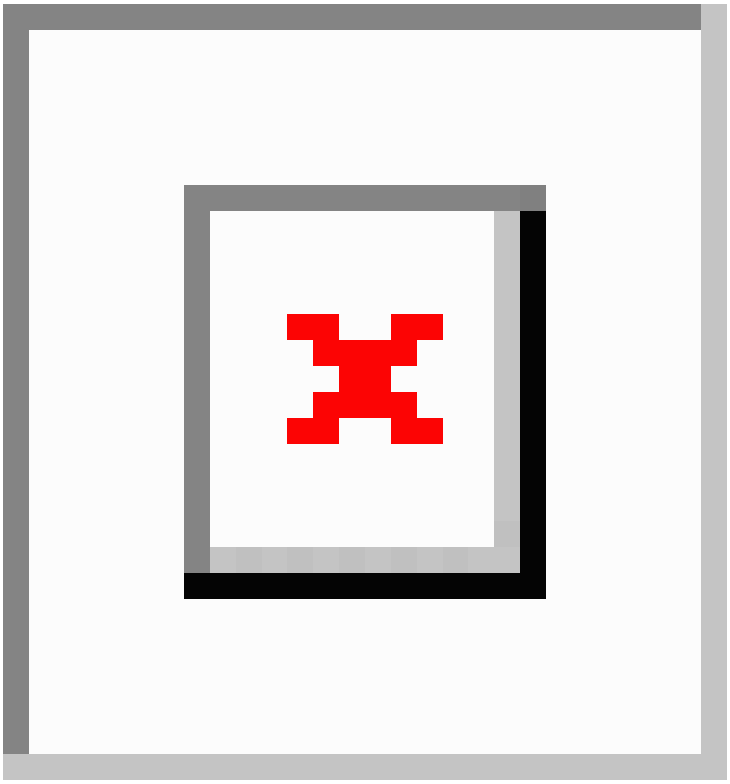
A dedicated VOA regulates the optical power for every single channel (single wavelength) inserted in the MSTP system through a WSS, 32MUX-O, or AD-xC-xx.x card.

The final state for the VOAs is the power control working mode. In this mode, the attenuation that the VOA introduces is automatically set based on the feedback provided from a dedicated photodiode, so that a specific power setpoint value is reached and maintained.

VOA Startup Phases

The final VOA condition is achieved through a startup procedure divided into the four sequential phases shown in Figure 26: VOA Startup Procedure, on page 78.

Figure 26: VOA Startup Procedure



Until the VOA has completed all the phases shown in Figure 26: VOA Startup Procedure, on page 78, the power control mode is not fully activated.

Phase 1: Incoming Signal Validation

The Incoming Signal Validation phase checks to see that the optical interface connection is valid and that the optical power level is appropriate.

Cisco TransportPlanner calculates the VOA Attenuation Reference value to allow only supported MSTP interfaces to overcome the power start-up (Pstart-up) acceptance level. (Refer to the Network Reference chapter of the Configuration guide.)

If the interface that is connected has a power value outside the allowed range, the Phase 1 check prevents OCHNC turn-up.

Phase 2: Valid Signal Detected

If Phase 1 indicates that the signal is valid, an automatic iterative attenuation adjustment on the VOA takes place to reach a power target on the photodiode downstream of the VOA.



Note The power setpoint is generated by Cisco TransportPlanner on a case-by-case basis. During the ANS run, the power target is provisioned on the VOA.

Phase 3: Channel Power Setpoint Locking

In Phase 3, the VOA is kept in a transient standby condition when a steady power value close enough to the final power setpoint has been reached (nominally 3 dBm lower).

The duration of the transient standby condition is three seconds (by default) and allows safe management of optical interfaces that have different signal rise time values or are undergoing a pulse startup procedure compliant with the ITU-T G664 recommendation.

Phase 4: Channel Power Control Mode Fully Activated

The VOA reaches the final attenuation condition that leads the power value that is read on the photodiode to the expected target value (VOA Power Reference). Simultaneously, the VOA operating mode switches to power control mode.

From this point on, any further adjustment of the VOA attenuation is triggered by a variation of the value read on the photodiode. The aim of these adjustments is to always keep the power value equal to the power setpoint, with +/ 0.5 dBm as the minimum adjustment increment.

VOA Failure Scenarios

Several conditions can stop the startup procedure at an intermediate step, blocking the VOA (and the circuit activation, as a consequence) from completing activation of the power control mode. The scenarios in this section portray those conditions.

Root-cause identification can be performed based on the alarm raised and the power reading on the photodiode associated with the VOA.

Scenario A: Optical Power Level of the Incoming Signal Lower Than Minimum Allowed by MSTP Supported Optical Interfaces

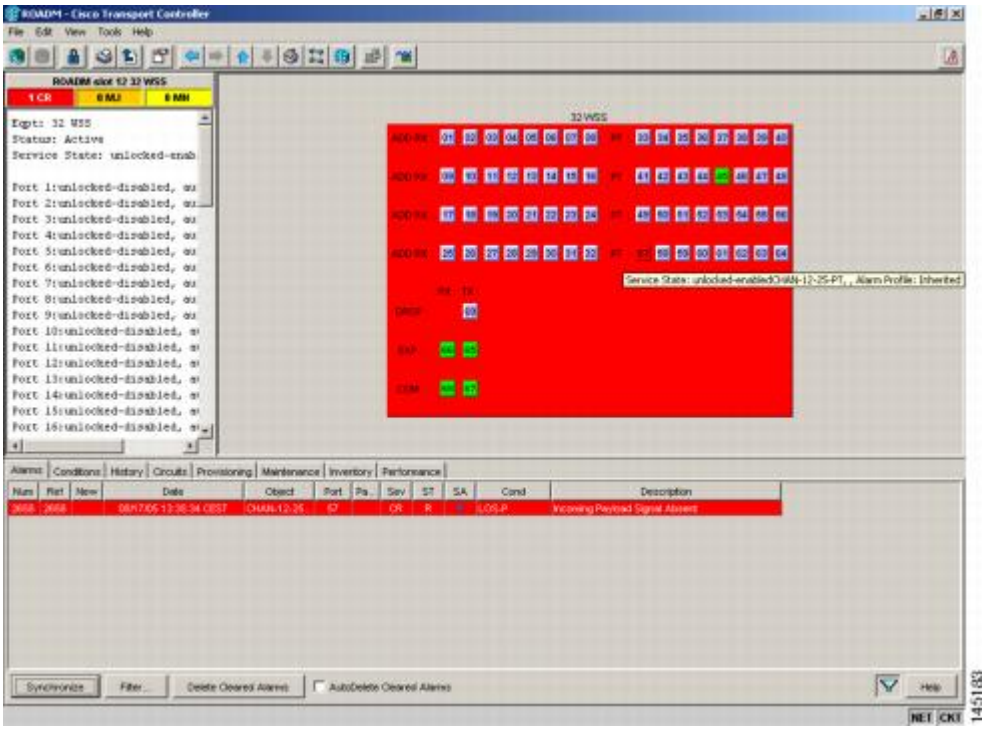
This scenario is for a condition where a TXP or MXP card is directly connected to a 32MUX-O, 40MUX, 32WSS, or 40WSS-C card where power in is expressed as Pin < –4.5 dBm.

If the incoming power level is lower than the minimum allowed, the startup procedure always stops at Phase 1 (see Figure 27: LOS-P Indication on the VOA Port, on page 80). This is the case even if the final VOA Power Reference reported in CTC is reachable.

The final conditions that CTC reports are:

- A LOS-P (OCH layer) alarm on the port associated with the VOA (see Figure 27: LOS-P Indication on the VOA Port, on page 80)
- A valid optical power value (different from the end of scale value of – 50 dBm) in the Power field, but the value for Power is less than –33 dBm. (To view the Power field, in card view, click the **Provisioning** > **Parameters** tabs.)

Figure 27: LOS-P Indication on the VOA Port



Use the following procedure to troubleshoot and eventually fix issues related to the VOA start-up when the optical power level of the incoming signal is lower than the minimum allowed by the MSTP supported optical interfaces.

Corrective Action for Scenario A

Procedure

Step 1 Verify the alarm validity:

a) Identify the DWDM nodes where the alarmed card is seated.
b) Double-click the card.
c) Click **Alarms.**
d) Verify that a LOS-P alarm is present on the ADD-RX port.
e) Click the **Synchronize** button in the bottom left of the window.
f) If the alarm is correctly reported, move to Step 2. If not, close the CTC application, delete the CTC cache, and open the CTC connection again.

Note
If the alarm inconsistency persists, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 2 If the alarmed card is a 32WSS or 40WSS-C, verify the incoming power level from the connected TXP, MXP, or line card. If the alarmed card is a 32MUX-O or 40MUX, go to Step 5.

a) Double-click the WSS card.
b) Click the **Provisioning > Optical Chn: Optical Connector** *X* **> Parameters** tabs to display the optical power physically coming into the WSS ADD-RX port.

Note
X is the number (1 to 45) of the appropriate multifiber MPO connector that manages the alarmed channel (wavelength).

c) Identify the proper channel (wavelength) and read the Power ADD field.
d) If the Power ADD value is less than 4.5 dBm, go to Step 3. If not, click the Provisioning > Optical Chn: Optical Connector *X* > Parameters tabs.

Note
X is the number (1 to 4) of the appropriate multifiber MPO connector that manages the alarmed channel (wavelength).

e) Identify the correct row based on the Type field (the row must indicate Add in the type field).
f) Decrease the attenuation on the VOA to the minimum (0 dB) to enable channel startup. To perform this adjustment:
   - Read the VOA Attenuation Ref value for the channel (wavelength).
   - Enter into the VOA Attenuation Calib field the same value as that of the VOA Attenuation Ref field, but with the opposite sign (the algebraic sum of the two contributions must be equal to zero).
   - Click **Apply**. If the LOS-P alarm persists, continue with this procedure. Otherwise, the problem has been corrected.

g) In card view, click **Circuits.**
h) Delete the OCHNC circuit that relates to the faulty channel.

i) Ensure that the corresponding ADD-RX service state port changes to IS-AINS (or Unlocked,automaticInService) and that the color changes to grey (the LOS-P alarm should clear).
j) Recreate the OCHNC circuit and verify that the Status field reports DISCOVERED and that the state is IS (Unlocked).
k) If the LOS-P alarm has not cleared, replace the 32WSS card (refer to the Upgrade, Add, and Remove Cards and Nodes chapter of the Configuration guide). Before you replace the card, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Step 3 Because the actual power received by the WSS card is lower than expected, verify the correct behavior of the TXP, MXP, or line card connected to the WSS:

- The TX laser must be active (trunk port is in IS [or Unlocked] state).
- The wavelength provisioned must be the proper one.
- The output power value must be within the expected range (refer to the Configuration guide). If the trunk port PM is not available through CTC, perform a manual measurement using a standard power meter.

If the TX laser is active, the wavelength is provisioned properly, and the output power value is in the correct range, go to Step 4. Otherwise, take the appropriate corrective action, including card replacement if the output power value is outside of the expected range (refer to the Upgrade, Add, and Remove Cards and Nodes chapter of the Configuration guide. Replacing the card should correct the problem.)

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Step 4 If the TXP or MXP card behaves as expected, the only remaining root cause is the fiber connection between the two cards:

a) Verify that the ADD_RX port of the alarmed WSS is connected to the TRUNK_TX port of the TXP or MXP card using an MPO-LC multifiber cable.

Note
A patch-panel tray is normally used to manage fiber connections (for patch-panel cabling details, refer to the Turn Up a Node chapter in the Configuration guide).

b) Check and clean the LC fiber fan-out according to site practice. The fiber numbers (1 to 8) must correspond to the wavelength managed.
c) If a patch panel is used, check and, if necessary, clean the LC-LC adapter. If necessary, replace any bad devices (maximum tolerance is 1 dB).
d) Pull out the LC connector from the TRUNK_TX port of the TXP or MXP card and clean the fiber according to site practice.

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter of the Configuration guide.

Note
If the alarm condition has not cleared, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 5 When the alarmed card is a 32MUX-O or 40MUX, the troubleshooting procedure should start from the TXP, MXP, or line card. Verify the correct behavior of the TXP, MXP, or line card connected to the 32MUX-O or 40MUX:

- The TX laser must be active (trunk port is in IS [or Unlocked] state).
- The wavelength provisioned must be the proper one.
- The output power value must be within the expected range (refer to the Configuration guide). If the trunk port PM is not available through CTC, perform a manual measurement using a standard power meter.

If the TX laser is active, the wavelength is provisioned properly, and the output power value is in the correct range, go to Step 6. Otherwise, take the appropriate corrective action, including card replacement if the output power value is outside of the expected range (refer to the Upgrade, Add, and Remove Cards and Nodes chapter of the Configuration guide. Replacing the card should correct the problem.)

Step 6 If the TXP or MXP card behaves as expected, check the fiber connection between the two cards:

a) The ADD_RX port of the alarmed 32MUX-O or 40MUX must be connected to the TRUNK_TX port of a TXP or MXP card using an MPO-LC multifiber cable.

Note
A patch-panel tray is normally used to manage fiber connections (for patch-panel cabling details, refer to the Turn Up a Node chapter in the Configuration guide).

b) Check and clean the LC fiber fan-out according to site practice. The fiber numbers (1 to 8) must correspond to the wavelength managed.
c) If a patch panel is used, check and, if necessary, clean the LC-LC adapter.
d) If necessary, replace any bad devices (maximum tolerance is 1 dB).
e) Pull out the LC connector from the TRUNK_TX port of the TXP or MXP card and clean the fiber according to site practice.

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter of the Configuration guide.

f) If the alarm condition persists, move to Step 7. Otherwise, the problem has been corrected.

Step 7 Verify the correct behavior of the VOA inside the 32MUX-O or 40MUX card:

a) Double-click the card.
b) Click **Circuits.**
   - Delete the OCHNC circuit relating to the faulty channel.
   - Ensure that the service state of the corresponding ADD-RX port changes to IS-AINS (or Unlocked,automaticInService), and that the color turns grey (the LOS-P alarm should clear).
c) In card view, click the **Provisioning** > **Optical Chn** > **Parameters** tabs and identify the proper channel (wavelength).

d) Decrease the attenuation on the VOA to the minimum (0 dB) to enable channel startup. To perform this in field adjustment:

- Read the VOA Attenuation Ref value for the channel (wavelength).
- Enter the same value into the VOA Attenuation Calib field as that of the VOA Attenuation Ref field, but with the opposite sign (the algebraic sum of the two contributions must be equal to zero).
- Click **Apply**. If the LOS-P alarm persists, continue with this procedure. Otherwise, the problem has been corrected.

e) Click **Circuits.**

f) Recreate the OCHNC circuit and verify that Circuit Status field reports DISCOVERED and the state is IS (Unlocked).

g) If the LOS-P alarm has not cleared, replace the 32MUX-O or 40MUX card (refer to the Upgrade, Add, and Remove Cards and Nodes chapter of the Configuration guide). Before you replace the card, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem).

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Scenario B: Optical Power Level of the Incoming Signal Lower Than Expected

In some cases, the pass-through channels on the WSS card or the optical bypass channels on the 32MUX-O or 40MUX card are at a power level that is lower than expected. The incoming power level can be lower than expected for several reasons. A few examples are:

- Dirty connections
- Excessive span loss
- Wrong amplifier gain setting

When the power is lower than expected, the start-up procedure can stop at Phase 1, Phase 2, or Phase 3 . The point at which the start-up procedure stops depends on the amount of power missing.

Given that Delta Power is the amount of optical power missing compared to the expected value, two final conditions for Scenario B can be identified, Conditions B1 and B2.

Condition B1—Delta Power > 6 dB (LOS-P Alarm)

When the optical power is more than 6 dB lower than the expected value, the final VOA Power Reference setpoint value is definitively not reachable and even Phase 1 of the start-up procedure cannot be properly completed. As a consequence, the final condition reported in CTC is the same as that of Scenario A:

- A LOS-P (OCH layer) alarm is present on the port associated with the VOA.
- A valid optical power value (different from the end of scale value of – 50 dBm) can be read in the Power field, but the value for Power is less than –33 dBm. (To access this value, in card view, click the **Provisioning** > **Parameters** tabs.)

Condition B2—Delta Power less than 6 dB (OPWR-LowDEGrade Alarm)

When the optical power is less than 6 dB lower than the expected value, even if a valid incoming signal is present, the final VOA Power Reference setpoint value that is reported in the CTC is not reachable and the VOA startup procedure is stopped at Phase 3.

The final conditions that CTC reports are:

- An OPWR-LowDEGrade (OCH layer) alarm is present on the port associated with the VOA.
- A valid optical power value (different from the end of scale value of –50 dBm) can be read in the Power field, but the value is (VOA Power Ref – 6 dBm) < Power < VOA Power Ref. To access this value, in card view, click the **Provisioning > Parameters** tabs.

Corrective Actions for Scenario B (Optical Power Level of Incoming Signal Lower than Expected)

When the optical power level of the incoming signal is lower than expected for the pass-through channels on the WSS or the optical bypass channels on the 32MUX-O or 40MUX card, use the following procedures to troubleshoot and eventually fix issues related to VOA start-up. According to the final conditions reported by the card (either LOS-P alarm for condition B1 or OPWR-LowDEGrade for condition B2), two troubleshooting procedures are suggested. These procedures are given in the following sections.

Condition B1 - LOS-P Alarm

Procedure

Step 1 Verify the alarm validity:

a) Identify the DWDM nodes where the alarmed card is located.
b) Double-click the card (either the 32MUX-O, 40MUX, or WSS card).
c) Click **Alarms.**
d) Verify that a LOS-P alarm is present on the ADD-RX port.
e) Click the **Synchronize** button at the bottom left of the window.
f) If the alarm is correctly reported, move to Step 2, on page 85. If not, close the CTC application, delete the CTC cache, and open the CTC connection again.

Note
If the alarm inconsistency persists, log into the Technical Support Website at http://www.cisco.com/cisco/web/support/index.html for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 2 In card view, click **Circuits** and retrieve the node, card, and port information for the alarmed channel from the Source field of the OCHNC circuit. Then follow the procedures of Step 3, on page 85 (32MUX-O, 32WSS, 40MUX, 40WSS-C, or AD-xC-xx.x card) or Step 4, on page 86 (TXP, MXP, or line card) as appropriate.

Step 3 Verify the correct behavior of the far-end DWDM card (32MUX-O, 32WSS, 40MUX, 40WSS-C, or AD-xC-xx.x) that manages the channel (wavelength):

a) Verify that the power value coming in on the ADD_RX port is correct.

- In card view, click the **Provisioning > Optical Chn: Optical Connector** *X* > Parameters tabs.

Note

X is number (1 to 45) of the proper multifiber MPO connector that manages the alarmed channel (wavelength).

- The Power field value must be the same as that in the VOA Power Ref field. If not, take the appropriate corrective actions according to the alarm raised at the RX-ADD port.

Step 4 Verify the correct behavior of the TXP, MXP, or line card that is the signal source of the channel (wavelength) that is alarmed:

a) The TX laser must be active (trunk port is in IS [Unlocked] state).
b) The wavelength provisioned must be the proper one.
c) The output power value must be within the expected range (refer to the Hardware Specifications appendix in the Reference manual. If the trunk port PM is not available through CTC (for example, TXP_MR_2.5G), perform a manual measurement using a standard power meter.

Step 5 If the cards referenced in Step 3, on page 85 and Step 4, on page 86 are operating properly, go to Step 6, on page 86. If not, take the appropriate corrective actions according to the alarm raised on the card.

Step 6 If the alarmed card is a 32MUX-O or 40MUX, go to Step 9, on page 87.

Step 7 If the alarmed card is a 32WSS or 40MUX, continue with the following steps:

a) Double-click the card.
b) Click the **Provisioning** > **Optical Chn: Optical Connector** *X* > **Parameters** tabs.

Note
X is number (1 to 45) of the proper multifiber MPO connector that manages the alarmed channel (wavelength).

c) Identify the correct row based in the Type field (the row must indicate Passthrough in the type field).
d) Decrease the attenuation on the VOA to the minimum (0 dB) to enable channel startup. To perform this in field adjustment:

- Read the VOA Attenuation Ref value for the channel (wavelength).
- Enter the same value into the VOA Attenuation Calib field as that of the VOA Attenuation Ref field, but with the opposite sign (the algebraic sum of the two contributions must be equal to zero).
- Click **Apply**. If the LOS-P alarm persists, continue with this procedure. Otherwise, the problem has been corrected.

e) Click **Circuits.**
f) Delete the OCHNC circuit for the faulty channel.
g) Ensure that the service state of the corresponding ADD-RX port changes to IS-AINS (or Unlocked,automaticInService) and that the color changes to grey (LOS-P alarm should clear).
h) Recreate the OCHNC circuit and verify that Circuit Status field reports DISCOVERED and the state is IS (Unlocked).
i) If the LOS-P alarm has not cleared, continue with Step 8, on page 86. Otherwise, the problem has been corrected.

Step 8 To unambiguously pinpoint the root cause of the alarm, verify the proper cabling of the EXP_RX port (which is the common input port for all the pass-through channels) on the 32WSS or 4-WSS-C card:

a) The EXP_RX port of the alarmed 32WSS card must be connected to the EXP_TX port of the coupled WSS card on the opposite side of the node.

b) Pull out the LC connector from the EXP_RX port of the WSS card and clean the fiber according to site practice.
c) Pull out the LC connector from the EXP_TX port of the coupled WSS card and clean that connector also.
d) Verify that the fiber attenuation is within the specifications (maximum tolerance is 1 dB).
e) If necessary, replace any bad fibers.

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter of the Configuration Guide.

f) If the alarm condition persists even after the checking and fixing the fibers, replace the 32WSS card (refer to the Upgrade, Add, and Remove Cards and Nodes chapter of the Configuration Guide). Before replacing the card, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem).

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Step 9 Verify the correct behavior of the VOA inside the 32MUX-O or 40MUX card:

a) Double-click the 32MUX-O or 40MUX card.
b) Click **Circuits.**
c) Delete the OCHNC circuit for the faulty channel.
d) Ensure that the service state of the corresponding ADD-RX port changes to IS-AINS (or Unlocked,automaticInService) and that the color changes to grey (LOS-P alarm should clear).
e) Click the **Provisioning > Optical Chn > Parameters** tabs and identify the proper channel (wavelength).
f) Decrease the attenuation on the VOA to the minimum (0 dB) to enable channel startup. To perform this in field adjustment:

- Read the VOA Attenuation Ref value for the channel (wavelength).
- Enter the same value into the VOA Attenuation Calib field as that of the VOA Attenuation Ref field, but with the opposite sign (the algebraic sum of the two contributions must be equal to zero).
- Click the **Apply** button. If the LOS-P alarm persists, continue with this procedure. Otherwise, the problem has been corrected.

g) Click **Circuits.**
h) Recreate the OCHNC circuit and verify that Circuit Status field reports DISCOVERED and the state is IS (Unlocked).
i) If the LOS-P alarm has not cleared, continue with Step 8, on page 86. Otherwise, the problem has been corrected.

Step 10 To unambiguously pinpoint the root cause of the alarm, verify the proper cabling of the alarmed ADD_RX port on the 32MUX-O or 40MUX card:

a) The ADD_RX port of the alarmed 32MUX-O or 40MUX must be connected to the DROP_TX port of the coupled 32DMX-O or 40DMX card on the opposite side of the node using two MPO-LC multifiber cables.

Note
A patch-panel tray is normally used to manage fiber connections (for patch-panel cabling details, refer to the Turn Up a Node chapter in the Configuration Guide).

b) Verify that the power value coming out of DROP_TX port of the coupled 32DMX-O or 40DMX card is correct:

- In card view, click the **Provisioning > Optical Chn: > Parameters** tabs.
- The Power field value must be the same as that in the VOA Power Ref field. If it is not, take the appropriate corrective action for the alarm according to Alarm Troubleshooting

c) Check and clean the LC fiber fan-out according to site practice. The fiber numbers (1 to 8) must correspond to the wavelength managed.
d) Repeat Step 10.e, on page 88 for the MPO-LC multifiber cable coming out of the DROP_TX port of the coupled 32DMX-O or 40DMX card.
e) Check and, if necessary, clean the LC-LC adapter.
f) If necessary, replace and bad devices (maximum tolerance is 1 dB).

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter of the Configuration Guide.

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

g) If the alarm condition persists even after the cabling is checked or fixed, replace the 32MUX-O or 40MUX card (refer to the Upgrade, Add, and Remove Cards and Nodes chapter of the Configuration Guide. Before replacing the card, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem).

Condition B2 - OPWR-LowDEGrade Alarm

Procedure

Step 1 Verify the alarm validity:

a) Identify the DWDM node where the alarmed card is located.
b) Double-click the card (either the 32MUX-O, 32WSS, 40MUX, or 40WSS-C card).
c) Click **Alarms.**
d) Verify that an Optical Power Degrade Low (OPWR-LDEG) alarm is present on the ADD-RX port.
e) Click the **Synchronize** button at the bottom left of the window.
f) If the alarm is correctly reported, go to Step 2. If not, close the CTC application, delete the CTC cache, and open the CTC connection again.

Note
If the alarm inconsistency persists, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 2 In card view, click **Circuits** and retrieve the node, card, and port information for the alarmed channel from the Source field of the OCHNC circuit. Then, follow the procedures in Step 3 (for 32MUX-O, 32WSS, 40MUX, 40WSS-C, or AD-xC-xx.x cards) or Step 4 (for TXP, MXP, or line cards) as appropriate.

Step 3 Verify the correct behavior of the far-end DWDM card (32MUX-O, 32WSS, 40MUX, 40WSS-C, or AD-xC-xx.x) that manages the channel (wavelength). To do this, verify that the power value coming in on the ADD_RX port is correct:

a) In card view, click the **Provisioning** > **Optical Chn: Optical Connector** *X* > **Parameters** tabs.

Note
X is number (1 to 45) of the proper multi-fibers MPO connector that manages the alarmed channel (wavelength).

b) The Power field value must be the same as the VOA Power Ref field. If it is not, take the appropriate corrective action for the alarm according to Alarm Troubleshooting

Step 4 Verify the correct behavior of the TXP, MXP, or line card that is the signal source of the channel (wavelength) that is alarmed:

a) The TX laser must be active (trunk port is in IS [unlocked] state).
b) The wavelength provisioned must be the proper one.
c) The output power value must be within the expected range (refer to the Configuration guide). If the trunk port PM is not available through CTC, perform a manual measurement using a standard power meter.

Step 5 If the cards referenced in Step 3 and Step 4 are operating properly, go to Step 6. If not, take the appropriate corrective actions according to the alarm raised on the card (see Alarm Troubleshooting).

Step 6 If the alarmed card is a 32MUX-O or 40MUX card, go to Step 8.

Step 7 If the alarmed card is a 32WSS or 40WSS-C card, verify the proper cabling of the EXP_RX port (common input port for all pass-through channels) on the WSS card:

a) Verify that the EXP_RX port of the alarmed WSS card is connected to the EXP_TX port of the coupled WSS card on the opposite side of the node.
b) Pull out the LC connector from the EXP_RX port of the WSS card and clean the fiber according to site practice.
c) Pull out the LC connector from the EXP_TX port of the coupled WSS card and clean its connector also.
d) Verify that the fiber attenuation is within the specifications (maximum tolerance is 1 dB).
e) If necessary, replace any bad fibers.

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter of the Configuration guide.

Note

If the alarm condition persists even after the cabling check/fixing, the root cause could be related to a network issue and a more accurate analysis of the signal flow is needed according to the actual system topology. If necessary, call Cisco TAC (1 800 553-2447) for help.

Step 8 Verify the proper cabling of the alarmed ADD_RX port on the 32MUX-O or 40MUX card:

a) Verify that the ADD_RX port of the alarmed 32MUX-O or 40MUX is connected to the DROP_TX port of the coupled 32DMX-O or 40DMX card on the opposite side of the node, using two MPO-LC multifiber cables.

Note
A patch-panel tray is normally used to manage fiber connections (for patch-panel cabling details, refer to the Turn Up a Node chapter in the Configuration guide).

b) Verify that the power value coming out of the DROP_TX port of the coupled 32DMX-O card is correct:

- In card view, click the **Provisioning > Optical Chn> Parameters** tabs.
- The Power field value must be the same as that in the VOA Power Ref field. If it is not, take the appropriate corrective action for the alarm according to Alarm Troubleshooting

c) Check (the number [1 to 8] must correspond with the wavelength managed) and clean the LC fan-out according to site practice.

d) Repeat Step Condition B2 - OPWR-LowDEGrade Alarm, on page 88 for the MPO-LC multifiber cable coming out of the DROP_TX port of the coupled 32DMX-O or 40DMX card.

e) Check and, if necessary, clean the LC-LC adapter used.

f) If necessary, replace any bad devices (maximum tolerance is 1 dB).

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter of the Configuration guide.

Note
If the alarm condition persists even after the cable check and repair procedures, the root cause could be related to a network issue and a more accurate analysis of the signal flow is needed according with the actual system topology. If necessary, call Cisco TAC (1 800 553-2447) for help.

Scenario C: Optical Drop Power Level Lower Than Expected

This scenario describes the condition in which the optical power at the 32DMX-O or 40DMX drop channels is lower than expected. The 32DMX-O card is equipped with a VOA for each wavelength, and each VOA manages the power for one dropped wavelength.

The failing scenarios during the OCHNC turn-up and consequent VOA startup are the same as those described in the Scenario B: Optical Power Level of the Incoming Signal Lower Than Expected, on page 84. The only difference is the type of alarm that is raised when the condition exists in which Delta Power is greater than 6 dB.

Condition C1—Delta Power > 6 dB Lower than Expected

When the optical power on the dropped channel is more than 6 dB lower that the value expected, the final VOA Power Reference setpoint value is definitively not reachable. As a consequence, the final conditions reported in CTC are as follows:

- An OPWR-LFAIL (OCH layer) alarm is present on the port associated with the VOA.
- A valid optical power value (different from the end of scale value of –50 dBm) can be read in the CTC Power field, but the Power value is less than –33 dBm. (To view this value in card view, click the **Provisioning** > **Parameters** tabs.)

Condition C2—Delta Power less than 6 dB Lower than Expected

If the delta power is less than 6 dB lower than expected, the final conditions reported in CTC are the same as those reported for Condition B2 (see the Condition B2—Delta Power less than 6 dB (OPWR-LowDEGrade Alarm), on page 85):

- An OPWR-LowDEGrade (OCH layer) alarm is present on the port associated with the VOA.
- A valid optical power value (different from the end of scale value of –50 dBm) can be read in the CTC Power field, but the value is (VOA Power Ref – 6 dBm) < Power < VOA Power Ref. To view this value in card view, click the **Provisioning** > **Parameters** tabs.

A dirty connection or excessive loss of the incoming span are among the possible reasons that can lead to a fault condition. They are the most common and affect all wavelengths, whereas an excessive amplifier gain tilt or a wavelength misconfiguration on the far-end TXP or MXP card can lead to condition where only a single wavelength fails.

Corrective Action for Scenario C (Optical Power Level of Incoming Signal Lower than Expected)

Scenario C1 - LOS-P Alarm

Procedure

Step 1 Verify the alarm validity:

a) Identify the DWDM nodes where the alarmed card is located.
b) Double-click the 32DMX-O or 40DMX card.
c) Click **Alarms.**
d) Verify that a LOS-P alarm is present on the CHAN-TX port.
e) Click the **Synchronize** button at the bottom left of the window.
f) If the alarm is correctly reported, move to Scenario C1 - LOS-P Alarm, on page 91. If not, close the CTC application, delete the CTC cache, and open the CTC connection again.

Note
If the alarm inconsistency persists, log into the Technical Support Website at http://www.cisco.com/cisco/web/support/index.html for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 2 Verify the correct behavior of the far-end DWDM card (32MUX-O, 32WSS, 40MUX, 40WSS-C, AD-xC-xx.x) that manages the channel (wavelength), and the TXP, MXP, or line card that is the signal source of the channel (wavelength) alarmed:

a) Click Circuits and retrieve the node, card, and port information for the alarmed channel from the Source field of the OCHNC circuit.

b) For the far-end DWDM card, verify that the power value coming in the ADD_RX port is correct:

- In card view, click the **Provisioning > Optical Chn: Optical Connector** *X* **> Parameters** tabs.

Note
X is number (1 to 45) of the proper multifiber MPO connector that manages the alarmed channel (wavelength).

- The Power field value must be the same of VOA Power Ref field. If not, take the appropriate corrective actions according to Alarm Troubleshooting

c) For the corresponding TXP, MXP, or line card connected, verify the following:

- The TX laser is active (the trunk port is in IS [Unlocked] state).
- The wavelength provisioned is the proper one.

d) The output power value must be within the expected range (refer to the Configuration guide). If the trunk port PM is not available through CTC (for example, TXP_MR_2.5G), perform a manual measurement using a standard power meter.

e) If everything in Scenario C1 - LOS-P Alarm, on page 91 is correct, go to Scenario C1 - LOS-P Alarm, on page 91. If not, take the appropriate corrective actions according to Alarm Troubleshooting

Step 3 Verify the correct behavior of the VOA inside the 32DMX-O or 40DMX card:

a) Double-click the 32DMX-O or 40DMX card.

b) Click **Circuits.**

c) Delete the OCHNC circuit for the faulty channel.

d) Ensure that the service state of the corresponding CHAN-TX port changes to IS-AINS (or Unlocked,automaticInService) and the color changes to grey (LOS-P alarm should clear).

e) Click the **Provisioning > Optical Chn > Parameters** tabs and identify the proper channel (wavelength).

f) Decrease the attenuation on the VOA to the minimum (0 dB) to enable channel startup. To perform this in field adjustment:

- Read the VOA Attenuation Ref value for the channel (wavelength).
- Enter the same value into the VOA Attenuation Calib field as that in the VOA Attenuation Ref field, but with the opposite sign (the algebraic sum of the two contributions must be equal to zero).
- Click **Apply.**

g) Click **Circuits.**

h) Recreate the OCHNC circuit and verify that Circuit Status field reports DISCOVERED and the state is IS (Unlocked).

i) If the LOS-P alarm has not cleared, continue with Scenario C1 - LOS-P Alarm, on page 91. If it has cleared, you are finished.

Step 4 To unambiguously pinpoint the root cause of the alarm, verify the proper cabling of the COM-RX port (common input port for all the drop channels) of the alarmed 32DMX-O or 40DMX card:

a) Verify that the COM_RX port of the alarmed 32DMX-O or 40DMX is connected either to the DROP_TX port of a 32WSS or 40WSS-C card or to the COM_TX port of an OPT-PRE, OPT-BST/OPT-AMP-C/OPT-AMP-17-C, or OSC-CSM card, depending on the actual node layout.
b) Pull out the LC connector from the COM_RX port of the 32DMX-O or 40DMX card and clean the fiber according to site practice.
c) Pull out the LC connector from the COM_TX or DROP_TX port of the connected DWDM card and clean the fiber according to site practice.
d) Verify that the fiber attenuation is within the specifications (maximum tolerance is 1 dB).
e) If necessary, replace any bad fibers.

Warning
Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard. Statement 1056

Note
Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter of the Configuration guide.

f) If the alarm condition persists even after the cabling has been checked and fixed, replace the 32DMX-O card (refer to the Upgrade, Add, and Remove Cards and Nodes chapter of the Configuration guide. Before replacing the card, log into the Technical Support Website at http://www.cisco.com/techsupport for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem).

Warning
High-performance devices on this card can get hot during operation. To remove the card, hold it by the faceplate and bottom edge. Allow the card to cool before touching any other part of it or before placing it in an antistatic bag. Statement 201

Scenario C2 - OPWR-LowDEGrade Alarm

Procedure

Step 1 Verify the alarm validity:
a) Identify the DWDM nodes where the alarmed card is seated.
b) Double-click the 32DMX-O or 40DMX card.
c) Click **Alarms.**
d) Verify that an Optical Power Degrade Low Loss of incoming Payload (OPWR-LDEG) alarm is present on the CHAN-TX port.
e) Click the **Synchronize** button at the bottom left of the window.
f) If the alarm is correctly reported, move to Scenario C2 - OPWR-LowDEGrade Alarm, on page 93. If not, close the CTC application, delete the CTC cache, and open the CTC connection again.

Note
If the alarm inconsistency persists, log into the Technical Support Website at http://www.cisco.com/cisco/web/support/index.html for more information or call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Step 2 Verify the correct behavior of the far-end DWDM card (32MUX-O, 32WSS, 40MUX, 40WSS-C, or AD-xC-xx.x) that manages the channel (wavelength) and the TXP, MXP, or line card that is the signal source of the channel (wavelength) alarmed.

a) Click **Circuits** and retrieve the node, card, and port information for to the alarmed channel from the Source field of the OCHNC circuit.

b) For the far-end DWDM card, verify that the power value coming in on the ADD_RX port is correct:

- In card view, click the **Provisioning > Optical Chn: Optical Connector** *X* **> Parameters** tabs.

  Note
  X is number (1 to 45) of the proper multifiber MPO connector that manages the alarmed channel (wavelength).

- The Power field value must be the same of VOA Power Ref field. If not, take the appropriate corrective actions according to Alarm Troubleshooting

c) For the corresponding TXP, MXP, or line card connected, verify the following:

- The TX laser is active (the trunk port is in IS [Unlocked] state).
- The wavelength provisioned is the proper one.

d) The output power value must be within the expected range (refer to the Configuration guide). If the trunk port PM is not available through CTC, perform a manual measurement using a standard power meter.

e) If everything in Scenario C2 - OPWR-LowDEGrade Alarm, on page 93 is correct, move to Scenario C2 - OPWR-LowDEGrade Alarm, on page 93. If not, take the appropriate corrective actions according to Alarm Troubleshooting.

Step 3 Verify the proper cabling of the COM-RX port (the common input port for all of the drop channels) of the alarmed 32DMX-O or 40DMX:

a) Verify that the COM_RX port of the alarmed 32DMX-O or 40DMX is connected either to the DROP_TX port of a 32WSS or 40WSS-C card or to the COM_TX port of an OPT-PRE, OPT-BST/OPT-AMP-C/OPT-AMP-17-C, or OSC-CSM, depending on the actual node layout.

b) Pull out the LC connector from the COM_RX port of the 32DMX-O or 40DMX card and clean the fiber according to site practice.

c) Pull out the LC connector from the COM_TX or DROP_TX port of the connected DWDM card and clean the fiber according to site practice.

d) Verify that the fiber attenuation is within the specifications (maximum tolerance is 1 dB).

e) If necessary, replace any bad fibers.

Warning
Invisible laser radiation could be emitted from the end of the unterminated fiber cable or connector. Do not stare into the beam 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 could pose an eye hazard. Statement 1056

Note

Before disconnecting any optical amplifier card fiber for troubleshooting, ensure that the optical amplifier card is unplugged.

Note
If no site practice exists for cleaning fibers, complete the procedure in the Maintain the Node chapter in the Configuration guide.

f) If the alarm condition persists even after the cabling has been checked and fixed, the root cause could be related to a network issue and a more accurate analysis of the signal flow is needed according to the actual system topology. If necessary, call Cisco TAC (1 800 553-2447) in order to report a service-affecting problem.

Counter-Propagating Light Affecting Operation of 32DMX-C and 32DMX-L Cards

Problem The in-service operation of the 32DMX-C and 32DMX-L cards (with vendor ID 2049 and 2050) can be seriously affected by the counter-propagating light travelling from the drop ports of the card towards the COM RX port. This counter-propagating light affects the internal VOA control loop of the vendor-specific optical module of the 32DMX-C and 32DMX-L cards, leading to an increased optical path attenuation. This is traffic affecting for all in-service channels.

Possible Cause The counter-propagating light can be inserted into the 32DMX-C or 32DMX-L card as a result of incorrect cabling of transponder or line cards to the fiber patch-panel (in particular, swapping RX with TX patchcords).

Solution For software releases higher than or equal to 9.0, the vendor-specific optical module on all the cards is automatically upgraded to a newer version. The vendor ID of the new version of the card is 2051 and can be viewed at **CTC > Card View > Inventory** tab. This new version of the optical module makes the VOA control robust to counter-propagating light, thus, minimizing the effects of incorrect cabling during installation and/or maintenance.

Solution For software releases lower than 9.0, for new 32DMX-C and 32DMX-L cards that are not already installed, the vendor-specific optical module on all these new cards is automatically upgraded to a newer version at the Cisco Spare depots. Once the new card is installed in field, a downgrade of the optical module will be prevented and the latest optical module version is preserved on the software package. If the 32DMX-C or 32DMX-L card is already installed, complete the Corrective Action for Software Releases Lower than 9.0, on page 95 to manually fix the problem.

Corrective Action for Software Releases Lower than 9.0

Procedure

Step 1 If the TXP card is preprovisioned in CTC, but not installed:

a) Log into CTC.
b) Display card view for the TXP card.
c) Click the **Provisioning > Line** tab and choose **OOS,DSBLD** (ANSI) or **Locked,disabled** (ETSI) from the Admin State drop-down list for the Trunk-TX port.
d) Continue with Step 2.

Step 2 Install the TXP card into the receptacle at the back of the designated slot.

Step 3 Wait for the TXP card to boot completely.

Step 4 Verify that the Trunk-TX port of the TXP card is in OOS,DSBLD (ANSI) or Locked,disabled (ETSI) state.

Step 5 Wire the Trunk-TX/RX port of the TXP card to the fiber patch-panel.

Step 6 Turn up the TXP card and display card view for the TXP card in CTC.

Step 7 Click the **Provisioning > Line** tab and choose **IS,AINS** (ANSI) or **Unlocked,automaticInService** (ETSI) from the Admin State drop-down list for the Trunk-TX port.

Step 8 Display card view for the 32WSS card.

Step 9 Click the **Performance > Optical Chn** tab and verify the Power ADD field on the CHAN-RX port of the 32WSS card connected to the TXP card.

a) If a valid power level exists, the cabling of the TXP card is correct. Change the admin state of the Trunk-TX port of the TXP card back to the original state.

b) If no power level exists, the cabling of the TXP card is incorrect. Change the admin state of the Trunk-TX port of the TXP card to OOS,DSBLD (ANSI) or Locked,disabled (ETSI) state and reverse the cabling.

Note
It is important that you perform Steps Step 7, on page 96 to Step 9, on page 96 in the shortest time possible. That is, you must check the presence of a valid RX power on WSS card (Step 9, on page 96) immediately after you turn up the TXP Trunk-TX port (Step 7, on page 96), and in case of a bad connection, you must shut off the TXP Trunk-TX port (Step 9) as soon as possible. This is to minimize possible impairments on other channels that are already in service.