CHAPTER 11

Provision Transponder and Muxponder Cards

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

This chapter describes Cisco ONS 15454 transponder (TXP), muxponder (MXP), GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP cards, as well as their associated plug-in modules (Small Form-factor Pluggables [SFPs or XFPs]). For card safety and compliance information, see the *Cisco Optical Transport Products Safety and Compliance Information*.

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

Note The cards described in this chapter are supported on the Cisco ONS 15454, Cisco ONS 15454 M6, Cisco ONS 15454 M2 platforms, unless noted otherwise.

Note The procedures and tasks described in this chapter for the Cisco ONS 15454 platform is applicable to the Cisco ONS 15454 M2 and Cisco ONS 15454 M6 platforms, unless noted otherwise.

Chapter topics include:

- 11.1 Card Overview, page 11-2
- 11.2 Safety Labels, page 11-11
- 11.3 TXP_MR_10G Card, page 11-11
- 11.3.3 Related Procedures for TXP_MR_10G Card, page 11-14
- 11.4 TXP_MR_10E Card, page 11-14
- 11.4.4 Related Procedures for TXP_MR_10E Card, page 11-16
- 11.5 TXP_MR_10E_C and TXP_MR_10E_L Cards, page 11-16
- 11.5.4 Related Procedures for TXP_MR_10E_C and TXP_MR_10E_L Cards, page 11-18
- 11.6 TXP_MR_2.5G and TXPP_MR_2.5G Cards, page 11-18

- 11.6.3 Related Procedures for TXP_MR_2.5G and TXPP_MR_2.5G Cards, page 11-23
- 11.7 40E-TXP-C and 40ME-TXP-C Cards, page 11-23
- 11.7.3 Related Procedures for 40E-TXP-C and 40ME-TXP-C Cards, page 11-25
- 11.8 MXP_2.5G_10G Card, page 11-25
- 11.8.3 Related Procedures for MXP_2.5G_10G Card, page 11-28
- 11.9 MXP_2.5G_10E Card, page 11-28
- 11.9.4 Related Procedures for MXP_2.5G_10E Card, page 11-32
- 11.10 MXP_2.5G_10E_C and MXP_2.5G_10E_L Cards, page 11-32
- 11.10.4 Related Procedures for MXP_2.5G_10E_C and MXP_2.5G_10E_L Cards, page 11-38
- 11.11 MXP_MR_2.5G and MXPP_MR_2.5G Cards, page 11-39
- 11.11.3 Related Procedures for MXP_MR_2.5G and MXPP_MR_2.5G Cards, page 11-44
- 11.12 MXP_MR_10DME_C and MXP_MR_10DME_L Cards, page 11-44
- 11.12.4 Related Procedures for MXP_MR_10DME_C and MXP_MR_10DME_L Cards, page 11-51
- 11.13 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards, page 11-52
- 11.13.4 Related Procedures for 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards, page 11-58
- 11.14 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards, page 11-58
- 11.14.17 Related Procedures for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards, page 11-82
- 11.15 ADM-10G Card, page 11-83
- 11.15.17 Related Procedures for ADM-10G Card, page 11-97
- 11.16 OTU2_XP Card, page 11-97
- 11.16.9 Related Procedures for OTU2_XP Card, page 11-105
- 11.17 TXP_MR_10EX_C Card, page 11-105
- 11.17.4 Related Procedures for TXP_MR_10EX_C Card, page 11-108
- 11.18 MXP_2.5G_10EX_C card, page 11-108
- 11.18.4 Related Procedures for MXP_2.5G_10EX_C Card, page 11-112
- 11.19 MXP_MR_10DMEX_C Card, page 11-112
- 11.19.4 Related Procedures for MXP_MR_10DMEX_C Card, page 11-118
- 11.20 MLSE UT, page 11-118
- 11.21 SFP and XFP Modules, page 11-119

Note Cisco ONS 15454 DWDM supports IBM's 5G DDR (Double Data Rate) InfiniBand[1] interfaces.

11.1 Card Overview

The card overview section lists the cards described in this chapter and provides compatibility information.

1. 5G DDR InfiniBand is referred to as IB_5G.

Note Each card is marked with a symbol that corresponds to a slot (or slots) on the ONS 15454 shelf assembly. The cards are then installed into slots displaying the same symbols. For a list of slots and symbols, see the "Card Slot Requirements" section in the *Cisco CPT and Cisco ONS 15454 Hardware Installation Guide*.

The purpose of a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, or OTU2_XP card is to convert the “gray” optical client interface signals into trunk signals that operate in the “colored” dense wavelength division multiplexing (DWDM) wavelength range. Client-facing gray optical signals generally operate at shorter wavelengths, whereas DWDM colored optical signals are in the longer wavelength range (for example, 1490 nm = violet; 1510 nm = blue; 1530 nm = green; 1550 nm = yellow; 1570 nm = orange; 1590 nm = red; 1610 nm = brown). Some of the newer client-facing SFPs, however, operate in the colored region. Transponding or muxponding is the process of converting the signals between the client and trunk wavelengths.

An MXP generally handles several client signals. It aggregates, or multiplexes, lower rate client signals together and sends them out over a higher rate trunk port. Likewise, it demultiplexes optical signals coming in on a trunk and sends them out to individual client ports. A TXP converts a single client signal to a single trunk signal and converts a single incoming trunk signal to a single client signal. GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards can be provisioned as TXPs, as MXPs, or as Layer 2 switches.

All of the TXP and MXP cards perform optical to electrical to optical (OEO) conversion. As a result, they are not optically transparent cards. The reason for this is that the cards must operate on the signals passing through them, so it is necessary to do an OEO conversion.

On the other hand, the termination mode for all of the TXPs and MXPs, which is done at the electrical level, can be configured to be transparent. In this case, neither the Line nor the Section overhead is terminated. The cards can also be configured so that either Line or Section overhead can be terminated, or both can be terminated.

Note The MXP_2.5G_10G card, by design, when configured in the transparent termination mode, actually does terminate some of the bytes. See Table G-17 on page G-32 for details.

11.1.1 Card Summary

Table 11-1 lists and summarizes the functions of each TXP, TXPP, MXP, MXPP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP card.

Table 11-1 Cisco ONS 15454 Transponder and Muxponder Cards

Card	Port Description	For Additional Information
TXP_MR_10G	The TXP_MR_10G card has two sets of ports located on the faceplate.	See the “11.3 TXP_MR_10G Card” section on page 11-11.
TXP_MR_10E	The TXP_MR_10E card has two sets of ports located on the faceplate.	See the “11.4 TXP_MR_10E Card” section on page 11-14.
TXP_MR_10E_C and TXP_MR_10E_L	The TXP_MR_10E_C and TXP_MR_10E_L cards have two sets of ports located on the faceplate.	See the “11.5 TXP_MR_10E_C and TXP_MR_10E_L Cards” section on page 11-16.

Table 11-1 Cisco ONS 15454 Transponder and Muxponder Cards (Continued)

Card	Port Description	For Additional Information
TXP_MR_2.5G	The TXP_MR_2.5G card has two sets of ports located on the faceplate.	See the "11.6 TXP_MR_2.5G and TXPP_MR_2.5G Cards" section on page 11-18.
TXPP_MR_2.5G	The TXPP_MR_2.5G card has three sets of ports located on the faceplate.	See the "11.6 TXP_MR_2.5G and TXPP_MR_2.5G Cards" section on page 11-18.
40E-TXP-C, and 40ME-TXP-C	The 40E-TXP-C and 40ME-TXP-C cards have two ports located on the face plate.	See the "11.7 40E-TXP-C and 40ME-TXP-C Cards" section on page 11-23.
MXP_2.5G_10G	The MXP_2.5G_10G card has nine sets of ports located on the faceplate.	See the "11.8 MXP_2.5G_10G Card" section on page 11-25.
MXP_2.5G_10E	The MXP_2.5G_10E card has nine sets of ports located on the faceplate.	See the "11.9 MXP_2.5G_10E Card" section on page 11-28.
MXP_2.5G_10E_C and MXP_2.5G_10E_L	The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards have nine sets of ports located on the faceplate.	See the "11.10 MXP_2.5G_10E_C and MXP_2.5G_10E_L Cards" section on page 11-32.
MXP_MR_2.5G	The MXP_MR_2.5G card has nine sets of ports located on the faceplate.	See the "11.11 MXP_MR_2.5G and MXPP_MR_2.5G Cards" section on page 11-39.
MXPP_MR_2.5G	The MXPP_MR_2.5G card has ten sets of ports located on the faceplate.	See the "11.11 MXP_MR_2.5G and MXPP_MR_2.5G Cards" section on page 11-39.
MXP_MR_10DME_C and MXP_MR_10DME_L	The MXP_MR_10DME_C and MXP_MR_10DME_L cards have eight sets of ports located on the faceplate.	See the "11.12 MXP_MR_10DME_C and MXP_MR_10DME_L Cards" section on page 11-44.
40G-MXP-C 40E-MXP-C and 40ME-MXP-C	The 40G-MXP-C, 40E-MXP-C and 40ME-MXP-C cards have five ports located on the faceplate.	See the "11.13 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards" section on page 11-52.
GE_XP and GE_XPE	The GE_XP and GE_XPE cards have twenty Gigabit Ethernet client ports and two 10 Gigabit Ethernet trunk ports.	See the "11.14 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards" section on page 11-58.
10GE_XP and 10GE_XPE	The 10GE_XP and 10GE_XPE cards have two 10 Gigabit Ethernet client ports and two 10 Gigabit Ethernet trunk ports.	See the "11.14 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards" section on page 11-58.
ADM-10G	The ADM-10G card has 19 sets of ports located on the faceplate.	See the "11.15 ADM-10G Card" section on page 11-83.
OTU2_XP	The OTU2_XP card has four ports located on the faceplate.	See the "11.16 OTU2_XP Card" section on page 11-97.
TXP_MR_10EX_C	The TXP_MR_10EX_C card has two sets of ports located on the faceplate.	See the "11.17 TXP_MR_10EX_C Card" section on page 11-105.
MXP_2.5G_10EX_C	The MXP_2.5G_10EX_C card has nine sets of ports located on the faceplate.	See the "11.18 MXP_2.5G_10EX_C card" section on page 11-108.
MXP_MR_10DMEX_C	The MXP_MR_10DMEX_C card has eight sets of ports located on the faceplate.	See the "11.19 MXP_MR_10DMEX_C Card" section on page 11-112.

11.1.2 Card Compatibility

Table 11-2 lists the platform and Cisco Transport Controller (CTC) software compatibility for each TXP, TXPP, MXP, MXPP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP card.

Table 11-2 Platform and Software Release Compatibility for Transponder and Muxponder Cards

Card Name	R4.5	R4.6	R4.7	R5.0	R6.0	R7.0	R7.2	R8.0	R8.5	R9.0	R9.1	R9.2	R9.2.1	R9.3
TXP_MR_10G	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM
TXP_MR_10E	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM
TXP_MR_10E_C	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
TXP_MR_10E_L	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM
TXP_MR_2.5G	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
TXPP_MR_2.5G	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
MXP_2.5G_10G	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM

Table 11-2 Platform and Software Release Compatibility for Transponder and Muxponder Cards

Card Name	R4.5	R4.6	R4.7	R5.0	R6.0	R7.0	R7.2	R8.0	R8.5	R9.0	R9.1	R9.2	R9.2.1	R9.3
MXP_2.5G_10E	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM
MXP_2.5G_10E_C	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
MXP_2.5G_10E_L	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM
MXP_MR_2.5G	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
MXPP_MR_2.5G	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
MXP_MR_10DME_C	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
MXP_MR_10DME_L	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM

Table 11-2 Platform and Software Release Compatibility for Transponder and Muxponder Cards

Card Name	R4.5	R4.6	R4.7	R5.0	R6.0	R7.0	R7.2	R8.0	R8.5	R9.0	R9.1	R9.2	R9.2.1	R9.3
GE_XP	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
10GE_XP	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
GE_XPE	No	No	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
10GE_XPE	No	No	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
ADM-10G	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6

Table 11-2 Platform and Software Release Compatibility for Transponder and Muxponder Cards

Card Name	R4.5	R4.6	R4.7	R5.0	R6.0	R7.0	R7.2	R8.0	R8.5	R9.0	R9.1	R9.2	R9.2.1	R9.3
OTU2_XP	No	No	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
TXP_MR_10EX_C	No	No	No	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
MXP_2.5G_10EX_C	No	No	No	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
MXP_MR_10DMEX_C	No	No	No	No	No	No	No	No	No	No	15454-DWDM	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
40E-TXP-C	No	No	No	No	No	No	No	No	No	No	No	No	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6

Table 11-2 Platform and Software Release Compatibility for Transponder and Muxponder Cards

Card Name	R4.5	R4.6	R4.7	R5.0	R6.0	R7.0	R7.2	R8.0	R8.5	R9.0	R9.1	R9.2	R9.2.1	R9.3
40ME-TXP-C	No	No	No	No	No	No	No	No	No	No	No	No	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
40G-MXP-C	No	No	No	No	No	No	No	No	No	No	No	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
40E-MXP-C	No	No	No	No	No	No	No	No	No	No	No	No	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6
40ME-MXP-C	No	No	No	No	No	No	No	No	No	No	No	No	15454-DWDM, 15454-M2, 15454-M6	15454-DWDM, 15454-M2, 15454-M6

Older versions of the TXP_MR_10E_C, TXP_MR_2.5G, TXPP_MR_2.5G, and MXP_2.5G_10E_C cards cannot be installed in the Cisco ONS 15454 M2 and Cisco ONS 15454 M6 shelves because of an incompatible backplane connector.

The following table describes the version numbers of the cards that are compatible with the ONS 15454 M2 and ONS 15454 M6 shelves. The version numbers can be viewed from the HW Rev field in the Inventory tab.

Table 11-3 Version Number Compatibility for Transponder and Muxponder Cards

Card	Version Number
TXP_MR_2.5G	Version 06 or later of the different Unit Part Number
TXPP_MR_2.5G	Version 06 or later of the different Unit Part Number

Table 11-3 Version Number Compatibility for Transponder and Muxponder Cards (Continued)

Card	Version Number
MXP_2.5G_10E_C	Version 04 or later of the 800-26774 Part Number
TXP_MR_10E_C	Version 04 or later of the 800-26772 Part Number

11.2 Safety Labels

For information about safety labels, see the "G.1 Safety Labels" section on page G-1.

11.3 TXP_MR_10G Card

(Cisco ONS 15454 only)

The TXP_MR_10G processes one 10-Gbps signal (client side) into one 10-Gbps, 100-GHz DWDM signal (trunk side). It provides one 10-Gbps port per card that can be provisioned for an STM-64/OC-192 short reach (1310-nm) signal, compliant with ITU-T G.707, ITU-T G.709, ITU-T G.691, and Telcordia GR-253-CORE, or a 10GBASE-LR signal compliant with IEEE 802.3.

The TXP_MR_10G card is tunable over two neighboring wavelengths in the 1550-nm, ITU 100-GHz range. It is available in 16 different versions, each of which covers two wavelengths, for a total coverage of 32 different wavelengths in the 1550-nm range.

Note ITU-T G.709 specifies a form of forward error correction (FEC) that uses a "wrapper" approach. The digital wrapper lets you transparently take in a signal on the client side, wrap a frame around it and restore it to its original form. FEC enables longer fiber links because errors caused by the optical signal degrading with distance are corrected.

The trunk port operates at 9.95328 Gbps (or 10.70923 Gbps with ITU-T G.709 Digital Wrapper/FEC) and at 10.3125 Gbps (or 11.095 Gbps with ITU-T G.709 Digital Wrapper/FEC) over unamplified distances up to 80 km (50 miles) with different types of fiber such as C-SMF or dispersion compensated fiber limited by loss and/or dispersion.

Caution Because the transponder has no capability to look into the payload and detect circuits, a TXP_MR_10G card does not display circuits under card view.

Caution You must use a 15-dB fiber attenuator (10 to 20 dB) when working with the TXP_MR_10G card in a loopback on the trunk port. Do not use direct fiber loopbacks with the TXP_MR_10G card. Using direct fiber loopbacks causes irreparable damage to the TXP_MR_10G card.

You can install TXP_MR_10G cards in Slots 1 to 6 and 12 to 17 and provision this card in a linear configuration. TXP_MR_10G cards cannot be provisioned as a bidirectional line switched ring (BLSR)/Multiplex Section - Shared Protection Ring (MS-SPRing), a path protection/single node control point (SNCP), or a regenerator. They can only be used in the middle of BLSR/MS-SPRing and 1+1 spans when the card is configured for transparent termination mode.

The TXP_MR_10G port features a 1550-nm laser for the trunk port and a 1310-nm laser for the for the client port and contains two transmit and receive connector pairs (labeled) on the card faceplate.

The MTU setting is used to display the OverSizePkts counters on the receiving trunk and client port interfaces. Traffic of frame sizes up to 65535 bytes pass without any packet drops, from the client port to the trunk port and vice versa irrespective of the MTU setting.

The TXP_MR_10G card has the following available wavelengths and versions:

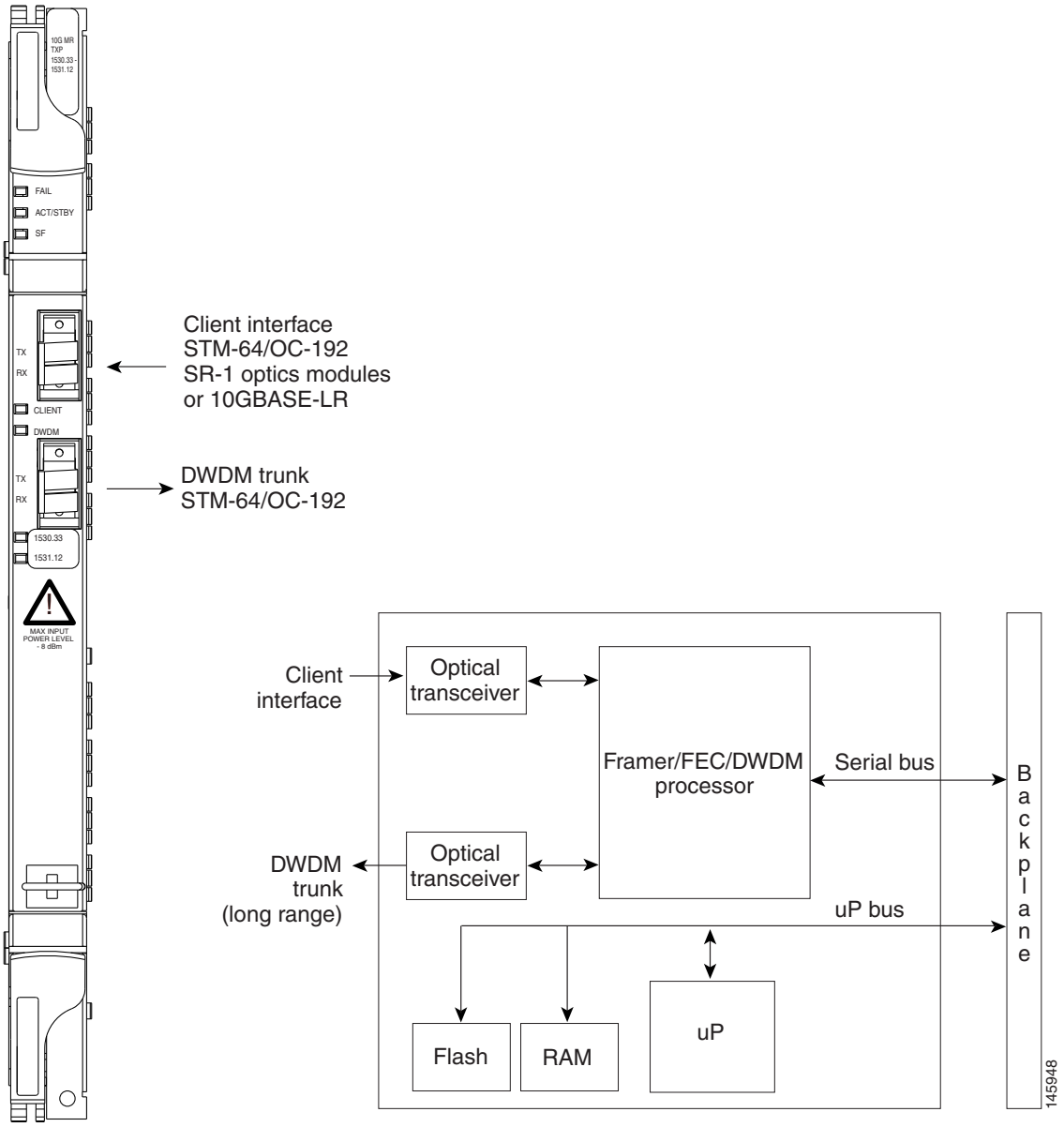
- ITU grid blue band:

  - 1538.19 to 1538.98 nm, 10T-L1-38.1
  - 1539.77 to 1540.56 nm, 10T-L1-39.7
  - 1530.33 to 1531.12 nm, 10T-L1-30.3
  - 1531.90 to 1532.68 nm, 10T-L1-31.9
  - 1534.25 to 1535.04 nm, 10T-L1-34.2
  - 1535.82 to 1536.61 nm, 10T-L1-35.8
  - 1542.14 to 1542.94 nm, 10T-L1-42.1
  - 1543.73 to 1544.53 nm, 10T-L1-43.73
- ITU grid red band:
  - 1554.13 to 1554.94 nm, 10T-L1-54.1
  - 1555.75 to 1556.55 nm, 10T-L1-55.7
  - 1546.12 to 1546.92 nm, 10T-L1-46.1
  - 1547.72 to 1548.51 nm, 10T-L1-47.7
  - 1550.12 to 1550.92 nm, 10T-L1-50.1
  - 1551.72 to 1552.52 nm, 10T-L1-51.7
  - 1558.17 to 1558.98 nm, 10T-L1-58.1
  - 1559.79 to 1560.61 nm, 10T-L1-59.7

11.3.1 Faceplate and Block Diagram

Figure 11-1 shows the TXP_MR_10G faceplate and block diagram.

Figure 11-1 TXP_MR_10G Faceplate and Block Diagram



For information about safety labels for the card, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

11.3.2 TXP_MR_10G Functions

The functions of the TXP_MR_10G card are:

- G.2 Automatic Laser Shutdown, page G-6
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-7 on page G-10

11.3.3 Related Procedures for TXP_MR_10G Card

The following is the list of procedures and tasks related to the configuration of the TXP_MR_10G card:

- NTP-G96 Provision the 10G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds, page 11-166
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.4 TXP_MR_10E Card

(Cisco ONS 15454 only)

The card is fully backward compatible with the TXP_MR_10G card. It processes one 10-Gbps signal (client side) into one 10-Gbps, 100-GHz DWDM signal (trunk side) that is tunable over four wavelength channels (spaced at 100 GHz on the ITU grid) in the C band and tunable over eight wavelength channels (spaced at 50 GHz on the ITU grid) in the L band. There are eight versions of the C-band card, with each version covering four wavelengths, for a total coverage of 32 wavelengths. There are five versions of the L-band card, with each version covering eight wavelengths, for a total coverage of 40 wavelengths.

You can install TXP_MR_10E cards in Slots 1 to 6 and 12 to 17 and provision the cards in a linear configuration, BLSR/MS-SPRing, path protection/SNCP, or a regenerator. The card can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the card is configured for transparent termination mode.

The TXP_MR_10E card features a 1550-nm tunable laser (C band) or a 1580-nm tunable laser (L band) for the trunk port and a separately orderable ONS-XC-10G-S1 1310-nm or ONS-XC-10G-L2 1550-nm laser XFP module for the client port.

Note When the ONS-XC-10G-L2 XFP is installed, the TXP_MR_10E card must be installed in Slots 6, 7, 12 or 13)

On its faceplate, the TXP_MR_10E card contains two transmit and receive connector pairs, one for the trunk port and one for the client port. Each connector pair is labeled.

11.4.1 Key Features

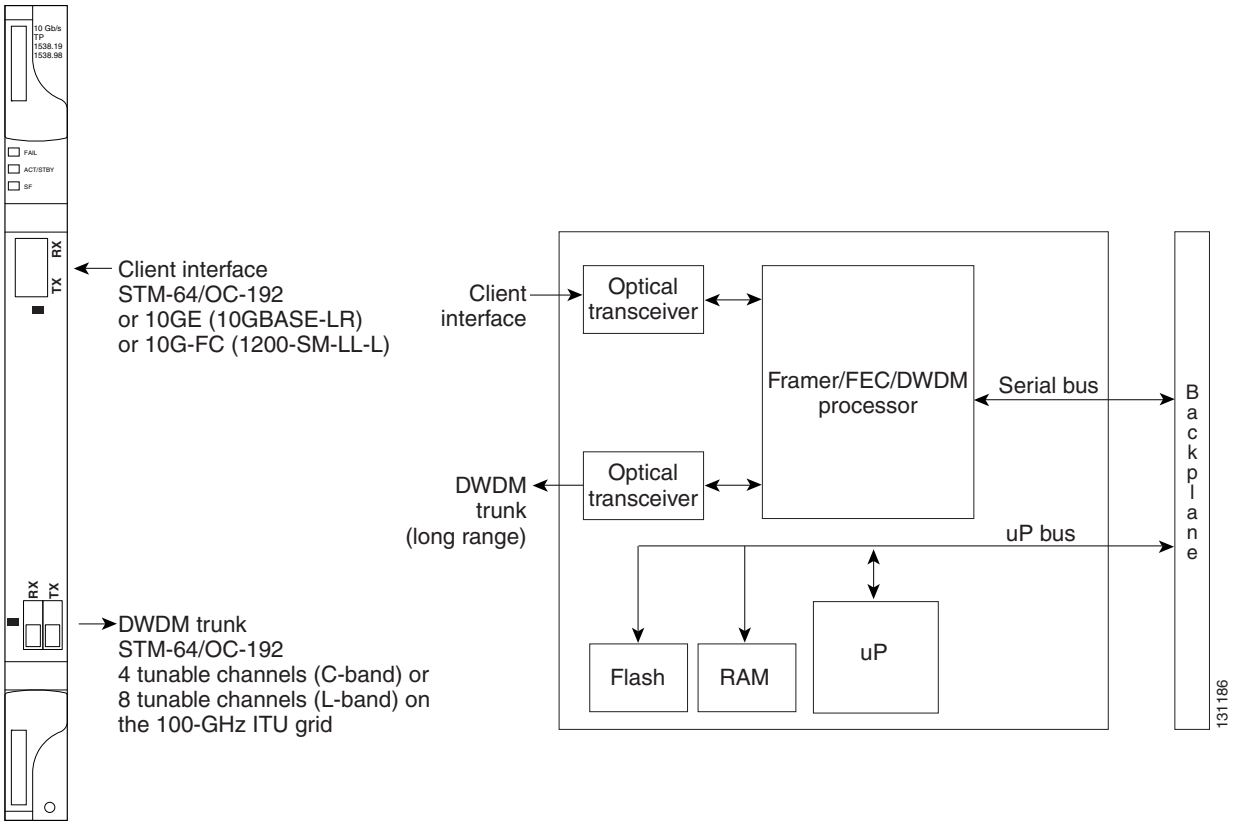
The key features of the TXP_MR_10E card are:

- A tri-rate client interface (available through the ONS-XC-10G-S1 XFP, ordered separately)
  - OC-192 (SR1)
  - 10GE (10GBASE-LR)
  - 10G-FC (1200-SM-LL-L)
- OC-192 to ITU-T G.709 OTU2 provisionable synchronous and asynchronous mapping
- The MTU setting is used to display the OverSizePkts counters on the receiving trunk and client port interfaces. Traffic of frame sizes up to 65535 bytes pass without any packet drops, from the client port to the trunk port and vice versa irrespective of the MTU setting.

11.4.2 Faceplate and Block Diagram

Figure 11-2 shows the TXP_MR_10E faceplate and block diagram.

Figure 11-2 TXP_MR_10E Faceplate and Block Diagram



For information about safety labels for the card, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Caution You must use a 15-dB fiber attenuator (10 to 20 dB) when working with the TXP_MR_10E card in a loopback on the trunk port. Do not use direct fiber loopbacks with the TXP_MR_10E card. Using direct fiber loopbacks causes irreparable damage to the TXP_MR_10E card.

11.4.3 TXP_MR_10E Functions

The functions of the TXP_MR_10E card are:

- G.2 Automatic Laser Shutdown, page G-6
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10
- G.5 Client Interface, page G-14
- G.7 DWDM Trunk Interface, page G-15

- G.8 Enhanced FEC (E-FEC) Feature, page G-15
- G.9 FEC and E-FEC Modes, page G-16
- G.10 Client-to-Trunk Mapping, page G-16

11.4.4 Related Procedures for TXP_MR_10E Card

The following is the list of procedures and tasks related to the configuration of the TXP_MR_10E card:

- NTP-G96 Provision the 10G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds, page 11-166
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.5 TXP_MR_10E_C and TXP_MR_10E_L Cards

TXP_MR_10E_L: (Cisco ONS 15454 only)

The TXP_MR_10E_C and TXP_MR_10E_L cards are multirate transponders for the ONS 15454 platform. The cards are fully backward compatible with the TXP_MR_10G and TXP_MR_10E cards. They processes one 10-Gbps signal (client side) into one 10-Gbps, 100-GHz DWDM signal (trunk side). The TXP_MR_10E_C is tunable over the entire set of C-band wavelength channels (82 channels spaced at 50 GHz on the ITU grid). The TXP_MR_10E_L is tunable over the entire set of L-band wavelength channels (80 channels spaced at 50 GHz on the ITU grid) and is particularly well suited for use in networks that employ DS fiber or SMF-28 single-mode fiber.

The advantage of these cards over previous versions (TXP_MR_10G and TXP_MR_10E) is that there is only one version of each card (one C-band version and one L-band version) instead of several versions needed to cover each band.

You can install TXP_MR_10E_C and TXP_MR_10E_L cards in Slots 1 to 6 and 12 to 17 and provision the cards in a linear configuration, BLSR/MS-SPRing, path protection/SNCP, or a regenerator. The cards can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the cards are configured for transparent termination mode.

The TXP_MR_10E_C and TXP_MR_10E_L cards feature a universal transponder 2 (UT2) 1550-nm tunable laser (C band) or a UT2 1580-nm tunable laser (L band) for the trunk port and a separately orderable ONS-XC-10G-S1 1310-nm or ONS-XC-10G-L2 1550-nm laser XFP module for the client port.

Note When the ONS-XC-10G-L2 XFP is installed, the TXP_MR_10E_C or TXP_MR_10E-L card is required to be installed in a high-speed slot (slot 6, 7, 12, or 13)

On its faceplate, the TXP_MR_10E_C and TXP_MR_10E_L cards contain two transmit and receive connector pairs, one for the trunk port and one for the client port. Each connector pair is labeled.

11.5.1 Key Features

The key features of the TXP_MR_10E_C and TXP_MR_10E_L cards are:

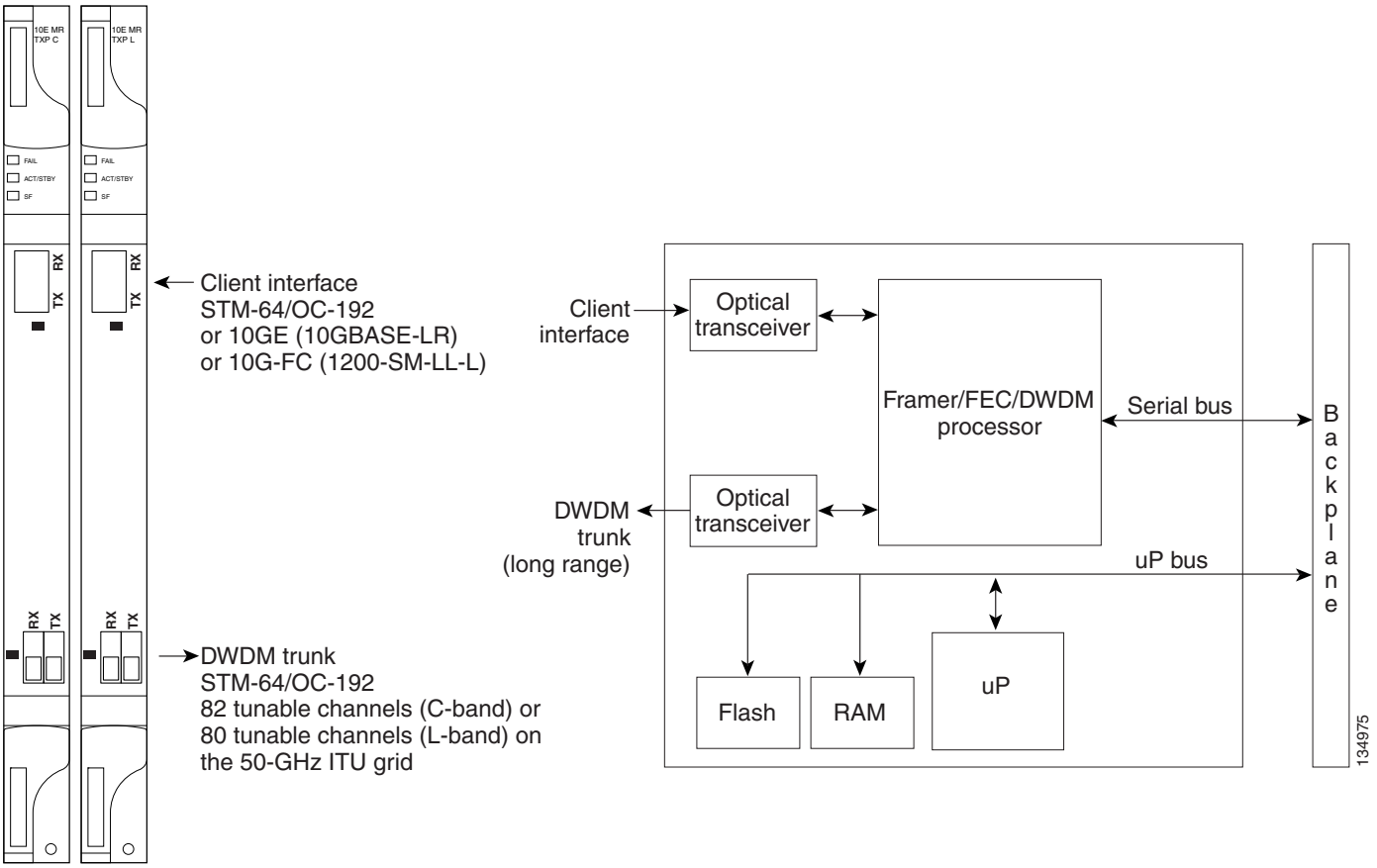
- A tri-rate client interface (available through the ONS-XC-10G-S1 XFP, ordered separately):

  - OC-192 (SR1)
  - 10GE (10GBASE-LR)
  - 10G-FC (1200-SM-LL-L)
- A UT2 module tunable through the entire C band (TXP_MR_10E_C card) or L band (TXP_MR_10E_L card). The channels are spaced at 50 GHz on the ITU grid.
- OC-192 to ITU-T G.709 OTU2 provisionable synchronous and asynchronous mapping.
- The MTU setting is used to display the OverSizePkts counters on the receiving trunk and client port interfaces. Traffic of frame sizes up to 65535 bytes pass without any packet drops, from the client port to the trunk port and vice versa irrespective of the MTU setting.

11.5.2 Faceplates and Block Diagram

Figure 11-3 shows the TXP_MR_10E_C and TXP_MR_10E_L faceplates and block diagram.

Figure 11-3 TXP_MR_10E_C and TXP_MR_10E_L Faceplates and Block Diagram



For information about safety labels for the cards, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Caution You must use a 15-dB fiber attenuator (10 to 20 dB) when working with the TXP_MR_10E_C or TXP_MR_10E_L card in a loopback on the trunk port. Do not use direct fiber loopbacks with the cards. Using direct fiber loopbacks causes irreparable damage to the cards.

11.5.3 TXP_MR_10E_C and TXP_MR_10E_L Functions

The functions of the TXP_MR_10E_C and TXP_MR_10E_L cards are:

- G.2 Automatic Laser Shutdown, page G-6
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10.
- G.5 Client Interface, page G-14
- G.7 DWDM Trunk Interface, page G-15
- G.8 Enhanced FEC (E-FEC) Feature, page G-15
- G.9 FEC and E-FEC Modes, page G-16
- G.10 Client-to-Trunk Mapping, page G-16

11.5.4 Related Procedures for TXP_MR_10E_C and TXP_MR_10E_L Cards

The following is the list of procedures and tasks related to the configuration for both TXP_MR_10E_C and TXP_MR_10E_L:

- NTP-G96 Provision the 10G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds, page 11-166
- DLP-G358 Provision TXP_MR_10E_L and TXP_MR_10E_C Cards for Acceptance Testing, page 15-25
- NTP-G75 Monitor Transponder and Muxponder Performance

11.6 TXP_MR_2.5G and TXPP_MR_2.5G Cards

The TXP_MR_2.5G card processes one 8-Mbps to 2.488-Gbps signal (client side) into one 8-Mbps to 2.5-Gbps, 100-GHz DWDM signal (trunk side). It provides one long-reach STM-16/OC-48 port per card, compliant with ITU-T G.707, ITU-T G.709, ITU-T G.957, and Telcordia GR-253-CORE.

The TXPP_MR_2.5G card processes one 8-Mbps to 2.488-Gbps signal (client side) into two 8-Mbps to 2.5-Gbps, 100-GHz DWDM signals (trunk side). It provides two long-reach STM-16/OC-48 ports per card, compliant with ITU-T G.707, ITU-T G.957, and Telcordia GR-253-CORE.

The TXP_MR_2.5G and TXPP_MR_2.5G cards are tunable over four wavelengths in the 1550-nm, ITU 100-GHz range. They are available in eight versions, each of which covers four wavelengths, for a total coverage of 32 different wavelengths in the 1550-nm range.

Note ITU-T G.709 specifies a form of FEC that uses a "wrapper" approach. The digital wrapper lets you transparently take in a signal on the client side, wrap a frame around it, and restore it to its original form. FEC enables longer fiber links because errors caused by the optical signal degrading with distance are corrected.

The trunk/line port operates at up to 2.488 Gbps (or up to 2.66 Gbps with ITU-T G.709 Digital Wrapper/FEC) over unamplified distances up to 360 km (223.7 miles) with different types of fiber such as C-SMF or higher if dispersion compensation is used.

Caution Because the transponder has no capability to look into the payload and detect circuits, a TXP_MR_2.5G or TXPP_MR_2.5G card does not display circuits under card view.

The TXP_MR_2.5G and TXPP_MR_2.5G cards support 2R (retime, regenerate) and 3R (retime, reshape, and regenerate) modes of operation where the client signal is mapped into a ITU-T G.709 frame. The mapping function is simply done by placing a digital wrapper around the client signal. Only OC-48/STM-16 client signals are fully ITU-T G.709 compliant, and the output bit rate depends on the input client signal. Table 11-43 shows the possible combinations of client interfaces, input bit rates, 2R and 3R modes, and ITU-T G.709 monitoring.

Table 11-4 2R and 3R Mode and ITU-T G.709 Compliance by Client Interface

Client Interface	Input Bit Rate	3R vs. 2R	ITU-T G.709
OC-48/STM-16	2.488 Gbps	3R	On or Off
DV-6000	2.38 Gbps	2R	—
2 Gigabit Fibre Channel (2G-FC)/fiber connectivity (FICON)	2.125 Gbps	3R[1]	On or Off
High-Definition Television (HDTV)	1.48 Gbps	2R	—
Gigabit Ethernet (GE)	1.25 Gbps	3R	On or Off
1 Gigabit Fibre Channel (1G-FC)/FICON	1.06 Gbps	3R	On or Off
OC-12/STM-4	622 Mbps	3R	On or Off
OC-3/STM-1	155 Mbps	3R	On or Off
Enterprise System Connection (ESCON)	200 Mbps	2R	—
SDI/D1/DVB-ASI video	270 Mbps	2R	—
ISC-1 Compat	1.06 Gbps	2R	Off
ISC-3	1.06 or 2.125 Gbps	2R	—
ETR_CLO	16 Mbps	2R	—

1. No monitoring

Note ITU-T G.709 and FEC support is disabled for all the 2R payload types in the TXP_MR_2.5G and TXPP_MR_2.5G cards.

The output bit rate is calculated for the trunk bit rate by using the 255/238 ratio as specified in ITU-T G.709 for OTU1. Table 11-5 lists the calculated trunk bit rates for the client interfaces with ITU-T G.709 enabled.

Table 11-5 Trunk Bit Rates With ITU-T G.709 Enabled

Client Interface	ITU-T G.709 Disabled	ITU-T G.709 Enabled
OC-48/STM-16	2.488 Gbps	2.66 Gbps
2G-FC	2.125 Gbps	2.27 Gbps
GE	1.25 Gbps	1.34 Gbps
1G-FC	1.06 Gbps	1.14 Gbps
OC-12/STM-3	622 Mbps	666.43 Mbps
OC-3/STM-1	155 Mbps	166.07 Mbps

For 2R operation mode, the TXP_MR_2.5G and TXPP_MR_2.5G cards have the ability to pass data through transparently from client side interfaces to a trunk side interface, which resides on an ITU grid. The data might vary at any bit rate from 200-Mbps up to 2.38-Gbps, including ESCON, DVB-ASI, ISC-1, and video signals. In this pass-through mode, no performance monitoring (PM) or digital wrapping of the incoming signal is provided, except for the usual PM outputs from the SFPs. Similarly, this card has the ability to pass data through transparently from the trunk side interfaces to the client side interfaces with bit rates varying from 200-Mbps up to 2.38-Gbps. Again, no PM or digital wrapping of received signals is available in this pass-through mode.

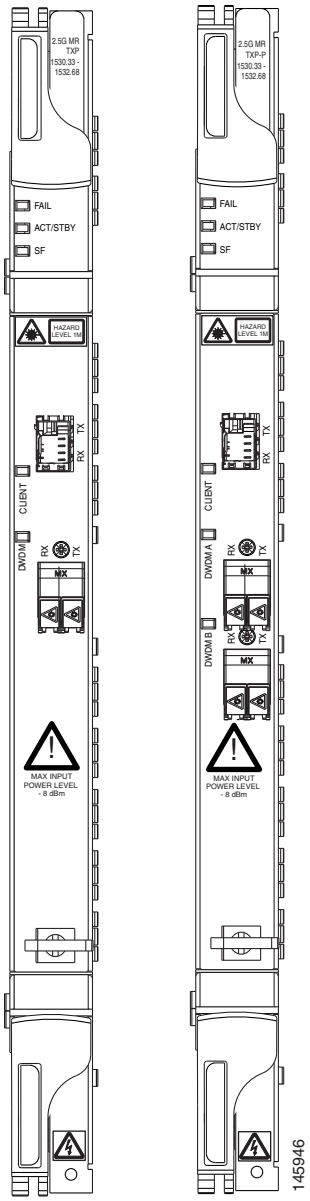
For 3R operation mode, the TXP_MR_2.5G and TXPP_MR_2.5G cards apply a digital wrapper to the incoming client interface signals (OC-N/STM-N, 1G-FC, 2G-FC, GE). PM is available on all of these signals except for 2G-FC, and varies depending upon the type of signal. For client inputs other than OC-48/STM-16, a digital wrapper might be applied but the resulting signal is not ITU-T G.709 compliant. The card applies a digital wrapper that is scaled to the frequency of the input signal.

The TXP_MR_2.5G and TXPP_MR_2.5G cards have the ability to take digitally wrapped signals in from the trunk interface, remove the digital wrapper, and send the unwrapped data through to the client interface. PM of the ITU-T G.709 OH and SONET/SDH OH is implemented.

11.6.1 Faceplates and Block Diagram

Figure 11-4 shows the TXP_MR_2.5G and TXPP_MR_2.5G faceplates.

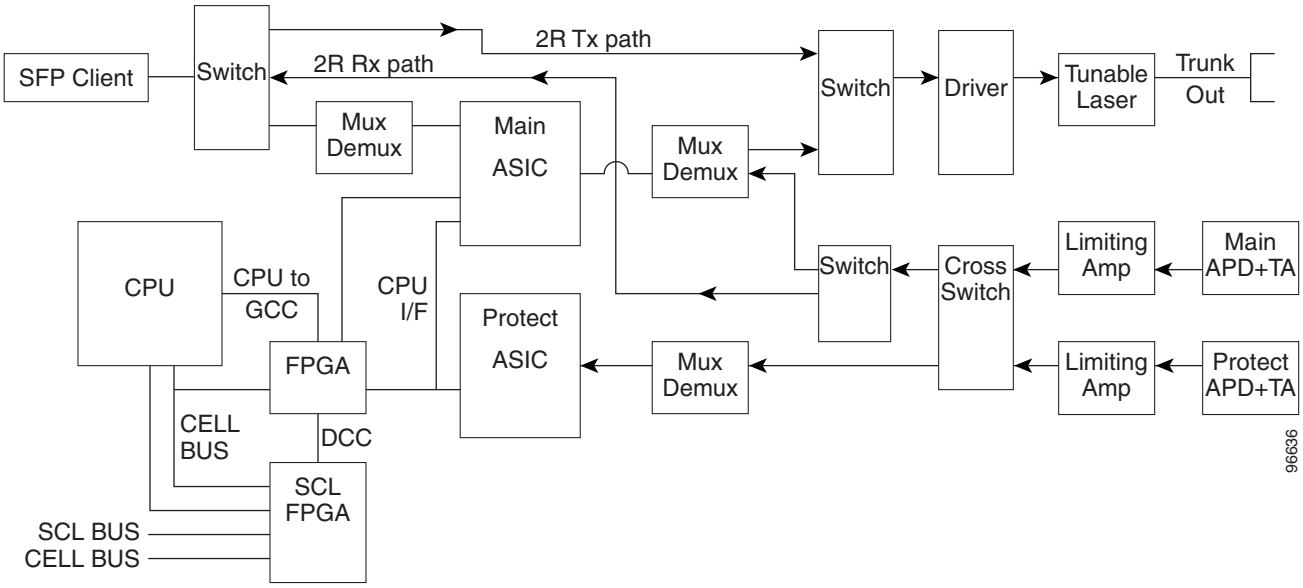
Figure 11-4 TXP_MR_2.5G and TXPP_MR_2.5G Faceplates



For information about safety labels for the cards, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Figure 11-5 shows a block diagram of the TXP_MR_2.5G and TXPP_MR_2.5G cards.

Figure 11-5 TXP_MR_2.5G and TXPP_MR_2.5G Block Diagram



Caution You must use a 20-dB fiber attenuator (15 to 25 dB) when working with the TXP_MR_2.5G and TXPP_MR_2.5G cards in a loopback on the trunk port. Do not use direct fiber loopbacks with the TXP_MR_2.5G and TXPP_MR_2.5G cards. Using direct fiber loopbacks causes irreparable damage to the TXP_MR_2.5G and TXPP_MR_2.5G cards.

You can install TXP_MR_2.5G and TXPP_MR_2.5G cards in Slots 1 to 6 and 12 to 17. You can provision this card in a linear configuration. TXP_MR_10G and TXPP_MR_2.5G cards cannot be provisioned as a BLSR/MS-SPRing, a path protection/SNCP, or a regenerator. They can be used in the middle of BLSR/MS-SPRing or 1+1 spans only when the card is configured for transparent termination mode.

The TXP_MR_2.5G card features a 1550-nm laser for the trunk/line port and a 1310-nm laser for the client port. It contains two transmit and receive connector pairs (labeled) on the card faceplate. The card uses dual LC connectors for optical cable termination.

The TXPP_MR_2.5G card features a 1550-nm laser for the trunk/line port and a 1310-nm or 850-nm laser (depending on the SFP) for the client port and contains three transmit and receive connector pairs (labeled) on the card faceplate. The card uses dual LC connectors for optical cable termination.

11.6.2 TXP_MR_2.5G and TXPP_MR_2.5G Functions

The functions of the TXP_MR_2.5G and TXPP_MR_2.5G cards are:

- G.2 Automatic Laser Shutdown, page G-6
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10 (for TXP_MR_2.5G)
- Port level indicators—Table G-8 on page G-11 (for TXPP_MR_2.5G)

11.6.3 Related Procedures for TXP_MR_2.5G and TXPP_MR_2.5G Cards

The following is the list of procedures and tasks related to the configuration for both TXP_MR_2.5G and TXPP_MR_2.5G:

- NTP-G98 Provision the 2.5G Multirate Transponder Card Line Settings and PM Parameter Thresholds, page 11-146
- NTP-G33 Create a Y-Cable Protection Group, page 11-138 (TXP_MR_2.5G only)
- NTP-G75 Monitor Transponder and Muxponder Performance

11.7 40E-TXP-C and 40ME-TXP-C Cards

The 40E-TXP-C and 40ME-TXP-C cards process a single 40-Gbps signal (client side) into a single 40-Gbps, 50-GHz DWDM signal (trunk side). It provides one 40-Gbps port per card that can be provisioned for an OC-768/STM-256 very short reach (1550-nm) signal compliant with ITU-T G.707, ITU-T G.691, and Telcordia GR-253-CORE, 40G Ethernet LAN signal compliant with IEEE 802.3ba, or OTU3 signal compliant with ITU-T G.709.

The trunk port of the 40E-TXP-C and 40ME-TXP-C cards are tunable between 1529.55 nm through 1561.83 nm, ITU 50-GHz range.

ITU-T G.709 specifies a form of forward error correction (FEC) that uses a “wrapper” approach. The digital wrapper lets you transparently take in a signal on the client side, wrap a frame around it and restore it to its original form. FEC enables longer fiber links because errors caused by the optical signal degrading with distance are corrected.

Caution You must use a 15-dB fiber attenuator (10 to 20 dB) when working with the 40E-TXP-C, and 40ME-TXP-C cards in a loopback on the trunk port. Do not use direct fiber loopbacks with the 40E-TXP-C, and 40ME-TXP-C cards. Using direct fiber loopbacks causes irreparable damage to the these cards.

You can install and provision the 40E-TXP-C, and 40ME-TXP-C cards in a linear configuration in:

- Slots 1 to 5 and 12 to 16 in ONS 15454 DWDM chassis
- Slot 2 in ONS 15454 M2 chassis
- Slots 2 to 6 in ONS 15454 M6 chassis

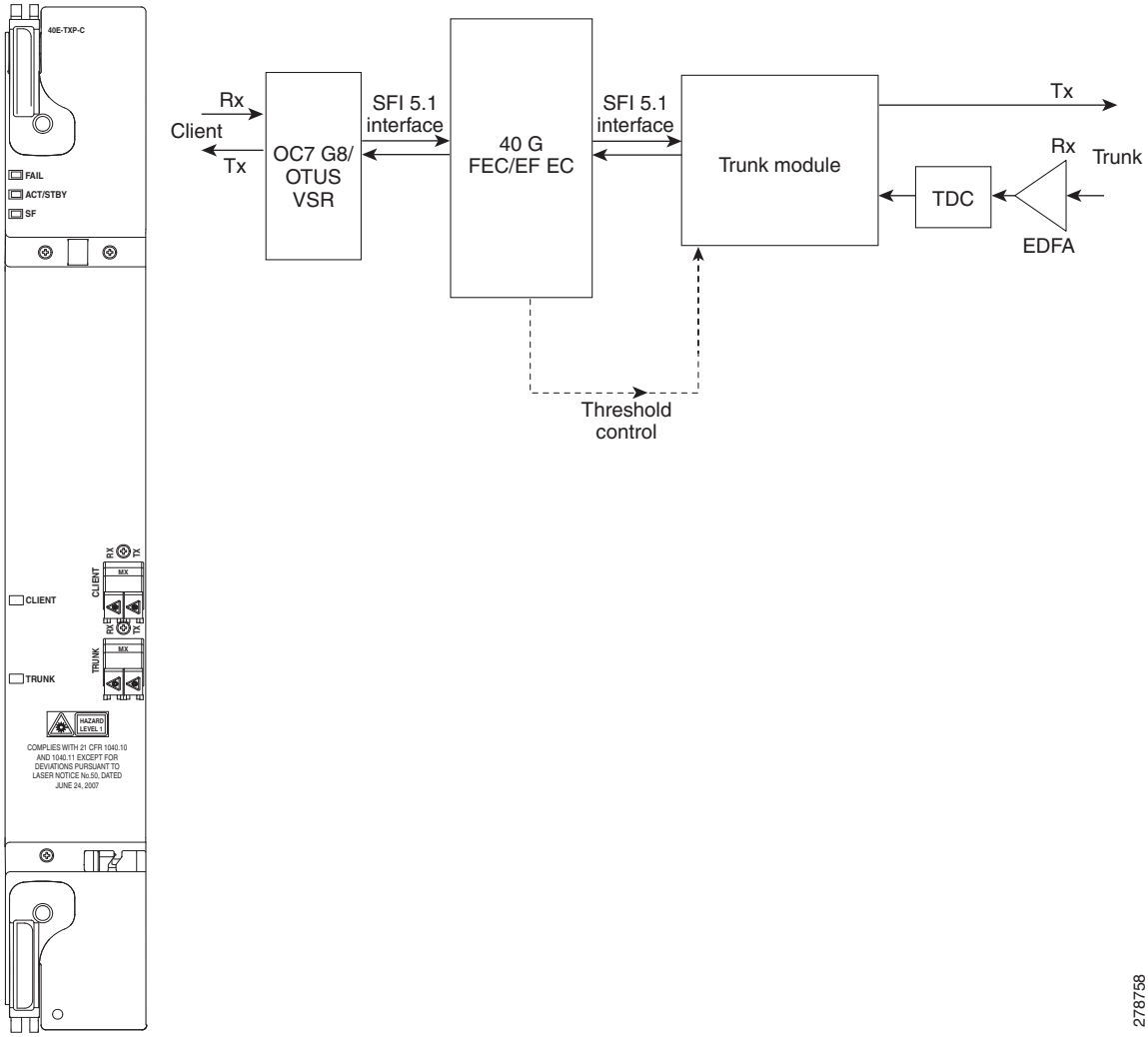
When a protection switch occurs on the 40E-TXP-C and 40ME-TXP-C cards, the recovery from PSM protection switch takes about 3 to 4 minutes.

Note The maximum ambient operating temperature for 40E-TXP-C, and 40ME-TXP-C cards is 50^0 Celsius.

11.7.1 Faceplates and Block Diagram

Figure 11-6 shows the 40E-TXP-C and 40ME-TXP-C faceplate and block diagram.

Figure 11-6 40E-TXP-C and 40ME-TXP-C Faceplate and Block Diagram



For information about safety labels for the card, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

11.7.2 40E-TXP-C and 40ME-TXP-C Functions

The functions of the 40E-TXP-C and 40ME-TXP-C cards are:

- G.2 Automatic Laser Shutdown, page G-6 (supported on a client interface)
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10.

11.7.3 Related Procedures for 40E-TXP-C and 40ME-TXP-C Cards

The following is the list of procedures and tasks related to the configuration of 40E-TXP-C and 40ME-TXP-C:

- NTP-G292 Provision the 40G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds, page 11-191
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.8 MXP_2.5G_10G Card

(Cisco ONS 15454 only)

The MXP_2.5G_10G card multiplexes/demultiplexes four 2.5-Gbps signals (client side) into one 10-Gbps, 100-GHz DWDM signal (trunk side). It provides one extended long-range STM-64/OC-192 port per card on the trunk side (compliant with ITU-T G.707, ITU-T G.709, ITU-T G.957, and Telcordia GR-253-CORE) and four intermediate- or short-range OC-48/STM-16 ports per card on the client side. The port operates at 9.95328 Gbps over unamplified distances up to 80 km (50 miles) with different types of fiber such as C-SMF or dispersion compensated fiber limited by loss and/or dispersion.

Client ports on the MXP_2.5G_10G card are also interoperable with SONET OC-1 (STS-1) fiber optic signals defined in Telcordia GR-253-CORE. An OC-1 signal is the equivalent of one DS-3 channel transmitted across optical fiber. OC-1 is primarily used for trunk interfaces to phone switches in the United States. There is no SDH equivalent for SONET OC-1.

The MXP_2.5G_10G card is tunable over two neighboring wavelengths in the 1550-nm, ITU 100-GHz range. It is available in 16 different versions, each of which covers two wavelengths, for a total coverage of 32 different wavelengths in the 1550-nm range.

Note ITU-T G.709 specifies a form of FEC that uses a “wrapper” approach. The digital wrapper lets you transparently take in a signal on the client side, wrap a frame around it and restore it to its original form. FEC enables longer fiber links because errors caused by the optical signal degrading with distance are corrected.

The port can also operate at 10.70923 Gbps in ITU-T G.709 Digital Wrapper/FEC mode.

Caution Because the transponder has no capability to look into the payload and detect circuits, an MXP_2.5G_10G card does not display circuits under card view.

Caution You must use a 20-dB fiber attenuator (15 to 25 dB) when working with the MXP_2.5G_10G card in a loopback on the trunk port. Do not use direct fiber loopbacks with the MXP_2.5G_10G card. Using direct fiber loopbacks causes irreparable damage to the MXP_2.5G_10G card.

You can install MXP_2.5G_10G cards in Slots 1 to 6 and 12 to 17.

Caution Do not install an MXP_2.5G_10G card in Slot 3 if you have installed a DS3/EC1-48 card in Slots 1or 2. Likewise, do not install an MXP_2.5G_10G card in Slot 17 if you have installed a DS3/EC1-48 card in Slots 15 or 16. If you do, the cards will interact and cause DS-3 bit errors.

You can provision this card in a linear configuration. MXP_2.5G_10G cards cannot be provisioned as a BLSR/MS-SPRing, a path protection/SNCP, or a regenerator. They can be used in the middle of BLSR/MS-SPRing or 1+1 spans only when the card is configured for transparent termination mode.

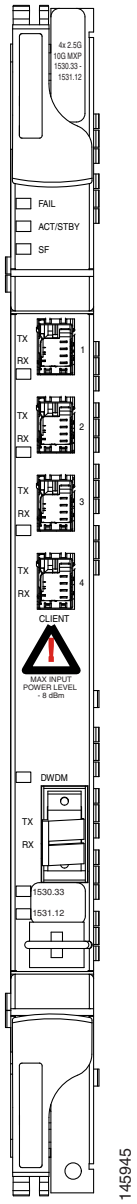
The MXP_2.5G_10G port features a 1550-nm laser on the trunk port and four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The card uses a dual LC connector on the trunk side and SFP connectors on the client side for optical cable termination.

Note When you create a 4xOC-48 OCHCC circuit, you need to select the G.709 and Synchronous options. A 4xOC-48 OCHCC circuit is supported by G.709 and synchronous mode. This is necessary to provision a 4xOC-48 OCHCC circuit.

11.8.1 Faceplates and Block Diagram

Figure 11-7 shows the MXP_2.5G_10G faceplate.

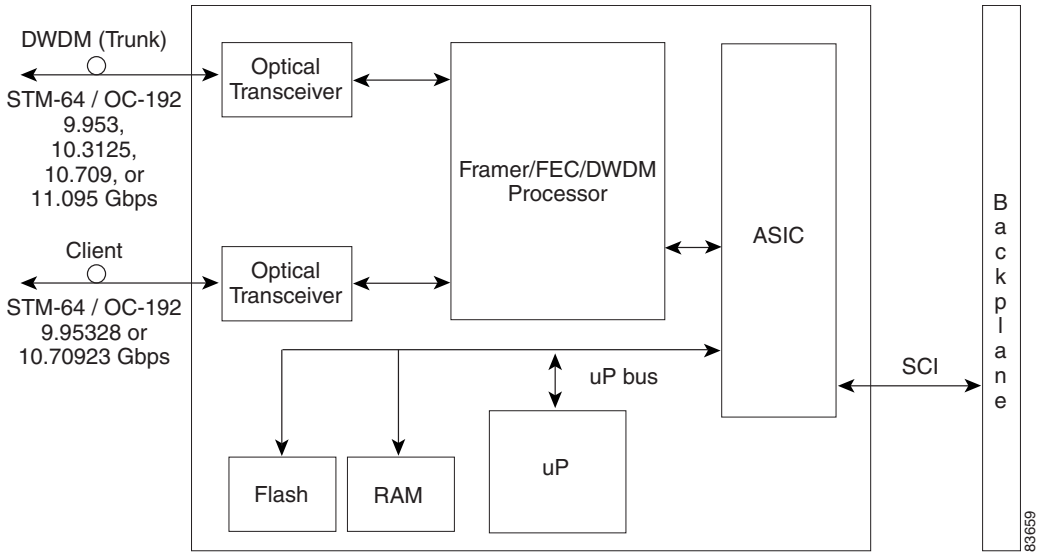
Figure 11-7 MXP_2.5G_10G Faceplate



For information about safety labels for the card, see the "G.1.1 Class 1 Laser Product Cards" section on page G-1.

Figure 11-8 shows a block diagram of the MXP_2.5G_10G card.

Figure 11-8 MXP_2.5G_10G Card Block Diagram



11.8.2 MXP_2.5G_10G Functions

The functions of the MXP_2.5G_10G card are:

- G.11 Timing Synchronization, page G-16
- G.2 Automatic Laser Shutdown, page G-6
- Card level indicators—Table G-1 on page G-7
- Port level indicators— Table G-7 on page G-10

11.8.3 Related Procedures for MXP_2.5G_10G Card

The following is the list of procedures and tasks related to the configuration of MXP_2.5G_10G:

- NTP-G97 Modify the 4x2.5G Muxponder Card Line Settings and PM Parameter Thresholds, page 11-236
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.9 MXP_2.5G_10E Card

The faceplate designation of the card is “4x2.5G 10E MXP.” The MXP_2.5G_10E card is a DWDM muxponder for the ONS 15454 platform that supports full transparent termination the client side. The card multiplexes four 2.5 Gbps client signals (4 x OC48/STM-16 SFP) into a single 10-Gbps DWDM optical signal on the trunk side. The MXP_2.5G_10E provides wavelength transmission service for the four incoming 2.5 Gbps client interfaces. The MXP_2.5G_10E muxponder passes all SONET/SDH overhead bytes transparently.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up generic communications channels (GCCs) for data communications, enable FEC, or facilitate performance monitoring.

The MXP_2.5G_10E works with optical transport network (OTN) devices defined in ITU-T G.709. The card supports ODU1 to OTU2 multiplexing, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope. See the "G.12 Multiplexing Function" section on page G-17.

The MXP_2.5G_10E card is not compatible with the MXP_2.5G_10G card, which does not support full transparent termination. You can install MXP_2.5G_10E cards in Slots 1 to 6 and 12 to 17. You can provision this card in a linear configuration, as a BLSR/MS-SPRing, a path protection/SNCP, or a regenerator. The card can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the card is configured for transparent termination mode.

The MXP_2.5G_10E features a 1550-nm laser on the trunk port and four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The card uses a dual LC connector on the trunk side and uses SFP modules on the client side for optical cable termination. The SFP pluggable modules are short reach (SR) or intermediate reach (IR) and support an LC fiber connector.

Note When you create a 4xOC-48 OCHCC circuit, you need to select the G.709 and Synchronous options. A 4xOC-48 OCHCC circuit is supported by G.709 and synchronous mode. This is necessary to provision a 4xOC-48 OCHCC circuit.

11.9.1 Key Features

The MXP_2.5G_10E card has the following high level features:

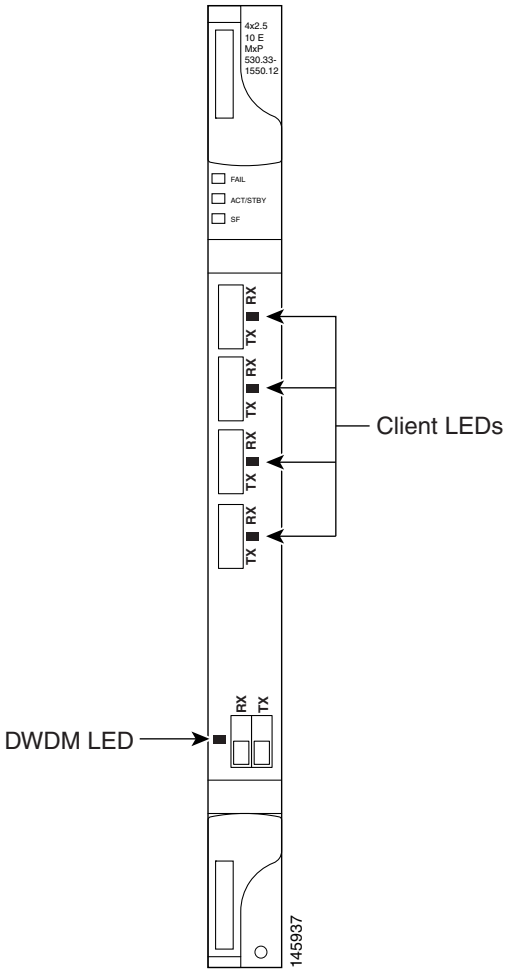
- Four 2.5 Gbps client interfaces (OC-48/STM-16) and one 10 Gbps trunk. The four OC-48 signals are mapped into a ITU-T G.709 OTU2 signal using standard ITU-T G.709 multiplexing.
- Onboard E-FEC processor: The processor supports both standard Reed-Solomon (RS, specified in ITU-T G.709) and E-FEC, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces. The E-FEC functionality increases the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (237,255) correction algorithm. A new block code (BCH) algorithm implemented in E-FEC allows recovery of an input BER up to 1E-3.
- Pluggable client interface optic modules: The MXP_2.5G_10E card has modular interfaces. Two types of optics modules can be plugged into the card. These include an OC-48/STM 16 SR-1 interface with a 7-km (4.3-mile) nominal range (for short range and intra-office applications) and an IR-1 interface with a range up to 40 km (24.9 miles). SR-1 is defined in Telcordia GR-253-CORE and in I-16 (ITU-T G.957). IR-1 is defined in Telcordia GR-253-CORE and in S-16-1 (ITU-T G.957).
- High level provisioning support: The MXP_2.5G_10E card is initially provisioned using Cisco TransportPlanner software. Subsequently, the card can be monitored and provisioned using CTC software.
- Link monitoring and management: The MXP_2.5G_10E card uses standard OC-48 OH (overhead) bytes to monitor and manage incoming interfaces. The card passes the incoming SDH/SONET data stream and its overhead bytes transparently.

- Control of layered SONET/SDH transport overhead: The card is provisionable to terminate regenerator section overhead. This is used to eliminate forwarding of unneeded layer overhead. It can help reduce the number of alarms and help isolate faults in the network.
- Automatic timing source synchronization: The MXP_2.5G_10E normally synchronizes from the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE card. If for some reason, such as maintenance or upgrade activity, the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE is not available, the MXP_2.5G_10E automatically synchronizes to one of the input client interface clocks.
- Configurable squelching policy: The card can be configured to squelch the client interface output if there is LOS at the DWDM receiver or if there is a remote fault. In the event of a remote fault, the card manages multiplex section alarm indication signal (MS-AIS) insertion.

11.9.2 Faceplates and Block Diagram

Figure 11-9 shows the MXP_2.5G_10E faceplate.

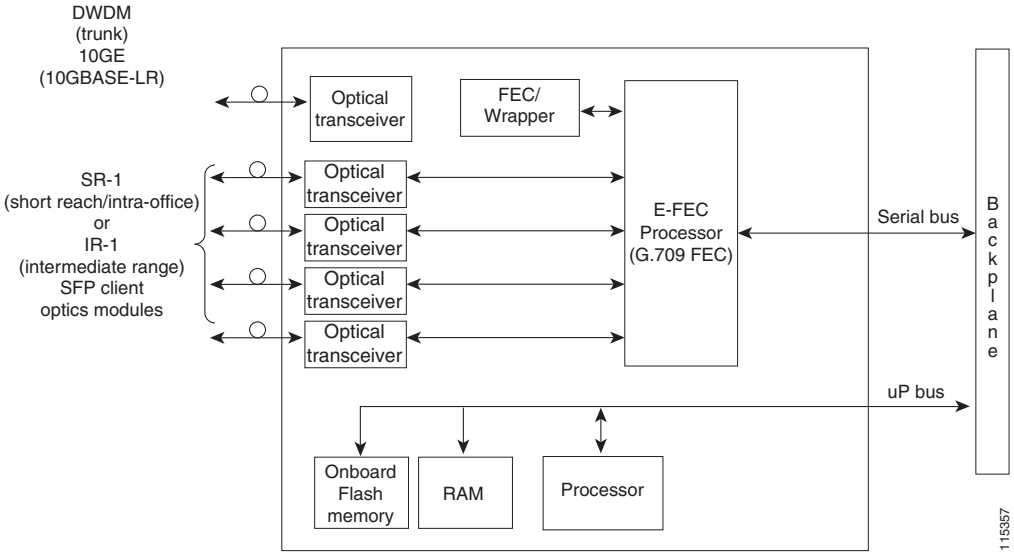
Figure 11-9 MXP_2.5G_10E Faceplate



For information about safety labels for the card, see the "G.1.1 Class 1 Laser Product Cards" section on page G-1.

Figure 11-10 shows a block diagram of the MXP_2.5G_10E card.

Figure 11-10 MXP_2.5G_10E Block Diagram



11.9.3 MXP_2.5G_10E Functions

The functions of the MXP_2.5G_10E card are:

- G.5 Client Interface, page G-14
- G.6 DWDM Interface, page G-14
- G.12 Multiplexing Function, page G-17
- G.11 Timing Synchronization, page G-16
- G.8 Enhanced FEC (E-FEC) Feature, page G-15
- G.9 FEC and E-FEC Modes, page G-16
- G.13 SONET/SDH Overhead Byte Processing, page G-18
- G.13 SONET/SDH Overhead Byte Processing, page G-18
- G.14 Client Interface Monitoring, page G-18
- G.2 Automatic Laser Shutdown, page G-6
- G.15 Jitter, page G-18
- G.16 Lamp Test, page G-18
- G.17 Onboard Traffic Generation, page G-18
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10.

11.9.3.1 Wavelength Identification

The card uses trunk lasers that are wave-locked, which allows the trunk transmitter to operate on the ITU grid effectively. Table 11-6 describes the required trunk transmit laser wavelengths. The laser is tunable over eight wavelengths at 50-GHz spacing or four at 100-GHz spacing.

Table 11-6 MXP_2.5G_10E Trunk Wavelengths

Band	Wavelength (nm)	Band	Wavelength (nm)
30.3	1530.33	46.1	1546.12
30.3	1531.12	46.1	1546.92
30.3	1531.90	46.1	1547.72
30.3	1532.68	46.1	1548.51
34.2	1534.25	50.1	1550.12
34.2	1535.04	50.1	1550.92
34.2	1535.82	50.1	1551.72
34.2	1536.61	50.1	1552.52
38.1	1538.19	54.1	1554.13
38.1	1538.98	54.1	1554.94
38.1	1539.77	54.1	1555.75
38.1	1540.56	54.1	1556.55
42.1	1542.14	58.1	1558.17
42.1	1542.94	58.1	1558.98
42.1	1543.73	58.1	1559.79
42.1	1544.53	58.1	1560.61

11.9.4 Related Procedures for MXP_2.5G_10E Card

The following is the list of procedures and tasks related to the configuration of MXP_2.5G_10E Card:

- NTP-G97 Modify the 4x2.5G Muxponder Card Line Settings and PM Parameter Thresholds, page 11-236
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.10 MXP_2.5G_10E_C and MXP_2.5G_10E_L Cards

MXP_2.5G_10E_L: (Cisco ONS 15454 only)

The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards are DWDM muxponders for the ONS 15454 platform that support transparent termination mode on the client side. The faceplate designation of the cards is “4x2.5G 10E MXP C” for the MXP_2.5G_10E_C card and “4x2.5G 10E MXP L” for the MXP_2.5G_10E_L card. The cards multiplex four 2.5-Gbps client signals (4 x OC48/STM-16 SFP) into

a single 10-Gbps DWDM optical signal on the trunk side. The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards provide wavelength transmission service for the four incoming 2.5 Gbps client interfaces. The MXP_2.5G_10E_C and MXP_2.5G_10E_L muxponders pass all SONET/SDH overhead bytes transparently.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up GCCs for data communications, enable FEC, or facilitate PM.

The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards work with OTN devices defined in ITU-T G.709. The cards support ODU1 to OTU2 multiplexing, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope. See the "G.12 Multiplexing Function" section on page G-17.

The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards are not compatible with the MXP_2.5G_10G card, which does not support transparent termination mode.

You can install MXP_2.5G_10E_C and MXP_2.5G_10E_L cards in Slots 1 to 6 and 12 to 17. You can provision a card in a linear configuration, as a BLSR/MS-SPRing, a path protection/SNCP, or a regenerator. The cards can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the cards are configured for transparent termination mode.

The MXP_2.5G_10E_C card features a tunable 1550-nm C-band laser on the trunk port. The laser is tunable across 82 wavelengths on the ITU grid with 50-GHz spacing between wavelengths. The MXP_2.5G_10E_L features a tunable 1580-nm L-band laser on the trunk port. The laser is tunable across 80 wavelengths on the ITU grid, also with 50-GHz spacing. Each card features four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The cards uses dual LC connectors on the trunk side and use SFP modules on the client side for optical cable termination. The SFP pluggable modules are SR or IR and support an LC fiber connector.

Note When you create a 4xOC-48 OCHCC circuit, you need to select the G.709 and Synchronous options. A 4xOC-48 OCHCC circuit is supported by G.709 and synchronous mode. This is necessary to provision a 4xOC-48 OCHCC circuit.

11.10.1 Key Features

The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards have the following high level features:

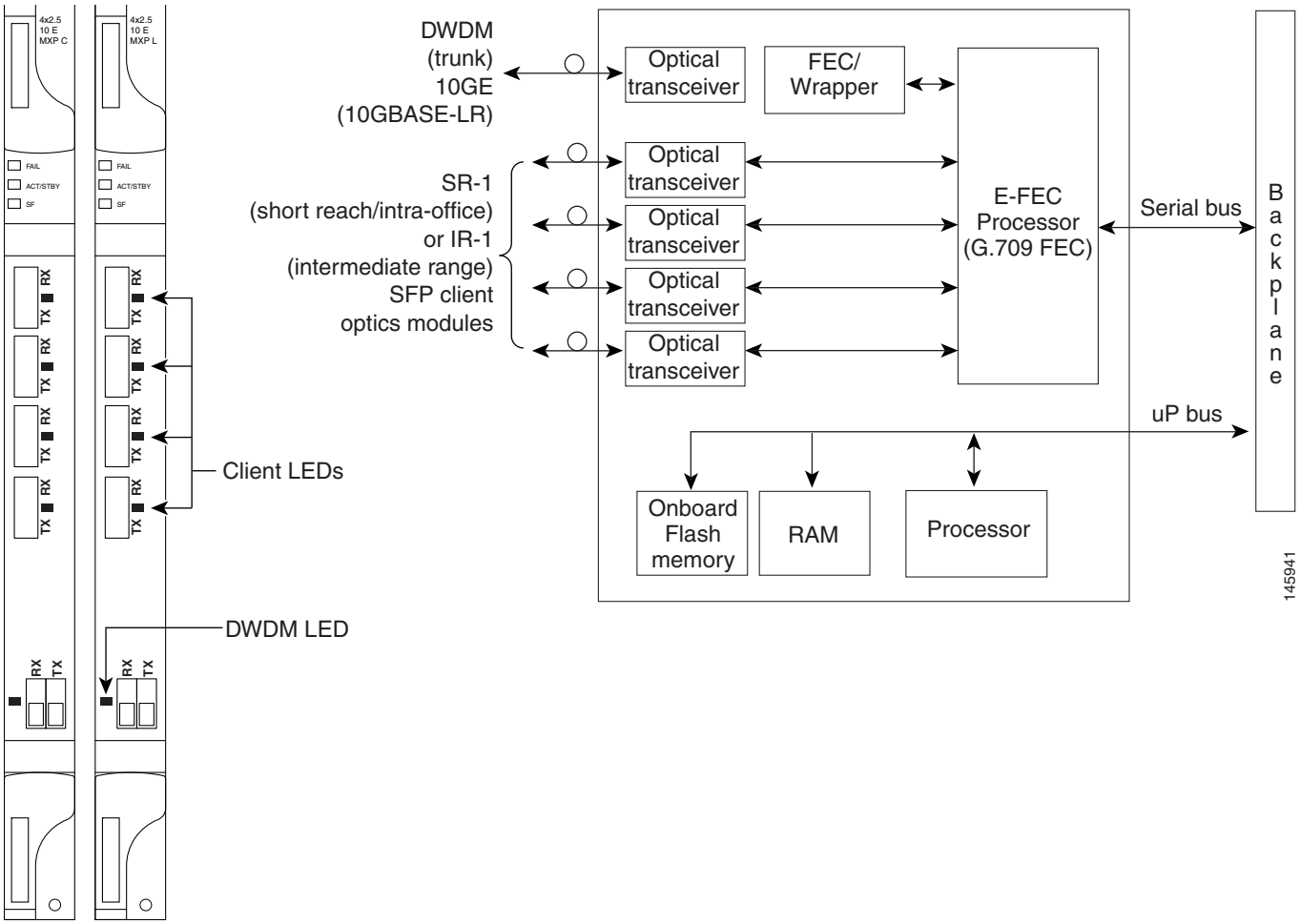
- Four 2.5 Gbps client interfaces (OC-48/STM-16) and one 10 Gbps trunk. The four OC-48 signals are mapped into a ITU-T G.709 OTU2 signal using standard ITU-T G.709 multiplexing.
- Onboard E-FEC processor: The processor supports both standard RS (specified in ITU-T G.709) and E-FEC, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces. The E-FEC functionality increases the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (237,255) correction algorithm. A new BCH algorithm implemented in E-FEC allows recovery of an input BER up to 1E-3.
- Pluggable client interface optic modules: The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards have modular interfaces. Two types of optics modules can be plugged into the card. These include an OC-48/STM 16 SR-1 interface with a 7-km (4.3-mile) nominal range (for short range and intra-office applications) and an IR-1 interface with a range up to 40 km (24.9 miles). SR-1 is defined in Telcordia GR-253-CORE and in I-16 (ITU-T G.957). IR-1 is defined in Telcordia GR-253-CORE and in S-16-1 (ITU-T G.957).

- High level provisioning support: The cards are initially provisioned using Cisco TransportPlanner software. Subsequently, the card can be monitored and provisioned using CTC software.
- Link monitoring and management: The cards use standard OC-48 OH (overhead) bytes to monitor and manage incoming interfaces. The cards pass the incoming SDH/SONET data stream and its overhead bytes transparently.
- Control of layered SONET/SDH transport overhead: The cards are provisionable to terminate regenerator section overhead. This is used to eliminate forwarding of unneeded layer overhead. It can help reduce the number of alarms and help isolate faults in the network.
- Automatic timing source synchronization: The MXP_2.5G_10E_C and MXP_2.5G_10E_L cards normally synchronize from the TCC2/TCC2P/TCC3 card. If for some reason, such as maintenance or upgrade activity, the TCC2/TCC2P/TCC3 is not available, the cards automatically synchronize to one of the input client interface clocks.
- Configurable squelching policy: The cards can be configured to squelch the client interface output if there is LOS at the DWDM receiver or if there is a remote fault. In the event of a remote fault, the card manages MS-AIS insertion.
- The cards are tunable across the full C band (MXP_2.5G_10E_C) or full L band (MXP_2.5G_10E_L), thus eliminating the need to use different versions of each card to provide tunability across specific wavelengths in a band.

11.10.2 Faceplates and Block Diagram

Figure 11-11 shows the MXP_2.5G_10E_C and MXP_2.5G_10E_L faceplates and block diagram.

Figure 11-11 MXP_2.5G_10E _C and MXP_2.5G_10E_L Faceplates and Block Diagram



For information about safety labels for the cards, see the "G.1.1 Class 1 Laser Product Cards" section on page G-1.

11.10.3 MXP_2.5G_10E_C and MXP_2.5G_10E_L Functions

The functions of the MXP_2.5G_10E_C and MXP_2.5G_10E_L cards are:

- G.5 Client Interface, page G-14
- G.6 DWDM Interface, page G-14
- G.12 Multiplexing Function, page G-17
- G.11 Timing Synchronization, page G-16
- G.8 Enhanced FEC (E-FEC) Feature, page G-15
- G.9 FEC and E-FEC Modes, page G-16
- G.13 SONET/SDH Overhead Byte Processing, page G-18
- G.13 SONET/SDH Overhead Byte Processing, page G-18
- G.14 Client Interface Monitoring, page G-18

- G.2 Automatic Laser Shutdown, page G-6
- G.15 Jitter, page G-18
- G.16 Lamp Test, page G-18
- G.17 Onboard Traffic Generation, page G-18
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10.

11.10.3.1 Wavelength Identification

The card uses trunk lasers that are wavelocked, which allows the trunk transmitter to operate on the ITU grid effectively. Both the MXP_2.5G_10E_C and MXP_2.5G_10E_L cards implement the UT2 module. The MXP_2.5G_10E_C card uses a C-band version of the UT2 and the MXP_2.5G_10E_L card uses an L-band version.

Table 11-7 describes the required trunk transmit laser wavelengths for the MXP_2.5G_10E_C card. The laser is tunable over 82 wavelengths in the C band at 50-GHz spacing on the ITU grid.

Table 11-7 MXP_2.5G_10E_C Trunk Wavelengths

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	196.00	1529.55	42	193.95	1545.72
2	195.95	1529.94	43	193.90	1546.119
3	195.90	1530.334	44	193.85	1546.518
4	195.85	1530.725	45	193.80	1546.917
5	195.80	1531.116	46	193.75	1547.316
6	195.75	1531.507	47	193.70	1547.715
7	195.70	1531.898	48	193.65	1548.115
8	195.65	1532.290	49	193.60	1548.515
9	195.60	1532.681	50	193.55	1548.915
10	195.55	1533.073	51	193.50	1549.32
11	195.50	1533.47	52	193.45	1549.71
12	195.45	1533.86	53	193.40	1550.116
13	195.40	1534.250	54	193.35	1550.517
14	195.35	1534.643	55	193.30	1550.918
15	195.30	1535.036	56	193.25	1551.319
16	195.25	1535.429	57	193.20	1551.721
17	195.20	1535.822	58	193.15	1552.122
18	195.15	1536.216	59	193.10	1552.524
19	195.10	1536.609	60	193.05	1552.926
20	195.05	1537.003	61	193.00	1553.33
21	195.00	1537.40	62	192.95	1553.73
22	194.95	1537.79	63	192.90	1554.134

Table 11-7 MXP_2.5G_10E_C Trunk Wavelengths (Continued)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
23	194.90	1538.186	64	192.85	1554.537
24	194.85	1538.581	65	192.80	1554.940
25	194.80	1538.976	66	192.75	1555.343
26	194.75	1539.371	67	192.70	1555.747
27	194.70	1539.766	68	192.65	1556.151
28	194.65	1540.162	69	192.60	1556.555
29	194.60	1540.557	70	192.55	1556.959
30	194.55	1540.953	71	192.50	1557.36
31	194.50	1541.35	72	192.45	1557.77
32	194.45	1541.75	73	192.40	1558.173
33	194.40	1542.142	74	192.35	1558.578
34	194.35	1542.539	75	192.30	1558.983
35	194.30	1542.936	76	192.25	1559.389
36	194.25	1543.333	77	192.20	1559.794
37	194.20	1543.730	78	192.15	1560.200
38	194.15	1544.128	79	192.10	1560.606
39	194.10	1544.526	80	192.05	1561.013
40	194.05	1544.924	81	192.00	1561.42
41	194.00	1545.32	82	191.95	1561.83

Table 11-8 describes the required trunk transmit laser wavelengths for the MXP_2.5G_10E_L card. The laser is fully tunable over 80 wavelengths in the L band at 50-GHz spacing on the ITU grid.

Table 11-8 MXP_2.5G_10E_L Trunk Wavelengths

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	190.85	1570.83	41	188.85	1587.46
2	190.8	1571.24	42	188.8	1587.88
3	190.75	1571.65	43	188.75	1588.30
4	190.7	1572.06	44	188.7	1588.73
5	190.65	1572.48	45	188.65	1589.15
6	190.6	1572.89	46	188.6	1589.57
7	190.55	1573.30	47	188.55	1589.99
8	190.5	1573.71	48	188.5	1590.41
9	190.45	1574.13	49	188.45	1590.83
10	190.4	1574.54	50	188.4	1591.26

Table 11-8 MXP_2.5G_10E_L Trunk Wavelengths (Continued)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
11	190.35	1574.95	51	188.35	1591.68
12	190.3	1575.37	52	188.3	1592.10
13	190.25	1575.78	53	188.25	1592.52
14	190.2	1576.20	54	188.2	1592.95
15	190.15	1576.61	55	188.15	1593.37
16	190.1	1577.03	56	188.1	1593.79
17	190.05	1577.44	57	188.05	1594.22
18	190	1577.86	58	188	1594.64
19	189.95	1578.27	59	187.95	1595.06
20	189.9	1578.69	60	187.9	1595.49
21	189.85	1579.10	61	187.85	1595.91
22	189.8	1579.52	62	187.8	1596.34
23	189.75	1579.93	63	187.75	1596.76
24	189.7	1580.35	64	187.7	1597.19
25	189.65	1580.77	65	187.65	1597.62
26	189.6	1581.18	66	187.6	1598.04
27	189.55	1581.60	67	187.55	1598.47
28	189.5	1582.02	68	187.5	1598.89
29	189.45	1582.44	69	187.45	1599.32
30	189.4	1582.85	70	187.4	1599.75
31	189.35	1583.27	71	187.35	1600.17
32	189.3	1583.69	72	187.3	1600.60
33	189.25	1584.11	73	187.25	1601.03
34	189.2	1584.53	74	187.2	1601.46
35	189.15	1584.95	75	187.15	1601.88
36	189.1	1585.36	76	187.1	1602.31
37	189.05	1585.78	77	187.05	1602.74
38	189	1586.20	78	187	1603.17
39	188.95	1586.62	79	186.95	1603.60
40	188.9	1587.04	80	186.9	1604.03

11.10.4 Related Procedures for MXP_2.5G_10E_C and MXP_2.5G_10E_L Cards

The following is the list of procedures and tasks related to the configuration of MXP_2.5G_10E_C and MXP_2.5G_10E_L cards:

- NTP-G97 Modify the 4x2.5G Muxponder Card Line Settings and PM Parameter Thresholds, page 11-236
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.11 MXP_MR_2.5G and MXPP_MR_2.5G Cards

The MXP_MR_2.5G card aggregates a mix and match of client Storage Area Network (SAN) service client inputs (GE, FICON, Fibre Channel, and ESCON) into one 2.5 Gbps STM-16/OC-48 DWDM signal on the trunk side. It provides one long-reach STM-16/OC-48 port per card and is compliant with Telcordia GR-253-CORE.

Note In Software Release 7.0 and later, two additional operating modes have been made available to the user: pure ESCON (all 8 ports running ESCON), and mixed mode (Port 1 running FC/GE/FICON, and Ports 5 through 8 running ESCON). When the card is part of a system running Software Release 6.0 or below, only one operating mode, (FC/GE) is available for use.

The 2.5-Gbps Multirate Muxponder–Protected–100 GHz–Tunable 15xx.xx-15yy.yy (MXPP_MR_2.5G) card aggregates various client SAN service client inputs (GE, FICON, Fibre Channel, and ESCON) into one 2.5 Gbps STM-16/OC-48 DWDM signal on the trunk side. It provides two long-reach STM-16/OC-48 ports per card and is compliant with ITU-T G.957 and Telcordia GR-253-CORE.

Because the cards are tunable to one of four adjacent grid channels on a 100-GHz spacing, each card is available in eight versions, with 15xx.xx representing the first wavelength and 15yy.yy representing the last wavelength of the four available on the card. In total, 32 DWDM wavelengths are covered in accordance with the ITU-T 100-GHz grid standard, G.692, and Telcordia GR-2918-CORE, Issue 2. The card versions along with their corresponding wavelengths are shown in Table 11-9.

Table 11-9 Card Versions

Card Version	Frequency Channels at 100 GHz (0.8 nm) Spacing			
1530.33–1532.68	1530.33 nm	1531.12 nm	1531.90 nm	1532.68 nm
1534.25–1536.61	1534.25 nm	1535.04 nm	1535.82 nm	1536.61 nm
1538.19–1540.56	1538.19 nm	1538.98 nm	1539.77 nm	1540.56 nm
1542.14–1544.53	1542.14 nm	1542.94 nm	1543.73 nm	1544.53 nm
1546.12–1548.51	1546.12 nm	1546.92 nm	1547.72 nm	1548.51 nm
1550.12–1552.52	1550.12 nm	1550.92 nm	1551.72 nm	1552.52 nm
1554.13–1556.55	1554.13 nm	1554.94 nm	1555.75 nm	1556.55 nm
1558.17–1560.61	1558.17 nm	1558.98 nm	1559.79 nm	1560.61 nm

The muxponders are intended to be used in applications with long DWDM metro or regional unregenerated spans. Long transmission distances are achieved through the use of flat gain optical amplifiers.

The client interface supports the following payload types:

- 2G FC

- 1G FC
- 2G FICON
- 1G FICON
- GE
- ESCON

Note Because the client payload cannot oversubscribe the trunk, a mix of client signals can be accepted, up to a maximum limit of 2.5 Gbps.

Table 11-10 shows the input data rate for each client interface, and the encapsulation method. The current version of the ITU-T Transparent Generic Framing Procedure (GFP-T) G.7041 supports transparent mapping of 8B/10B block-coded protocols, including Gigabit Ethernet, Fibre Channel, and FICON.

In addition to the GFP mapping, 1-Gbps traffic on Port 1 or 2 of the high-speed serializer/deserializer (SERDES) is mapped to an STS-24c channel. If two 1-Gbps client signals are present at Port 1 and Port 2 of the SERDES, the Port 1 signal is mapped into the first STS-24c channel and the Port 2 signal into the second STS-24c channel. The two channels are then mapped into an OC-48 trunk channel.

Table 11-10 MXP_MR_2.5G and MXPP_MR_2.5G Client Interface Data Rates and Encapsulation

Client Interface	Input Data Rate	ITU-T GFP-T G.7041 Encapsulation
2G FC	2.125 Gbps	Yes
1G FC	1.06 Gbps	Yes
2G FICON	2.125 Gbps	Yes
1G FICON	1.06 Gbps	Yes
GE	1.25 Gbps	Yes
ESCON	0.2 Gbps	Yes

Table 11-11 shows some of the mix and match possibilities on the various client ports. The table is intended to show the full client payload configurations for the card.

Table 11-11 Client Data Rates and Ports

Mode	Port(s)	Aggregate Data Rate
2G FC	1	2.125 Gbps
1G FC	1, 2	2.125 Gbps
2G FICON	1	2.125 Gbps
1G FICON	1, 2	2.125 Gbps
GE	1, 2	2.5 Gbps
1G FC ESCON (mixed mode)	1 5, 6, 7, 8	1.06 Gbps 0.8 Gbps 1.86 Gbps total

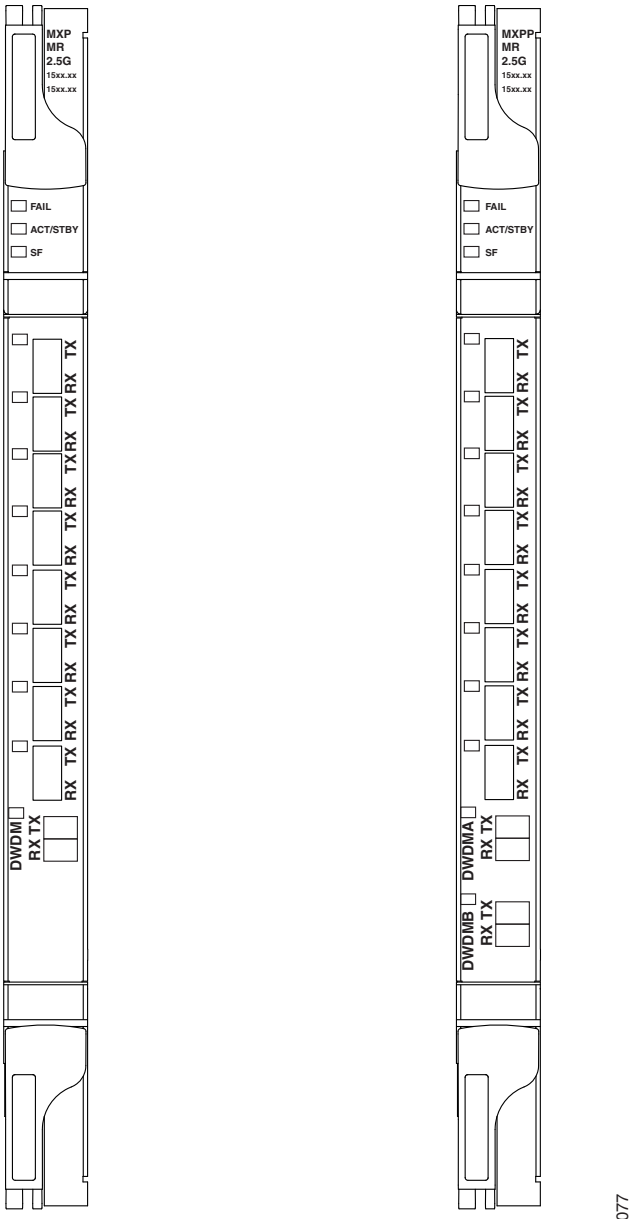
Table 11-11 Client Data Rates and Ports (Continued)

Mode	Port(s)	Aggregate Data Rate
1G FICON ESCON (mixed mode)	1 5, 6, 7, 8	1.06 Gbps 0.8 Gbps 1.86 Gbps total
GE ESCON (mixed mode)	1 5, 6, 7, 8	1.25 Gbps 0.8 Gbps Total 2.05 Gbps
ESCON	1, 2, 3, 4, 5, 6, 7, 8	1.6 Gbps

11.11.1 Faceplates and Block Diagram

Figure 11-12 shows the MXP_MR_2.5G and MXPP_MR_2.5G faceplates.

Figure 11-12 MXP_MR_2.5G and MXPP_MR_2.5G Faceplates



MXP_MR_2.5G MXPP_MR_2.5G

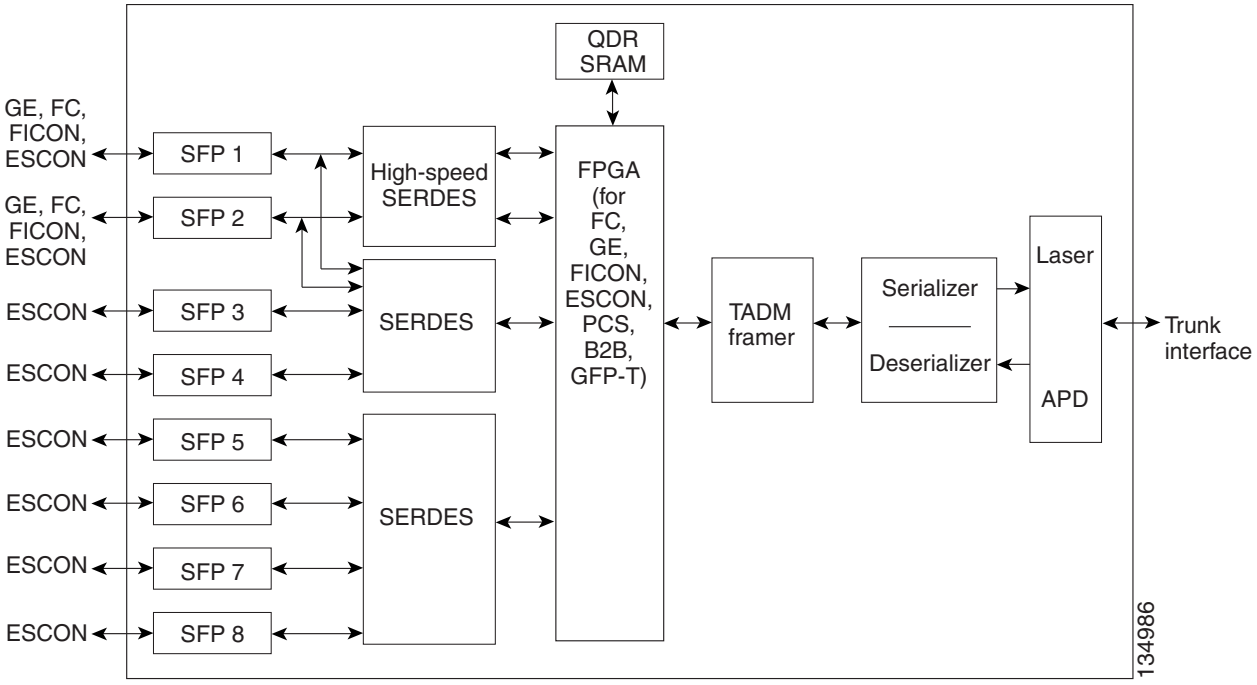
For information about safety labels for the cards, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Figure 11-13 shows a block diagram of the MXP_MR_2.5G card. The card has eight SFP client interfaces. Ports 1 and 2 can be used for GE, FC, FICON, or ESCON. Ports 3 through 8 are used for ESCON client interfaces. There are two SERDES blocks dedicated to the high-speed interfaces (GE, FC, FICON, and ESCON) and two SERDES blocks for the ESCON interfaces. A FPGA is provided to support different configurations for different modes of operation. This FPGA has a Universal Test and Operations Physical Interface for ATM (UTOPIA) interface. A transceiver add/drop multiplexer

(TADM) chip supports framing. Finally, the output signal is serialized and connected to the trunk front end with a direct modulation laser. The trunk receive signal is converted into an electrical signal with an avalanche photodiode (APD), is deserialized, and is then sent to the TADM framer and FPGA.

The MXPP_MR_2.5G is the same, except a 50/50 splitter divides the power at the trunk interface. In the receive direction, there are two APDs, two SERDES blocks, and two TADM framers. This is necessary to monitor both the working and protect paths. A switch selects one of the two paths to connect to the client interface.

Figure 11-13 MXP_MR_2.5G and MXPP_MR_2.5G Block Diagram



Caution You must use a 20-dB fiber attenuator (15 to 25 dB) when working with the MXP_MR_2.5G and MXPP_MR_2.5G cards in a loopback configuration on the trunk port. Do not use direct fiber loopbacks with the MXP_MR_2.5G and MXPP_MR_2.5G cards. Using direct fiber loopbacks causes irreparable damage to the MXP_MR_2.5G and MXPP_MR_2.5G cards.

11.11.2 MXP_MR_2.5G and MXPP_MR_2.5G Functions

The functions of the MXP_MR_2.5G and MXPP_MR_2.5G cards are:

- G.18 Performance Monitoring, page G-19
- G.19 Distance Extension, page G-19
- G.20 Slot Compatibility, page G-19
- G.21 Interoperability with Cisco MDS Switches, page G-19
- G.22 Client and Trunk Ports, page G-19
- G.2 Automatic Laser Shutdown, page G-6

- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-10 on page G-12

11.11.3 Related Procedures for MXP_MR_2.5G and MXPP_MR_2.5G Cards

The following is the list of procedures and tasks related to the configuration of MXP_MR_2.5G and MXPP_MR_2.5G cards:

- NTP-G99 Modify the 2.5G Data Muxponder Card Line Settings and PM Parameter Thresholds, page 11-257
- NTP-G33 Create a Y-Cable Protection Group, page 11-138 (MXP_MR_2.5G only)
- NTP-G75 Monitor Transponder and Muxponder Performance

11.12 MXP_MR_10DME_C and MXP_MR_10DME_L Cards

MXP_MR_10DME_L: (Cisco ONS 15454 only)

The MXP_MR_10DME_C and MXP_MR_10DME_L cards aggregate a mix of client SAN service client inputs (GE, FICON, and Fibre Channel) into one 10.0 Gbps STM-64/OC-192 DWDM signal on the trunk side. It provides one long-reach STM-64/OC-192 port per card and is compliant with Telcordia GR-253-CORE and ITU-T G.957.

The cards support aggregation of the following signal types:

- 1-Gigabit Fibre Channel
- 2-Gigabit Fibre Channel
- 4-Gigabit Fibre Channel
- 1-Gigabit Ethernet
- 1-Gigabit ISC-Compatible (ISC-1)
- 2-Gigabit ISC-Peer (ISC-3)

Note On the card faceplates, the MXP_MR_10DME_C and MXP_MR_10DME_L cards are displayed as 10DME_C and 10DME_L, respectively.

Caution The card can be damaged by dropping it. Handle it safely.

The MXP_MR_10DME_C and MXP_MR_10DME_L muxponders pass all SONET/SDH overhead bytes transparently.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up GCCs for data communications, enable FEC, or facilitate PM. The MXP_MR_10DME_C and MXP_MR_10DME_L cards work with the OTN devices defined in ITU-T G.709. The cards support ODU1 to OTU2 multiplexing, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope. See the "G.12 Multiplexing Function" section on page G-17.

Note Because the client payload cannot oversubscribe the trunk, a mix of client signals can be accepted, up to a maximum limit of 10 Gbps.

You can install MXP_MR_10DME_C and MXP_MR_10DME_L cards in Slots 1 to 6 and 12 to 17.

Note The MXP_MR_10DME_C and MXP_MR_10DME_L cards are not compatible with the MXP_2.5G_10G card, which does not support transparent termination mode.

The MXP_MR_10DME_C card features a tunable 1550-nm C-band laser on the trunk port. The laser is tunable across 82 wavelengths on the ITU grid with 50-GHz spacing between wavelengths. The MXP_MR_10DME_L features a tunable 1580-nm L-band laser on the trunk port. The laser is tunable across 80 wavelengths on the ITU grid, also with 50-GHz spacing. Each card features four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The cards uses dual LC connectors on the trunk side and use SFP modules on the client side for optical cable termination. The SFP pluggable modules are SR or IR and support an LC fiber connector.

Table 11-12 shows the input data rate for each client interface, and the encapsulation method. The current version of the GFP-T G.7041 supports transparent mapping of 8B/10B block-coded protocols, including Gigabit Ethernet, Fibre Channel, ISC, and FICON.

In addition to the GFP mapping, 1-Gbps traffic on Port 1 or 2 of the high-speed SERDES is mapped to an STS-24c channel. If two 1-Gbps client signals are present at Port 1 and Port 2 of the high-speed SERDES, the Port 1 signal is mapped into the first STS-24c channel and the Port 2 signal into the second STS-24c channel. The two channels are then mapped into an OC-48 trunk channel.

Table 11-12 MXP_MR_10DME_C and MXP_MR_10DME_L Client Interface Data Rates and Encapsulation

Client Interface	Input Data Rate	GFP-T G.7041 Encapsulation
2G FC	2.125 Gbps	Yes
1G FC	1.06 Gbps	Yes
2G FICON/2G ISC-Compatible (ISC-1)/ 2G ISC-Peer (ISC-3)	2.125 Gbps	Yes
1G FICON/1G ISC-Compatible (ISC-1)/ 1G ISC-Peer (ISC-3)	1.06 Gbps	Yes
Gigabit Ethernet	1.25 Gbps	Yes

There are two FPGAs on each MXP_MR_10DME_C and MXP_MR_10DME_L, and a group of four ports is mapped to each FPGA. Group 1 consists of Ports 1 through 4, and Group 2 consists of Ports 5 through 8. Table 11-13 shows some of the mix and match possibilities on the various client data rates for Ports 1 through 4, and Ports 5 through 8. An X indicates that the data rate is supported in that port.

Table 11-13 Supported Client Data Rates for Ports 1 through 4 and Ports 5 through 8

Port (Group 1)	Port (Group 2)	Gigabit Ethernet	1G FC	2G FC	4G FC
1	5	X	X	X	X
2	6	X	X	—	—

Table 11-13 Supported Client Data Rates for Ports 1 through 4 and Ports 5 through 8 (Continued)

Port (Group 1)	Port (Group 2)	Gigabit Ethernet	1G FC	2G FC	4G FC
3	7	X	X	X	—
4	8	X	X	—	—

GFP-T PM is available through RMON and trunk PM is managed according to Telcordia GR-253-CORE and ITU G.783/826. Client PM is achieved through RMON for FC and GE.

A buffer-to-buffer credit management scheme provides FC flow control. With this feature enabled, a port indicates the number of frames that can be sent to it (its buffer credit), before the sender is required to stop transmitting and wait for the receipt of a "ready" indication The MXP_MR_10DME_C and MXP_MR_10DME_L cards support FC credit-based flow control with a buffer-to-buffer credit extension of up to 1600 km (994.1 miles) for 1G FC, up to 800 km (497.1 miles) for 2G FC, or up to 400 km (248.5 miles) for 4G FC. The feature can be enabled or disabled.

The MXP_MR_10DME_C and MXP_MR_10DME_L cards feature a 1550-nm laser for the trunk/line port and a 1310-nm or 850-nm laser (depending on the SFP) for the client ports. The cards contains eight 12.5 degree downward tilt SFP modules for the client interfaces. For optical termination, each SFP uses two LC connectors, which are labeled TX and RX on the faceplate. The trunk port is a dual-LC connector with a 45 degree downward angle.

The throughput of the MXP_MR_10DME_C and MXP_MR_10DME_L cards is affected by the following parameters:

- Distance extension—If distance extension is enabled on the card, it provides more throughput but more latency. If distance extension is disabled on the card, the buffer to buffer credits on the storage switch affects the throughput; higher the buffer to buffer credits higher is the throughput.

  Note For each link to operate at the maximum throughput, it requires a minimum number of buffer credits to be available on the devices which the link connects to. The number of buffer credits required is a function of the distance between the storage switch extension ports and the link bandwidth, that is, 1G, 2G, or 4G. These buffer credits are provided by either the storage switch (if distance extension is disabled) or by both the storage switch and the card (if distance extension is enabled).

- Forward Error Correction (FEC)—If Enhanced FEC (E-FEC) is enabled on the trunk port of the card, the throughout is significantly reduced in comparison to standard FEC being set on the trunk port.

  Note If distance extension is enabled on the card, the FEC status does not usually affect the throughput of the card.

- Payload size—The throughput of the card decreases with decrease in payload size.

The resultant throughput of the card is usually the combined effect of the above parameters.

11.12.1 Key Features

The MXP_MR_10DME_C and MXP_MR_10DME_L cards have the following high-level features:

- Onboard E-FEC processor: The processor supports both standard RS (specified in ITU-T G.709) and E-FEC, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces. The E-FEC functionality increases the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (237,255) correction algorithm. A new BCH algorithm implemented in E-FEC allows recovery of an input BER up to 1E-3.
- Pluggable client interface optic modules: The MXP_MR_10DME_C and MXP_MR_10DME_L cards have modular interfaces. Two types of optics modules can be plugged into the card. These include an OC-48/STM 16 SR-1 interface with a 7-km (4.3-mile) nominal range (for short range and intra-office applications) and an IR-1 interface with a range up to 40 km (24.9 miles). SR-1 is defined in Telcordia GR-253-CORE and in I-16 (ITU-T G.957). IR-1 is defined in Telcordia GR-253-CORE and in S-16-1 (ITU-T G.957).
- Y-cable protection: Supports Y-cable protection between the same card type only, on ports with the same port number and signal rate. See the "G.35.1.1 Y-Cable Protection" section on page G-26 for more detailed information.
- High level provisioning support: The cards are initially provisioned using Cisco TransportPlanner software. Subsequently, the card can be monitored and provisioned using CTC software.
- ALS: A safety mechanism used in the event of a fiber cut. For details regarding ALS provisioning for the MXP_MR_10DME_C and MXP_MR_10DME_L cards, see the "NTP-G162 Change the ALS Maintenance Settings" section on page 11-423.
- Link monitoring and management: The cards use standard OC-48 OH bytes to monitor and manage incoming interfaces. The cards pass the incoming SDH/SONET data stream and its OH bytes transparently.
- Control of layered SONET/SDH transport overhead: The cards are provisionable to terminate regenerator section overhead. This is used to eliminate forwarding of unneeded layer overhead. It can help reduce the number of alarms and help isolate faults in the network.
- Automatic timing source synchronization: The MXP_MR_10DME_C and MXP_MR_10DME_L cards normally synchronize from the TCC2/TCC2P/TCC3 card. If for some reason, such as maintenance or upgrade activity, the TCC2/TCC2P/TCC3 is not available, the cards automatically synchronize to one of the input client interface clocks.

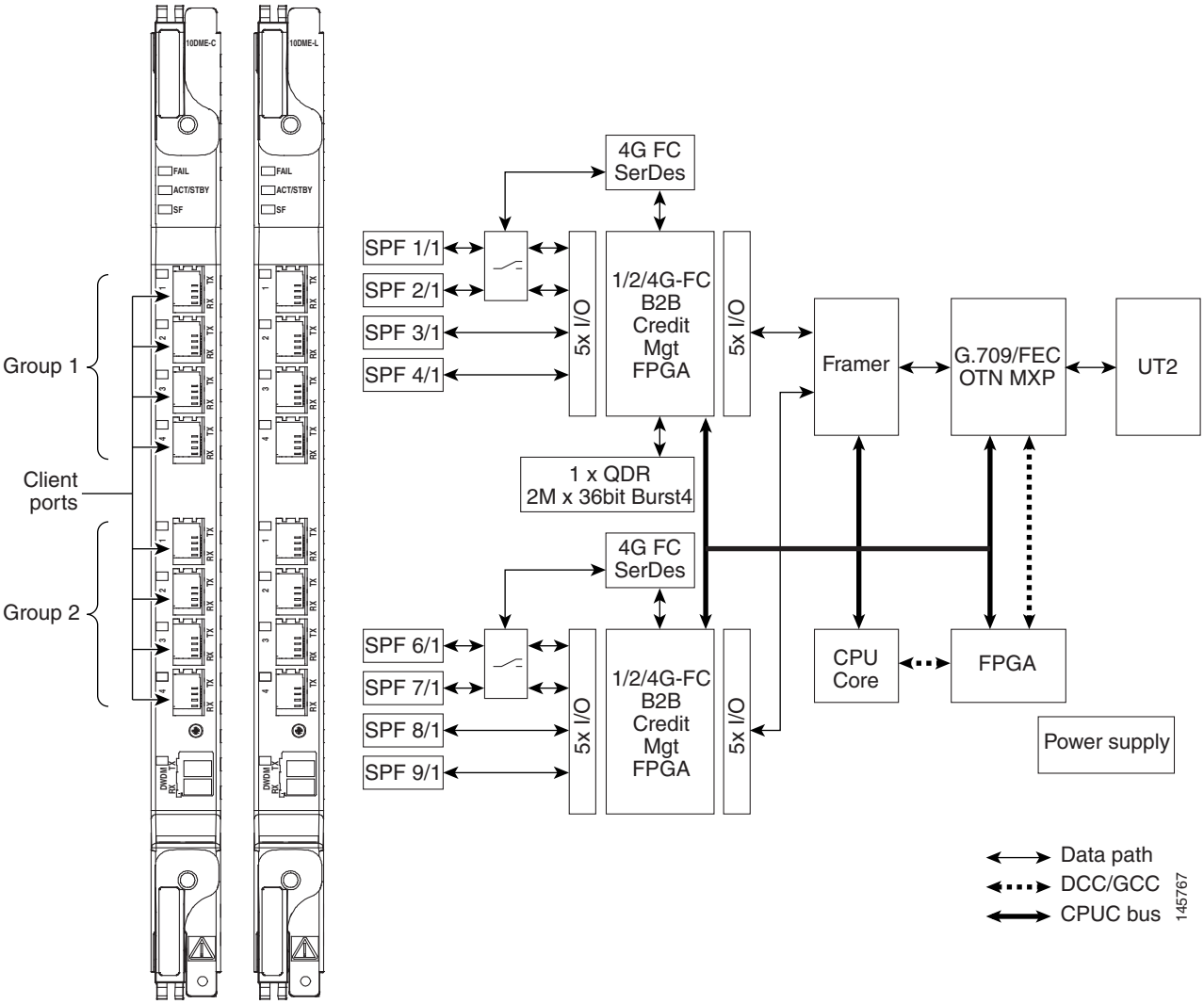
  Note MXP_MR_10DME_C and MXP_MR_10DME_L cards cannot be used for line timing.

- Configurable squelching policy: The cards can be configured to squelch the client interface output if there is LOS at the DWDM receiver or if there is a remote fault. In the event of a remote fault, the card manages MS-AIS insertion.
- The cards are tunable across the full C band (MXP_MR_10DME_C) or full L band (MXP_MR_10DME_L), thus eliminating the need to use different versions of each card to provide tunability across specific wavelengths in a band.
- You can provision a string (port name) for each fiber channel/FICON interface on the MXP_MR_10DME_C and MXP_MR_10DME_L cards, which allows the MDS Fabric Manager to create a link association between that SAN port and a SAN port on a Cisco MDS 9000 switch.
- From Software Release 9.0, the fast switch feature of MXP_MR_10DME_C and MXP_MR_10DME_L cards along with the buffer-to-buffer credit recovery feature of MDS switches, prevents reinitialization of ISL links during Y-cable switchovers.

11.12.2 Faceplates and Block Diagram

Figure 11-14 shows the MXP_MR_10DME_C and MXP_MR_10DME_L faceplates and block diagram.

Figure 11-14 MXP_MR_10DME_C and MXP_MR_10DME_L Faceplates and Block Diagram



For information about safety labels for the cards, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Caution You must use a 20-dB fiber attenuator (15 to 25 dB) when working with the cards in a loopback on the trunk port. Do not use direct fiber loopbacks with the cards. Using direct fiber loopbacks causes irreparable damage to the MXP_MR_10DME_C and MXP_MR_10DME_L cards.

11.12.3 MXP_MR_10DME_C and MXP_MR_10DME_L Functions

The functions of the MXP_MR_10DME_C and MXP_MR_10DME_L cards are:

- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-9 on page G-11

11.12.3.1 Wavelength Identification

The card uses trunk lasers that are wavelocked, which allows the trunk transmitter to operate on the ITU grid effectively. Both the MXP_MR_10DME_C and MXP_MR_10DME_L cards implement the UT2 module. The MXP_MR_10DME_C card uses a C-band version of the UT2 and the MXP_MR_10DME_L card uses an L-band version.

Table 11-14 describes the required trunk transmit laser wavelengths for the MXP_MR_10DME_C card. The laser is tunable over 82 wavelengths in the C band at 50-GHz spacing on the ITU grid.

Table 11-14 MXP_MR_10DME_C Trunk Wavelengths

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	196.00	1529.55	42	193.95	1545.72
2	195.95	1529.94	43	193.90	1546.119
3	195.90	1530.334	44	193.85	1546.518
4	195.85	1530.725	45	193.80	1546.917
5	195.80	1531.116	46	193.75	1547.316
6	195.75	1531.507	47	193.70	1547.715
7	195.70	1531.898	48	193.65	1548.115
8	195.65	1532.290	49	193.60	1548.515
9	195.60	1532.681	50	193.55	1548.915
10	195.55	1533.073	51	193.50	1549.32
11	195.50	1533.47	52	193.45	1549.71
12	195.45	1533.86	53	193.40	1550.116
13	195.40	1534.250	54	193.35	1550.517
14	195.35	1534.643	55	193.30	1550.918
15	195.30	1535.036	56	193.25	1551.319
16	195.25	1535.429	57	193.20	1551.721
17	195.20	1535.822	58	193.15	1552.122
18	195.15	1536.216	59	193.10	1552.524
19	195.10	1536.609	60	193.05	1552.926
20	195.05	1537.003	61	193.00	1553.33
21	195.00	1537.40	62	192.95	1553.73
22	194.95	1537.79	63	192.90	1554.134
23	194.90	1538.186	64	192.85	1554.537

Table 11-14 MXP_MR_10DME_C Trunk Wavelengths (Continued)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
24	194.85	1538.581	65	192.80	1554.940
25	194.80	1538.976	66	192.75	1555.343
26	194.75	1539.371	67	192.70	1555.747
27	194.70	1539.766	68	192.65	1556.151
28	194.65	1540.162	69	192.60	1556.555
29	194.60	1540.557	70	192.55	1556.959
30	194.55	1540.953	71	192.50	1557.36
31	194.50	1541.35	72	192.45	1557.77
32	194.45	1541.75	73	192.40	1558.173
33	194.40	1542.142	74	192.35	1558.578
34	194.35	1542.539	75	192.30	1558.983
35	194.30	1542.936	76	192.25	1559.389
36	194.25	1543.333	77	192.20	1559.794
37	194.20	1543.730	78	192.15	1560.200
38	194.15	1544.128	79	192.10	1560.606
39	194.10	1544.526	80	192.05	1561.013
40	194.05	1544.924	81	192.00	1561.42
41	194.00	1545.32	82	191.95	1561.83

Table 11-15 describes the required trunk transmit laser wavelengths for the MXP_MR_10DME_L card. The laser is fully tunable over 80 wavelengths in the L band at 50-GHz spacing on the ITU grid.

Table 11-15 MXP_MR_10DME_L Trunk Wavelengths

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	190.85	1570.83	41	188.85	1587.46
2	190.8	1571.24	42	188.8	1587.88
3	190.75	1571.65	43	188.75	1588.30
4	190.7	1572.06	44	188.7	1588.73
5	190.65	1572.48	45	188.65	1589.15
6	190.6	1572.89	46	188.6	1589.57
7	190.55	1573.30	47	188.55	1589.99
8	190.5	1573.71	48	188.5	1590.41
9	190.45	1574.13	49	188.45	1590.83
10	190.4	1574.54	50	188.4	1591.26
11	190.35	1574.95	51	188.35	1591.68

Table 11-15 MXP_MR_10DME_L Trunk Wavelengths (Continued)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
12	190.3	1575.37	52	188.3	1592.10
13	190.25	1575.78	53	188.25	1592.52
14	190.2	1576.20	54	188.2	1592.95
15	190.15	1576.61	55	188.15	1593.37
16	190.1	1577.03	56	188.1	1593.79
17	190.05	1577.44	57	188.05	1594.22
18	190	1577.86	58	188	1594.64
19	189.95	1578.27	59	187.95	1595.06
20	189.9	1578.69	60	187.9	1595.49
21	189.85	1579.10	61	187.85	1595.91
22	189.8	1579.52	62	187.8	1596.34
23	189.75	1579.93	63	187.75	1596.76
24	189.7	1580.35	64	187.7	1597.19
25	189.65	1580.77	65	187.65	1597.62
26	189.6	1581.18	66	187.6	1598.04
27	189.55	1581.60	67	187.55	1598.47
28	189.5	1582.02	68	187.5	1598.89
29	189.45	1582.44	69	187.45	1599.32
30	189.4	1582.85	70	187.4	1599.75
31	189.35	1583.27	71	187.35	1600.17
32	189.3	1583.69	72	187.3	1600.60
33	189.25	1584.11	73	187.25	1601.03
34	189.2	1584.53	74	187.2	1601.46
35	189.15	1584.95	75	187.15	1601.88
36	189.1	1585.36	76	187.1	1602.31
37	189.05	1585.78	77	187.05	1602.74
38	189	1586.20	78	187	1603.17
39	188.95	1586.62	79	186.95	1603.60
40	188.9	1587.04	80	186.9	1604.03

11.12.4 Related Procedures for MXP_MR_10DME_C and MXP_MR_10DME_L Cards

The following is the list of procedures and tasks related to the configuration of MXP_MR_10DME_C and MXP_MR_10DME_L cards:

- NTP-G148 Modify the 10G Data Muxponder Card Line Settings and PM Parameter Thresholds, page 11-275
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.13 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards aggregate a variety of client service inputs (GigabitEthernet, fibre channel, OTU2, OTU2e, and OC-192) into a single 40-Gbps OTU3/OTU3e signal on the trunk side. You can either have 40E-MXP-C, or 40ME-MXP-C card based on your requirement, though the CTC name 40E-MXP-C is common for both. The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards support aggregation of the following signals:

- With overclock enabled on the trunk port:
  - 10-Gigabit Fibre Channel
  - OTU2e
- With overclock disabled on the trunk port:
  - 8-Gigabit Fibre Channel
  - 10-GigabitEthernet LAN-Phy (GFP framing)
  - 10-GigabitEthernet LAN-Phy (WIS framing)
  - OC-192/STM-64
  - OTU2

Caution Handle the card with care. Dropping or misuse of the card could result in permanent damage.

The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C muxponders pass all SONET/SDH overhead bytes transparently, section, or line termination.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up GCCs for data communications, enable FEC, or facilitate performance monitoring. The 40G-MXP-C, 40E-MXP-C and 40ME-MXP-C cards work with the OTN devices defined in ITU-T G.709. The card supports ODTU23 multiplexing, an industry standard method for asynchronously mapping client payloads into a digitally wrapped envelope. See the "G.12 Multiplexing Function" section on page G-17.

You can install and provision the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards in a linear configuration in:

- Slots 1 to 5 and 12 to 16 in ONS 15454 DWDM chassis
- Slot 2 in ONS 15454 M2 chassis
- Slots 2 to 6 in ONS 15454 M6 chassis

The client ports of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards interoperates with all the existing TXP/MXP (OTU2 trunk) cards.

The auto negotiation is not supported on the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards in 8G FC client mode. Hence, during interoperation, the auto negotiation of the 8G-FC client port of the other device connected to 8G-FC client port on 40G-MXP-C, 40E-MXP-C, or 40ME-MXP-C card must be set to Fixed/Disabled.

The client port of 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards does not interoperate with OTU2_XP card when the signal rate is OTU1e (11.049 Gbps) and the “No Fixed Stuff” option is enabled on the trunk port of OTU2_XP card.

For OTU2 and OTU2e client protocols, Enhanced FEC (EFEC) is not supported on Port 1 of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards. Table 11-16 lists the FEC configuration supported on OTU2/OTU2e protocol for 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.

Table 11-16 Client Interface Data Rates for 40G-MXP-C, 40E-MXP-C and 40ME-MXP-C Cards

40G-MXP-C, 40E-MXP-C and 40ME-MXP-C Client Port	FEC Configuration Supported on OTU2/OTU2e Client Protocol
Port 1	Only Standard FEC
Port 2	Standard and Enhanced FEC
Port 3	Standard and Enhanced FEC
Port 4	Standard and Enhanced FEC

When setting up the card for the first time, or when the card comes up after clearing the LOS-P condition due to fiber cut, the trunk port of the 40G-MXP-C card takes about 6 minutes to lock a signal. The trunk port of the 40G-MXP-C card raises an OTUK-LOF alarm when the card is comes up. The alarm clears when the trunk port locks the signal.

When a protection switch occurs on the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards, the recovery from PSM protection switch takes about 3 to 4 minutes.

The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards is tunable over C-band on the trunk port. The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards support pluggable XFPs on the client ports on the card faceplate. The card uses dual LC connectors on the trunk side, and XFP modules on the client side for optical cable termination. The XFP pluggable modules are SR, LR, MM, DWDM, or CWDM and support an LC fiber connector. The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards contains four XFP modules for the client interfaces. For optical termination, each XFP uses two LC connectors, which are labeled TX and RX on the faceplate. The trunk port is a dual LC connector facing downward at 45 degrees.

Table 11-17 shows the input data rate for each client interface.

Table 11-17 Client Interface Input Data Rates for 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Client Interface	Input Data Rate
8-Gigabit Fibre Channel	8.48 Gbps
10-Gigabit Fibre Channel	10.519 Gbps
10-GigabitEthernet LAN-Phy	10.312 Gbps
10-GigabitEthernet WAN-Phy	9.953 Gbps
OC-192/STM-64	9.953 Gbps
OTU2	10.709 Gbps
OTU2e	11.096 Gbps

11.13.1 Key Features

The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards provides the following key features:

- The 40G-MXP-C card uses the RZ-DQPSK 40G modulation format.
- The 40E-MXP-C and 40ME-MXP-C cards uses the CP-DQPSK modulation format.
- Onboard E-FEC processor—The E-FEC functionality improves the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (239,255) correction algorithm. A new BCH algorithm implemented (according to G.975.1 I.7) in E-FEC allows recovery of an input BER up to 1E-3. The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards support both the standard RS (specified in ITU-T G.709) and E-FEC standard, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces.
- Y-cable protection—Supports Y-cable protection only between the same card type on ports with the same port number and signal rate. For more information on Y-cable protection, seethe "G.35.1 Y-Cable and Splitter Protection" section on page G-26.

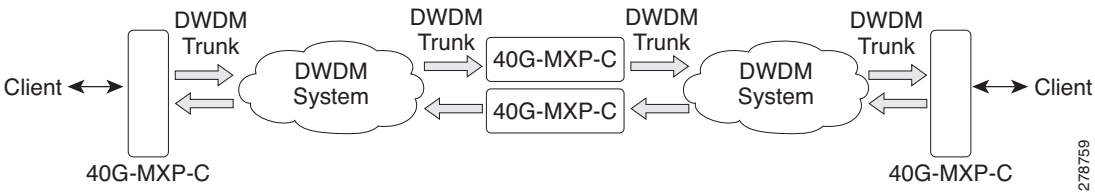
Note Y-cable cannot be created on a 10 GE port when WIS framing is enabled on the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.

- Unidirectional regeneration—The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards supports unidirectional regeneration configuration. Each 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C card in the configuration regenerates the signal received from another 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C card in one direction.

Note When you configure the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards in the Unidirectional Regen mode, ensure that the payload is not configured on the pluggable port modules of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C card.

Figure 11-15 shows a typical unidirectional regeneration configuration.

Figure 11-15 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards in Unidirectional Regeneration Configuration

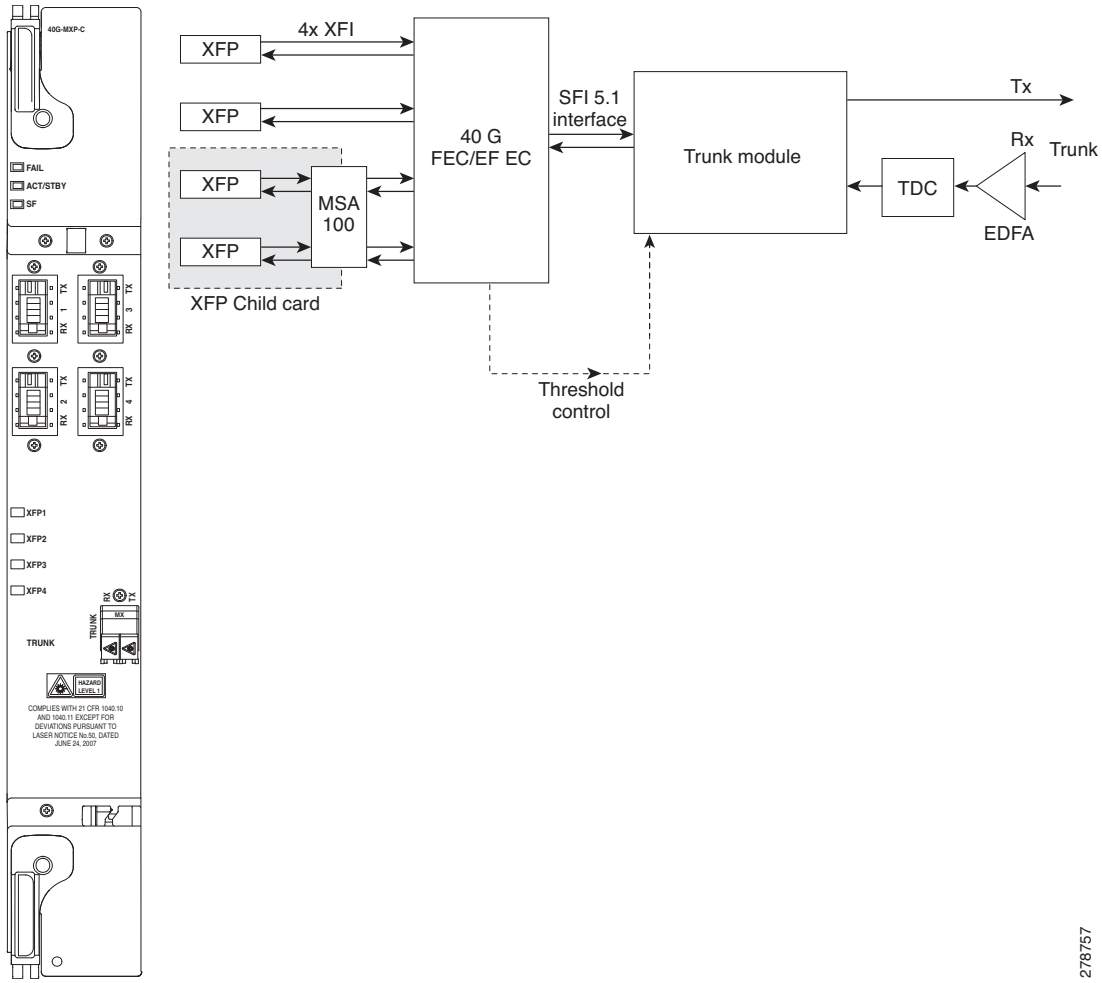


- High level provisioning support—The cards are initially provisioned using Cisco Transport Planner software. Subsequently, the card can be monitored and provisioned using CTC software.
- Automatic Laser Shutdown (ALS)—A safety mechanism, Automatic Laser Shutdown (ALS), is used in the event of a fiber cut. The Auto Restart ALS option is supported only for OC-192/STM-64 and OTU2 payloads. The Manual Restart ALS option is supported for all payloads. For more information on provisioning ALS for the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards, see the "NTP-G162 Change the ALS Maintenance Settings" section on page 11-423.
- Control of layered SONET/SDH transport overhead—The cards are provisionable to terminate regenerator section overhead. This is used to eliminate forwarding of unneeded layer overhead. It can help reduce the number of alarms and help isolate faults in the network.
- Automatic timing source synchronization—The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards synchronize to the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE cards. Because of a maintenance or upgrade activity, if the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE cards are not available, the cards automatically synchronize to one of the input client interface clocks.
- Squelching policy—The cards are set to squelch the client interface output if there is LOS at the DWDM receiver, or if there is a remote fault. In the event of a remote fault, the card manages MS-AIS insertion.
- The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards are tunable across the full C-band wavelength.

11.13.2 Faceplate and Block Diagram

Figure 11-16 shows the faceplate and block diagram of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.

Figure 11-16 Faceplate and Block Diagram of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards



For information about safety labels for the cards, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Caution You must use a 20-dB fiber attenuator (15 to 25 dB) when working with the cards in a loopback on the trunk port. Do not use direct fiber loopbacks with the cards. Using direct fiber loopbacks causes irreparable damage to the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.

11.13.3 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Functions

The functions of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards are:

- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-9 on page G-11

11.13.3.1 Wavelength Identification

The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards use trunk lasers that are wavelocked, which allows the trunk transmitter to operate on the ITU grid effectively. These cards implement the UT2 module; they use a C-band version of the UT2.

Table 11-18 lists the required trunk transmit laser wavelengths for the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards. The laser is tunable over 82 wavelengths in the C-band at 50-GHz spacing on the ITU grid.

Table 11-18 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Trunk Wavelengths

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	196.00	1529.55	42	193.95	1545.72
2	195.95	1529.94	43	193.90	1546.119
3	195.90	1530.334	44	193.85	1546.518
4	195.85	1530.725	45	193.80	1546.917
5	195.80	1531.116	46	193.75	1547.316
6	195.75	1531.507	47	193.70	1547.715
7	195.70	1531.898	48	193.65	1548.115
8	195.65	1532.290	49	193.60	1548.515
9	195.60	1532.681	50	193.55	1548.915
10	195.55	1533.073	51	193.50	1549.32
11	195.50	1533.47	52	193.45	1549.71
12	195.45	1533.86	53	193.40	1550.116
13	195.40	1534.250	54	193.35	1550.517
14	195.35	1534.643	55	193.30	1550.918
15	195.30	1535.036	56	193.25	1551.319
16	195.25	1535.429	57	193.20	1551.721
17	195.20	1535.822	58	193.15	1552.122
18	195.15	1536.216	59	193.10	1552.524
19	195.10	1536.609	60	193.05	1552.926
20	195.05	1537.003	61	193.00	1553.33
21	195.00	1537.40	62	192.95	1553.73
22	194.95	1537.79	63	192.90	1554.134
23	194.90	1538.186	64	192.85	1554.537
24	194.85	1538.581	65	192.80	1554.940
25	194.80	1538.976	66	192.75	1555.343
26	194.75	1539.371	67	192.70	1555.747

Table 11-18 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Trunk Wavelengths (Continued)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
27	194.70	1539.766	68	192.65	1556.151
28	194.65	1540.162	69	192.60	1556.555
29	194.60	1540.557	70	192.55	1556.959
30	194.55	1540.953	71	192.50	1557.36
31	194.50	1541.35	72	192.45	1557.77
32	194.45	1541.75	73	192.40	1558.173
33	194.40	1542.142	74	192.35	1558.578
34	194.35	1542.539	75	192.30	1558.983
35	194.30	1542.936	76	192.25	1559.389
36	194.25	1543.333	77	192.20	1559.794
37	194.20	1543.730	78	192.15	1560.200
38	194.15	1544.128	79	192.10	1560.606
39	194.10	1544.526	80	192.05	1561.013
40	194.05	1544.924	81	192.00	1561.42
41	194.00	1545.32	82	191.95	1561.83

11.13.4 Related Procedures for 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

The following is the list of procedures and tasks related to the configuration of 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards:

- NTP-G293 Modify the 40G Muxponder Card Line Settings and PM Parameter Thresholds, page 11-297
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G75 Monitor Transponder and Muxponder Performance

11.14 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards are Gigabit Ethernet Xponders for the ONS 15454 ANSI and ETSI platforms.

Note GE_XPE card is the enhanced version of the GE_XP card and 10GE_XPE card is the enhanced version of the 10GE_XP card.

The cards aggregate Ethernet packets received on the client ports for transport on C-band trunk ports that operate on a 100-GHz grid. The trunk ports operate with ITU-T G.709 framing and either FEC or E-FEC. The GE_XP and 10GE_XP cards are designed for bulk point-to-point transport over 10GE LAN PHY wavelengths for Video-on-Demand (VOD), or broadcast video across protected 10GE LAN PHY

wavelengths. The GE_XPE and 10GE_XPE cards are designed for bulk GE_XPE or 10GE_XPE point-to-point, point-to-multipoint, multipoint-to-multipoint transport over 10GE LAN PHY wavelengths for Video-on-Demand (VOD), or broadcast video across protected 10GE LAN PHY wavelengths.

You can install and provision the GE_XP, and GE_XPE cards in a linear configuration in:

- Slots 1 to 5 and 12 to 16 in ONS 15454 DWDM chassis
- Slot 2 in ONS 15454 M2 chassis
- Slots 2 to 6 in ONS 15454 M6 chassis

The 10GE_XP and 10GE_XPE cards can be installed in Slots 1 through 6 or 12 through 17. The GE_XP and GE_XPE are double-slot cards with twenty Gigabit Ethernet client ports and two 10 Gigabit Ethernet trunk ports. The 10GE_XP and 10GE_XPE are single-slot cards with two 10 Gigabit Ethernet client ports and two 10 Gigabit Ethernet trunk ports. The client ports support SX, LX, and ZX SFPs and SR and 10GBASE-LR XFPs. (LR2 XFPs are not supported.) The trunk ports support a DWDM XFP.

The RAD pluggables (ONS-SC-E3-T3-PW= and ONS-SC-E1-T1-PW=) do not support:

- No loopbacks (Terminal or Facility)
- RAI (Remote Alarm Indication) alarm
- AIS and LOS alarm

Caution A fan-tray assembly (15454E-CC-FTA for the ETSI shelf, or 15454-CC-FTA for the ANSI shelf) must be installed in a shelf where a GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed.

GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards can be provisioned to perform different Gigabit Ethernet transport roles. All the cards can work as Layer 2 switches. However, the 10GE_XP and 10GE_XPE cards can also perform as a 10 Gigabit Ethernet transponders (10GE TXP mode), and the GE_XP and GE_XPE can perform as a 10 Gigabit Ethernet or 20 Gigabit Ethernet muxponders (10GE MXP or 20GE MXP mode). Table 11-19 shows the card modes supported by each card.

Note Changing the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card mode requires the ports to be in a OOS-DSBL (ANSI) or Locked, disabled (ETSI) service state. In addition, no circuits can be provisioned on the cards when the mode is being changed.

Table 11-19 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Modes

Card Mode	Cards	Description
Layer 2 Ethernet switch	GE_XP 10GE_XP GE_XPE 10GE_XPE	Provides capability to switch between any two ports irrespective of client or trunk port. Supported Ethernet protocols and services include 1+1 protection, QoS (Quality of Service), CoS (Class of Service), QinQ, MAC learning, MAC address retrieval, service provider VLANs (SVLANs), IGMP snooping and Multicast VLAN Registration (MVR), link integrity, and other Ethernet switch services.
10GE TXP	10GE_XP 10GE_XPE	Provides a point-to-point application in which each 10 Gigabit Ethernet client port is mapped to a 10 Gigabit Ethernet trunk port.
10GE MXP 20GE MXP	GE_XP GE_XPE	Provides the ability to multiplex the twenty Gigabit Ethernet client ports on the card to one or both of its 10 Gigabit Ethernet trunk ports. The card can be provisioned as a single MXP with twenty Gigabit Ethernet client ports mapped to one trunk port (Port 21) or as two MXPs with ten Gigabit Ethernet client ports mapped to a trunk port (Ports 1 to 10 mapped to Port 21, and Ports 11-20 mapped to Port 22).

11.14.1 Key Features

The GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards have the following high-level features:

- Link Aggregation Control Protocol (LACP) that allows you to bundle several physical ports together to form a single logical channel.
- Ethernet Connectivity Fault Management (CFM) protocol that facilitates proactive connectivity monitoring, fault verification, and fault isolation.

- Ethernet Operations, Administration, and Maintenance (OAM) protocol that facilitates link monitoring, remote failure indication, and remote loopback.
- Resilient Ethernet Protocol (REP) that controls network loops, handles link failures, and improves convergence time.
- Configurable service VLANs (SVLANs) and customer VLANs (CVLANs).
- Ingress rate limiting that can be applied on both SVLANs and CVLANs. You can create SVLAN and CVLAN profiles and can associate a SVLAN profile to both UNI and NNI ports; however, you can associate a CVLAN profile only to UNI ports.
- CVLAN rate limiting that is supported for QinQ service in selective add mode.
- Differentiated Services Code Point (DSCP) to class of service (CoS) mapping that you can configure for each port. You can configure the CoS of the outer VLAN based on the incoming DSCP bits. This feature is supported only on GE_XPE and 10GE_XPE cards.
- Ports, in Layer 2 switch mode, can be provisioned as network-to-network interfaces (NNIs) or user-network interfaces (UNIs) to facilitate service provider to customer traffic management.
- Broadcast drop-and-continue capability for VOD and broadcast video applications.
- Gigabit Ethernet MXP, TXP, and Layer 2 switch capability over the ONS 15454 DWDM platform.
- Compatible with the ONS 15454 ANSI high-density shelf assembly, the ONS 15454 ETSI shelf assembly, ONS 15454 ETSI high-density shelf assembly, ONS 15454 M2, and the ONS 15454 M6 shelf assemblies. Compatible with TCC2, TCC2P, TCC3, TNC, TNCE, TSC, and TSCE cards.
- Far-End Laser Control (FELC) that is supported on copper SFPs from Release 8.52 and later releases. For more information on FELC, see the "G.36 Far-End Laser Control" section on page G-31.
- Layer 2 switch mode that provides VLAN translation, QinQ, ingress CoS, egress QoS, Fast Ethernet protection switching, and other Layer 2 Ethernet services.
- Interoperable with TXP_MR_10E and TXP_MR_10E_C cards. Also interoperable with Cisco Catalyst 6500 and Cisco 7600 series Gigabit Ethernet, 10 GE interfaces and CRS-1 10GE interfaces.
- The GE_XP and GE_XPE cards have twenty Gigabit Ethernet client ports and two 10 Gigabit Ethernet trunk ports. The 10GE_XP and 10GE_XPE cards have two 10 Gigabit Ethernet client ports and two 10 Gigabit Ethernet trunk ports. The client Gigabit Ethernet signals are mapped into an ITU-T G.709 OTU2 signal using standard ITU-T G.709 multiplexing when configured in one of the MXP modes (10GE MXP or 20GE MXP).
- ITU-T G.709 framing with standard Reed-Soloman (RS) (255,237) FEC. Performance monitoring and ITU-T G.709 Optical Data Unit (ODU) synchronous and asynchronous mapping. E-FEC with ITU-T G.709 ODU and 2.7 Gbps with greater than 8 dB coding gain.
- IEEE 802.3 frame format that is supported for 10 Gigabit Ethernet interfaces. The minimum frame size is 64 bytes. The maximum frame size is user-provisionable.
- MAC learning capability in Layer 2 switch mode.
- MAC address retrieval in cards provisioned in the L2-over-DWDM mode.
- When a port is in UNI mode, tagging can be configured as transparent or selective. In transparent mode, only SVLANs in the VLAN database of the node can be configured. In selective mode, a CVLAN- to-SVLAN relationship can be defined.
- Layer 2 VLAN port mapping that allows the cards to be configured as multiple Gigabit Ethernet TXPs and MXPs.
- Y-cable protection is configurable in TXP and MXP modes.

- Two protection schemes are available in Layer 2 mode. They are:
  - 1+1 protection—Protection scheme to address card, port, or shelf failures for client ports.
  - Fast Automatic Protection—Protection scheme to address card, port, or shelf failures for trunk ports.
- End-to-end Ethernet link integrity.
- Pluggable client interface optic modules (SFPs and XFPs)—Client ports support tri-rate SX, LX, and ZX SFPs, and 10-Gbps SR1 XFPs.
- Pluggable trunk interface optic modules; trunk ports support the DWDM XFP.
- Internet Group Management Protocol (IGMP) snooping that restricts the flooding of multicast traffic by forwarding multicast traffic to those interfaces where a multicast device is present.
- Multicast VLAN Registration (MVR) for applications using wide-scale deployment of multicast traffic across an Ethernet ring-based service provider network.
- Ingress CoS that assigns a CoS value to the port from 0 (highest) to 7 (lowest) and accepts CoS of incoming frames.
- Egress QoS that defines the QoS capabilities for the egress port.
- MAC address learning that facilitates switch processing.
- Storm Control that limits the number of packets passing through a port. You can define the maximum number of packets allowed per second for the following types of traffic: Broadcast, Multicast, and Unicast. The threshold for each type of traffic is independent and the maximum number of packets allowed per second for each type of traffic is 16777215.

11.14.2 Protocol Compatibility list

Table 11-20 lists the protocol compatibility for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

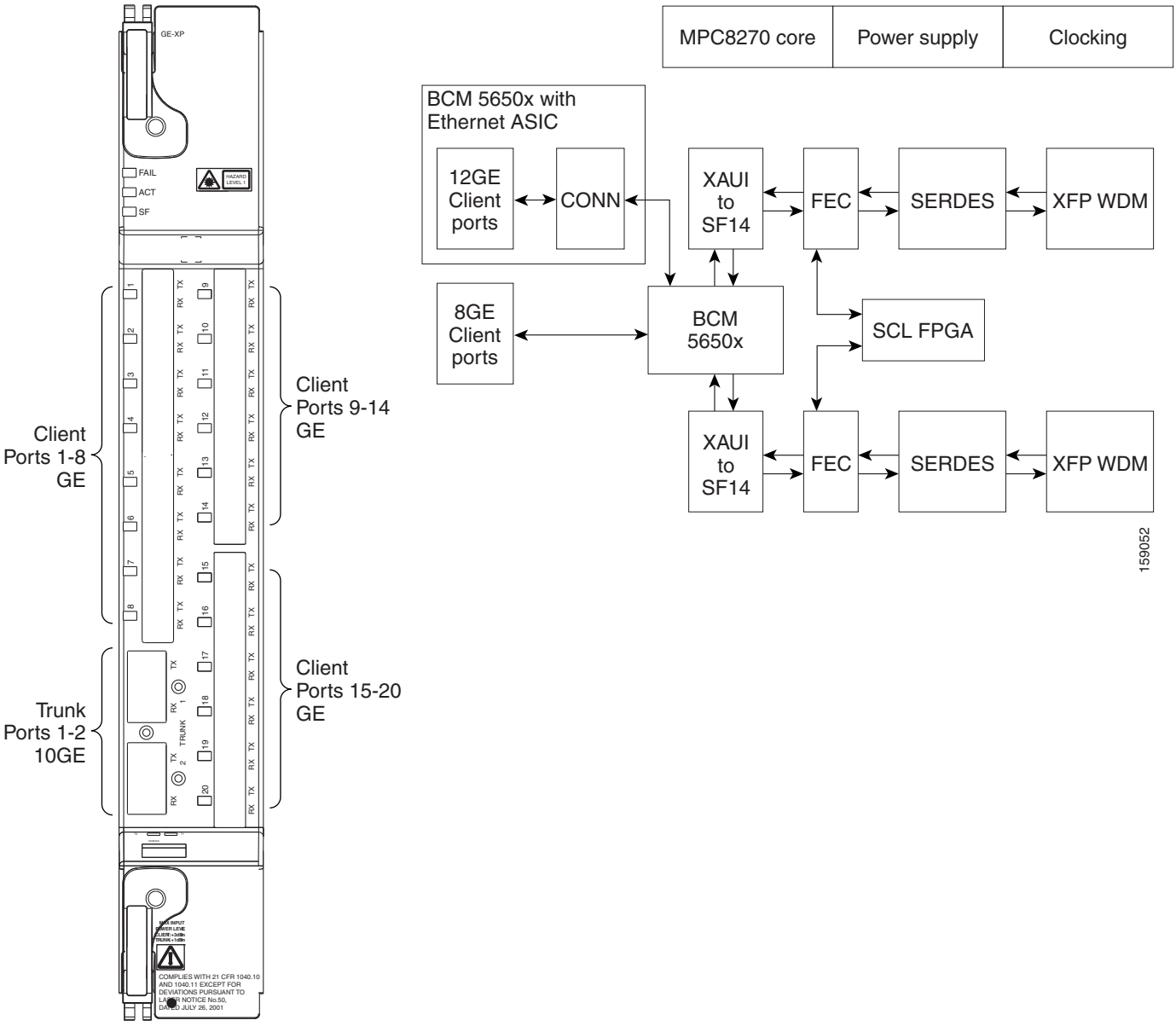
Table 11-20 Protocol Compatibility List for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

Protocol	L1	1+1	FAPS	IGMP	REP	LACP	CFM	EFM
L1		No	Yes	Yes	No	No	Yes	No
1+1	No		Yes	Yes	No	No	Yes	No
FAPS	Yes	Yes		Yes	No	No	Yes	No
IGMP	Yes	Yes	Yes		Yes	No	Yes	No
REP	No	No	No	Yes		No	Yes	No
LACP	No	No	No	No	No		No	No
CFM	Yes	Yes	Yes	Yes	Yes	No		No
EFM	No	No	No	No	No	No	No	

11.14.3 Faceplate and Block Diagram

Figure 11-17 shows the GE_XP faceplate and block diagram. The GE_XPE faceplate and block diagram looks the same.

Figure 11-17 GE_XP and GE_XPE Faceplates and Block Diagram

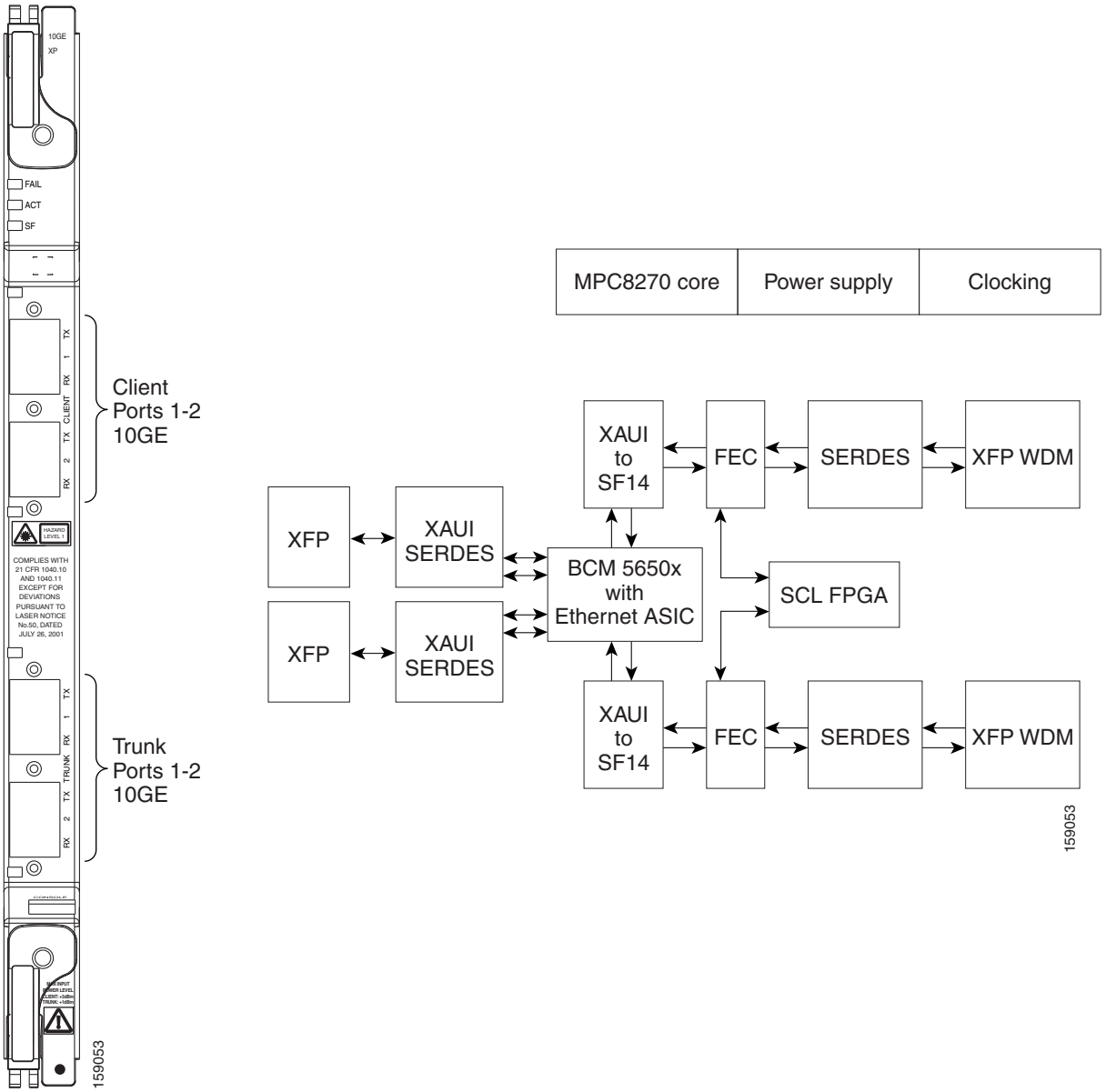


The GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards have two trunk ports. The GE_XP and GE_XPE trunk ports are displayed as follows:

- Trunk 1 and Trunk 2 on the faceplate
- 21-1 and 22-1 on CTC
- 21 (Trunk) and 22 (Trunk) on the Optics Thresholds table

Figure 11-18 shows the 10GE_XP faceplate and block diagram. The 10 GE_XPE faceplate and block diagram looks the same.

Figure 11-18 10GE_XP and 10GE_XPE Faceplates and Block Diagram



The 10GE_XP and 10GE_XPE card trunk ports are displayed as follows:

- Trunk 1 and Trunk 2 on the faceplate
- 3-1 and 4-1 on CTC
- 3 (Trunk) and 4 (Trunk) on the Optics Thresholds table

For information about safety labels for the cards, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Caution You must use a 20-dB fiber attenuator (15 to 25 dB) when working with the cards in a loopback on the trunk port. Do not use direct fiber loopbacks with the cards. Using direct fiber loopbacks causes irreparable damage to the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

11.14.4 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Functions

The functions of the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards are:

- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-9 on page G-11

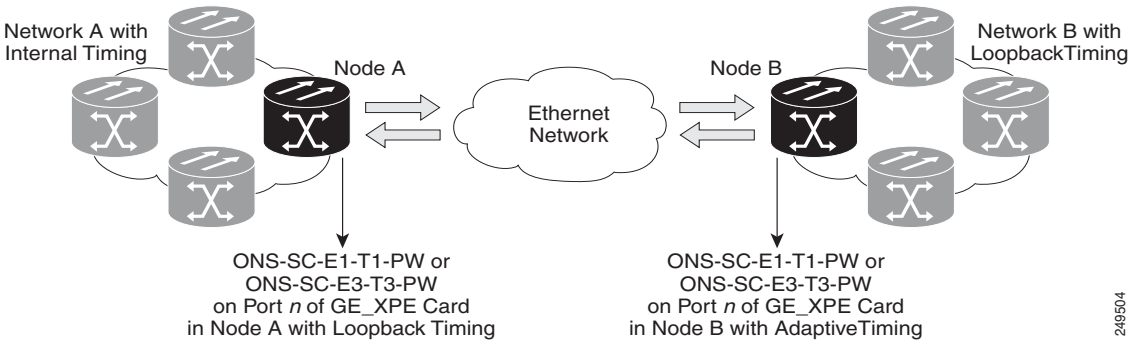
11.14.4.1 Client Interface

The client interface is implemented with separately orderable SFP or XFP modules. The client interfaces support the following tri-rate SFPs and XFPs using dual LC connectors and multimode fiber:

- SFP - GE/1G-FC/2G-FC - 850 nm - MM - LC (PID ONS-SE-G2F-SX)
- SFP - GE/1G-FC/2G-FC 1300 nm - SM - LC (PID ONS-SE-G2F-LX)
- SFP - GE/1G-FC/2G-FC 1300 nm - SM - LC (PID ONS-SE-G2F-ZX)
- SFP - 10/100/1000Base-T - Copper (PID ONS-SE-ZE-EL) Intra office up to 100; Cable: RJ45 STP CAT5, CAT5E, and CAT6
- SFP - 1000Base BX D/Gigabit Ethernet 1550 nm - SM - LC (PID ONS-SE-GE-BXD)
- SFP - 1000Base BX U/Gigabit Ethernet 1550 nm - SM - LC (PID ONS-SE-GE-BXU)
- SFP - Fast Ethernet 1310 nm - SM - LC (PID ONS-SI-100-LX10)
- SFP - Fast Ethernet 1310 nm - MM - LC (PID ONS-SI-100-FX)
- SFP - Fast Ethernet over DS1/E1 - SM - LC (PID ONS-SC-EOP1) (GE_XPE only)
- SFP - Fast Ethernet over DS3/E3 - SM - LC (PID ONS-SC-EOP3) (GE_XPE only)
- SFP - E1/DS1 over Fast Ethernet - SM - LC (PID ONS-SC-E1-T1-PW) (GE_XPE only)
- SFP - E3/DS3 PDH over Fast Ethernet - SM - LC (PID ONS-SC-E3-T3-PW) (GE_XPE only)

Note The recommended topology for using ONS-SC-E1-T1-PW and ONS-SC-E3-T3-PW SFPs is shown in Figure 11-19.

Figure 11-19 Recommended Topology for Using ONS-SC-E1-T1-PW and ONS -SC-E3-T3-PW SFPs



The client interfaces support the following dual-rate XFP using dual LC connectors and single-mode fiber:

- XFP - OC-192/STM-64/10GE/10-FC/OTU2 - 1310 SR - SM LC (PID: ONS-XC-10G-S1)
- XFP - 10GE - 1550 nm - SM - LC (PID ONS-XC-10G-L2)
- XFP - 10GE - 1550 nm - SM - LC (PID ONS-XC-10G-C)

Note If ONS-XC-10G-C XFP is used on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards on client port 1, the maximum temperature at which the system qualifies is +45 degree Celsius.

The client interfaces support the following multimode XFP using dual LC connectors and multi-mode fiber:

- XFP - OC-192/10GFC/10GE - 850 nm MM LC (PID ONS-XC-10G-SR-MM)

11.14.4.2 DWDM Trunk Interface

The GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards have two 10 Gigabit Ethernet trunk ports operating at 10 Gigabit Ethernet (10.3125 Gbps) or 10 Gigabit Ethernet into OTU2 (nonstandard 11.0957 Gbps). The ports are compliant with ITU-T G.707, ITU-T G.709, and Telcordia GR-253-CORE standards. The ports are capable of carrying C-band and L-band wavelengths through insertion of DWDM XFPs. Forty channels are available in the 1550-nm C band 100-GHz ITU grid, and forty channels are available in the L band.

11.14.4.3 Configuration Management

The GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards support the following configuration management parameters:

- Port name—User-assigned text string.
- Admin State/Service State—Administrative and service states to manage and view port status.
- MTU—Provisionable maximum transfer unit (MTU) to set the maximum number of bytes per frames accepted on the port.
- Mode—Provisional port mode, either Autonegotiation or the port speed.
- Flow Control—Flow control according to IEEE 802.1x pause frame specification can be enabled or disabled for TX and RX ports.
- Bandwidth—Provisionable maximum bandwidth allowed for the port.
- Ingress CoS—Assigns a CoS value to the port from 0 (highest) to 7 (lowest) and accepts CoS of incoming frames.
- Egress QoS—Defines the QoS capabilities at the egress port.
- NIM—Defines the port network interface management type based on Metro Ethernet Forum specifications. Ports can be defined as UNI or NNI.
- MAC Learning—MAC address learning to facilitate switch processing.
- VLAN tagging provided according to the IEEE 802.1Q standard.

Note When the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards are provisioned in a MXP or TXP mode, only the following parameters are available: Port Name, State, MTU, Mode, Flow control, and Bandwidth.

11.14.4.4 Security

GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card ports can be provisioned to block traffic from a user-defined set of MAC addresses. The remaining traffic is normally switched. You can manually specify the set of blocked MAC addresses for each port. Each port of the card can receive traffic from a limited predefined set of MAC addresses. The remaining traffic will be dropped. This capability is a subset of the Cisco IOS "Port Security" feature.

11.14.4.5 Card Protection

The following card protection schemes are available for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

- Y-Cable Protection—See the "G.35.1.1 Y-Cable Protection" section on page G-26.
- 1+1 Protection—See the "G.35.2 1+1 Protection" section on page G-29.
- Layer 2 Over DWDM Protection—See the "G.35.3 Layer 2 Over DWDM Protection" section on page G-30.

11.14.4.5.1 Related Procedures for Card Protection

The following are the related procedures for creating card protection on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards:

- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G198 Create 1+1 Protection for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards, page 11-144
- DLP-G381 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Layer 2 Protection Settings, page 11-368

11.14.5 IGMP Snooping

As networks increase in size, multicast routing becomes critically important as a means to determine which segments require multicast traffic and which do not. IP multicasting allows IP traffic to be propagated from one source to a number of destinations, or from many sources to many destinations. Rather than sending one packet to each destination, one packet is sent to the multicast group identified by a single IP destination group address. GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards can learn up to a maximum of 1024 multicast groups. This includes groups on all the VLANs.

Internet Group Management Protocol (IGMP) snooping restricts the flooding of multicast traffic by forwarding multicast traffic to those interfaces where a multicast device is present.

When the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card receives an IGMP leave group message from a host, it removes the host port from the multicast forwarding table after generating group specific queries to ensure that no other hosts interested in traffic for the particular group are present on that port. Even in the absence of any "leave" message, the cards have a timeout mechanism to update the group table with the latest information. After a card relays IGMP queries from the multicast router, it deletes entries periodically if it does not receive any IGMP membership reports from the multicast clients.

In a multicast router, general queries are sent on a VLAN when Protocol Independent Multicast (PIM) is enabled on the VLAN. The GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card forwards queries to all ports belonging to the VLAN. All hosts interested in this multicast traffic send Join requests and are

added to the forwarding table entry. The Join requests are forwarded only to router ports. By default, these router ports are learned dynamically. However, they can also be statically configured at the port level in which case the static configuration overrides dynamic learning.

For information about interaction of IGMP with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

11.14.5.1 IGMP Snooping Guidelines and Restrictions

The following guidelines and restrictions apply to IGMP snooping on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards:

- IGMP snooping V2 is supported as specified in RFC 4541.
- IGMP snooping V3 is not supported and the packets are flooded in the SVLAN.
- Layer 2 multicast groups learned through IGMP snooping are dynamic.
- GE_XP and 10GE_XP cards support IGMP snooping on 128 stacked VLANs and GE_XPE and 10GE_XPE cards support up to 256 stacked VLANs that are enabled.
- IGMP snooping can be configured per SVLAN or CVLAN. By default, IGMP snooping is disabled on all SVLANs and CVLANs.
- IGMP snooping on CVLAN is enabled only when:
  - MVR is enabled.
  - UNI ports are in selective add and selective translate modes. For each UNI port, a CVLAN must be specified for which IGMP snooping is to be enabled.
- IGMP snooping can be enabled only on one CVLAN per port. If you enable IGMP snooping on CVLAN, you cannot enable IGMP snooping on the associated SVLAN and vice versa. The number of VLANs that can be enabled for IGMP snooping cannot exceed 128.
- When IGMP snooping is enabled on double-tagged packets, CVLAN has to be the same on all ports attached to the same SVLAN.
- When IGMP snooping is working with the Fast Automatic Protection Switch (FAPS) in a ring-based setup, it is advisable to configure all NNI ports as static router ports. This minimizes the multicast traffic hit when a FAPS switchover occurs.

The following conditions are raised from IGMP snooping at the card:

- MCAST-MAC-TABLE-FULL—This condition is raised when the multicast table is full and a new join request is received. This table is cleared when at least one entry gets cleared from the multicast table after the alarm is raised.
- MCAST-MAC-ALIASING—This condition is raised when there are multiple L3 addresses that map to the same L2 address in a VLAN. This is a transient condition.

For more information on severity level of these conditions and procedure to clear these alarms, refer to the *Cisco ONS 15454 Troubleshooting Guide*.

11.14.5.2 Fast-Leave Processing

Note Fast-Leave processing is also known as Immediate-Leave.

IGMP snooping Fast-Leave processing allows the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE to remove an interface that sends a leave message from the forwarding table without first sending group specific queries to the interface. When you enable IGMP Fast-Leave processing, the card immediately removes a port from the IP multicast group when it detects an IGMP, version 2 (IGMPv2) leave message on that port.

11.14.5.3 Static Router Port Configuration

Multicast-capable ports are added to the forwarding table for every IP multicast entry. The card learns of such ports through the PIM method.

11.14.5.4 Report Suppression

Report suppression is used to avoid a storm of responses to an IGMP query. When this feature is enabled, a single IGMP report is sent to each multicast group in response to a single query. Whenever an IGMP snooping report is received, report suppression happens if the report suppression timer is running. The Report suppression timer is started when the first report is received for a general query. Then this time is set to the response time specified in general query.

11.14.5.5 IGMP Statistics and Counters

An entry in a counter contains multicasting statistical information for the IGMP snooping capable GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card. It provides statistical information about IGMP messages that have been transmitted and received. IGMP statistics and counters can be viewed via CTC from the Performance > Ether Ports > Statistics tab.

This information can be stored in the following counters:

- cisTxGeneralQueries—Number of general queries transmitted through an interface.
- cisTxGroupSpecificQueries—Total group specific queries transmitted through an interface.
- cisTxReports—Total membership reports transmitted through an interface.
- cisTxLeaves—Total Leave messages transmitted through an interface.
- cisRxGeneralQueries—Total general queries received at an interface.
- cisRxGroupSpecificQueries—Total Group Specific Queries received at an interface.
- cisRxReports—Total Membership Reports received at an interface.
- cisRxLeaves—Total Leave messages received at an interface.
- cisRxValidPackets—Total valid IGMP packets received at an interface.
- cisRxInvalidPackets—Total number of packets that are not valid IGMP messages received at an interface.

11.14.5.6 Related Procedure for Enabling IGMP Snooping

To enable IGMP snooping on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G204 Enable IGMP Snooping on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards" section on page 11-386.

11.14.6 Multicast VLAN Registration

Multicast VLAN Registration (MVR) is designed for applications using wide-scale deployment of multicast traffic across an Ethernet-ring-based service provider network (for example, the broadcast of multiple television channels over a service-provider network). MVR allows a subscriber on a port to subscribe and unsubscribe to a multicast stream on the network-wide multicast VLAN. It allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs. MVR provides the ability to continuously send multicast streams in the multicast VLAN, but to isolate the streams from the subscriber VLANs for bandwidth and security reasons.

MVR assumes that subscriber ports subscribe and unsubscribe ("Join" and "Leave") these multicast streams by sending out IGMP Join and Leave messages. These messages can originate from an IGMP version-2-compatible host with an Ethernet connection. MVR operates on the underlying mechanism of IGMP snooping. MVR works only when IGMP snooping is enabled.

The card identifies the MVR IP multicast streams and their associated MAC addresses in the card forwarding table, intercepts the IGMP messages, and modifies the forwarding table to include or remove the subscriber as a receiver of the multicast stream, even though the receivers is in a different VLAN than the source. This forwarding behavior selectively allows traffic to cross between different VLANs.

Note When MVR is configured, the port facing the router must be configured as NNI in order to allow the router to generate or send multicast stream to the host with the SVLAN. If router port is configured as UNI, the MVR will not work properly.

11.14.6.1 Related Procedure for Enabling MVR

To enable MVR on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G206 Enable MVR on a GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card" section on page 11-388.

11.14.7 MAC Address Learning

The GE_XPE and 10 GE_XPE cards support 32K MAC addresses. MAC address learning can be enabled or disabled per SVLAN on GE_XPE and 10 GE_XPE cards. The cards learn the MAC address of packets they receive on each port and add the MAC address and its associated port number to the MAC address learning table. As stations are added or removed from the network, the GE_XPE and 10 GE_XPE cards update the MAC address learning table, adding new dynamic addresses and aging out those that are currently not in use.

MAC address learning can be enabled or disabled per SVLAN. When the configuration is changed from enable to disable, all the related MAC addresses are cleared. The following conditions apply:

- If MAC address learning is enabled on per port basis, the MAC address learning is not enabled on all VLANs, but only on VLANs that have MAC address learning enabled.
- If per port MAC address learning is disabled then the MAC address learning is disabled on all VLANs, even if it is enabled on some of the VLAN supported by the port.
- If the per port MAC address learning is configured on GE-XP and 10 GE-XP cards, before upgrading to GE-XPE or 10 GE-XPE cards, enable MAC address learning per SVLAN. Failing to do so disables MAC address learning.

11.14.7.1 Related Procedure for MAC Address Learning

To enable MAC address learning on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "DLP-G221 Enable MAC Address Learning on SVLANs for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards" section on page 11-376.

11.14.8 MAC Address Retrieval

MAC addresses learned can be retrieved or cleared on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards provisioned in L2-over-DWDM mode. The MAC addresses can be retrieved using the CTC or TL1 interface.

GE_XPE and 10GE_XPE cards support 32K MAC addresses and GE_XP and 10GE_XP cards support 16K MAC addresses. To avoid delay in processing requests, the learned MAC addresses are retrieved using an SVLAN range. The valid SVLAN range is from 1 to 4093.

The MAC addresses of the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards can also be retrieved. The card MAC addresses are static and are used for troubleshooting activities. One MAC address is assigned to each client, trunk, and CPU ports of the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card. These internal MAC addresses can be used to determine if the packets received on the far-end node are generated by GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

For MAC address retrieval, the following conditions apply:

- The cards must be provisioned in L2-over-DWDM mode.
- MAC address learning must be enabled per SVLAN on GE_XPE or 10 GE_XPE cards.
- MAC address learning must be enabled per port on GE_XP or 10 GE_XP cards.

11.14.8.1 Related Procedure for MAC Address Retrieving

To retrieve and clear MAC addresses on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G237 Retrieve and Clear MAC Addresses on SVLANs for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards" section on page 11-378.

11.14.9 Link Integrity

The GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card support end-to-end Ethernet link integrity. This capability is integral to providing an Ethernet private line service and correct operation of Layer 2 and Layer 3 protocols on the attached Ethernet devices.

The link integrity feature propagates a trunk fault on all the affected SVLAN circuits in order to squelch the far end client interface. Ethernet-Advanced IP Services (E-AIS) packets are generated on a per-port/SVLAN basis. An E-AIS format is compliant with ITU Y.1731.

Note E-AIS packets are marked with a CoS value of 7 (also called .1p bits). Ensure that the network is not overloaded and there is sufficient bandwidth for this queue in order to avoid packet drops.

When link integrity is enabled on a per-port SVLAN basis, E-AIS packets are generated when the following alarms are raised;

- LOS-P

- OTUKLOF/LOM
- SIGLOSS
- SYNCHLOSS
- OOS
- PPM not present

When link integrity is enabled, GE_XP and 10 GE_XP card supports up to128 SVLANs and GE_XPE, 10 GE_XPE can support up to 256 SVLANs.

11.14.9.1 Related Procedure for Enabling Link Integrity

To enable link integrity on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G205 Enable Link Integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards" section on page 11-381.

11.14.10 Ingress CoS

Ingress CoS functionality enables differentiated services across the GE_XPE and 10GE_XPE cards. A wide range of networking requirements can be provisioned by specifying the class of service applicable to each transmitted traffic.

When a CVLAN is configured as ingress CoS, the per-port settings are not considered. A maximum of 128 CVLAN and CoS relationships can be configured.

11.14.10.1 Related Procedure for Enabling Ingress CoS

To enable Ingress CoS on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the:

- "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" section on page 11-356
- "DLP-G612 Modify the Parameters of the Channel Group Using CTC" section on page 11-322

11.14.11 CVLAN Rate Limiting

CVLAN rate limiting is supported on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards. CVLAN rate limiting is supported for QinQ service in selective add mode. The following limitations and restrictions apply to CVLAN rate limiting:

- CVLAN rate limiting is not supported for the following service types:
  - Selective translate mode
  - Transparent mode
  - Selective double add mode
  - Selective translate add mode
  - Untagged packets
  - CVLAN range
  - Services associated with the channel group
- CVLAN rate limiting and SVLAN rate limiting cannot be applied to the same service instance.

- Pseudo-IOS command line interface (PCLI) is not supported for CVLAN rate limiting.
- A VLAN profile with Link Integrity option enabled cannot be used to perform CVLAN rate limiting.
- On GE_XP and 10 GE_XP cards, CVLAN rate limiting can be applied to up to 128 services. However, the number of provisionable CVLAN rate limiting service instances is equal to 192 minus the number of SVLAN rate limiting service instances present on the card (subject to a minimum of 64 CVLAN rate limiting service instances).
- On GE_XPE and 10 GE_XPE cards, CVLAN rate limiting can be applied to up to 256 services. However, the number of provisionable CVLAN rate limiting service instances is equal to 384 minus the number of SVLAN rate limiting service instances present on the card (subject to a minimum of 128 CVLAN rate limiting service instances).

11.14.11.1 Related Procedure for Provisioning CVLAN Rate

To provision CVLAN rate on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G289 Provision CVLAN Rate Limiting on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card" section on page 11-383.

11.14.12 DSCP to CoS Mapping

DSCP to CoS mapping can be configured for each port. You can configure the CoS of the outer VLAN based on the incoming DSCP bits. This feature is supported only on GE_XPE and 10GE_XPE cards. PCLI is not supported for DSCP to CoS mapping.

DSCP to CoS mapping is supported for the following service types:

- Selective add mode
- Selective translate mode
- Transparent mode
- Selective double add mode
- Selective translate add mode
- Untagged packets
- CVLAN range
- Services associated with the channel group

11.14.12.1 Related Procedure for Provisioning CoS Based on DSCP

To provision CoS based on DSCP on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings" section on page 11-374.

11.14.13 Link Aggregation Control Protocol

Link Aggregation Control Protocol (LACP) is part of the IEEE802.3ad standard that allows you to bundle several physical ports together to form a single logical channel. LACP allows a network device such as a switch to negotiate an automatic bundling of links by sending LACP packets to the peer device.

LACP allows you to form a single Layer 2 link automatically from two or more Ethernet links. This protocol ensures that both ends of the Ethernet link are functional and agree to be members of the aggregation group before the link is added to the group. LACP must be enabled at both ends of the link to be operational.

For more information on LACP, refer to the IEEE802.3ad standard. For information about interaction of LACP with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

11.14.13.1 Advantages of LACP

LACP provides the following advantages:

- High-speed network that transfers more data than any single port or device.
- High reliability and redundancy. If a port fails, traffic continues on the remaining ports.
- Hashing algorithm that allows to apply load balancing policies on the bundled ports.

11.14.13.2 Functions of LACP

LACP performs the following functions in the system:

- Maintains configuration information to control aggregation.
- Exchanges configuration information with other peer devices.
- Attaches or detaches ports from the link aggregation group based on the exchanged configuration information.
- Enables data flow when both sides of the aggregation group are synchronized.

11.14.13.3 Modes of LACP

LACP can be configured in the following modes:

- On — Default. In this mode, the ports do not exchange LACP packets with the partner ports.
- Active — In this mode, the ports send LACP packets at regular intervals to the partner ports.
- Passive — In this mode, the ports do not send LACP packets until the partner sends LACP packets. After receiving the LACP packets from the partner ports, the ports send LACP packets.

11.14.13.4 Parameters of LACP

LACP uses the following parameters to control aggregation:

- System Identifier—A unique identification assigned to each system. It is the concatenation of the system priority and a globally administered individual MAC address.
- Port Identification—A unique identifier for each physical port in the system. It is the concatenation of the port priority and the port number.
- Port Capability Identification—An integer, called a key, that identifies the capability of one port to aggregate with another port. There are two types of keys:
  - Administrative key—The network administrator configures this key.
  - Operational key—The LACP assigns this key to a port, based on its aggregation capability.
- Aggregation Identifier—A unique integer that is assigned to each aggregator and is used for identification within the system.

11.14.13.5 Unicast Hashing Schemes

LACP supports the following unicast hashing schemes:

- Ucast SA VLAN Incoming Port
- Ucast DA VLAN Incoming Port
- Ucast SA DA VLAN Incoming port
- Ucast Src IP TCP UDP
- Ucast Dst IP TCP UDP
- Ucast Src Dst IP TCP UDP

Note Unicast hashing schemes apply to unicast traffic streams only when the destination MAC address is already learned by the card. Hence, MAC learning must be enabled to support load balancing as per the configured hashing scheme. If the destination MAC address is not learned, the hashing scheme is Ucast Src Dst IP TCP UDP.

11.14.13.6 LACP Limitations and Restrictions

The LACP on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards has the following limitations and restrictions:

- Hot standby link state is not supported on the channel group.
- Marker protocol generator is not supported.
- ALS cannot be configured on the channel group.
- Loopback configuration cannot be applied on the channel group.

11.14.13.7 Related Procedure for LACP

To provision Channel Group using LACP, see the "NTP-G281 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Channel Group Settings" section on page 11-320.

11.14.14 Ethernet Connectivity Fault Management

Ethernet Connectivity Fault Management (CFM) is part of the IEEE 802.1ag standard. The Ethernet CFM is an end-to-end per service instance that supports the Ethernet layer Operations, Administration, and Management (OAM) protocol. It includes proactive connectivity monitoring, link trace on a per service basis, fault verification, and fault isolation for large Ethernet metropolitan-area networks (MANs) and WANs.

CFM is disabled on the card by default. CFM is enabled on all the ports by default.

For more information on CFM, refer to the IEEE 802.1ag standard. For information about interaction of CFM with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62. The following sections contain conceptual information about Ethernet CFM.

11.14.14.1 Maintenance Domain

A maintenance domain is an administrative domain that manages and administers a network. You can assign a unique maintenance level (from 0 to 7) to define the hierarchical relationship between domains. The larger the domain, the higher the maintenance level for that domain. For example, a service provider domain would be larger than an operator domain and might have a maintenance level of 6, while the operator domain maintenance level would be 3 or 4.

Maintenance domains cannot intersect or overlap because that would require more than one entity to manage it, which is not allowed. Domains can touch or nest if the outer domain has a higher maintenance level than the nested domain. Maintenance levels of nesting domains must be communicated among the administrating organizations. For example, one approach would be to have the service provider assign maintenance levels to operators.

The CFM protocol supports up to eight maintenance domains on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

11.14.14.2 Maintenance Association

A maintenance association identifies a service within the maintenance domain. You can have any number of maintenance associations within each maintenance domain. The CFM protocol supports up to 1500 maintenance associations on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

Note Each maintenance association is mapped to a maintenance domain. This mapping is done to configure a Maintenance End Point (MEP). The CFM protocol supports up to 1000 mappings on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

11.14.14.3 Maintenance End Points

Maintenance End Points (MEPs) reside at the edge of the maintenance domain and are active elements of the Ethernet CFM. MEPs transmit Continuity Check messages at periodic intervals and receive similar messages from other MEPs within a domain. MEPs also transmit Loopback and Traceroute messages at the request of the administrator. MEPs confine CFM messages within the boundary of a maintenance domain through the maintenance level. There are two types of MEPs:

- Up (Inwards, towards the bridge)
- Down (Outwards, towards the wire).

You can create up to 255 MEPs and MIPs together on GE_XP and 10GE_XP cards. You can create up to 500 MEPs and MIPs together on GE_XPE and 10GE_XPE cards.

The MEP continuity check database (CCDB) stores information that is received from other MEPs in the maintenance domain. The card can store up to 4000 MEP CCDB entries.

11.14.14.4 Maintenance Intermediate Points

Maintenance Intermediate Points (MIPs) are internal to the maintenance domain and are passive elements of the Ethernet CFM. They store information received from MEPs and respond to Linktrace and Loopback CFM messages. MIPs forward CFM frames received from MEPs and other MIPs, drop all CFM frames at a lower level, and forward all CFM frames at a higher level.

You can create up to 255 MEPs and MIPs together on GE_XP and 10GE_XP cards. You can create up to 500 MEPs and MIPs together on GE_XPE and 10GE_XPE cards.

The MIP CCDB maintains the information received for all MEPs in the maintenance domain. The card can store up to 4000 MIP CCDB entries.

11.14.14.5 CFM Messages

The Ethernet CFM on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards supports the following messages:

- Continuity Check—These messages are exchanged periodically among MEPs. They allow MEPs to discover other MEPs within a domain and allow MIPs to discover MEPs. These messages are confined to a domain.
- Loopback—These messages are unicast messages that a MEP transmits, at the request of an administrator, to verify connectivity to a specific maintenance point. A reply to a loopback message indicates whether a destination is reachable.
- Traceroute—These messages are multicast messages that a MEP transmits, at the request of an administrator, to track the path to a destination MEP.

11.14.14.6 CFM Limitations and Restrictions

The CFM on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards has the following limitations and restrictions:

- CFM is not supported on channel groups.
- CFM is not enabled on protected ports running REP, FAPS, and 1+1.
- Y.1731 enhancements including AIS, LCK, and performance monitoring messages along with CFM are not supported.
- IEEE CFM MIB is not supported.
- L1 and CFM are mutually exclusive on a SVLAN because LI and CFM use the same MAC address.
- MAC security and CFM are mutually exclusive on the card due to hardware resource constraints.

11.14.14.7 Related Procedure for Ethernet CFM

For information about the supported Ethernet CFM features on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G283 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card CFM Settings" section on page 11-331.

11.14.15 Ethernet OAM

The Ethernet OAM protocol is part of the IEEE 802.3ah standard and is used for installing, monitoring, and troubleshooting Ethernet MANs and Ethernet WANs. This protocol relies on an optional sublayer in the data link layer of the OSI model. The Ethernet OAM protocol was developed for Ethernet in the First Mile (EFM) applications. The terms Ethernet OAM and EFM are interchangeably used and both mean the same.

Normal link operation does not require Ethernet OAM. You can implement Ethernet OAM on any full-duplex point-to-point or emulated point-to-point Ethernet link for a network or part of a network (specified interfaces). OAM frames, called OAM Protocol Data Units (OAM PDUs), use the slow protocol destination MAC address 0180.c200.0002. OAM PDUs are intercepted by the MAC sublayer and cannot propagate beyond a single hop within an Ethernet network.

Ethernet OAM is disabled on all interfaces by default. When Ethernet OAM is enabled on an interface, link monitoring is automatically turned on.

For more information on Ethernet OAM protocol, refer to IEEE 802.3ah standard. For information about interaction of Ethernet OAM with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

11.14.15.1 Components of the Ethernet OAM

Ethernet OAM consists of two major components, the OAM Client and the OAM Sublayer.

11.14.15.1.1 OAM Client

The OAM client establishes and manages the Ethernet OAM on a link. The OAM client also enables and configures the OAM sublayer. During the OAM discovery phase, the OAM client monitors the OAM PDUs received from the remote peer and enables OAM functionality. After the discovery phase, the OAM client manages the rules of response to OAM PDUs and the OAM remote loopback mode.

11.14.15.1.2 OAM Sublayer

The OAM sublayer presents two standard IEEE 802.3 MAC service interfaces:

- One interface facing toward the superior sub-layers, which include the MAC client (or link aggregation).
- Other interface facing toward the subordinate MAC control sublayer.

The OAM sublayer provides a dedicated interface for passing OAM control information and OAM PDUs to and from the client.

11.14.15.2 Benefits of the Ethernet OAM

Ethernet OAM provides the following benefits:

- Competitive advantage for service providers
- Standardized mechanism to monitor the health of a link and perform diagnostics

11.14.15.3 Features of the Ethernet OAM

The Ethernet OAM protocol has the following OAM features:

- Discovery—Identifies devices in the network and their OAM capabilities. The Discovery feature uses periodic OAM PDUs to advertise the OAM mode, configuration, and capabilities. An optional phase allows the local station to accept or reject the configuration of the peer OAM entity.
- Link Monitoring—Detects and indicates link faults under a variety of conditions. It uses the event notification OAM PDU to notify the remote OAM device when it detects problems on the link.
- Remote Failure Indication—Allows an OAM entity to convey the failure conditions to its peer through specific flags in the OAM PDU.
- Remote Loopback—Ensures link quality with a remote peer during installation or troubleshooting.

11.14.15.4 Ethernet OAM Limitations and Restrictions

The Ethernet OAM on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards has the following limitations and restrictions:

- CFM, REP, link integrity, LACP, FAPS, IGMP on SVLAN and L2 1+1 protection are not supported with EFM.
- IEEE EFM MIB is not supported.
- EFM cannot be enabled or disabled at the card level.
- Unidirectional functionality is not supported.
- Errored Symbol Period, Rx CRC errors, Tx CRC errors are not supported.
- OAM PDUs are limited to 1 frame per second.
- Dying Gasp and critical events are not supported.

Note Dying Gasp RFI is not generated on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards. However, if the peer device sends a dying gasp RFI, the card detects it and raises an alarm.

11.14.15.5 Related Procedure for Ethernet OAM

For information about the supported Ethernet OAM features on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G285 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card EFM Settings" section on page 11-343.

11.14.16 Resilient Ethernet Protocol

The Resilient Ethernet Protocol (REP) is a protocol used to control network loops, handle link failures, and improve convergence time.

REP performs the following tasks:

- Controls a group of ports connected in a segment.
- Ensures that the segment does not create any bridging loops.
- Responds to link failures within the segment.
- Supports VLAN load balancing.

For information about interaction of REP with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

11.14.16.1 REP Segments

A REP segment is a chain of ports connected to each other and configured with a segment ID. Each segment consists of regular segment ports and two edge ports. A GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card can have up to 2 ports that belong to the same segment, and each segment port can have only one external neighbor port.

A segment protects only against a single link failure. Any more failures within the segment result in loss of connectivity.

11.14.16.2 Characteristics of REP Segments

REP segments have the following characteristics:

- If all the ports in the segment are operational, one port blocks traffic for each VLAN. If VLAN load balancing is configured, two ports in the segment control the blocked state of VLANs.
- If any port in the segment is not operational, all the other operational ports forward traffic on all VLANs to ensure connectivity.
- In case of a link failure, the alternate ports are immediately unblocked. When the failed link comes up, a logically blocked port per VLAN is selected with minimal disruption to the network.

11.14.16.3 REP Port States

Ports in REP segments take one of three roles or states: Failed, Open, or Alternate.

- A port configured as a regular segment port starts as a failed port.
- When the neighbor adjacencies are determined, the port transitions to the alternate port state, blocking all the VLANs on the interface. Blocked port negotiations occur and when the segment settles, one blocked port remains in the alternate role and all the other ports become open ports.
- When a failure occurs in a link, all the ports move to the failed state. When the alternate port receives the failure notification, it changes to the open state, forwarding all VLANs.

11.14.16.4 Link Adjacency

Each segment port creates an adjacency with its immediate neighbor. Link failures are detected and acted upon locally. If a port detects a problem with its neighbor, the port declares itself non-operational and REP converges to a new topology.

REP Link Status Layer (LSL) detects its neighbor port and establishes connectivity within the segment. All VLANs are blocked on an interface until the neighbor port is identified. After the neighbor port is identified, REP determines the neighbor port that must be the alternate port and the ports that must forward traffic.

Each port in a segment has a unique port ID. When a segment port starts, the LSL layer sends packets that include the segment ID and the port ID.

A segment port does not become operational if the following conditions are satisfied:

- No neighbor port has the same segment ID or more than one neighbor port has the same segment ID.
- The neighbor port does not acknowledge the local port as a peer.

11.14.16.5 Fast Reconvergence

REP runs on a physical link and not on per VLAN. Only one hello message is required for all VLANs that reduces the load on the protocol.

REP Hardware Flood Layer (HFL) is a transmission mechanism that floods packets in hardware on an admin VLAN. HFL avoids the delay that is caused by relaying messages in software. HFL is used for fast reconvergence in the order of 50 to 200 milliseconds.

11.14.16.6 VLAN Load Balancing

You must configure two edge ports in the segment for VLAN load balancing. One edge port in the REP segment acts as the primary edge port; the other edge port as the secondary edge port. The primary edge port always participates in VLAN load balancing in the segment. VLAN load balancing is achieved by blocking certain VLANs at a configured alternate port and all the other VLANs at the primary edge port.

11.14.16.7 REP Configuration Sequence

You must perform the following tasks in sequence to configure REP:

- Configure the REP administrative VLAN or use the default VLAN 1. The range of REP admin VLAN is 1 to 4093. VLAN 4094 is not allowed.
- Add ports to the segment in interface configuration mode.
- Enable REP on ports and assign a segment ID to it. REP is disabled on all ports by default. The range of segment ID is 1 to 1024.
- Configure two edge ports in the segment; one port as the primary edge port and the other as the secondary edge port.
- If you configure two ports in a segment as the primary edge port, for example, ports on different switches, REP selects one of the ports to serve as the primary edge port based on port priority. The Primary option is enabled only on edge ports.
- Configure the primary edge port to send segment topology change notifications (STCNs) and VLAN load balancing to another port or to other segments. STCNs and VLAN load balancing configurations are enabled only for edge ports.

Note A port can belong to only one segment. Only two ports can belong to the same segment. Both the ports must be either regular ports or edge ports. However, if the No-neighbor port is configured, one port can be an edge port and another port can be a regular port.

11.14.16.8 REP Supported Interfaces

REP supports the following interfaces:

- REP is supported on client (UNI) and trunk (NNI) ports.
- Enabling REP on client ports allows protection at the access or aggregation layer when the cards are connected to the L2 network.
- Enabling REP on trunk ports allows protection at the edge layer when the cards are connected in a ring.

11.14.16.9 REP Limitations and Restrictions

The REP on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards has the following limitations and restrictions:

- Fast re-convergence and VLAN load balancing are not supported on UNI ports in transparent mode.
- Native VLAN is not supported.
- CFM, EFM, link integrity, LACP, FAPS, and L2 1+1 protection are not supported on ports that are configured as part of REP segment and vice versa.

- When a node installed with GE_XP, GE_XPE, 10GE_XP, or 10GE_XPE cards configured with REP or LACP is upgraded, traffic loss may occur. This traffic loss is due to reconvergence when the cards soft reset during the upgrade process.
- NNI ports cannot be configured as the primary edge port or blocking port at the access or aggregation layer.
- Only three REP segments can be configured on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
- Consider the following configuration:

  More than one REP closed segment is configured on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards and the same HFL admin VLAN is enabled on the switches.

  If two different segments are configured on more than one common switch, the following consequences happen.

  - Layer 1 loop
  - Flooding of HFL packets across segments if one REP segment fails
  - Segment goes down due to LSL time out even if the segment does not have faults

  Hence, it is recommended not to configure two different segments on more than one common switch.
- Consider the following configuration:
  - VLAN Load Balancing is configured on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards by specifying the VLB preempt delay.
  - Primary and secondary edge ports are configured on the same switch.
  - HFL or LSL is activated.

  This configuration leads to high convergence time during manual premption, VLB activation, and deactivation (400 to 700 milliseconds).

11.14.16.10 Related Procedure for Managing the REP Settings

To manage the REP settings on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, see the "NTP-G287 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card REP Settings" section on page 11-348.

11.14.17 Related Procedures for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

The following is the list of procedures and tasks related to the configuration of the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards:

- NTP-G165 Modify the GE_XP, 10GE_XP, GE_XPE, 10GE_XPE Cards Ethernet Parameters, Line Settings, and PM Thresholds, page 11-355
- NTP-G311 Provision the Storm Control Settings for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards, page 11-380
- NTP-G208 Provision SVLAN Rate Limiting on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card, page 11-384
- NTP-G314 Add a GE_XP or 10GE_XP Card on a FAPS Ring, page 11-398
- NTP-G75 Monitor Transponder and Muxponder Performance

11.15 ADM-10G Card

The ADM-10G card operates on ONS 15454 SONET, ONS 15454 SDH, ONS 15454 M2, ONS 15454 M6, and DWDM networks to carry optical signals and Gigabit Ethernet signals over DWDM wavelengths for transport. The card aggregates lower bit-rate client SONET or SDH signals (OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, or Gigabit Ethernet) onto a C-band tunable DWDM trunk operating at a higher OC-192/STM-64 rate. In a DWDM network, the ADM-10G card transports traffic over DWDM by mapping Gigabit Ethernet and SONET or SDH circuits onto the same wavelength with multiple protection options.

You can install and provision the ADM-10G card in a linear configuration in:

- Slots 1 to 5 and 12 to 16 in standard and high-density ONS 15454 ANSI shelves (15454-SA-ANSI or 15454-SA-HD), the ETSI ONS 15454 standard shelf assembly, or the ONS 15454 ETSI high-density shelf assembly
- Slot 2 in ONS 15454 M2 chassis
- Slots 2 to 6 in ONS 15454 M6 chassis

Caution Fan-tray assembly 15454E-CC-FTA (ETSI shelf)/15454-CC-FTA (ANSI shelf) must be installed in a shelf where the ADM-10G card is installed.

The card is compliant with ITU-T G.825 and ITU-T G.783 for SDH signals. It supports concatenated and non-concatenated AU-4 mapped STM-1, STM-4, and STM-16 signals as specified in ITU-T G.707. The card also complies with Section 5.6 of Telcordia GR-253-CORE and supports synchronous transport signal (STS) mapped OC-3, OC-12, and OC-48 signals as specified in the standard.

The client SFP and trunk XFP are compliant with interface requirements in Telcordia GR-253-CORE, ITU-T G.957 and/or ITU-T G.959.1, and IEEE 802.3.

11.15.1 Key Features

The ADM-10G card has the following high-level features:

- Operates with the TCC2, TCC2P, TCC3, TNC, TNCE, TSC, or TSCE.
- Interoperable with TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10EX_C, and OTU2_XP cards.
- Has built-in OC-192/STM-64 add/drop multiplexing function including client, trunk, and STS cross-connect.
- Supports both single-card and double-card (ADM-10G peer group) configuration.
- Supports path protection/SNCP on client and trunk ports for both single-card and double-card configuration. The card does not support path protection/SNCP between a client port and a trunk port. Path protection/SNCP is supported only between two client ports or two trunk ports.
- Supports 1+1 protection on client ports for double-card configuration only.
- Supports SONET, SDH, and Gigabit Ethernet protocols on client SFPs.
- Supports XFP DWDM trunk interface single wavelengths.
- Returns zero bit errors when a TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE card switches from active to standby or when manual or forced protection switches occur.
- Has 16 SFP-based client interfaces (gray, colored, coarse wavelength division multiplexing (CWDM), and DWDM optics available).

- Supports STM1, STM4, STM16, and Gigabit Ethernet client signals (8 Gigabit Ethernet maximum).
- Has one XFP-based trunk interface supporting E-FEC/FEC and ITU-T G.709 for double-card configuration.
- Has two XFP-based trunk interface supporting E-FEC/FEC and ITU-T G.709 for single-card configuration.
- Has two SR XFP interlink interfaces supporting redundancy connection with protection board and pass-through traffic for double-card configuration.
- Supports frame-mapped generic framing procedure (GFP-F) and LEX mapping for Ethernet over SONET or SDH.
- Can be installed or pulled from operation, in any slot, without impacting other service cards in the shelf.
- Supports client to client hairpinning, that is, creation of circuits between two client ports for both single-card and double-card configuration. See the "11.15.11 Circuit Provisioning" section on page 11-90 for more detailed information.

11.15.2 ADM-10G POS Encapsulation, Framing, and CRC

The ADM-10G card supports Cisco EoS LEX (LEX) and generic framing procedure framing (GFP-F) encapsulation on 8 POS ports corresponding to 8 GigE ports (Port 1 to Port 8) in both single-card and double-card (ADM-10G peer group) configuration.

You can provision framing on the ADM-10G card as either the default GFP-F or LEX framing. With GFP-F framing, you can configure a 32-bit cyclic redundancy check (CRC) or none (no CRC) (the default). LEX framing supports 16-bit or 32-bit CRC configuration. The framing type cannot be changed when there is a circuit on the port.

On the CTC, navigate to card view and click the Provisioning > Line> Ethernet Tab. To see the various parameters that can be configured on the ethernet ports, see the "CTC Display of ethernet Port Provisioning Status" section in the *Cisco ONS 15454 and Cisco ONS 15454 SDH Ethernet Card Software Feature and Configuration Guide*. Parameters such as, admin state, service state, framing type, CRC, MTU and soak time for a port can be configured.

It is possible to create an end-to-end circuit between equipment supporting different kinds of encapsulation (for example, LEX on one side and GFP-F on other side). But, under such circumstances, traffic does not pass through, and an alarm is raised if there is a mismatch.

11.15.2.1 POS Overview

Ethernet data packets need to be framed and encapsulated into a SONET/SDH frame for transport across the SONET/SDH network. This framing and encapsulation process is known as packet over SONET/SDH (POS).

The Ethernet frame comes into the ADM-10G card on a standard Gigabit Ethernet port and is processed through the card's framing mechanism and encapsulated into a POS frame. When the POS frame exits, the ADM-10G card is in a POS circuit, and this circuit is treated as any other SONET circuit (STS) or SDH circuit (VC) in the ONS node. It is cross-connected and rides the SONET/SDH signal out the port of an optical card and across the SONET/SDH network.

The destination of the POS circuit is a card or a device that supports the POS interface. Data packets in the destination card frames are removed and processed into ethernet frames. The Ethernet frames are then sent to a standard Ethernet port of the card and transmitted onto an Ethernet network.

11.15.2.2 POS Framing Modes

A POS framing mode is the type of framing mechanism employed by the ADM-10G card to frame and encapsulate data packets into a POS signal. These data packets were originally encapsulated in Ethernet frames that entered the standard Gigabit Ethernet interface of the ADM-10G card.

11.15.2.2.1 GFP-F Framing

The GFP-F framing represent standard mapped Ethernet over GFP-F according to ITU-T G.7041. GFP-F defines a standard-based mapping of different types of services onto SONET/SDH. GFP-F maps one variable length data packet onto one GFP packet. GFP-F comprises of common functions and payload specific functions. Common functions are those shared by all payloads. Payload-specific functions are different depending on the payload type. GFP-F is detailed in the ITU recommendation G.7041.

11.15.2.2.2 LEX Framing

LEX encapsulation is a HDLC frame based Cisco Proprietary protocol, where the field is set to values specified in Internet Engineering Task Force (IETF) RFC 1841. HDLC is one of the most popular Layer 2 protocols. The HDLC frame uses the zero insertion/deletion process (commonly known as bit stuffing) to ensure that the bit pattern of the delimiter flag does not occur in the fields between flags. The HDLC frame is synchronous and therefore relies on the physical layer to provide a method of clocking and synchronizing the transmission and reception of frames. The HDLC framing mechanism is detailed in the IETF's RFC 1662, "PPP in HDLC-like Framing."

11.15.2.3 GFP Interoperability

The ADM-10G card defaults to GFP-F encapsulation that is compliant with ITU-T G.7041. This mode allows the card to operate with ONS 15310-CL, ONS 15310-MA, ONS 15310-MA SDH, or ONS 15454 data cards (for example, ONS 15454 CE100T-8 or ML1000-2 cards). GFP encapsulation also allows the ADM-10G card to interoperate with other vendors Gigabit Ethernet interfaces that adhere to the ITU-T G.7041 standard.

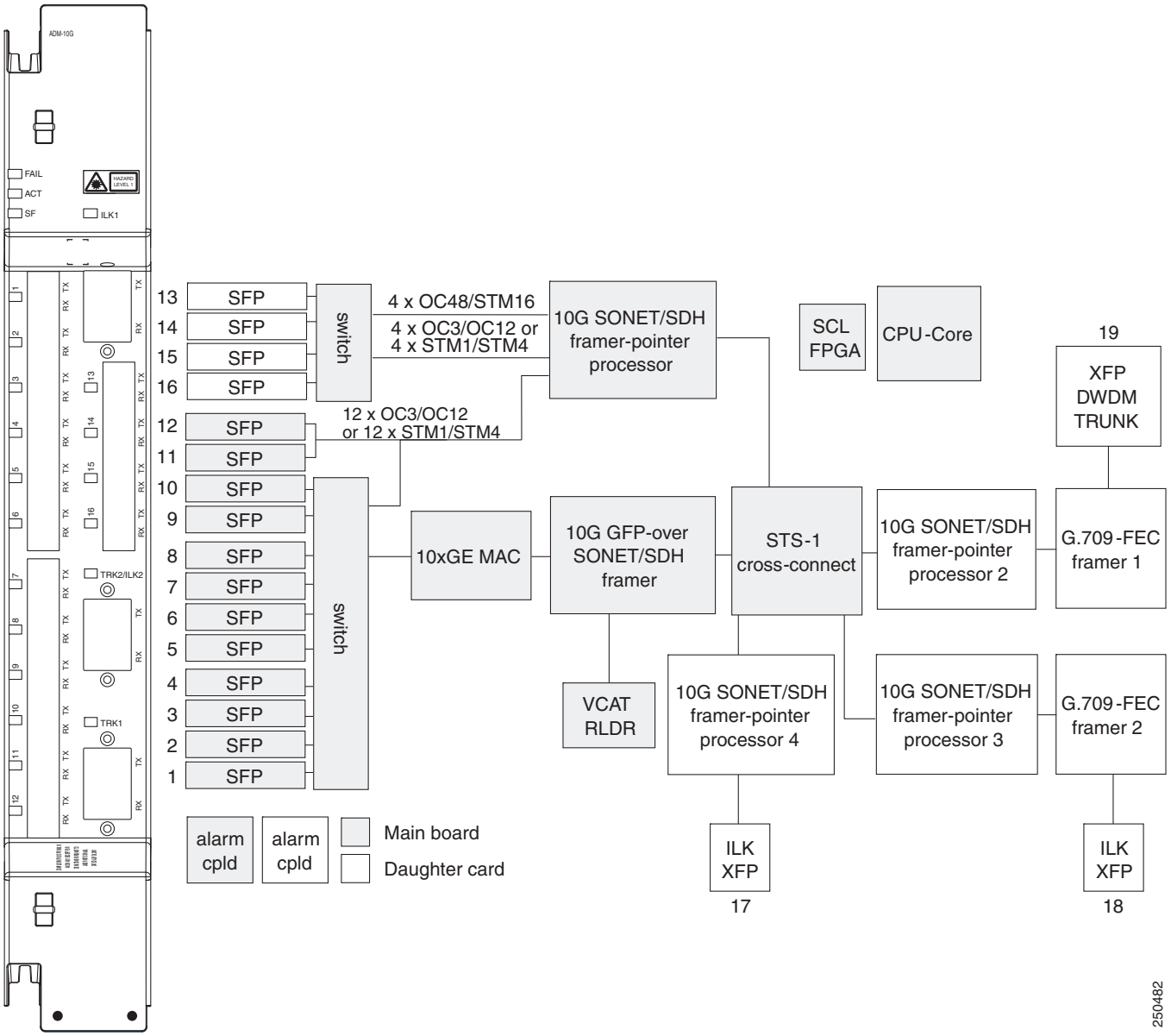
11.15.2.4 LEX Interoperability

The LEX encapsulation is compliant with RFC 1841. This mode allows the card to operate with ONS 15310-CL, ONS 15310-MA, ONS 15310-MA SDH, or ONS 15454 data cards (for example, G1000-4/G1K-4 cards, CE-1000-4, ONS 15454 CE100T-8 or ML1000-2 cards).

11.15.3 Faceplate and Block Diagram

Figure 11-20 shows the ADM-10G card faceplate.

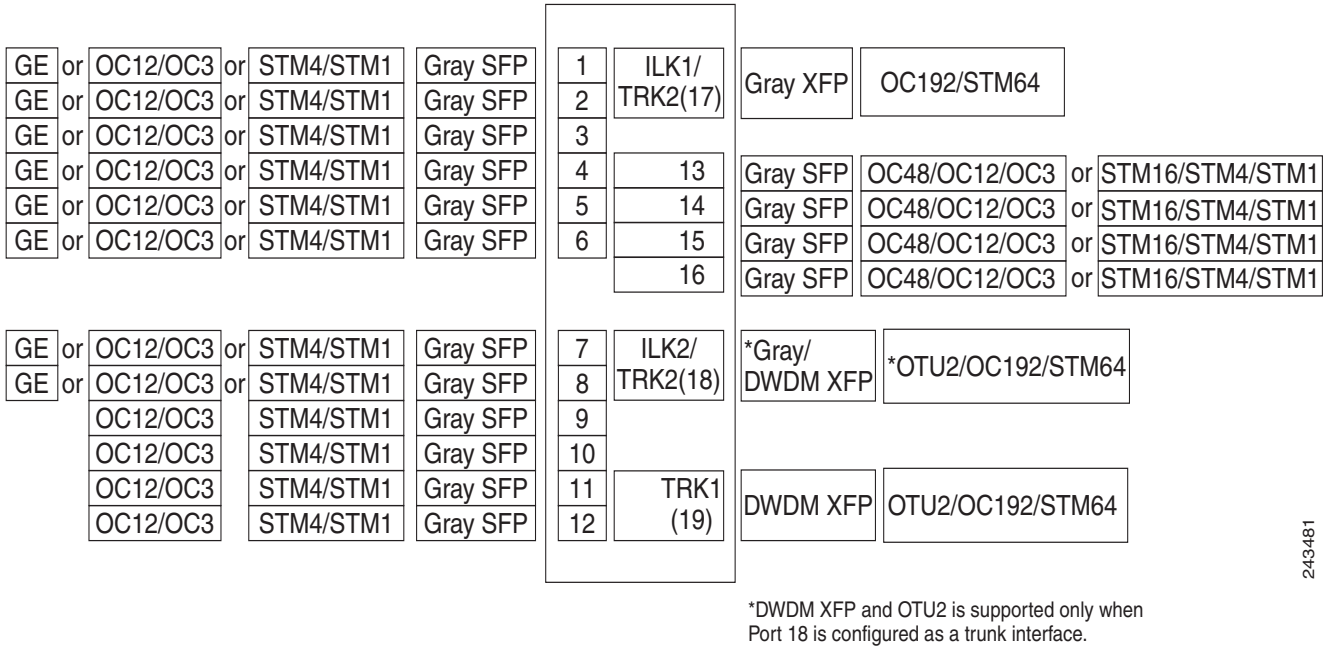
Figure 11-20 ADM-10G Card Faceplate and Block Diagram



11.15.4 Port Configuration Rules

ADM-10G card client and trunk port capacities are shown in Figure 11-21.

Figure 11-21 ADM-10G Card Port Capacities



Port 17 acts as trunk2 or ILK1 interface based on single-card or double-card configuration.

11.15.5 Client Interfaces

The ADM-10G card uses LC optical port connectors and, as shown in Figure 11-21, supports up to 16 SFPs that can be utilized for OC-N/STM-N traffic. Eight of the SFPs can be used for Gigabit Ethernet. The interfaces can support any mix of OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, or Gigabit Ethernet of any reach, such as SX, LX, ZX, SR, IR, or LR. The interfaces support a capacity of:

- 4 x OC-48/STM-16
- 16 x OC-12/STM-4
- 16 x OC-3/STM-1
- 8 x GE

The supported client SFPs and XFPs are:

- Gray SFPs
  - 1000Base-SX SFP 850 nm (ONS-SE-G2F-SX=)
  - 1000Base-LX SFP 1310 nm (ONS-SE-G2F-LX=)
  - OC48/STM16 IR1, OC12/STM4 SR1, OC3/STM1 SR1, GE-LX multirate SFP 1310 nm (ONS-SE-Z1=)
  - OC3/STM1 IR1, OC12/STM4 IR1 multirate SFP 1310 nm (ONS-SI-622-I1=)
  - OC48/STM16 SR1 SFP 1310 nm (ONS-SI-2G-S1=)
  - OC48/STM16 IR1 SFP 1310 nm (ONS-SI-2G-I1=)
  - OC48/STM16, 1550 LR2, SM LC (ONS-SE-2G-L2=)

- Colored DWDM SFPs
  - 1000Base-ZX SFP 1550 nm (ONS-SI-GE-ZX=)
  - OC3/STM1 LR2 SFP 1550 nm (ONS-SI-155-L2=)
  - OC48/STM16 LR2 SFP 1550 nm (ONS-SI-2G-L2=)
  - OC48/STM16 SFP (ONS-SC-2G-xx.x)

Note xx.x = 28.7 to 60.6. ONS-SC-2G-28.7, ONS-SC-2G-33.4, ONS-SC-2G-41.3, ONS-SC-2G-49.3, and ONS-SC-2G-57.3 are supported from Release 8.5 and later.

- CWDM SFPs
  - OC48/STM16/GE CWDM SFP (ONS-SC-Z3-xxxx)
- XFPs
  - OC-192/STM-64/10GE XFP 1550 nm (ONS-XC-10G-I2)

11.15.6 Interlink Interfaces

Two 2R interlink interfaces, called ILK1 (Port 17) and ILK2 (Port 18), are provided for creation of ADM-10G peer groups in double-card configurations. In a single-card configuration, Port 17 (OC-192/STM-64) and Port 18 (OC-192/STM-64 or OTU2 payload) must be configured as trunk interfaces. In a double-card configuration (ADM-10G peer group), Ports 17 and 18 must be configured as ILK1 and ILK2 interfaces, respectively. Physically cabling these ports between two ADM-10G cards, located on the same shelf, allows you to configure them as an ADM-10G peer group.The ILK ports carry 10 Gb of traffic each.

The interlink interfaces support STM64 SR1 (ONS-XC-10G-S1=) XFP and 10GE BASE SR (ONS-XC-10G-SR-MM=) XFPs.

11.15.7 DWDM Trunk Interface

The ADM-10G card supports OC-192/STM-64 signal transport and ITU-T G.709 digital wrapping according to the ITU-T G.709 standard.The ADM-10G card supports three trunk XFPs:

- Two DWDM trunks, and one trunk interface in a single-card configuration.
- One DWDM trunk XFP in a double-card configuration.

The supported DWDM trunk XFPs are:

- 10G DWDM (ONS-XC-10G-xx.x=) (colored XFP)
- STM64 SR1 (ONS-XC-10G-S1=) (gray XFP)

11.15.8 Configuration Management

When using OC-48/STM-16 traffic, some contiguous port configurations, listed in Table 11-21, are unavailable due to hardware limitations. This limitation does not impact the Gigabit Ethernet payload.

Note The ADM-10G card cannot be used in the same shelf with SONET or SDH cross-connect cards.

Table 11-21 OC-48/STM-16 Configuration Limitations

OC-48/STM-16 Port Number	Ports Restricted from Optical Traffic
OC-48/STM-16 on Port 13	No OC-N/STM-N on Port 1 through Port 3
OC-48/STM-16 on Port 14	No OC-N/STM-N on Port 4 through Port 6
OC-48/STM-16 on Port 15	No OC-N/STM-N on Port 7 through Port 9
OC-48/STM-16 on Port 16	No OC-N/STM-N on Port 10 through Port 12

Note The total traffic rate for each trunk cannot exceed OC-192/STM-64 on each ADM-10G card, or for each ADM-10G peer group.

Note Gigabit Ethernet is supported on Ports 1 through 8. Ports 9 through Port 12 support only OC-3/STM-1 or OC-12/STM-4.

Additionally, the following guidelines apply to the ADM-10G card:

- Trunk Port 17 supports OC-192/STM-64.
- Trunk Ports 18 and 19 support OC-192/STM-64 and OTU2.
- The interlink port supports OC-192/STM-64.
- Up to six ADM-10G cards can be installed in one shelf.
- Up to 24 ADM-10G cards can be installed per network element (NE) regardless of whether the card is installed in one shelf or in multiple shelves.
- The card can be used in all 15454-SA-ANSI and 15454-SA-HD shelves as well as ETSI ONS 15454 standard and high-density shelves.
- A lamp test function can be activated from CTC to ensure that all LEDs are functional.
- The card can operate as a working protected or working non-protected card.
- In a redundant configuration, an active card hardware or software failure triggers a switch to the standby card. This switch is detected within 10 ms and is completed within 50 ms.
- ADM-10G cards support jumbo frames with MTU sizes of 64 to 9,216 bytes; the maximum is 9,216.
- After receiving a link or path failure, the ADM-10G card can shut down only the downstream Gigabit Ethernet port.

Note In ADM-10G cards, the Gigabit Ethernet port does not support flow control.

11.15.9 Security

The ADM-10G card that an SFP or XFP is plugged into implements the Cisco Standard Security Code Check Algorithm that keys on the vendor ID and serial number.

If a pluggable port module (PPM) is plugged into a port on the card but fails the security code check because it is not a Cisco PPM, a minor NON-CISCO-PPM alarm is raised.

If a PPM with an unqualified product ID is plugged into a port on this card—that is, the PPM passes the security code as a Cisco PPM but it has not been qualified for use on the ADM-10G card— a minor UNQUAL-PPM alarm is raised.

11.15.10 Protection

The ADM-10G card supports 1+1 and SONET path protection and SDH SNCP protection architectures in compliance with Telcordia GR-253-CORE, Telcordia GR-1400-CORE, and ITU-T G.841 specifications.

11.15.10.1 Circuit Protection Schemes

The ADM-10G card supports path protection/SNCP circuits at the STS/VC4 (high order) level and can be configured to switch based on signal degrade calculations. The card supports path protection/SNCP on client and trunk ports for both single-card and double-card configuration.

Note The ADM-10G card supports path protection/SNCP between client ports and trunk port 17. The card does not support path protection/SNCP between client ports and trunk ports 18 or 19. The card does not support path protection/SNCP between port 17 and trunk ports 18 and 19.

The card allows open-ended path protection/SNCP configurations incorporating other vendor equipment. In an open-ended path protection/SNCP, you can specify one source point and two possible endpoints (or two possible source points and one endpoint) and the legs can include other vendor equipment. The source and endpoints are part of the network discovered by CTC.

11.15.10.2 Port Protection Schemes

The ADM-10G card supports unidirectional and bidirectional 1+1 APS protection schemes on client ports for double-card configuration (ADM-10G peer group) only. 1+1 APS protection scheme is not supported in single-card configuration. For 1+1 optical client port protection, you can configure the system to use any pair of like facility interfaces that are on different cards of the ADM-10G peer group.

11.15.11 Circuit Provisioning

The ADM-10G card supports STS circuit provisioning both in single-card and double-card (ADM-10G peer group) configuration. The card allows you to create STS circuits between:

- Client and trunk ports
- Two trunk ports
- Two client ports (client-to-client hairpinning)

Note Circuits between two trunk ports are called pass-through circuits.

For an ADM-10G card in single-card configuration, if you are creating STS circuits between two client ports, the following limitation must be considered:

- Gigabit Ethernet to Gigabit Ethernet connections are not supported.

For an ADM-10G card that is part of an ADM-10G peer group, if you are creating STS circuits between two client ports or between client and trunk ports, the following limitations must be considered:

- Gigabit Ethernet to Gigabit Ethernet connections are not supported.
- Optical channel (OC) to OC, OC to Gigabit Ethernet, and Gigabit Ethernet to OC connections between two peer group cards are supported. Peer group connections use interlink port bandwidth, hence, depending on the availability/fragmentation of the interlink port bandwidth, it may not be possible to create an STS circuit from the Gigabit Ethernet/OC client port to the peer card trunk port. This is because, contiguous STSs (that is, STS-3c, STS-12c, STS-24c, and so on) must be available on the interlink port for circuit creation.

Note There are no limitations to create an STS circuit between two trunk ports.

The two ADM-10G cards used in a paired mode use interlink ports ILK1 (Port 17) and ILK2 (Port 18). A CCAT or VCAT circuit created between the peer ADM-10G cards uses the ILK1 port if the source or destination is Port 19. The circuits created with a single ADM-10G card uses the ILK2 port.

If the circuit is of type STS-*n*c (where *n* is an integer and can take values 3,6,9,12,18,24,36,48,96) and uses the ILK2 port, then the starting timeslot needs to use specific timeslots for traffic to flow. The timeslots can be 12*m*+1 for STS-12c circuits and 48*m*+1 (where *m* is an integer and can take values 0,1,2,3...) for STS-48c circuits. The timeslots can be 3*m*+1 for the other STS-*n*c circuits.

The following example illustrates how to use the correct timeslot for an ILK2 port:

If there is no circuit on the ILK2 port and a STS-3c circuit is created, the circuit uses timeslots 1 to 3. An STS-12c circuit must be created on the ILK2 port later. The STS-12c circuit must have used timeslots 4 to 15. However, the STS-12c circuit uses timeslots starting from 12m+1 (1, 13, 25, and so on) as defined in the above rule. Therefore, before creating the STS-12c circuit, dummy circuits must be created in CTC that consumes STS-9 bandwidth.

11.15.12 ADM-10G CCAT and VCAT Characteristics

The ADM-10G card supports high-order (HO) contiguous concatenation (CCAT) and HO virtual concatenation (VCAT) circuits on 8 GigE ports (Port 1 to Port 8) in both single-card and double-card (ADM-10G peer group) configuration.

To enable end-to-end connectivity in a VCAT circuit that traverses through a third-party network, you can use Open-Ended VCAT circuit creation.

The ADM-10G card supports flexible non-LCAS VCAT groups (VCGs). With flexible VCGs, the ADM-10G can perform the following operations:

- Add or remove members from groups
- Put members into or out of service, which also adds/removes them from the group
- Add or remove cross-connect circuits from VCGs

Any operation on the VCG member is service effecting (for instance, adding or removing members from the VCG). Adding or removing cross-connect circuits is not service-affecting, if the associated members are not in the group

The ADM-10G card allows independent routing and protection preferences for each member of a VCAT circuit. You can also control the amount of VCAT circuit capacity that is fully protected, unprotected, or uses Protection Channel Access (PCA) (when PCA is available). Alarms are supported on a per-member as well as per virtual concatenation group (VCG) basis.

The ADM-10G card supports both automatic and manual routing for VCAT circuit, that is, all members are manually or automatically routed. Bidirectional VCAT circuits are symmetric, which means that the same number of members travel in each direction. With automatic routing, you can specify the constraints for individual members; with manual routing, you can select different spans for different members. Two types of automatic and manual routing are available for VCAT members: common fiber routing and split routing.

The ADM-10G card supports VCAT common fiber routing and VCAT split fiber (diverse) routing. With VCAT split fiber routing, each member can be routed independently through the SONET or SDH or DWDM network instead of having to follow the same path as required by CCAT and VCAT common fiber routing. This allows a more efficient use of network bandwidth, but the different path lengths and different delays encountered may cause slightly different arrival times for the individual members of the VCG. The VCAT differential delay is this relative arrival time measurement between members of a VCG. The maximum tolerable VCAT split fiber routing differential delay for the ADM-10G card is approximately 55 milliseconds. A loss of alignment alarm is generated if the maximum differential delay supported is exceeded.

The differential delay compensation function is automatically enabled when you choose split fiber routing during the CTC circuit configuration process. CCAT and VCAT common fiber routing do not enable or need differential delay support.

Caution Protection switches with switching time of less than 60 milliseconds are not guaranteed with the differential delay compensation function enabled. The compensation time is added to the switching time.

Note For TL1, EXPBUFFERS parameter must be set to ON in the ENT-VCG command to enable support for split fiber routing.

Available Circuit Sizes

Table 11-22 and Table 11-23 show the circuit sizes available for the ADM-10G card.

Table 11-22 Supported SONET Circuit Sizes of ADM-10G card on ONS 15454

CCAT	VCAT High Order
STS-1	STS-1-1*n*V (*n*= 1 to 21)
STS-3c	STS-3c-*m*v (*m*= 1 to 7)
STS-6c	
STS-9c	
STS-12c	
STS-24c	

Table 11-23 Supported SDH Circuit Sizes of ADM-10G card on ONS 15454 SDH

CCAT	VCAT High Order
VC-4	VC-4-*m*v (*m*= 1 to 7)
VC-4-2c	
VC-4-3c	
VC-4-4c	
VC-4-8c	

Note In ADM-10G cards, the Gigabit Ethernet port does not support flow control. When less than seven VC-4s are configured for the port, with the client traffic expected to be below the line rate, a burst in traffic beyond the supposed bandwidth leads to packet loss. It is, therefore, recommended to use an external flow control mechanism with less than seven VC-4s configured. Connecting a GE-XP or GE-XPE card between the client traffic and the ADM-10G Gigabit Ethernet interface enables such flow control.

11.15.12.1 Related Procedure for VCAT Circuit

The following is the list of procedures related to creating VCAT circuits:

- NTP-G245 Create an Automatically Routed VCAT Circuit, page 17-85
- NTP-G246 Create a Manually Routed VCAT Circuit, page 17-88

11.15.13 Intermediate Path Performance Monitoring

Intermediate path performance monitoring (IPPM) allows a node to monitor the constituent channel of an incoming transmission signal. You can enable IPPM for STS/VC-4s payload on OCn and Trunk ports of ADM-10G card. The IPPM is complaint with GR253/G.826.

Software Release 9.2 and higher enables the ADM-10G card to monitor the near-end and far-end PM data on individual STS/VC-4 payloads by enabling IPPM. After provisioning IPPM on the card, service providers can monitor large amounts of STS/VC-4 traffic through intermediate nodes, thus making troubleshooting and maintenance activities more efficient. IPPM occurs only on STS/VC-4 paths that have IPPM enabled, and TCAs are raised only for PM parameters on the selected IPPM paths.

For a CCAT circuit, you can enable IPPM only on the first STS/VC-4 of the concatenation group. For a VCAT circuit, you can enable IPPM independently on each member STS/VC-4 of the concatenation group.

11.15.13.1 Related Procedure for IPPM

To enable IPPM on the ADM-10G card, see the "NTP-G247 Enable or disable Path Performance Monitoring on Intermediate Nodes" section on page 17-91.

11.15.14 Pointer Justification Count Performance Monitoring

Pointers are used to compensate for frequency and phase variations. Pointer justification counts indicate timing errors on SONET networks. When a network is out of synchronization, jitter and wander occur on the transported signal. Excessive wander can cause terminating equipment to slip.

Slips cause different effects in service. Voice service has intermittent audible clicks. Compressed voice technology has short transmission errors or dropped calls. Fax machines lose scanned lines or experience dropped calls. Digital video transmission has distorted pictures or frozen frames. Encryption service loses the encryption key, causing data to be transmitted again.

Pointers provide a way to align the phase variations in STS and VC4 payloads. The STS payload pointer is located in the H1 and H2 bytes of the line overhead. Clocking differences are measured by the offset in bytes from the pointer to the first byte of the STS synchronous payload envelope (SPE) called the J1 byte. Clocking differences that exceed the normal range of 0 to 782 can cause data loss.

There are positive (PPJC) and negative (NPJC) pointer justification count parameters. PPJC is a count of path-detected (PPJC-PDET-P) or path-generated (PPJC-PGEN-P) positive pointer justifications. NPJC is a count of path-detected (NPJC-PDET-P) or path-generated (NPJC-PGEN-P) negative pointer justifications depending on the specific PM name. PJCDIFF is the absolute value of the difference between the total number of detected pointer justification counts and the total number of generated pointer justification counts. PJCS-PDET-P is a count of the one-second intervals containing one or more PPJC-PDET or NPJC-PDET. PJCS-PGEN-P is a count of the one-second intervals containing one or more PPJC-PGEN or NPJC-PGEN.

A consistent pointer justification count indicates clock synchronization problems between nodes. A difference between the counts means that the node transmitting the original pointer justification has timing variations with the node detecting and transmitting this count. Positive pointer adjustments occur when the frame rate of the SPE is too slow in relation to the rate of the STS-1.

You must enable PPJC and NPJC performance monitoring parameters for ADM-10Gcard. In CTC, the count fields for PPJC and NPJC PMs appear white and blank unless they are enabled on the card view Provisioning tab.

11.15.15 Performance Monitoring Parameter Definitions

This section describes the STS and VC-4 path performance monitoring parameters that ADM-10G card support.

Table 11-24 lists the STS near-end path performance monitoring parameters.

Table 11-24 STS Near-end Path Performance Monitoring Parameters

Parameter	Definition
CV-P	Near-End STS Path Coding Violations (CV-P) is a count of BIP errors detected at the STS path layer (that is, using the B3 byte). Up to eight BIP errors can be detected per frame; each error increments the current CV-P second register.
ES-P	Near-End STS Path Errored Seconds (ES-P) is a count of the seconds when at least one STS path BIP error was detected. An AIS Path (AIS-P) defect (or a lower-layer, traffic-related, near-end defect) or a Loss of Pointer Path (LOP-P) defect can also cause an ES-P.

Table 11-24 STS Near-end Path Performance Monitoring Parameters

Parameter	Definition
SES-P	Near-End STS Path Severely Errored Seconds (SES-P) is a count of the seconds when K (2400) or more STS path BIP errors were detected. An AIS-P defect (or a lower-layer, traffic-related, near-end defect) or an LOP-P defect can also cause an SES-P.
UAS-P	Near-End STS Path Unavailable Seconds (UAS-P) is a count of the seconds when the STS path was unavailable. An STS path becomes unavailable when ten consecutive seconds occur that qualify as SES-Ps, and continues to be unavailable until ten consecutive seconds occur that do not qualify as SES-Ps.
FC-P	Near-End STS Path Failure Counts (FC-P) is a count of the number of near-end STS path failure events. A failure event begins when an AIS-P failure, an LOP-P failure, a UNEQ-P failure, or a Section Trace Identifier Mismatch Path (TIM-P) failure is declared. A failure event also begins if the STS PTE that is monitoring the path supports Three-Bit (Enhanced) Remote Failure Indication Path Connectivity (ERFI-P-CONN) for that path. The failure event ends when these failures are cleared.
PPJC-PDET-P	Positive Pointer Justification Count, STS Path Detected (PPJC-PDET-P) is a count of the positive pointer justifications detected on a particular path in an incoming SONET signal.
PPJC-PGEN-P	Positive Pointer Justification Count, STS Path Generated (PPJC-PGEN-P) is a count of the positive pointer justifications generated for a particular path to reconcile the frequency of the SPE with the local clock.
NPJC-PDET-P	Negative Pointer Justification Count, STS Path Detected (NPJC-PDET-P) is a count of the negative pointer justifications detected on a particular path in an incoming SONET signal.
NPJC-PGEN-P	Negative Pointer Justification Count, STS Path Generated (NPJC-PGEN-P) is a count of the negative pointer justifications generated for a particular path to reconcile the frequency of the SPE with the local clock.
PJCDIFF-P	Pointer Justification Count Difference, STS Path (PJCDIFF-P) is the absolute value of the difference between the total number of detected pointer justification counts and the total number of generated pointer justification counts. That is, PJCDiff-P is equal to (PPJC-PGEN-P - NPJC-PGEN-P) - (PPJC-PDET-P - NPJC-PDET-P).
PJCS-PDET-P	Pointer Justification Count Seconds, STS Path Detect (NPJCS-PDET-P) is a count of the one-second intervals containing one or more PPJC-PDET or NPJC-PDET.
PJCS-PGEN-P	Pointer Justification Count Seconds, STS Path Generate (PJCS-PGEN-P) is a count of the one-second intervals containing one or more PPJC-PGEN or NPJC-PGEN.

Table 11-25 gives the VC-4 near-end path performance monitoring parameters definition that ADM-10G card support.

Table 11-25 VC-4 Near-end Path Performance Monitoring Parameters

Parameter	Definition
HP-EB	High-Order Path Errored Block (HP-EB) indicates that one or more bits are in error within a block.
HP-BBE	High-Order Path Background Block Error (HP-BBE) is an errored block not occurring as part of an SES.
HP-ES	High-Order Path Errored Second (HP-ES) is a one-second period with one or more errored blocks or at least one defect.
HP-SES	High-Order Path Severely Errored Seconds (HP-SES) is a one-second period containing 30 percent or more errored blocks or at least one defect. SES is a subset of ES.
HP-UAS	High-Order Path Unavailable Seconds (HP-UAS) is a count of the seconds when the VC path was unavailable. A high-order path becomes unavailable when ten consecutive seconds occur that qualify as HP-SESs, and it continues to be unavailable until ten consecutive seconds occur that do not qualify as HP-SESs.
HP-BBER	High-Order Path Background Block Error Ratio (HP-BBER) is the ratio of BBE to total blocks in available time during a fixed measurement interval. The count of total blocks excludes all blocks during SESs.
HP-ESR	High-Order Path Errored Second Ratio (HP-ESR) is the ratio of errored seconds to total seconds in available time during a fixed measurement interval.
HP-SESR	High-Order Path Severely Errored Second Ratio (HP-SESR) is the ratio of SES to total seconds in available time during a fixed measurement interval.
HP-PPJC-PDET	High-Order, Positive Pointer Justification Count, Path Detected (HP-PPJC-Pdet) is a count of the positive pointer justifications detected on a particular path on an incoming SDH signal.
HP-NPJC-PDET	High-Order, Negative Pointer Justification Count, Path Detected (HP-NPJC-Pdet) is a count of the negative pointer justifications detected on a particular path on an incoming SDH signal.
HP-PPJC-PGEN	High-Order, Positive Pointer Justification Count, Path Generated (HP-PPJC-Pgen) is a count of the positive pointer justifications generated for a particular path.
HP-NPJC-PGEN	High-Order, Negative Pointer Justification Count, Path Generated (HP-NPJC-Pgen) is a count of the negative pointer justifications generated for a particular path.
HP-PJCDIFF	High-Order Path Pointer Justification Count Difference (HP-PJCDiff) is the absolute value of the difference between the total number of detected pointer justification counts and the total number of generated pointer justification counts. That is, HP-PJCDiff is equal to (HP-PPJC-PGen - HP-NPJC-PGen) - (HP-PPJC-PDet - HP-NPJC-PDet).

Table 11-25 VC-4 Near-end Path Performance Monitoring Parameters

Parameter	Definition
HP-PJCS-PDET	High-Order Path Pointer Justification Count Seconds (HP-PJCS-PDet) is a count of the one-second intervals containing one or more HP-PPJC-PDet or HP-NPJC-PDet.
HP-PJCS-PGEN	High-Order Path Pointer Justification Count Seconds (HP-PJCS-PGen) is a count of the one-second intervals containing one or more HP-PPJC-PGen or HP-NPJC-PGen.

11.15.16 ADM-10G Functions

The functions of the ADM-10G card are:

- G.2 Automatic Laser Shutdown, page G-6
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-11 on page G-12

11.15.17 Related Procedures for ADM-10G Card

The following is the list of procedures and tasks related to the configuration of the ADM-10G card:

- NTP-G170 Provision the ADM-10G Card Peer Group, Ethernet Settings, Line Settings, PM Parameters, and Thresholds, page 11-211
- NTP-G200 Create, Delete, and Manage STS or VC Circuits for the ADM-10G Card, page 17-40
- NTP-G75 Monitor Transponder and Muxponder Performance
- NTP-G333 Add an ADM-10G card to an Existing Topology, page 11-235

11.16 OTU2_XP Card

The OTU2_XP card is a single-slot card with four ports with XFP-based multirate (OC-192/STM-64, 10GE, 10G FC, IB_5G) Xponder for the ONS 15454 ANSI and ETSI platforms. The OTU2_XP card supports multiple configurations.

Table 11-26 describes the different configurations supported by the OTU2_XP card and the ports that must be used for these configurations.

Table 11-26 OTU2_XP Card Configurations and Ports

Configuration	Port 1	Port 2	Port 3	Port 4
2 x 10G transponder	Client port 1	Client port 2	Trunk port 1	Trunk port 2
2 x 10G standard regenerator (with enhanced FEC (E-FEC) only on one port)	Trunk port 1	Trunk port 2	Trunk port 1	Trunk port 2

Table 11-26 OTU2_XP Card Configurations and Ports (Continued)

Configuration	Port 1	Port 2	Port 3	Port 4
10 GE LAN Phy to WAN Phy	Client port	Client port in transponder or trunk port in regenerator configuration	Trunk port	Trunk port in transponder or regenerator configuration
1 x 10G E-FEC regenerator (with E-FEC on two ports)	Not used	Not used	Trunk port	Trunk port
1 x 10G splitter protected transponder	Client port	Not used	Trunk port (working)	Trunk port (protect)

All the four ports are ITU-T G.709 compliant and support 40 channels (wavelengths) at 100-GHz channel spacing in the C-band (that is, the 1530.33 nm to 1561.42 nm wavelength range).

The OTU2_XP card can be installed in Slots 1 through 6 or 12 through 17. The OTU2_XP card supports SONET SR1, IR2, and LR2 XFPs, 10GE BASE SR, SW, LR, LW, ER, EW, and ZR XFPs, and 10G FC MX-SN-I and SM-LL-L XFPs.

Caution Fan-tray assembly 15454E-CC-FTA (ETSI shelf)/15454-CC-FTA (ANSI shelf) must be installed in a shelf where the OTU2_XP card is installed.

11.16.1 Key Features

The OTU2_XP card has the following high-level features:

- 10G transponder, regenerator, and splitter protection capability on the ONS 15454 DWDM platform.
- Compatible with the ONS 15454 ANSI high-density shelf assembly, the ETSI ONS 15454 shelf assembly, and the ETSI ONS 15454 high-density shelf assembly. Compatible with TCC2/TCC2P/ TCC3/TNC/TNCE/TSC/TSCE cards.
- Interoperable with TXP_MR_10E and TXP_MR_10E_C cards.
- Four port, multirate (OC-192/STM-64, 10G Ethernet WAN Phy, 10G Ethernet LAN Phy, 10G Fibre Channel, IB_5G) client interface. The client signals are mapped into an ITU-T G.709 OTU2 signal using standard ITU-T G.709 multiplexing.
- ITU-T G.709 framing with standard Reed-Soloman (RS) (255,237) FEC. Performance monitoring and ITU-T G.709 Optical Data Unit (ODU) synchronous mapping. Enhanced FEC (E-FEC) with ITU-T G.709 ODU with greater than 8 dB coding gain.
- The trunk rate remains the same irrespective of the FEC configuration. The error coding performance can be provisioned as follows:
  - FEC—Standard ITU-T G.709.
  - E-FEC—Standard ITU-T G.975.1 I.7
- IEEE 802.3 frame format supported for 10 Gigabit Ethernet interfaces. The minimum frame size is 64 bytes. The maximum frame size is user-provisionable.

- Supports fixed/no fixed stuff mapping (insertion of stuffing bytes) for 10G Ethernet LAN Phy signals (only in transponder configuration).
- Supports 10G Ethernet LAN Phy to 10G Ethernet WAN Phy conversion on Ports 1 (client port) and 3 (trunk port).
- Supports 10G Ethernet LAN Phy to WAN Phy conversion using CTC and TL1. When enabled on the OTU2_XP card, the first Channel (Ports 1 and 3) supports LAN to WAN conversion. The second channel carries normal 10GE, 10G FC, and OC192/STM64 traffic.
- The LAN Phy to WAN Phy conversion functions in accordance to WAN Interface Sublayer (WIS) mechanism as defined by IEEE802.3ae (IEEE Std 802.3ae-2002, Amendment to CSMA/CD).
- Default configuration is transponder, with trunk ports configured as ITU-T G.709 standard FEC.
- In transponder or regenerator configuration, if one of the ports is configured the corresponding port is automatically created.
- In regenerator configuration, only Ports 3 and 4 can be configured as E-FEC. Ports 1 and 2 can be configured only with standard FEC.
- When port pair 1-3 or 2-4 is configured as regenerator (that is, card mode is standard regenerator), the default configuration on Ports 3 and 4 is automatically set to standard FEC.
- When Ports 3 and 4 are configured as regenerator (that is, card mode is E-FEC regenerator), the default configuration on both these ports is automatically set to E-FEC.
- In splitter protected transponder configuration, the trunk ports (Ports 3 and 4) are configured as ITU-T G.709 standard FECor E-FEC.
- Supports protection through Y-cable protection scheme.

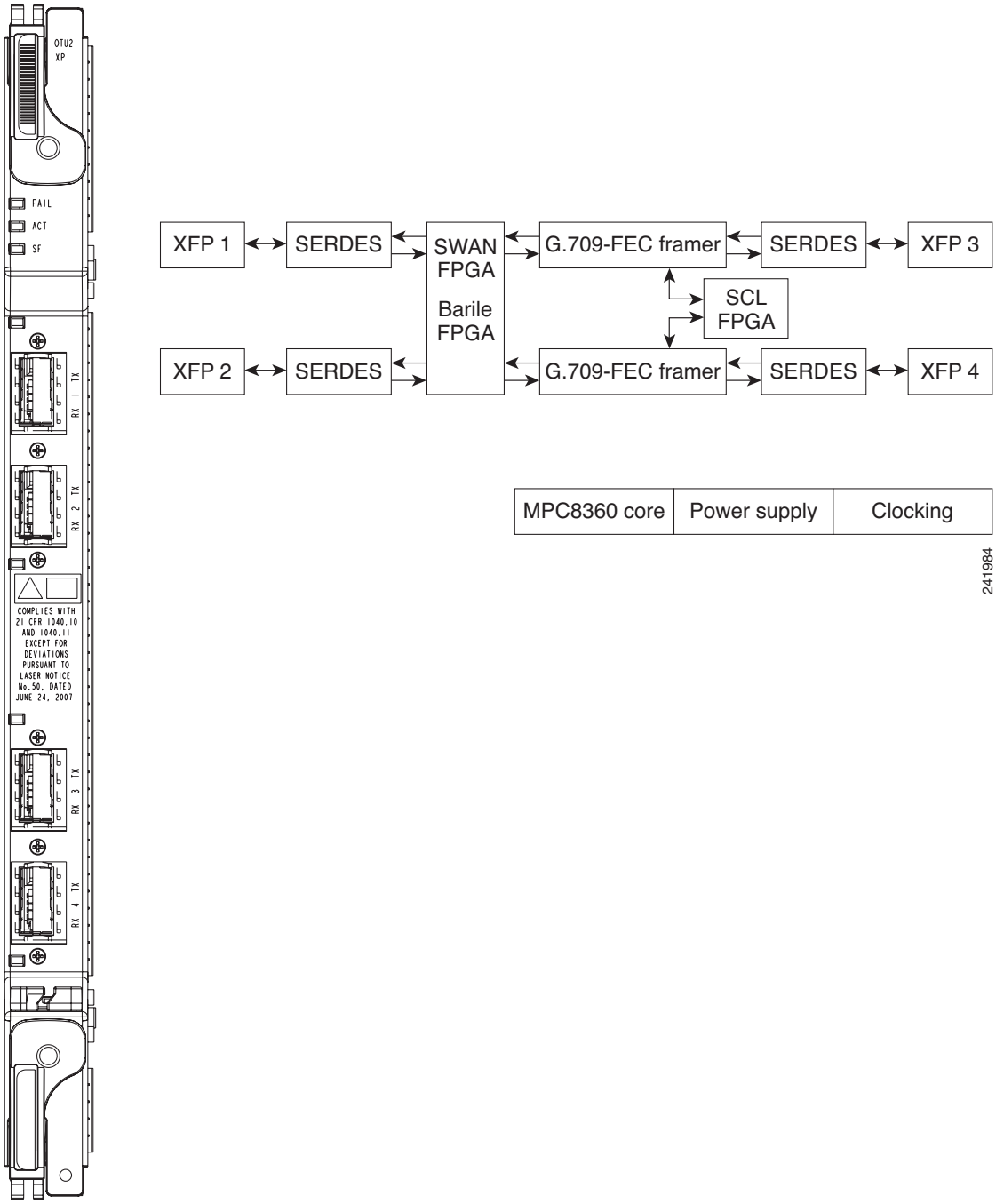
Note When enabled, the 10G Ethernet LAN Phy to WAN Phy conversion feature does not support Y-cable protection on the LAN to WAN interface (ports 1 and 3).

- Client ports support SONET SR1, IR2, and LR2 XFPs, 10GE BASE SR, SW, LR, LW, ER, EW, and ZR XFPs, and 10G FC MX-SN-I and SM-LL-L XFPs.
- Following are the OTU2 link rates that are supported on the OTU2_XP trunk port:
  - Standard G.709 (10.70923 Gbps) when the client is provisioned as “SONET” (including 10G Ethernet WAN PHY) (9.95328 Gbps).
  - G.709 overclocked to transport 10GE as defined by ITU-T G. Sup43 Clause 7.2 (11.0491 Gbps) when the client is provisioned as “10G Ethernet LAN Phy” (10.3125 Gbps) with “No Fixed Stuff” enabled.
  - G.709 overclocked to transport 10GE as defined by ITU-T G. Sup43 Clause 7.1 (11.0957 Gbps) when the client is provisioned as “10G Ethernet LAN Phy” (10.3125 Gbps) with “No Fixed Stuff” disabled.
  - G.709 proprietary overclocking mode to transport 10G FC (11.3168 Gbps) when the client is provisioned as “10G Fiber Channel” (10.518 Gbps).
  - Proprietary rate at the trunk when the client is provisioned as IB_5G.
- The MTU setting is used to display the ifInerrors and OverSizePkts counters on the receiving trunk and client port interfaces. Traffic of frame sizes up to 65535 bytes pass without any packet drops, from the client port to the trunk port and vice versa irrespective of the MTU setting.

11.16.2 Faceplate and Block Diagram

Figure 11-22 shows the OTU2_XP card faceplate and block diagram.

Figure 11-22 OTU2_XP Card Faceplate and Block Diagram



Note The Swan FPGA is automatically loaded when the LAN Phy to WAN Phy conversion feature is enabled on the OTU2_XP card. The Barile FPGA is automatically loaded when the LAN Phy to WAN Phy conversion feature is disabled on the OTU2_XP card.

11.16.3 OTU2_XP Card Interface

The OTU2_XP card is a multi-functional card that operates in different configurations, such as transponder, standard regenerator, E-FEC regenerator, and 10G Ethernet LAN Phy to WAN Phy conversion mode. The OTU2_XP card acts as a protected transponder, when the 10G Ethernet LAN Phy to WAN Phy is in splitter protected transponder configuration mode.

Depending on the configuration of the OTU2_XP card, the ports act as client or trunk ports (see Table 11-26). This following section describes the client and trunk rates supported on the OTU2_XP card for different card configurations:

11.16.3.1 Client Interface

In transponder and 10G Ethernet LAN Phy to WAN Phy card configurations, Ports 1 and 2 act as client ports and in splitter protected transponder configuration, Port 1 acts as a client port. For these card configurations, the client rates supported are:

- OC-192/STM-64
- 10G Ethernet WAN Phy
- 10G Ethernet LAN Phy
- 10G Fibre Channel
- IB_5G

11.16.3.2 Trunk Interface

In transponder, 10G Ethernet LAN Phy to WAN Phy, and splitter protected transponder card configurations, Ports 3 and 4 act as trunk ports. For these card configurations, the trunk rates supported are:

- OC-192/STM-64
- 10G Ethernet WAN Phy
- 10G Ethernet LAN Phy
- 10G Fibre Channel
- OTU2 with ITU-T G.709 for OC-192 client interface
- OTU2e with ITU-T G.709 for 10G Ethernet LAN Phy client interface
- Proprietary rate at the trunk when the client is provisioned as IB_5G.

In standard regenerator card configuration, all four ports act as trunk ports and in E-FEC regenerator configuration, Ports 3 and 4 act as the trunk ports. For these card configurations, the trunk rate supported is OTU2 G.709

Note The above mentioned OTU2 signal must be an OC-192/STM-64, 10G Ethernet WAN Phy, 10G Ethernet LAN Phy, or 10G Fibre Channel signal packaged into an OTU2 G.709 frame. Additionally, the standard regenerator and E-FEC regenerator configuration supports an OTU2 signal that is OTU2 has been generated by multiplexing four ODU1 signals.

11.16.4 Configuration Management

The OTU2_XP card supports the following configuration management parameters:

- Card Configuration—Provisionable card configuration: Transponder, Standard Regen, Enhanced FEC, or Mixed, or 10G Ethernet LAN Phy to WAN Phy.
- Port Mode—Provisionable port mode when the card configuration is set as Mixed. The port mode can be chosen as either Transponder or Standard Regen for each port pair (1-3 and 2-4). For card configurations other than Mixed, CTC automatically sets the port mode depending on the selected card configuration. For 10G Ethernet LAN Phy to WAN Phy mode, CTC automatically selects the port pair (1-3) as 10G Ethernet LAN Phy to WAN Phy. Port pair (2-4) in 10G Ethernet LAN Phy to WAN Phy mode is selected as Transponder or Standard Regen.
- Termination Mode—Provisionable termination mode when the card configuration is set as either Transponder or Mixed. The termination mode can be chosen as Transparent, Section, or Line. For Standard Regen and Enhanced FEC card configurations, CTC automatically sets the termination mode as Transparent. For 10G Ethernet LAN Phy to WAN Phy mode, CTC automatically selects the Termination Mode of port pair (1-3) as Line. You cannot provision the Termination Mode parameter.
- AIS/Squelch—Provisionable AIS/Squelch mode configuration when the card configuration is set as either Transponder, Mixed, or Standard Regen. The AIS/Squelch mode configuration can be chosen as AIS or Squelch. For Enhanced FEC card configuration, CTC automatically sets the AIS/Squelch mode configuration as AIS. For 10G Ethernet LAN Phy to WAN Phy mode, the CTC automatically selects the AIS/Squelch of port pair (1-3) as Squelch. You cannot provision the AIS/Squelch parameter.

Note When AIS/Squelch is enabled in Standard Regen configuration with port pairs (1-3) and (2-4), Squelch is supported on ports 1 and 2 and AIS on ports 3 and 4.

Note When you choose the 10G Ethernet LAN Phy to WAN Phy conversion, the Termination mode is automatically set to LINE. The AIS/Squelch is set to SQUELCH and ODU Transparency is set to Cisco Extended Use for Ports 1 and 3.

- Regen Line Name—User-assigned text string for regeneration line name.
- ODU Transparency—Provisionable ODU overhead byte configuration, either Transparent Standard Use or Cisco Extended Use. See the "11.16.7 ODU Transparency" section on page 11-104 for more detailed information. For 10G Ethernet LAN Phy to WAN Phy mode, CTC automatically selects the ODU Transparency as Cisco Extended Use. You cannot provision the ODU Transparency parameter.
- Port name—User-assigned text string.
- Admin State/Service State—Administrative and service states to manage and view port status.
- ALS Mode—Provisionable ALS function.

- Reach—Provisionable optical reach distance of the port.
- Wavelength—Provisionable wavelength of the port.
- AINS Soak—Provisionable automatic in-service soak period.

11.16.5 OTU2_XP Card Configuration Rules

The following rules apply to OTU2_XP card configurations:

- When you preprovision the card, port pairs 1-3 and 2-4 come up in the default Transponder configuration.
- The port pairs 1-3 and 2-4 can be configured in different modes only when the card configuration is Mixed. If the card configuration is Mixed, you must choose different modes on port pairs 1-3 and 2-4 (that is, one port pair in Transponder mode and the other port pair in Standard Regen mode).
- If the card is in Transponder configuration, you can change the configuration to Standard Regen or Enhanced FEC.
- If the card is in Standard Regen configuration and you have configured only one port pair, then configuring payload rates for the other port pair automatically changes the card configuration to Mixed, with the new port pair in Transponder mode.
- If the card is in Standard Regen configuration, you cannot directly change the configuration to Enhanced FEC. You have to change to Transponder configuration and then configure the card as Enhanced FEC.
- If the card is in Enhanced FEC configuration, Ports 1 and 2 are disabled. Hence, you cannot directly change the configuration to Standard Regen or Mixed. You must remove the Enhanced FEC group by moving the card to Transponder configuration, provision PPM on Ports 1 and 2, and then change the card configuration to Standard Regen or Mixed.
- If the card is in Standard Regen or Enhanced FEC configuration, you cannot change the payload rate of the port pairs. You have to change the configuration to Transponder, change the payload rate, and then move the card configuration back to Standard Regen or Enhanced FEC.
- If any of the affected ports are in IS (ANSI) or Unlocked-enabled (ETSI) state, you cannot change the card configuration.
- If IB_5G payload has to be provisioned, the NE Default should match the values listed in the Table 11-27. For more information on editing the NE Default values, see the "NTP-G135 Edit Network Element Defaults" task on page 24-23.

Table 11-27 OTU2_XP Card Configuration for IB_5G Payload Provisioning

Parameter	NE Default Name	Value
FEC	OTU2-XP.otn.otnLines.FEC	Standard
ITU-T G.709 OTN	OTU2-XP.otn.otnLines.G709OTN	Enable
Termination Mode	OTU2-XP.config.port.TerminationMode	Transparent
ODU Transparency	OTU2-XP.config.port.OduTransparency	Cisco Extended Use
AIS/Squelch	OTU2-XP.config.port.AisSquelchMode	Squelch

- If the card is changed to 10G Ethernet LAN Phy to WAN Phy, the first PPM port is deleted and replaced by a 10G Ethernet port; the third PPM port is deleted and automatically replaced with OC192/STM64 (SONET/SDH) port. The third PPM port is automatically deleted and the third PPM port is replaced with OC192/STM64 (SONET/SDH).

Table 11-28 provides a summary of transitions allowed for the OTU2_XP card configurations.

Table 11-28 Card Configuration Transition Summary

	Transition To				
Card Configuration	**Transponder**	**Standard Regen**	**Enhanced FEC**	**Mixed**	**10G Ethernet LAN Phy to WAN Phy**
Transponder	—	Yes	Yes	Yes	Yes
Standard Regen	Yes	—	No	Yes	Yes
Enhanced FEC	Yes	No	—	No	No
Mixed	Yes	Yes	No	—	Yes
10G Ethernet LAN Phy to WAN Phy	Yes	Yes	No	The 10G Ethernet LAN Phy to WAN Phy to Mixed is supported if the Port pair 1-3 is chosen as Transponder. The 10G Ethernet LAN Phy to WAN Phy to Mixed is not supported if the Port pair 1-3 is chosen as Standard Regen.	—

11.16.6 Security

The OTU2_XP card, when an XFP is plugged into it, implements the Cisco Standard Security Code Check Algorithm that keys on vendor ID and serial number.

If a PPM is plugged into a port on the card but fails the security code check because it is not a Cisco PPM, a NON-CISCO-PPM Not Reported (NR) condition occurs.

If a PPM with a non-qualified product ID is plugged into a port on this card, that is, the PPM passes the security code as a Cisco PPM but it has not been qualified for use on the OTU2_XP card, a UNQUAL-PPM NR condition occurs.

11.16.7 ODU Transparency

A key feature of the OTU2_XP card is the ability to configure the ODU overhead bytes (EXP bytes and RES bytes 1 and 2) using the ODU Transparency parameter. The two options available for this parameter are:

- Transparent Standard Use—ODU overhead bytes are transparently passed through the card. This option allows the OTU2_XP card to act transparently between two trunk ports (when the card is configured in Standard Regen or Enhanced FEC).
- Cisco Extended Use—ODU overhead bytes are terminated and regenerated on both ports of the regenerator group.

The ODU Transparency parameter is configurable only for Standard Regen and Enhanced FEC card configuration. For Transponder card configuration, this parameter defaults to Cisco Extended Use and cannot be changed.

Note The Forward Error Correction (FEC) Mismatch (FEC-MISM) alarm will not be raised on OTU2_XP card when you choose Transparent Standard Use.

11.16.8 OTU2_XP Functions

The functions of the OTU2_XP card are:

- G.2 Automatic Laser Shutdown, page G-6
- G.35.1 Y-Cable and Splitter Protection, page G-26
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-11 on page G-12

11.16.9 Related Procedures for OTU2_XP Card

The following is the list of procedures and tasks related to the configuration of the OTU2_XP card:

- NTP-G197 Provision the OTU2_XP Card Line Settings, PM Parameters, and Thresholds, page 11-401
- NTP-G33 Create a Y-Cable Protection Group, page 11-138
- NTP-G199 Create a Splitter Protection Group for the OTU2_XP Card, page 11-142
- NTP-G75 Monitor Transponder and Muxponder Performance

11.17 TXP_MR_10EX_C Card

The TXP_MR_10EX_C card is a multirate transponder for the ONS 15454 platform. The card is fully backward compatible with TXP_MR_10E_C cards (only when the error decorrelator is disabled in the CTC on the TXP_MR_10EX_C card). It processes one 10-Gbps signal (client side) into one 10-Gbps, 100-GHz DWDM signal (trunk side). The TXP_MR_10EX_C card is tunable over the 82 channels of C-band (82 channels spaced at 50 GHz on the ITU grid).

You can install TXP_MR_10EX_C card in Slots 1 to 6 and 12 to 17. The card can be provisioned in linear, BLSR/MS-SPRing, path protection/SNCP configurations or as a regenerator. The card can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the card is configured for transparent termination mode. The TXP_MR_10EX_C card features an MLSE-based Universal Transponder 1550-nm tunable laser and a separately orderable ONS-XC-10G-S1 1310-nm or ONS-XC-10G-L2 1550-nm laser XFP module for the client port.

Note The PRE FEC BER performance of the TXP_MR_10EX_C card may be significantly low when compared to the TXP_MR_10E card. However, this does not affect the Post FEC BER performance, but could possibly affect any specific monitoring application that relies on the PRE FEC BER value (for example, protection switching). In this case, the replacement of TXP_MR_10E card with the TXP_MR_10EX_C may not work properly.

Note When the ONS-XC-10G-L2 XFP is installed, the TXP_MR_10EX_C card must be installed in a high-speed slot (slot 6, 7, 12, or 13)

On its faceplate, the TXP_MR_10EX_C card contains two transmit and receive connector pairs, one for the trunk port and one for the client port. Each connector pair is labeled.

11.17.1 Key Features

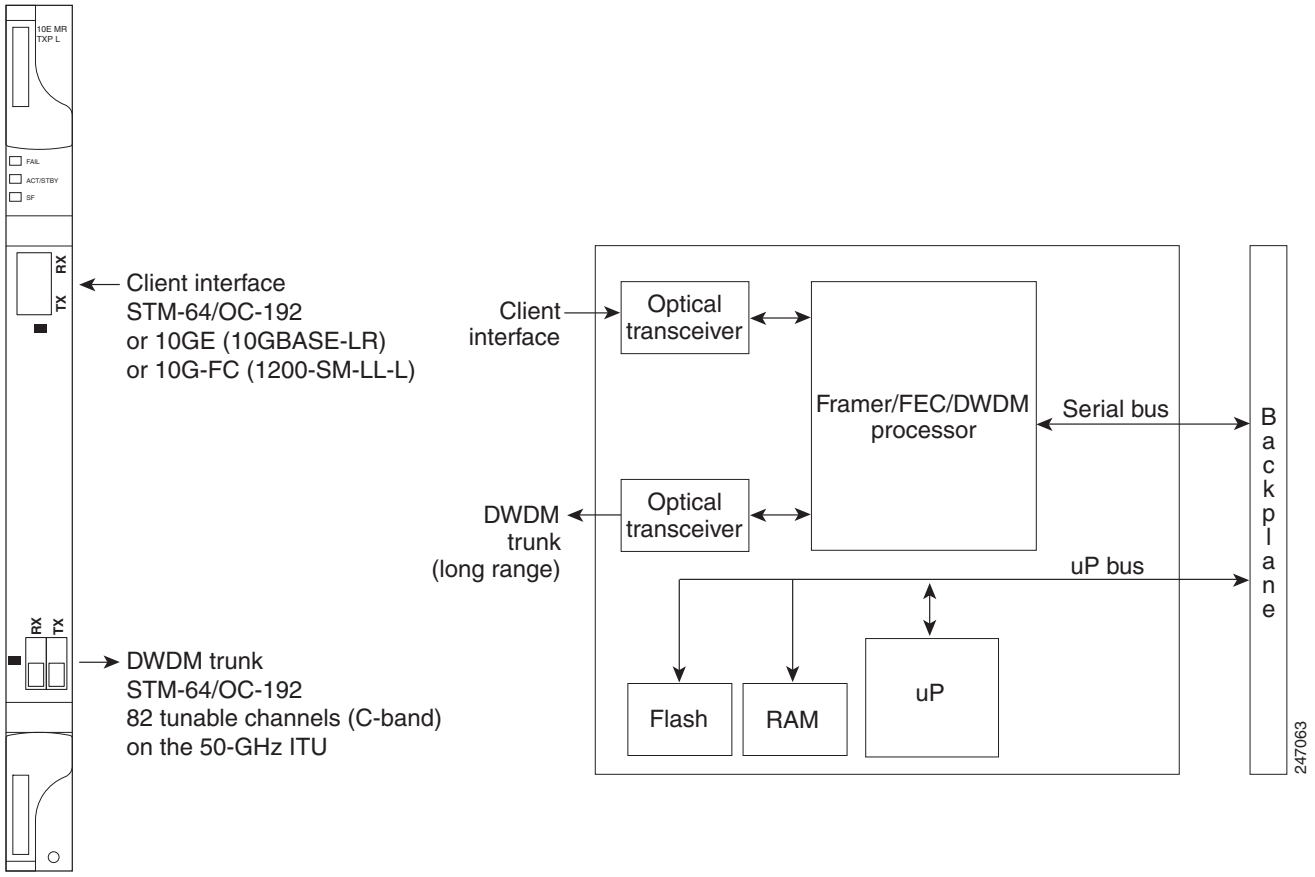
The key features of the TXP_MR_10EX_C card are:

- A multi-rate client interface (available through the ONS-XC-10G-S1 XFP, ordered separately):
  - OC-192 (SR1)
  - 10GE (10GBASE-LR)
  - 10G-FC (1200-SM-LL-L)
  - (ONS-XC-10G-S1 version 3 only) IB_5G
- An MLSE-based UT module tunable through 82 channels of C-band. The channels are spaced at 50 GHz on the ITU grid.
- OC-192 to ITU-T G.709 OTU2 provisionable synchronous and asynchronous mapping.
- Proprietary rate at the trunk when the client is provisioned as IB_5G.
- The MTU setting is used to display the OverSizePkts counters on the receiving trunk and client port interfaces. Traffic of frame sizes up to 65535 bytes pass without any packet drops, from the client port to the trunk port and vice versa irrespective of the MTU setting.

11.17.2 Faceplate and Block Diagram

Figure 11-23 shows the TXP_MR_10EX_C faceplate and block diagram.

Figure 11-23 TXP_MR_10EX_C Faceplate and Block Diagram



For information about safety labels for the card, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Caution You must use a 15-dB fiber attenuator (10 to 20 dB) when working with the TXP_MR_10EX_C card in a loopback on the trunk port. Do not use direct fiber loopbacks with this card, because they can cause irreparable damage to the card.

11.17.3 TXP_MR_10EX_C Functions

The functions of the TXP_MR_10EX_C card are:

- G.5 Client Interface, page G-14
- G.7 DWDM Trunk Interface, page G-15
- G.8 Enhanced FEC (E-FEC) Feature, page G-15
- G.9 FEC and E-FEC Modes, page G-16
- G.10 Client-to-Trunk Mapping, page G-16
- G.2 Automatic Laser Shutdown, page G-6

- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10.

11.17.4 Related Procedures for TXP_MR_10EX_C Card

The following is the list of procedures and tasks related to the configuration of the TXP_MR_10EX_C card:

- NTP-G96 Provision the 10G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds, page 11-166
- NTP-G75 Monitor Transponder and Muxponder Performance

11.18 MXP_2.5G_10EX_C card

The MXP_2.5G_10EX_C card is a DWDM muxponder for the ONS 15454 platform that supports transparent termination mode on the client side. The faceplate designation of the card is "4x2.5G 10EX MXP." The card multiplexes four 2.5-Gbps client signals (4xOC48/STM-16 SFP) into a single 10-Gbps DWDM optical signal on the trunk side. The card provides wavelength transmission service for the four incoming 2.5-Gbps client interfaces. The MXP_2.5G_10EX_C muxponder passes all SONET/SDH overhead bytes transparently.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up GCCs for data communications, enable FEC, or facilitate PM.

The MXP_2.5G_10EX_C card works with OTN devices defined in ITU-T G.709. The card supports ODU1 to OTU2 multiplexing, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope. See the "G.12 Multiplexing Function" section on page G-17.

The MXP_2.5G_10EX_C card is not compatible with the MXP_2.5G_10G card, which does not support transparent termination mode.

You can install the MXP_2.5G_10EX_C card in slots 1 to 6 and 12 to 17. You can provision a card in a linear configuration, a BLSR/MS-SPRing, a path protection/SNCP, or a regenerator. The card can be used in the middle of BLSR/MS-SPRing or 1+1 spans when the card is configured for transparent termination mode.

The MXP_2.5G_10EX_C card features a tunable 1550-nm C-band laser on the trunk port. The laser is tunable across 82 wavelengths on the ITU grid with 50-GHz spacing between wavelengths. The card features four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The card uses dual LC connectors on the trunk side and SFP modules on the client side for optical cable termination. The SFP pluggable modules are SR or IR and support an LC fiber connector.

Note When you create a 4xOC-48 OCHCC circuit, you need to select the G.709 and Synchronous options. A 4xOC-48 OCHCC circuit is supported by G.709 and synchronous mode, which are necessary to provision the 4xOC-48 OCHCC circuit.

11.18.1 Key Features

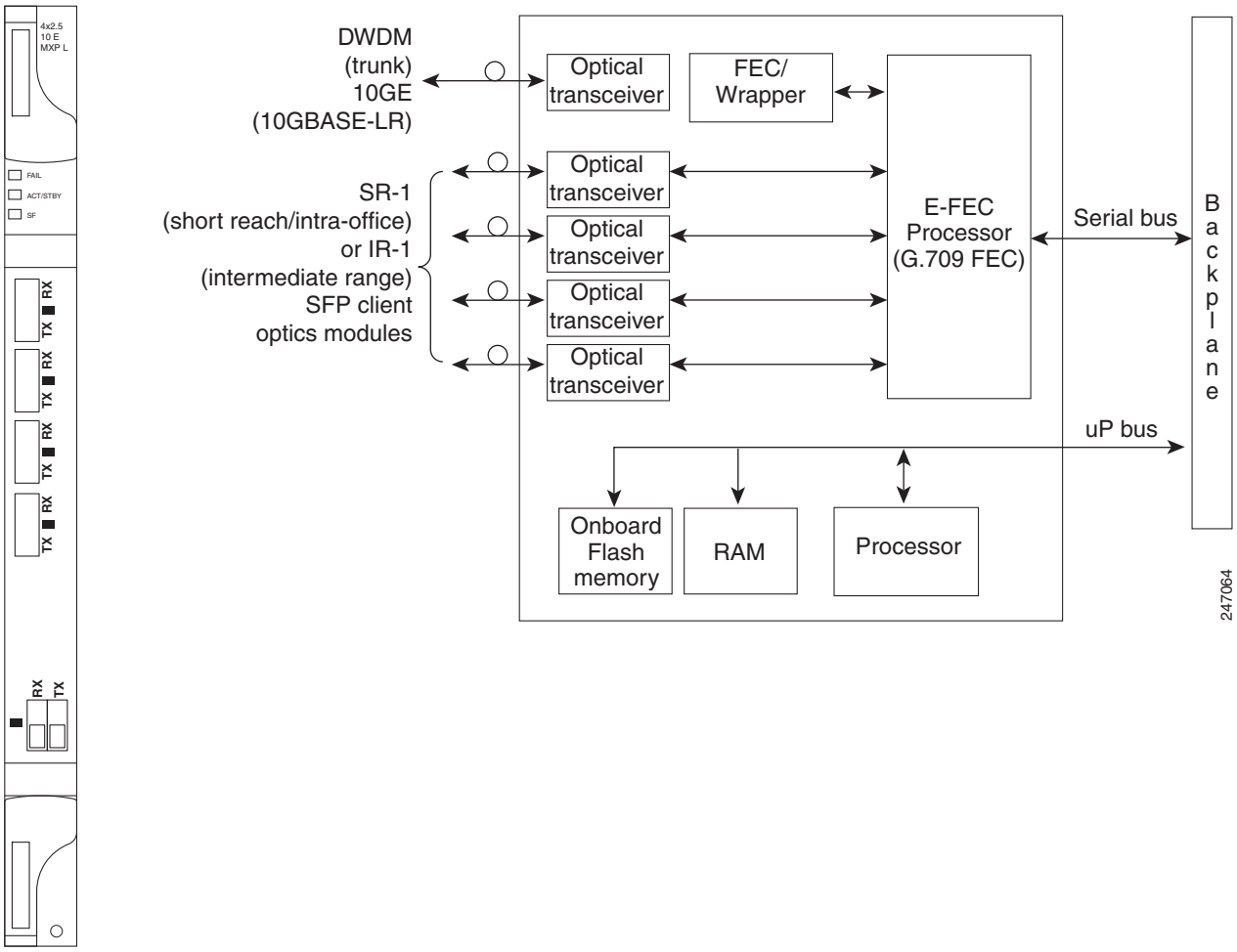
The MXP_2.5G_10EX_C card has the following high-level features:

- Four 2.5-Gbps client interfaces (OC-48/STM-16) and one 10-Gbps trunk. The four OC-48 signals are mapped into an ITU-T G.709 OTU2 signal using standard ITU-T G.709 multiplexing.
- Onboard E-FEC processor: The processor supports both standard RS (specified in ITU-T G.709) and E-FEC, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces. The E-FEC functionality increases the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (237,255) correction algorithm.
- Pluggable client-interface optic modules: The MXP_2.5G_10EX_C card has modular interfaces. Two types of optic modules can be plugged into the card. These modules include an OC-48/STM-16 SR-1 interface with a 7-km (4.3-mile) nominal range (for short range and intra-office applications) and an IR-1 interface with a range of up to 40 km (24.9 miles). SR-1 is defined in Telcordia GR-253-CORE and in I-16 (ITU-T G.957). IR-1 is defined in Telcordia GR-253-CORE and in S-16-1 (ITU-T G.957).
- High-level provisioning support: The card is initially provisioned using Cisco TransportPlanner software. Subsequently, the card can be monitored and provisioned using CTC software.
- Link monitoring and management: The card uses standard OC-48 OH (overhead) bytes to monitor and manage incoming interfaces. The card passes the incoming SDH/SONET data stream and its overhead bytes transparently.
- Control of layered SONET/SDH transport overhead: The card is provisionable to terminate regenerator section overhead, which eliminates forwarding of unneeded layer overhead. It can help reduce the number of alarms and help isolate faults in the network.
- Automatic timing source synchronization: The MXP_2.5G_10EX_C card normally synchronizes from the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE card. If for some reason, such as maintenance or upgrade activity, the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE is not available, the card automatically synchronize to one of the input client-interface clocks.
- Configurable squelching policy: The card can be configured to squelch the client interface output if LOS occurs at the DWDM receiver or if a remote fault occurs. In the event of a remote fault, the card manages MS-AIS insertion.
- The card is tunable across the full C-band, thus eliminating the need to use different versions of each card to provide tunability across specific wavelengths in a band.

11.18.2 Faceplate and Block Diagram

Figure 11-24 shows the MXP_2.5G_10EX_C faceplate and block diagram.

Figure 11-24 MXP_2.5G_10EX_C Faceplate and Block Diagram



For information about safety labels for the card, see the "G.1.1 Class 1 Laser Product Cards" section on page G-1.

11.18.3 MXP_2.5G_10EX_C Functions

The functions of the MXP_2.5G_10EX_C card are:

- G.5 Client Interface, page G-14
- G.6 DWDM Interface, page G-14
- G.8 Enhanced FEC (E-FEC) Feature, page G-15
- G.9 FEC and E-FEC Modes, page G-16
- G.12 Multiplexing Function, page G-17
- G.11 Timing Synchronization, page G-16
- G.13 SONET/SDH Overhead Byte Processing, page G-18
- G.13 SONET/SDH Overhead Byte Processing, page G-18
- G.14 Client Interface Monitoring, page G-18

- G.2 Automatic Laser Shutdown, page G-6
- G.15 Jitter, page G-18
- G.16 Lamp Test, page G-18
- G.17 Onboard Traffic Generation, page G-18
- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-6 on page G-10

11.18.3.1 Wavelength Identification

The card uses trunk lasers that are wavelocked, which allows the trunk transmitter to operate on the ITU grid effectively. The MXP_2.5G_10EX_C card implements the MLSE-based UT module. The MXP_2.5G_10EX_C card uses a C-band version of the UT2.

Table 11-29 describes the required trunk transmit laser wavelengths for the MXP_2.5G_10EX_C card. The laser is tunable over 82 wavelengths in the C-band at 50-GHz spacing on the ITU grid.

Table 11-29 MXP_2.5G_10EX_C Trunk Wavelengths

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	196.00	1529.55	42	193.95	1545.72
2	195.95	1529.94	43	193.90	1546.119
3	195.90	1530.334	44	193.85	1546.518
4	195.85	1530.725	45	193.80	1546.917
5	195.80	1531.116	46	193.75	1547.316
6	195.75	1531.507	47	193.70	1547.715
7	195.70	1531.898	48	193.65	1548.115
8	195.65	1532.290	49	193.60	1548.515
9	195.60	1532.681	50	193.55	1548.915
10	195.55	1533.073	51	193.50	1549.32
11	195.50	1533.47	52	193.45	1549.71
12	195.45	1533.86	53	193.40	1550.116
13	195.40	1534.250	54	193.35	1550.517
14	195.35	1534.643	55	193.30	1550.918
15	195.30	1535.036	56	193.25	1551.319
16	195.25	1535.429	57	193.20	1551.721
17	195.20	1535.822	58	193.15	1552.122
18	195.15	1536.216	59	193.10	1552.524
19	195.10	1536.609	60	193.05	1552.926
20	195.05	1537.003	61	193.00	1553.33
21	195.00	1537.40	62	192.95	1553.73
22	194.95	1537.79	63	192.90	1554.134

Table 11-29 MXP_2.5G_10EX_C Trunk Wavelengths (Continued)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
23	194.90	1538.186	64	192.85	1554.537
24	194.85	1538.581	65	192.80	1554.940
25	194.80	1538.976	66	192.75	1555.343
26	194.75	1539.371	67	192.70	1555.747
27	194.70	1539.766	68	192.65	1556.151
28	194.65	1540.162	69	192.60	1556.555
29	194.60	1540.557	70	192.55	1556.959
30	194.55	1540.953	71	192.50	1557.36
31	194.50	1541.35	72	192.45	1557.77
32	194.45	1541.75	73	192.40	1558.173
33	194.40	1542.142	74	192.35	1558.578
34	194.35	1542.539	75	192.30	1558.983
35	194.30	1542.936	76	192.25	1559.389
36	194.25	1543.333	77	192.20	1559.794
37	194.20	1543.730	78	192.15	1560.200
38	194.15	1544.128	79	192.10	1560.606
39	194.10	1544.526	80	192.05	1561.013
40	194.05	1544.924	81	192.00	1561.42
41	194.00	1545.32	82	191.95	1561.83

11.18.4 Related Procedures for MXP_2.5G_10EX_C Card

The following is the list of procedures and tasks related to the configuration of the MXP_2.5G_10EX_C card:

- NTP-G97 Modify the 4x2.5G Muxponder Card Line Settings and PM Parameter Thresholds, page 11-236
- NTP-G75 Monitor Transponder and Muxponder Performance

11.19 MXP_MR_10DMEX_C Card

The MXP_MR_10DMEX_C card aggregates a mix of client SAN service-client inputs (GE, FICON, and Fibre Channel) into one 10-Gbps STM-64/OC-192 DWDM signal on the trunk side. It provides one long-reach STM-64/OC-192 port per card and is compliant with Telcordia GR-253-CORE and ITU-T G.957.

The card supports aggregation of the following signal types:

- 1-Gigabit Fibre Channel
- 2-Gigabit Fibre Channel

- 4-Gigabit Fibre Channel
- 1-Gigabit Ethernet
- 1-Gigabit ISC-Compatible (ISC-1)
- 2-Gigabit ISC-Peer (ISC-3)

Caution The card can be damaged by dropping it. Handle it carefully.

The MXP_MR_10DMEX_C muxponder passes all SONET/SDH overhead bytes transparently.

The digital wrapper function (ITU-T G.709 compliant) formats the DWDM wavelength so that it can be used to set up GCCs for data communications, enable FEC, or facilitate PM. The MXP_MR_10DMEX_C card works with the OTN devices defined in ITU-T G.709. The card supports ODU1 to OTU2 multiplexing, an industry standard method for asynchronously mapping a SONET/SDH payload into a digitally wrapped envelope. See the "G.12 Multiplexing Function" section on page G-17.

Note You cannot disable ITU-T G.709 on the trunk side. If ITU-T G.709 is enabled, then FEC cannot be disabled.

Note Because the client payload cannot oversubscribe the trunk, a mix of client signals can be accepted, up to a maximum limit of 10 Gbps.

You can install the MXP_MR_10DMEX_C card in slots 1 to 6 and 12 to 17.

Note The MXP_MR_10DMEX_C card is not compatible with the MXP_2.5G_10G card, which does not support transparent termination mode.

The MXP_MR_10DMEX_C card features a tunable 1550-nm C-band laser on the trunk port. The laser is tunable across 82 wavelengths on the ITU grid with 50-GHz spacing between wavelengths. Each card features four 1310-nm lasers on the client ports and contains five transmit and receive connector pairs (labeled) on the card faceplate. The card uses dual LC connectors on the trunk side and SFP modules on the client side for optical cable termination. The SFP pluggable modules are SR or IR and support an LC fiber connector.

Table 11-30 shows the input data rate for each client interface, and the encapsulation method. The current version of the GFP-T G.7041 supports transparent mapping of 8B/10B block-coded protocols, including Gigabit Ethernet, Fibre Channel, ISC, and FICON.

In addition to the GFP mapping, 1-Gbps traffic on Port 1 or 2 of the high-speed SERDES is mapped to an STS-24c channel. If two 1-Gbps client signals are present at Port 1 and Port 2 of the high-speed SERDES, the Port 1 signal is mapped into the first STS-24c channel and the Port 2 signal into the second STS-24c channel. The two channels are then mapped into an OC-48 trunk channel.

Table 11-30 MXP_MR_10DMEX_C Client Interface Data Rates and Encapsulation

Client Interface	Input Data Rate	GFP-T G.7041 Encapsulation
2G FC	2.125 Gbps	Yes
1G FC	1.06 Gbps	Yes

Table 11-30 MXP_MR_10DMEX_C Client Interface Data Rates and Encapsulation (Continued)

Client Interface	Input Data Rate	GFP-T G.7041 Encapsulation
2G FICON/2G ISC-Compatible (ISC-1)/ 2G ISC-Peer (ISC-3)	2.125 Gbps	Yes
1G FICON/1G ISC-Compatible (ISC-1)/ 1G ISC-Peer (ISC-3)	1.06 Gbps	Yes
Gigabit Ethernet	1.25 Gbps	Yes

The MXP_MR_10DMEX_C card includes two FPGAs, and a group of four ports is mapped to each FPGA. Group 1 consists of Ports 1 through 4, and Group 2 consists of Ports 5 through 8. Table 11-31 shows some of the mix and match possibilities on the various client data rates for Ports 1 through 4, and Ports 5 through 8. An X indicates that the data rate is supported in that port.

Table 11-31 Supported Client Data Rates for Ports 1 through 4 and Ports 5 through 8

Port (Group 1)	Port (Group 2)	Gigabit Ethernet	1G FC	2G FC	4G FC
1	5	X	X	X	X
2	6	X	X	—	—
3	7	X	X	X	—
4	8	X	X	—	—

GFP-T PM is available through RMON and trunk PM is managed according to Telcordia GR-253-CORE and ITU G.783/826. Client PM is achieved through RMON for FC and GE.

A buffer-to-buffer credit management scheme provides FC flow control. With this feature enabled, a port indicates the number of frames that can be sent to it (its buffer credit), before the sender is required to stop transmitting and wait for the receipt of a “ready” indication. The MXP_MR_10DMEX_C card supports FC credit-based flow control with a buffer-to-buffer credit extension of up to 1600 km (994.1 miles) for 1G FC, up to 800 km (497.1 miles) for 2G FC, or up to 400 km (248.5 miles) for 4G FC. The feature can be enabled or disabled.

The MXP_MR_10DMEX_C card features a 1550-nm laser for the trunk/line port and a 1310-nm or 850-nm laser (depending on the SFP) for the client ports. The card contains eight 12.5-degree downward-tilt SFP modules for the client interfaces. For optical termination, each SFP uses two LC connectors, which are labeled TX and RX on the faceplate. The trunk port is a dual-LC connector with a 45-degree downward angle.

11.19.1 Key Features

The MXP_MR_10DMEX_C card has the following high-level features:

- Onboard E-FEC processor: The processor supports both standard RS (specified in ITU-T G.709) and E-FEC, which allows an improved gain on trunk interfaces with a resultant extension of the transmission range on these interfaces. The E-FEC functionality increases the correction capability of the transponder to improve performance, allowing operation at a lower OSNR compared to the standard RS (237,255) correction algorithm.

- Pluggable client-interface optic modules: The MXP_MR_10DMEX_C card has modular interfaces. Two types of optics modules can be plugged into the card. These modules include an OC-48/STM-16 SR-1 interface with a 7-km (4.3-mile) nominal range (for short range and intra-office applications) and an IR-1 interface with a range of up to 40 km (24.9 miles). SR-1 is defined in Telcordia GR-253-CORE and in I-16 (ITU-T G.957). IR-1 is defined in Telcordia GR-253-CORE and in S-16-1 (ITU-T G.957).
- Y-cable protection: The card supports Y-cable protection between the same card type only, on ports with the same port number and signal rate. See the "G.35.1.1 Y-Cable Protection" section on page G-26 for more detailed information.
- High-level provisioning support: The card is initially provisioned using Cisco TransportPlanner software. Subsequently, the card can be monitored and provisioned using CTC software.
- ALS: This safety mechanism is used in the event of a fiber cut. For details regarding ALS provisioning for the MXP_MR_10DMEX_C card, see the "NTP-G162 Change the ALS Maintenance Settings" section on page 11-423.
- Link monitoring and management: The card uses standard OC-48 OH (overhead) bytes to monitor and manage incoming interfaces. The card passes the incoming SDH/SONET data stream and its OH (overhead) bytes transparently.
- Control of layered SONET/SDH transport overhead: The card is provisionable to terminate regenerator section overhead, which eliminates forwarding of unneeded layer overhead. It can help reduce the number of alarms and help isolate faults in the network.
- Automatic timing source synchronization: The MXP_MR_10DMEX_C card normally synchronizes from the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE card. If for some reason, such as maintenance or upgrade activity, the TCC2/TCC2P/TCC3/TNC/TNCE/TSC/TSCE is not available, the card automatically synchronizes to one of the input client-interface clocks.

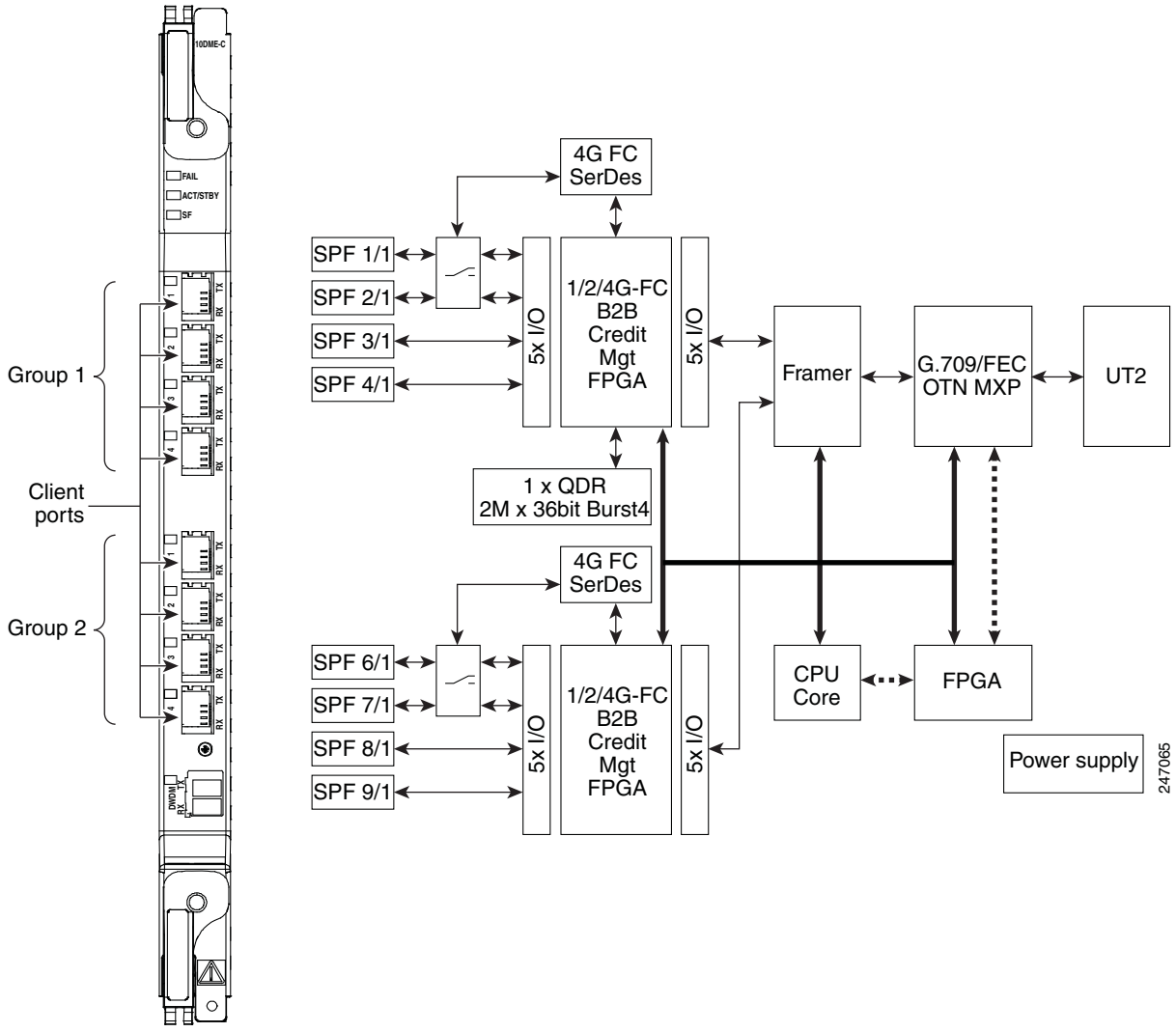
Note MXP_MR_10DMEX_C card cannot be used for line timing.

- Configurable squelching policy: The card can be configured to squelch the client-interface output if LOS occurs at the DWDM receiver or if a remote fault occurs. In the event of a remote fault, the card manages MS-AIS insertion.
- The card is tunable across the full C-band, thus eliminating the need to use different versions of each card to provide tunability across specific wavelengths in a band.
- You can provision a string (port name) for each fiber channel/FICON interface on the MXP_MR_10DMEX_C card, which allows the MDS Fabric Manager to create a link association between that SAN port and a SAN port on a Cisco MDS 9000 switch.

11.19.2 Faceplate and Block Diagram

Figure 11-25 shows the MXP_MR_10DMEX_C faceplate and block diagram.

Figure 11-25 MXP_MR_10DMEX_C Faceplate and Block Diagram



For information about safety labels for the card, see the "G.1.2 Class 1M Laser Product Cards" section on page G-4.

Caution You must use a 20-dB fiber attenuator (15 to 25 dB) when working with the card in a loopback on the trunk port. Do not use direct fiber loopbacks with the card, because they can cause irreparable damage to the MXP_MR_10DMEX_C card.

11.19.3 MXP_MR_10DMEX_C Functions

The functions of the MXP_MR_10DMEX_C card are:

- Card level indicators—Table G-1 on page G-7
- Port level indicators—Table G-9 on page G-11

11.19.3.1 Wavelength Identification

The card uses trunk lasers that are wavelocked, which allows the trunk transmitter to operate on the ITU grid effectively. The MXP_MR_10DMEX_C card uses a C-band version of the MLSE-based UT module.

Table 11-32 describes the required trunk transmit laser wavelengths for the MXP_MR_10DMEX_C card. The laser is tunable over 82 wavelengths in the C-band at 50-GHz spacing on the ITU grid.

Table 11-32 MXP_MR_10DMEX_C Trunk Wavelengths

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
1	196.00	1529.55	42	193.95	1545.72
2	195.95	1529.94	43	193.90	1546.119
3	195.90	1530.334	44	193.85	1546.518
4	195.85	1530.725	45	193.80	1546.917
5	195.80	1531.116	46	193.75	1547.316
6	195.75	1531.507	47	193.70	1547.715
7	195.70	1531.898	48	193.65	1548.115
8	195.65	1532.290	49	193.60	1548.515
9	195.60	1532.681	50	193.55	1548.915
10	195.55	1533.073	51	193.50	1549.32
11	195.50	1533.47	52	193.45	1549.71
12	195.45	1533.86	53	193.40	1550.116
13	195.40	1534.250	54	193.35	1550.517
14	195.35	1534.643	55	193.30	1550.918
15	195.30	1535.036	56	193.25	1551.319
16	195.25	1535.429	57	193.20	1551.721
17	195.20	1535.822	58	193.15	1552.122
18	195.15	1536.216	59	193.10	1552.524
19	195.10	1536.609	60	193.05	1552.926
20	195.05	1537.003	61	193.00	1553.33
21	195.00	1537.40	62	192.95	1553.73
22	194.95	1537.79	63	192.90	1554.134
23	194.90	1538.186	64	192.85	1554.537
24	194.85	1538.581	65	192.80	1554.940
25	194.80	1538.976	66	192.75	1555.343
26	194.75	1539.371	67	192.70	1555.747
27	194.70	1539.766	68	192.65	1556.151
28	194.65	1540.162	69	192.60	1556.555
29	194.60	1540.557	70	192.55	1556.959

Table 11-32 MXP_MR_10DMEX_C Trunk Wavelengths (Continued)

Channel Number	Frequency (THz)	Wavelength (nm)	Channel Number	Frequency (THz)	Wavelength (nm)
30	194.55	1540.953	71	192.50	1557.36
31	194.50	1541.35	72	192.45	1557.77
32	194.45	1541.75	73	192.40	1558.173
33	194.40	1542.142	74	192.35	1558.578
34	194.35	1542.539	75	192.30	1558.983
35	194.30	1542.936	76	192.25	1559.389
36	194.25	1543.333	77	192.20	1559.794
37	194.20	1543.730	78	192.15	1560.200
38	194.15	1544.128	79	192.10	1560.606
39	194.10	1544.526	80	192.05	1561.013
40	194.05	1544.924	81	192.00	1561.42
41	194.00	1545.32	82	191.95	1561.83

11.19.4 Related Procedures for MXP_MR_10DMEX_C Card

The following is the list of procedures and tasks related to the configuration of the MXP_MR_10DMEX_C card:

- NTP-G148 Modify the 10G Data Muxponder Card Line Settings and PM Parameter Thresholds, page 11-275
- NTP-G75 Monitor Transponder and Muxponder Performance

11.20 MLSE UT

The maximum likelihood sequence estimation (MLSE) based universal transponder (UT) modules are added to the TXP_MR_10EX_C, MXP_2.5G_10EX_C, and MXP_MR_10DMEX_C cards to support the error decorrelator functionality to enhance system performance.

11.20.1 Error Decorrelator

The MLSE feature uses the error decorrelator functionality to reduce the chromatic dispersion (CD) and polarization mode dispersion (PMD), thereby extending the transmission range on the trunk interface. You can enable or disable the error decorrelator functionality using CTC or TL1. The dispersion compensation unit (DCU) is also used to reduce CD and PMD. The MLSE-based UT module helps to reduce CD and PMD without the use of a DCU.

11.21 SFP and XFP Modules

SFPs and 10-Gbps SFPs (XFPs) are integrated fiber optic transceivers that provide high-speed serial links from a port or slot to the network. For more information on SFPs/XFPs and for a list of SFPs/XFPs supported by the transponder and muxponder cards, see the Installing the GBIC, SFP, SFP+, and XFP Optical Modules in Cisco ONS Platforms.

In CTC, SFPs/XFPs are called pluggable port modules (PPMs). To provision SFPs/XFPs and change the line rate for multirate PPMs, see the "DLP-G277 Provision a Multirate PPM" section on page 11-128.

11.22 Procedures for Transponder and Muxponder Cards

The procedures described below explain how to provision transponder (TXP), muxponder (MXP), Xponder (GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE), and ADM-10G cards. The provisioning must be performed before you provision the dense wavelength division multiplexing (DWDM) network and create circuits.

11.22.1 Before You Begin

Before performing any of the following procedures, investigate all alarms and clear any trouble conditions. Refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* as necessary.

Caution Provisioning TXP and MXP cards can be service affecting. You should make all changes during a scheduled maintenance window.

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

1. NTP-G128 Manage Pluggable Port Modules, page 11-121—Complete this procedure to provision a multirate pluggable port module (PPM), provision or change the optical line rate of a PPM, or delete a PPM. PPMs provide the fiber interface to the TXP, MXP, and ADM-10G cards. With the exception of the TXP_MR_10G card, all TXPs, MXPs, and ADM-10G cards accept PPMs.
2. NTP-G33 Create a Y-Cable Protection Group, page 11-138—As needed, complete this procedure for TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards that will be protected with Y-cable protection.
3. NTP-G199 Create a Splitter Protection Group for the OTU2_XP Card, page 11-142—As needed, complete this procedure to create a splitter protection group for an OTU2_XP card.
4. NTP-G198 Create 1+1 Protection for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards, page 11-144—As needed, complete this procedure to create 1+1 protection for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
5. NTP-G98 Provision the 2.5G Multirate Transponder Card Line Settings and PM Parameter Thresholds, page 11-146—As needed, complete this procedure to change the transmission settings for TXP_MR_2.5G and TXPP_MR_2.5G cards.
6. NTP-G96 Provision the 10G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds, page 11-166—As needed, complete this procedure to change the transmission settings for TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C cards.

7. NTP-G292 Provision the 40G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds, page 6-72—As needed, complete this procedure to change the transmission settings for 40E-TXP-C and 40ME-TXP-C cards.
8. NTP-G170 Provision the ADM-10G Card Peer Group, Ethernet Settings, Line Settings, PM Parameters, and Thresholds, page 11-211—As needed, complete this procedure to provision the transmission settings for ADM-10G cards.
9. NTP-G97 Modify the 4x2.5G Muxponder Card Line Settings and PM Parameter Thresholds, page 11-236—As needed, complete this procedure to change the transmission settings for MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C cards.
10. NTP-G99 Modify the 2.5G Data Muxponder Card Line Settings and PM Parameter Thresholds, page 11-257—As needed, complete this procedure to change the transmission settings for MXP_MR_2.5G and MXPP_MR_2.5G cards.
11. NTP-G148 Modify the 10G Data Muxponder Card Line Settings and PM Parameter Thresholds, page 11-275—As needed, complete this procedure to change the transmission settings for MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C cards.
12. NTP-G293 Modify the 40G Muxponder Card Line Settings and PM Parameter Thresholds, page 11-297—As needed, complete this procedure to change the transmission settings for 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.
13. NTP-G281 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Channel Group Settings, page 11-320—As needed, complete this procedure to change the channel group settings for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
14. NTP-G283 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card CFM Settings, page 11-331—As needed, complete this procedure to change the CFM settings for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
15. NTP-G285 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card EFM Settings, page 11-343—As needed, complete this procedure to change the EFM settings for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
16. NTP-G287 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card REP Settings, page 11-348—As needed, complete this procedure to change the REP settings for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
17. NTP-G165 Modify the GE_XP, 10GE_XP, GE_XPE, 10GE_XPE Cards Ethernet Parameters, Line Settings, and PM Thresholds, page 11-355—As needed, complete this procedure to change the transmission settings for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
18. NTP-G314 Add a GE_XP or 10GE_XP Card on a FAPS Ring, page 11-398—As needed, complete this procedure to add a GE_XP or 10GE_XP Card on a FAPS Ring.
19. NTP-G197 Provision the OTU2_XP Card Line Settings, PM Parameters, and Thresholds, page 11-401—As needed, complete this procedure to change the transmission settings for OTU2_XP cards.
20. NTP-G162 Change the ALS Maintenance Settings, page 11-423—As needed, complete this procedure to change the automatic laser shutdown settings for a TXP or MXP card.
21. NTP-G192 Force FPGA Update, page 11-424—As needed, complete this procedure to force an upgrade of the FPGA image on the MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C cards.

22. NTP-G196 Force FPGA Update When the Card is Part of a Protection Group, page 11-426—As needed, complete this procedure to force an upgrade of the FPGA image on the MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C cards when the card is part of a protection group.
23. NTP-G232 Enabling Error Decorrelator, page 11-427—As needed, complete this procedure to enable error decorrelator on a TXP_MR_10EX_C, MXP_2.5G_10EX_C, or MXP_MR_10DMEX_C card.

NTP-G128 Manage Pluggable Port Modules

Purpose	Complete this procedure to provision a multirate PPM, provision the optical line rate of a multirate PPM, or delete a single-rate or multirate PPM.
Tools/Equipment	None
Prerequisite Procedures	DLP-G63 Install an SFP or XFP, page 14-72
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note If a single-rate PPM is installed, the PPM screen will autoprovision and no further steps are necessary.

Note When you autoprovision a PPM, initial alarm and TCA defaults are supplied by Cisco Transport Controller (CTC) depending on your port and rate selections and the type of PPM. These default values can be changed after you install the PPM.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, or OTU2_XP card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 1 Complete the DLP-G46 Log into CTC" task to log into an ONS 15454 on the network. If you are already logged in, continue with Step 2.

Step 2 Click the **Alarms** tab:

a. Verify that the alarm filter is not turned on. See the "DLP-G128 Disable Alarm Filtering" task as necessary.

b. Verify that no unexplained conditions appear. If unexplained conditions appear, resolve them before continuing. Refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide*.

Step 3 If you are provisioning a MXP_MR_2.5G or MXPP_MR_2.5G card, complete the "DLP-G235 Change the 2.5G Data Muxponder Card Mode" task on page 11-122. If not, continue with Step 4

Step 4 If you are provisioning a MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C card, complete the "DLP-G332 Change the 10G Data Muxponder Port Mode" task on page 11-123. If not, continue with Step 5.

Step 5 If you are provisioning a GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125. If not, continue with Step 6.

Step 6 If you are provisioning a OTU2_XP card, complete the "DLP-G452 Change the OTU2_XP Card Mode" task on page 11-127. If not, continue with Step 7.

Step 7 If you are provisioning a PPM on an ADM-10G card, complete the "DLP-G411 Provision an ADM-10G PPM and Port" task on page 11-126. If not, continue with Step 8.

Step 8 Complete the "DLP-G277 Provision a Multirate PPM" task on page 11-128 for TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP ports with multirate PPMs. If you already preprovisioned the multirate PPM (DLP-G273 Preprovision an SFP or XFP Slot, page 14-73), skip this step and continue with Step 9.

Step 9 If you are provisioning an IBM ETR_CLO (External Time Reference – Control Link Oscillator) or InterSystem Coupling Link (ISC) service on the PPM, complete "DLP-G274 Verify Topologies for ETR_CLO and ISC Services" task on page 11-129. Otherwise, continue with Step 10.

Step 10 Complete the "DLP-G278 Provision the Optical Line Rate" task on page 11-131 to assign a line rate to a TXP, MXP, or OTU2_XP port after the PPM is provisioned. (This task is not performed for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.)

Step 11 If you need to delete a PPM at any point in this procedure, complete the "DLP-G280 Delete a PPM" task on page 11-136.

Stop. You have completed this procedure.

DLP-G235 Change the 2.5G Data Muxponder Card Mode

Purpose	This task changes the card mode for MXP_MR_2.5G and MXPP_MR_2.5G muxponder cards. The card mode determines which PPMs can be provisioned for the card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the card settings.

Step 2 Click the **Provisioning > Line > SONET** (ANSI) or **SDH** (ETSI) tabs.

Step 3 Locate the Trunk port table row and verify that the Service State column value is OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI). If the service state is correct, continue with Step 6. If not, complete the following steps:

a. Click the **Admin State** table cell and choose **OOS,DSBLD** (ANSI) or **Locked,Maintenance** (ETSI).

b. Click **Apply**, then **Yes**.

Step 4 Click the **Provisioning > Line > Client** tabs.

Step 5 Locate the Trunk port table row and verify that the Service State column value is OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI). If the service state is correct, continue with Step 6. If not, complete the following steps:

a. Click the **Admin State** table cell and choose **OOS,DSBLD** (ANSI) or **Locked,Maintenance** (ETSI).

b. Click **Apply**, then **Yes**.

Step 6 Click the **Provisioning > Card** tabs.

Step 7 Change the Card Mode as needed:

- FC-GE—Choose this option if you will provision any of the following PPM port rates: FC1G (Ports 1-1 and 2-1 only), FC2G (Port 1-1 only), FICON1G (Ports 1-1 and 2-1 only), FICON2G (Port 1-1 only), and ONE_GE (Ports 1-1 through 8-1).
- Mixed—Choose this option if you will provision any of the following PPM port rates: FC1G and ONE_GE (Port 1–1 only), ESCON (Ports 5–1 through 8-1 only)
- ESCON—Choose this option if you will provision the ESCON PPM on Ports 1-1 through 8-1.

Note The Provisioning > Card tab also has the display-only Tunable Wavelengths field. This field shows the supported wavelengths of the trunk port after the card is installed in the format: *first wavelength-last wavelength-frequency spacing-number of supported wavelengths*. For example, 1529.55nm-1561.83nm-50gHz-82.

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G332 Change the 10G Data Muxponder Port Mode

Purpose	This task changes the port mode for the MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C muxponder cards. The port mode determines which PPMs can be provisioned on the ports.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C cards have two port mode groups, one for Ports 1 through 4, and the second for Ports 5 through 8. To change the port mode, all ports within the selected port group must be in OOS (out-of-service) service state. Ports in the second port group do not need to be in OOS service state if you are not changing the port mode for the second port group. Before you change the port mode, you must also ensure that any PPM port rate provisioned for the selected port group is deleted (see the "DLP-G280 Delete a PPM" task on page 11-136).

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C card where you want to change the port mode.

Step 2 Click the **Provisioning > Card** tabs.

Step 3 Change the port mode as described in Table 11-33.

Note The PPM port rates are provisioned in the "DLP-G277 Provision a Multirate PPM" task on page 11-128.

Table 11-33 10G Data Muxponder Card Port Modes

Parameter	Description	Options
Port 1-4 Mode	Sets the mode of operation for Ports 1-1 through 4-1.	Chose one of the following: • FC-GE_ISC—Choose this option if you will provision any of the following PPM port rates: FC1G (Ports 1-1 through 4-1), FC2G (Ports 1-1 and 3-1 only), FICON1G (Ports 1-1 through 4-1), FICON2G (Ports 1-1 and 3-1 only), ONE_GE (Ports 1-1 through 4-1), ISC3 COMPAT (Ports 1-1 through 4-1), ISC3 PEER 1G (Ports 1-1 through 4-1), and ISC3 PEER 2G (Ports 1-1 and 3-1 only). • FC4G—Choose this option if you will provision an FC4G or FICON4G PPM (Port 1-1 only).
Port 5-8 Mode	Sets the mode of operation for Ports 5-1 through 8-1.	Chose one of the following: • FC-GE_ISC—choose this option if you will provision any of the following PPM port rates: FC1G (Ports 5-1 through 8-1), FC2G (Ports 5-1 and 7-1 only), FICON1G (Ports 5-1 through 8-1), FICON2G (Ports 5-1 and 7-1 only), ONE_GE (Ports 5-1 through 8-1), ISC3 COMPAT (Ports 5-1 through 8-1), ISC3 PEER 1G (Ports 5-1 through 8-1), and ISC3 PEER 2G (Ports 5-1 and 7-1 only). • FC4G—choose this option if you will provision an FC4G or FICON4G PPM port rate (Port 5-1 only).

Note The Provisioning > Cards tab also has a display-only Tunable Wavelengths field which shows the wavelengths supported by the card. If a MXP_MR_10DME_C card is installed, the 32 C-band wavelengths appear. If the MXP_MR_10DME_L card is installed, the 32 L-band wavelengths appear. If the MXP_MR_10DMEX_C card is installed, the 82 C-band wavelengths appear.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

Note Loopbacks on MXP-MR-10DME are not applicable when Fiber Channel switches are present.

Note If the Fiber Channel switch version is not present then the Distance Extension settings are not supported.

DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode

Purpose	This task changes the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card mode. 10GE_XP and 10GE_XPE cards can be provisioned as a Layer 2 Ethernet switch or a 10G Ethernet TXP. GE_XP and GE_XPE cards can be provisioned as a Layer 2 Ethernet switch, 10G Ethernet MXP, or 20G Ethernet MXP.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the card mode.

Step 2 In card view, click **Provisioning > Ether Ports > Ports**.

Step 3 Verify that any provisioned client or trunk ports have an **OOS-MA,DSBLD** (ANSI) or **Locked-enabled,disabled** (ETSI) service state in the Service State column**.** If so, continue with Step 4. If not, complete the following substeps.

a. For the first port that is not out of service, in the Admin State column, choose **OOS,DSBLD** (ANSI) or **Locked,disabled** (ETSI).

b. Repeat Step **a** for each port that is not out of service.

c. Click **Apply**.

Step 4 Click the **Provisioning > Card** tabs.

Step 5 Choose one of the card modes shown in Table 11-34.

:

Table 11-34 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Modes

Mode	Cards	Description
L2 over DWDM	GE_XP 10GE_XP GE_XPE 10GE_XPE	Provisions the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE as a Layer 2 switch.
10GE TXP	10GE_XP 10GE_XPE	Provisions the 10GE_XP or 10GE_XPE as a 10 Gigabit Ethernet transponder. Traffic received on the 10GE client Port 1-1 is sent to 10 Gigabit Ethernet trunk Port 3-1, and traffic received on 10 Gigabit Ethernet client Port 2-1 is sent to 10 Gigabit Ethernet trunk Port 4-1.

Table 11-34 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Modes

Mode	Cards	Description
10GE MXP	GE_XP GE_XPE	Provisions the GE_XP or GE_XPE as a 10 Gigabit Ethernet muxponder. Traffic received on Gigabit Ethernet client Ports 1-1 through 10-1 is multiplexed and sent to 10 Gigabit Ethernet trunk Port 21-1, and traffic received on Gigabit Ethernet client Ports 11-1 through 20-1 is multiplexed and sent to 10 Gigabit Ethernet trunk Port 22-1.
20GE MXP	GE_XP GE_XPE	Provisions the GE_XP or GE_XPE as a 20 Gigabit Ethernet muxponder. Traffic received on Gigabit Ethernet client Ports 1-1 through 20-1 is multiplexed and sent to 10 Gigabit Ethernet trunk Port 21-1. Trunk port 22-1 is not used.

The GE-XP and GE-XPE cards operating in 10GE MXP mode and configured for 100% traffic flow, do not drop frames when up to nine ports are in use. However, when all the ten ports are in use, some frames are dropped. When the tenth port is to be used, configure the Committed Info Rate (CIR) at 55% on any one of the ports. For more information about configuring the CIR, see the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Step 6 Click **Apply**, then click **Yes** in the confirmation dialog box.

Step 7 Return to your originating procedure (NTP).

DLP-G411 Provision an ADM-10G PPM and Port

Purpose	This task provisions a fixed-rate PPM and port on an ADM-10G PPM card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to provision PPM settings.

Step 2 Click the **Provisioning > Pluggable Port Modules** tabs.

Step 3 In the Pluggable Port Modules area, click **Create**. The Create PPM dialog box appears.

Step 4 In the Create PPM dialog box, complete the following:

- PPM—Choose the SFP you want to install from the drop-down list.
- PPM Type—Choose the number of ports supported by your SFP from the drop-down list. If only one port is supported, **PPM (1 port)** is the only option.

Step 5 Click **OK**. The newly created PPM appears in the Pluggable Port Modules area. The row in the Pluggable Port Modules area turns white and the Actual Equipment Type column lists the equipment name.

Step 6 In the Pluggable Ports area, click **Create**. The Create Ports dialog box appears.

Step 7 In the Create Ports dialog box, complete the following:

- Port—Choose the port you want to configure from the drop-down list.
- Port Type—Choose the port type, such as OC-3, OC-12, OC-48, or ONE-GE from the drop-down list.
  - Ports 1 - 8 can only be OC-3, OC-12, or ONE_GE
  - Ports 9 - 12 can on be OC-3 or OC-12
  - Ports 13 - 16 can only be OC-3, OC-12, or OC-48

Step 8 Click **OK**. The newly created port appears in the Pluggable Ports area. The port type you provisioned is listed in the Rate column.

Step 9 If you want to provision a PPM or another port, repeat Steps 4 through 8.

Step 10 Return to your originating procedure (NTP).

DLP-G452 Change the OTU2_XP Card Mode

Purpose	This task changes the OTU2_XP card mode. The card mode determines which PPMs can be provisioned for the card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Caution Changing the card configuration to 10G Ethernet LAN Phy to WAN Phy automatically replaces the current port configurations (Ports 1 and 3) to 10G Ethernet and OC192. This resets and reboots the OTU2_XP card.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the card mode.

Step 2 In card view, click the **Provisioning > Line > Ports** tab.

Step 3 Verify that all provisioned client or trunk ports have an OOS-MA, DSBLD (ANSI) or Locked-enabled, disabled (ETSI) service state in the Service State column. If so, continue with Step 4. If not, complete the following substeps.

a. For the first port that is not out of service, in the Admin State column, choose **OOS, DSBLD** (ANSI) or **Locked, disabled** (ETSI).

b. Repeat Step **a** for each port that is not out of service.

c. Click **Apply**.

Step 4 Click the **Provisioning > Card** tab.

Step 5 Change the Card Configuration as needed:

- **Transponder**—Choose this option to provision the OTU2_XP card as a transponder. Port pairs 1-3 and 2-4 are both configured as transponders. This is the default card configuration.

- **Standard Regen**—Choose this option to provision the OTU2_XP card as a standard regenerator (with E-FEC only on one port). Port pairs 1-3 and 2-4 are both configured as regenerators.
- **Enhanced FEC**—Choose this option to provision the OTU2_XP card as an E-FEC regenerator (with E-FEC on two ports). Port pair 3-4 is configured as enhanced regenerator. Ports 1 and 2 are not used.
- **Mixed**—Choose this option to provision the OTU2_XP card as a transponder and a standard regenerator (mixed configuration). One of the port pair (1-3 or 2-4) is configured as a transponder and the other port pair as a standard regenerator.
- **10G Ethernet LAN Phy to WAN Phy—**Choose this option to provision the OTU2_XP card to enable the 10G Ethernet LAN Phy to WAN Phy conversion. Port pair 1-3 supports LAN Phy to WAN Phy conversion. Port pair 2-4 can be configured either as a transponder or a standard regenerator.

Note If you revert to the previous release (release earlier than 9.10), be sure to disable the 10G Ethernet LAN Phy to WAN Phy conversion feature. If you do not disable the 10G Ethernet LAN Phy to WAN Phy feature, an error message stating that the user needs to disable 10G Ethernet LAN Phy to WAN Phy feature before reverting to the previous release is displayed.

Note Table 11-173 on page 11-414 lists the Ethernet variables supported on Ports 1 and 3 of the OTU2_XP card that has the 10G Ethernet LAN Phy to WAN Phy enabled. When the card is in the 10G Ethernet LAN Phy to WAN Phy mode, no 10G FC RMONS are supported on Ports 2 and 4.

For more information on OTU2_XP card configuration rules, see the "11.16.5 OTU2_XP Card Configuration Rules" section on page 11-103.

Step 6 Click **Apply**. Then click **Yes** in the confirmation dialog box.

Step 7 Return to your originating procedure (NTP).

DLP-G277 Provision a Multirate PPM

Purpose	This task provisions a multirate PPM on a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, or OTU2_XP card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note If the PPM was preprovisioned using the "DLP-G273 Preprovision an SFP or XFP Slot" task on page 14-73 this task is unnecessary, unless the PPM has an Out-of-Service and Autonomous Management, Unassigned (OOS-AUMA,UAS) (ANSI) or unlocked-disabled, unassigned (ETSI) service state.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, or OTU2_XP card where you want to provision PPM settings.

Step 2 Click the **Provisioning > Pluggable Port Modules** tabs.

Step 3 In the Pluggable Port Modules area, click **Create**. The Create PPM dialog box appears.

Step 4 In the Create PPM dialog box, complete the following:

- PPM—Choose the PPM slot number where the SFP is installed from the drop-down list.
- PPM Type—Choose the number of ports supported by your SFP from the drop-down list. If only one port is supported, **PPM (1 port)** is the only option.

Step 5 Click **OK**. The newly created port appears in the Pluggable Port Modules area. The row in the Pluggable Port Modules area turns white and the Actual Equipment Type column lists the equipment name.

Step 6 If you want to provision a PPM on another port, repeat Steps 3 through 5. If not, continue with Step 7.

Step 7 Return to your originating procedure (NTP).

DLP-G274 Verify Topologies for ETR_CLO and ISC Services

Purpose	This task verifies that the DWDM network topology can support the IBM ETR_CLO and ISC services.
Tools/Equipment	Cisco TransportPlanner site plan
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Display your site plan in Cisco TransportPlanner.

Step 2 Verify that the topology where you plan to run the ETR_CLO or ISC service can support the service. The following topologies support ETR_CLO or ISC:

- Single span—Two terminal sites with no intermediate sites in between and one of the following sets of cards installed:
  - 32MUX-O and 32DMX-O cards
  - 32WSS and 32DMX cards
  - 32WSS and 32-DMX-O cards
  - 40-MUX-C and 40-DMX-C/40-DMX-CE cards
  - 40-WSS-C/40-WSS-CE and 40-DMX-C/40-DMX-CE cards

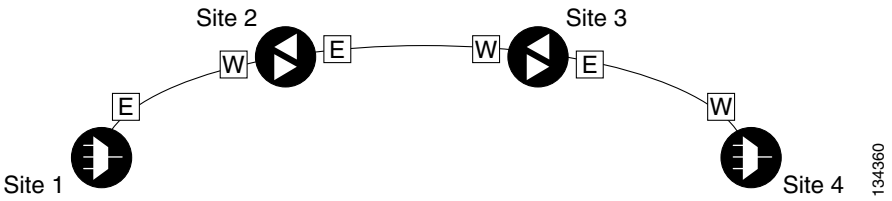
  Figure 11-26 shows a single-span topology as displayed in Cisco TransportPlanner.

Figure 11-26 Single-Span Topology

- Point-to-Point—Two terminal sites with one of the following sets of cards installed:
  - 32MUX-O and 32DMX-O cards
  - 32WSS and 32DMX cards
  - 32WSS and 32-DMX-O cards
  - 40-MUX-C and 40-DMX-C/40-DMX-CE cards
  - 40-WSS-C/40-WSS-CE and 40-DMX-C/40-DMX-CE cards

  Line amplifiers can be installed between the terminal sites, but intermediate (traffic terminating) sites cannot be installed. Figure 11-27 shows a point-to-point topology as shown in Cisco TransportPlanner.

Figure 11-27 Point-to-Point Topology



- Two hubs—Two hub nodes in a ring with one of the following sets of cards installed:
  - 32MUX-O and 32DMX-O cards
  - 32WSS and 32DMX cards
  - 32WSS and 32-DMX-O cards
  - 40-MUX-C and 40-DMX-C/40-DMX-CE cards
  - 40-WSS-C/40-WSS-CE and 40-DMX-C/40-DMX-CE cards

  Line amplifiers can be installed between the hubs. Figure 11-28 shows two hub nodes with no line amplifier nodes installed. Figure 11-29 shows two hub nodes with line amplifier nodes installed.

Figure 11-28 Hubs with No Line Amplifiers

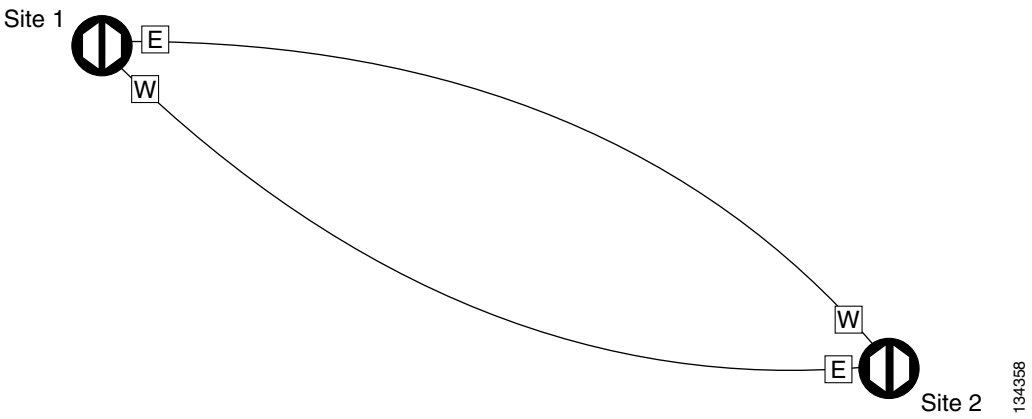
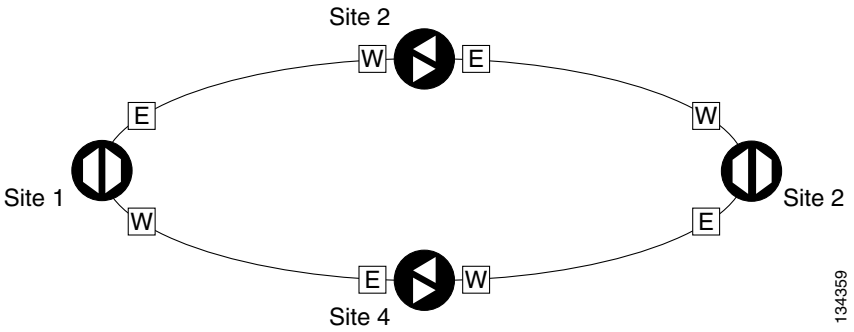


Figure 11-29 Hubs with Line Amplifiers



Step 3 Return to your originating procedure (NTP).

DLP-G278 Provision the Optical Line Rate

Purpose	This task provisions the line rate for TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC DLP-G277 Provision a Multirate PPM, page 11-128 DLP-G274 Verify Topologies for ETR_CLO and ISC Services, page 11-129, if you are provisioning an ETR_CLO service.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The optical line rate for cards with single-rate PPMs is provisioned automatically when you complete the "DLP-G277 Provision a Multirate PPM" task on page 11-128 if the trunk port is out of service. If the optical line rate was provisioned automatically, you do not need to complete this task for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, MXP_2.5G_10EX_C, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card. If the trunk port was in-service when you provisioned the PPM, complete this task to provision the optical line rate manually for those cards.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card where you want to provision PPM ports. If the data rate that you are provisioning is DV-6000, HDTV, ESCON, SDI/D1 Video, ISC1, ISC3 (for TXP_MR_2.5G and TXPP_MR_2.5G cards), or ETR_CLO, complete the following steps. Otherwise, continue with Step 4.

a. Click the **Provisioning > OTN > OTN Lines** tabs.

b. In the ITU-T G.709 OTN field for the respective PPM, choose **Disable**.

c. In the FEC field for the respective PPM, choose **Disable**.

d. Click **Apply**.

Step 2 For the TXP_MR-10G card, click the **Provisioning > Data Rate Selection** tabs. For all other cards, go to Step 4.

Step 3 In the Data Rate Selection area, click **Create** and choose the type of port from the drop-down list. The supported port types are SONET (including 10G Ethernet WAN Phy) and 10G Ethernet LAN Phy.

Step 4 Click the **Provisioning > Pluggable Port Modules** tabs.

Step 5 In the Pluggable Ports area, click **Create**. The Create Port dialog box appears.

Step 6 In the Create Port dialog box, complete the following:

- Port—Choose the port and port number from the drop-down list. The first number indicates the PPM in the Pluggable Port Modules area, and the second number indicates the port number on the PPM. For example, the first PPM with one port appears as 1-1 and the second PPM with one port appears as 2-1. The PPM number can be 1 to 4, but the port number is always 1.
- Port Type—Choose the type of port from the drop-down list. The port type list displays the supported port rates on your PPM. See Table 11-35 on page 11-133 for definitions of the supported rates on the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card.

Step 7 Click **OK**. The row in the Pluggable Ports area turns white if the physical SFP is installed and light blue if the SFP is not installed.
If the optical parameter values differ from the NE Default settings, change the port state to In-Service (for ANSI) or Unlocked (for ETSI) to synchronize the values with the NE Default settings.

Step 8 Repeat Steps 5 through 7 to configure the rest of the port rates as needed.

Table 11-35 PPM Port Types

Card	Port Type
TXP_MR_2.5G TXPP_MR_2.5G	• OC-3/STM1—155 Mbps • OC-12/STM4—622 Mbps • OC-48/STM16—2.48 Gbps • ONE_GE—One Gigabit Ethernet 1.125 Gbps • ESCON—Enterprise System Connection 200 Mbps (IBM signal) • DV6000—Proprietary signal from video vendor • SDI_D1_VIDEO—Serial Digital Interface and Digital Video signal type 1 • HDTV—High Definition Television • PASS-THRU—Not specified • FC1G—Fibre Channel 1.06 Gbps • FC2G—Fibre Channel 2.125 Gbps • FICON1G—Fiber connectivity1.06 Gbps (IBM signal) • FICON2G—Fiber connectivity 2.125 Gbps (IBM signal) • ETR_CLO—External Time Reference–Control Link Oscillator • ISC compat—InterSystem Coupling Link 1 (ISC1) • ISC peer—InterSystem Coupling Link 3 (ISC3) • DVB-ASI — Proprietary signal from video vendor. Digital Video Broadcast - Asynchronous Serial Interface • ISC1— InterSystem Channel 1 Gbps (IBM signal)
MXP_2.5G_10G MXP_2.5G_10E MXP_2.5G_10E_C MXP_2.5G_10E_L MXP_2.5G_10EX_C	• OC-48/STM16—2.48 Gbps[1]
TXP_MR_10G[2]	• SONET (OC-192)/SDH (STM-64) including 10G Ethernet WAN Phy • 10G Ethernet LAN Phy
TXP_MR_10E TXP_MR_10E_C TXP_MR_10E_L TXP_MR_10EX_C	• SONET (OC-192)/SDH (STM-64) including 10G Ethernet WAN Phy—10 Gbps • 10G Ethernet LAN Phy—10 Gbps Ethernet • 10G Fibre Channel—10 Gbps Fibre Channel • (TXP_MR_10EX_C only) IB_5G

Table 11-35 PPM Port Types (Continued)

Card	Port Type
40E-TXP-C 40ME-TXP-C	• SONET (OC-768)/SDH (STM-256) • 40G Ethernet LAN Phy • OTU3
MXP_MR_2.5G MXPP_MR_2.5G	If the card mode is FC_GE: • FC1G ISL—Fibre Channel 1.06 Gbps (Ports 1-1 and 2-1) • FC2G ISL—Fibre Channel 2.125 Gbps (Port 1-1 only) • FICON1G ISL—Fiber connectivity 1.06 Gbps (IBM signal) (Ports 1-1 and 2-1) • FICON2G ISL—Fiber connectivity 2.125 Gbps (IBM signal) (Port 1-1 only) • ONE_GE—One Gigabit Ethernet 1.125 Gbps (Ports 1-1 and 2-1 only) If the card mode is Mixed: • FC1G ISL—Fibre Channel 1.06 Gbps (Port 1-1 only) • FICON1G ISL—Fiber connectivity 1.06 Gbps (IBM signal) (Port1-1 only) • ONE_GE—One Gigabit Ethernet 1.125 Gbps (Port 1-1 only) • ESCON—Enterprise System Connection 200 Mbps (IBM signal) (Ports 5-1 through 8-1) If the card mode is ESCON: • ESCON—Enterprise System Connection 200 Mbps (IBM signal) (Ports 1-1 through 8-1)

Table 11-35 PPM Port Types (Continued)

Card	Port Type
MXP_MR_10DME_C MXP_MR_10DME_L MXP_MR_10DMEX_C	If the port mode is FC_GE_ISC: • FC1G—Fibre Channel 1.06 Gbps (Ports 1-1 through 8-1) • FC2G—Fibre Channel 2.125 Gbps (Ports 1-1, 3-1, 5-1, and 7-1 only; ports are not available if the port that follows—2-1, 4-1, 6-1, or 8-1—has a PPM provisioned.) • FICON1G—Fiber connectivity 1.06 Gbps (IBM signal) FICON2G—Fiber connectivity 2.125 Gbps (IBM signal) (Ports 1-1, 3-1, 5-1, and 7-1 only; ports are not available if the port that follows—2-1, 4-1, 6-1, or 8-1—has a PPM provisioned.) • ONE_GE—One Gigabit Ethernet 1.125 Gbps (Ports 1-1 through 8-1) • ISC COMPAT (Ports 1-1 through 8-1) • ISC3 PEER 1G (Ports 1-1 through 8-1) • ISC3 PEER 2G (Ports 1-1, 3-1, 5-1, and 7-1 only; ports are not available if the port that follows—2-1, 4-1, 6-1, or 8-1—has a PPM provisioned.) If the port mode is FC4G: • FC4G—Fibre Channel 4.25 Gbps (Ports 1-1 or 5-1 only; ports are not available if any of the three ports that follow has a PPM provisioned.) • FICON4G—Fiber connectivity 4.25 Gbps (IBM signal) (Ports 1-1 or 5-1 only; ports are not available if any of the three ports that follow has a PPM provisioned.)
40G-MXP-C 40E-MXP-C 40ME-MXP-C	• SONET (OC-192)/SDH (STM-64) • FC8G • FC10G • TEN_GE • OTU2

Table 11-35 PPM Port Types (Continued)

Card	Port Type
GE_XP 10GE_XP GE_XPE 10GE_XPE	• GE_XP and GE_XPE client ports[1] • 10GE_XP and 10GE_XPE client and trunk ports; GE_XP and GE_XPE trunk ports[1]
OTU2_XP	• SONET (including 10G Ethernet WAN Phy)—10 Gbps • 10G Ethernet LAN Phy—10 Gbps Ethernet • 10G Fiber Channel—10 Gbps Fibre Channel • IB_5G—InfiniBand 5 Gbps **Note** If you have an OTU2 signal in which the OPU2 has been generated by multiplexing four ODU1 signals, choose SONET as the port rate. This allows the OTU2 signal to be transported transparently in standard or E-FEC regenerator configuration.

1. Automatically provisioned when the PPM is created if the trunk port is out of service.
2. Provisioned on the Data Rate Selection tab.

Step 9 Return to your originating procedure (NTP).

DLP-G280 Delete a PPM

Purpose	This task deletes PPM provisioning for SFPs or XFPs installed on TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, or OTU2_XP card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G63 Install an SFP or XFP, page 14-72 or DLP-G273 Preprovision an SFP or XFP Slot, page 14-73 DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Before deleting a PPM, delete the PPM from the provisioning pane.

Note This task does not apply to the TXP_MR_10G card. To change the TXP_MR_10G data rate, complete the "DLP-G365 Provision the TXP_MR_10G Data Rate" task on page 11-167.

Note You cannot delete a PPM if the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card is part of a regenerator group. For OTU2_XP card, you cannot delete a PPM if the card configuration is in Standard Regen or Enhanced FEC mode.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, or OTU2_XP card where you want to delete PPM settings.

Step 2 Verify that the PPM port Service State is **OOS,DSBLD**. If the PPM port is **OOS,DSBLD**, go to Step 3. If it is not OOS,DSBLD, follow the tasks in NTP-G128 Manage Pluggable Port Modules, page 11-121, to change the Service State of the PPM port to **OOS,DSBLD**.

Step 3 Click the **Provisioning > Pluggable Port Modules** tabs.

Step 4 To delete a PPM and the associated ports:

- **a.** In the Pluggable Port Modules area, click the PPM that you want to delete. The highlight changes to dark blue.
- **b.** Click **Delete**. The Delete PPM dialog box appears.
- **c.** Click **Yes**. The PPM provisioning is removed from the Pluggable Port Modules area and the Pluggable Ports area.

Note You cannot delete a PPM until its port is in the OOS,DSBLD state. You cannot delete a client port if the client is in the In Service and Normal (IS-NR) (ANSI) or Unlocked-enabled (ETSI) service state, is in a protection group, has a generic communications channel (GCC) or data communications channel (DCC), is a timing source, has circuits or overhead circuits, or transports Link Management Protocol channels or links. You can delete a client port (except the last port) if the trunk port is in service and the client port is in the OOS,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) service state. You can delete the last client port only if the trunk port is in a OOS,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) service state for all cards except the MXP_MR_2.5G, MXPP_MR_2.5G, MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C cards. For more information about port states, see the Administrative and Service States document.

Step 5 Verify that the PPM provisioning is deleted:

- In the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, or OTU2_XP card view, CTC shows an empty port after the PPM is deleted.
- If the SFP or XFP is physically present when you delete the PPM provisioning, CTC transitions to the deleted state, the ports (if any) are deleted, and the PPM is represented as a gray graphic in CTC. The SFP or XFP can be provisioned again in CTC, or the equipment can be removed. If the equipment is removed, the graphic disappears.

Step 6 If you need to remove the PPM hardware (the SFP or XFP), complete the "DLP-G64 Remove an SFP or XFP" task on page 14-74.

Step 7 Return to your originating procedure (NTP).

NTP-G33 Create a Y-Cable Protection Group

Purpose	This procedure creates a Y-cable protection group between the client ports of two TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards. For additional information about Y-cable protection, see "G.35.1.1 Y-Cable Protection" section on page G-26.
Tools/Equipment	Installed TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card Cisco TransportPlanner Traffic Matrix
Prerequisite Procedures	In the *Cisco CPT and Cisco ONS 15454 Hardware Installation Guide*: • NTP-G15 Install the Common Control Cards • NTP-G14 Install DWDM Equipment DLP-G46 Log into CTC NTP-G139 Verify Cisco Transport Planner Reports and Files, page 14-3
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Y-cable protection is available for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards when they are provisioned in 10GE MXP, 20GE MXP, or 10GE TXP mode. Y-cable protection cannot be provisioned for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards when they are provisioned in L2-over-DWDM mode. Y-cable protection is available for the OTU2_XP card when it is provisioned in the TXP card mode. Y-cable protection is not supported on IB_5G.

Note If you are provisioning Y-cable protection for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards, the Ethernet mode must be set to 1000 and 10000 Mbps respectively. To provision the Ethernet mode, see the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Note There is a traffic hit of upto a couple hundred milliseconds on the MXP_MR_2.5G and MXP_MR_10DME cards in Y-cable configuration when a fiber cut or SFP failure occurs on one of the client ports.

Note The OTU2-XP and 40E-MXP-C card cannot implement Y-cable protection for the client ports in 10 GE LAN PHY mode. Hence, a pair of OTU2_XP cards is used at each end in pass-through mode (Transponder mode with G.709 disabled) to implement Y-cable protection. The 40E-MXP-CE card can implement Y-cable protection without the OTU2-XP card for the client ports in LAN PHY GFP mode. However, the 40E-MXP-CE card cannot implement Y-cable protection without the OTU2-XP card for the client ports in LAN PHY WIS mode.

Note For SONET or SDH payloads, Loss of Pointer Path (LOP-P) alarms can occur on a split signal if the ports are not in a Y-cable protection group.

Step 1 View the Cisco TransportPlanner Traffic Matrix (see the Table 14-1 on page 14-4) for your site. Verify the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards that need Y-cable protection groups. (Cards requiring Y-cable protection are indicated with "Y-Cable" in the Traffic Matrix table Protection Type column. Refer to the *Cisco TransportPlanner DWDM Operations Guide* for more information.)

Step 2 Verify that the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards are installed according to the requirements specified in Table 14-7 on page 14-109. Table 11-36 lists the protection types available in the ONS 15454 for DWDM client cards.

Table 11-36 Protection Types

Protection Type	Cards	Description and Installation Requirements
Y-cable	MXP_2.5_10G MXP_2.5_10E MXP_2.5_10E_C MXP_2.5_10E_L TXP_MR_10EX_C TXP_MR_10G TXP_MR_10E TXP_MR_10E_C TXP_MR_10E_L TXP_MR_2.5G 40E-TXP-C 40ME-TXP-C MXP_MR_2.5G MXP_MR_10DME_C MXP_MR_10DME_L MXP_MR_10DMEX_C 40G-MXP-C 40E-MXP-C 40ME-MXP-C GE_XP[1] 10GE_XP[2] GE_XPE 10GE_XPE OTU2_XP	Pairs a working transponder or muxponder card or port with a protect transponder or muxponder card or port. The protect port must be on a different card than the working port and it must be the same card type as the working port. The working and protect port numbers must be the same, that is, Port 1 can only protect Port 1, Port 2 can only protect Port 2, and so on. **Note** The working and protect card must be in the same shelf for a multishelf node.
Splitter	TXPP_MR_2.5G MXPP_MR_2.5G	A splitter protection group is automatically created when a TXPP_MR_2.5G or MXPP_MR_2.5G card is installed. You can edit the splitter protection group name.
	OTU2_XP	A splitter protection group is configurable for the OTU2_XP card. You can create a splitter protection group on Ports 3 and 4 of the OTU2_XP card using the "NTP-G199 Create a Splitter Protection Group for the OTU2_XP Card" procedure on page 11-142.
1+1	GE_XP 10GE_XP GE_XPE 10GE_XPE	In the Layer 2 (L2) card mode 1+1 protection is provided to protect the card against client port and card failure.

1. When provisioned in 10GE MXP or 20GE MXP card mode.
2. When provisioned in 10GE TXP card mode.

Step 3 Verify that pluggable ports are provisioned for the same payload and payload rate on the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP cards where you will create the Y-cable protection group:

a. Display the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card in card view.

b. Click the **Provisioning > Pluggable Port Module** tab.

c. Verify that a pluggable port is provisioned in the Pluggable Port Module area, and the payload type and rate is provisioned for it in the Pluggable Ports area. If they are not the same, for example, if the pluggable port and rate are not the same, you must either delete the provisioned rate and create a new rate to match using the "DLP-G273 Preprovision an SFP or XFP Slot" task on page 14-73 or replace the pluggable port (SFP or XFP) using the "DLP-G64 Remove an SFP or XFP" task on page 14-74.

Step 4 In node view (single-shelf mode) or shelf view (multishelf mode), click the **Provisioning > Protection** tabs.

Step 5 In the Protection Groups area, click **Create**.

Step 6 In the Create Protection Group dialog box, enter the following:

- Name—Type a name for the protection group. The name can have up to 32 alphanumeric (a-z, A-Z, 0-9) characters. Special characters are permitted. For TL1 compatibility, do not use question mark (?), backslash (\), or double quote (") characters.
- Type—Choose **Y Cable** from the drop-down list.
- Protect Port—From the drop-down list, choose the port that will be the standby or protection port to the active port. The list displays the available transponder or muxponder ports. If transponder or muxponder cards are not installed, no ports appear in the drop-down list.

After you choose the protect port, a list of available working ports appear in the Available Ports list. If no cards are available, no ports appear. If this occurs, you can not complete this task until you install the physical cards or preprovision the ONS 15454 slots using the "DLP-G353 Preprovision a Slot" task on page 14-53.

Step 7 From the Available Ports list, select the port that will be protected by the port you selected in Protect Ports. Click the top arrow button to move the port to the Working Ports list.

Step 8 Complete the remaining fields:

- Revertive—Check this check box if you want traffic to revert to the working port after failure conditions remain corrected for the amount of time entered in the Reversion Time field.
- Reversion time—If Revertive is checked, select a reversion time from the drop-down list. The range is 0.5 to 12.0 minutes. The default is 5.0 minutes. Reversion time is the amount of time that will elapse before the traffic reverts to the working card. The reversion timer starts after conditions causing the switch are cleared.

Note The Bidirectional switching option is available for Y-cable protection groups only in the following cases:

- On the MXP_MR_10DME card when ISC3_PEER_1G/ISC3_PEER_2G is the client payload.
- On the MXP_MR_10DME and MXP_MR_2.5G cards when Fibre Channel is the client payload. In this case Bidirectional switching is:
  - Automatically enabled when Distance Extension is enabled.
  - Automatically disabled when Distance Extension is disabled.

The Bidirectional switching option is available for all SONET and SDH 1+1 protection groups.

Step 9 Click **OK**.

Step 10 Repeat this procedure for every Y-cable protection group indicated in the Cisco TransportPlanner Traffic Matrix.

Stop. You have completed this procedure.

NTP-G199 Create a Splitter Protection Group for the OTU2_XP Card

Purpose	This procedure creates a splitter protection group between the trunk ports of an OTU2_XP card. For additional information about splitter protection, see the "G.35.1.2 Splitter Protection" section on page G-28.
Tools/Equipment	Installed OTU2_XP card Cisco TransportPlanner Traffic Matrix
Prerequisite Procedures	In the *Cisco CPT and Cisco ONS 15454 Hardware Installation Guide*: • NTP-G15 Install the Common Control Cards • NTP-G14 Install DWDM Equipment DLP-G46 Log into CTC NTP-G139 Verify Cisco Transport Planner Reports and Files, page 14-3
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note A splitter protection group is automatically created when a TXPP_MR_2.5G, MXPP_MR_2.5G, or PSM card is installed. You can edit the splitter protection group name for these cards. The splitter protection group is deleted when you delete the TXPP_MR_2.5G, MXPP_MR_2.5G, or PSM card.

Note Splitter protection is available for the OTU2_XP card when it is provisioned in Transponder configuration only. In a splitter-protected Transponder configuration, Port 1 is the client port, Port 3 is the working trunk port, and Port 4 is the standby trunk port.

Note For SONET or SDH payloads, Loss of Pointer Path (LOP-P) alarms can occur on a split signal if the ports are not in a splitter protection group.

Step 1 View the Cisco TransportPlanner Traffic Matrix (see the Table 14-1 on page 14-4) for your site. Verify which OTU2_XP card needs a splitter protection group. (Cards requiring splitter protection are indicated with "Splitter" in the Traffic Matrix table Protection Type column. Refer to the *Cisco TransportPlanner DWDM Operations Guide* for more information.)

Step 2 Verify that the OTU2_XP card is installed according to the requirements specified in Table 14-7 on page 14-109.

Step 3 Verify that the pluggable port (SFP or XFP) slot is provisioned for the same payload rate as the pluggable port on the OTU2_XP card where you will create the splitter protection group:

a. Display the OTU2_XP card in card view.

b. Click the **Provisioning > Pluggable Port Module** tabs.

c. Verify that a pluggable port (SFP or XFP) slot is provisioned in the Pluggable Port Module area, and that the payload rate of the pluggable port (SFP or XFP) slot is same as the payload rate of the pluggable port on the OTU2_XP card provisioned in the Pluggable Ports area. If they are not the same, you must either delete the provisioned rate and create a new rate to match using the "DLP-G273 Preprovision an SFP or XFP Slot" task on page 14-73 or replace the pluggable port (SFP or XFP) using the "DLP-G64 Remove an SFP or XFP" task on page 14-74.

Step 4 In node view (single-shelf mode) or shelf view (multishelf view), click the **Provisioning > Protection** tabs.

Step 5 In the Protection Groups area, click **Create**.

Step 6 In the Create Protection Group dialog box, enter the following:

- Name—Type a name for the protection group. The name can have up to 32 alphanumeric (a-z, A-Z, 0-9) characters. Special characters are permitted. For TL1 compatibility, do not use question mark (?), backslash (\), or double quote (") characters.
- Type—Choose **Splitter** from the drop-down list.
- Protect Card—From the drop-down list, choose the port that will be the standby or protection port to the active port. The list displays the available OTU2_XP ports. If transponder or muxponder cards are not installed or if the trunk ports of the card are part of a regenerator group, no ports appear in the drop-down list.

After you choose the protect port, a list of available working ports appear in the Available Cards list. If no cards are available, no ports appear. If this occurs, you cannot complete this task until you install the physical cards or preprovision the ONS 15454 slots using the "DLP-G353 Preprovision a Slot" task on page 14-53.

Step 7 From the Available Cards list, select the port that will be protected by the port you selected in Protect Cards. Click the top arrow button to move the port to the Working Cards list.

Step 8 Complete the remaining fields:

- Revertive—Check this check box if you want traffic to revert to the working port after failure conditions remain corrected for the amount of time entered in the Reversion Time field.
- Reversion time—If Revertive is checked, select a reversion time from the drop-down list. The range is 0.5 to 12.0 minutes. The default is 5.0 minutes. Reversion time is the amount of time that will elapse before the traffic reverts to the working card. The reversion timer starts after conditions causing the switch are cleared.

Note The Bidirectional Switching option is not applicable for splitter protection groups.

Step 9 Click **OK**.

Step 10 Repeat this procedure for every splitter protection group indicated in the Cisco TransportPlanner Traffic Matrix.

Stop. You have completed this procedure.

NTP-G198 Create 1+1 Protection for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This procedure creates a 1+1 protection group to protect against client port and card failure of GE_XP, 10GE_XP, GE_XPE, 10GE_XPE cards. For additional information about 1+1 protection, see the "G.35.2 1+1 Protection" section on page G-29.
Tools/Equipment	None
Prerequisite Procedures	In the *Cisco CPT and Cisco ONS 15454 Hardware Installation Guide*: • NTP-G15 Install the Common Control Cards • NTP-G14 Install DWDM Equipment NTP-G139 Verify Cisco Transport Planner Reports and Files, page 14-3
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to protect the card against client port and card failure. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed according to the requirements specified in Table 14-7 on page 14-109.

Step 3 Complete the NTP-G242 Create an Internal Patchcord Manually, page 14-114 by selecting the Trunk to Trunk (L2) option, at the trunk port where you want to create 1+1 protection.

Step 4 Complete the "NTP-G461 Create a 1+1 Protection Group for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards" task on page 11-145 to create a protection group.

Step 5 Configure the standby port behavior, by setting the Protection Action to **None** or **Squelch**. For detailed information on how to configure the standby port behavior, see the, "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Note Do not enable squelch in a 1 + 1 protection group, if the 100FX, 100LX, and ONS-SE-ZE-EL SFP are used in the protection group and is connected to the peer via the parallel cable (not Y-cable).

Note When you configure L2 1 + 1 protection on 10GE_XP and 10GE_XPE cards, set the Protection Action to **None** on the client ports. Setting the Protection Action as **Squelch** results in unexpected switching behavior.

Step 6 Configure the standby and active port speed, by setting the mode parameter to Auto or 1000 or any other values. For detailed information on how to configure the standby port behavior, see the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Stop. You have completed this procedure.

NTP-G461 Create a 1+1 Protection Group for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This procedure creates a 1+1 protection group for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE slots where internal patchcords were created.
Tools/Equipment	None
Prerequisite Procedures	DLP-G344 Verify Provisionable and Internal Patchcords, page 17-52
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

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

Step 2 In the Protection Groups area, click **Create**.

Step 3 In the Create Protection Group dialog box, enter the following:

- Name—Type a name for the protection group. The name can have up to 32 alphanumeric (a-z, A-Z, 0-9) characters. Special characters are permitted. For TL1 compatibility, do not use question mark (?), backslash (\), or double quote (“) characters.
- Type—Choose **L2 1+1 (port)** from the drop-down list.
- Protect Port—From the drop-down list, choose the port that will be the standby or protection port for the active port. The list displays the available transponder or muxponder ports. If transponder or muxponder cards are not installed, no ports appear in the drop-down list.

After you choose the protect port, a list of available working ports appear in the Available Ports list. If no cards are available, no ports appear. If this occurs, you cannot complete this task until you install the physical cards or preprovision the ONS 15454 slots using the “DLP-G353 Preprovision a Slot” task on page 14-53.

Step 4 From the Available Ports list, select the port that will be protected by the port you selected in the Protected Port drop-down list. Click the top arrow button to move the port to the Working Ports list.

Step 5 Complete the remaining fields:

- Revertive—Check this check box if you want traffic to revert to the working port after failure conditions remain corrected for the amount of time entered in the Reversion Time field.
- Reversion time—If Revertive is checked, select a reversion time from the drop-down list. The range is 0.5 to 12.0 minutes. The default is 5.0 minutes. Reversion time is the amount of time that will elapse before the traffic reverts to the working card. The reversion timer starts after conditions causing the switch are cleared.

The bidirectional switching option is available for SONET and SDH 1+1 protection groups.

Step 6 Click **OK**.

Step 7 Repeat this procedure for every 1+1 protection group indicated in the Cisco TransportPlanner Traffic Matrix.

Step 8 Return to your originating procedure (NTP).

NTP-G98 Provision the 2.5G Multirate Transponder Card Line Settings and PM Parameter Thresholds

Purpose	This procedure changes the line and threshold settings for TXP_MR_2.5G and TXPP_MR_2.5G transponder cards.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G63 Install an SFP or XFP, page 14-72 DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary) DLP-G278 Provision the Optical Line Rate, page 11-131 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the transponder card settings. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 Perform any of the following tasks as needed:

- DLP-G229 Change the 2.5G Multirate Transponder Card Settings, page 11-147
- DLP-G230 Change the 2.5G Multirate Transponder Line Settings, page 11-148
- DLP-G231 Change the 2.5G Multirate Transponder Line Section Trace Settings, page 11-151
- DLP-G232 Change the 2.5G Multirate Transponder SONET or SDH Line Threshold Settings, page 11-153
- DLP-G320 Change the 2.5G Multirate Transponder Line RMON Thresholds for 1G Ethernet or 1G FC/FICON Payloads, page 11-156
- DLP-G305 Provision the 2.5G Multirate Transponder Trunk Port Alarm and TCA Thresholds, page 11-157
- DLP-G306 Provision the 2.5G Multirate Transponder Client Port Alarm and TCA Thresholds, page 11-159
- DLP-G234 Change the 2.5G Multirate Transponder OTN Settings, page 11-163
- DLP-G367 Change the 2.5G Multirate Transponder Trunk Wavelength Settings, page 11-152

Stop. You have completed this procedure.

DLP-G229 Change the 2.5G Multirate Transponder Card Settings

Purpose	This task changes the card settings for TXP_MR_2.5G and TXPP_MR_2.5G transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the card settings.

Step 2 Click the **Provisioning > Card** tabs.

Step 3 Modify any of the settings described in Table 11-37.

Note The Card subtab Framing Type and Tunable Wavelengths fields are display-only. Framing Type shows the card framing type, either SONET or SDH, depending on whether the card is installed in an ANSI or ETSI chassis. The Tunable Wavelengths field shows the tunable wavelengths for the physical TXP_MR_2.5G or TXPP_MR_2.5G that is installed.

Table 11-37 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Settings

Parameter	Description	Options
Termination Mode	Sets the mode of operation (option only supported for SONET/SDH payloads).	• Transparent • Section (ANSI) or Regeneration Section (ETSI) • Line (ANSI) or Multiplex Section (ETSI)
Regeneration Peer Slot	Sets the slot containing another TXP_MR_2.5G or TXPP_MR_2.5G card to create a regeneration peer group. A regeneration peer group facilitates the management of two TXP_MR_2.5G or TXPP_MR_2.5G cards that are needed to perform a complete signal regeneration. The regeneration peer group synchronizes provisioning of the two cards. Payload type and ITU-T G.709 optical transport network (OTN) changes made on one TXP_MR_2.5G or TXPP_MR_2.5G card are reflected on the peer TXP_MR_2.5G or TXPP_MR_2.5G card. **Note** Y-cable protection groups cannot be created on TXP_MR_2.5G or TXPP_MR_2.5G cards that are in a regeneration peer group.	• None • 1 • 2 • 3 • 4 • 5 • 6 • 12 • 13 • 14 • 15 • 16 • 17
Regeneration Group Name	Sets the regeneration peer group name.	User defined

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G230 Change the 2.5G Multirate Transponder Line Settings

Purpose	This task changes the line settings for the client port of the TXP_MR_2.5G and TXPP_MR_2.5G transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > SONET** tabs.

Step 3 Modify any of the settings described in Table 11-38.

Note The 2.5G multirate transponder trunk settings are provisioned in the "DLP-G305 Provision the 2.5G Multirate Transponder Trunk Port Alarm and TCA Thresholds" task on page 11-157.

Table 11-38 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Line Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	• 1 • 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G card only)
Port Name	The user can assign a logical name for each of the ports shown by filling in this field.	User-defined. Name can be up to 32 alphanumeric/ special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about administrative states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • IS,AINS (ANSI) or Unlocked,automaticInService (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI)
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)
SF BER	(OC-N and STM-N payloads only) Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5
SD BER	(OC-N and STM-N payloads only) Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9

Table 11-38 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Line Settings (Continued)

Parameter	Description	Options
ALS Mode	Sets the automatic laser shutdown (ALS) function.	• Disabled (default) • Auto Restart • Manual Restart • Manual Restart for Test
Reach	Displays the optical reach distance of the client port.	Options: ANSI/ETSI • Autoprovision/Autoprovision (default) • SR • SR 1/I-1—Short reach up to 2-km distance • IR 1/S1—Intermediate reach, up to 15-km distance • IR 2/S2—Intermediate reach up to 40-km distance • LR 1/L1—long reach, up to 40-km distance • LR 2/L2—long reach, up to 80-km distance • LR 3/L3—long reach, up to 80-km distance
Wavelength	Displays the wavelength of the client port.	• First Tunable Wavelength • Further wavelengths: 1310 nm through 1560.61 nm, 100-GHz ITU spacing; coarse wavelength division multiplexing (CWDM) spacing Note: supported wavelengths are marked by asterisks (**)
AINS Soak	(OC-N and STM-N payloads only) Sets the automatic in-service soak period.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments
Type	(OC-N and STM-N payloads only) The optical transport type.	• SONET • SDH

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G231 Change the 2.5G Multirate Transponder Line Section Trace Settings

Purpose	This task changes the section trace settings for TXP_MR_2.5G and TXPP_MR_2.5G transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note This task only applies to SONET services.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs.

Step 3 Modify any of the settings described in Table 11-39.

Table 11-39 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Section Trace Settings

Parameter	Description	Options
Port	(Display only) Port number.	• 1 • 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G only)
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable AIS/RDI on TIM-S	If an TIM on Section overhead alarm arises because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size

Table 11-39 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Section Trace Settings (Continued)

Parameter	Description	Options
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this display updated automatically.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G367 Change the 2.5G Multirate Transponder Trunk Wavelength Settings

Purpose	This task changes the trunk wavelength settings for the TXP_MR_2.5G and TXPP_MR_2.5G cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the trunk wavelength settings.

Step 2 Click the **Provisioning > Line > Wavelength Trunk Settings** tabs.

Step 3 Modify any of the settings as described in Table 11-40.

Table 11-40 TXP_MR_2.5G and TXPP_MR_2.5G Card Wavelength Trunk Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	• 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G only)
Wavelength	The wavelength provisioned for the trunk.	• First Tunable Wavelength • Further wavelengths in 100-GHz ITU-T, C-band spacing. If the card is installed, the wavelengths it carries are identified with two asterisks. Other wavelengths have a dark grey background. If the card is not installed, all wavelengths appear with a dark grey background.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G232 Change the 2.5G Multirate Transponder SONET or SDH Line Threshold Settings

Purpose	This task changes the line threshold settings for TXP_MR_2.5G and TXPP_MR_2.5G transponder cards carrying OC-3/STM-1, OC-12/STM-4, and OC-48/STM-16 payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds** tabs.

Note You must modify Near End and Far End independently; 15 Min and 1 Day independently; and Line and Section independently. To do so, choose the appropriate radio button and click **Refresh**.

Step 3 Modify any of the settings in Table 11-41.

Note Some parameters and options in Table 11-41 do not apply to all TXP_MR_2.5G or TXPP_MR_2.5G cards. If a parameter or option does not apply, that parameter or option does not appear in CTC.

Table 11-41 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Line Thresholds Settings for OC-3/STM-1, OC-12/STM-4, and OC-48/STM-16 Payloads

Parameter	Description	Options - ANSI	Options - ETSI
Port	(Display only) Port number	• 1 • 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G only)	• 1 • 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G only)
EB	Path Errored Block indicates that one or more bits are in error within a block	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Table 11-41 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Line Thresholds Settings for OC-3/STM-1, OC-12/STM-4, and OC-48/STM-16 Payloads (Continued)

Parameter	Description	Options - ANSI	Options - ETSI
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
SEFS	(Near End Section or Regeneration Section only) Severely errored framing seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.	—
UAS	Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
BBE	Background block errors	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G320 Change the 2.5G Multirate Transponder Line RMON Thresholds for 1G Ethernet or 1G FC/FICON Payloads

Purpose	This task changes the line remote monitoring (RMON) threshold settings for TXP_MR_2.5G and TXPP_MR_2.5G transponder cards carrying the 1G Ethernet or 1G FC/FICON payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In card view, display the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose the applicable port.

Step 5 From the Variable drop-down list, choose an Ethernet variable. See Table 11-42 for a list of available Ethernet variables.

Table 11-42 TXP_MR_2.5G and TXPP_MR_2.5G Card 1G Ethernet and 1G FC/FICON Thresholds

Variable	Description
ifInErrors	Number of inbound packets that contained errors preventing them from being delivered to a higher-layer protocol.
rxTotalPkts	Total number of received packets.
8b10bStatsEncodingDispErrors	Number of IETF 8b10b disparity violations on the Fibre Channel line side.
8b10bIdleOrderedSets	Number of received packets containing idle ordered sets.
8b10bNonIdleOrderedSets	Number of received packets containing non-idle ordered sets.
8b10bDataOrderedSets	Number of received packets containing data ordered sets.

Step 6 From the Alarm Type drop-down list, indicate whether the event will be triggered by the rising threshold, the falling threshold, or both the rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Enter the appropriate number of seconds for the Sample Period.

Step 9 Enter the appropriate number of occurrences for the Rising Threshold.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Step 12 Return to your originating procedure (NTP).

DLP-G305 Provision the 2.5G Multirate Transponder Trunk Port Alarm and TCA Thresholds

Purpose	This task changes the TXP_MR_2.5G and TXPP_MR_2.5G trunk port alarm and threshold crossing alert (TCA) thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note In this task, trunk port refers to Port 2 for TXP_MR_2.5G cards, and to Ports 2 and 3 for TXPP_MR_2.5G cards.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Pluggable Port Modules** tab. Under Pluggable Ports, record the Rate that is provisioned.

Step 3 Look up the rate in Table 11-43 and note whether it is 2R or 3R.

Table 11-43 2R and 3R Mode and ITU-T G.709 Compliance by Client Interface

Client Interface	Input Bit Rate	3R vs. 2R	ITU-T G.709
OC-48/STM-16	2.488 Gbps	3R	On or Off
DV-6000	2.38 Gbps	2R	—
2 Gigabit Fibre Channel (2G-FC)/fiber connectivity (FICON)	2.125 Gbps	3R[1]	On or Off
High-Definition Television (HDTV)	1.48 Gbps	2R	—
Gigabit Ethernet (GE)	1.25 Gbps	3R	On or Off
1 Gigabit Fibre Channel (1G-FC)/FICON	1.06 Gbps	3R	On or Off
OC-12/STM-4	622 Mbps	3R	On or Off
OC-3/STM-1	155 Mbps	3R	On or Off
Enterprise System Connection (ESCON)	200 Mbps	2R	—
SDI/D1 video	270 Mbps	2R	—
ISC-1 Compact	1.06 Gbps	3R	Off
ISC-3	1.06 or 2.125 Gbps	2R	—
ETR_CLO	16 Mbps	2R	—

1. No monitoring

Step 4 Click the **Provisioning > Optics Thresholds** tabs.

Step 5 Under **Types**, verify that the TCA radio button is checked. If not, check it and click **Refresh**.

Step 6 Referring to Table 11-44, verify the trunk port TCA thresholds for RX Power High and RX Power Low depending on whether the rate is 2R or 3R. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note Do not modify the Laser Bias parameters.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-44 TXP_MR_2.5G and TXPP_MR_2.5G Trunk Port TCA Thresholds

Signal	TCA RX Power Low	TCA RX Power High
3R	–23 dBm	–9 dBm
2R	–24 dBm	–9 dBm

Step 7 Click **Apply**.

Step 8 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 9 Verify the trunk port Alarm thresholds for RX Power High is –7 dBm, and for RX Power Low is –26 dBm. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Step 10 Click **Apply**.

Step 11 Return to your originating procedure (NTP).

DLP-G306 Provision the 2.5G Multirate Transponder Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the TXP_MR_2.5G and TXPP_MR_2.5G cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G278 Provision the Optical Line Rate, page 11-131 DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs. The TCA thresholds are shown by default.

Step 3 Referring to Table 11-45, verify the Port 1 (client) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface at the other end. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note Do not modify the Laser Bias parameters.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Table 11-45 TXP_MR_2.5G and TXPP_MR_2.5G Card Client Interface TCA Thresholds

Port Type (by CTC)	Pluggable Port Module (SFP)	TCA RX Power Low	TCA RX Power High	TCA TX Power Low	TCA TX Power High
OC-3	15454-SFP3-1-IR	–23	–8	–21	–2
STM-1	15454E-SFP-L.1.1	–24	–10	–21	–2
OC-12	15454-SFP12-4-IR	–28	–7	–21	–2
STM-4	15454E-SFP-L.4.1	–28	–8	–21	–2
OC-48	ONS-SE-2G-S1	–18	–3	–16	3
	15454-SFP-OC48-IR	–18	0	–11	6
STM-16	ONS-SE-2G-S1 15454E-SFP-L.16.1	–18	–3	–16	3
ONE_GE	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–17	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
ESCON	15454-SFP-200 15454E-SFP-200 ONS-SE-200-MM	–21	–14	–35	–8
DV6000	15454-SFP-OC48-IR	–18	0	–11	6
	15454E-SFP-L.16.1	–18	–3	–16	3
SDI_D1_ VIDEO	15454-SFP12-4-IR	–28	–7	–21	–2
	15454E-SFP-L.4.1	–28	–8	–21	–2
HDTV	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
PASS-THRU	2R MODE (not specified)	—	—	—	—
FC1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–17	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
FC2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–15	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3

Table 11-45 TXP_MR_2.5G and TXPP_MR_2.5G Card Client Interface TCA Thresholds (Continued)

Port Type (by CTC)	Pluggable Port Module (SFP)	TCA RX Power Low	TCA RX Power High	TCA TX Power Low	TCA TX Power High
FICON1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–17	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
FICON2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–15	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
ETR_CLO	15454-SFP-200 15454E-SFP-200 ONS-SE-200-MM	–17	0	–16	3
ISC compat	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
ISC peer	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3

Step 4 Click **Apply**.

Step 5 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 6 Referring to Table 11-46, verify the Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Table 11-46 TXP_MR_2.5G and TXPP_MR_2.5G Card Client Interface Alarm Thresholds

Port Type (by CTC)	Pluggable Port Module (SFP)	Alarm RX Power Low	Alarm RX Power High	Alarm TX Power Low	Alarm TX Power High
OC-3	15454-SFP3-1-IR	–26	–5	–17	–6
STM-1	15454E-SFP-L.1.1	–27	–7	–17	–6
OC-12	15454-SFP12-4-IR	–31	–4	–17	–6
STM-4	15454E-SFP-L.4.1	–31	–5	–17	–6
OC-48	ONS-SE-2G-S1	–21	0	–12	–1
	15454-SFP-OC48-IR	–21	3	–7	2
STM-16	ONS-SE-2G-S1 15454E-SFP-L.16.1	–21	0	–12	–1

Table 11-46 TXP_MR_2.5G and TXPP_MR_2.5G Card Client Interface Alarm Thresholds (Continued)

Port Type (by CTC)	Pluggable Port Module (SFP)	Alarm RX Power Low	Alarm RX Power High	Alarm TX Power Low	Alarm TX Power High
ONE_GE	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–12	–2
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1
ESCON	15454-SFP-200 15454E-SFP-200 ONS-SE-200-MM	–24	–11	–31	–12
DV6000	15454-SFP-OC48-IR	–21	3	–7	2
	15454E-SFP-L.16.1	–21	0	–12	–5
SDI_D1_ VIDEO	15454-SFP12-4-IR	–31	–4	–17	–6
	15454E-SFP-L.4.1	–31	–5	–17	–6
HDTV	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1
PASS-THRU	2R MODE (not specified)	—	—	—	—
FC1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–12	–2
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1
FC2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–18	3	–12	–2
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1
FICON1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–12	–2
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1
FICON2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–18	3	–12	–2
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1

Table 11-46 TXP_MR_2.5G and TXPP_MR_2.5G Card Client Interface Alarm Thresholds (Continued)

Port Type (by CTC)	Pluggable Port Module (SFP)	Alarm RX Power Low	Alarm RX Power High	Alarm TX Power Low	Alarm TX Power High
ETR_CLO	15454-SFP-200 15454E-SFP-200 ONS-SE-200-MM	–20	3	–12	–2
ISC compat	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1
ISC peer	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–12	–1

Step 7 Click **Apply**.

Step 8 Return to your originating procedure (NTP).

DLP-G234 Change the 2.5G Multirate Transponder OTN Settings

Purpose	This task changes the OTN settings for TXP_MR_2.5G and TXPP_MR_2.5G transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_2.5G or TXPP_MR_2.5G card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then choose one of the following subtabs: **OTN Lines**, **G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-47 through 11-50.

Note You must modify Near End and Far End; 15 Min and 1 Day; and SM and PM settings independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-47 describes the values on the Provisioning > OTN > OTN Lines tab.

Table 11-47 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card OTN Line Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	• 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G)
G.709 OTN	Sets the OTN lines according to ITU-T G.709.	• Enable • Disable
FEC	Sets the OTN lines to forward error correction (FEC).	• Enable • Disable
SF BER	(Display only) The signal fail bit error rate.	• 1E-5
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9

Table 11-48 describes the values on the Provisioning > OTN > G.709 Thresholds tab.

Table 11-48 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card ITU-T G.709 Threshold Settings

Parameter	Description	Options
Port[1]	(Display only) Port number.	• 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G)
ES	Errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
SES	Severely errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
UAS	Unavailable seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
BBE	Background block errors	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
FC	Failure counter	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.

1. Latency for a 1G-FC payload without ITU-T G.709 is 4 microseconds, and with ITU-T G.709 is 40 microseconds. Latency for a 2G-FC payload without ITU-T G.709 is 2 microseconds, and with ITU-T G.709 is 20 microseconds. Consider these values when planning a FC network that is sensitive to latency.

Table 11-49 describes the values on the Provisioning > OTN > FEC Threshold tab.

Table 11-49 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card FEC Threshold Settings

Parameter	Description	Options
Port	(Display only) Port number.	• 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G)
Bit Errors Corrected	Sets the value for bit errors corrected.	Numeric. Can be set for 15-minute or one-day intervals.
Uncorrectable Words	Sets the value for uncorrectable words.	Numeric. Can be set for 15-minute or one-day intervals.

Table 11-50 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-50 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Trail Trace Identifier Settings

Parameter	Description	Options
Port	(Display only) Port number.	• 2 (Trunk) • 3 (Trunk) (TXPP_MR_2.5G)
Level	Sets the level.	• Section • Path
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable FDI on TIM	If an TIM on Section overhead alarm arises because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size

Table 11-50 TXP_MR_2.5G and TXPP_MR_2.5G Transponder Card Trail Trace Identifier Settings (Continued)

Parameter	Description	Options
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 minutes.	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

NTP-G96 Provision the 10G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds

Purpose	This procedure changes the line and threshold settings for 10G multirate transponder cards including the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C cards.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G63 Install an SFP or XFP, page 14-72 DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary) DLP-G278 Provision the Optical Line Rate, page 11-131 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The TXP_MR_10G card does not support PPMs.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the transponder card settings. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 If you are provisioning a TXP_MR_10G card, complete the "DLP-G365 Provision the TXP_MR_10G Data Rate" task on page 11-167, and if you are provisioning a TXP_MR_10E or TXP_MR_10EX_C card, complete the "DLP-G712 Provision the TXP_MR_10E or TXP_MR_10EX_C Data Rate" task on page 11-168. If not, continue with Step 4.

Step 4 Perform any of the following tasks as needed:

- DLP-G216 Change the 10G Multirate Transponder Card Settings, page 11-168
- DLP-G217 Change the 10G Multirate Transponder Line Settings, page 11-170
- DLP-G218 Change the 10G Multirate Transponder Line Section Trace Settings, page 11-173
- DLP-G219 Change the 10G Multirate Transponder Line Thresholds for SONET or SDH Payloads Including 10G Ethernet WAN Phy, page 11-176
- DLP-G319 Change the 10G Multirate Transponder Line RMON Thresholds for 10G Ethernet LAN Phy Payloads, page 11-179
- DLP-G301 Provision the 10G Multirate Transponder Trunk Port Alarm and TCA Thresholds, page 11-183
- DLP-G302 Provision the 10G Multirate Transponder Client Port Alarm and TCA Thresholds, page 11-184
- DLP-G221 Change the 10G Multirate Transponder OTN Settings, page 11-186
- DLP-G368 Change the 10G Multirate Transponder Trunk Wavelength Settings, page 11-175

Stop. You have completed this procedure.

DLP-G365 Provision the TXP_MR_10G Data Rate

Purpose	This task changes the TXP_MR_10G card data rate.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G card where you want to change the card data rate settings.

Step 2 Click the **Provisioning > Data Rate Selection** tabs.

Step 3 Click **Create**.

Step 4 In the Create Port dialog box, choose one of the following data rates:

- SONET (ANSI) or SDH (ETSI) (including 10G Ethernet WAN Phy)
- 10G Ethernet LAN Phy

Step 5 Click **Ok**.

Step 6 Return to your originating procedure.

DLP-G712 Provision the TXP_MR_10E or TXP_MR_10EX_C Data Rate

Purpose	This task changes the TXP_MR_10E or TXP_MR_10EX_C card data rate.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10E or TXP_MR_10EX_C card where you want to change the card data rate settings.

Step 2 Click the **Provisioning > Pluggable Port Modules** tabs.

Step 3 In the Pluggable Port Modules area, click **Create**. The Create PPM dialog box appears.

Step 4 In the Create PPM dialog box, complete the following:

- PPM—Choose the SFP you want to install from the drop-down list.
- PPM Type—Choose the number of ports supported by your SFP from the drop-down list. If only one port is supported, **PPM (1 port)** is the only option.

Step 5 Click **OK**. The newly created PPM appears in the Pluggable Port Modules area. The row in the Pluggable

Step 6 Port Modules area turns white and the Actual Equipment Type column lists the equipment name.

Step 7 In the Pluggable Ports area, click **Create**. The Create Ports dialog box appears.

Step 8 In the Create Port dialog box, choose one of the following data rates:

- SONET (ANSI) or SDH (ETSI) (including 10G Ethernet WAN Phy)
- 10G Ethernet LAN Phy
- 10G FIBER Channel
- (TXP-MR-10EX_C card only) IB_5G

Step 9 Click **Ok**.

Step 10 Return to your originating procedure.

DLP-G216 Change the 10G Multirate Transponder Card Settings

Purpose	This task changes the card settings for the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, or TXP_MR_10E_L card where you want to change the card settings.

Step 2 Click the **Provisioning > Card** tabs.

Step 3 Modify any of the settings described in Table 11-51.

Table 11-51 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card Settings

Parameter	Description	ONS 15454 Options	ONS 15454 SDH Options
Termination Mode	Sets the mode of operation. (This option is only available for SONET/SDH payloads).	• Transparent • Section (TXP_MR_10E only) • Line	• Transparent • Regeneration Section (TXP_MR_10E only) • Multiplex Section
AIS/Squelch Configuration	(TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C only) Sets the transparent termination mode configuration.	• Squelch • AIS	• Squelch • AIS
Regeneration Peer Slot	Sets the slot containing another TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card to create a regeneration peer group. A regeneration peer group facilitates the management of two TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C cards that are needed to perform a complete signal regeneration. The regeneration peer group synchronizes provisioning of the two cards. Payload type and ITU-T G.709 optical transport network (OTN) changes made on one TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card are reflected on the peer TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card. **Note** Y-cable protection groups cannot be created on TXP cards that are in a regeneration peer group.	• None • 1 • 2 • 3 • 4 • 5 • 6 • 12 • 13 • 14 • 15 • 16 • 17	• None • 1 • 2 • 3 • 4 • 5 • 6 • 12 • 13 • 14 • 15 • 16 • 17

Table 11-51 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card Settings

Parameter	Description	ONS 15454 Options	ONS 15454 SDH Options
Regeneration Group Name	(Display only) The regeneration peer group name.	—	—
Tunable Wavelengths	(Display only) Shows the supported wavelengths of the trunk port after the card is installed. For the TXP_MR_10E_C, or TXP_MR_10E_L cards, the first and last supported wavelength, frequency spacing, and number of supported wavelengths are shown in the format: *first wavelength-last wavelength-frequency spacing-number of supported wavelengths*. For example, the TXP_MR_10E_C card would show: `1529.55nm-1561.83nm-50gHz-82`. The TXP_MR_10E show the four wavelengths supported by the card that is installed. The TXP_MR_10G show the two wavelengths supported by the card that is installed.	—	—

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G217 Change the 10G Multirate Transponder Line Settings

Purpose	This task changes the line settings for TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > SONET/SDH/Ethernet** tabs. SONET is the option for ANSI shelves when 10G Ethernet WAN phy is the Pluggable Port Rate, SDH is the option for ETSI shelves when 10G Ethernet WAN phy is the Pluggable Port Rate, and Ethernet is the option for ANSI or ETSI shelves when 10GE LAN Phy is the Pluggable Port Rate.

Step 3 Modify any of the settings described in Table 11-52.

Note In Table 11-52, some parameter tabs do not always apply to all 10G multirate transponder cards. If a tab does not apply, it will not appear in CTC.

Table 11-52 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Line Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the port number.	• 1 (OC192) (10G Ethernet WAN Phy) (if TXP_MR_10G) • 1 (TEN_GE) (if Ethernet LAN is provisioned on the TXP_MR_10G card) • 1-1 (OC192) (10G Ethernet WAN Phy on the TXP_MR_10E card) • 1-1 (TEN_GE) (if Ethernet LAN is provisioned on the TXP_MR_10E card) • 1-1 (FC10G) (if 10G fiber channel is provisioned on the TXP_MR_10E card) • 2 (Trunk) • (TXP_MR_10EX_C only) IB_5G	• 1 (STM-64) (10G Ethernet WAN Phy) (if TXP_MR_10G) • 1 (TEN_GE) (if Ethernet LAN is provisioned on the TXP_MR_10G card) • 1-1 (STM-64) (10G Ethernet WAN Phy on the TXP_MR_10E card) • 1-1 (TEN_GE) (if Ethernet LAN is provisioned on the TXP_MR_10E card) • 1-1 (FC10G) (if 10G fiber channel is provisioned on the TXP_MR_10E card) • 2 (Trunk) • (TXP_MR_10EX_C only) IB_5G
Port Name	Provides the ability to assign the specified port a name.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state. For more information about administrative states, see the Administrative and Service States.	• IS • IS,AINS • OOS,DSBLD • OOS,MT	• Unlocked • Unlocked,automaticInService • Locked,disabled • Locked,maintenance
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States.	• IS-NR • OOS-AU,AINS • OOS-MA,DSBLD • OOS-MA,MT	• Unlocked-enabled • Unlocked-disabled, automaticInService • Locked-enabled,disabled • Locked-enabled,maintenance

Table 11-52 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Line Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
SF BER	(SONET [ANSI] or SDH [ETSI] including 10G Ethernet WAN Phy only) Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5	• 1E-3 • 1E-4 • 1E-5
SD BER	(SONET [ANSI] or SDH [ETSI] including 10G Ethernet WAN Phy only) Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
Type	(SONET [ANSI] or SDH [ETSI] including 10G Ethernet WAN Phy only) The optical transport type.	• SONET • SDH	• SONET • SDH
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled, or it can be set for one of three mode options.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.
AINS Soak	(SONET [ANSI] or SDH [ETSI] including 10G Ethernet WAN Phy only) Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to change settings.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments

Table 11-52 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Line Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
ProvidesSync	(TXP_MR_10E, OC192 only) Sets the ProvidesSync card parameter. If checked, the card is provisioned as a network element (NE) timing reference.	Checked or unchecked	Checked or unchecked
SyncMsgIn	(TXP_MR_10E, OC192 only) Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked	Checked or unchecked
Max Size	(TXP_MR_10E, TXP_MR_10G LAN Phy only) Sets the maximum Ethernet packet size.	• 1548 bytes • Jumbo (64 to 9,216 bytes)	• 1548 bytes • Jumbo (64 to 9,216 bytes)
Incoming MAC Address	(TXP_MR_10E, TXP_MR_10G LAN Phy only) Sets the incoming MAC address.	Value of MAC address. Six bytes in hexadecimal format.	Value of MAC address. Six bytes in hexadecimal format.
Wavelength	Displays the wavelength of the client port.	• First Tunable Wavelength • Further wavelengths: 1310 nm through 1560.61 nm, 100-GHz ITU spacing; coarse wavelength division multiplexing (CWDM) spacing Note: supported wavelengths are marked by asterisks (**)	• First Tunable Wavelength • Further wavelengths: 1310 nm through 1560.61 nm, 100-GHz ITU spacing; coarse wavelength division multiplexing (CWDM) spacing Note: supported wavelengths are marked by asterisks (**)
Reach	Displays the optical reach distance of the client port.	The Reach options depend on the traffic type that has been selected.	The Reach options depend on the traffic type that has been selected.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G218 Change the 10G Multirate Transponder Line Section Trace Settings

Purpose	This task changes the line section trace settings for the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The Section Trace tab is available for the 10G Multirate Transponder cards only if no PPMs are provisioned, or the OC192 PPM is provisioned. The tab is not available if a 10G Ethernet LAN Phy or 10G Fibre Channel PPM is provisioned.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card where you want to change the section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs.

Step 3 Modify any of the settings described in Table 11-53.

Table 11-53 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Section Trace Settings

Parameter	Description	ONS 15454 Options	Options — ONS 15454 SDH
Port	Sets the port number.	• 1-1 (OC192) • 2—Trunk	• 1-1 (STM64) • 2—Trunk
Received Trace Mode	Sets the trace mode.	• Off/None • Manual	• Off/None • Manual
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte	• 1 byte • 16 byte
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size	String of trace string size
Disable AIS/RDI on TIM-S	If an TIM on Section overhead alarm arises because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size	String of trace string size

Table 11-53 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Section Trace Settings

Parameter	Description	ONS 15454 Options	Options — ONS 15454 SDH
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G368 Change the 10G Multirate Transponder Trunk Wavelength Settings

Purpose	This task changes the trunk wavelength settings for the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Before modifying the wavelength settings, change the port state to OOS,DSBLD (for ANSI) or Locked,disabled (for ETSI) and delete the circuit and patchcord provisioning present on the port. Payload or communication channel provisioning can be retained.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C card where you want to change the trunk wavelength settings.

Step 2 Click the **Provisioning > Line > Wavelength Trunk Settings** tabs.

Step 3 Modify any of the settings as described in Table 11-54.

Table 11-54 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C Card Wavelength Trunk Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	Port 2 (Trunk)
Band	Indicates the wavelength band that can be provisioned. If the physical TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C is installed, this field is display-only.	• C—The C-band wavelengths are available in the Wavelength field. • L—The L-band wavelengths are available in the Wavelength field.
Even/Odd	Sets the wavelengths available for provisioning for TXP_MR_10E_C, and TXP_MR_10E_L cards. (This field does not apply to TXP_MR_10G or TXP_MR_10E cards.)	• Even—Displays even C-band or L-band wavelengths in the Wavelength field. • Odd—Displays odd C-band or L-band wavelengths in the Wavelength field.
Wavelength	The wavelength provisioned for the trunk.	• First Tunable Wavelength • Further wavelengths in 100-GHz ITU-T C-band or L-band spacing, depending on the card that is installed. For TXP_MR_10G and TXP_MR_10E cards, the wavelengths carried by the card are identified with two asterisks. If the card is not installed, all wavelengths appear with a dark grey background.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G219 Change the 10G Multirate Transponder Line Thresholds for SONET or SDH Payloads Including 10G Ethernet WAN Phy

Purpose	This task changes the line threshold settings for TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C transponder cards carrying SONET or SDH payloads, including the physical 10G Ethernet WAN Phy payload.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds > SONET Thresholds** (ANSI) or **SDH Thresholds** (ETSI) tabs.

Step 3 Modify any of the settings described in Table 11-55.

Note Parameters shown in Table 11-55 do not apply to all 10G multirate transponder cards. If the parameter or option does not apply, it is not shown in CTC.

Table 11-55 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card Line Threshold Settings

Parameter	Description	Options - ANSI	Options - ETSI
Port	(Display only) Port number	• 1-1 (OC192) • 2 (Trunk)	• 1-1 (STM64) • 2 (Trunk)
EB	Path Errored Block indicates that one or more bits are in error within a block	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Table 11-55 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card Line Threshold Settings (Continued)

Parameter	Description	Options - ANSI	Options - ETSI
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
SEFS	(Near End Section or Regeneration Section only) Severely errored framing seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
OFS	(Near End Section or Regeneration Section only) Out of frame seconds	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.
BBE	Background block errors	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Table 11-55 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card Line Threshold Settings (Continued)

Parameter	Description	Options - ANSI	Options - ETSI
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
UAS	(Line or Multiplex Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G319 Change the 10G Multirate Transponder Line RMON Thresholds for 10G Ethernet LAN Phy Payloads

Purpose	This task changes the line threshold settings for TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C transponder cards carrying the physical 10G Ethernet LAN payload.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Display the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card where you want to change the line threshold settings in card view.

Step 2 Click the **Provisioning > Line Thresholds > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose the applicable port.

Step 5 From the Variable drop-down list, choose an Ethernet variable. See Table 11-56 for a list of available Ethernet variables.

Table 11-56 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card GE LAN Phy Variables

Variable	Description
ifInOctets	Total number of octets received on the interface, including framing characters.
rxTotalPkts	Total number of received packets.
ifInMulticastPkts	Number of multicast frames received error free.
ifInBroadcastPkts	Number of packets, delivered by a sublayer to an higher sublayer, that were addressed to a broadcast address at this sublayer.
ifInErrors	Number of inbound packets that contained errors preventing them from being delivered to a higher-layer protocol.
ifInErrorBytePkts (TXP_MR_10G only)	Number of receive error bytes.
ifInFramingErrorPkts (TXP_MR_10G only)	Number of receive framing error counters.
ifInJunkInterPkts (TXP_MR_10G only)	Number of receive interpacket junk counters.
ifOutOctets (TXP_MR_10G only)	Total number of octets transmitted out of the interface, including framing characters.
txTotalPkts (TXP_MR_10G only)	Total number of transmit packets.
ifOutMulticastPkts (TXP_MR_10G only)	Number of multicast frames transmitted error free.
ifOutBroadcastPkts (TXP_MR_10G only)	Total number of packets that higher-level protocols requested be transmitted, and that were addressed to a broadcast address at this sublayer, including those that were discarded or not sent.
dot3StatsFCSErrors	Number of frames with frame check errors, that is, there is an integral number of octets, but an incorrect Frame Check Sequence (FCS).
dot3StatsFrameTooLong (TXP_MR_10G only)	Number of received frames that were larger than the maximum size permitted.
etherStatsUndersizePkts	Total number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.

Table 11-56 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card GE LAN Phy Variables (Continued)

etherStatsFragments	Total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Note that it is entirely normal for etherStatsFragments to increment. This is because it counts both runts (which are normal occurrences due to collisions) and noise hits.
etherStatsPkts64Octets	Total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
etherStatsPkts65to127Octets	Total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts128to255Octets	The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts256to511Octets	Total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts512to1023Octets	Total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts1024to1518Octets	Total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsBroadcastPkts	Total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.
etherStatsMulticastPkts	Total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
etherStatsOversizePkts	Total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsJabbers	Total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
etherStatsOctets	Total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets).

Table 11-56 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card GE LAN Phy Variables (Continued)

etherStatsCRCAlignErrors (TXP_MR_10G only)	Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
rxPauseFrames (TXP_MR_10G only)	Number of received IETF 802.x pause frames.
rxControlFrames	Number of MAC control frames passed by the MAC sublayer to the MAC control sublayer.
rxUnknownOpcodeFrames (TXP_MR_10G only)	Number of MAC control frames received that contain an opcode that is not supported by the device.

Step 6 From the Alarm Type drop-down list, indicate whether the event will be triggered by the rising threshold, the falling threshold, or both the rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Type in an appropriate number of seconds for the Sample Period.

Step 9 Type in the appropriate number of occurrences for the Rising Threshold.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Note To view all RMON thresholds, click **Show All RMON thresholds**.

Step 12 Return to your originating procedure (NTP).

DLP-G301 Provision the 10G Multirate Transponder Trunk Port Alarm and TCA Thresholds

Purpose	This task provisions the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C trunk port alarm and threshold cross alert (TCA) thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Step 3 Under Types, verify that the TCA radio button is checked. If not, check it, then click **Refresh**.

Step 4 Referring to Table 11-57, verify the trunk port (Port 2) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting the existing value, and entering the new value. Hit **Enter**, then click **Apply**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Table 11-57 10G Multirate Transponder Trunk Port TCA Thresholds

Card	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
TXP_MR_10G	–8 dBm	–18 dBm	7 dBm	–1 dBm
TXP_MR_10E TXP_MR_10E_C TXP_MR_10E_L TXP_MR_10EX_C	–9 dBm	–18 dBm	9 dBm	0 dBm

Step 5 Click **Apply**.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Referring to Table 11-58, verify the trunk port (Port 2) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting the existing value, and entering the new value. Hit **Enter**, then click **Apply**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-58 10G Multirate Transponder Trunk Port Alarm Thresholds

Card	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
TXP_MR_10G	–8 dBm	–20 dBm	4 dBm	2 dBm
TXP_MR_10E TXP_MR_10E_C TXP_MR_10E_L TXP_MR_10EX_C	–8 dBm	–20 dBm	7 dBm	3 dBm

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G302 Provision the 10G Multirate Transponder Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G278 Provision the Optical Line Rate, page 11-131 DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs. The TCA thresholds are shown by default.

Step 3 Under Types, verify that the TCA radio button is checked. If not, check it, then click **Refresh**.

Step 4 Referring to Table 11-59, verify the Port 1 (Client) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface at the other end. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting the existing value, and entering the new value. Hit Enter, then click **Apply**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Table 11-59 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card Client Interface TCA Thresholds

Pluggable Port Rate	Pluggable Port Module (XFP)	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
SONET (or SDH)	TXP_MR_10E uses ONS-XC-10G-S1 TXP_MR_10G (XFP not present)	–1	–11	–1	–6
10G Ethernet LAN Phy	TXP_MR_10E uses ONS-XC-10G-S1 TXP_MR_10G (XFP not present)	0.5	–14.4	–1	–6
10G Fibre Channel	TXP_MR_10E uses ONS-XC-10G-S1	0.5	–14.4	–1	–6
IB_5G[1]	TXP_MR_10EX_C uses ONS-XC-10G-S1 Version 3	1.0	–14.0	5.0	12.0

1. Only the TXP_MR_10EX_C card supports IB_5G.

Step 5 Click **Apply**.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Referring to Table 11-60, provision the Port 1 (Client) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-60 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card Client Interface Alarm Thresholds

Pluggable Port Rate	Pluggable Port Module (XFP)	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
SONET (or SDH)	TXP_MR_10E uses ONS-XC-10G-S1 TXP_MR_10G (XFP not present)	3	–16	1	–8
10G Ethernet LAN Phy	TXP_MR_10E uses ONS-XC-10G-S1 TXP_MR_10G (XFP not present)	3	–16	1	–8
10G Fibre Channel	TXP_MR_10E uses ONS-XC-10G-S1	3	–16	1	–8
IB_5G[1]	TXP_MR_10EX_C uses ONS-XC-10G-S1 Version 3	3.0	–16	1.0	–8

1. Only the TXP_MR_10EX_C card supports IB_5G.

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G221 Change the 10G Multirate Transponder OTN Settings

Purpose	This task changes the line OTN settings for the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, and TXP_MR_10EX_C transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then click one of the following subtabs: **OTN Lines**, **G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-61 through 11-64.

Note You must modify Near End and Far End independently, 15 Min and 1 Day independently, and SM and PM independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-61 describes the values on the Provisioning > OTN > OTN Lines tab.

Table 11-61 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card OTN Lines Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	2
G.709 OTN	Sets the OTN lines according to ITU-T G.709. Check the box to enable. For TXP-MR-10EX_C cards, the G.709 OTN should be enabled.	• Enable • Disable
FEC	Sets the OTN lines FEC mode. FEC mode can be Disabled, Enabled, or, for the TXP_MR_10E, Enhanced FEC mode can be enabled to provide greater range and lower bit error rate. For TXP_MR_10E cards, Standard is the same as enabling FEC. For TXP-MR-10EX_C cards, the FEC should be enabled.	• Enable—(TXP_MR_10G only) FEC is on. • Disable—FEC is off. • Standard—(TXP_MR_10E only) Standard FEC is on. • Enhanced—(TXP_MR_10E only) Enhanced FEC is on.
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
SF BER	(Display only) Indicates the signal fail bit error rate.	• 1E-5
Asynch/Synch Mapping	(TXP_MR_10E only) Sets how the ODUk (client payload) is mapped to the optical channel (OTUk).	• Asynch mapping • Synch mapping

Table 11-62 describes the values on the Provisioning > OTN > G.709 Thresholds tab.

Table 11-62 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card ITU-T G.709 Threshold Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	2
ES	Severely errored seconds. Two types of thresholds can be asserted. Selecting the SM (OTUk) radio button selects FEC, overhead management, and PM using OTUk. Selecting the PM radio button selects path PM using ODUk.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. **Note** SM (OTUk) is the ITU-T G.709 optical channel transport unit order of k overhead frame used for management and performance monitoring. PM (ODUk) is the ITU-T G.709 optical channel data unit order of k overhead frame unit used for path performance monitoring.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
UAS	Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-62 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card ITU-T G.709 Threshold Settings (Continued)

Parameter	Description	Options
BBE	Background block errors	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
FC	Failure counter	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-63 describes the values on the Provisioning > OTN > FEC Thresholds tab.

Table 11-63 TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or TXP_MR_10EX_C Card FEC Threshold Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	2
Bit Errors Corrected	Displays the number of bit errors corrected during the selected time period.	Numeric display. Can be set for 15-minute or one-day intervals.
Uncorrectable Words	Displays the number of uncorrectable words in the selected time period.	Numeric display. Can be set for 15-minute or one-day intervals.

Table 11-64 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-64 10G Multirate Transponder Trail Trace Identifier Settings

Parameter	Description	Options
Port	Sets the port number.	• 1 • 2
Level	Sets the level.	• Section • Path
Received Trace Mode	Sets the trace mode.	• Off/None • Manual

Table 11-64 10G Multirate Transponder Trail Trace Identifier Settings (Continued)

Parameter	Description	Options
Disable FDI on TTIM	If a Trace Identifier Mismatch on Section overhead alarm arises because of a J0 overhead string mismatch, no Forward Defect Indication (FDI) signal is sent to the downstream nodes if this box is checked.	• Checked (FDI on TTIM is disabled) • Unchecked (FDI on TTIM is not disabled)
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size; trail trace identifier is 64 bytes in length.
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 minutes.	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

NTP-G292 Provision the 40G Multirate Transponder Card Line Settings, PM Parameters, and Thresholds

Purpose	This procedure changes the line settings, PM parameters, and threshold settings for 40G multirate transponder cards (40E-TXP-C, 40ME-TXP-C).
Tools/Equipment	None
Prerequisite Procedures	• NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 • DLP-G63 Install an SFP or XFP, page 14-72 • DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary) • DLP-G278 Provision the Optical Line Rate, page 11-131 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The 40E-TXP-C and 40ME-TXP-C cards does not support PPMs.

Note The maximum ambient operating temperature for 40E-TXP-C, and 40ME-TXP-C cards is 50^0 Celsius.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the transponder card settings. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 If you are provisioning a 40E-TXP-C or 40ME-TXP-C card, complete the "DLP-G656 Provision the 40E-TXP-C and 40ME-TXP-C Data Rate" task on page 11-192. If not, continue with Step 4.

Step 4 Perform any of the following tasks as needed:

- DLP-G657 Change the 40G Multirate Transponder Card Settings, page 11-192
- DLP-G658 Change the 40G Multirate Transponder Line Settings, page 11-193
- DLP-G659 Change the 40G Multirate Transponder SONET, SDH, or Ethernet Line Settings, page 11-195
- DLP-G660 Change the 40G Multirate Transponder Line Section Trace Settings, page 11-199
- DLP-G661 Change the 40G Multirate Transponder Line Thresholds for SONET or SDH Payloads Including 40G Ethernet WAN Phy, page 11-202
- DLP-G663 Provision the 40G Multirate Transponder Trunk Port Alarm and TCA Thresholds, page 11-204
- DLP-G664 Provision the 40G Multirate Transponder Client Port Alarm and TCA Thresholds, page 11-205
- DLP-G665 Change the 40G Multirate Transponder OTN Settings, page 11-206

Stop. You have completed this procedure.

DLP-G656 Provision the 40E-TXP-C and 40ME-TXP-C Data Rate

Purpose	This task changes the 40E-TXP-C and 40ME-TXP-C card data rate.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the card data rate settings.

Step 2 Click the **Provisioning > Data Rate Selection** tabs.

Step 3 Click **Create**.

Step 4 In the Create Port dialog box, choose one of the following data rates:

- SONET (ANSI) OC-768 or SDH (ETSI) STM-256
- 40G Ethernet LAN Phy (only when overclock mode is ON)
- OTU3

Step 5 Click **Ok**.

Step 6 Return to your originating procedure.

DLP-G657 Change the 40G Multirate Transponder Card Settings

Purpose	This task changes the card settings of the 40E-TXP-C and 40ME-TXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the card settings.

Step 2 Click the **Provisioning > Card** tabs.

Step 3 Modify any of the settings described in Table 11-65.

Table 11-65 40E-TXP-C and 40ME-TXP-C Card Settings

Parameter	Description	ONS 15454(ANSI) Options	ONS 15454 SDH(ETSI) Options
Regeneration Peer Slot	Sets the slot containing another 40E-TXP-C or 40ME-TXP-C card to create a regeneration peer group. A regeneration peer group facilitates the management of two 40E-TXP-C or 40ME-TXP-C cards that are needed to perform a complete signal regeneration. The regeneration peer group synchronizes provisioning of the two cards. Payload type and ITU-T G.709 optical transport network (OTN) changes made on one 40E-TXP-C or 40ME-TXP-C card is reflected on the peer 40E-TXP-C or 40ME-TXP-C card. **Note** Y-cable protection groups cannot be created on TXP cards that are in a regeneration peer group.	• None • 1 • 2 • 3 • 4 • 5 • 12 • 13 • 14 • 15 • 16	• None • 1 • 2 • 3 • 4 • 5 • 12 • 13 • 14 • 15 • 16
Regeneration Group Name	(Display only) The regeneration peer group name.	—	—
Trunk Wavelengths	(Display only) Shows the supported wavelengths of the trunk port after the card is installed. The 40E-TXP-C, or 40ME-TXP-C that is installed shows the C-band wavelengths that it supports.	—	—

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G658 Change the 40G Multirate Transponder Line Settings

Purpose	This task changes the line settings of the 40E-TXP-C and 40ME-TXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > Ports** tabs.

Step 3 Modify any of the settings for the Client tab as described in Table 11-66.

Table 11-66 Line Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number.	1 and 2
Port Name	Assigns a logical name for each of the ports shown by filling in this field.	User-defined. The port name can be up to 32 alphanumeric or special characters, or both. The port name is blank by default. For information about assigning a port name, see the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about service states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI) • IS,AINS (ANSI) or Unlocked,automaticInService (ETSI)
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)
ALS Mode	(Client port only) Sets the ALS function mode.	• Disabled (default)—ALS is off; the laser is not automatically shut down when traffic outage or loss of signal (LOS) occurs. • Auto Restart: (OC-768/STM-256/OTU-3 only) ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart—ALS is on; the laser automatically shuts down when traffic outage or LOS occurs. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test—Manually restarts the laser for testing.
Reach	(Display only) Displays the optical reach distance of the port.	• Autoprovision—(trunk port only) The system automatically provisions the reach. • VSR—(client port only) The system provisions very short reach (VSR) for the port.
Wavelength	Provisions the wavelength for the port.	• First Tunable Wavelength • Further wavelengths: Further wavelengths in 100-GHz ITU-T C-band spacing. The wavelengths carried by the card are identified with two asterisks. If the card is not installed, all wavelengths appear with a dark grey background.

Table 11-66 Line Settings (Continued)of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	Options
Squelch	(Display only) Applicable only to client port 1. When the termination mode is set to transparent, squelch is enabled. For section/line termination mode, AIS is enabled. For trunk port, squelch is disabled.	• Squelch • AIS • Disable **Note** Both Squelch and AIS options are supported when the selected Termination Mode is Transparent. If the Termination Mode selected is Section or Line, then only AIS is supported. This is applicable for OC-192/STM-64 and OC-768/STM-256. For OTN payloads, both Squelch and AIS options are supported.
Overclock	Enables or disables overclock mode on trunk port.	• OFF (default) • ON
Rx Wavelength	Provisions the wavelength of the trunk port.	• First Tunable Wavelength • Further wavelengths: Further wavelengths in 100-GHz ITU-T C-band spacing. The wavelengths carried by the card are identified with two asterisks. If the card is not installed, all wavelengths appear with a dark grey background.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G659 Change the 40G Multirate Transponder SONET, SDH, or Ethernet Line Settings

Purpose	This task changes the SONET, SDH, or Ethernet line settings for 40E-TXP-C and 40ME-TXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the SONET, SDH, or Ethernet line settings.

Step 2 Click the **Provisioning > Line > SONET/SDH/Ethernet** tabs.

Step 3 Modify any of the settings described in Table 11-67.

Note In Table 11-67, some parameter tabs do not always apply to all 40G multirate transponder cards. If a tab does not apply, it will not appear in CTC.

Table 11-67 SONET, SDH Line Settings of the 40E-TXP-C and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the port number.	• 1 (OC-768) • 1 (40G Ethernet LAN Phy) • 1 (OTU3)	• 1 (STM-256) • 1 (40G Ethernet LAN Phy) • 1 (OTU3)
SF BER	(SONET [ANSI] or SDH [ETSI] only) Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5	• 1E-3 • 1E-4 • 1E-5
SD BER	(SONET [ANSI] or SDH [ETSI] only) Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
ProvidesSync	(OC-768/STM-256 only) Sets the ProvidesSync card parameter. If checked, the card is provisioned as a network element (NE) timing reference.	Checked or unchecked	Checked or unchecked
SyncMsgIn	(OC-768/STM-256 only) Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked	Checked or unchecked
Admin SSM In	Overrides the synchronization status message (SSM) and the synchronization traceability unknown (STU) value. If the node does not receive an SSM signal, it defaults to STU.	• PRS—Primary Reference Source (Stratum 1) • STU—Sync traceability unknown • ST2—Stratum 2 • ST3—Stratum 3 • SMC—SONET minimum clock • ST4—Stratum 4 • DUS—Do not use for timing synchronization • RES—Reserved; quality level set by user	• G811—Primary reference clock • STU—Sync traceability unknown • G812T—Transit node clock traceable • G812L—Local node clock traceable • SETS—Synchronous equipment • DUS—Do not use for timing synchronization

Table 11-67 SONET, SDH Line Settings of the 40E-TXP-C and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Send DoNotUse	(OC-768/STM-256 only) Sets the Send DoNotUse card state. When checked, sends a do not use (DUS) message on the S1 byte.	Checked or unchecked	Checked or unchecked
Type	(SONET [ANSI] or SDH [ETSI] only) Indicates the optical transport type.	• SONET • SDH	• SONET • SDH
Termination Mode	(OC-768/STM-256 only) Sets the mode of operation. **Note** This option is only available for SONET/SDH payloads.	• Transparent • Section • Line	• Transparent • Regeneration Section (RS) • Multiplex Section (MS)

Table 11-68 Ethernet Line Settings of the 40E-TXP-C and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the port number.	• 1-1 to 1-16 (OC3/OC12/OC48/GE) • 17-1 (Trunk/Interlink) • 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 17 and Port 18 are trunk ports that support OC192 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).	• 1-1 to 1-16 (STM1/STM4/STM16/GE) • 17-1 (Trunk/Interlink) • 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 17 and Port 18 are trunk ports that support STM64 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).
Port Name	Provides the ability to assign the specified port a name.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.

Table 11-68 Ethernet Line Settings of the 40E-TXP-C and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Admin State	Sets the port service state. For more information about administrative states, see the Administrative and Service States document.	• IS • IS,AINS • OOS,DSBLD • OOS,MT	• Unlocked • Unlocked,automaticInService • Locked,disabled • Locked,maintenance
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR • OOS-AU,AINS • OOS-MA,DSBLD • OOS-MA,MT	• Unlocked-enabled • Unlocked-disabled, automaticInService • Locked-enabled,disabled • Locked-enabled,maintenance
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled, or it can be set for one of three mode options.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.
AINS Soak	Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to change settings.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments **Note** The AINS service state is not supported on interlink ports.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments **Note** The AINS service state is not supported on interlink ports.
Reach	Displays the optical reach distance of the client port.	The Reach options depend on the traffic type that has been selected.	The Reach options depend on the traffic type that has been selected.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G660 Change the 40G Multirate Transponder Line Section Trace Settings

Purpose	This task changes the line section trace settings of the 40E-TXP-C, and 40ME-TXP-C transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the line section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs.

Step 3 Modify any of the settings described in Table 11-69.

Table 11-69 Section Trace Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	Sets the port number.	• 1 (OC-768) • 2 (OC-768)	• 1 (STM-256) • 2 (STM-256)
Received Trace Mode	Sets the trace mode.	• Off/None • Manual	• Off/None • Manual
Disable AIS/RDI on TIM-S	If a TIM on Section overhead alarm is raised because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte	• 1 byte • 16 byte

Table 11-69 Section Trace Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Transmit String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode).The supported range for 1 bit Hex TX trace is 20 to 7E. If TX trace is provisioned outside this range, client transmits 00.	String of trace string size	String of trace string size
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Expected String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode).	String of trace string size	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size	String of trace string size
Auto-refresh	Refreshes the display automatically every 5 seconds, if checked.	Checked or unchecked (default)	Checked or unchecked (default)

Step 4 Click **Apply**.

Step 5 Click **Default** to restore default values.

Step 6 Return to your originating procedure (NTP).

DLP-G692 Change the 40G Multirate Transponder OTU Settings

Purpose	This task changes the OTU settings of the 40E-TXP-C, and 40ME-TXP-C transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C or 40ME-TXP-C card where you want to change the OTU settings.

Step 2 Click the **Provisioning > Line > OTU** tabs.

Step 3 Modify any of the settings described in Table 11-70.

Table 11-70 OTU Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the port number that is applicable only for OC-192/STM-64 payloads.	• 1-1 • 2-1 • 3-1 • 4-1	• 1-1 • 2-1 • 3-1 • 4-1
SyncMsgIn	(Display only) (OC-768/STM-256 only) Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked	Checked or unchecked
Admin SSM	Overrides the synchronization status message (SSM) and the synchronization traceability unknown (STU) value. If the node does not receive an SSM signal, it defaults to STU.	• PRS—Primary Reference Source (Stratum 1) • STU—Sync traceability unknown • ST2—Stratum 2 • ST3—Stratum 3 • SMC—SONET minimum clock • ST4—Stratum 4 • DUS—Do not use for timing synchronization • RES—Reserved; quality level set by user	• G811—Primary reference clock • STU—Sync traceability unknown • G812T—Transit node clock traceable • G812L—Local node clock traceable • SETS—Synchronous equipment • DUS—Do not use for timing synchronization
ProvidesSync	(Display only) (OC-768/STM-256 only) Sets the ProvidesSync card parameter. If checked, the card is provisioned as a network element (NE) timing reference.	Checked or unchecked	Checked or unchecked

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G661 Change the 40G Multirate Transponder Line Thresholds for SONET or SDH Payloads Including 40G Ethernet WAN Phy

Purpose	This task changes the line threshold settings of 40E-TXP-C and 40ME-TXP-C transponder cards carrying SONET or SDH payloads, including the physical 40G Ethernet WAN Phy payload.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds > SONET Thresholds** (ANSI) or **SDH Thresholds** (ETSI) tabs.

Step 3 Modify any of the settings described in Table 11-71.

Table 11-71 Line Threshold Settings for the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Port number	• 1 (OC-768) • 2 (OC-768)	• 1 (STM-256) • 2 (STM-256)
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Table 11-71 Line Threshold Settings for the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.	—
UAS	(Line or Multiplex Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G663 Provision the 40G Multirate Transponder Trunk Port Alarm and TCA Thresholds

Purpose	This task provisions the 40E-TXP-C, and 40ME-TXP-C trunk port alarm and threshold cross alert (TCA) thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Step 3 Under Types area, verify that the TCA radio button is selected. If not, click it, then click **Refresh**.

Step 4 Referring to Table 11-72, verify the trunk port (Port 2) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting the existing value, and entering the new value. Press **Enter**, then click **Apply**.

Step 5 Under Intervals area, select 15 Min or 1 Day, then click **Refresh**.

Note Do not modify the Laser Bias parameters.

Table 11-72 Trunk Port TCA Thresholds of the 40E-TXP-C, and 40ME-TXP-C Cards

Card	TCA RX Power High (dbm)	TCA RX Power Low (dbm)	TCA TX Power High (dbm)	TCA TX Power Low (dbm)
40E-TXP-C 40ME-TXP-C	–9.0	–22.0	9.0	0.0

Step 6 Click **Apply**.

Step 7 Under Types area, click the **Alarm** radio button and click **Refresh**.

Step 8 Referring to Table 11-72, verify the trunk port (Port 2) alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting the existing value, and entering the new value. Press **Enter**, then click **Apply**.

Step 9 Under Intervals area, select 15 Min or 1 Day, then click **Refresh**.

Table 11-73 Trunk Port Alarm Thresholds of the 40E-TXP-C, and 40ME-TXP-C Cards

Card	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
40E-TXP-C 40ME-TXP-C	–9.0	–22.0	9.0	0.0

Step 10 Click **Apply**.

Step 11 Click **Default** to restore default values.

Step 12 Return to your originating procedure (NTP).

DLP-G664 Provision the 40G Multirate Transponder Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the 40E-TXP-C, and 40ME-TXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G278 Provision the Optical Line Rate, page 11-131 DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs. The TCA thresholds are shown by default.

Step 3 Under Types area, verify that the TCA radio button is selected. If not, click it, then click **Refresh**.

Step 4 Referring to Table 11-74, verify the client port (Port 1) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface at the other end. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting the existing value, and entering the new value. Press Enter, then click **Apply**.

Step 5 Under Intervals area, select 15 Min or 1 Day, then click **Refresh**.

Note Do not modify the Laser Bias parameters.

Table 11-74 Client Interface TCA Thresholds of the 40E-TXP-C, and 40ME-TXP-C Cards

Pluggable Port Rate	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
40G Ethernet LAN Phy	3.0	–6.0	6.0	–3.0
OC-768/STM-256	3.0	–6.0	6.0	–3.0
OTU3	3.0	–6.0	6.0	–3.0

Step 6 Click **Apply**.

Step 7 Under Types area, click the **Alarm** radio button and click **Refresh**.

Step 8 Referring to Table 11-75, provision the client port (Port 1) alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned.

Step 9 Under Intervals area, select 15 Min or 1 Day, then click **Refresh**.

Table 11-75 Card Client Interface Alarm Thresholds of the 40E-TXP-C, and 40ME-TXP-C Cards

Pluggable Port Rate	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
40G Ethernet LAN Phy	5.0	–8.0	4.0	–1.0
OC-768/STM-256	5.0	–8.0	4.0	–1.0
OTU3	5.0	–8.0	4.0	–1.0

Step 10 Click **Apply**.

Step 11 Return to your originating procedure (NTP).

DLP-G665 Change the 40G Multirate Transponder OTN Settings

Purpose	This task changes the line OTN settings of the 40E-TXP-C, and 40ME-TXP-C transponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40E-TXP-C card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then click one of the following subtabs: **OTN Lines**, **ITU-T G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-76 through 11-79.

Note You must modify Near End and Far End, 15 Min and 1 Day, and SM and PM independently. To do so, select the appropriate radio button and click **Refresh**.

Table 11-76 describes the values on the Provisioning > OTN > OTN Lines tab.

Table 11-76 OTN Line Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	• 1 (only when data rate is set to OTU3) • 2
ITU-T G.709 OTN	(Display only) Displays the OTN lines according to ITU-T G.709.	• Enable • Disable
FEC	Sets the OTN line FEC mode. FEC mode can be Standard or Enhanced. Standard is the same as enabling FEC. Enhanced FEC mode can be enabled to provide greater range and lower bit error rate.	• Standard Standard FEC is on. • Enhanced Enhanced FEC is on.
SF BER	(Display only) Sets the signal fail bit error rate.	• 1E-5
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9

Table 11-77 describes the values on the Provisioning > OTN > G.709 Thresholds tab.

Table 11-77 ITU-T G.709 Threshold Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	2
ES	Severely errored seconds. Two types of thresholds can be asserted. Selecting the SM (OTUk) radio button selects FEC, overhead management, and PM using OTUk. Selecting the PM radio button selects path PM using ODUk.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values. **Note** SM (OTUk) is the ITU-T G.709 optical channel transport unit order of k overhead frame used for management and performance monitoring. PM (ODUk) is the ITU-T G.709 optical channel data unit order of k overhead frame unit used for path performance monitoring.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.
UAS	Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.

Table 11-77 ITU-T G.709 Threshold Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	Options
BBE	Background block errors	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.
FC	Failure counter	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.

Table 11-78 describes the values on the Provisioning > OTN > FEC Thresholds tab.

Table 11-78 FEC Threshold Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	2
Bit Errors Corrected	Displays the number of bit errors corrected during the selected time period.	Numeric display. Can be set for 15-minute or one-day intervals. Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.
Uncorrectable Words	Displays the number of uncorrectable words in the selected time period.	Numeric display. Can be set for 15-minute or one-day intervals. Choose an option in each category and click **Refresh**. Click **Reset to Default** to restore default values.

Table 11-79 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-79 Trail Trace Identifier Settings of the 40E-TXP-C, and 40ME-TXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	Sets the port number.	• 1 (OTU3) • 2 (Trunk)	• 1 (OTU3) • 2 (Trunk)
Received Trace Mode	Sets the trace mode.	• Off/None • Manual	• Off/None • Manual
Disable AIS/RDI on TIM-S	If a TIM on Section overhead alarm is raised because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte	• 1 byte • 16 byte
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Transmit String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode).	String of trace string size	String of trace string size
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Transmit String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode).	String of trace string size	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size	String of trace string size
Auto-refresh	Refreshes the display automatically every 5 seconds, if checked.	Checked or unchecked (default)	Checked or unchecked (default)

Step 4 Click **Apply**.

Step 5 Click **Default** to restore default settings.

Step 6 Return to your originating procedure (NTP).

NTP-G170 Provision the ADM-10G Card Peer Group, Ethernet Settings, Line Settings, PM Parameters, and Thresholds

Purpose	This procedure creates an ADM-10G peer group and changes line settings, PM parameters, and threshold settings for ADM-10G cards.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G63 Install an SFP or XFP, page 14-72 DLP-G411 Provision an ADM-10G PPM and Port, page 11-126 (if necessary) DLP-G278 Provision the Optical Line Rate, page 11-131 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the ADM-10G card settings. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 To provision a peer group, complete the "DLP-G403 Create the ADM-10G Peer Group" task on page 11-212.

Step 4 To provision Ethernet settings, complete the "DLP-G469 Provision the ADM-10G Card Ethernet Settings" task on page 11-213.

Step 5 To change line settings, complete the following tasks as needed:

- DLP-G397 Change the ADM-10G Line Settings, page 11-214
- DLP-G398 Change the ADM-10G Line Section Trace Settings, page 11-219
- DLP-G399 Change the ADM-10G Line Thresholds for SONET and SDH Payloads, page 11-221
- DLP-G412 Change the ADM-10G Line RMON Thresholds for the 1G Ethernet Payload, page 11-225

Step 6 To change thresholds, complete the following tasks as needed:

- DLP-G400 Provision the ADM-10G Interlink or Trunk Port Alarm and TCA Thresholds, page 11-228
- DLP-G401 Provision the ADM-10G Client Port Alarm and TCA Thresholds, page 11-229
- DLP-G402 Change the ADM-10G OTN Settings, page 11-230

Stop. You have completed this procedure.

DLP-G403 Create the ADM-10G Peer Group

Purpose	This task creates peer group protection for two ADM-10G cards within the same node, located on the same shelf.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69, for two ADM-10G cards (located on the same shelf) for which a peer group is desired. DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note You cannot perform this task on a single ADM-10G card; it is only available if a second ADM-10G card can be accessed through the interlink ports (Port 17 and Port 18).

Note Due to a hardware limitation, you cannot provision the SDCC/LDCC on Port 17.

Note Perform this task on only one of the two peer cards.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the card settings.

Step 2 Click the **Provisioning > Card** tabs.

Step 3 In the **ADM Group Peer** drop-down list, choose the slot number (for example, 14) where the companion ADM-10G card is located.

Step 4 In the **ADM Peer Group** field, enter a group name.

Step 5 Click **Apply**.

Note The Card Parameters Tunable Wavelengths area is read-only and does not contain any wavelengths until circuits are separately provisioned for the card.

Step 6 Return to your originating procedure (NTP).

DLP-G469 Provision the ADM-10G Card Ethernet Settings

Purpose	This task changes the Ethernet settings for the ADM-10G card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the Ethernet settings. The card view appears.

Step 2 Click the **Provisioning > Line > Ethernet** tabs.

Step 3 Modify any of the settings for the Ethernet tab as described in Table 11-80. The parameters that appear depend on the card mode.

Table 11-80 ADM-10G Card Ethernet Settings

Parameter	Description	Options
Port	(Display only) The Port number (*n-n*) and rate.	—
MTU	The maximum size of the Ethernet frames accepted by the port.	Jumbo. Default: 64 to 9216 Numeric: 1548
Mode	Sets the Ethernet mode.	1000 Mbps
Framing	Sets the framing type.	• GFP-F • HDLC
CRC Encap	Sets the CRC encap values for the framing type.	CRC encap value for GFP-F: • None (default) • 32-Bit CRC encap value for HDLC: • 16-Bit • 32-Bit (default)
AINS Soak	Automatic in-service soak time. The duration of time that must pass with an uninterrupted signal before the traffic/termination transitions to the IS-NR (ANSI) or unlocked-enabled (ETSI) service state.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G397 Change the ADM-10G Line Settings

Purpose	This task changes the line settings for ADM-10G cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > Ports tabs**.

Step 3 Modify any of the settings described in Table 11-81 as needed.

Note In Table 11-81, some parameter tabs do not always apply to all ADM-10G cards. If a tab does not apply, it will not appear in CTC.

Table 11-81 ADM-10G Line Port Tab Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the port number.	• 1-1 to 1-16 (OC3/OC12/OC48/GE) • 17-1 (Trunk/Interlink) • 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 17 and Port 18 are trunk ports that support OC192 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).	• 1-1 to 1-16 (STM1/STM4/STM16/GE) • 17-1 (Trunk/Interlink) • 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 17 and Port 18 are trunk ports that support STM64 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).
Port Name	Provides the ability to assign the specified port a name.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state. For more information about administrative states, see the Administrative and Service States document.	• IS • IS,AINS • OOS,DSBLD • OOS,MT	• Unlocked • Unlocked,automaticInService • Locked,disabled • Locked,maintenance

Table 11-81 ADM-10G Line Port Tab Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR • OOS-AU,AINS • OOS-MA,DSBLD • OOS-MA,MT	• Unlocked-enabled • Unlocked-disabled, automaticInService • Locked-enabled,disabled • Locked-enabled,maintenance
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled, or it can be set for one of three mode options.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: (Not applicable for Gigabit Ethernet client interfaces) ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: (Not applicable for Gigabit Ethernet client interfaces) ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.

Table 11-81 ADM-10G Line Port Tab Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
AINS Soak	Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to change settings.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments **Note** The AINS service state is not supported on interlink ports.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments **Note** The AINS service state is not supported on interlink ports.
Reach	Displays the optical reach distance of the client port.	The Reach options depend on the traffic type that has been selected.	The Reach options depend on the traffic type that has been selected.
Wavelength	Tunable wavelength.	Shows the supported wavelengths of the trunk port after the card is installed in the format: *first wavelength-last wavelength-frequency spacing-number of supported wavelengths*. For example, 1529.55nm-1561.83nm-50g Hz-8 are supported wavelengths.	Shows the supported wavelengths of the trunk port after the card is installed in the format: *first wavelength-last wavelength-frequency spacing-number of supported wavelengths*. For example, 1529.55nm-1561.83nm-50g Hz-8 are supported wavelengths.

Step 4 Click **Apply**.

Step 5 Click the **Provisioning > Line > SONET or SDH** tabs.

Step 6 Modify any of the settings described in Table 11-82 as needed.

Table 11-82 ADM-10G Line SONET or SDH Tab Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the client and trunk port number.	• 1-1 to 1-16 (OC3/OC12/OC48/GE) • 17-1 (OC192) • 18-1 (OC192/Interlink) • 19-1 (OC192) **Note** Port 17 and Port 18 are trunk ports that support OC192 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).	• 1-1 to 1-16 (STM1/STM4/STM16/GE) • 17-1(STM64) • 18-1 (STM64/Interlink) • 19-1 (STM64) **Note** Port 17 and Port 18 are trunk ports that support STM64 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).
ProvidesSync	When checked, the card is provisioned as an NE timing reference.	Checked or unchecked	Checked or unchecked
SyncMsgIn	Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked	Checked or unchecked
SF BER	Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5	• 1E-3 • 1E-4 • 1E-5
Send DoNotUse	When checked, sends a DUS message on the S1 byte.	Checked or unchecked	Checked or unchecked
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9

Table 11-82 ADM-10G Line SONET or SDH Tab Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Type	(Display only) Type of node.	• SONET • SDH	• SDH
Admin SSM In	Overrides the synchronization status message (SSM) synchronization traceability unknown (STU) value. If the node does not receive an SSM signal, it defaults to STU.	• PRS—Primary Reference Source (Stratum 1) • ST2—Stratum 2 • TNC—Transit node clock • ST3E—Stratum 3E • ST3—Stratum 3 • SMC—SONET minimum clock • ST4—Stratum 4 • DUS—Do not use for timing synchronization • RES—Reserved; quality level set by user	• G811—Primary reference clock • STU—Sync traceability unknown • G812T—Transit node clock traceable • G812L—Local node clock traceable • SETS—Synchronous equipment • DUS—Do not use for timing synchronization

Step 7 Return to your originating procedure (NTP).

DLP-G398 Change the ADM-10G Line Section Trace Settings

Purpose	This task changes the line section trace settings for the ADM-10G cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The **Section Trace** tab is available for ports configured as OC-N (Ports 1 through 16, Ports 17 and 18 [only in a single-card configuration] and Port 19). Section trace is not available on interlink ports.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the section trace settings. The card view appears.

Step 2 Click the **Provisioning > Line > Section Trace** tabs.

Step 3 Modify any of the settings described in Table 11-83.

Table 11-83 ADM-10G Section Trace Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	Sets the port number.	• 1-1 to 1-16 (OC3/OC12/OC48/GE) • 17-1 (OC 192) • 18-1 (OC192) • 19-1 (OC192) **Note** Port 17 and Port 18 are trunk ports that support OC192 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).	• 1-1 to 1-16 (STM1/STM4/STM16/GE) • 17-1 (STM64) • 18-1 (STM64) • 19-1 (STM64) **Note** Port 17 and Port 18 are trunk ports that support STM64 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).
Received Trace Mode	Sets the trace mode.	• Off/None • Manual	• Off/None • Manual
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte • 64 byte	• 1 byte • 16 byte • 64 byte
Current	Current Transmit String displays the current transmit string; New Transmit String sets a new transmit string. Current String Type allows you to choose between ASCII or Hexadecimal format. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size	String of trace string size

Table 11-83 ADM-10G Section Trace Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Received	(Display only) Current Received String displays the current received string. You can click **Refresh** to manually refresh this display, or check the **Auto-refresh every 5 sec** check box to keep this panel updated.	String of trace string size	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G399 Change the ADM-10G Line Thresholds for SONET and SDH Payloads

Purpose	This task changes the line threshold settings for ADM-10G cards carrying SONET payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the line threshold settings. The card view appears.

Step 2 Click the **Provisioning > Line Thresholds > SONET or SDH Thresholds** tabs.

Step 3 Modify any of the settings described in Table 11-84.

Table 11-84 ADM-10G Card Line Threshold Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Port number	• 1-1 to 1-16 (OC3/OC12/OC48/GE) • 17-1 (OC 192) • 18-1 (OC192) • 19-1 (OC192) **Note** Port 17 and Port 18 are trunk ports that support OC192 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).	• 1-1 to 1-16 (STM1/STM4/STM16/GE) • 17-1 (STM 64) • 18-1 (STM64) • 19-1 (STM64) **Note** Port 17 and Port 18 are trunk ports that support STM64 payload in a single-card configuration. These ports are interlink ports in a double-card configuration (ADM-10G peer group).
EB	Path Errored Block indicates that one or more bits are in error within a block	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—

Table 11-84 ADM-10G Card Line Threshold Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.
BBE	Background block errors	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
FC	(Line Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—

Table 11-84 ADM-10G Card Line Threshold Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
PSC	Protection Switching Count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day Choose an option in each category and click **Refresh**.	—
PSD	Protection Switching Duration	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day Choose an option in each category and click **Refresh**.	—
UAS	(Line Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G412 Change the ADM-10G Line RMON Thresholds for the 1G Ethernet Payload

Purpose	This task changes the line RMON threshold settings for an ADM-10G card carrying the 1G Ethernet payload.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC DLP-G411 Provision an ADM-10G PPM and Port, page 11-126
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note This task can only be performed if the ADM-10G card has at least one PPM port provisioned for Gigabit Ethernet.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the line RMON thresholds. The card view appears.

Step 2 Click the **Provisioning > Line Thresholds > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose the applicable port.

Step 5 From the Variable drop-down list, choose the applicable Ethernet variable. See Table 11-85 for a list of available Ethernet variables.

Table 11-85 ADM-10G Gigabit Ethernet Thresholds

Variable	Description
ifInOctets	Total number of octets received on the interface, including framing characters.
ifInErrors	Number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.
ifOutOctets	Total number of octets transmitted out of the interface, including framing characters.
ifInMulticastPkts	Number of multicast frames received error-free.
ifInBroadcastPkts	Number of packets, delivered by a sublayer to a higher layer or sublayer, that were addressed to a broadcast address at this sublayer.
ifInErrorBytePkts	Number of receive error bytes.
dot3StatsFCSErrors	Number of frames with frame check errors; that is, there is an integral number of octets, but there is also an incorrect frame check sequence (FCS).
dot3StatsFrameTooLong	Number of received frames that were larger than the permitted maximum size.

Table 11-85 ADM-10G Gigabit Ethernet Thresholds (Continued)

dot3ControlInUnknownOpcodes	A count of MAC control frames received on this interface that contain an opcode not supported by this device.
dot3InPauseFrames	A count of MAC control frames received on this interface with an opcode indicating the PAUSE operation.
dot3OutPauseFrames	A count of MAC control frames transmitted on this interface with an opcode indicating the PAUSE operation.
etherStatsUndersizePkts	Total number of packets received that were well-formed and less than 64 octets long (excluding framing bits and including FCS octets).
etherStatsFragments	Total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad FCS with an integral number of octets (FCS error) or a bad FCS with a non-integral number of octets (alignment error). **Note** It is normal for etherStatsFragments to increment. This is because it counts both runts (which are normal occurrences due to collisions) and noise hits.
etherStatsPkts64Octets	Total number of packets (including bad packets) transmitted and received by the interface that were 64 octets in length (excluding framing bits and including FCS octets).
etherStatsPkts65to127Octets	Total number of packets (including bad packets) transmitted and received by the interface that were between 65 and 127 octets in length, inclusive.
etherStatsPkts128to255Octets	The total number of packets (including bad packets) transmitted and received by the interface that were between 128 and 255 octets in length, inclusive, excluding framing bits and including FCS octets.
etherStatsPkts256to511Octets	Total number of packets (including bad packets) transmitted and received by the interface that were between 256 and 511 octets in length, inclusive.
etherStatsPkts512to1023Octets	Total number of packets (including bad packets) transmitted and received by the interface that were between 512 and 1023 octets in length, inclusive, excluding framing bits and including FCS octets.
etherStatsPkts1024to1518Octets	Total number of packets (including bad packets) transmitted and received by the interface that were between 1024 and 1518 octets in length, inclusive, excluding framing bits and including FCS octets.
etherStatsBroadcastPkts	Total number of good packets transmitted and received by the interface that were directed to the broadcast address. **Note** Multicast packets are not included.

Table 11-85 ADM-10G Gigabit Ethernet Thresholds (Continued)

etherStatsMulticastPkts	Total number of good packets transmitted and received by the interface that were directed to a multicast address. **Note** This number does not include packets directed to the broadcast address.
etherStatsOversizePkts	Total number of packets transmitted and received by the interface that were well-formed and longer than 1518 octets, excluding framing bits and including FCS octets.
etherStatsJabbers	Total number of packets received that were longer than 1518 octets (excluding framing bits and including FCS octets), and had a bad FCS with an integral number of octets (FCS error) or a bad FCS with a non-integral number of octets (alignment error).
rxTotalPkts	Total number of received packets.
txTotalPkts	Total number of transmit packets.

Step 6 From the Alarm Type drop-down list, indicate whether the event will be triggered by the rising threshold, the falling threshold, or both the rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Type an appropriate number of seconds for the Sample Period.

Step 9 Type the appropriate number of occurrences for the Rising Threshold.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Step 12 Return to your originating procedure (NTP).

DLP-G400 Provision the ADM-10G Interlink or Trunk Port Alarm and TCA Thresholds

Purpose	This task provisions the ADM-10G interlink or trunk port alarm and threshold crossing alert (TCA) thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the interlink or trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Step 3 Under Types, verify that the TCA radio button is checked. If not, check it, then click **Refresh**.

Step 4 Referring to Table 11-86, verify the interlink or trunk port TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and pressing **Enter**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Table 11-86 ADM-10G Interlink and Trunk Port TCA Thresholds

Port	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
17-1 and 18-1 (Trunk/Interlink) **Note** Port 17 and Port 18 are trunk ports in single-card configuration and an interlink port in double-card configuration (ADM-10G peer group).	–7.0 dBm	–27.0 dBm	6.0 dBm	–4.0 dBm
19-1 (Trunk)	–7.0 dBm	–27.0 dBm	6.0 dBm	–4.0 dBm

Step 5 Click **Apply**.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Referring to Table 11-87, verify the interlink or trunk port alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and pressing **Enter**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-87 ADM-10G Interlink and Trunk Port Alarm Thresholds

Port	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
17-1 (Trunk/Interlink) **Note** Port 17 is a trunk port in single-card configuration and an interlink port in double-card configuration (ADM-10G peer group).	1.0 dBm	–13.0 dBm	1.0 dBm	–8.0 dBm
18-1 (Trunk/Interlink) **Note** Port 18 is a trunk port in single-card configuration and an interlink port in double-card configuration (ADM-10G peer group).	–5.0 dBm	–30.0 dBm	5.0 dBm	–3.0 dBm
19-1 (Trunk)	–5.0 dBm	–30.0 dBm	5.0 dBm	–3.0 dBm

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G401 Provision the ADM-10G Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the ADM-10G card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G278 Provision the Optical Line Rate, page 11-131 DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Step 3 Under Types, verify that the **TCA** radio button is checked. If not, check it, then click **Refresh**.

Step 4 Referring to Table 11-45 on page 11-160 and Table 11-46 on page 11-161, verify the Port 1 to 16 (Client) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and pressing **Enter**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Step 5 Click **Apply**.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Referring to Table 11-45 and Table 11-46 on page 11-161, verify the interlink ports 17-1 and 18-1 for RX Power High, RX Power Low, TX Power High, and TX Power Low settings. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and pressing **Enter**.

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G402 Change the ADM-10G OTN Settings

Purpose	This task changes the line OTN settings for the ADM-10G cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the ADM-10G card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then click one of the following subtabs: **OTN Lines**, **ITU-T G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-88 through 11-91.

Note You must modify Near End and Far End independently; 15 Min and 1 Day independently; and SM and PM independently. To do so, choose the appropriate radio buttons and click **Refresh**.

Table 11-88 describes the values on the Provisioning > OTN > OTN Lines tab.

Table 11-88 ADM-10G Card OTN Lines Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	• 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 18 is a trunk port in single-card configuration and an interlink port in double-card configuration (ADM-10G peer group).
ITU-TG.709 OTN	Sets the OTN lines according to ITU-T G.709.	• Enable • Disable
FEC	Sets the OTN lines FEC mode. FEC mode can be Disabled, Enabled, or, for the TXP_MR_10E, Enhanced FEC mode can be enabled to provide greater range and lower bit error rate. For TXP_MR_10E cards, Standard is the same as enabling FEC.	• Disable—FEC is off. • Standard—Standard FEC is on. • Enhanced—Enhanced FEC is on.
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
SF BER	(Display only) Indicates the signal fail bit error rate.	• 1E-5
Synch Mapping	Sets how the ODUk (client payload) is mapped to the optical channel (OTUk).	Synch mapping

Table 11-89 describes the values on the Provisioning > OTN > ITU-T G.709 Thresholds tab.

Table 11-89 ADM-10G Card ITU-T G.709 Threshold Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	• 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 18 is a trunk port in single-card configuration and an interlink port in double-card configuration (ADM-10G peer group).
ES	Errored seconds. Selecting the SM (OTUk) radio button selects FEC, overhead management, and PM using OTUk. Selecting the PM radio button selects path PM using ODUk.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. **Note** SM (OTUk) is the ITU-T G.709 optical channel transport unit order of k overhead frame used for management and performance monitoring. PM (ODUk) is the ITU-T G.709 optical channel data unit order of k overhead frame unit used for path performance monitoring.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
UAS	Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-89 ADM-10G Card ITU-T G.709 Threshold Settings (Continued)

Parameter	Description	Options
BBE	Background block errors	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
FC	Failure counter	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-90 describes the values on the Provisioning > OTN > FEC Thresholds tab.

Table 11-90 ADM-10G Card FEC Threshold Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	• 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 18 is a trunk port in single-card configuration and an interlink port in double-card configuration (ADM-10G peer group).
Bit Errors Corrected	Displays the number of bit errors corrected during the selected time period.	Numeric display. Can be set for 15-minute or 1 day intervals.
Uncorrectable Words	Displays the number of uncorrectable words in the selected time period.	Numeric display. Can be set for 15-minute or 1 day intervals.

Table 11-91 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-91 ADM-10GTrail Trace Identifier Settings

Parameter	Description	Options
Port	Sets the port number.	• 18-1 (Trunk/Interlink) • 19-1 (Trunk) **Note** Port 18 is a trunk port in single-card configuration and an interlink port in double-card configuration (ADM-10G peer group).
Level	Sets the level.	• Section • Path
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable FDI on TTIM	If a Trace Identifier Mismatch on Section/Path overhead alarm arises because of a J0/J1 overhead string mismatch, no Forward Defect Indication (FDI) signal is sent to the downstream nodes if this box is checked.	• Checked (FDI on TTIM is disabled) • Unchecked (FDI on TTIM is not disabled)
Transmit	Current Transmit String displays the current transmit string; New sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Transmit String Type, click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size; trail trace identifier is 64 bytes in length.
Expected	Current Expected String displays the current expected string; New sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Expected String Type, click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Current Received String displays the current received string. You can click **Refresh** to manually refresh this display, or check the **Auto-refresh every 5 sec** check box to keep this panel updated.	String of trace string size
Auto-refresh (every 5 sec)	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)

Step 4 Click **Apply**.

Return to your originating procedure (NTP).

NTP-G333 Add an ADM-10G card to an Existing Topology

Purpose	This procedure adds an ADM-10G card to an existing topology. Perform the steps in this procedure when OCHNC and DCC are present in the network. In case of OCH trails, delete all the circuits in Step 3 that traverses the port before deleting the OCH-trail.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC. • Complete the turn up procedures in Turn Up a Node, page 14-1 for the node to be added. • An updated Cisco Transport Planner network plan recalculated with the new node.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 If path protected circuits exist between Node A and Node B, complete the DLP-A197 Initiate a Path Protection Force Switch task. This task applies a force switch on the path between Node A and Node B.

Step 2 Complete the NTP-G129 Add a DWDM Node task to add Node C.

Step 3 Complete the DLP-G106 Delete Optical Channel Network Connections, page 17-38 task to delete OCHNC circuit between Node A and Node B.

Step 4 Complete the NTP-G59 Create, Delete, and Manage Optical Channel Network Connections, page 17-34, task to create OCHNC circuit between Node A-->Node C and Node C-->Node B for wavelength connectivity.

Note The ports on the card in Node C must be tuned to the same wavelength as Node A and Node B.

Step 5 Create DCC terminations on Node C. See the DLP-A377 Provision Section DCC Terminations task.

Alternatively, if additional bandwidth is needed for CTC management, complete the DLP-A378 Provision Line DCC Terminations task.

Step 6 Ensure that the DCCs are functional between Node A-->Node C and Node C-->Node B. See the DLP-G76 Provision DCC/GCC Terminations, page 17-72 task.

Step 7 Complete the NTP-G200 Create, Delete, and Manage STS or VC Circuits for the ADM-10G Card, page 17-40 to create pass-through STS or VC circuits in Node C.

Step 8 Complete the NTP-A301 Merge Circuits task for each circuit created.

Step 9 If path protected circuits exist between Node A and Node B, complete the DLP-A198 Clear a Path Protection Force Switch task. This task clears a force switch on the path between Node A and Node B.

Stop. You have completed this procedure.

NTP-G97 Modify the 4x2.5G Muxponder Card Line Settings and PM Parameter Thresholds

Purpose	This procedure changes the line and threshold settings for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69. DLP-G63 Install an SFP or XFP, page 14-72 DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary) DLP-G278 Provision the Optical Line Rate, page 11-131 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the muxponder card settings. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 Perform any of the following tasks as needed:

- DLP-G222 Change the 4x2.5G Muxponder Card Settings, page 11-237
- DLP-G223 Change the 4x2.5G Muxponder Line Settings, page 11-239
- DLP-G224 Change the 4x2.5G Muxponder Section Trace Settings, page 11-241
- DLP-G225 Change the 4x2.5G Muxponder Trunk Settings, page 11-243
- DLP-G226 Change the 4x2.5G Muxponder SONET/SDH Line Thresholds Settings, page 11-246
- DLP-G303 Provision the 4x2.5G Muxponder Trunk Port Alarm and TCA Thresholds, page 11-248
- DLP-G304 Provision the 4x2.5G Muxponder Client Port Alarm and TCA Thresholds, page 11-250
- DLP-G228 Change the 4x2.5G Muxponder Line OTN Settings, page 11-252
- DLP-G369 Change the 4x2.5G Muxponder Trunk Wavelength Settings, page 11-244

Step 4 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2.

Stop. You have completed this procedure.

DLP-G222 Change the 4x2.5G Muxponder Card Settings

Purpose	This task changes the card settings for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C muxponder cards, including payload type, termination mode, and wavelength.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the card settings.

Step 2 Click the **Provisioning > Card** tabs.

Step 3 Modify any of the settings described in Table 11-92.

Note Parameters shown in Table 11-92 do not apply to all 4x2.5G muxponder cards. If the parameter or option does not apply, it is not shown in CTC.

Table 11-92 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Settings

Parameter	Description	Options
Termination Mode	Sets the mode of operation. Options that do not apply to a card do not display. The MXP_2.5G_10G card is based on SONET/SDH multiplexing. The transparent mode terminates and rebuilds the B1 byte (as well as other bytes) of the incoming OC-48/STM-16 signal. The B2 byte is not touched. The MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C cards are fully transparent in transparent mode based on the OTN/ITU-T G.709 multiplexing scheme. It does not terminate the B1 byte or other bytes. It encapsulates OC-48/STM-16 bytes into ODU1 first, then multiplexes them into an OTU2.	For ANSI platforms: • Transparent • Section (MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C only) • Line (MXP_2.5G_10G only) For ETSI platforms: • Transparent • Multiplex Section (MXP_2.5G_10G, only) • Regeneration Section (MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C only)
AIS/Squelch	(MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C only) Sets the transparent termination mode configuration.	• Ais • Squelch
Tunable Wavelengths	(Display only) Shows the supported wavelengths of the trunk port after the card is installed. For the MXP_2.5G_10E_C, or MXP_2.5G_10E_L cards, the first and last supported wavelength, frequency spacing, and number of supported wavelengths are shown in the format: *first wavelength-last wavelength-frequency spacing-number of supported wavelengths*. For example, the MXP_2.5G_10E_C card would show: 1529.55nm-1561.83nm-50gHz-82. The MXP_2.5G_10G and MXP_2.5G_10E show the four wavelengths supported by the card that is installed.	—

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G223 Change the 4x2.5G Muxponder Line Settings

Purpose	This task changes the line settings for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > SONET** (ANSI) or **SDH** (ETSI) tabs.

Note The SONET tab appears only if you have created a PPM for a given port.

Step 3 Modify any of the settings described in Table 11-93.

Note You must modify Near End and Far End independently; 15 Min and 1 Day independently; and Line and Section independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-93 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line Settings

Parameter	Description	Options
Port	(Display only) Port number. Ports 1 to 4 are client ports (OC-48/STM-16). Port 5 is the DWDM trunk (OC-192/STM-64) that provides wavelength services. Client ports will not appear of the pluggable port module is not provisioned for it.	• 1 • 2 • 3 • 4 • 5 (Trunk) (MXP_2.5G_10G only)
Port Name	Provides the ability to assign the specified port a logical name.	User-defined. Name can be up to 32 alphanumeric/ special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about administrative states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • IS,AINS (ANSI) or Unlocked,automaticInService (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI)

Table 11-93 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line Settings (Continued)

Parameter	Description	Options
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)
SF BER	Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled or can be set for one of three mode options.	• Disable (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.
AINS Soak	Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to change settings.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments
Type	Sets the optical transport type.	• SONET • SDH
SyncMsgIn	Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source. (This parameter does not appear for the MXP_2.5G_10E trunk port.)	Checked or unchecked

Table 11-93 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line Settings (Continued)

Parameter	Description	Options
ProvidesSync	Sets the ProvidesSync card parameter. If checked, the card is provisioned as an NE timing reference. (This parameter does not appear for the MXP_2.5G_10E trunk port.)	Checked or unchecked
Reach	Displays the optical reach distance of the client port.	Options: ANSI/ETSI • Autoprovision/Autoprovision (default) • SR • SR 1/I-1—Short reach up to 2-km distance • IR 1/S1—Intermediate reach, up to 15-km distance • IR 2/S2—Intermediate reach up to 40-km distance • LR 1/L1—long reach, up to 40-km distance • LR 2/L2—long reach, up to 80-km distance • LR 3/L3—long reach, up to 80-km distance
Wavelength	Displays the wavelength of the client port.	• First Tunable Wavelength • Further wavelengths: 850 nm through 1560.61 nm 100-GHz ITU spacing CWDM spacing

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G224 Change the 4x2.5G Muxponder Section Trace Settings

Purpose	This task changes the section trace settings for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The Section Trace tab appears only if you have created a PPM for the card.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs.

Step 3 Modify any of the settings described in Table 11-94.

Table 11-94 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Section Trace Settings

Parameter	Description	Options
Port	Sets the port number.	• 1 • 2 • 3 • 4 • 5 (Trunk; MXP_2.5G_10G only)
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable AIS/RDI on TIM-S	If an TIM on Section overhead alarm arises because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size. Select either radio button.	• 1 byte • 16 byte
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 minutes.	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G225 Change the 4x2.5G Muxponder Trunk Settings

Purpose	This task provisions the trunk settings for the MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note This task does not apply to the MXP_2.5G_10G card.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the trunk settings.

Step 2 Click the **Provisioning > Line > Trunk** tabs.

Step 3 Modify any of the settings described in Table 11-95.

Table 11-95 MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Trunk Settings

Parameter	Description	Options
Port	(Display only) Displays the port number. Port 5 is the DWDM trunk (OC-192/STM-64) that provides wavelength services.	5 (Trunk)
Port Name	Provides the ability to assign the specified port a logical name.	User-defined. Name can be up to 32 alphanumeric/ special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about administrative states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • IS,AINS (ANSI) or Unlocked,automaticInService (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI)

Table 11-95 MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Trunk Settings

Parameter	Description	Options
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled or can be set for one of three mode options.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.
AINS Soak	(OC-N and STM-N payloads only) Sets the automatic in-service soak period.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G369 Change the 4x2.5G Muxponder Trunk Wavelength Settings

Purpose	This task changes the trunk wavelength settings for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C card where you want to change the trunk wavelength settings.

Step 2 Click the **Provisioning > Line > Wavelength Trunk Settings** tabs.

Step 3 Modify any of the settings described in Table 11-96.

Table 11-96 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C Card Wavelength Trunk Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	5 (Trunk)
Band	(Display only) Indicates the wavelength band available from the card that is installed. If the card is preprovisioned, the field can be provisioned to the band of the card that will be installed.	• C—The C-band wavelengths are available in the Wavelength field. • L—The L-band wavelengths are available in the Wavelength field.
Even/Odd	Sets the wavelengths available for provisioning for MXP_2.5G_10E_C and MXP_2.5G_10E_L cards. (This field does not apply to MXP_2.5G_10G or MXP_2.5G_10E cards.)	• Even—Displays even C-band or L-band wavelengths in the Wavelength field. • Odd—Displays odd C-band or L-band wavelengths in the Wavelength field.
Wavelength	The wavelength provisioned for the trunk.	• First Tunable Wavelength • Further wavelengths in 100-GHz ITU-T C-band or L-band spacing, depending on the card that is installed. For MXP_2.5G_10G and MXP_2.5G_10E cards, the wavelengths carried by the card are identified with two asterisks. If the card is not installed, all wavelengths appear with a dark grey background.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G226 Change the 4x2.5G Muxponder SONET/SDH Line Thresholds Settings

Purpose	This task changes the SONET (ANSI) or SDH (ETSI) line threshold settings for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds** tabs.

Step 3 Modify any of the settings described in Table 11-97.

Note In Table 11-97, some parameter tabs or selections do not always apply to all 4x2.5G muxponder cards. If the tabs or selections do not apply, they do not appear in CTC.

Table 11-97 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line Threshold Settings

Parameter	Description	Options - ONS 15454	Options - ONS 15454 SDH
Port	(Display only) Port number	• 1 • 2 • 3 • 4 • 5 (MXP_2.5G_10G only)	• 1 • 2 • 3 • 4 • 5 (MXP_2.5G_10G only)
EB	Path Errored Block indicates that one or more bits are in error within a block	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Table 11-97 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line Threshold Settings (Continued)

Parameter	Description	Options - ONS 15454	Options - ONS 15454 SDH
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
SEFS	(Near End Section or Regeneration Section only) Severely errored framing seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—

Table 11-97 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line Threshold Settings (Continued)

Parameter	Description	Options - ONS 15454	Options - ONS 15454 SDH
BBE	Background block errors	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
UAS	(Line or Multiplex Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G303 Provision the 4x2.5G Muxponder Trunk Port Alarm and TCA Thresholds

Purpose	This task changes the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C trunk port alarm and TCA thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Step 3 Select **TCA** (if not already selected), a **15 Min** or **1 Day** PM interval radio button and then click **Refresh**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Step 4 Referring to Table 11-98, verify the trunk port (Port 5) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note Do not modify the Laser Bias parameters.

Table 11-98 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Trunk Port TCA Thresholds

Card	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
MXP_2.5G_10G	–8 dBm	–18 dBm	7 dBm	–1 dBm
MXP_2.5G_10E	–9 dBm	–18 dBm	9 dBm	0 dBm
MXP_2.5G_10E_C	–9 dBm	–18 dBm	9 dBm	0 dBm
MXP_2.5G_10E_L	–9 dBm	–18 dBm	9 dBm	0 dBm
MXP_2.5G_10EX_C	–9 dBm	–18 dBm	9 dBm	0 dBm

Step 5 Click **Apply**.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Referring to Table 11-99, verify the trunk port (Port 5) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note Do not modify the Laser Bias parameters.

Table 11-99 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Trunk Port Alarm Thresholds

Card	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
MXP_2.5G_10G	–8 dBm	–20 dBm	4 dBm	2 dBm
MXP_2.5G_10E	–8 dBm	–20 dBm	7 dBm	3 dBm
MXP_2.5G_10E_C	–8 dBm	–20 dBm	7 dBm	3 dBm
MXP_2.5G_10E_L	–8 dBm	–20 dBm	7 dBm	3 dBm
MXP_2.5G_10EX_C	–8 dBm	–20 dBm	7 dBm	3 dBm

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G304 Provision the 4x2.5G Muxponder Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G278 Provision the Optical Line Rate, page 11-131 DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs. The TCA thresholds are shown by default.

Step 3 Referring to Table 11-100, verify the client Port *N* (where *N* = 1 through 4) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface at the other end. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Table 11-100 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Client Interfaces TCA Thresholds

Port Type (by CTC)	Pluggable Port Module (SFP)	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
OC-48	ONS-SE-2G-S1	–3	–18	3	–16
	15454-SFP-OC48-IR	0	–18	6	–11
STM-16	ONS-SE-2G-S1	–3	–18	3	–16
	15454E-SFP-L.16.1	0	–18	6	–11

Step 4 Repeat Step 3 to provision each additional client port.

Step 5 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 6 Referring to Table 11-101, verify the client Port *N* (where *N* = 1 through 4) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note Do not modify the Laser Bias parameters.

Table 11-101 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, or MXP_2.5G_10E_L Card Client Interfaces Alarm Thresholds

Port Type (by CTC)	Pluggable Port Module (SFP)	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
OC-48	ONS-SE-2G-S1	0	–21	0	–13
	15454-SFP-OC48-IR	3	–21	3	–8
STM-16	ONS-SE-2G-S1	0	–21	0	–13
	15454E-SFP-L.16.1	3	–21	3	–8

Step 7 Click **Apply**.

Step 8 Repeat Steps 6 and 7 to provision each additional client port.

Step 9 Return to your originating procedure (NTP).

DLP-G228 Change the 4x2.5G Muxponder Line OTN Settings

Purpose	This task changes the line OTN settings for MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, and MXP_2.5G_10EX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C card where you want to change the line OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then choose one of the following subtabs: **OTN Lines**, **OTN G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-102 through 11-105.

Note You must modify Near End and Far End independently, 15 Min and 1 Day independently, and SM and PM independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-102 describes the values on the Provisioning > OTN > OTN Lines tab.

Note In Table 11-102, some parameter tabs or values do not always apply to all MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, or MXP_2.5G_10E_L cards. If the tabs or values do not apply, they do not appear in CTC.

Table 11-102 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line OTN Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	5 (Trunk)
G.709 OTN	Sets the OTN lines according to ITU-T G.709.	• Enable • Disable

Table 11-102 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Card Line OTN Settings (Continued)

Parameter	Description	Options
FEC	Sets the OTN line FEC mode. FEC mode can be Disabled or Enabled. With the MXP_2.5G_10E card, Enhanced FEC (E-FEC) mode can be enabled to provide greater range and lower bit error rate. E-FEC applies only to the MXP_2.5G_10E card.	• Enable—(MXP_2.5G_10G only) FEC is on. • Disable—FEC is off. • Standard—(MXP_2.5G_10E only) FEC is on. • Enhanced—(MXP_2.5G_10E only) Enhanced FEC is on.
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
SF BER	(Display only) Sets the signal fail bit error rate.	• 1E-5
Asynch/Synch Mapping	(MXP_2.5G_10E only) The MXP_2.5G_10E can perform standard ODU multiplexing according to ITU-T G.709. The card uses this to aggregate the four OC-48 client signals.	• ODU Multiplex

Table 11-103 describes the values on the Provisioning > OTN > OTN G.709 Thresholds tab.

Table 11-103 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C ITU-T G.709 Threshold Settings

Parameter	Description	Options
Port	(Display only) Port number	5 (Trunk)
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. **Note** SM (OTUk) is the ITU-T G.709 optical channel transport unit order of k overhead frame used for management and performance monitoring. PM (ODUk) is the ITU-T G.709 optical channel data unit order of k overhead frame unit used for path performance monitoring.
SES	Severely errored seconds. Two types of thresholds can be asserted. Selecting the SM (OTUk) radio button selects FEC, overhead management, and PM using OTUk. Selecting the PM radio button selects path PM using ODUk.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
UAS	Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-103 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C ITU-T G.709 Threshold Settings (Continued)

Parameter	Description	Options
BBE	Background block errors	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
FC	Failure counter	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-104 describes the values on the Provisioning > OTN > FEC Thresholds tab.

Table 11-104 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C FEC Threshold Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	5 (Trunk)
Bit Errors Corrected	Displays the number of bit errors corrected during the interval selected. The interval can be set for 15 minutes or one day.	Numeric
Uncorrectable Words	Displays the number of uncorrectable words during the interval selected. The interval can be set for 15 minutes or one day.	Numeric

Table 11-105 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-105 MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, or MXP_2.5G_10EX_C Trail Trace Identifier Settings

Parameter	Description	Options
Port	Sets the port number. The trail trace identifier is applicable only to the trunk interface, which handles ITU-T G.709 frames.	5 (Trunk)
Level	Sets the level.	• Section • Path
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable FDI on TTIM	If a Trace Identifier Mismatch on Section overhead alarm arises because of a J0 overhead string mismatch, no Forward Defect Indication (FDI) signal is sent to the downstream nodes if this box is checked.	• Checked (FDI on TTIM is disabled) • Unchecked (FDI on TTIM is not disabled)
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size; trail trace identifier is 64 bytes in length.
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec box to keep this panel updated.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 minutes.	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

NTP-G99 Modify the 2.5G Data Muxponder Card Line Settings and PM Parameter Thresholds

Purpose	This procedure changes the line and threshold settings for the MXP_MR_2.5G and MXPP_MR_2.5G muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G63 Install an SFP or XFP, page 14-72 DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary) DLP-G278 Provision the Optical Line Rate, page 11-131 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the muxponder card settings. If you are already logged in, proceed to Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 Perform any of the following tasks as needed:

- DLP-G236 Change the 2.5G Data Muxponder Client Line Settings, page 11-258
- DLP-G237 Change the 2.5G Data Muxponder Distance Extension Settings, page 11-260
- DLP-G238 Change the 2.5G Data Muxponder SONET (OC-48)/SDH (STM-16) Settings, page 11-262
- DLP-G239 Change the 2.5G Data Muxponder Section Trace Settings, page 11-264
- DLP-G240 Change the 2.5G Data Muxponder SONET or SDH Line Thresholds, page 11-267
- DLP-G321 Change the 2.5G Data Muxponder Line Thresholds for 1G Ethernet or 1G FC/FICON Payloads, page 11-269
- DLP-G307 Provision the 2.5G Data Muxponder Trunk Port Alarm and TCA Thresholds, page 11-271
- DLP-G308 Provision the 2.5G Data Muxponder Client Port Alarm and TCA Thresholds, page 11-272
- DLP-G370 Change the 2.5G Data Muxponder Trunk Wavelength Settings, page 11-266

Note To use the Alarm Profiles tab, including creating alarm profiles and suppressing alarms, see the Alarm and TCA Monitoring and Management document.

Stop. You have completed this procedure.

DLP-G236 Change the 2.5G Data Muxponder Client Line Settings

Purpose	This task changes the client line settings for MXP_MR_2.5G and MXPP_MR_2.5G muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > Client** tabs. Tabs and parameter selections vary according to PPM provisioning.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 3 Modify any of the settings for the Client tab as described in Table 11-106.

Table 11-106 MXP_MR_2.5G or MXPP_MR_2.5G Card Client Settings

Parameter	Description	Options
Port	(Display only) Port number.	• 1 • 2
Port Name	The user can assign a logical name for each of the ports shown by filling in this field.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16. **Note** You can provision a string (port name) for each fiber channel/FICON interface on the MXP_MR_2.5G and MXPP_MR_2.5G cards, which allows the MDS Fabric Manager to create a link association between that SAN port and a SAN port on a Cisco MDS 9000 switch.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about administrative states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI)

Table 11-106 MXP_MR_2.5G or MXPP_MR_2.5G Card Client Settings (Continued)

Parameter	Description	Options
Service State	Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)
ALS Mode	Sets the ALS function.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: (MXP_MR_2.5G only) ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.

Table 11-106 MXP_MR_2.5G or MXPP_MR_2.5G Card Client Settings (Continued)

Parameter	Description	Options
Reach	Displays the optical reach distance of the client port.	The reach distances that appear in the drop-down list depend on the card: • Autoprovision—The system to automatically provision the reach from the pluggable port module (PPM) reach value on the hardware. • SX—Short laser wavelength on multimode fiber optic cable for a maximum length of 550 meters. The operating wavelength range is 770-860 nm. • LX—Long wavelength for a long haul fiber optic cable for a maximum length of 10 km. The operating wavelength range is 1270-1355 nm. • CX—Two pairs of 150-ohm shielded twisted pair cable for a maximum length of 25 meters. • T—Four pairs of Category 5 Unshielded Twisted Pair cable for a maximum length of 100 meters. • DX—Single mode up to 40 km. The operating wavelength range is 1430-1580 nm. • HX—Single mode up to 40 km. The operating wavelength range is 1280-1335 nm. • ZX—Extended wavelength single-mode optical fiber for up to 100 km. The operating wavelength range is 1500-1580 nm. • VX—Single mode up to 100 km. The operating wavelength range is 1500-1580 nm.
Wavelength	Displays the wavelength of the client port.	• First Tunable Wavelength • Further wavelengths:850 nm through 1560.61 nm; 100-GHz ITU spacing; CWDM spacing

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G237 Change the 2.5G Data Muxponder Distance Extension Settings

Purpose	This task changes the distance extension settings for MXP_MR_2.5G and MXPP_MR_2.5G muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Distance extension settings can be changed only if the facilities are out of service (OOS,DSBLD).

Note The distance extension parameters only apply to client ports (Ports 1 to 8) and not to the trunk ports (Port 9 for MXP_MR_2.5G card or Ports 9 and 10 for the MXPP_MR_2.5G card).

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the distance extension settings.

Step 2 Click the **Provisioning > Line** > *Client* tabs. A client port must be provisioned for the tab to be present.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 3 Locate the Client port table row and verify that the Service State column value is OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI). If yes, continue with Step 4. If not, complete the following substeps:

a. Click the **Admin State** table cell and choose **OOS,DSBLD** (ANSI) or **Locked,Maintenance** (ETSI).

b. Click **Apply**, then **Yes**.

Step 4 Click the **Provisioning > Line > Distance Extension** tabs. Tabs and parameter selections vary according to PPM provisioning.

Step 5 Modify any of the settings for the Distance Extension tab as described in Table 11-107.

Table 11-107 MXP_MR_2.5G or MXPP_MR_2.5G Card Line Distance Extension Settings

Parameter	Description	Options
Port	(Display only) Port number	• 1 • 2
Enable Distance Extension	Allows end-to-end distances of up to 1600 km for FC1G and up to 800 km for FC2G. If Distance Extension is enabled, set the connected Fibre Channel switches to Interop or Open Fabric mode, depending on the Fibre Channel switch. By default, the MXP_MR_2.5G and MXPP_MR_2.5G card will interoperate with the Cisco Multilayer Director Switch (MDS) storage products.	Checked or unchecked
Auto Detect Credits	Allows automatic detection of buffer credits for Fibre Channel flow control.	Checked or unchecked

Table 11-107 MXP_MR_2.5G or MXPP_MR_2.5G Card Line Distance Extension Settings

Parameter	Description	Options
Credits Available	(Display only) Displays the number of buffer credits available.	Numeric (range depends on the client equipment attached to the card)
Autoadjust GFP Buffer Threshold	Allows the threshold of the generic framing procedure (GFP) buffer between two MXP_MR_2.5G or two MXPP_MR_2.5G cards to be automatically adjusted.	Checked or unchecked
GFP Buffers Available	Displays the number of GFP buffers available between two MXP_MR_2.5G or two MXPP_MR_2.5G cards.	Numeric

Step 6 Click **Apply**.

Step 7 Return to your originating procedure (NTP).

DLP-G238 Change the 2.5G Data Muxponder SONET (OC-48)/SDH (STM-16) Settings

Purpose	This task changes the SONET (OC-48) or SDH (STM-16) settings for MXP_MR_2.5G and MXPP_MR_2.5G muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note SONET (OC-48)/SDH (STM-16) settings apply only to the trunk ports (Port 9 for the MXP_MR_2.5G card and Ports 9 and 10 for the MXPP_MR_2.5G card.)

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the OC-48/STM-64 settings.

Step 2 Click the **Provisioning > Line > SONET** (ANSI) or **SDH** (ETSI). Tabs and parameter selections vary according to PPM provisioning.

Step 3 Modify any of the settings for the SONET or SDH tab as described in Table 11-108.

Table 11-108 MXP_MR_2.5G or MXPP_MR_2.5G Card Line SONET or SDH Settings

Parameter	Description	Options
Port	(Display only) Port number.	9 (trunk for MXP_MR_2.5G) or 9 and 10 (trunks for MXPP_MR_2.5G)
Port Name	Provides the ability to assign the specified port a name.	User-defined. Name can be up to 32 alphanumeric/ special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about administrative states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • IS,AINS (ANSI) or Unlocked,automaticInService (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI)
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)
SF BER[1]	Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5
SD BER[1]	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled or can be set for one of three mode options.	• Disable (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.

Table 11-108 MXP_MR_2.5G or MXPP_MR_2.5G Card Line SONET or SDH Settings (Continued)

Parameter	Description	Options
AINS Soak	Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to change settings.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments
Type	The optical transport type.	• SONET (ANSI) • SDH (ETSI)
SyncMsgIn	Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked
Send DoNotUse	Sets the Send DoNotUse card state. When checked, sends a DUS message on the S1 byte.	Checked or unchecked
ProvidesSync	Sets the ProvidesSync card parameter. If checked, the card is provisioned as an NE timing reference.	Checked or unchecked

1. SF BER and SD BER thresholds apply only to trunk ports (Port 9 for MXP_MR_2.5G and Ports 9 and 10 for MXPP_MR_2.5G).

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G239 Change the 2.5G Data Muxponder Section Trace Settings

Purpose	This task changes the section trace settings for MXP_MR_2.5G and MXPP_MR_2.5G muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs. Tabs and parameter selections vary according to PPM provisioning.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 3 Modify any of the settings in the Section Trace tab as described in Table 11-109.

Table 11-109 MXP_MR_2.5G or MXPP_MR_2.5G Card Line Section Trace Settings

Parameter	Description	Options
Port	(Display only) Port number.	• 9 (trunk port for MXP_MR_2.5G) • 9 and 10 (trunk ports for MXPP_MR_2.5G)
Received Trace Mode	Sets the received trace mode.	• Off/None • Manual
Disable AIS/RDI on TIM-S	If an TIM on Section overhead alarm arises because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G370 Change the 2.5G Data Muxponder Trunk Wavelength Settings

Purpose	This task changes the trunk wavelength settings for the MXP_MR_2.5G and MXPP_MR_2.5G.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the trunk wavelength settings.

Step 2 Click the **Provisioning > Line > Wavelength Trunk Settings** tabs.

Step 3 Modify any of the settings as described in Table 11-110.

Table 11-110 MXP_MR_2.5G or MXPP_MR_2.5G Card Wavelength Trunk Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	9 (Trunk) 10 (Trunk) (MXPP_MR_2.5G only)
Band	(Display only) Indicates the wavelength band that can be provisioned.	C—Only the C band is available
Even/Odd	Sets the wavelengths available for provisioning. This field does not apply to MXP_MR_2.5G or MXPP_MR_2.5G cards	—
Wavelength	The wavelength provisioned for the trunk.	• First Tunable Wavelength • Further wavelengths in 100-GHz ITU-T, C-band spacing. If the card is installed, the wavelengths it carries are identified with two asterisks. Other wavelengths have a dark grey background. If the card is not installed, all wavelengths appear with a dark grey background.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G240 Change the 2.5G Data Muxponder SONET or SDH Line Thresholds

Purpose	This task changes the SONET or SDH line threshold settings for MXP_MR_2.5G and MXPP_MR_2.5G muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds > SONET Thresholds** (ANSI) or **SDH Thresholds** (ETSI) tabs.

Step 3 Modify any of the settings as shown in Table 11-111.

Note You must modify Near End and Far End independently, 15 Min and 1 Day independently, and Line and Section independently. To do so, choose the appropriate radio button and click **Refresh**.

Note In Table 11-111, some parameters or options do not apply to all MXP_MR_2.5G or MXPP_MR_2.5G cards. If the parameters or options do not apply, they do not appear in CTC.

Table 11-111 MXP_MR_2.5G or MXPP_MR_2.5G Card Line Threshold Settings

Field	Description	ONS 15454 Options	ONS 15454 SDH Options
Port	(Display only) Port number	• 9 (MXP_MR_2.5G) • 9 and 10 (MXPP_MR_2.5G)	• 9 (MXP_MR_2.5G) • 9 and 10 (MXPP_MR_2.5G)
EB	Path Errored Block indicates that one or more bits are in error within a block	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—

Table 11-111 MXP_MR_2.5G or MXPP_MR_2.5G Card Line Threshold Settings (Continued)

Field	Description	ONS 15454 Options	ONS 15454 SDH Options
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
BBE	Background block errors	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
SEFS	(Section or Regeneration Section only) Severely errored framing seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Section only Choose an option in each category and click **Refresh**.	—
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Section only Choose an option in each category and click **Refresh**.	—
UAS	(Line or Multiplex Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Section only Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Regeneration Section (only) Choose an option in each category and click **Refresh**.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G321 Change the 2.5G Data Muxponder Line Thresholds for 1G Ethernet or 1G FC/FICON Payloads

Purpose	This task changes the line threshold settings for MXP_MR_10G and MXPP_MR_2.5G transponder cards carrying the 1G Ethernet or 1G FC/FICON payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Display the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the line threshold settings in card view.

Step 2 Click the **Provisioning > Line Thresholds > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose the applicable port.

Step 5 From the Variable drop-down list, choose an Ethernet variable. See Table 11-112 for a list of available Ethernet variables.

Table 11-112 MXP_MR_2.5G and MXPP_MR 2.5G Card 1G Ethernet or 1G, 2G FC/FICON Variables

Variable	Description
ifInOctets	Number of bytes received since the last counter reset.
rxTotalPkts	Total number of receive packets.
ifInDiscards	Number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol.
ifInErrors	Total number of receive errors.
ifOutOctets	The total number of octets transmitted out of the interface, including framing characters.
txTotalPkts	Total number of transmitted packets.
ifOutDiscards	Number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted.

Table 11-112 MXP_MR_2.5G and MXPP_MR 2.5G Card 1G Ethernet or 1G, 2G FC/FICON Variables (Continued)

mediaIndStatsRxFramesTruncated	Total number of frames received that are less than 5 bytes. This value is a part of high-level data link control (HDLC) and GFP port statistics.
mediaIndStatsRxFramesTooLong	Number of received frames that exceed the maximum transmission unit (MTU). This value is part of HDLC and GFP port statistics.
mediaIndStatsRxFramesBadCRC	Number of receive data frames with payload cyclic redundancy check (CRC) errors when HDLC framing is used.
mediaIndStatsTxFramesBadCRC	Number of transmitted data frames with payload CRC errors when HDLC framing is used.
8b10bInvalidOrderedSets	Number of 8b10b disparity violations on the Fibre Channel line side.
8b10bStatsEncodingDispErrors	Number of 8b10b disparity violations on the Fibre Channel line side.

Step 6 From the Alarm Type drop-down list, indicate whether the event will be triggered by the rising threshold, the falling threshold, or both the rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Type in an appropriate number of seconds for the Sample Period.

Step 9 Type in the appropriate number of occurrences for the Rising Threshold.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Step 12 Return to your originating procedure (NTP).

DLP-G307 Provision the 2.5G Data Muxponder Trunk Port Alarm and TCA Thresholds

Purpose	This task changes the MXP_MR_2.5G and MXPP_MR_2.5G trunk port alarm and TCA thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Throughout this task, trunk port refers to Port 9 (MXP_MR_2.5G and MXPP_MR_2.5G) and Port 10 (MXPP_MR_2.5G only).

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Step 3 Verify the trunk port TCA thresholds for RX Power High is –9 dBm and for RX Power Low is –23 dBm. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Step 4 Under Types, click the **Alarm** radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Step 5 Verify the trunk port Alarm thresholds for RX Power High is –7 dBm and for RX Power Low is –26 dBm. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Step 6 Click **Apply**.

Step 7 Return to your originating procedure (NTP).

DLP-G308 Provision the 2.5G Data Muxponder Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the MXP_MR_2.5G and MXPP_MR_2.5G cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G278 Provision the Optical Line Rate, page 11-131 DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs. The TCA thresholds are shown by default.

Step 3 Referring to Table 11-113, verify the client port (Ports 1 through 8) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface at the other end. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note Do not modify the Laser Bias parameters.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Table 11-113 MXP_MR_2.5G and MXPP_MR_2.5G Card Client Interface TCA Thresholds

Port Type (by CTC)	Pluggable Port Module (XFP)	TCA RX Power Low	TCA RX Power High	TCA TX Power Low	TCA TX Power High
FC1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–17	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
FC2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–15	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
FICON1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–17	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
FICON2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–17	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
ONE_GE	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–17	0	–16	3
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–20	–3	–16	3
ESCON	ONS-SE-200-MM	–21	–14	–32	–11

Step 4 Click **Apply**.

Step 5 Repeat Steps 3 and 4 to provision each additional client port.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Referring to Table 11-114, verify the client port (Ports 1 through 8) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Table 11-114 MXP_MR_2.5G and MXPP_MR_2.5G Card Client Interface Alarm Thresholds

Port Type (by CTC)	Pluggable Port Module (XFP)	Alarm RX Power Low	Alarm RX Power High	Alarm TX Power Low	Alarm TX Power High
FC1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
FC2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–18	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
FICON1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
FICON2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
ONE_GE	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
ESCON	ONS-SE-200-MM	–24	–11	–35	–8

Step 8 Click **Apply**.

Step 9 Repeat Steps 7 and 8 to provision each additional client port. When you have finished provisioning client ports, continue with Step 10.

Step 10 Return to your originating procedure (NTP).

NTP-G148 Modify the 10G Data Muxponder Card Line Settings and PM Parameter Thresholds

Purpose	This procedure changes the line and threshold settings for the MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G63 Install an SFP or XFP, page 14-72 DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary) DLP-G278 Provision the Optical Line Rate, page 11-131 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the muxponder card settings. If you are already logged in, proceed to Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 Perform any of the following tasks as needed:

- DLP-G333 Change the 10G Data Muxponder Client Line Settings, page 11-276
- DLP-G334 Change the 10G Data Muxponder Distance Extension Settings, page 11-278
- DLP-G340 Change the 10G Data Muxponder Trunk Wavelength Settings, page 11-280
- DLP-G335 Change the 10G Data Muxponder SONET (OC-192)/SDH (STM-64) Settings, page 11-281
- DLP-G336 Change the 10G Data Muxponder Section Trace Settings, page 11-283
- DLP-G341 Change the 10G Data Muxponder SONET or SDH Line Thresholds, page 11-284
- DLP-G337 Change the 10G Data Muxponder Line RMON Thresholds for Ethernet, 1G FC/FICON, or ISC/ISC3 Payloads, page 11-286
- DLP-G338 Provision the 10G Data Muxponder Trunk Port Alarm and TCA Thresholds, page 11-289
- DLP-G339 Provision the 10G Data Muxponder Client Port Alarm and TCA Thresholds, page 11-291
- DLP-G366 Change the 10G Data Muxponder OTN Settings, page 11-294

Note To use the Alarm Profiles tab, including creating alarm profiles and suppressing alarms, see the Alarm and TCA Monitoring and Management document.

Stop. You have completed this procedure.

DLP-G333 Change the 10G Data Muxponder Client Line Settings

Purpose	This task changes the line settings for the MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > Client** tabs. Tabs and parameter selections vary according to PPM provisioning.

Step 3 Modify any of the settings for the Client tab as described in Table 11-115.

Table 11-115 MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C Card Line Client Settings

Parameter	Description	Options
Port	(Display only) Port number.	1 through 8
Port Name	The user can assign a logical name for each of the ports shown by filling in this field.	User-defined. Name can be up to 32 alphanumeric/ special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16. **Note** You can provision a string (port name) for each fiber channel/FICON interface on the MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C cards, which allows the MDS Fabric Manager to create a link association between that SAN port and a SAN port on a Cisco MDS 9000 switch.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about administrative states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI)
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)

Table 11-115 MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C Card Line Client Settings (Continued)

Parameter	Description	Options
ALS Mode	Sets the ALS function mode.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.
Reach	Sets the optical reach distance of the client port.	The reach distances that appear in the drop-down list depend on the card: • Autoprovision—The system to automatically provision the reach from the pluggable port module (PPM) reach value on the hardware. • SX—Short laser wavelength on multimode fiber optic cable for a maximum length of 550 meters. The operating wavelength range is 770-860 nm.) • LX—Long wavelength for a long haul fiber optic cable for a maximum length of 10 km. The operating wavelength range is 1270-1355 nm.) • CX—Two pairs of 150-ohm shielded twisted pair cable for a maximum length of 25 meters.) • T—Four pairs of Category 5 Unshielded Twisted Pair cable for a maximum length of 100 meters.) • DX—Single mode up to 40 km. The operating wavelength range is 1430-1580 nm.) • HX—Single mode up to 40 km. The operating wavelength range is 1280-1335 nm.) • ZX—Extended wavelength single-mode optical fiber for up to 100 km. The operating wavelength range is 1500-1580 nm.) • VX—Single mode up to 100 km. The operating wavelength range is 1500-1580 nm.)
Wavelength	Displays the wavelength of the client port.	• First Tunable Wavelength • Further wavelengths: 850 nm through 1560.61 nm 100-GHz ITU spacing CWDM spacing
Squelch	Shuts down the far-end laser in response to certain defects. (Squelch does not apply to ISC COMPACT payloads.)	• Squelch • Disable

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G334 Change the 10G Data Muxponder Distance Extension Settings

Purpose	This task changes the distance extension settings for the MXP_MR_10DME_C, MXP_MR_10DME_L, and MXP_MR_10DMEX_C muxponder card ports provisioned for Fibre Channel or FICON payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The distance extension parameters only apply to client ports (Ports 1 to 8) and not to the trunk port (Port 9).

Note The client port must be in the OOS,DSBLD (ANSI) or Locked,disabled (ETSI) state in order to change the distance extension settings. If a Y-cable is provisioned on the client port, both the working and protect client ports must be in OOS,DSBLD (ANSI) or Locked,disabled (ETSI) state before you change the distance extension settings.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C card where you want to change the distance extension settings.

Step 2 Click the **Provisioning > Line > Distance Extension** tabs.

Step 3 Modify any of the settings as described in Table 11-116.

Table 11-116 MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C Card Line Distance Extension Settings

Parameter	Description	Options
Port	(Display only) Port number. Up to eight ports might appear based on the number of pluggable port modules that are provisioned.	—

Table 11-116 MXP_MR_10DME_C, MXP_MR_10DME_L, or MXP_MR_10DMEX_C Card Line Distance Extension Settings (Continued)

Parameter	Description	Options
Enable Distance Extension	Allows end-to-end distances of up to 1600 km for FC1G and up to 800 km for FC2G. If Distance Extension is enabled, set the connected Fibre Channel switches to Interop or Open Fabric mode, depending on the Fibre Channel switch. By default, the MXP_MR_10DME_C and MXP_MR_10DME_L card will interoperate with the Cisco MDS storage products.	Checked or unchecked
Fast Switch	If unchecked, the end-to-end fiber channel link is reinitialized every time a Y-cable protection switch occurs. If checked, reinitialization of the link is avoided when a Y-cable protection switch occurs, thus reducing the traffic hit considerably. This feature is supported for FC1G, FC2G, FC4G, FICON1G, FICON2G, and FICON4G trunk failures as well as user-initiated Y-cable protection switch such as, Manual, Force, or Lockout. It is recommended that you do not enable the Fast Switch option as the link may not come up after a Y-cable protection switch in certain cases. **Note** This option can be used only if you have unchecked Enable Distance Extension option.	Checked or unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G340 Change the 10G Data Muxponder Trunk Wavelength Settings

Purpose	This task changes the trunk wavelength settings for the MXP_MR_10DME_C and MXP_MR_10DME_L.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C or MXP_MR_10DME_L card where you want to change the trunk wavelength settings.

Step 2 Click the **Provisioning > Line > Wavelength Trunk Settings** tabs.

Step 3 Modify any of the settings for the Wavelength Trunk Settings tab as described in Table 11-117.

Table 11-117 MXP_MR_10DME_C or MXP_MR_10DME_L Card Wavelength Trunk Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	Port 9 (Trunk)
Band	Indicates the wavelength band that can be provisioned. The field is display-only when a physical MXP_MR_10DME_C or MXP_MR_10DME_L is installed. If the card is provisioned in CTC only, you can provision the band for the card that will be installed.	• C—The C-band wavelengths are available in the Wavelength field. • L—The L-band wavelengths are available in the Wavelength field.
Even/Odd	Sets the wavelengths available for provisioning.	• Even—Displays even C-band or L-band wavelengths in the Wavelength field. • Odd—Displays odd C-band or L-band wavelengths in the Wavelength field.
Wavelength	The wavelength provisioned for the trunk.	• First Tunable Wavelength • Further wavelengths in 100-GHz ITU spacing

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G335 Change the 10G Data Muxponder SONET (OC-192)/SDH (STM-64) Settings

Purpose	This task changes the OC-192 (ANSI)/STM-64 (ETSI) settings for the MXP_MR_10DME_C and MXP_MR_10DME_L muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C or MXP_MR_10DME_L card where you want to change the SONET (OC-192)/SDH (STM-64) settings.

Step 2 Click the **Provisioning > Line > SONET** (ANSI) or **SDH** (ETSI). Tabs and parameter selections vary according to PPM provisioning.

Step 3 Modify any of the settings as described in Table 11-118.

Table 11-118 MXP_MR_10DME_C or MXP_MR_10DME_L Card Line SONET or SDH Settings

Parameter	Description	Options
Port	(Display only) Port number.	9 (Trunk)
Port Name	Provides the ability to assign the specified port a name.	User-defined. Name can be up to 32 alphanumeric/ special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state unless network conditions prevent the change. For more information about administrative states, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • IS,AINS (ANSI) or Unlocked,automaticInService (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI)
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)
SF BER[1]	Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5

Table 11-118 MXP_MR_10DME_C or MXP_MR_10DME_L Card Line SONET or SDH Settings (Continued)

Parameter	Description	Options
SD BER[1]	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
Type	The optical transport type.	• SONET (ANSI) • SDH (ETSI)
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled or can be set for one of three mode options.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.
AINS Soak	Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to change settings.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments
ProvidesSync	Sets the ProvidesSync card parameter. If checked, the card is provisioned as a NE timing reference.	Checked or unchecked
SyncMsgIn	Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked
Send DoNotUse	Sets the Send DoNotUse card state. When checked, sends a DUS (do not use) message on the S1 byte.	Checked or unchecked

1. SF BER and SD BER thresholds apply only to trunk ports (Port 9 for MXP_MR_2.5G and Ports 9 and 10 for MXPP_MR_2.5G).

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G336 Change the 10G Data Muxponder Section Trace Settings

Purpose	This task changes the section trace settings for the MXP_MR_10DME_C and MXP_MR_10DME_L muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C or MXP_MR_10DME_L card where you want to change the section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs. Tabs and parameter selections vary according to PPM provisioning.

Step 3 Modify any of the settings in the Section Trace tab as described in Table 11-119.

Table 11-119 MXP_MR_10DME_C or MXP_MR_10DME_L Card Line Section Trace Settings

Parameter	Description	Options
Port	(Display only) Port number.	• 9 (trunk only)
Received Trace Mode	Sets the received trace mode.	• Off/None • Manual
Disable AIS/RDI on TIM-S	If a TIM on section overhead alarm arises because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or select the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G341 Change the 10G Data Muxponder SONET or SDH Line Thresholds

Purpose	This task changes the SONET or SDH line threshold settings for the MXP_MR_10DME_C and MXP_MR_10DME_L muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C or MXP_MR_10DME_L card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds > SONET Thresholds** (ANSI) or **SDH Thresholds** (ETSI) tabs.

Step 3 Modify any of the settings as shown in Table 11-120.

Note You must modify Near End and Far End independently; 15 Min and 1 Day independently; and Line and Section independently. To do so, choose the appropriate radio button and click **Refresh**.

Note In Table 11-120, some parameters and options do not apply to all MXP_MR_10DME cards. If the parameter or options do not apply, they do not appear in CTC.

Table 11-120 MXP_MR_10DME_C or MXP_MR_10DME_LCard Line Threshold Settings

Parameter	Description	Options - ONS 15454	Options - ONS 15454 SDH
Port	(Display only) Port number	• 9 (Trunk)	• 9 (Trunk)
EB	Path Errored Block indicates that one or more bits are in error within a block	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Table 11-120 MXP_MR_10DME_C or MXP_MR_10DME_LCard Line Threshold Settings (Continued)

Parameter	Description	Options - ONS 15454	Options - ONS 15454 SDH
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	—
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
SEFS	(Near End Section or Regeneration Section only) Severely errored framing seconds	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
BBE	Background block errors	—	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Table 11-120 MXP_MR_10DME_C or MXP_MR_10DME_LCard Line Threshold Settings (Continued)

Parameter	Description	Options - ONS 15454	Options - ONS 15454 SDH
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.
UAS	(Line or Multiplex Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option in each category and click **Refresh**.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G337 Change the 10G Data Muxponder Line RMON Thresholds for Ethernet, 1G FC/FICON, or ISC/ISC3 Payloads

Purpose	This task changes the line threshold settings for MXP_MR_10DME_C and MXP_MR_10DME_L cards carrying Ethernet, FC/FICON, or ISC/ISC3 payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), display the MXP_MR_10DME_C or MXP_MR_10DME_L card where you want to change the line threshold settings in card view.

Step 2 Click the **Provisioning > Line Thresholds > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose the applicable port, either the payload port, for example “1-1 (ONE_GE)”, or the equivalent ITU-T G.7041 GFP (Generic Frame Procedure) port.

Step 5 From the Variable drop-down list, choose an Ethernet, FC, FICON, or ISC variable. See Table 11-121 for a list of available Ethernet variables, Table 11-122 for a list of FC and FICON variables, Table 11-123 for a list of ISC and ISC3 variables, and Table 11-124 for a list of GFP variables.

Table 11-121 MXP_MR_10DME_C or MXP_MR_10DME_L Ethernet Variables

Variable	Description
ifInOctets	Number of bytes received since the last counter reset.
rxTotalPkts	Total number of receive packets.
ifInErrors	Total number of receive errors.
ifOutOctets	The total number of octets transmitted out of the interface, including framing characters.
txTotalPkts	Total number of transmitted packets.
mediaIndStatsRxFramesTruncated	Total number of frames received that are less than 5 bytes. This value is a part of HDLC and GFP port statistics.
mediaIndStatsRxFramesTooLong	Number of received frames that exceed the MTU[1]. This value is part of HDLC and GFP port statistics.
mediaIndStatsRxFramesBadCRC	Number of receive data frames with payload CRC errors when HDLC framing is used.
mediaIndStatsTxFramesBadCRC	Number of transmitted data frames with payload CRC errors when HDLC framing is used.
8b10bInvalidOrderedSetsDispErrorsSum	Number of code violations/running disparity errors in the 8b/10b encoded characters received.

1. Frames larger than the MTU, including Jumbo frames, pass through. The MTU, however, is not specified by the user.

Table 11-122 MXP_MR_10DME_C or MXP_MR_10DME_L FC/FICON Variables

Variable	Description
ifInOctets	Number of bytes received since the last counter reset.
rxTotalPkts	Total number of receive packets.
ifInErrors	Total number of receive errors.
ifOutOctets	The total number of octets transmitted out of the interface, including framing characters.
txTotalPkts	Total number of transmitted packets.
ifOutOversizePkts	Total number of oversized packets output from the interface.
mediaIndStatsRxFramesTruncated	Total number of frames received that are less than 5 bytes. This value is a part of HDLC and GFP port statistics.
mediaIndStatsRxFramesTooLong	Number of received frames that exceed the MTU. This value is part of HDLC and GFP port statistics.

Table 11-122 MXP_MR_10DME_C or MXP_MR_10DME_L FC/FICON Variables (Continued)

Variable	Description
mediaIndStatsRxFramesBadCRC	Number of receive data frames with payload CRC errors when HDLC framing is used.
mediaIndStatsTxFramesBadCRC	Number of transmitted data frames with payload CRC errors when HDLC framing is used.
fcStatsZeroTxCredits	This is a count that increments when the FC/FICON Tx credits go from a non-zero value to zero.
fcStatsRxRecvrReady	Number of received RDY (Receive Ready) order set.
fcStatsTxRecvrReady	Number of transmitted RDY (Receive Ready) order set.
8b10bInvalidOrderedSetsDispErrorsSum	Number of Code Violations/Running Disparity errors in the 8b/10b encoded characters received.

Table 11-123 MXP_MR_10DME_C or MXP_MR_10DME_L ISC and ISC3Variables

Variable	Description
ifInOctets	Number of bytes received since the last counter reset.
rxTotalPkts	Total number of receive packets.
ifOutOctets	The total number of octets transmitted out of the interface, including framing characters.
txTotalPkts	Total number of transmitted packets.
8b10bInvalidOrderedSetsDispErrorsSum	Number of Code Violations/Running Disparity errors in the 8b/10b encoded characters received.

Table 11-124 MXP_MR_10DME_C or MXP_MR_10DME_L GFP RMON Variables

Variable	Description
gfpStatsRxSBitErrors	Received generic framing protocol (GFP) frames with single bit errors in the core header (these errors are correctable).
gfpStatsRxTypeInvalid	Received GFP frames with invalid type (these are discarded). For example, receiving GFP frames that contain Ethernet data when we expect Fibre Channel data.
gfpStatsRxSblkCRCErrors	Total number of superblock CRC errors with the receive transparent GFP frame. A transparent GFP frame has multiple superblocks which each contain Fibre Channel data.
gfpStatsCSFRaised	Number of Rx client management frames with Client Signal Fail indication.

Table 11-124 MXP_MR_10DME_C or MXP_MR_10DME_L GFP RMON Variables (Continued)

gfpStatsLFDRaised	The number of Core HEC CRC Multiple Bit Errors. **Note** This count is only for cHEC multiple bit error when in frame. It is a count of when the state machine goes out of frame.

Step 6 From the Alarm Type drop-down list, indicate whether the event will be triggered by the rising threshold, the falling threshold, or both the rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Type in an appropriate number of seconds for the Sample Period.

Step 9 Type in the appropriate number of occurrences for the Rising Threshold.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Note To view all RMON thresholds, click **Show All RMON thresholds**.

Step 12 Return to your originating procedure (NTP).

DLP-G338 Provision the 10G Data Muxponder Trunk Port Alarm and TCA Thresholds

Purpose	This task changes the MXP_MR_10DME_C and MXP_MR_10DME_L trunk port alarm and TCA thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C or MXP_MR_10DME_L card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Step 3 If TCA is not selected, click **TCA** and then click Refresh. If it is selected, continue with Step 4.

Step 4 Verify the trunk port (Port 9) TCA thresholds are set at the values shown as follows. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and press **Enter**.

- RX Power High: –9 dBm
- RX Power Low: –18 dBm
- TX Power High: 9 dBm
- TX Power Low: 0 dBm

Step 5 Under Types, click the **Alarm** radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Step 6 Verify the trunk port (Port 9) Alarm thresholds are set at the values shown as follows. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and press **Enter**.

- RX Power High: –8 dBm
- RX Power Low: –20 dBm
- TX Power High: 7 dBm
- TX Power Low: 3 dBm

Step 7 Click **Apply**.

Step 8 Return to your originating procedure (NTP).

DLP-G339 Provision the 10G Data Muxponder Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the MXP_MR_10DME_C and MXP_MR_10DME_L cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G278 Provision the Optical Line Rate, page 11-131 DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C and MXP_MR_10DME_L card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs. The TCA thresholds are shown by default.

Step 3 Referring to Table 11-125, verify the client ports (Ports 1 through 8) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface at the other end. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Note Do not modify the Laser Bias parameters.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Table 11-125 MXP_MR_10DME_C and MXP_MR_10DME_L Card Client Interfaces TCA Thresholds

PPM Port Rate	Pluggable Port Module (XFP)	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
FC1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	0	–17	3	–16
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–3	–20	3	–16
FC2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	0	–15	3	–16
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–3	–20	3	–16
FICON1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	0	–17	3	–16
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–3	–20	3	–16
FICON2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	0	–17	3	–16
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–3	–20	3	–16
ISC3 PEER 1G ISC3 PEER 2G	ONS-SE-G2F-SX	0	–17	3	–16
	ONS-SE-G2F-LX	0	–20	3	–16
FC4G	ONS-SE-4G-MM	0	–12	4	–15
	ONS-SE-4G-SM	–1	–15	4	–15
FICON4G	ONS-SE-4G-MM	0	–12	4	–15
	ONS-SE-4G-SM	–1	–15	4	–15

Step 4 Click **Apply**.

Step 5 Repeat Steps 3 and 4 to provision each additional client port.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Referring to Table 11-126, verify the client port (Ports 1 through 8) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Table 11-126 MXP_MR_10DME_C and MXP_MR_10DME_L Card Client Interface Alarm Thresholds

PPM Port Rate	Pluggable Port Module (XFP)	Alarm RX Power Low	Alarm RX Power High	Alarm TX Power Low	Alarm TX Power High
FC1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
FC2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–18	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
FICON1G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
FICON2G	15454-SFP-GEFC-SX 15454E-SFP-GEFC-S ONS-SE-G2F-SX	–20	3	–13	–1
	15454-SFP-GE+-LX 15454E-SFP-GE+-LX ONS-SE-G2F-LX	–23	0	–13	0
ISC3 PEER 1G ISC3 PEER 2G	ONS-SE-G2F-SX	–20	3	–13	–1
	ONS-SE-G2F-LX	–23	0	–13	0
FC4G	ONS-SE-4G-MM	–15	3	–11	–1
	ONS-SE-4G-SM	–18	2	–11	0
FICON4G	ONS-SE-4G-MM	–15	3	–11	–1
	ONS-SE-4G-SM	–18	2	–11	0

Step 8 Click **Apply**.

Step 9 Repeat Steps 7 and 8 to provision each additional client port.

Step 10 Return to your originating procedure (NTP).

DLP-G366 Change the 10G Data Muxponder OTN Settings

Purpose	This task changes the OTN settings for the MXP_MR_10DME_C and MXP_MR_10DME_L cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the MXP_MR_10DME_C and MXP_MR_10DME_L card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then choose one of the following subtabs: **OTN Lines**, **G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-127 through 11-130.

Note You must modify Near End and Far End; 15 Min and 1 Day; and SM and PM independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-127 describes the values on the Provisioning > OTN > OTN Lines tab.

Table 11-127 MXP_MR_10DME_C and MXP_MR_10DME_L Card OTN Line Settings

Parameter	Description	Options
Port	(Display only) Displays the port number.	9 (Trunk)
G.709 OTN	Sets the OTN lines according to ITU-T G.709.	• Enable • Disable
FEC	Sets the OTN lines to forward error correction (FEC).	• Standard • Enhanced
SF BER	(Display only) Sets the signal fail bit error rate.	• 1E-5
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
Asynch/Synch Mapping	Sets how the ODUk (client payload) is mapped to the optical channel (OTUk).	• Asynch mapping • Synch mapping

Table 11-128 describes the values on the Provisioning > OTN > G.709 Thresholds tab.

Table 11-128 MXP_MR_10DME_C and MXP_MR_10DME_L Card ITU-T G.709 Threshold Settings

Parameter	Description	Options
Port[1]	(Display only) Port number.	9 (Trunk)
ES	Errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
SES	Severely errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
UAS	Unavailable seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
BBE	Background block errors	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
FC	Failure counter	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.

1. Latency for a 1G-FC payload without ITU-T G.709 is 4 microseconds, and with ITU-T G.709 is 40 microseconds. Latency for a 2G-FC payload without ITU-T G.709 is 2 microseconds, and with ITU-T G.709 is 20 microseconds. Consider these values when planning a FC network that is sensitive to latency.

Table 11-129 describes the values on the Provisioning > OTN > FEC Threshold tab.

Table 11-129 MXP_MR_10DME_C and MXP_MR_10DME_L Card FEC Threshold Settings

Parameter	Description	Options
Port	(Display only) Port number.	2
Bit Errors Corrected	Sets the value for bit errors corrected.	Numeric. Can be set for 15-minute or one-day intervals.
Uncorrectable Words	Sets the value for uncorrectable words.	Numeric. Can be set for 15-minute or one-day intervals.

Table 11-130 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-130 MXP_MR_10DME_C and MXP_MR_10DME_L Card Trail Trace Identifier Settings

Parameter	Description	Options
Port	(Display only) Port number.	2
Level	Sets the level.	• Section • Path
Received Trace Mode	Sets the trace mode.	• Off/None • Manual

Table 11-130 MXP_MR_10DME_C and MXP_MR_10DME_L Card Trail Trace Identifier Settings (Continued)

Parameter	Description	Options
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Disable FDI on TTIM	If a Trace Identifier Mismatch on Section overhead alarm arises because of a J0 overhead string mismatch, no Forward Defect Indication (FDI) signal is sent to the downstream nodes if this box is checked.	• Checked (FDI on TTIM is disabled) • Unchecked (FDI on TTIM is not disabled)
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

NTP-G293 Modify the 40G Muxponder Card Line Settings and PM Parameter Thresholds

Purpose	This procedure changes the line and parameter threshold settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 • DLP-G63 Install an SFP or XFP, page 14-72 • DLP-G277 Provision a Multirate PPM, page 11-128 (Optional) • DLP-G278 Provision the Optical Line Rate, page 11-131 (Optional)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the muxponder card settings. If you are already logged in, proceed to Step 2.

Step 2 Complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to save the existing settings before modifying.

Step 3 Perform any of the following tasks as needed:

- DLP-G662 Change the 40G Multirate Muxponder Card Settings, page 11-298
- DLP-G666 Change the 40G Muxponder Line Settings, page 11-299
- DLP-G667 Change the 40G Muxponder SONET (OC-192)/SDH (STM-64) Settings, page 11-301
- DLP-G668 Change the 40G Muxponder Section Trace Settings, page 11-303
- DLP-G669 Change the 40G Muxponder SONET or SDH Line Thresholds, page 11-306
- DLP-G670 Change the 40G Muxponder Line RMON Thresholds for Ethernet, 8G FC, or 10G FC Payloads, page 11-308
- DLP-G671 Provision the 40G Muxponder Trunk Port Alarm and TCA Thresholds, page 11-312
- DLP-G672 Provision the 40G Muxponder Client Port Alarm and TCA Thresholds, page 11-313
- DLP-G673 Change the 40G Muxponder OTN Settings, page 11-317

Note To use the Alarm Profiles tab, including creating alarm profiles and suppressing alarms, see the Alarm and TCA Monitoring and Management document.

Stop. You have completed this procedure.

DLP-G662 Change the 40G Multirate Muxponder Card Settings

Purpose	This task changes the card settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the card settings.

Step 2 Click the **Provisioning > Card** tabs.

Step 3 Modify either of the settings described in Table 11-131.

Table 11-131 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Card Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Card Mode	Sets the card mode.	• Muxponder • Unidirectional Regen Set the mode to Unidirectional Regen under the following conditions: – Trunk port is in OOS,DSBLD state. – Pluggable port modules of the card must not be configured for payload. – Regeneration peer slot must be set to None.	• Muxponder • Unidirectional Regen Set the mode to Unidirectional Regen under the following conditions: – Trunk port is in locked,disabled state. – Pluggable port modules of the card must not be configured for payload. – Regeneration peer slot must be set to None.
Trunk Wavelengths	(Display only) Shows supported wavelengths of the trunk port after the card is installed. The 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C card that is installed shows the C-band wavelengths that it supports.	—	—

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G666 Change the 40G Muxponder Line Settings

Purpose	This task changes the line settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C or 40E-MXP-C card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > Ports** tabs. Tabs and parameters vary according to the PPM provisioning.

Step 3 Modify any of the settings as described in Table 11-132.

Table 11-132 Line Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number.	• 1 through 4 (client) • 5 (trunk)
Port Name	Assigns a logical name for each of the port.	User-defined. This can be up to 32 alphanumeric or special characters, or both. The port name is blank by default. For information about assigning a port name, see the "DLP-G104 Assign a Name to a Port" task on page 17-16. **Note** You can assign a port name for each fiber channel/FICON interface on the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C card, enabling the MDS Fabric Manager to associate the SAN port and a SAN port on the Cisco MDS 9000 switch.
Admin State	Sets the port service state unless network conditions prevent the change. For more information, see the Administrative and Service States document.	• IS (ANSI) or Unlocked (ETSI) • OOS,DSBLD (ANSI) or Locked,disabled (ETSI) • OOS,MT (ANSI) or Locked,maintenance (ETSI) • IS,AINS (ANSI) or Unlocked,automaticInService (ETSI)
Service State	(Display only) Shows the general condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR (ANSI) or Unlocked-enabled (ETSI) • OOS-AU,AINS (ANSI) or Unlocked-disabled, automaticInService (ETSI) • OOS-MA,DSBLD (ANSI) or Locked-enabled,disabled (ETSI) • OOS-MA,MT (ANSI) or Locked-enabled,maintenance (ETSI)

Table 11-132 Line Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
ALS Mode	(Client ports only) Activates the ALS mode.	• Disabled (default)—ALS is off; the laser is not automatically shut down when traffic outage or loss of signal (LOS) occurs. • Auto Restart—(OC-192/STM-64 only) ALS is on; the laser automatically shuts down during LOS. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart—ALS is on; the laser automatically shuts down when traffic outage or LOS occurs. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test—Manually restarts the laser for testing.
AINS Soak	Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to the change settings.	• Duration of valid input signal, in hh.mm format, after which the card status changes to in service (IS) automatically • 0 to 48 hours, 15-minute increments
Reach	Sets the optical reach distance of the client port.	• Autoprovision—The system automatically provisions the reach from the pluggable port module (PPM) reach value on the hardware. • EW • LW • SW • LRM • ER • LR • SR • ZR • IR 2 • LR 2 • DWDM • CWDM40km
Wavelength	Provisions the port wavelength.	• First Tunable Wavelength • Further wavelengths: Further wavelengths in the 100-GHz ITU-T C-band spacing. The card wavelengths are marked by asterisks. If the card is not installed, all wavelengths appear with a dark grey background.

Table 11-132 Line Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Squelch	Shuts down the far-end laser in response to certain defects.	• Squelch **Note** Squelch does not apply to ISC COMPACT payloads. • Disable **Note** Both Squelch and AIS options are supported when the selected Termination Mode is Transparent. If the Termination Mode selected is Section or Line, then only AIS is supported. This is applicable for OC-192/STM-64 and OC-768/STM-256. For OTN payloads, both Squelch and AIS options are supported.
Overclock	(Trunk port only) Enables or disables overclock mode on the trunk port.	• OFF (default) • ON
Rx Wavelength	(Trunk port only) Provisions the trunk port wavelength.	• First Tunable Wavelength • Further wavelengths: Further wavelengths in the 100-GHz ITU-T C-band spacing. The card wavelengths are marked by asterisks. If the card is not installed, all wavelengths appear with a dark grey background.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G667 Change the 40G Muxponder SONET (OC-192)/SDH (STM-64) Settings

Purpose	This task changes the SONET OC-192 or SDH STM-64 settings for the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the SONET (OC-192) or SDH (STM-64) settings.

Step 2 Click the **Provisioning > Line > SONET** (ANSI) or **SDH** (ETSI). Tabs and parameters vary according to the PPM provisioning.

Step 3 Modify any of the settings described in Table 11-133.

Table 11-133 Line SONET or SDH Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number.	5 (Trunk)
Port Name	Assigns a logical name assigned to a port. This field is blank by default.	User-defined. This can be up to 32 alphanumeric or special characters, or both. The port name is blank by default. For information about assigning a port name, see the "DLP-G104 Assign a Name to a Port" task on page 17-16.
SF BER	Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
ProvidesSync	(Display only) Displays the ProvidesSync card parameter state.	Checked or unchecked
SyncMsgIn	Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked
Send DoNotUse	Sets the Send DoNotUse card state. When checked, sends a DUS (do not use) message on the S1 byte.	Checked or unchecked
Type	Indicates the optical transport type.	• SONET (ANSI) • SDH (ETSI)
Termination Mode	(Display-only for Standard Regeneration and Enhanced FEC card configurations) Sets the mode of operation.	• Transparent • Section (ANSI) or Regeneration Section (RS) (ETSI) • Line (ANSI) or Multiplex Section (MS) (ETSI)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G668 Change the 40G Muxponder Section Trace Settings

Purpose	This task changes the section trace settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs. Tabs and parameter selections vary according to the PPM provisioning.

Step 3 Modify any of the settings described in Table 11-134.

Table 11-134 Line Section Trace Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number that is applicable only for OC-192/STM-64 payloads.	• 1-1 • 2-1 • 3-1 • 4-1
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable AIS/RDI on TIM-S	Disables the alarm indication signal.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte
Transmit	Displays and sets the current transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Transmit String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode). The supported range for 1 bit Hex TX trace is 20 to 7E. If TX trace is provisioned outside this range, client transmits 00.	Transmit string size

Table 11-134 Line Section Trace Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Expected	Displays and sets the current expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Expected String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode). The supported range for 1 bit Hex TX trace is 20 to 7E. If TX trace is provisioned outside this range, client transmits 00.	Expected string size
Received	(Display only) Displays the current received string. Click **Refresh** to manually refresh this display, or check the **Auto-refresh** every 5 sec check box to keep this panel updated.	Received string size
Auto-refresh	Automatically refreshes the display every 5 seconds.	• Checked • Unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G691 Change the 40G Muxponder OTU Settings

Purpose	This task changes the OTU settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the OTU settings.

Step 2 Click the **Provisioning > Line > OTU** tabs. Tabs and parameter selections vary according to the PPM provisioning.

Step 3 Modify any of the settings described in Table 11-135.

Table 11-135 OTU Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the port number that is applicable only for OC-192/STM-64 payloads.	• 1-1 • 2-1 • 3-1 • 4-1	• 1-1 • 2-1 • 3-1 • 4-1
SyncMsgIn	(Display only) (OC-768/STM-256 only) Sets the EnableSync card parameter. Enables synchronization status messages (S1 byte), which allow the node to choose the best timing source.	Checked or unchecked	Checked or unchecked
Admin SSM	Overrides the synchronization status message (SSM) and the synchronization traceability unknown (STU) value. If the node does not receive an SSM signal, it defaults to STU.	• PRS—Primary Reference Source (Stratum 1) • STU—Sync traceability unknown • ST2—Stratum 2 • ST3—Stratum 3 • SMC—SONET minimum clock • ST4—Stratum 4 • DUS—Do not use for timing synchronization • RES—Reserved; quality level set by user	• G811—Primary reference clock • STU—Sync traceability unknown • G812T—Transit node clock traceable • G812L—Local node clock traceable • SETS—Synchronous equipment • DUS—Do not use for timing synchronization
ProvidesSync	(Display only) (OC-768/STM-256 only) Sets the ProvidesSync card parameter. If checked, the card is provisioned as a network element (NE) timing reference.	Checked or unchecked	Checked or unchecked

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G669 Change the 40G Muxponder SONET or SDH Line Thresholds

Purpose	This task changes the SONET or SDH line threshold settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C muxponder cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds > SONET Thresholds** (ANSI) or **SDH Thresholds** (ETSI) tabs.

Step 3 Modify any of the settings shown in Table 11-136.

Note In Table 11-136, some parameters and options do not apply to all 40-G-MXP-C cards. If the parameter or options do not apply, they do not appear in CTC.

Table 11-136 Line Threshold Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Port number. Applicable for only OC-192/STM-64 payloads.	• 1-1 • 2-1 • 3-1 • 4-1	• 1-1 • 2-1 • 3-1 • 4-1
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option individually in each category and click **Refresh**.	—

Table 11-136 Line Threshold Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option individually in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option individually in each category and click **Refresh**.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option individually in each category and click **Refresh**. Click **Reset to Default** to restore default values.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option individually in each category and click **Refresh**. Click **Reset to Default** to restore default values.
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option individually in each category and click **Refresh**. Click **Reset to Default** to restore default values.	—
UAS	(Line or Multiplex Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Line or Section (near end only) Choose an option individually in each category and click **Refresh**. Click **Reset to Default** to restore default values.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—Multiplex Section or Regeneration Section (near end only) Choose an option individually in each category and click **Refresh**. Click **Reset to Default** to restore default values.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G670 Change the 40G Muxponder Line RMON Thresholds for Ethernet, 8G FC, or 10G FC Payloads

Purpose	This task changes the line threshold settings of 40G-MXP-C, or 40E-MXP-C card carrying Ethernet, 8G FC, or 10G FC payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), display the 40G-MXP-C, or 40E-MXP-C card where you want to change the line threshold settings in the card view.

Step 2 Click the **Provisioning > Line Thresholds > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose the payload port— for example "1-1 (TEN_GE)", or the equivalent ITU-T G.7041 GFP (Generic Frame Procedure) port.

Step 5 From the Variable drop-down list, choose an Ethernet or FC variable. See Table 11-137 for a list of available Ethernet variables, Table 11-138 for a list of FC, and Table 11-138 for a list of GFP variables.

Table 11-137 Ethernet Variables of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Variable	Description
ifInOctets	Number of bytes received since the last counter reset.
rxTotalPkts	Total number of received packets.
ifInUcastPkts	Number of packets, delivered by this sub-layer to a higher sub-layer, which were not addressed to a multicast or broadcast address at this sub-layer.
inInMulticastPkts	Number of packets, delivered by this sub-layer to a higher sub-layer, which were addressed to a multicast address at this sub-layer. For a MAC layer protocol, this includes both Group and Functional addresses.
ifInBroadcastPkts	Number of packets, delivered by this sub-layer to a higher sub-layer, which were addressed to a broadcast address at this sub-layer.
ifInErrors	Total number of received errors.
ifOutOctets	Total number of octets transmitted out of the interface, including framing characters.

Table 11-137 Ethernet Variables of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Variable	Description
txTotalPkts	Total number of transmitted packets.
dot3StatsFCSErrors	Count of frames received on a particular interface that are an integral number of octets in length but do not pass the Frame Check Sequence (FCS) check.
dot3StatsFrameTooLong	Count of frames received on a particular interface that exceed the maximum permitted frame size.
dot3StatsInPauseFrames	Count of frames received on this interface with an opcode indicating the PAUSE operation.
dot3StatsOutPauseFrames	Count of MAC control frames transmitted on this interface with an opcode indicating the PAUSE operation.
etherStatsUndersizePkts	Total number of packets transmitted and received by the interface that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsFragments	Total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets.
etherStatsPkts	Total number of packets (including bad packets, broadcast packets, and multicast packets) transmitted and received by the interface.
etherStatsPkts64Octets	Total number of packets (including bad packets) transmitted and received by the interface that were 64 octets in length (excluding framing bits but including FCS octets).
etherStatsPkts65to127Octets	Total number of packets (including error packets) transmitted and received by the interface that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts128to255Octets	Total number of packets (including error packets) transmitted and received by the interface that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts256to511Octets	Total number of packets (including error packets) transmitted and received by the interface that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts512to1023Octets	Total number of packets (including error packets) transmitted and received by the interface that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).

Table 11-137 Ethernet Variables of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Variable	Description
etherStatsPkts1024to1518Octets	Total number of packets (including error packets) transmitted and received by the interface that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsBroadcastPkts	Total number of good packets transmitted and received by the interface that were directed to the broadcast address.
etherStatsMulticastPkts	Total number of good packets transmitted and received by the interface that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
etherStatsOversizePkts	Total number of packets transmitted and received by the interface that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsJabbers	Total number of packets transmitted and received by the interface that were longer than 1518 octets (excluding framing bits, but including FCS octets), and were not an integral number of octets in length or had a bad FCS.
etherStatsOctets	Total number of octets of data (including those in bad packets) transmitted and received by the interface on the network (excluding framing bits but including FCS octets).

Table 11-138 FC Variables of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Variable	Description
ifInOctets	Number of bytes received since the last counter reset.
rxTotalPkts	Total number of received packets.
ifInErrors	Total number of received errors. IfInErrors = CRC_ERR + FRAMES_TOO_LONG counters
ifOutOctets	Total number of octets transmitted out of the interface, including framing characters.
txTotalPkts	Total number of transmitted packets.
ifOutErrors	Number of outbound packets or transmission units that could not be transmitted because of errors. IfOutErrors = CRC_ERR + FRAMES_TOO_LONG counters
mediaIndStatsRxFramesTruncated	Total number of frames received that are less than 5 bytes. This value is a part of HDLC and GFP port statistics.
mediaIndStatsRxFramesTooLong	Number of received frames that exceed the MTU. This value is part of HDLC and GFP port statistics.

Table 11-138 FC Variables of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Variable	Description
mediaIndStatsRxFramesBadCRC	Number of receive data frames with payload CRC errors when HDLC framing is used.
mediaIndStatsTxFramesBadCRC	Number of transmitted data frames with payload CRC errors when HDLC framing is used.
mediaIndStatsTxFramesTooLong	Total number of transmitted data frames that are less than 5 bytes. This value is a part of HDLC and GFP port statistics.
mediaIndStatsTxFramesTruncated	Number of transmitted data frames that exceed the MTU. This value is part of HDLC and GFP port statistics.

Table 11-139 GFP RMON Variables of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Variable	Description
gfpStatsRxFrame	Total number of received data frames.
gfpStatsTxFrame	Total number of transmitted data frames.
gfpStatsRxSblkCRCErrors	Total number of superblock CRC errors with the receive transparent GFP frame. A transparent GFP frame has multiple superblocks where each contains Fibre Channel data.
gfpStatsRxOctets	Total number of GFP data octets received.
gfpStatsTxOctets	Total number of GFP data octets transmitted.
gfpStatsRxSBitErrors	Received GFP frames with single bit errors in the core header (these errors can be corrected).
gfpStatsRxMBitErrors	Received GFP frames with multiple bit errors in the core header (these errors cannot be corrected).
gfpStatsRxTypeInvalid	Received GFP frames with invalid type (these are discarded). For example, receiving GFP frames that contain Ethernet data when we expect Fibre Channel data.
gfpStatsLFDRaised	Count of core HEC CRC multiple bit errors. **Note** This count is only of eHec multiple bit errors when in frame. This can be looked at as a count of when the state machine goes out of frame.
gfpRxCmfFrame	—
gfpTxCmfFrame	—

Step 6 From the Alarm Type drop-down list, choose an alarm type. The alarm type indicates whether or not an event is triggered by the type of threshold.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Enter the number of Sample Period occurrences.

Step 9 Enter the number of Rising Threshold occurrences.

To trigger the alarm, the measured value of a threshold must always move from below the falling threshold to above the rising threshold. For example, if a network moves from below a rising threshold of 1000 collisions every 15 seconds to 1001 collisions.

Step 10 Enter the appropriate number of occurrences for the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the exact opposite of a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded.

Step 11 Click **OK**.

Step 12 Return to your originating procedure (NTP).

DLP-G671 Provision the 40G Muxponder Trunk Port Alarm and TCA Thresholds

Purpose	This task changes the trunk port alarm and TCA thresholds of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Note You must modify 15 Min and 1 Day independently. To do so, select the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Step 3 If TCA is not selected, click **TCA** and then click Refresh. If it is selected, continue with Step 4.

Step 4 Verify the trunk port (Port 5) TCA thresholds are set at the values shown as follows:

- Laser Bias High (%): 95.0
- RX Power High (dBm): –9.0
- RX Power Low (dBm): –22.0
- TX Power High (dBm): 9.0
- TX Power Low (dBm): 0.0

Provision new thresholds as needed by replacing the old values with new ones.

Step 5 Under Types area, click the **Alarm** radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Step 6 Verify the trunk port (Port 5) alarm thresholds are set at the values shown as follows:

- Laser Bias High (%): 98.0
- RX Power High (dBm): –8.0
- RX Power Low (dBm): –24.0
- TX Power High (dBm): 7.0
- TX Power Low (dBm): 3.0

Provision new thresholds as needed replacing the old values with new ones.

Step 7 Click **Apply**.

Step 8 Return to your originating procedure (NTP).

DLP-G672 Provision the 40G Muxponder Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC • DLP-G278 Provision the Optical Line Rate, page 11-131
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Step 3 If TCA is not selected, click **TCA** and then click Refresh. If it is selected, continue with Step 4.

Step 4 Referring to Table 11-140, verify the client ports (Ports 1 through 4) TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface at the other end. Provision new thresholds as needed by replacing the old values with new ones.

Note Do not modify the Laser Bias parameters.

Note You must modify 15 Min and 1 Day independently. To do so, select the appropriate radio button and click **Refresh**.

Table 11-140 Client Interfaces TCA Thresholds of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

PPM Port Rate	Pluggable Port Module[1] (XFP)	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
FC8G	ONS-XC-8G-FC-SM	–9	–22	9.0	0.0
FC10G	ONS-XC-10G-1470 through ONS-XC-10G-1610 ONS-XC-10G-C ONS-XC-10G-S1	–9	–22	9.0	0.0
	ONS-XC-10G-I2	2.0	–15.8	8.0	–7.0
	ONS-XC-10G-L2	1.0	–14.0	5.0	–12.0
	ONS-XC-10G-SR-MM	0.0	0.0	6.0	–6.0
10GE	ONS-XC-10G-30.3 through ONS-XC-10G-61.4 ONS-XC-10G-C ONS-XC-10G-SR-M ONS-XC-10G-S1	–9	–22	9.0	0.0
	ONS-XC-10G-I2	2.0	–15.8	8.0	–7.0
	ONS-XC-10G-L2	–7.0	–24.0	6.5	–2.5

Table 11-140 Client Interfaces TCA Thresholds of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

PPM Port Rate	Pluggable Port Module[1] (XFP)	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
OC-192	ONS-XC-10G-30.3 through ONS-XC-10G-61.4 ONS-XC-10G-C ONS-XC-10G-1470 through ONS-XC-10G-1610 ONS-XC-10G-I2 ONS-XC-10G-SR-MM	–9	–22	9.0	0.0
	ONS-XC-10G-L2	–9.0	–26.0	8.0	–8.0
	ONS-XC-10G-S1	–1.0	–11.0	5.0	–12.0
OTU2	ONS-XC-10G-30.3 through ONS-XC-10G-61.4 ONS-XC-10G-C ONS-XC-10G-1470 through ONS-XC-10G-1610 ONS-XC-10G-I2 ONS-XC-10G-L2 ONS-XC-10G-SR-MM ONS-XC-10G-S1	–9	–22	9.0	0.0

1. In CTC, SFPs, and XFPs are called pluggable port modules (PPMs). For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 5 Click **Apply**.

Step 6 Repeat Steps 3 and 4 to provision the additional client ports.

Step 7 Under Types area, click the **Alarm** radio button and click **Refresh**.

Step 8 Referring to Table 11-141, verify the client port (Ports 1 through 8) Alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low based on the client interface that is provisioned. Provision new thresholds as needed replacing the old values with new ones.

Table 11-141 Client Interface Alarm Thresholds of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

PPM Port Rate	Pluggable Port Module[1] (XFP)	Alarm RX Power Low	Alarm RX Power High	Alarm TX Power Low	Alarm TX Power High
FC8G	ONS-XC-8G-FC-SM ONS-XC-10G-S1	–9	–22	9.0	0.0
FC10G	ONS-XC-10G-30.3 through ONS-XC-10G-61.4 ONS-XC-10G-C ONS-XC-10G-1470 through ONS-XC-10G-1610 ONS-XC-10G-S1	–9	–22	9.0	0.0
	ONS-XC-10G-I2	4.5	–18.3	4.5	–3.5
	ONS-XC-10G-L2	–4.5	–26.5	6.5	–2.5
	ONS-XC-10G-SR-MM	2.0	–2.0	2.0	–2.0
10GE	ONS-XC-10G-30.3 through ONS-XC-10G-61.4 ONS-XC-10G-C ONS-XC-10G-S1 ONS-XC-10G-SR-MM	–9	–22	9.0	0.0
	ONS-XC-10G-I2	4.5	–18.3	4.5	–3.5
	ONS-XC-10G-L2	–4.5	–26.5	6.5	–2.5
OC-192	ONS-XC-10G-30.3 through ONS-XC-10G-61.4 ONS-XC-10G-C ONS-XC-10G-1470 through ONS-XC-10G-1610 ONS-XC-10G-I2 ONS-XC-8G-FC-SM ONS-XC-10G-SR-MM	–9	–22	9.0	0.0
	ONS-XC-10G-L2	–7.0	–28.0	4.0	–4.0
	ONS-XC-10G-S1	–1.0	–13.0	1.0	–8.0
OTU2	ONS-XC-10G-30.3 through ONS-XC-10G-61.4 ONS-XC-10G-C ONS-XC-10G-1470 through ONS-XC-10G-1610 ONS-XC-10G-S1 ONS-XC-10G-I2 ONS-XC-10G-L2 ONS-XC-8G-FC-SM ONS-XC-10G-SR-MM	–9	–22	9.0	0.0

1. In CTC, SFPs and XFPs are called pluggable port modules (PPMs). For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 9 Click **Apply**.

Step 10 Repeat Steps 7 and 8 to provision additional client ports.

Step 11 Return to your originating procedure (NTP).

DLP-G673 Change the 40G Muxponder OTN Settings

Purpose	This task changes the OTN settings for the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the 40G-MXP-C, or 40E-MXP-C card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then choose one of the following subtabs: **OTN Lines**, **ITU-T G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-142 through 11-145.

Note You must modify Near End and Far End, 15 Min and 1 Day, and SM and PM independently. To do so, select the appropriate radio button and click **Refresh**.

Table 11-142 describes the values on the Provisioning > OTN > OTN Lines tab.

Table 11-142 OTN Line Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number. Applicable for trunk ports and ports with OTU2 payload.	• 1-1 • 2-1 • 3-1 • 4-1 • 5 (Trunk)
ITU-T G.709 Thresholds	Sets the OTN lines according to ITU-T G.709.	• Enable • Disable
FEC	Sets the OTN lines to forward error correction (FEC).	• Standard • Enhanced

Table 11-142 OTN Line Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
SF BER	(Display only) Sets the signal fail bit error rate.	• 1E-5
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9

Table 11-143 describes the values on the Provisioning > OTN > G.709 Thresholds tab.

Table 11-143 ITU-T G.709 Threshold Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number. Applicable for trunk ports and ports with OTU2 payload.	• 1-1 • 2-1 • 3-1 • 4-1 • 5 (Trunk)
ES	Errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select the radio button individually and click **Refresh**. Click **Reset to Default** to restore default values.
SES	Severely errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select the radio button individually and click **Refresh**.
UAS	Unavailable seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select the radio button individually and click **Refresh**.
BBE	Background block errors	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select the radio button individually and click **Refresh**.
FC	Failure counter	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select radio button individually and click **Refresh**.

Table 11-144 describes the values on the Provisioning > OTN > FEC Threshold tab.

Table 11-144 FEC Threshold Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number. Applicable for trunk ports and ports with OTU2 payload.	• 1-1 • 2-1 • 3-1 • 4-1 • 5 (Trunk)
Bit Errors Corrected	Sets the value for bit errors corrected.	Numeric. Can be set for 15-minute or one-day intervals.
Uncorrectable Words	Sets the value for uncorrectable words.	Numeric. Can be set for 15-minute or one-day intervals.

Table 11-145 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-145 Trail Trace Identifier Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Port	(Display only) Displays the port number. Applicable for trunk ports and ports with OTU2 payload.	• 1-1 • 2-1 • 3-1 • 4-1 • 5 (Trunk)
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable AIS/RDI on TIM-S	Disables alarm indication signal.	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte
Transmit	Displays and sets the current transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Transmit String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode).	Transmit string size

Table 11-145 Trail Trace Identifier Settings of the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C Cards

Parameter	Description	Options
Expected	Displays and sets the current expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. In Expected String Type, click **Hex Mode** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex Mode).	Expected string size
Received	(Display only) Displays the current received string. Click **Refresh** to manually refresh this display, or check the **Auto-refresh every 5 sec** check box to keep this panel updated.	Received string size
Auto-refresh	Refreshes the display automatically every 5 seconds.	• Checked • Unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

NTP-G281 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Channel Group Settings

Purpose	This procedure changes the channel group settings for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 • "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125 • DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the channel group settings. If you are already logged in, continue with Step 2.

Step 2 Perform any of the following tasks as needed:

- DLP-G611 Create a Channel Group Using CTC, page 11-321
- DLP-G612 Modify the Parameters of the Channel Group Using CTC, page 11-322
- DLP-G613 Add or Remove Ports to or from an Existing Channel Group Using CTC, page 11-326
- DLP-G614 Delete a Channel Group Using CTC, page 11-327
- DLP-G615 Retrieve Information on Channel Group, REP, CFM, and EFM Using CTC, page 11-328
- DLP-G616 View Channel Group PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards Using CTC, page 11-329
- DLP-G617 View Channel Group Utilization PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards Using CTC, page 11-330
- DLP-G618 View Channel Group History PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards Using CTC, page 11-330
- DLP-G619 Create a Channel Group on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI
- DLP-G620 Add Ports to a Channel Group on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI

Step 3 **Stop. You have completed this procedure.**

DLP-G611 Create a Channel Group Using CTC

Purpose	This task creates a channel group on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note You can create up to 11 channel groups on the GE_XP and GE_XPE cards and up to 2 channel groups on the 10GE_XP and 10GE_XPE cards. You can create a channel group with ports only when the ports do not have any UNI QinQ settings or NNI SVLAN settings. Otherwise, the channel group will be created with empty ports.

For information about interaction of LACP with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to create a channel group. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed according to the requirements specified in Table 14-7 on page 14-109.

Step 3 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 4 In card view, click the **Provisioning > Channel Groups** tabs.

Step 5 Click **Create**. The Channel Group Creation dialog box appears.

Step 6 Enter the name of the channel group in the Name field.

Step 7 From the Stand Alone list, choose the ports that will belong to this channel group and click the right arrow button to move the selected ports to the Bundled list.

Step 8 From the LACP Mode drop-down list, choose the LACP mode as needed:

- On—Default mode. In this mode, the ports will not exchange LACP packets with the partner ports.
- Active—In this mode, the ports will send LACP packets at regular intervals to the partner ports.
- Passive—In this mode, the ports will not send LACP packets until the partner ports send LACP packets. After receiving the LACP packets from the partner ports, the ports will send LACP packets.

Step 9 From the LACP Hashing drop-down list, select the LACP hashing algorithm that the protocol uses to perform the load balancing task between the bundled ports.

The following hashing algorithms are supported:

- Ucast SA VLAN Incoming Port
- Ucast DA VLAN Incoming Port
- Ucast SA DA VLAN Incoming port
- Ucast Src IP TCP UDP
- Ucast Dst IP TCP UDP
- Ucast Src Dst IP TCP UDP

Step 10 Click **Create**.

A new row is added in the LACP table and all the other parameters in the channel group are set to default values. The default values of these parameters are taken from the first port that is attached to the channel group.

Step 11 Return to your originating procedure (NTP).

DLP-G612 Modify the Parameters of the Channel Group Using CTC

Purpose	This task modifies the parameters of the channel group.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Ports cannot be added or removed using this procedure. For adding or removing the ports, see the "DLP-G613 Add or Remove Ports to or from an Existing Channel Group Using CTC" task on page 11-326.

Step 1 Complete the "DLP-G46 Log into CTC" task the node where you want to modify the parameters of the channel group. If you are already logged in, continue with Step 2.

Step 2 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to modify the parameters of the channel group.

Step 3 In card view, click the **Provisioning > Channel Groups** tabs.

Step 4 Choose a channel group from the existing channel groups.

Step 5 Modify the channel group settings as described in Table 11-146.

Table 11-146 Channel Group Settings

Parameter	Description	Options
Channel Group	(Display only) ID and name of the channel group.	N.A.
Name	Sets the name of the channel group.	—
Ports	(Display only) Port number (*n-n*) and rate (GE or TEN_GE of the channel group).	N.A.
LACP Mode	Sets the LACP mode. The channel group must be in OOS-DSBLD admin state.	• On • Active • Passive
Hashing	Sets the LACP hashing algorithm. The channel group must be in OOS-DSBLD admin state.	• Ucast SA VLAN Incoming Port • Ucast DA VLAN Incoming Port • Ucast SA DA VLAN Incoming port • Ucast Src IP TCP UDP • Ucast Dst IP TCP UDP • Ucast Src Dst IP TCP UDP
Admin State	Sets the administrative state on the channel group.	• IS • OOS, DSBLD
Service State	(Display only) Sets the service state that indicates the operational state of the channel group.	• IS-NR • OOS-MA, DSBLD

Table 11-146 Channel Group Settings

Parameter	Description	Options
MTU	Sets the maximum transfer unit (MTU), which sets the maximum number of bytes per frame accepted on the port. The member ports must be in OOS-DSBLD admin state. The default MTU value in the channel group is taken from the default settings in the node.	Numeric. Default: 9700 Range: 64 to 9700
Mode	Sets the provisional port mode. If the port mode is Auto, the Expected Speed field determines which ports can belong to the bundle. The member ports must be in OOS-DSBLD admin state.	• Auto • 1000 Mbps
Expected Speed	Sets the expected speed of ports of the channel group. The channel group must be in OOS-DSBLD admin state.	• 10 Mbps • 100 Mbps • 1000 Mbps
Duplex	(Display only) Expected duplex capability of ports of the channel group.	• Full
Committed Info Rate	Sets the guaranteed information rate as per the service provider service-level agreement. The channel group must be in OOS-DSBLD admin state.	Numeric. Default: 100 Range: 0 to 100%
Committed Burst Size	Sets the maximum number of bits transferred per second. The channel group must be in OOS-DSBLD admin state.	• 4k (default) • 8k • 16k • 32k • 64k • 128k • 256k • 512k • 1M • 2M • 4M • 8M • 16M

Table 11-146 Channel Group Settings

Parameter	Description	Options
Excess Burst Size	Sets the maximum number of bits credited for later transfer if the committed burst rate cannot be transmitted. The channel group must be in OOS-DSBLD admin state.	• 4k (default) • 8k • 16k • 32k • 64k • 128k • 256k • 512k • 1M • 2M • 4M • 8M • 16M
NIM	Sets the network interface mode (NIM) for the channel group. The member ports must be in OOS-DSBLD admin state. The channel group NIM is set to UNI or NNI based on the mode of the first port that is added to the channel group.	• UNI Mode (Default)—provisions the port as a User-Network Interface (UNI). This is the interface that faces the subscriber. • NNI Mode—provisions the port as a Network-to-Network Interface (NNI). This is the interface that faces the service provider network.
Ingress CoS	Provisions the IEEE 802.1p ingress class of service (CoS). Ingress CoS is used to set the priority of the Ethernet frame in the service provider network. The member ports must be in OOS-DSBLD admin state.	• 0 • 1 • 2 • 3 • 4 • 5 • 6 • 7 • Trust • CVLAN • DSCP

Table 11-146 Channel Group Settings

Parameter	Description	Options
Inner Ethertype (Hex)	Defines the inner Ethertype field. The Ethertype field indicates which protocol is being transported in an Ethernet frame. The member ports must be in OOS-DSBLD admin state to modify the Inner Ethertype value to a non-default value.	Numeric. Default: 8100 (IEEE Std 802.1Q customer VLAN tag type) Range: 0x600 to 0xffff.
Outer Ethertype (Hex)	Defines the outer Ethertype field. The Ethertype field identifies which protocol is being transported in an Ethernet frame. The member ports must be in OOS-DSBLD admin state.	Numeric. Default: 8100 (IEEE standard 802.1Q service provider VLAN tag type) Range: 0x600 to 0xffff
MAC Learning	Enables or disables MAC learning for the port on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards. MAC learning is used by Layer 2 switches to learn the MAC addresses of network nodes so that the Layer 2 switches send traffic to the right location. In GE_XPE or 10GE_XPE cards, enable MAC address learning per SVLAN.	• Checked—MAC learning is enabled for this port. • Unchecked—(Default) MAC learning is disabled for this port.

Note When you set the Committed Info Rate above 40% on 10GE_XP and 10GE_XPE cards, the Committed Burst Size and Excess Burst Size must be set to at least 32K. The Committed Burst Size and Excess Burst Size can be increased based on the packet size and Committed Info Rate value.

Step 6 Click **Apply**.

Step 7 Return to your originating procedure (NTP).

DLP-G613 Add or Remove Ports to or from an Existing Channel Group Using CTC

Purpose	This task adds or removes ports to or from an existing channel group.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Before You Begin

- You can assign up to eight ports to a channel group on GE_XP and GE_XPE cards and up to three ports on the 10GE_XP and 10GE_XPE cards.
- You can assign the ports to a channel group only if the ports are in OOS-DSBLD admin state. The ports must not have any UNI QinQ rule or NNI SVLAN configuration.
- If the channel group is configured in UNI mode, only the UNI ports can be added to the channel group. If the channel group is configured in NNI mode, only the NNI ports can be added to the channel group.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want add ports to an existing channel group. If you are already logged in, continue with Step 2.

Step 2 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to add ports to an existing channel group.

Step 3 In card view, click the **Provisioning > Channel Groups** tabs.

Step 4 Choose a channel group from the existing channel groups.

Step 5 Click **Add/Remove Ports**. The Add/Remove Ports dialog box appears.

Step 6 To add ports to an existing channel group, complete the following:

From the Stand Alone list, choose the required ports and click the right arrow button to move the selected ports to the Bundled list.

Step 7 To remove ports from an existing channel group, complete the following:

From the Bundled list, choose the required ports and click the left arrow button to move the selected ports to the Stand Alone list.

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G614 Delete a Channel Group Using CTC

Purpose	This task deletes a channel group.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to delete the channel group. If you are already logged in, continue with Step 2.

Step 2 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XP card where you want to delete the channel group.

Step 3 In card view, click the **Provisioning > Channel Groups** tabs.

Step 4 Choose a channel group that you want to delete.

Step 5 Click **Delete**.

Step 6 Return to your originating procedure (NTP).

DLP-G615 Retrieve Information on Channel Group, REP, CFM, and EFM Using CTC

Purpose	This task enables you to view and retrieve information on the channel group, Resilient Ethernet Protocol (REP), Connectivity Fault Management (CFM), and Ethernet in the First Mile (EFM) on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to view and retrieve information on the channel group, REP, CFM, and EFM. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Maintenance > Show Commands** tabs.

Step 4 From the Command drop-down list, choose a command.

The following commands are supported:

- ETH LACP—Displays detailed LACP information from the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
- REP TOPO—Displays the topology information for a specific REP segment.
- REP TOPO ARCHIVE—Displays the previous topology information for a specific REP segment.
- REP INTERFACE—Displays information on the REP interface status and configuration. You can retrieve detailed information for each segment by selecting Detailed from the Level drop-down list and providing the segment ID.
- OAM DISCOVERY—Displays discovery information for all the EFM interfaces or for a specific EFM interface.
- OAM SUMMARY—Displays the active EFM sessions on a device.
- OAM STATISTICS—Displays detailed information about the EFM packets.

- OAM STATUS—Displays information about the EFM configurations for all the EFM interfaces or for a specific interface.

For more information, see the Pseudo Command Line Interface Reference document.

Step 5 From the Level drop-down list, choose **Normal** or **Detailed**.

Step 6 Click **Show**. Depending on the command, the appropriate output appears in the text area.

Step 7 Return to your originating procedure (NTP).

DLP-G616 View Channel Group PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards Using CTC

Purpose	This task enables you to view current statistical performance monitoring (PM) counts on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards and channel groups to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to view the channel group PM counts on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

Step 2 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to view the channel group statistics. The card view appears.

Step 3 Click the **Performance** > **Channel Groups** > **Statistics** tabs.

Step 4 Click **Refresh**. Performance monitoring statistics for each channel group on the card appear in the Statistics tab.

View the PM parameter names in the Param column. The current PM parameter values appear in the Port # (CHGRP) column. For PM parameter definitions, see the Monitor Performance document.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display" procedure.

Return to your originating procedure (NTP).

DLP-G617 View Channel Group Utilization PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards Using CTC

Purpose	This task enables you to view line utilization PM counts on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards and channel groups to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to view the channel group utilization PM parameters on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

Step 2 In node view, double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to view the channel group utilization. The card view appears.

Step 3 Click the **Performance > Channel Groups > Utilization** tabs.

Step 4 Click **Refresh**. The utilization percentages for each channel group on the card appear in the Utilization tab.

View the Port # column to find the channel group you want to monitor.

The transmit (Tx) and receive (Rx) bandwidth utilization values, for the previous time intervals, appear in the Prev-*n* columns. For PM parameter definitions, see the Monitor Performance document.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display" procedure.

Return to your originating procedure (NTP).

DLP-G618 View Channel Group History PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards Using CTC

Purpose	This task enables you to view historical PM counts at selected time intervals on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards and channel groups to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to view the channel group history PM parameters on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.

Step 2 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card where you want to view the channel group history PM data. The card view appears.

Step 3 Click the **Performance > Channel Groups > History** tabs.

Step 4 From the **Port** field, choose a channel group.

Step 5 Click **Refresh**. Performance monitoring statistics for each channel group on the card appear in the History tab.

View the PM parameter names that appear in the Param column. The PM parameter values appear in the Prev-*n* columns. For PM parameter definitions, see the Monitor Performance document.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display" procedure.

Return to your originating procedure (NTP).

NTP-G283 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card CFM Settings

Purpose	This procedure changes the CFM settings for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 • "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125 • DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the CFM settings. If you are already logged in, continue with Step 2.

Step 2 Perform any of the following tasks as needed:

- DLP-G621 Enable or Disable CFM on the Card Using CTC, page 11-332
- DLP-G622 Enable or Disable CFM for Each Port Using CTC, page 11-333
- DLP-G623 Create a Maintenance Domain Profile Using CTC, page 11-334
- DLP-G624 Delete a Maintenance Domain Profile Using CTC, page 11-335
- DLP-G625 Create a Maintenance Association Profile Using CTC, page 11-336

- DLP-G626 Modify a Maintenance Association Profile Using CTC, page 11-337
- DLP-G627 Delete a Maintenance Association Profile Using CTC, page 11-337
- DLP-G628 Map a Maintenance Association Profile to a Maintenance Domain Profile Using CTC, page 11-338
- DLP-G629 Create a MEP Using CTC, page 11-339
- DLP-G630 Delete a MEP Using CTC, page 11-340
- DLP-G631 Create a MIP Using CTC, page 11-340
- DLP-G632 Delete a MIP Using CTC, page 11-341
- DLP-G633 Ping MEP Using CTC, page 11-342
- DLP-G634 Traceroute MEP Using CTC, page 11-342
- DLP-G615 Retrieve Information on Channel Group, REP, CFM, and EFM Using CTC, page 11-328
- DLP-G635 Enable CFM on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI
- DLP-G636 Create a Maintenance Domain on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI
- DLP-G637 Create a Maintenance Intermediate Point on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI
- DLP-G638 Create a Maintenance End Point on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI

Step 3 **Stop. You have completed this procedure.**

DLP-G621 Enable or Disable CFM on the Card Using CTC

Purpose	This task allows you to enable or disable CFM on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note CFM is disabled on the card by default. CFM must be enabled at both card and port levels for the CFM service to work.

For information about interaction of CFM with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable or disable CFM on the card. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > Security** tab.

Step 4 Uncheck the **MAC security** check box to disable MAC security.

Step 5 In card view, click the **Provisioning > CFM > Configuration > Global Settings** tabs.

Step 6 Check the **Enable CFM** check box that is present at the bottom of the screen.

Step 7 Choose the value for CC Timer field. The value can be 1 second, 10 seconds, or 1 minute.

Note Continuity Check (CC) messages are periodically exchanged between maintenance end points (MEPs). The CC Timer field is used to set the time frequency for transmission of CC messages.

Step 8 Click **Apply** to enable CFM on the card.

Note Uncheck the **Enable CFM** check box to disable CFM on the card.

Step 9 Return to your originating procedure (NTP).

DLP-G622 Enable or Disable CFM for Each Port Using CTC

Purpose	This task allows you to enable or disable CFM for each port on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note CFM must be enabled at both card and port levels for the CFM service to work. However, CFM is enabled on all the ports by default.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable or disable CFM for each port. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > Global Settings** tabs.

Step 4 If you want to enable CFM on a specific port, check the **Enable CFM** check box against that port.

Step 5 Choose the value for CC Timer field. The value can be 1 second, 10 seconds, or 1 minute.

Note Continuity Check (CC) messages are periodically exchanged between MEPs. The CC Timer field is used to set the time frequency for transmission of CC messages.

Step 6 Click **Apply** to enable CFM on the port.

Note Uncheck the **Enable CFM** check box against the port to disable CFM on the port.

Step 7 Return to your originating procedure (NTP).

DLP-G623 Create a Maintenance Domain Profile Using CTC

Purpose	This task allows you to create a maintenance domain profile on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Before You Begin

- You can create up to eight maintenance domain profiles on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
- The maximum number of characters for the maintenance domain profile and the maintenance association profile must not exceed 43 characters.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to create a maintenance domain profile. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > Domain Profiles** tabs or in node/network view, click the **Provisioning > CFM Profiles > Domain Profiles** tabs.

Note Use the network view to store the domain profile on multiple nodes.

Step 4 Click **Add row(s)**.

Step 5 Enter the name of the domain in the Domain Name field.

Step 6 Enter the level of the domain profile in the Level field. The range of the domain profile level is from 0 to 7.

Step 7 Click **Store**.

Step 8 Choose the card slot where you want to store this domain profile and click **OK**.

Step 9 Return to your originating procedure (NTP).

DLP-G624 Delete a Maintenance Domain Profile Using CTC

Purpose	This task allows you to delete a maintenance domain profile on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to delete a maintenance domain profile. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > Domain Profiles** tabs or in node/network view, click the **Provisioning > CFM Profiles > Domain Profiles** tabs.

Step 4 Select the domain profiles that you want to delete.

Step 5 Check the **on Node** check box.

Step 6 Click **Delete Sel. row(s)**. The **CFM Profile Deleting** dialog box appears.

Step 7 Choose the card slot where you want to delete this profile and click **OK**. The **Deleting Profile** dialog box appears.

Step 8 In the **Deleting Profile** dialog box, click **Yes**.

Step 9 Return to your originating procedure (NTP).

DLP-G625 Create a Maintenance Association Profile Using CTC

Purpose	This task allows you to create a maintenance association profile on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note You can create up to 1500 maintenance association profiles on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to create a maintenance association profile. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MA Profiles** tabs or in node/network view, click the **Provisioning > CFM Profiles > MA Profiles** tabs.

Note Use the network view to store the maintenance association profile on multiple nodes.

Step 4 Click **Add row(s)**.

Step 5 Enter the name of the maintenance association in the Maintenance Profile Name field.

Step 6 Enter the VLAN ID in the VLAN ID field. The range of the VLAN ID is from 1 to 4093.

Step 7 Check the **CC Enable** check box to receive Continuity Check messages.

Step 8 Click **Store**.

Step 9 Choose the card slot where you want to store this maintenance association profile and click **OK**.

Step 10 Return to your originating procedure (NTP).

DLP-G626 Modify a Maintenance Association Profile Using CTC

Purpose	This task allows you to modify a maintenance association profile on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note Ensure that the maintenance association profile you want to modify is not associated with a maintenance domain profile.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to modify a maintenance association profile. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MA Profiles** tabs or in node/network view, click the **Provisioning > CFM Profiles > MA Profiles** tabs.

Step 4 Select the maintenance association profiles that you want to modify.

Step 5 Click **Modify Selected Profile(s)**. The **Modify MA Profile** dialog box appears.

Step 6 Modify the values as required and click **OK**.

Step 7 Return to your originating procedure (NTP).

DLP-G627 Delete a Maintenance Association Profile Using CTC

Purpose	This task allows you to delete a maintenance association profile on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note Ensure that the maintenance association profile you want to delete is not associated with a maintenance domain profile.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to delete a maintenance association profile. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MA Profiles** tabs or in node/network view, click the **Provisioning > CFM Profiles > MA Profiles** tabs.

Step 4 Select the maintenance association profiles that you want to delete.

Step 5 Check the **on Node** check box.

Step 6 Click **Delete Sel. row(s)**. The **CFM Profile Deleting** dialog box appears.

Step 7 Choose the card slot where you want to delete this profile and click **OK**. The **Deleting Profile** dialog box appears.

Step 8 In the **Deleting Profile** dialog box, click **Yes**.

Step 9 Return to your originating procedure (NTP).

DLP-G628 Map a Maintenance Association Profile to a Maintenance Domain Profile Using CTC

Purpose	This task allows you to map a maintenance association profile to a maintenance domain profile on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note Ensure that you have already created maintenance domain profiles and maintenance association profiles.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to map a maintenance association profile to a maintenance domain profile. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MA-Domain Mapping** tabs.

Step 4 From the main drop-down list, choose a maintenance domain profile.

Step 5 Click **Link MA Profiles**. The **Link MA Profiles** dialog box appears.

Step 6 From the Available Profiles list, choose the required MA profiles and click the right arrow button to move the MA profiles to the Linked Profiles list and click **OK**.

Note The maintenance association profiles that are mapped with a specific maintenance domain profile must have a unique SVLAN ID.

Step 7 Return to your originating procedure (NTP).

DLP-G629 Create a MEP Using CTC

Purpose	This task allows you to create a Maintenance End Point (MEP) for a given VLAN range on a specific maintenance domain.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note You can create up to 255 MEPs and MIPs on the GE_XP and 10GE_XP cards. You can create up to 500 MEPs and MIPs on the GE_XPE and 10GE_XPE cards.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to create a MEP. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MEP** tabs.

Step 4 Click **Create**. The **Create MEP** dialog box appears.

Step 5 From the Port drop-down list, choose a port where you want to create the MEP.

Note CFM must be enabled on the port to create a MEP. The port must not belong to a channel group.

Step 6 From the Domain drop-down list, choose a maintenance domain.

Step 7 Enter the SVLAN ID in the Vlan Id field.

Note The specified VLAN must be configured on the selected port. The specified VLAN must also appear in the MA-Domain Mapping table.

Step 8 Enter the MP ID (identifier of the maintenance end point) in the MPID field and click **OK**. The range of the MP ID is from 1 to 8191.

The MP ID must not be the same between the maintenance end points.

Step 9 Return to your originating procedure (NTP).

DLP-G630 Delete a MEP Using CTC

Purpose	This task allows you to delete a MEP on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to delete a MEP. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MEP** tabs.

Step 4 Select the MEPs that you want to delete.

Step 5 Click **Delete**.

Step 6 Return to your originating procedure (NTP).

DLP-G631 Create a MIP Using CTC

Purpose	This task allows you to create a Maintenance Intermediate Point (MIP) for a given VLAN range with a specific maintenance level.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note You can create up to 255 MEPs and MIPs on the GE_XP and 10GE_XP cards. You can create up to 500 MEPs and MIPs on the GE_XPE and 10GE_XPE cards.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to create a MIP. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MIP** tabs.

Step 4 Click **Create**. The **Create MIP** dialog box appears.

Step 5 From the Port drop-down list, choose a port where you want to create the MIP.

Note The port must not belong to a channel group.

Step 6 From the Level drop-down list, choose a maintenance level. The range of the maintenance level is from 0 to 7.

Step 7 Enter the SVLAN range in the Vlan range field. The range of the SVLAN is from 1 to 4093.

Note The specified SVLAN must be configured on the selected port.

Step 8 Click **OK**.

Step 9 Return to your originating procedure (NTP).

DLP-G632 Delete a MIP Using CTC

Purpose	This task allows you to delete a MIP on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to delete a MIP. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Configuration > MIP** tabs.

Step 4 Select the MIPs that you want to delete.

Step 5 Click **Delete**.

Step 6 Return to your originating procedure (NTP).

DLP-G633 Ping MEP Using CTC

Purpose	This task allows you to display the output of the ping command on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to ping MEP. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Ping** tabs.

Step 4 Enter the MP ID value in the MPID field. The range of the MP ID is from 1 to 8191.

Note Remote MP ID user cannot ping local MP ID.

Step 5 (Optional) Enter the MAC address of the remote maintenance point in the Mac Addr field. The format of MAC address is abcd.abcd.abcd.

Step 6 Enter the SVLAN ID in the VLAN ID field. The range of the SVLAN ID is from 1 to 4093.

Step 7 Enter the domain name in the Domain Name field.

Step 8 Enter the size of the ping packet in the DataGram Size field. The default value is 100.

Step 9 Enter the number of ping packets in the No of Requests field. The default value is 5.

Step 10 Click **Ping**. The output of the ping command appears in the Ping Response area.

Step 11 Return to your originating procedure (NTP).

DLP-G634 Traceroute MEP Using CTC

Purpose	This task allows you to display the output of the traceroute command on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to view the output of the **traceroute** command. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > CFM > Traceroute** tabs.

Step 4 Enter the remote MP ID value in the MPID field. The range of the MP ID is from 1 to 8191.

Step 5 (Optional) Enter the MAC address of the remote maintenance point in the Mac Addr field. The format of MAC address is abcd.abcd.abcd.

Step 6 Enter the SVLAN ID in the VLAN ID field. The range of the SVLAN ID is from 1 to 4093.

Step 7 Enter the domain name in the Domain Name field.

Step 8 Click **TraceRoute Response**.

The output of the **traceroute** command appears in the TraceRoute Response area.

- Verify the RlyHit message is shown in the traceroute display and LTM reaches a maintenance point whose MAC address matches the target MAC address.
- Verify the RlyFDB message is shown in the traceroute display when the next hop address is found in the forwarding database.
- Verify the RlyMPDB message is shown in the traceroute display when the next hop address is found in the CCDN.

Step 9 Return to your originating procedure (NTP).

NTP-G285 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card EFM Settings

Purpose	This procedure changes the EFM settings of the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 • "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125 • DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the EFM settings. If you are already logged in, continue with Step 2.

Step 2 Perform any of the following tasks as needed:

- DLP-G639 Enable or Disable EFM for Each Port Using CTC, page 11-344
- DLP-G640 Configure EFM Parameters Using CTC, page 11-345
- DLP-G641 Configure EFM Link Monitoring Parameters Using CTC, page 11-346
- DLP-G642 Enable Remote Loopback for Each Port Using CTC, page 11-348
- DLP-G615 Retrieve Information on Channel Group, REP, CFM, and EFM Using CTC, page 11-328
- DLP-G643 Enable EFM on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI
- DLP-G644 Configure the EFM Mode on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI

Stop. You have completed this procedure.

DLP-G639 Enable or Disable EFM for Each Port Using CTC

Purpose	This task allows you to enable or disable EFM for each port on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Before You Begin

- You can enable EFM on both UNI and NNI ports.
- You cannot enable or disable EFM for ports that belong to a channel group.
- For information about interaction of EFM with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable or disable EFM for each port. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > EFM > Configuration** tabs. The EFM details appear for each port.

Step 4 From the EFM State drop-down list, choose **Enabled**.

Step 5 Click **Apply** to enable EFM for that port.

Note From the EFM State drop-down list, choose **Disabled** to disable EFM for that port.

Step 6 Return to your originating procedure (NTP).

DLP-G640 Configure EFM Parameters Using CTC

Purpose	This task allows you to configure EFM parameters on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to configure EFM parameters. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > EFM > Configuration** tabs.

Step 4 Modify the EFM parameter settings as described in Table 11-147.

Table 11-147 EFM Parameter Settings

Parameter	Description	Options
Port	(Display only) Port number (*n-n*) and rate (GE or TEN_GE).	—
EFM State	Sets the state of the EFM protocol for each port.	• Enabled • Disabled
Mode	Sets the operating mode of the port. If the mode is Active, the port sends OAM Protocol Data Units (OAMPDUs) at regular intervals to the partner ports. If the mode is Passive, the port will not send OAMPDUs until the partner ports send OAMPDUs.	• Active • Passive

Table 11-147 EFM Parameter Settings

Parameter	Description	Options
Link Fault	Sets the Remote Failure Indication (RFI) action. If the link is down on a port, the link fault RFI is sent to the partner port through OAMPDU. An alarm indicating the remote failure indication link fault (RFI-LF) is raised. The alarm is cleared after you clear the link fault condition. You can specify the following actions for link fault RFI: • Error Block—The interface is placed in the error-block state and the RFI-LF alarm is raised. • None—Only the RFI-LF alarm is raised. **Note** Dying Gasp and critical events are not supported.	• Error Block • None
Session Timer	Sets the duration up to when the EFM session is retained with the partner port without receiving OAMPDUs.	Default: 5 seconds Range: 2 to 30 seconds

Step 5 Click **Apply** to save the changes.

Step 6 Return to your originating procedure (NTP).

DLP-G641 Configure EFM Link Monitoring Parameters Using CTC

Purpose	This task allows you to configure EFM link monitoring parameters for each port on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to configure EFM link monitoring parameters. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > EFM > Link Monitoring** tabs.

Step 4 Modify the EFM link monitoring parameter settings as described in Table 11-148.

Table 11-148 EFM Link Monitoring Parameter Settings

Parameter	Description	Options
Port	(Display only) Port number (*n-n*) and rate (GE or TEN_GE).	—
EF Max	Sets the threshold value for the maximum number of errored frames to detect during a specific period.	Range: 1 to 65535
EF Min	Sets the threshold value for the minimum number of errored frames to detect during a specific period.	Range: 0 to 65535
EF Action	Specifies that when the parameter value exceeds the maximum threshold value, the applicable action is None. When the parameter value falls below the minimum threshold value, a threshold crossing alert (transient condition) is generated.	• None • Squelch
EF Window	Period in which the errored frame parameters are monitored.	Range: 10 to 600
EFP Max	Sets the threshold value for the maximum number of errored frames within the last *n* frames.	Range: 1 to 65535
EFP Min	Sets the threshold value for the minimum number of errored frames within the last *n* frames.	Range: 0 to 65535
EFP Action	Specifies that when the parameter value exceeds the maximum threshold value, the applicable action is None. When the parameter value falls below the minimum threshold value, a threshold crossing alert (transient condition) is generated.	• None • Squelch
EFP Window	Period in which the EFP parameters are monitored.	Range: 1 to 65535
EFSS Max	Sets the threshold value for the maximum number of errored seconds within the last *m* seconds.	Range: 1 to 900
EFSS Min	Sets the threshold value for the minimum number of errored seconds within the last *m* seconds.	Range: 0 to 900
EFSS Action	Specifies that when the parameter value exceeds the maximum threshold value, the applicable action is None. When the parameter value falls below the minimum threshold value, a threshold crossing alert (transient condition) is generated.	• None • Squelch
EFSS Window	Specifies the period when the EFSS parameters are monitored.	Range: 100 to 9000

Step 5 Click **Apply** to save the changes.

Step 6 Return to your originating procedure (NTP).

DLP-G642 Enable Remote Loopback for Each Port Using CTC

Purpose	This task allows you to enable remote loopback for each port on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable the remote loopback for each port. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > EFM > Loopback** tabs.

The remote loopback type details appear for each port.

Step 4 From the Remote Loopback Type drop-down list, choose **Remote Loopback**.

Step 5 Click **Apply** to save the changes.

Step 6 Return to your originating procedure (NTP).

NTP-G287 Manage the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card REP Settings

Purpose	This procedure changes the REP settings for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	• NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 • "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125 • DLP-G277 Provision a Multirate PPM, page 11-128 (if necessary)
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the REP settings. If you are already logged in, continue with Step 2.

Step 2 Perform any of the following tasks as needed:

- DLP-J713 Provision Administrative VLAN for Ports in a REP Segment Using CTC, page 11-349
- DLP-G645 Create a Segment Using CTC, page 11-350
- DLP-G646 Edit a Segment Using CTC, page 11-353
- DLP-G647 Activate VLAN Load Balancing Using CTC, page 11-353
- DLP-G648 Deactivate VLAN Load Balancing Using CTC, page 11-354
- DLP-G615 Retrieve Information on Channel Group, REP, CFM, and EFM Using CTC, page 11-328
- DLP-G649 Create a Segment on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI
- DLP-G650 Configure STCN on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI
- DLP-G651 Configure Preemption Delay on the Primary Edge Port Using PCLI
- DLP-G652 Configure VLAN Load Balancing on the Primary Edge Port Using PCLI

Stop. You have completed this procedure.

DLP-J713 Provision Administrative VLAN for Ports in a REP Segment Using CTC

Purpose	This task allows you to provision administrative VLAN for NNI and UNI ports in a REP segment on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note One administrative CVLAN and one administrative SVLAN can be provisioned for each card. The REP segments using NNI ports send Hardware Flood Layer (HFL) messages using the administrative SVLAN. The REP segments using UNI ports send HFL messages using the administrative CVLAN. The two VLANs need not be the same.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to provision administrative VLAN. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > REP > Admin VLAN Configuration** tabs.

Step 4 To provision administrative VLAN for NNI ports in a REP segment, perform the following steps:

a. From the SVLAN drop-down list, choose a SVLAN. The following table describes the REP convergence time for SVLANs.

Table 11-149 REP Convergence Time for SVLANs

SVLAN	Administrative VLAN	REP Convergence Time
0 (default)	Not configured	4 to 5 seconds
1 to 4093	Configured	Less than 200 milliseconds

b. Click **Apply**.

c. To associate the chosen SVLAN with the NNI ports, see "DLP-G382 Add and Remove SVLANS to/from GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE NNI Ports" task on page 11-371.

Step 5 To provision administrative VLAN for UNI ports in a REP segment, perform the following steps:

a. Enter the CVLAN in the CVLAN field.

b. Click **Apply**.

c. To associate the CVLAN with the UNI ports, see "DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings" task on page 11-374.

Step 6 Return to your originating procedure (NTP).

DLP-G645 Create a Segment Using CTC

Purpose	This task allows you to create a segment on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Before You Begin

- You can create up to three segments on a card. Each segment can have up to two ports on the same switch.
- You must configure the REP administrative VLAN to activate the Hardware Flood Layer (HFL).
- Before creating REP segments, you must configure the administrative VLAN or use the default VLAN 1 and add the ports to the segment. Only one SVLAN can be configured per card for all the three segments. REP uses the administrative VLAN to flood its own control traffic.
- The administrative CVLAN is required if a REP port is configured as a UNI port. However, the REP ports are configured as NNI ports in many configurations, and hence the administrative CVLAN is not required in these configurations. The option to configure the administrative CVLAN is present in CTC.

- You must configure two edge ports in the segment. A segment has only one primary edge port. If you configure two ports in a segment as the primary edge port, for example, ports on different switches, REP selects one of the ports to serve as the primary edge port based on port priority.
- If REP is enabled on two ports on a switch, both the ports must be either regular ports or edge ports. However, if the No-neighbor port is configured, one port can be an edge port and another port can be a regular port.
- You can also optionally configure where to send segment topology change notifications (STCNs) and VLAN load balancing (VLB). STCNs are enabled only for primary edge ports. VLB configurations are enabled on any edge ports.
- For information about interaction of REP with other protocols, see the "11.14.2 Protocol Compatibility list" section on page 11-62.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to create a segment. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > REP > Segment** tabs.

Step 4 Click **Create**. The **Create Segment** wizard appears.

Step 5 Enter the segment ID in the Segment field. The range of the segment ID is from 1 to 1024.

Step 6 From the Port drop-drown list, choose a REP port that must belong to this segment.

Note A REP port can belong to only one segment.

Step 7 From the Port Role area, choose whether you want to configure the port as an edge port or a regular port. The options are:

a. Edge—The port is configured as an edge port.

- Check the **Primary** check box to configure the edge port as a primary edge port. A segment can have only one primary edge port.

Note If an edge port is configured as primary edge port, the other edge port in the ring automatically becomes secondary edge port. If neither edge port is configured as primary edge port, one edge port is automatically selected as primary edge port, and the other edge port is secondary edge port. Configuring an edge port as a primary edge port is not mandatory. However, it is recommended since VLAN load balancing must be configured on the node with the primary edge port.

- Uncheck the **Primary** check box to configure the edge port as a secondary edge port.
- (Optional) Check the **Preferred** check box to configure the regular or edge port as a preferred alternate port (alternate to primary edge port). This port blocks a range of SVLANs for VLAN load balancing. There is no limit on the number of preferred ports in a REP ring. The preferred port, if configured, is relevant even without VLAN load balancing, as it takes priority over non-preferred ports for alternate port election.

Note Configuring a port as **preferred** does not ensure that it becomes the alternate port; it only gets preference over the other ports that are not configured as preferred when an alternate port is elected.

- Check the **NoNeighbor** check box if the edge port must not have a neighbor port. REP does not check for neighbor adjacency.

Note When the **NoNeighbor** check box is checked, ensure that only one segment is created.

b. None—The port is configured as a regular port. If you choose this option, Segment Topology Change Notifications (STCN) and VLAN Load Balancing (VLB) configurations are disabled.

Check the **Preferred** check box to configure the regular port as a preferred alternate port.

Step 8 From the STCN area, configure the destination of STCN messages:

a. Check the **Enable** check box to enable sending STCN messages.

b. From the Port drop-down list, choose the STCN port to send STCN messages or enter the segment ID in the Segment field to send STCN messages. The STCN port and REP port must be unique.

Step 9 From the VLAN Load Balancing area, configure VLAN Load Balancing on the primary edge port:

a. Check the **Enable** check box to enable VLB.

b. Enter a single SVLAN or range of SVLANs in the SVLAN field. These SVLANs are blocked at the alternate ports. The primary edge port blocks the remaining VLANs.

c. Enter the Rep PortId in the Rep PortId field to identify the VLAN blocking alternate port. This unique port ID is automatically generated when REP is enabled.

d. Check the **Preferred** check box to select the segment port previously identified as the preferred alternate port for VLAN load balancing.

When you check **Preferred** under VLAN Load Balancing area, you configure VLAN load balancing to use one of the previously configured preferred ports (under the Port Role area) to be the load balancing port. This restricts the load balancing port to be one among the preferred ports, but you cannot select a specific preferred port.

Step 10 From the VLB Preempt Delay area, enter the trigger delay for automatic VLB activation. The range is 15 to 300 seconds.

Step 11 Click **Next.**

Step 12 Enter the details of the second port to add it to the segment.

Repeat Step 6 to 10 when the first port is configured as a regular port and the second port is configured as a primary edge port. Repeat Step 6 to 7 when the first port is configured as a primary edge port and the second port is configured as a regular port.

Step 13 Click **Finish**.

Step 14 Return to your originating procedure (NTP).

DLP-G646 Edit a Segment Using CTC

Purpose	This task allows you to edit a segment on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note You can edit only the STCN and VLB entries for a segment.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to edit a segment. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > REP > Segment** tabs. The list of segments appear.

Step 4 Choose a segment from the list of segments.

Step 5 Click **Edit**.

Step 6 Modify the values as required and click **Finish**.

Step 7 Return to your originating procedure (NTP).

DLP-G647 Activate VLAN Load Balancing Using CTC

Purpose	This task allows you to activate VLAN load balancing on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note When VLAN load balancing is activated, the default configuration is manual preemption with the delay timer disabled.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to activate VLAN load balancing. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > REP > Segment** tabs. The list of segments appear.

Step 4 Choose a segment from the list of segments.

Step 5 Click **Activate VLB**.

Step 6 Return to your originating procedure (NTP).

DLP-G648 Deactivate VLAN Load Balancing Using CTC

Purpose	This task allows you to deactivate VLAN load balancing on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to deactivate VLAN load balancing. If you are already logged in, continue with Step 2.

Step 2 Verify that the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card is installed in L2-over-DWDM mode. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 3 In card view, click the **Provisioning > REP > Segment** tabs. The list of segments appear.

Step 4 Choose a segment from the list of segments.

Step 5 Click **Deactivate VLB**.

Step 6 Return to your originating procedure (NTP).

NTP-G165 Modify the GE_XP, 10GE_XP, GE_XPE, 10GE_XPE Cards Ethernet Parameters, Line Settings, and PM Thresholds

Purpose	This procedure changes Ethernet, line, and PM threshold settings for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G63 Install an SFP or XFP, page 14-72
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the card settings. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 Verify the card mode:

a. Display the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card in card view.

b. Click the **Provisioning > Card** tabs.

c. Verify that the card mode is set to the mode designated by your site plan:

- L2-over-DWDM (GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE)
- 10GE TXP (10GE_XP or 10 GE_XPE)
- 10GE MXP (GE_XP or GE_XPE)
- 20GE MXP (GE_XP or GE_XPE)

If the card mode is set correctly, continue with Step 4. If not, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 4 Complete the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Step 5 If the ONS-SC-E1-T1-PW or ONS-SC-E3-T3-PW SFP is inserted in the GE_XPE card, complete the following tasks, as needed.

- DLP-G684 Provision the GE_XPE Card PDH Ethernet Settings, page 11-364
- DLP-G685 Provision the GE_XPE Card Electrical Lines Settings, page 11-366

Step 6 If the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card mode is L2-over-DWDM, complete the following tasks, as needed. If the card mode is not L2-over-DWDM, continue with Step 7.

- DLP-G381 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Layer 2 Protection Settings, page 11-368
- DLP-G421 Create and Store an SVLAN Database, page 17-69
- DLP-G382 Add and Remove SVLANS to/from GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE NNI Ports, page 11-371

- DLP-G383 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Quality of Service Settings, page 11-372
- DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings, page 11-374
- NTP-G205 Enable Link Integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards, page 11-381.
- DLP-G385 Provision the MAC Filter Settings for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card, page 11-377
- NTP-G204 Enable IGMP Snooping on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards, page 11-386 or NTP-G220 Enable IGMP Snooping on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI.
- NTP-G206 Enable MVR on a GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card, page 11-388 or NTP-G224 Enable MVR on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI.
- DLP-G460 Enable MAC Address Learning on SVLANs for GE_XPE or 10GE_XPE Cards Using CTC, page 11-376 or NTP-G226 Enable MAC Address Learning on SVLANs for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI.

Step 7 Complete the following tasks, as needed:

- DLP-G386 Provision the Gigabit Ethernet Trunk Port Alarm and TCA Thresholds, page 11-389
- DLP-G387 Provision the Gigabit Ethernet Client Port Alarm and TCA Thresholds, page 11-391
- DLP-G388 Change the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card RMON Thresholds, page 11-392
- DLP-G389 Change the Gigabit Ethernet Optical Transport Network Settings, page 11-395

Note To use the Alarm Profiles tab, including creating alarm profiles and suppressing alarms, see the Alarm and TCA Monitoring and Management document.

Stop. You have completed this procedure.

DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings

Purpose	This task changes the Ethernet settings for the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the Ethernet settings. The card view appears.

Step 2 Click the **Provisioning > Ether Ports > Ethernet** tabs.

Step 3 Modify any of the settings for the Ethernet tab as described in Table 11-150. The parameters that appear depend on the card mode.

Table 11-150 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Ethernet Settings

Parameter	Description	Card Mode	Options
Port	(Display only) The Port number (*n-n*) and rate (GE or TEN_GE).	• L2-over-DWDM • 10GE TXP • 10GE MXP • 20GE MXP	—
MTU	The maximum size of the Ethernet frames accepted by the port. The port must be in OOS/locked state.	• L2-over-DWDM • 10GE TXP • 10GE MXP • 20GE MXP	Numeric. Default: 9700 Range 64 to 9700 (for R9.1 and later) (jumbo frame)
Mode	Sets the Ethernet mode. The port must be in OOS/locked state before setting the card mode. **Note** For GE_XP and GE_XPE cards that are in Y-cable protection groups, Mode must be set to 1000 Mbps for those client ports that are configured in Y-cable. For 10GE_XP and 10GE_XPE cards that are in Y-cable protection groups, Mode must be set to 10000 Mbps.	• L2-over-DWDM • 10GE TXP • 10GE MXP • 20GE MXP	• Auto (default) • Display Only • 1000 Mbps • 10000 Mbps • Auto_Fdx (10Mbps Full). This option applies to ONS-SE-ZE-EL copper SFP that carries traffic from GE_XP and GE_XPE cards. **Note** If Mode is set to Auto on the GE_XP or GE_XPE port, autonegotiation gets enabled on the peer port. **Note** On GE_XP card, the copper Pluggable Port Module (PPM) interface can auto-negotiate and carry traffic even when the peer interface operates at rates other than 1000 Mbps.

Table 11-150 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Ethernet Settings (Continued)

Parameter	Description	Card Mode	Options
Flow Control	Enables/disables flow control messaging with its peer port. When enabled, the port can send and receive PAUSE frames when buffer congestion occurs. When disabled, no PAUSE frames are transmitted and the PAUSE frames received are discarded. **Note** Flow control messaging is symmetric and not negotiated. When flow control is enabled on one port, the other end of the link (peer port) is not considered. That is, even if flow control is disabled on the peer port, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card will send PAUSE frames.	• L2-over-DWDM • 10GE MXP • 10GE TXP • 20GE MXP	• ON—Flow control is enabled. • OFF (default)—Flow control is disabled. • Display Only.
Media Type	(GE_XPE card only) Sets the Media Type. **Note** PROV-MISMATCH alarm is raised if the Media Type is not set to Ethernet Over DS1 (ANSI) or Ethernet Over E1 (ETSI) for ONS-SC-EOP1,Ethernet Over DS3 (ANSI) or Ethernet Over E3 (ETSI) for ONS-SC-EOP3, or DS1 Over Ethernet (ANSI) or E1 Over Ethernet (ETSI) for ONS-SC-E1-T1-PW or DS3 Over Ethernet (ANSI) or E3 Over Ethernet (ETSI) ONS-SC-E3-T3-PW. Set the correct Media Type to clear the PROV-MISMATCH alarm.	• L2-over-DWDM • 10GE MXP • 20GE MXP	• Ethernet Over DS1 (ANSI) (for ONS-SC-EOP1) • Ethernet Over E1 (ETSI) (for ONS-SC-EOP1) • Ethernet Over DS3 (ANSI) (for ONS-SC-EOP3) • Ethernet Over E3 (ETSI) (for ONS-SC-EOP3) • DS1 over Ethernet (ANSI) (for ONS-SC-E1-T1-PW) • DS3 over Ethernet (ANSI) (for ONS-SC-E3-T3-PW) • E1 Over Ethernet (ETSI) (for ONS-SC-E1-T1-PW) • E3 Over Ethernet (ETSI) (for ONS-SC-E3-T3-PW)
Committed Info Rate	Sets the guaranteed information rate as provided by the service provider service-level agreement. The port must be in OOS/locked state.	• L2-over-DWDM • 10GE MXP • 20GE MXP	Numeric. Default: 100 Range: 0 to 100%

Table 11-150 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Ethernet Settings (Continued)

Parameter	Description	Card Mode	Options
Committed Burst Size	Sets the maximum number of bits that will be transferred per second. The port must be in OOS/locked state before the Committed Burst Size is provisioned.	• L2-over-DWDM • 10GE MXP • 20GE MXP	• 4k (default) • 8k • 16k • 32k • 64k • 128k • 256k • 512k • 1MB • 2MB • 8MB • 16MB
Excess Burst Size	The maximum number of bits that are credited for later transfer in the event the committed burst rate cannot be transmitted. The port must be in OOS/locked state before the Excess Burst Size is provisioned.	• L2-over-DWDM • 10GE MXP • 20GE MXP	• None • 4k (default) • 8k • 16k • 32k • 64k • 128k • 256k • 512k • 1MB • 2MB • 8MB • 16MB
NIM	Sets the port network interface mode (NIM). This parameter classifies port types designed for the Metro Ethernet market to simplify deployment, management, and troubleshooting. The port must be in OOS/locked state before the NIM is provisioned.	L2-over-DWDM	• UNI Mode—provisions the port as a user-to-network interface (UNI). This is the interface that faces the subscriber. • NNI Mode—provisions the port as a network-to-network interface. This is the interface that faces the service provider network.
Egress QoS	Enables Quality of Service (QoS) on the port's egress or output queues. The port must be in OOS/locked state before the Egress QoS is provisioned.	L2-over-DWDM	• Checked—QoS is enabled on the port's egress queues. • Unchecked—(Default) QoS is disabled on the port's egress queues.

Table 11-150 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Ethernet Settings (Continued)

Parameter	Description	Card Mode	Options
MAC Learning	Enables or disables MAC learning for the port on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards. MAC learning is used by Layer 2 switches to learn the MAC addresses of network nodes so the Layer 2 switches send traffic to the right location. Layer 2 switches, including the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards in L2-over-DWDM mode with MAC Learning configured, maintain a MAC learning table that associates the MAC addresses and VLANs with a given port. **Note** MAC addresses on SVLANs attached to the port must also be enabled to provision MAC address learning on GE_XPE and 10GE_XPE cards. **Note** MAC address table aging is 300 seconds. It cannot be changed.	L2-over-DWDM	• Checked—MAC learning is enabled for this port. • Unchecked—(Default) MAC learning is disabled.

Table 11-150 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Ethernet Settings (Continued)

Parameter	Description	Card Mode	Options
Ingress CoS	Provisions the IEEE 802.1p ingress Class of Service (CoS). The CoS .1p bits set the Ethernet frame priority. The port must be in OOS/locked state before the Ingress CoS is provisioned. Ingress CoS is used to set the priority of the Ethernet frame in the service provider network, This parameter is used to set the CoS .1p bits in the SVLAN tag. Ingress CoS applies only to ports provisioned as UNI mode. It does not apply to ports provisioned as NNI mode.	L2-over-DWDM	• 0—(default) All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 0. • 1—All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 1. • 2—All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 2. • 3—All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 3. • 4—All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 4. • 5—All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 5. • 6—All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 6. • 7—All incoming frames on the port will have the CoS .1p bits in the SVLAN tag set to 7. • Trust—Automatically copies customer VLAN tag into the service provider VLAN tag. • CVLAN—CoS can be provisioned based on CVLAN. For information on how CoS can be provisioned on the IEEE 802.1QinQ CVLAN tags, refer to the "DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings" task on page 11-374. If CVLAN CoS is configured on a GE_XP or a 10GE_XP card, a PROV-MISMATCH alarm is raised. Until this alarm is cleared, provisioning on the card is not possible. The CVLAN CoS configuration takes effect only after QinQ is configured.

Table 11-150 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Ethernet Settings (Continued)

Parameter	Description	Card Mode	Options
Inner Ethertype (Hex)	Defines the inner Ethertype field. The Ethertype field indicates which protocol is being transported in an Ethernet frame. The inner Ethertype applies to ports provisioned in UNI mode only. It does not apply to ports provisioned as NNI mode. The ports must be OOS/locked before the inner Ethertype is provisioned.	L2-over-DWDM	Numeric. Default: 8100 (IEEE Std 802.1Q customer VLAN tag type) Range: 0x0600 to 0xFFFF
Outer Ethertype (Hex)	Defines the outer Ethertype field. The Ethertype field identifies which protocol is being transported in an Ethernet frame. The ports must be OOS/locked before the Outer Ethertype is provisioned. **Note** The PROV-MISMATCH alarm is raised on GE_XPE and 10GE_XPE cards if more than four different Outer Ethertype options are configured per card.	L2-over-DWDM	Numeric. Default: 8100 (IEEE 802.1Q customer VLAN tag type) Range: 0x0600 to 0xFFFF
IGMP Static Router Port	Adds multicast-capable ports to the forwarding table for every IP multicast.	L2-over-DWDM	• Checked—IGMP static router port is enabled. • Unchecked—(Default) IGMP static router port is disabled.
AIS Action	Defines the AIS action type provisioned on the port.	L2-over-DWDM	• None—No action. • Squelch—When an AIS packet is received on a SVLAN terminating on the UNI-port, the UNI port is squelched.
Protection Action	Configures the standby port behavior. Set Protection Action to None if Media Type is set to Ethernet Over DS1 (ANSI) or Ethernet Over E1 (ETSI) for ONS-SC-EOP1, Ethernet Over DS3 (ANSI) or Ethernet Over E3 (ETSI) for ONS-SC-EOP3, or DS1 Over Ethernet (ANSI) or E1 Over Ethernet (ETSI) for ONS-SC-E1-T1-PW or DS3 Over Ethernet (ANSI) or E3 Over Ethernet (ETSI) for ONS-SC-E3-T3-PW.	L2-over-DWDM	• None—No action. • Squelch—The laser on the standby port in a 1+1 protection group is squelched. This setting has no effect if the port is not part of the 1+1 protection group.

Table 11-151 shows the inner and outer Ethertype behavior based on the NIM setting (either NNI mode or UNI mode). When the NIM is set to UNI, and the QinQ mode is set to Selective, the Ethertype behavior depends on the SVLAN/CVLAN operation that is provisioned, either Add or Translate. (QinQ parameters are provisioned in the "DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings" task on page 11-374.)

Note A packet can exit out of any UNI/NNI port if the outermost tag in the packet matches with the SVLAN provisioned on that port. In other words, in the egress path, the inner tags (even if present) of the packet are not matched with the inner SVLAN or CVLAN provisioned on the port.

Note The Committed Burst Size and Excess Burst Size must be configured based on the expected packet size to ensure that no packets are dropped when Flow Control is enabled. For example, if the CIR is 40% and packet size is 1 KB, the Committed Burst Size and Excess Burst Size should be set to 1 MB.

Note When you set the Committed Info Rate above 40% on 10GE_XP and 10GE_XPE cards, the Committed Burst Size and Excess Burst Size must be set to at least 32K. The Committed Burst Size and Excess Burst Size can be increased based on the packet size and Committed Info Rate value.

Table 11-151 Ethertype Behavior

Port Type/ Ethertype	NNI Mode	UNI Mode		
		Transparent	Selective Operation: Add	Selective Operation: Translate
Inner Ethertype	Not applicable: the outer Ethertype value is used.	Not applicable: all packets are mapped over the SVLAN.	Working (card-based)	Working (card-based)
Outer Ethertype	Working (per port)	Not applicable: the outer Ethertype is contained in the inner VLAN (same as UNI Selective mode).	Not applicable: the outer Ethertype is the one contained in the inner VLAN.	This cannot be set by port, only by card. The outer Ethertype is automatically set to the inner Ethertype.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G684 Provision the GE_XPE Card PDH Ethernet Settings

Purpose	This task changes the PDH Ethernet settings for the GE_XPE card.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC • Set the Media Type as DS1 Over Ethernet in Provisioning > Ether Ports > Ethernet tab in DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings, page 11-356
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The Provisioning > Ether Ports > PDH Ethernet Parameters tab is available in GE_XPE card view only, provided the PPM for GE_XPE port is created in FE mode.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XPE card where you want to change the PDH Ethernet settings. The card view appears.

Step 2 Click the **Provisioning > Ether Ports > PDH Ethernet Parameters** tabs. The PDH Ethernet Parameters tab appear only when the ONS-SC-E1-T1-PW or ONS-SC-E3-T3-PW SFP is inserted.

Step 3 Modify any of the settings for the PDH Ethernet Parameters tab as described in Table 11-152.

Table 11-152 GE_XPE Card PDH Ethernet Settings

Parameter	Description	Card Mode	Options
Port	(Display only) The Port number (*n-n*) and rate.	• L2-over-DWDM • 10GE MXP • 20GE MXP	—
Port Name	(Display only) The port name.	• L2-over-DWDM • 10GE MXP • 20GE MXP	—
MPLS Inner Label	Sets the MPLS Inner Label value.	• L2-over-DWDM • 10GE MXP • 20GE MXP	Default: 16 Range: 16-65535.
MPLS Outer Label	Sets the MPLS Outer Label value.	• L2-over-DWDM • 10GE MXP • 20GE MXP	Default: 16 Range: 16-65535.

Table 11-152 GE_XPE Card PDH Ethernet Settings (Continued)

Parameter	Description	Card Mode	Options
Jitter Buffer	Sets the jitter buffer value.	• L2-over-DWDM • 10GE MXP • 20GE MXP	Default: 1500 Range: 400-200000. Table 11-153 provides jitter buffer values for different payloads. **Note** The traffic is down if the jitter buffer is set to >=192000 when Media Type is set to DS1 over Ethernet (ANSI) (for ONS-SC-E1-T1-PW) and E1 Over Ethernet (ETSI) (for ONS-SC-E1-T1-PW).
RX Sensitivity	(ONS-SC-E1-T1-PW only) Sets the RX sensitivity value.	• L2-over-DWDM • 10GE MXP • 20GE MXP	Default: –36 (ANSI), –12 (ETSI) Range: –36 to –15 (ANSI), –12 to –43 (ETSI)
Source IP Address	Enter the source IP address. Only Unicast IP addresses are accepted.	• L2-over-DWDM • 10GE MXP • 20GE MXP	—
Peer IP Address	Enter the peer IP address. Only Unicast IP addresses are accepted.	• L2-over-DWDM • 10GE MXP • 20GE MXP	—

Table 11-153 Jitter Buffer Values for Various Payload Types

	Jitter Buffer Value	
Payload Type	Lower Limit	Upper Limit
T1 (DS1)	1500	20000
T3 (DS3)	400	4500
E1	1500	200000
E3	400	60000

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G685 Provision the GE_XPE Card Electrical Lines Settings

Purpose	This task changes the Electrical Lines settings for the GE_XPE card.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC • Set the Media Type as DS1 Over Ethernet in Provisioning > Ether Ports > Ethernet tab in DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings, page 11-356
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The Provisioning > Ether Ports > Electrical Lines tab is available in GE_XPE card view only, provided the PPM for GE_XPE port is created in FE mode.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XPE card where you want to change the Electrical Lines settings. The card view appears.

Step 2 Click the **Provisioning > Ether Ports > Electrical Lines** tabs. The Electrical Lines tab appear only when the ONS-SC-E1-T1-PW or ONS-SC-E3-T3-PW SFP is inserted.

Step 3 Modify any of the settings for the Electrical Lines > DS1 or Electrical Lines > DS3 tab as described in Table 11-154.

Table 11-154 GE_XPE Card Electrical Lines Settings

Parameter	Description	Card Mode	Options
Port	(Display only) The Port number (*n-n*) and rate.	• L2-over-DWDM • 10GE MXP • 20GE MXP	—
Port Name	(Display only) The port name.	• L2-over-DWDM • 10GE MXP • 20GE MXP	—
Clock Source	Sets the Clock Source	• L2-over-DWDM • 10GE MXP • 20GE MXP	Default: • Internal (for ONS-SC-E3-T3-PW) • Adaptive (for ONS-SC-E1-T1-PW) Options: • Loopback Timing • Internal • Adaptive

Table 11-154 GE_XPE Card Electrical Lines Settings (Continued)

Parameter	Description	Card Mode	Options
Line Type	Sets the Line Type	• L2-over-DWDM • 10GE MXP • 20GE MXP	Default: • C-BIT (for ONS-SC-E3-T3-PW ANSI) • Unframed (for ONS-SC-E3-T3-PW ETSI) • ESF (for ONS-SC-E1-T1-PW ANSI) • Framed (for ONS-SC-E1-T1-PW ETSI) Options: • G.751 (ETSI) • G.832 (ETSI) • C-BIT (ANSI) • ESF (ANSI) • M23 (ANSI) • Framed (ETSI) • Unframed (ETSI)
Line Coding	Sets the Line Coding	• L2-over-DWDM • 10GE MXP • 20GE MXP	Default: • B3ZS (for ONS-SC-E3-T3-PW ANSI) • HDB3 (for ONS-SC-E3-T3-PW ETSI) • B8ZS (for ONS-SC-E1-T1-PW ANSI) • HDB3 (for ONS-SC-E1-T1-PW ETSI) Options: • AMI (ETSI) • B3ZS (ANSI) • B8ZS (ANSI) • HDB3 (ETSI)
Line Length	(ANSI only) Sets the Line Length	• L2-over-DWDM • 10GE MXP • 20GE MXP	Defaults: • 0-225 ft (for ONS-SC-E3-T3-PW ANSI) • 266-399 ft (for ONS-SC-E1-T1-PW ANSI) Options (ANSI only): • 0-133 ft • 0-225 ft • 133-266 ft • 225-450 ft • 266-399 ft • 399-533 ft • 533-655 ft

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G381 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Layer 2 Protection Settings

Purpose	This task provisions the Layer 2 protection settings for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards when the cards are provisioned in L2-over-DWDM mode.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card must be in L2-over-DWDM mode. To change the card mode, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Note GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Layer 2 protection settings must be planned for the entire VLAN ring. One card in the ring is provisioned as the master card and one of its port is set to Blocking. The master card coordinates the protection switching for the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE in a VLAN ring.

Note You can choose to enable another card in the ring to be the master card. However, only one card in the ring can be provisioned as master card. Make sure that the provisioning settings on the card that was previously configured as the master are disabled as soon as another card is enabled as the master card. To perform this task complete the "DLP-G507 Enable a Different GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card as the Master Card" procedure on page 11-370

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the protection settings. The card view appears.

Step 2 Click the **Provisioning > Protection** tabs.

Step 3 In the Status column, modify the port protection status by clicking the appropriate table cell and choosing one of the following from the drop-down list:

- Forwarding—Forwards the Ethernet packets that are received by the port.
- Blocking—Blocks the Ethernet packets that are received by the port.

Note One port of the master card within a VLAN ring must be set to Blocking. All other ports must be set to Forwarding.

Step 4 Check the **Master** check box if you want the card to serve as the protection coordinator for the VLAN ring. If not, continue with Step 5.

Step 5 From the Protection drop-down list, choose one of the following:

- Enabled—Enables protection.
- Disabled—Disables protection.
- Forced—Converts all the SVLANs to protected SVLANs irrespective of the SVLAN protection configuration in the SVLAN database. This is applicable to a point-to-point linear topology. The SVLAN protection must be forced to move all SVLANs, including protected and unprotected SVLANs, to the protect path irrespective of provisioned SVLAN attributes.

Step 6 From the Hold Off Time drop-down list, choose one of the following:

- Disabled (default)—A FAPS switchover occurs immediately.
- 50 msec, 100 msec, 200 msec, 500 msec, 1 sec, 2 sec, or 5 sec—Holds off FAPS protection for the selected duration.

Note To get consistent results ensure Hold Off Time values are the same throughout the ring.

Note FAPS is an Layer 2 protection enabled on a VLAN. When a fiber fault occurs, Layer 1 protection is triggered immediately to restore the traffic. Setting the Hold Off Time option prevents Layer 2 FAPS protection from triggering at the same time as Layer 1 protection thereby avoiding traffic hits.

Step 7 Set the following parameters for FAPS switching with CRC errors:

a. Switch with CRC Alarm—Check this check box to enable FAPS switching with CRC errors.

b. CRC Threshold—Threshold for CRC error count. The default CRC threshold value is 10(-e)2. The available options are 10(-e)2, 10(-e)3, and 10(-e)4.

c. CRC Soak Count—Number of times the CRC error rate exceeds the CRC threshold value before raising the DATA-CRC alarm. The default CRC Soak Count is 10. The valid range is from 3 to 10.

d. CRC Poll Interval—Time interval (in seconds) between the successive polls. The default CRC Poll Interval is 60 seconds.

   For example, if the CRC Threshold value = 10(-e)2, CRC Soak Count = 10, and CRC Poll Interval = 60 seconds, then FAPS occurs when the incoming CRC error rate is more than 10(-e)2 continuously across 10 poll intervals (10*60 = 600 seconds).

e. Clear/Supress CRC Alarm—Uncheck the **Clear/Supress CRC Alarm** check box for FAPS to occur. If you check this check box, the DATA-CRC alarm gets cleared and FAPS does not occur.

Note As along as the **Clear/Supress CRC Alarm** checkbox is checked, the DATA-CRC alarm is not raised on that port and FAPS does not occur.

Note For consistent result, ensure that all the values that are set in Step 7 are same throughout the ring.

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G507 Enable a Different GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card as the Master Card

Purpose	This task provisions another GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card on a stable VLAN ring, to be the master card when the cards are provisioned in L2-over-DWDM mode.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC DLP-G381 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Layer 2 Protection Settings, page 11-368
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card must be in L2-over-DWDM mode. To change the card mode, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Note Do not attempt to change the master card when there is a failure in the FAPS ring.

Note GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Layer 2 protection must be enabled for the entire VLAN ring. One card in the ring is provisioned as the master card and one of its port is set to Blocking. The master card coordinates the protection switching for the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards in a VLAN ring.

Note You can choose to enable another card in the ring to be the master card. However, only one card in the ring can be provisioned as master card. Make sure that the provisioning settings on the card that was previously configured as the master are disabled as soon as another card is enabled as the master card.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card in a VLAN ring where you want to enable master card provisioning. The card view appears. Perform the following steps:

a. Click the **Provisioning** > **Protection** tabs.

b. From the Status drop-down list, choose **Blocking** for a trunk port.

Note One port of the master card within a VLAN ring must be set to Blocking. All other ports must be set to Forwarding.

c. Check the **Master** check box for the card that serves as the protection coordinator for the VLAN ring.

d. From the Protection drop-down list, choose **Enabled**.

e. Click **Apply**.

Step 2 The master card provisioning on the other card must be disabled. Perform the following steps:

a. Click the **Provisioning > Protection** tabs.

b. Uncheck the **Master** check box for the card where Master node provisioning must be disabled.

c. Click **Apply**.

d. From the Protection drop-down list, choose **Disabled**.

e. Click **Apply**.

Step 3 The protection on the card that was disabled in Step 2 must be enabled again. Perform the following steps:

a. Click the **Provisioning > Protection** tabs.

b. From the Protection drop-down list, choose **Enabled**.

c. Click **Apply**.

d. From the Status drop-down list, choose **Forwarding** on both ports.

e. Click **Apply**.

Step 4 Return to your originating procedure (NTP).

DLP-G382 Add and Remove SVLANS to/from GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE NNI Ports

Purpose	This task adds or removes service provider VLAN (SVLAN) provisioning to/from GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE ports. This task only applies to GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards in L2-over- DWDM mode.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC DLP-G421 Create and Store an SVLAN Database, page 17-69
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card must be in L2-over-DWDM mode. To change the card mode, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Note This task can only be performed on ports provisioned as NNI. See the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the SVLAN port settings. The card view appears.

Step 2 Click the **Provisioning > SVLAN** tabs.

Step 3 For each SVLAN shown in the table, click the check box under the Port [*port name*] table cell to include the SVLAN in that port. If you do not want the SVLAN included, uncheck the check box.

Note If no SVLANs appear in the SVLAN tab, complete the "DLP-G421 Create and Store an SVLAN Database" task on page 17-69.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G383 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Quality of Service Settings

Purpose	This task provisions the Weighted Round Robin (WRR) value and bandwidth for QoS Class of Service (CoS) egress queues on a GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card port.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card must be in L2-over-DWDM mode and the port must have QoS enabled. Refer to the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125 and the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356, if needed.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the QoS settings.

Step 2 Click the **Provisioning > QoS** tabs.

Step 3 In the Port field at the bottom of the window, choose the port where you want to provision the QoS settings.

Step 4 For each CoS egress queue, 0 through 7, define the following:

- WRR weight—sets the Weighted Round Robin (WRR) level for the CoS egress queue. The default is 1. The range is 0 to 15, where 0 is Strict Priority.)

Note The GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE define a set of eight queues, one queue for each CoS. Only one of the queues can be assigned the 0 WRR weight (Strict Priority).

- Bandwidth—sets the bandwidth allocated for the CoS egress queue, 100 is the default. This bandwidth value is the percentage (%) of bandwidth with respect to the SFP, XFP, or port speed (100 Mbps for FE, 1 Gbps for GE, and 10 Gbps for 10GE) of the interface.

Step 5 Click **Apply**. Click **Yes** in the confirmation dialog box.

Step 6 Return to your originating procedure (NTP).

DLP-G470 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Class of Service (CoS) Settings

Purpose	This task provisions Class of Service (CoS) settings on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card must be in L2-over-DWDM mode and the port must be in OOS state.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the CoS settings.

Step 2 Complete the following task:

- Refer to the Ingress CoS section in the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356

Step 3 Return to your originating procedure (NTP).

DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings

Purpose	This task provisions the IEEE 802.1QinQ VLAN tags on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card UNI ports. QinQ tags expand the VLAN capability by tagging the tagged packets to produce a "double-tagged" Ethernet frame. For service providers the expanded VLAN allows specific services to be provided on specific VLANs for specific customers, while other types of services can be provided to other customers on other VLANs.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC DLP-G421 Create and Store an SVLAN Database, page 17-69
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE must be in L2-over-DWDM mode. To change the card mode, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Note This task can only be performed on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards UNI ports. (To provision the port Ethernet parameters, see the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.)

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the QinQ settings.

Step 2 Click the **Provisioning > QinQ** tabs.

Step 3 Click the **Port** field and choose the port where you want to provision QinQ.

Channel groups configured in UNI mode appear in the Port field along with the physical ports.

Step 4 Click the **Mode** field and choose one of the following modes from the drop-down list:

- Selective—The incoming Ethernet packet is checked against the CVLAN and SVLAN table. If the CVLAN is not found, the packet is dropped. If you choose Selective, add an entry in the QinQ tab to map the administrative CVLAN to the SVLAN (if it is not same as the one used for data).
- Transparent—All incoming packets are transported with the additional VLAN chosen in the SVLAN field. If you choose transparent, the traffic on administrative CVLAN will pass through.

Step 5 Click the **BPDU** field and choose one of the following bridge protocol data unit (BPDU) modes from the drop-down list:

- Drop (default)—If checked, drops incoming packets with any of the following destination MAC addresses. The BPDU default can be applied for any UNI port.
  - 01-80-c2-00-00-00—IEEE 802.1D
  - 01-80-c2-00-00-02—Link Aggregation Control Protocol (LACP)

  - 01-80-0c-cc-cc-cc—VLAN Spanning Tree Plus (PVST+)
  - 01-00-c-cc-cc-cc—Cisco Discovery Protocol (CDP) type 0x2000, VLAN Trunk Protocol (VTP) type 0x2003, Port Aggregation Protocol (PAgP), type 0x0104, Uni-Directional Link Detection (UDLD) type 0x111, Dynamic Trunking Protocol (DTP) type 0x2004
- Tunnel—If checked, transparently sends any of the destination MAC addresses listed above.

Step 6 If the Mode was set to Selective, complete the following steps. If not, continue with Step 7.

a. To add a row, click **Add**.

b. Click the **CVLAN** table and type in the CVLAN range. You can enter a single value or a range using "–" between the two ends of the range.

Note If you are using Software Release 8.5 or earlier, it is recommended that you do not specify a CVLAN range due to certain limitations in the feature.

c. Click the **SVLAN** table cell and choose an SVLAN from the drop-down list.

d. Click the **Operation** table cell and choose an operation:

  - Add (default)—Adds the SVLAN on top of the CVLAN. The operation default can be applied for any UNI port.
  - Translate—CVLAN is translated with the SVLAN value.
  - Double Add—(GE_XPE and 10GE_XPE cards only) Adds an inner and an outer SVLAN to double tagged packets only. CVLAN settings are not required. If this double tagged selective operation is present on a port, no other selective operation can be present.
  - Translate Add—(GE_XPE and 10GE_XPE cards only) CVLAN gets translated to inner SVLAN and the SVLAN is added.

Note If Double Add and Translate Add are configured on a GE_XP or a 10GE_XP card, a PROV-MISMATCH alarm is raised. Until this alarm is cleared, provisioning on the card is not possible.

Note A CVLAN with a value of 0 means "untagged packet".

Note Two or more CVLANs cannot be translated over the same SVLAN.

e. (GE_XPE and 10GE_XPE cards only) Click the **COS** table cell and choose a value from the drop down list.

f. Click **Apply**.

g. Continue with Step 10.

Step 7 If the Mode was set to Transparent, in the SVLAN field, choose the SVLAN to be added to incoming packets.

Step 8 Click DSCP-Cos mapping Table to provision CoS based on DSCP for each port.

Step 9 For each DSCP, choose a CoS value from 0 to 7 and click **OK**.

Step 10 Return to your originating procedure (NTP).

DLP-G221 Enable MAC Address Learning on SVLANs for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This task enables MAC address learning on SVLANS for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	VLANs must already be created on the selected card.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable MAC Address Learning. If you are already logged in, continue with Step 2.

Step 2 Complete the following tasks, as needed:

- DLP-G460 Enable MAC Address Learning on SVLANs for GE_XPE or 10GE_XPE Cards Using CTC, page 11-376
- NTP-G226 Enable MAC Address Learning on SVLANs for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI

Stop. You have completed this procedure.

DLP-G460 Enable MAC Address Learning on SVLANs for GE_XPE or 10GE_XPE Cards Using CTC

Purpose	This task enables MAC address learning on SVLANs attached to the port of a GE_XPE or 10GE_XPE card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode, page 11-125
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XPE or 10GE_XPE card must be in L2-over-DWDM mode. Refer to the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125 if needed.

Note MAC address learning is applicable only for GE_XPE and 10GE_XPE cards. If MAC address learning is configured on a GE_XP or a 10GE_XP card, a PROV-MISMATCH alarm is raised. Until this alarm is cleared, provisioning on the card is not possible.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XPE or 10GE_XPE card where you want to enable MAC address learning.

Step 2 Enable MAC address learning on the port. Perform the following steps:

a. Click **Provisioning > Ethernet**.

b. Check the **MAC Learning** check box.

Note If the per port MAC address learning is configured on a GE_XP or 10 GE_XP cards, before upgrading to a GE_XPE or 10 GE_XPE card, enable MAC address learning per SVLAN. Not doing so disables MAC address learning.

Step 3 Enable MAC address learning on the SVLAN attached to the port. Perform the following steps:

a. Click **SVLAN > SVLAN DB** tabs.

b. Click **Load**. This loads an SVLAN database from a network node or local file and replaces any SVLANs that are in the network view VLAN DB table.

c. Check the **MAC Learning** check box related to the SVLAN (one or more than one SVLAN) to be configured with MAC address learning.

d. Click **Store**. This records and enables the new configuration.

Step 4 Return to your originating procedure (NTP).

DLP-G385 Provision the MAC Filter Settings for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card

Purpose	This task provisions the MAC address filter for the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards when the cards are provisioned in L2-over-DWDM mode. The MAC address filter is a list of MAC addresses whose packets should be accepted or dropped.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card must be in L2-over-DWDM mode. To change the card mode, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the MAC filter settings.

Step 2 Click the **Provisioning > Security > MAC Filter** tabs.

Step 3 Click the port for which you want to create a MAC filter.

Step 4 Click **Edit**.

Step 5 In the Edit MAC Address dialog box, click **Add**. A new table entry appears with the MAC address 00-00-00-00-00-00.

Step 6 In the MAC Address Port field, type in the MAC address you want to filter over the default 00-00-00-00-00-00 address.

Step 7 If you want to add more MAC addresses, repeat Steps 5 and 6. (Up to eight MAC addresses can be added for each port.) If not, click **OK**.

Step 8 On the MAC Filter table, provision the Allowed check box:

- Checked—All MAC addresses different from the address(es) entered in the table will be dropped.
- Unchecked—All MAC addresses matching the address(es) entered in the table will be dropped.

Step 9 Click **Apply**.

Step 10 Repeat Steps 3 through 9 for each port of the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card that you want to set up.

Step 11 Return to your originating procedure (NTP).

NTP-G237 Retrieve and Clear MAC Addresses on SVLANs for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This procedure retrieves and clears MAC addresses learned on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	• DLP-G46 Log into CTC • DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode, page 11-125 • DLP-G221 Enable MAC Address Learning on SVLANs for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards, page 11-376
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Caution Retrieving and clearing learned MAC addresses are CPU intensive and traffic affecting. You must clear the MAC addresses only during a scheduled maintenance window.

Note It is not possible to simultaneously retrieve learned MAC addresses from both CTC and TL1 interfaces.

Step 1 In the node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to retrieve the MAC addresses.

Step 2 To retrieve the MAC addresses learned, perform the following steps:

a. Click **Maintenance > MAC Addresses > Learned**.

b. In the SVLAN field, type a valid SVLAN range. The SVLAN range is from 1 to 4093.

c. Click **Refresh**.

The table displays the following fields:

- MAC Address—Displays the MAC address for the port.
- VLAN—Displays the VLAN identifier for the port.
- Port—Displays the port number.

Right-click the column heading to display the following options:

- Row Count—Displays the number of learned MAC addresses retrieved.
- Sort Column—Sorts the table by the column's values.
- Hide Column—Hides the column from view.
- Reorder Columns Visibility—Displays all hidden columns.

Step 3 Click **Refresh** to refresh the list of MAC addresses learned.

Step 4 Click **Clear** to clear the MAC addresses learned on all the SVLANS of the card.

Note It is not possible to delete the MAC addresses learned on a per SVLAN basis.

Step 5 To view card MAC addresses, complete the "DLP-G546 View Card MAC Addresses on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards" task on page 11-379.

Stop. You have completed this procedure.

DLP-G546 View Card MAC Addresses on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This task allows you to view the MAC addresses for each client and trunk port and the CPU port of the card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 To view the card MAC addresses, click **Maintenance > MAC Addresses > Card**. The MAC addresses for each client and trunk port and the CPU port are displayed.

The table displays the following fields:

- Port—Displays the port number.
- MAC Address—Displays the MAC address for the port.

Step 2 Return to your originating procedure.

NTP-G311 Provision the Storm Control Settings for GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This task provisions the storm control settings for the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards when the cards are provisioned in L2-over-DWDM mode.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note To perform this task, the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card must be in L2-over-DWDM mode. To change the card mode, complete the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the storm control settings.

Step 2 Click the **Provisioning > Security > Storm Control** tabs.

Step 3 Modify any of the settings as described in Table 11-155.

Table 11-155 Storm Control Settings

Parameter	Description	Options
Port	(Display only) The Port number (*n-n*) and rate (GE or TEN_GE).	
DLF Storm Control	Enables or disables DLF storm control on the card.	• Checked—DLF storm control is enabled. • Unchecked—DLF storm control is disabled.
DLF Storm Control Threshold (pps)	Threshold value to set the number of unknown unicast packets per second.	Range: 0 to 16777215 packets per second

Table 11-155 Storm Control Settings

Parameter	Description	Options
Mcast Storm Control	Enables or disables Multicast storm control on the card.	• Checked—Multicast storm control is enabled. • Unchecked—Multicast storm control is disabled.
Mcast Storm Control Threshold (pps)	Threshold value to set the number of multicast packets per second.	Range: 0 to 16777215 packets per second
Bcast Storm Control	Enables or disables Broadcast storm control on the card.	• Checked—Broadcast storm control is enabled. • Unchecked—Broadcast storm control is disabled.
Bcast Storm Control Threshold (pps)	Threshold value to set the number of broadcast packets per second.	Range: 0 to 16777215 packets per second

Step 4 Click **Apply**.

Stop. You have completed this procedure.

NTP-G205 Enable Link Integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This task enables link integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable link integrity. If you are already logged in, continue with Step 2.

Step 2 Complete the following tasks, as needed:

- DLP-G509 Enable Link Integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using CTC, page 11-382
- NTP-G216 Enable Link Integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI

Stop. You have completed this procedure.

DLP-G509 Enable Link Integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using CTC

Purpose	This task enables link integrity on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 From the View menu, choose **Go to Network View**.

Step 2 Create or load an SVLAN profile. To create a SVLAN profile see the DLP-G471 Create a SVLAN or CVLAN Profile, page 11-385.

Note Make sure the **Link Integrity** check box is selected to enable link integrity for a profile and save it to the node.

Step 3 Associate the SVLAN profile (with Link Integrity enabled) to a SVLAN on a port. To do this perform the following steps:

a. In node view (single-shelf mode), or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card. The card view appears.

b. Click the **Provisioning > Profiles Mapping > SVLAN** tabs.

c. Enter the SVLANs or SVLAN range in the **SVLAN to View** text box.

   A table appears that displays SVLANs and available ports. The SVLAN profiles that was created must be applied to a SVLAN and a port. However, make sure the SVLAN has already been associated with the port via the QinQ tab (For information on how to associate a SVLAN to a port, see the "DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings" task on page 11-374).

d. Select the SVLAN for a port and choose the available SVLAN profile from the drop-box.

e. Click **Apply**.

Step 4 AIS action must be set on a per-UNI port basis. Select **None** or **Squelch** from the AIS action drop-down list. For detailed instructions, see the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Step 5 Return to your originating procedure (NTP).

NTP-G289 Provision CVLAN Rate Limiting on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card

Purpose	This task provisions CVLAN rate limiting on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note You cannot provision CVLAN rate limiting on channel groups.

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to provision CVLAN rate limiting. If you are already logged in, continue with Step 2.

Step 2 From the View menu, choose **Go to Network View**.

Step 3 Create or load a CVLAN profile by setting Committed Info Rate, Committed Burst, Excess Info, Excess Burst. To create a CVLAN Profile see the "DLP-G471 Create a SVLAN or CVLAN Profile" task on page 11-385.

Step 4 Associate the CVLAN profile to a CVLAN on a UNI port. To do this perform the following steps:

a. In node view (single-shelf mode), or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card. The card view appears.

b. Click the **Provisioning > Profiles Mapping > CVLAN** tabs.

c. Enter the CVLANs or CVLAN range in the **CVLANS to View** text box.

A table appears that displays CVLANs and available ports. The CVLAN profiles that were created must be applied to a CVLAN and port. However, make sure the CVLAN has already been associated with the port via the QinQ tab (For information on how to associate a CVLAN profile to a UNI port, see the "DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings" task on page 11-374).

d. Select the CVLAN for a given port and choose the available CVLAN profile from the drop-down list.

e. Click **Apply**.

Stop. You have completed this procedure.

NTP-G208 Provision SVLAN Rate Limiting on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card

Purpose	This task provisions SVLAN rate limiting on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable SVLAN rate limiting. If you are already logged in, continue with Step 2.

Step 2 Complete the following tasks, as needed:

- DLP-G515 Provision SVLAN Rate Limiting on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Using CTC, page 11-384
- NTP-G225 Provision SVLAN Rate Limiting on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Using PCLI

Stop. You have completed this procedure.

DLP-G515 Provision SVLAN Rate Limiting on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Using CTC

Purpose	This task provisions SVLAN rate limiting on the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 From the View menu, choose **Go to Network View**.

Step 2 Create or load a SVLAN profile by setting Committed Info Rate, Committed Burst, Excess Info, Excess Burst. To create a SVLAN Profile see the "DLP-G471 Create a SVLAN or CVLAN Profile" task on page 11-385.

Step 3 Associate the SVLAN profile to a SVLAN on a port. To do this, perform the following steps:

a. In node view (single-shelf mode), or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card. The card view appears.

b. Click the **Provisioning > Profiles Mapping > SVLAN** tabs.

c. Enter the SVLANs or SVLAN range in the **SVLAN to View** text box.

A table appears that displays SVLANs and available ports. The SVLAN profiles that were created must be applied to a SVLAN and port. However, make sure the SVLAN has already been associated with the port via the QinQ tab (For information on how to associate a SVLAN profile to a UNI port, see the "DLP-G384 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE QinQ Settings" task on page 11-374 and to a NNI port see the "DLP-G382 Add and Remove SVLANS to/from GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE NNI Ports" task on page 11-371).

d. Select the SVLAN for a given port and choose the available SVLAN profile from the drop-down list.

e. Click **Apply**.

Stop. You have completed this procedure.

DLP-G471 Create a SVLAN or CVLAN Profile

Purpose	This task creates an SVLAN profile.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note You cannot associate SVLAN or CVLAN profiles to channel groups. You can associate a CVLAN profile only to a UNI port.

Step 1 From the View menu, choose **Go to Network View**.

Step 2 Click the **Provisioning > SVLAN > Profiles** tabs.

Step 3 Click **Add** and a profile is added to the Profiles tab. Modify any of the settings as follows:

- Name—The profile name can be up to 32 alphanumeric/special characters.
- Committed Info Rate—Sets the guaranteed information rate as provided by the service provider service-level agreement. The default value is 100 and the range is 0 to 100 percent.
- Committed Burst—Sets the maximum number of bits that will be transferred per second.
- Peak Info Rate—Sets the maximum information rate as provided by the service provider service-level agreement. The default value is 100 and the range is 0 to 100 percent. However, the value must be greater or equal to than the Committed Info Rate.
- Peak Burst Size—The maximum number of bits that are credited for later transfer in the event the committed burst rate cannot be transmitted.
- Link Integrity—Enables link integrity for the SVLAN profile. Do not check this check box if you are creating a CVLAN profile.

Note When you set the Committed Info Rate above 40% on 10GE_XP and 10GE_XPE cards, the Committed Burst Size and Excess Burst Size must be set to at least 32K. The Committed Burst Size and Excess Burst Size can be increased based on the packet size and Committed Info Rate value.

Step 4 Click **Store**.

Step 5 In the Store Profile(s) dialog box, choose one of the following:

- To Node(s)—Stores the SVLAN profile at one or more network nodes. Choose the network nodes where you want to store the SVLAN profile. To choose more than one node, press the Shift key, or click Select All.
- To File—Stores the SVLAN profile in a file. Enter a file name, then click Browse to navigate to a local or network drive where you want to store the file.

Step 6 Click **OK**.

Step 7 Return to your originating procedure (NTP).

NTP-G204 Enable IGMP Snooping on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards

Purpose	This procedure enables Internet Group Management Protocol (IGMP) snooping on a per-SVLAN basis on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable IGMP snooping. If you are already logged in, continue with Step 2.

Step 2 Complete the following tasks, as needed:

- "DLP-G511 Enable IGMP Snooping, IGMP Fast Leave and IGMP Report Suppression on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using CTC" task on page 11-387.
- NTP-G220 Enable IGMP Snooping on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI.
- NTP-G217 Enable IGMP Fast-Leave Processing on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI.
- NTP-G219 Enable IGMP Report Suppression on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI.

Stop. You have completed this procedure.

DLP-G511 Enable IGMP Snooping, IGMP Fast Leave and IGMP Report Suppression on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using CTC

Purpose	This procedure explains how to enable IGMP snooping, IGMP fast leave and IGMP report suppression on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards using CTC.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 From the View menu, choose **Go to Network View**.

Step 2 Click the **Provisioning > SVLAN > SVLAN DB** tabs. Click **Load** to load the SVLANs on the card where IGMP must be enabled.

Step 3 For each SVLAN shown in the table, select the following:

- IGMP—Check the IGMP check box to enable IGMP for the selected SVLAN.
- IGMP Fast Leave—Checking the IGMP Fast Leave causes the switch to immediately remove a port from the IP multicast group when it detects an IGMP, version 2 (IGMPv2) leave message on that port.
- IGMP Suppression—Check the IGMP Suppression check box to enable a single IGMP report to be sent to each multicast group in response to a single query.

Step 4 Click **Store SVLAN DB**.

Step 5 In the Store SVLAN DB dialog box, choose one of the following:

- To Node/Shelf/Card—Select the node and shelf. All the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards in L2 over DWDM mode are displayed. Select the card where you want to store the SVLAN DB.
- Stores the SVLAN database at one or more network nodes. Choose the network nodes where you want to store the SVLAN database. To choose more than one node, press the Shift key, or click **Select All**.
- To File—Stores the SVLAN database in a file. Enter a file name, then click **Browse** to navigate to a local or network drive where you want to store the file.
- Select the card on which you want to save the changes made in step 3.

Step 6 Click **OK**.

Note If you want to add the multicast-capable ports to the forwarding table for every IP multicast, select the IGMP Static Router Port check box as described in the "DLP-G380 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Ethernet Settings" task on page 11-356.

Stop. You have completed this procedure.

NTP-G206 Enable MVR on a GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card

Purpose	This procedure enables Multicast VLAN Registration (MVR) on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	None
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to enable IGMP snooping. If you are already logged in, continue with Step 2.

Step 2 Complete the following tasks, as needed:

- "DLP-G513 Enable MVR on a GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Using CTC" task on page 11-388.
- NTP-G224 Enable MVR on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Cards Using PCLI.

Stop. You have completed this procedure.

DLP-G513 Enable MVR on a GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Using CTC

Purpose	This procedure enables Multicast VLAN Registration (MVR) on GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE cards using CTC.
Tools/Equipment	None
Prerequisite Procedures	DLP-G382 Add and Remove SVLANS to/from GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE NNI Ports, page 11-371
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to enable MVR. The card view appears.

Note At least one SVLAN must be configured on the card.

Step 2 Click the **Provisioning > MVR** tabs. The MVR Settings tab appears.

Step 3 Check the **Enabled** check box and enter the following information:

- IGMP CVLAN—Check box to enable IGMP snooping on CVLAN. This check box is enabled only when MVR is enabled through the Enabled check box.
- Multicast SVLAN—Select the MVR SVLAN ID. The default value is the SVLAN with the lowest ID configured on the card. The drop box lists all the SVLANs on the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card.

Note SVLAN selected here can not be used for UNI port, make sure that the corresponding SVLAN on the NNI port is checked.

- Multicast Address—Sets the specified multicast group address as the MVR multicast group. The default address is 239.255.255.255 and the range is 224.0.0.0 to 239.255.255.255. Except the subrange [224-239].[0/128].0.x.
- Count—Sets the range of any additional multicast group addresses. The default is 1, and range is 1 to 256.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G386 Provision the Gigabit Ethernet Trunk Port Alarm and TCA Thresholds

Purpose	This task changes the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card trunk port alarm and TCA thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards have two trunk ports. The GE_XP and GE_XPE trunk ports are 21-1 and 22-1 on the card graphic and 21 (Trunk) and 22 (Trunk) on the Optics Thresholds table. The 10GE_XP and 10GE_XPE card trunk ports are 3-1 and 4-1 on the card graphic and 3 (Trunk) and 4 (Trunk) on the Optics Thresholds table.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 3 If TCA is not selected, click **TCA** and then click **Refresh**. When TCA is selected, continue with Step 4.

Step 4 Verify the trunk port TCA thresholds are provisioned as shown in Table 11-156. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Table 11-156 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Trunk Interface TCA Thresholds

Pluggable Port Module (XFP)	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
XFP WDM no FEC	–7	–23	6	–4
XFP WDM standard FEC	–7	–27	6	–4
XFP WDM Enhanced FEC	–7	–27	6	–4

Step 5 Under Types, click the **Alarm** radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Step 6 Verify the trunk port alarm thresholds are provisioned as shown in Table 11-157. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Table 11-157 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Trunk Interface Alarm Thresholds

Pluggable Port Module (XFP)	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
XFP WDM no FEC	–5	–26	5	–3
XFP WDM standard FEC	–5	–30	5	–3
XFP WDM Enhanced FEC	–5	–30	5	–3

Step 7 Click **Apply**.

Step 8 Repeat Steps 3 through 7 to provision the second trunk port.

Step 9 Return to your originating procedure (NTP).

DLP-G387 Provision the Gigabit Ethernet Client Port Alarm and TCA Thresholds

Purpose	This task provisions the client port alarm and TCA thresholds for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G277 Provision a Multirate PPM, page 11-128 DLP-G46 Log into CTC
Required/As Needed	Required
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The GE_XP card has 20 client ports. The ports are 1-1 through 20-1 on the card graphic and 1 (Client) through 20 (Client) on the Optics Thresholds table. The 10GE_XP card has 2 client ports. The ports are 1-1 and 2-1 on the card graphic and 1 (Client) and 2 (Client) on the Optics Thresholds table.

Note The hardware device that plugs into a TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or ADM-10G card faceplate to provide a fiber interface to the card is called a Small Form-factor Pluggable (SFP or XFP). In CTC, SFPs and XFPs are called pluggable port modules (PPMs). SFPs/XFPs are hot-swappable input/output devices that plug into a port to link the port with the fiber-optic network. Multirate PPMs have provisionable port rates and payloads. For more information about SFPs and XFPs, see the "11.21 SFP and XFP Modules" section on page 11-119.

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the client port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs. The TCA thresholds are shown by default.

Step 3 If TCA is not selected, click **TCA** and then click **Refresh**. When TCA is selected, continue with Step 4.

Step 4 Verify the client port TCA thresholds are provisioned as shown in Table 11-158. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Table 11-158 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card Client Interface TCA Thresholds

Pluggable Port Module (XFP)	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
10GE LAN PHY 10GBASE-LR	1	–14	5	–12
1000Base-SX (1Gbps)[1]	0	–17	3	–16
1000Base-LX [1]	–3	–20	3	–16

1. Gigabit Ethernet client

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Step 5 Under Types, click the **Alarm** radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Step 6 Verify the client port Alarm thresholds are provisioned as shown in Table 11-159. Provision new thresholds as needed by double-clicking the threshold value you want to change, deleting it, entering a new value, and hitting **Enter**.

Table 11-159 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card Client Interface Alarm Thresholds

Pluggable Port Module (XFP)	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
10GE LAN PHY 10GBASE-LR	3	–16	1	–8
1000Base-SX (1Gbps)[1]	3	–20	–2	–12
1000Base-SX (2Gbps)[1]	3	–18	–2	–12
1000Base-LX [1]	0	–23	–1	–12

1. Gigabit Ethernet client

Step 7 Click **Apply**.

Step 8 Repeat Steps 3 through 7 to provision each additional client port.

Step 9 Return to your originating procedure (NTP).

DLP-G388 Change the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card RMON Thresholds

Purpose	This task changes the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card RMON threshold settings.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), display the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the RMON thresholds.

Step 2 Click the **Provisioning > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose an individual port, or choose **All** to provision RMON thresholds for all ports.

Step 5 From the Variable drop-down list, choose an Ethernet variable. See Table 11-160 for a list of available Ethernet RMON variables.

Note Variable descriptions were obtained from the following Internet Engineering Task Force (IETF) Requests for Comment (RFCs): RFC 3635, RFC 2233, and RFC 1757. Refer to the RFCs for additional information.

Table 11-160 Gigabit Ethernet RMON Variables

Variable	Description
rxTotalPkts	Total number of receive packets.
ifInUcastPkts	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were not addressed to a multicast or broadcast address at this sub-layer.
ifInMulticastPkts	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were addressed to a multicast address at this sub-layer. For a MAC layer protocol, this includes both Group and Functional addresses.
ifInBroadcastPkts	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were addressed to a broadcast address at this sub-layer.
ifInDiscards	The number of inbound packets which were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.
ifInOctets	Total number of octets received on the interface, including framing characters.
ifOutOctets	Total number of octets transmitted out of the interface, including framing characters.
txTotalPkts	Total number of transmitted packets.
ifOutMulticastPkts	The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both group and functional addresses.
ifOutBroadcastPkts	The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a broadcast address at this sub-layer, including those that were discarded or not sent.
ifOutDiscards	The number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.
IfOutErrors	Number of outbound packets or transmission units that could not be transmitted because of errors.
dot3StatsFCSErrors	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
dot3StatsFrameTooLong	A count of frames received on a particular interface that exceed the maximum permitted frame size.
dot3ControlInUnknownOpCode	A count of MAC control frames received on this interface that contain an opcode that is not supported by this device.
dot3InPauseFrames	A count of MAC control frames received on this interface with an opcode indicating the PAUSE operation.
dot33StatsFCSErrors	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.

Table 11-160 Gigabit Ethernet RMON Variables (Continued)

Variable	Description
dot3StatsFrameTooLong	A count of frames received on a particular interface that exceed the maximum permitted frame size.
dot3ControlInUnknownOpCode	A count of MAC control frames received on this interface that contain an opcode that is not supported by this device.
dot3InPauseFrames	A count of MAC control frames received on this interface with an opcode indicating the PAUSE operation.
dot3OutPauseFrames	A count of MAC Control frames transmitted on this interface with an opcode indicating the PAUSE operation.
etherStatsCRCAlignErrors	Total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
etherStatsUndersizePkts	The total number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsFragments	The total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral.
etherStatsPkts	The total number of packets (including bad packets, broadcast packets, and multicast packets) received.
etherStatsPkts64Octets	The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
etherStatsPkts65to127Octets	The total number of packets (including error packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts128to255Octets	The total number of packets (including error packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts256to511Octets	The total number of packets (including error packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts512to1023Octets	The total number of packets (including error packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts1024to1518Octets	The total number of packets (including error packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts1519to1522Octets	The total number of packets (including error packets) received that were between 1519 and 1522 octets in length inclusive (excluding framing bits but including FCS octets). **Note** This variable is supported only on client ports.
etherStatsBroadcastPkts	The total number of good packets received that were directed to the broadcast address
etherStatsMulticastPkts	The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
etherStatsOversizePkts	The total number of packets received that were longer than 1518 octets (for untagged packets) or 1522 octets (for tagged packets) (excluding framing bits, but including FCS octets) and were otherwise well formed.

Table 11-160 Gigabit Ethernet RMON Variables (Continued)

Variable	Description
etherStatsJabbers	The total number of packets received that were longer than 1518 octets (for untagged packets) or 1522 octets (for tagged packets) (excluding framing bits, but including FCS octets), and were not an integral number of octets in length or had a bad FCS.
etherStatsOctets	The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets).

Step 6 From the Alarm Type drop-down list, indicate whether the event will be triggered by the rising threshold, the falling threshold, or both the rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Type in an appropriate number of seconds for the Sample Period.

Step 9 Type in the appropriate number of occurrences for the Rising Threshold.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Step 12 To view all RMON thresholds, click **Show All RMON thresholds**. If not, continue with Step 12

Step 13 Return to your originating procedure (NTP).

DLP-G389 Change the Gigabit Ethernet Optical Transport Network Settings

Purpose	This task changes the optical transport network (OTN) settings for the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs, then choose one of the following subtabs: **OTN Lines**, **G.709 Thresholds**, **FEC Thresholds**, or **Trail Trace Identifier**.

Step 3 Modify any of the settings described in Tables 11-161 through 11-164.

Note You must modify Near End and Far End; 15 Min and 1 Day; and SM and PM independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-161 describes the values on the Provisioning > OTN > OTN Lines tab.

Table 11-161 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card OTN Line Settings

Parameter	Description	Options
Port	(Display only) Port number and description:	3 (Trunk) and 4 (Trunk). 10GE_XP and 10GE_XPE cards 21 (Trunk) and 22 (Trunk). GE_XP and GE_XPE cards
ITU-T G.709 OTN	Sets the OTN lines according to ITU-T G.709.	• Enable • Disable
FEC	Sets the OTN lines to forward error correction (FEC).	• Standard • Enhanced
SF BER	(Display only) Sets the signal fail bit error rate.	• 1E-5
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9

Table 11-162 describes the values on the Provisioning > OTN > ITU-T G.709 Thresholds tab.

Table 11-162 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card ITU-T G.709 Threshold Settings

Parameter	Description	Options
Port	(Display only) Port number and description:	3 (Trunk) and 4 (Trunk). 10GE_XP and 10GE_XPE cards 21 (Trunk) and 22 (Trunk). GE_XP and GE_XPE cards
ES	Errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.

Table 11-162 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card ITU-T G.709 Threshold Settings

Parameter	Description	Options
SES	Severely errored seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
UAS	Unavailable seconds	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
BBE	Background block errors	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.
FC	Failure counter	Numeric. Can be set for Near End or Far End, for 15-minute or one-day intervals, or for SM (OTUk) or PM (ODUk). Select a bullet and click **Refresh**.

Table 11-163 describes the values on the Provisioning > OTN > FEC Threshold tab.

Table 11-163 GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE Card FEC Threshold Settings

Parameter	Description	Options
Port	(Display only) Port number and description:	3 (Trunk) and 4 (Trunk). 10GE_XP and 10GE_XPE cards 21 (Trunk) and 22 (Trunk). GE_XP and GE_XPE cards
Bit Errors Corrected	Sets the value for bit errors corrected.	Numeric. Can be set for 15-minute or one-day intervals.
Uncorrectable Words	Sets the value for uncorrectable words.	Numeric. Can be set for 15-minute or one-day intervals.

Table 11-164 describes the values on the Provisioning > OTN > Trail Trace Identifier tab.

Table 11-164 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPECard Trail Trace Identifier Settings

Parameter	Description	Options
Port	(Display only) Port number.	2
Level	Sets the level.	• Section • Path
Received Trace Mode	Sets the trace mode.	• Off/None • Manual

Table 11-164 GE_XP, 10GE_XP, GE_XPE, and 10GE_XPECard Trail Trace Identifier Settings

Parameter	Description	Options
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Disable FDI on TTIM	If a Trace Identifier Mismatch on Section overhead alarm arises because of a J0 overhead string mismatch, no Forward Defect Indication (FDI) signal is sent to the downstream nodes if this box is checked.	• Checked (FDI on TTIM is disabled) • Unchecked (FDI on TTIM is not disabled)
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

NTP-G314 Add a GE_XP or 10GE_XP Card on a FAPS Ring

Purpose This procedure adds a GE_XP or 10GE_XP card on a FAPS ring.

Tools/Equipment Installed GE_XP or 10GE_XP cards.

Prerequisite Procedures	DLP-G46 Log into CTC "NTP-G15 Install the Common Control Cards" in the *Cisco CPT and Cisco ONS 15454 Hardware Installation Guide* NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode, page 11-125
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to add a GE_XP or 10GE_XP card on a FAPS ring. If you are already logged in, continue with Step 2.

Step 2 Perform any of the following tasks as needed:

- DLP-G687 Add a GE_XP or 10GE_XP Card Facing Master Card on a FAPS Ring, page 11-399
- DLP-G688 Add a GE_XP or 10GE_XP Card Between the Slave Cards on a FAPS Ring, page 11-400

Stop. You have completed this procedure.

DLP-G687 Add a GE_XP or 10GE_XP Card Facing Master Card on a FAPS Ring

Purpose	This procedure adds a GE_XP or 10GE_XP card that faces the master card on a FAPS ring.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to add a GE_XP or 10GE_XP card on a FAPS ring.

Step 2 Verify that the GE_XP or 10GE_XP card is installed according to the requirements specified in Table 14-7 on page 14-109.

Step 3 Insert the new GE-XP card with XFP on the slot.

Step 4 Change the GE_XP card mode to L2-over-DWDM. See the "DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode" task on page 11-125.

Step 5 Create and store an SVLAN database on the new GE_XP card. See the DLP-G421 Create and Store an SVLAN Database, page 17-69.

Step 6 Enable FAPS protection on the new card.

Step 7 Attach SVLAN to the trunk ports of the new card.

Step 8 Choose OOS,DSBLD from the Admin State column for port 22 on the master card that is facing toward the new card. This action places port 22 in the blocking state and port 21 in the forwarding state.

FAPS configuration mismatch alarm is raised on the master card.

Step 9 Switch the traffic to the protect path.

Step 10 Choose OOS,DSBLD from the Admin State column for port 21 on the slave card that is facing toward the new card.

Step 11 Connect the fiber from the slave card (that is facing toward the new card) to the new card in segment B.

Step 12 Connect the fiber from the master card to the new card in segment A.

Step 13 Choose IS from the Admin State column for port 21 on the slave card that is facing toward the new card.

Step 14 Choose IS from the Admin State column for port 22 on the new card to bring up segment B.

Step 15 Choose IS from the Admin State column for port 21 on the new card.

Note The FAPS state of the new card will be in the forwarding state for both the ports and port 21 of the slave card will be in the blocking state.

Step 16 Choose IS from the Admin State column for port 22 on the master card to bring up segment A.

Note The FAPS state of port 21 on the master card will be in the blocking state and port 22 will be in the forwarding state. The trunk ports of the remaining GE_XP cards will be in the forwarding state. The port 21 of the slave card (that is facing toward the new card) will change to the forwarding state.

Step 17 Return to your originating procedure (NTP).

DLP-G688 Add a GE_XP or 10GE_XP Card Between the Slave Cards on a FAPS Ring

Purpose	This procedure adds a GE_XP or 10GE_XP card between the two slave cards on a FAPS ring.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to add a GE_XP or 10GE_XP card on a FAPS ring.

Step 2 Verify that the GE_XP or 10GE_XP card is installed according to the requirements specified in Table 14-7 on page 14-109.

Step 3 Insert the new GE-XP card with XFP on the slot.

Step 4 Change the GE_XP card mode to L2-over-DWDM. See the DLP-G379 Change the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Card Mode, page 11-125.

Step 5 Create and store an SVLAN database on the new GE_XP card. See the DLP-G421 Create and Store an SVLAN Database, page 17-69.

Step 6 Attach SVLAN to the trunk ports of the new card.

Step 7 Choose OOS,DSBLD from the Admin State column for port 22 on both the slave cards that are facing toward the new card.

Step 8 Connect the fiber from the slave card to the new card in segment B.

Step 9 Connect the fiber from the master card to the new card in segment A.

Step 10 Choose IS from the Admin State column for port 22 on the slave card.

Step 11 Choose IS from the Admin State column for port 22 on the new card to bring up segment B.

Step 12 Choose IS from the Admin State column for port 21 on the new card.

Step 13 Choose IS from the Admin State column for port 21 on the slave card to bring up segment A.

Step 14 Return to your originating procedure (NTP).

NTP-G197 Provision the OTU2_XP Card Line Settings, PM Parameters, and Thresholds

Purpose	This procedure changes line settings, PM parameters, and threshold setting for the OTU2_XP card.
Tools/Equipment	None
Prerequisite Procedures	NTP-G179 Install the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP Cards, page 14-69 DLP-G63 Install an SFP or XFP, page 14-72 DLP-G452 Change the OTU2_XP Card Mode, page 11-127
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 Complete the "DLP-G46 Log into CTC" task at the node where you want to change the card settings. If you are already logged in, continue with Step 2.

Step 2 As needed, complete the "NTP-G103 Back Up the Database" procedure on page 24-2 to preserve the existing transmission settings.

Step 3 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card.

Step 4 Verify the card mode:

a. Display the OTU2_XP card in card view.

b. Click the **Provisioning > Card** tabs.

c. Verify that the card mode is set to the mode designated by your site plan:

– Transponder

- Standard Regen
- Enhanced FEC
- Mixed
- 10G Ethernet LAN Phy to WAN Phy

If the card mode is set correctly, continue with Step 6. If not, complete the "DLP-G452 Change the OTU2_XP Card Mode" task on page 11-127.

Step 5 Refer to the "11.16.5 OTU2_XP Card Configuration Rules" section on page 11-103 before performing any task listed in Step 6.

Step 6 Perform any of the following tasks as needed.

- DLP-G453 Change the OTU2_XP Card Settings, page 11-402
- DLP-G454 Change the OTU2_XP Line Settings, page 11-403
- DLP-G455 Change the OTU2_XP Line Section Trace Settings, page 11-407
- DLP-G456 Change the OTU2_XP Line Thresholds for SONET or SDH Payloads, page 11-408
- DLP-G457 Provision the OTU2_XP Port Alarm and TCA Thresholds, page 11-410
- DLP-G462 Change the OTU2_XP Line RMON Thresholds for the 10G Ethernet and 10G FC Payloads, page 11-412
- DLP-G458 Change the OTU2_XP OTN Settings, page 11-415
- DLP-G523 Change the OTU2_XP Path Trace Settings, page 11-421
- DLP-G524 Provision the OTU2_XP Path Settings for 10G Ethernet LAN Phy to WAN Phy Configuration, page 11-422

Stop. You have completed this procedure.

DLP-G453 Change the OTU2_XP Card Settings

Purpose	This task changes the card settings for the OTU2_XP card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the card settings.

Step 2 Click the **Provisioning > Card** tab.

Step 3 Modify any of the settings described in Table 11-165.

Table 11-165 OTU2_XP Card Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Card Configuration	Sets the card configuration.	• Transponder • Standard Regen • Enhanced FEC • Mixed • 10G Ethernet LAN Phy to WAN Phy	• Transponder • Standard Regen • Enhanced FEC • Mixed • 10G Ethernet LAN Phy to WAN Phy
Port Mode	Sets the port configuration when the card configuration is set as Mixed. For card configurations other than Mixed, this is a display-only parameter. You can configure Ports 2 and 4 as port mode, when the card is in 10G Ethernet LAN Phy to WAN Phy mode.	• Transponder • Standard Regen	• Transponder • Standard Regen
Termination Mode	Sets the mode of operation. (This option is only available for SONET/SDH payloads). For Standard Regen and Enhanced FEC card configurations, this is a display-only parameter.	• Transparent • Section • Line	• Transparent • Regeneration Section (RS) • Multiplex Section (MS)
Framing Type	(Display only) The card framing type, either SONET or SDH.	—	—
AIS/Squelch	Sets the transparent termination mode configuration.	• AIS • Squelch	• AIS • Squelch
Regen Line Name	Sets the regeneration line name.	—	—
ODU Transparency	Sets the ODU overhead byte configuration. For Transponder card configuration, this is a display-only parameter.	• Transparent Standard Use • Cisco Extended Use	• Transparent Standard Use • Cisco Extended Use
Proactive Protection Regen	Enables or disables the proactive protection regen mode.	• Enable • Disable	• Enable • Disable

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G454 Change the OTU2_XP Line Settings

Purpose This task changes the line settings for OTU2_XP card.

Tools/Equipment None

Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the line settings.

Step 2 Click the **Provisioning > Line > Ports/SONET/Ethernet** tabs.

Step 3 Modify any of the settings described in Table 11-166.

Table 11-166 OTU2_XP Line Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Displays the port number.	• 1-1 (OC192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • 2-1 (OC192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • 3-1 (OC192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • 4-1 (OC192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • IB_5G	• 1-1 (STM-64/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • 2-1 (STM-64/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • 3-1 (STM-64/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • 4-1 (STM-64/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC) • IB_5G
Port Name	Provides the ability to assign the specified port a name.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.	User-defined. Name can be up to 32 alphanumeric/special characters. Blank by default. See the "DLP-G104 Assign a Name to a Port" task on page 17-16.
Admin State	Sets the port service state. For more information about administrative states, see the Administrative and Service States document.	• IS • IS,AINS • OOS,DSBLD • OOS,MT	• Unlocked • Unlocked,automaticInService • Locked,disabled • Locked,maintenance
Service State	(Display only) Identifies the autonomously generated state that gives the overall condition of the port. Service states appear in the format: Primary State-Primary State Qualifier, Secondary State. For more information about service states, see the Administrative and Service States document.	• IS-NR • OOS-AU,AINS • OOS-MA,DSBLD • OOS-MA,MT	• Unlocked-enabled • Unlocked-disabled, automaticInService • Locked-enabled,disabled • Locked-enabled,maintenance

Table 11-166 OTU2_XP Line Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
ALS Mode	Sets the ALS function mode. The DWDM transmitter supports ALS according to ITU-T G.644 (06/99). ALS can be disabled, or it can be set for one of three mode options.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.	• Disabled (default): ALS is off; the laser is not automatically shut down when traffic outages (LOS) occur. • Auto Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. It automatically restarts when the conditions that caused the outage are resolved. • Manual Restart: ALS is on; the laser automatically shuts down when traffic outages (LOS) occur. However, the laser must be manually restarted when conditions that caused the outage are resolved. • Manual Restart for Test: Manually restarts the laser for testing.
Reach	Displays the optical reach distance of the client/trunk ports.	The Reach options depend on the traffic type that has been selected.	The Reach options depend on the traffic type that has been selected.
Wavelength	Displays the wavelength of the client/trunk ports.	• First Tunable Wavelength • Further wavelengths: 850 nm through 1610 nm, 100-GHz ITU spacing; coarse wavelength division multiplexing (CWDM) spacing **Note** Supported wavelengths are marked by asterisks (**).	• First Tunable Wavelength • Further wavelengths: 850 nm through 1610 nm, 100-GHz ITU spacing; CWDM spacing **Note** Supported wavelengths are marked by asterisks (**).
AINS Soak	Sets the automatic in-service soak period. Double-click the time and use the up and down arrows to change settings.	• Duration of valid input signal, in hh.mm format, after which the card becomes in service (IS) automatically • 0 to 48 hours, 15-minute increments	• Duration of valid input signal, in hh.mm format, after which the card becomes IS automatically • 0 to 48 hours, 15-minute increments
SF BER	(SONET [ANSI] or SDH [ETSI] only) Sets the signal fail bit error rate.	• 1E-3 • 1E-4 • 1E-5	• 1E-3 • 1E-4 • 1E-5

Table 11-166 OTU2_XP Line Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
SD BER	(SONET [ANSI] or SDH [ETSI] only) Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
Type	(SONET [ANSI] or SDH [ETSI] only) The optical transport type.	• SONET • SDH **Note** When Type is set to SDH in a SONET (ANSI) provisioning, SDCC or LDCC on OTU2_XP cards cannot be provisioned.	• SONET • SDH
MTU	The maximum size of the Ethernet frames accepted by the port. The port must be in OOS/locked state.	• 1548 bytes • Jumbo (64 to 9,216 bytes)	• 1548 bytes • Jumbo (64 to 9,216 bytes)
Incoming MAC Address	Sets the incoming MAC address.	Value of MAC address. Six bytes in hexadecimal format.	Value of MAC address. Six bytes in hexadecimal format.
Flow Control (Only when the card is in 10G Ethernet LAN Phy to WAN Phy mode)	Enables/disables flow control messaging with its peer port. When enabled, the port can send and receive PAUSE frames when buffer congestion occurs. When disabled, no PAUSE frames are transmitted and the PAUSE frames received are discarded.	• ON (default)—Flow control is enabled. • OFF—Flow control is disabled.	• ON (default)—Flow control is enabled. • OFF—Flow control is disabled.
Client Distance (Only when the card is in 10G Ethernet LAN Phy to WAN Phy mode)	Sets the fiber distance between the client of OTU2_XP card and the LAN port that is connected to the OTU2_XP client port.	• 10 km (default) • 30 km	• 10 km (default) • 30 km

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G455 Change the OTU2_XP Line Section Trace Settings

Purpose	This task changes the line section trace settings for the OTU2_XP card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the section trace settings.

Step 2 Click the **Provisioning > Line > Section Trace** tabs.

Step 3 Modify any of the settings described in Table 11-167.

Table 11-167 OTU2_XP Section Trace Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	Sets the port number.	• 1-1 (OC192) • 2-1 (OC192) • 3-1 (OC192) • 4-1 (OC192)	• 1-1 (STM-64) • 2-1 (STM-64) • 3-1 (STM-64) • 4-1 (STM-64)
Received Trace Mode	Sets the trace mode.	• Off/None • Manual	• Off/None • Manual
Disable AIS/RDI on TIM-S	If a TIM on Section overhead alarm arises because of a J0 overhead string mismatch, no alarm indication signal is sent to downstream nodes if this box is checked. This is a display-only parameter under the following conditions: • Received Trace Mode is Off/None • Termination Mode is set to Transparent or Section (see the "DLP-G453 Change the OTU2_XP Card Settings" task on page 11-402)	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)	• Checked (AIS/RDI on TIM-S is disabled) • Unchecked (AIS/RDI on TIM-S is not disabled)
Transmit Section Trace String Size	Sets the trace string size.	• 1 byte • 16 byte	• 1 byte • 16 byte

Table 11-167 OTU2_XP Section Trace Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size	String of trace string size
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh check box to automatically refresh the display every 5 seconds.	String of trace string size	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)	Checked/unchecked (default)

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G456 Change the OTU2_XP Line Thresholds for SONET or SDH Payloads

Purpose	This task changes the line threshold settings for the OTU2_XP card carrying SONET or SDH payload.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the line threshold settings.

Step 2 Click the **Provisioning > Line Thresholds > SONET Thresholds** (ANSI) or **SDH Thresholds** (ETSI) tabs.

Note If you have enabled 10G Ethernet LAN Phy to WAN Phy on the OTU2_XP card, the STS option is automatically enabled.
Only near end STS thresholds are supported. No STS thresholds are support for Far End.

Step 3 Modify any of the OTU2_XP card path threshold settings on a LAN Phy to WAN Phy mode, as seen in Table 11-168.

Table 11-168 OTU2_XP Card Path Threshold Settings on a 10G Ethernet LAN Phy to WAN Phy Mode

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Port number.	• Ports 3-1 (Trunk), STS-1 • Ports 4-1 (Trunk), STS-1	• Port 3-1 (Trunk), VC4-1 • Port 4-1 (Trunk), VC4-1

Step 4 Modify any of the OTU2_XP Card Line Threshold settings described in Table 11-169

Table 11-169 OTU2_XP Card Line Threshold Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	(Display only) Port number	• 1-1 (OC192) • 2-1 (OC192) • 3-1 (OC192) • 4-1 (OC192)	• 1-1 (STM-64) • 2-1 (STM-64) • 3-1 (STM-64) • 4-1 (STM-64)
CV	Coding violations	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Line or Section Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Multiplex Section or Regeneration Section Choose an option in each category and click **Refresh**.
ES	Errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Line or Section Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Multiplex Section or Regeneration Section Choose an option in each category and click **Refresh**.

Table 11-169 OTU2_XP Card Line Threshold Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Line or Section Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Multiplex Section or Regeneration Section Choose an option in each category and click **Refresh**.
FC	(Line or Multiplex Section only) Failure count	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Line or Section Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Multiplex Section or Regeneration Section Choose an option in each category and click **Refresh**.
UAS	(Line or Multiplex Section only) Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Line or Section Choose an option in each category and click **Refresh**.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—(Near end only) Multiplex Section or Regeneration Section Choose an option in each category and click **Refresh**.

Step 5 Click **Apply**.

Step 6 Return to your originating procedure (NTP).

DLP-G457 Provision the OTU2_XP Port Alarm and TCA Thresholds

Purpose	This task provisions the OTU2_XP port alarm and threshold crossing alert (TCA) thresholds.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the trunk port alarm and TCA settings.

Step 2 Click the **Provisioning > Optics Thresholds** tabs.

Step 3 Under Types, verify that the TCA radio button is checked. If not, select it, then click **Refresh**.

Step 4 Refer to Table 11-170 to provision the port TCA thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Note Do not modify the Laser Bias parameters.

Table 11-170 OTU2_XP Port TCA Thresholds

Port	TCA RX Power High	TCA RX Power Low	TCA TX Power High	TCA TX Power Low
1-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	1.0 dBm	–14.0 dBm	5.0 dBm	–12.0 dBm
2-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	1.0 dBm	–14.0 dBm	5.0 dBm	–12.0 dBm
3-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	1.0 dBm	–14.0 dBm	5.0 dBm	–12.0 dBm
4-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	1.0 dBm	–14.0 dBm	5.0 dBm	–12.0 dBm

Step 5 Click **Apply**.

Step 6 Under Types, click the **Alarm** radio button and click **Refresh**.

Step 7 Refer to Table 11-171 to provision the port alarm thresholds for RX Power High, RX Power Low, TX Power High, and TX Power Low.

Note You must modify 15 Min and 1 Day independently. To do so, choose the appropriate radio button and click **Refresh**.

Table 11-171 OTU2_XP Port Alarm Thresholds

Port	Alarm RX Power High	Alarm RX Power Low	Alarm TX Power High	Alarm TX Power Low
1-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	3.0 dBm	–16.0 dBm	1.0 dBm	–8.0 dBm
2-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	3.0 dBm	–16.0 dBm	1.0 dBm	–8.0 dBm
3-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	3.0 dBm	–16.0 dBm	1.0 dBm	–8.0 dBm
4-1 (OC-192/10G Ethernet WAN Phy/10G Ethernet LAN Phy/10G FC/IB_5G)	3.0 dBm	–16.0 dBm	1.0 dBm	–8.0 dBm

Step 8 Click **Apply**.

Step 9 Return to your originating procedure (NTP).

DLP-G462 Change the OTU2_XP Line RMON Thresholds for the 10G Ethernet and 10G FC Payloads

Purpose	This task changes the line threshold settings for OTU2_XP card carrying the 10G Ethernet or 10G FC payloads.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the line threshold in the card view.

Step 2 Click the **Provisioning > Line Thresholds > RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose the applicable port.

Step 5 From the Variable drop-down list, choose an Ethernet variable. See Table 11-172 and Table 11-173 for a list of available Ethernet variables.

Table 11-172 OTU2_XP Card 10G Ethernet Variables

Variable	Description

Table 11-172 OTU2_XP Card 10G Ethernet Variables (Continued)

ifInOctets	Total number of octets received on the interface, including framing characters.
rxTotalPkts	Total number of received packets. rxTotalPkts increments for 10G FC payload packets with FCS errors. However, 10G Ethernet LAN Phy payload packets with CRC errors are not counted.
ifInMulticastPkts	Number of multicast frames received error free.
ifInBroadcastPkts	Number of packets, delivered by a sublayer to an higher sublayer, that were addressed to a broadcast address at this sublayer.
ifInErrors	Number of inbound packets that contained errors preventing them from being delivered to a higher-layer protocol.
dot3StatsFCSErrors	Number of frames with frame check errors, that is, there is an integral number of octets, but an incorrect Frame Check Sequence (FCS).
etherStatsUndersizePkts	Total number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsFragments	Total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error). Note that it is entirely normal for etherStatsFragments to increment. This is because it counts both runts (which are normal occurrences due to collisions) and noise hits.
etherStatsPkts64Octets	Total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
etherStatsPkts65to127Octets	Total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts128to255Octets	The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts256to511Octets	Total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts512to1023Octets	Total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts1024to1518Octets	Total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).

Table 11-172 OTU2_XP Card 10G Ethernet Variables (Continued)

etherStatsBroadcastPkts	Total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.
etherStatsMulticastPkts	Total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
etherStatsOversizePkts	Total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsJabbers	Total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a non-integral number of octets (Alignment Error).
etherStatsOctets	Total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets).
rxControlFrames	Number of MAC control frames passed by the MAC sublayer to the MAC control sublayer.

Table 11-173 OTU2_XP Card 10G FC Variables

Variable	Description
ifInOctets	Total number of octets received on the interface, including framing characters.
mediaIndStatsRxFramesTruncated	Total number of fiber channel frames received that are less than the minimum 36-byte frame. This is inclusive of header, SOF, EOF, and CRC with no data bytes.
mediaIndStatsRxFramesTooLong	Total number of fiber channel frames received that exceed the maximum 2148-byte frame. This is inclusive of header, SOF, EOF, CRC, and data bytes.
mediaIndStatsRxFramesBadCRC	Total number of fiber channel frames received with CRC errors.
ifInDiscards	The number of inbound packets, which were chosen to be discarded even though no errors had been detected to prevent their being delivered to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.[1]
ifOutOctets	Total number of octets transmitted out of the interface, including framing characters.[1]
mediaIndStatsTxFramesBadCRC	Number of transmitted data frames with payload CRC errors when HDLC framing is used.[1]
transmitPauseFrames	Number of transmitted pause frames.[1]

Table 11-173 OTU2_XP Card 10G FC Variables (Continued)

txTotalPkts	Total number of transmit packets.[1]

1. This variable is supported when the 10G Ethernet LAN Phy to WAN Phy mode is enabled on the OTU2_XP card.

Step 6 From the Alarm Type drop-down list, choose the event triggers. The available options are rising threshold, falling threshold, or rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Enter an appropriate number of seconds for the Sample Period.

Step 9 Enter in the appropriate number of occurrences for the Rising Threshold.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Note To view all RMON thresholds, click **Show All RMON thresholds**.

Step 12 Return to your originating procedure (NTP).

DLP-G458 Change the OTU2_XP OTN Settings

Purpose	This task changes the OTN line settings for the OTU2_XP card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the OTN settings.

Step 2 Click the **Provisioning > OTN** tabs. Then click one of the following subtabs: **OTN Lines**, **ITU-T G.709 Thresholds**, **FEC Thresholds**, **Trail Trace Identifier,** or **Proactive Protection Regen**.

Step 3 Modify any of the settings described in Tables 11-61 through 11-64.

Note You must modify Near End and Far End independently, 15 Min and 1 Day independently, and SM and PM independently. To do so, select the appropriate radio button and click **Refresh**.

Table 11-174 describes the values on the **Provisioning > OTN > OTN Lines** tabs.

Table 11-174 OTU2_XP Card OTN Lines Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	—
ITU-T G.709 OTN	Sets the OTN lines according to ITU-T G.709. Check the box to enable.	• Enable • Disable
FEC	Sets the OTN lines FEC mode. Enhanced FEC mode can be enabled to provide greater range and lower bit error rate.	• Disable—FEC is off. • Standard—Standard FEC is on. • Enhanced—Enhanced FEC is on.
SD BER	Sets the signal degrade bit error rate.	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9
SF BER	(Display only) Indicates the signal fail bit error rate.	• 1E-5
No Fixed Stuff	Sets the insertion of stuffing bytes. This parameter only applies to 10G Ethernet LAN Phy signals in transponder card configuration. This is a display-only parameter for all other card configurations. When the “No Fixed Stuff” parameter is disabled, the bit rate is 11.09 Gbps. When the “No Fixed Stuff” parameter is enabled, the bit rate is 11.05 Gbps.	• Disable • Enable

Table 11-175 describes the values on the **Provisioning > OTN > ITU-T G.709 Thresholds** tab.

Table 11-175 OTU2_XP Card ITU-T G.709 Threshold Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	—
ES	Severely errored seconds. Two types of thresholds can be asserted. Selecting the SM (OTUk) radio button selects FEC, overhead management, and PM using OTUk. Selecting the PM radio button selects path PM using ODUk.	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**. **Note** SM (OTUk) is the ITU-T G.709 optical channel transport unit order of k overhead frame used for management and performance monitoring. PM (ODUk) is the ITU-T G.709 optical channel data unit order of k overhead frame unit used for path performance monitoring.
SES	Severely errored seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
UAS	Unavailable seconds	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-175 OTU2_XP Card ITU-T G.709 Threshold Settings (Continued)

Parameter	Description	Options
BBE	Background block errors	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.
FC	Failure counter	Numeric. Threshold display options include: • Direction—Near End or Far End • Interval—15 Min (minutes) or 1 day • Types—SM (OTUk) or PM (ODUk) Choose an option in each category and click **Refresh**.

Table 11-176 describes the values on the **Provisioning > OTN > FEC Thresholds** tab.

Table 11-176 OTU2_XP Card FEC Threshold Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and optional name.	—
Bit Errors Corrected	Displays the number of bit errors corrected during the selected time period.	Numeric display. Can be set for 15-minute or one-day intervals.
Uncorrectable Words	Displays the number of uncorrectable words in the selected time period.	Numeric display. Can be set for 15-minute or one-day intervals.

Table 11-177 describes the values on the **Provisioning > OTN > Trail Trace Identifier** tab.

Note You cannot change the Path Trail Trace Identifier settings when the OTU2_XP card is in the Standard Regen mode, and if the ODU transparency is set to “Transparent Standard Use”.
You can change the Path Trail Trace Identifier settings when the OTU2_XP card is in the Standard Regen mode, and if the ODU transparency is set to “Cisco Extended Use”.

Table 11-177 OTU2_XP Card Trail Trace Identifier Settings

Parameter	Description	Options
Port	Sets the port number.	—
Level	Sets the level.	• Section • Path

Table 11-177 OTU2_XP Card Trail Trace Identifier Settings (Continued)

Parameter	Description	Options
Received Trace Mode	Sets the trace mode.	• Off/None • Manual
Disable FDI on TTIM	If a Trace Identifier Mismatch on Section overhead alarm arises because of a J0 overhead string mismatch, no Forward Defect Indication (FDI) signal is sent to the downstream nodes if this box is checked.	• Checked (FDI on TTIM is disabled) • Unchecked (FDI on TTIM is not enabled)
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size; trail trace identifier is 64 bytes in length.
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh every 5 sec check box to keep this panel updated.	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 minutes.	Checked/unchecked (default)

Table 11-178 describes the values on the **Provisioning > OTN > Proactive Protection Regen** tabs.

Note Proactive protection regen is supported on ports of OTU2_XP only in Standard Regen and Enhanced FEC mode.

Table 11-178 OTU2_XP Card Proactive Protection Regen Settings

Parameter	Description	Options
Port	(Display only) Displays the port number and name (optional).	—
Trigger threshold	Sets the maximum BER threshold to trigger proactive protection.	• 1E-3 • 9E-4 to 1E-4 • 9E-5 to 1E-5 • 9E-6 to 1E-6 • 9E-7 to 1E-7
Trigger window (ms)	Sets the duration for which BER is monitored before triggering the proactive protection. The trigger window value must be a multiple of: • 10 ms for trigger thresholds between 1E-3 and 6E-6 • 100 ms for trigger threshold between 5E-6 to 1E-7 Trigger window must be less than or equal to 10000 ms.	Time in milliseconds.
Revert Threshold	Sets the revert threshold value of BER. **Note** Revert Threshold settings must be less than the Trigger Threshold values.	• 1E-4 • 9E-5 to 1E-5 • 9E-6 to 1E-6 • 9E-7 to 1E-7 • 9E-8 to 5E-8
Revert window (ms)	Sets the duration for which BER is monitored for settings that are less than the revert threshold value before which proactive protection provided to the router is removed. Revert Window value must be at least 2000ms and a multiple of: • 10ms for a Revert Threshold of 1E-4 to 6E-7 • 100ms for a Revert Threshold of 5E-7 to 5E-8. The revert window must be less than or equal to 10000ms.	Time in milliseconds.

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

DLP-G523 Change the OTU2_XP Path Trace Settings

Purpose	This task changes the path trace settings for the OTU2_XP card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the path trace settings.

Step 2 Click the **Provisioning > Path> J1 Path Trace** tabs.

Step 3 Modify any of the settings described in Table 11-179.

Table 11-179 OTU2_XP Path Trace Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	Sets the port number.	• 3-1 (OC192) • 4-1 (OC192)	• 3-1 (STM-64) • 4-1 (STM-64)
Received Trace Mode	Sets the trace mode.	• Off/None • Manual	• Off/None • Manual
Transmit	Displays the current transmit string; sets a new transmit string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size	String of trace string size

Table 11-179 OTU2_XP Path Trace Settings (Continued)

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Expected	Displays the current expected string; sets a new expected string. You can click the button on the right to change the display. Its title changes, based on the current display mode. Click **Hex** to change the display to hexadecimal (button changes to ASCII); click **ASCII** to change the display to ASCII (button changes to Hex).	String of trace string size	String of trace string size
Received	(Display only) Displays the current received string. You can click Refresh to manually refresh this display, or check the Auto-refresh check box to automatically refresh the display every 5 seconds.	String of trace string size	String of trace string size
Auto-refresh	If checked, automatically refreshes the display every 5 seconds.	Checked/unchecked (default)	Checked/unchecked (default)

Step 4 Click **Apply**.

Return to your originating procedure (NTP).

DLP-G524 Provision the OTU2_XP Path Settings for 10G Ethernet LAN Phy to WAN Phy Configuration

Purpose	This task changes the path settings of the OTU2_XP card for 10G Ethernet LAN Phy to WAN Phy configuration.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the OTU2_XP card where you want to change the path settings.

Step 2 Click the **Provisioning > Path > SONET/SDH** tab. You can now provision the SF BER and SD BER values.

Step 3 Modify any of the OTU2_XP path settings described in Table 11-180.

Table 11-180 OTU2_XP Path Settings

Parameter	Description	ONS 15454 (ANSI) Options	ONS 15454 SDH (ETSI) Options
Port	Sets the port number.	• Port 3-1 (trunk) • Port 4-1 trunk	• Port 3-1 (trunk) • Port 4-1 trunk
SF BER	Sets the signal fail bit error rate (SONET [ANSI] or SDH [ETSI]).	• 1E-3 • 1E-4 • 1E-5	• 1E-3 • 1E-4 • 1E-5
SD BER	Sets the signal degrade bit error rate (SONET [ANSI] or SDH [ETSI]).	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9	• 1E-5 • 1E-6 • 1E-7 • 1E-8 • 1E-9

Step 4 Click **Apply**.

Step 5 Return to your originating procedure (NTP).

NTP-G162 Change the ALS Maintenance Settings

Purpose	This procedure changes the ALS maintenance settings for the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, and OTU2_XP cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The automatic laser shutdown (ALS) function is normally disabled for TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, and OTU2_XP cards. Enable ALS only when the cards are directly connected to each other.

Step 1 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, or OTU2_XP card where you want to change the ALS maintenance settings.

Step 2 Click the **Maintenance > ALS** tabs.

Step 3 Modify any of the settings described in Table 11-181. The provisionable parameters are listed in the Options column in the table.

Table 11-181 ALS Settings

Parameter	Description	Options
ALS Mode	Automatic laser shutdown. ALS provides the ability to shut down the TXP, MXP, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, and OTU2_XP TX laser when the card detects an LOS.	From the drop-down list, choose one of the following: • Disable—Deactivates ALS. • Auto Restart—(Default) ALS is active. The power is automatically shut down when needed and automatically tries to restart using a probe pulse until the cause of the failure is repaired. • Manual Restart • Manual Restart for Test
Recovery Pulse Duration	(Display only) Displays the duration of the optical power pulse that begins when an amplifier restarts.	—
Recovery Pulse Interval	(Display only) Displays the interval between optical power pulses.	—
Currently Shutdown	(Display only) Displays the current status of the laser.	—
Request Laser Restart	If checked, allows you to restart the laser for maintenance.	Checked or unchecked

Step 4 Click **Apply**. If the change affects traffic, a warning message displays. Click **Yes** to complete the change.

Stop. You have completed this procedure.

NTP-G192 Force FPGA Update

Purpose	This procedure forces an upgrade of the FPGA image on the MXP_MR_10DME_C and MXP_MR_10DME_L cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note Perform Step 1 through Step 4 if you are updating the node software. Otherwise continue with Step 5 to force FPGA image upgrade on MXP_MR_10DME_C or MXP_MR_10DME_L card.

Step 1 Close the CTC window, if open.

Step 2 Delete the CTC Cache from the CTC Launcher browser window.

Step 3 Close the CTC Launcher browser window.

Step 4 Relaunch the CTC Launcher browser window.

Step 5 In node view (single-shelf mode) or shelf view (multishelf mode), double-click the MXP_MR_10DME_C or MXP_MR_10DME_L card to be upgraded.

Step 6 For all ports being provisioned on the card, click the **Provisioning > Line** tabs.

a. Click the **Admin State** table cell and choose **OOS,DSBLD** (ANSI) or **Locked,Disabled** (ETSI).

b. Click **Apply**, then **Yes**.

Step 7 Click the **Provisioning > Card** tabs.

Step 8 Change the Card Mode as needed:

- FC-GE_ISC—Choose this option if you will provision any of the following PPM port rates: FC1G (Ports 1-1 through 4-1), FC2G (Ports 1-1 and 3-1 only), FICON1G (Ports 1-1 through 4-1), FICON2G (Ports 1-1 and 3-1 only), ONE_GE (Ports 1-1 through 4-1), ISC3 COMPAT (Ports 1-1 through 4-1), ISC3 PEER 1G (Ports 1-1 through 4-1), and ISC3 PEER 2G (Ports 1-1 and 3-1 only).
- FC4G—Choose this option if you will provision an FC4G or FICON4G PPM (Port 1-1 only).

Step 9 Click the **Force FPGA Update** button. This upgrades the FPGA image in the MXP_MR_10DME_C or MXP_MR_10DME_L card, as appropriate. The MXP_MR_10DME_C or MXP_MR_10DME_L card reboots and the FPGA now contains the updated image.

Step 10 For all ports being provisioned on the card, click the **Provisioning > Line** tabs.

a. Click the **Admin State** table cell and choose **IS** (ANSI) or **Unlocked** (ETSI).

b. Click **Apply**, then **Yes**.

Stop. You have completed this procedure.

NTP-G196 Force FPGA Update When the Card is Part of a Protection Group

Purpose	This procedure forces an upgrade of the FPGA image on the MXP_MR_10DME_C and MXP_MR_10DME_L cards when the card is part of a protection group.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note This procedure applies to a near-end node that has two MXP_MR_10DME_C or MXP_MR_10DME_L cards, one card acting as the working card and the other as the protect card. The far-end node has a similar configuration. The near-end working card trunk port is connected to the far-end working card trunk port. The near-end protect card trunk port is connected to the far-end protect card trunk port.

Note Perform Step 1 through Step 4 if you are updating the node software. Otherwise, continue with Step 5 to force FPGA image upgrade on MXP_MR_10DME_C or MXP_MR_10DME_L card.

Step 1 Close the CTC window, if open.

Step 2 Delete the CTC Cache from the CTC Launcher browser window.

Step 3 Close the CTC Launcher browser window.

Step 4 Relaunch the CTC Launcher browser window.

Step 5 Ensure traffic is running on the near-end and far-end working cards for each protection group on the MXP_MR_10DME_C or MXP_MR_10DME_L card.

Step 6 In node view (single-node mode) or multishelf view (multishelf mode), click the **Provisioning > Protection** tab.

Step 7 For each protection group, verify that the working card client port is reported as working/active and the protect card client port is reported as protect/standby.

Step 8 Repeat Steps 6 and 7 for the far-end node.

Step 9 For each protection group on the near-end and far-end nodes, complete the "DLP-G182 Apply a Lockout" task to prevent traffic from switching to the protect card.

Step 10 At the near-end and far-end nodes, complete the "NTP-G192 Force FPGA Update" procedure on page 11-424 to force an upgrade of the FPGA image on the protect card.

Step 11 For each protection group on the near-end and far-end nodes, complete the "DLP-G183 Clear a Lock-On or Lockout" task to remove a lockout and return a protection group to its usual switching method.

Step 12 For each protection group on the near-end and far-end nodes, complete the "DLP-G179 Apply a Force Y-Cable or Splitter Protection Switch" task to move traffic from the working to the protect card.

Step 13 At the near-end and far-end nodes, complete the "NTP-G192 Force FPGA Update" procedure on page 11-424 to force an upgrade of the FPGA image on the working card.

Step 14 For each protection group on the near-end and far-end nodes, complete the "DLP-G180 Clear a Manual or Force Y-Cable or Splitter Protection Switch" task to clear a Force protection switch on the working card. If the protection group is revertive, this operation causes the traffic to revert to the working card. If the protection group is non-revertive, this operation causes the traffic to remain on the protect card.

Stop. You have completed this procedure.

NTP-G232 Enabling Error Decorrelator

Purpose	This task enables error decorrelator on a TXP_MR_10EX_C, MXP_2.5G_10EX_C, or MXP_MR_10DMEX_C card.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), double-click the TXP_MR_10EX_C, MXP_2.5G_10EX_C, or MXP_MR_10DMEX_C card where you want to enable error decorrelator.

Step 2 Click the **Provisioning > Line> Error Decorrelator Settings** tabs.

Step 3 In the Error Decorrelator Settings area, Select **Enable.**

Note To inter-operate with other cards, disable the error decorrelator.
Click the **Provisioning > Line> Error Decorrelator Settings** tabs and then select **Disable**.

NTP-G315 Enable or Disable the Wavelength Drifted Channel Automatic Shutdown Feature

Purpose	This procedure allows you to enable or disable the wavelength drifted channel automatic shutdown feature for 40-SMR1-C, 40-SMR2-C, 80-WXC-C, 40-WXC-C, and 40-WSS-C cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

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

Step 2 Select the card from the Defaults Selector pane where you want to enable or disable the wavelength drifted channel automatic shutdown feature.

Step 3 Select the <card name>.config.card.WavelengthDrift from the Default Name column. Choose Disable or Enable from the Default Value drop-down list for the selected card.

For example, if you select 40-SMR2-C card from the Defaults Selector folder, the Default Name column reads “40-SMR2-C.config.card.WavelengthDrift”.

Step 4 Click **Apply** to save changes.

Stop. You have completed this procedure.

NTP-G316 Enable REP and FAPS on the same port

Purpose	This task allows you enable REP and FAPS on the same port for the GE_XP and 10GE_XP cards.
Tools/Equipment	None
Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note The FAPS master node on the edge ring should never be the node that has a common FAPS and REP port.

You can configure REP and FAPS on port 22 and 21 for GE_XP cards, and port 4 and 3 for 10GE_XP cards.

Step 1 To enable REP, complete the following procedures:

a. DLP-G645 Create a Segment Using CTC, page 11-350

b. DLP-G647 Activate VLAN Load Balancing Using CTC, page 11-353

Step 2 To enable FAPS, complete the DLP-G381 Provision the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Layer 2 Protection Settings, page 11-368.

Stop. You have completed this procedure.