Setting Up Optical Service Channel Cards

This chapter describes the optical service channel (OSC) cards for Cisco ONS 15454 dense wavelength division multiplexing (DWDM) networks. For card safety and compliance information, refer to the Regulatory Compliance and Safety Information for Cisco ONS Platforms document.

An optical service channel (OSC) is a bidirectional channel connecting two adjacent nodes in a DWDM ring. For every DWDM node (except terminal nodes), two different OSC terminations are present, one for the west side and another for the east side. The channel transports OSC overhead that is used to manage DWDM networks. An OSC signal uses the 1510-nm wavelength and does not affect client traffic. The primary purpose of this channel is to carry clock synchronization and orderwire channel communications for the DWDM network. It also provides transparent links between each node in the network. The OSC is an OC-3/STM-1 formatted signal.

There are two versions of the OSC modules: the OSCM, and the OSC-CSM, which contains the OSC wavelength combiner and separator component in addition to the OSC module.

The Mesh/Multiring Upgrade (MMU) card is used to optically bypass a given wavelength from one section of the network or ring to another one without requiring 3R regeneration.

Note On 15454-M2 and 15454-M6 shelves, the TNC and TNCE cards include the functions of the OSCM card. OSC can be created on the OC3 port (SFP-0) of the TNC, TNCE, and TNCS cards.

The TNC, TNCE, and TNCS cards support two optical service channels (OSC): primary OSC and secondary OSC.

The primary optical service channel (SFP-0) supports the following interfaces:

- OC-3/STM-1
- Fast Ethernet (FE)
- Gigabit Ethernet (GE).

The secondary optical service channel (SFP-1) supports the following interfaces:

- Fast Ethernet (FE)
- Gigabit Ethernet (GE).

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

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

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Card Compatibility

Table 1: Software Release Compatibility for Optical Service Channel Cards in Cisco ONS 15454

Card Name	R4.5 - R10.0	R10.5	R10.5.2/10.6.1/10.6.2/10.7/10.8/10.9 x .
OSCM	ONS 15454	ONS 15454	ONS 15454 S 4 N 4 5
OSC-CSM	ONS 15454, ONS 15454 M2, ONS 15454 M6	ONS 15454, ONS 15454 M2, ONS 15454 M6	ONS 15454, ONS 15454 M2, ONS 15454 M6, NCS 2015 S 4 , S 4 , S 5 N 4 5 N 4 2 N 4 6 C 1

Class 1 Laser Safety Labels

For information about safety labels, see the "Safety Labels" section.

OSCM Card

The OSCM card has reached end of support.

(Cisco ONS 15454 only)

Note For OSCM card specifications, see the OSCM Card Specifications document.

Note On 15454-M2 and 15454-M6 shelves, the TNC and TNCE cards include the functions of the OSCM card.

The OSCM card is used in amplified nodes that include the OPT-BST, OPT-BST-E, or OPT-BST-L booster amplifier. The OPT-BST, OPT-BST-E, and OPT-BST-L cards include the required OSC wavelength combiner and separator component. The OSCM cannot be used in nodes where you use OC-N/STM-N cards, electrical cards, or cross-connect cards. The OSCM uses Slots 8 and 10, which are also cross-connect card slots.

The OSCM supports the following features:

- OC-3/STM-1 formatted OSC
- Supervisory data channel (SDC) forwarded to the TCC2/TCC2P/TCC3 cards for processing
- Distribution of the synchronous clock to all nodes in the ring
- 100BaseT far-end (FE) User Channel (UC)
- Monitoring functions such as orderwire support and optical safety

The OC-3/STM-1 section data communications channel (SDCC or RS-DCC) overhead bytes are used for network communications. An optical transceiver terminates the OC-3/STM-1, then it is regenerated and converted into an electrical signal. The SDCC or RS-DCC bytes are forwarded to the active and standby TCC2/TCC2P/TCC3 cards for processing through the system communication link (SCL) bus on the backplane. Orderwire bytes (E1, E2, F1) are also forwarded via the SCL bus to the TCC2/TCC2P/TCC3 for forwarding to the AIC-I card.

The payload portion of the OC-3/STM-1 is used to carry the fast Ethernet UC. The frame is sent to a packet-over-SONET/SDH (POS) processing block that extracts the Ethernet packets and makes them available at the RJ-45 connector.

The OSCM distributes the reference clock information by removing it from the incoming OC-3/STM-1 signal and then sending it to the DWDM cards. The DWDM cards then forward the clock information to the active and standby TCC2/TCC2P/TCC3 cards.

Note Due to memory limitations, TCC2/TCC2P cards are not supported from Release 10.5.2 onwards. As a result, in a multishelf configuration, the TCC2/TCC2P card cannot be a node controller or a shelf controller. Upgrade the TCC2/TCC2P card to a TCC3 card.

For more information about the OSCM card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/product_data_sheet09186a00801a1641.html.

OSCM Card Functions

The functions of the OSCM card are:

- OSCM Card Power Monitoring

- See "Card level indicators"
- See "Port-Level Indicators"

OSCM Card Power Monitoring

Physical photodiode P1 monitors the power for the OSCM card. The returned power level value is calibrated to the OSC TX port.

Table 2: OSCM VOA Port Calibration

Photodiode	CTC Type Name	Calibrated to Port
P1	Output OSC	OSC TX

For information on the associated TL1 AIDs for the optical power monitoring points, refer the “CTC Port Numbers and TL1 Aids” section in Cisco ONS SONET TL1 Command Guide.

OSC-CSM Card

The OSC-CSM card has reached end of support.

Note For OSC-CSM card specifications, see the OSC-CSM Card Specifications document.

The OSC-CSM card is used in unamplified nodes. This means that the booster amplifier with the OSC wavelength combiner and separator is not required for OSC-CSM operation. The OSC-CSM can be installed in Slots 1 to 6 and 12 to 17. To operate in hybrid mode, the OSC-CSM cards must be accompanied by cross-connect cards. The cross-connect cards enable functionality on the OC-N/STM-N cards and electrical cards.

The OSC-CSM supports the following features:

- Optical combiner and separator module for multiplexing and demultiplexing the optical service channel to or from the wavelength division multiplexing (WDM) signal
- OC-3/STM-1 formatted OSC
- SDC forwarded to the TCC2/TCC2P/TCC3 cards for processing
- Distribution of the synchronous clock to all nodes in the ring
- 100BaseT FE UC
- Monitoring functions such as orderwire support
- Optical safety: Signal loss detection and alarming, fast transmitted power shut down by means of an optical 1x1 switch
- Optical safety remote interlock (OSRI), a feature capable of shutting down the optical output power

- Automatic laser shutdown (ALS), a safety mechanism used in the event of a fiber cut. For details on ALS provisioning for the card, see the . For information on using the card to implement ALS in a network, see the .

The WDM signal coming from the line is passed through the OSC combiner and separator, where the OSC signal is extracted from the WDM signal. The WDM signal is sent along with the remaining channels to the COM port (label on the front panel) for routing to the OADM or amplifier units, while the OSC signal is sent to an optical transceiver.

The OSC is an OC-3/STM-1 formatted signal. The OC-3/STM-1 SDCC or RS-DCC overhead bytes are used for network communications. An optical transceiver terminates the OC-3/STM-1, and then it is regenerated and converted into an electrical signal. The SDCC or RS-DCC bytes are forwarded to the active and standby TCC2/TCC2P/TCC3 cards for processing via the SCL bus on the backplane. Orderwire bytes (E1, E2, F1) are also forwarded via the SCL bus to the TCC2/TCC2P/TCC3 for forwarding to the AIC-I card.

The payload portion of the OC-3/STM-1 is used to carry the fast Ethernet UC. The frame is sent to a POS processing block that extracts the Ethernet packets and makes them available at the RJ-45 front panel connector.

The OSC-CSM distributes the reference clock information by removing it from the incoming OC-3/STM-1 signal and then sending it to the active and standby TCC2/TCC2P/TCC3 cards. The clock distribution is different from the OSCM card because the OSC-CSM does not use Slot 8 or 10 (cross-connect card slots).

Note Due to memory limitations, TCC2/TCC2P cards are not supported from Release 10.5.2 onwards. As a result, in a multishelf configuration, the TCC2/TCC2P card cannot be a node controller or a shelf controller. Upgrade the TCC2/TCC2P card to a TCC3 card

Note S1 and S2 (Figure 4-5 on page 4-10) are optical splitters with a splitter ratio of 2:98. The result is that the power at the MON TX port is about 17 dB lower than the relevant power at the COM RX port, and the power at the MON RX port is about 20 dB lower than the power at the COM TX port. The difference is due to the presence of a tap coupler for the P1 photodiode.

For more information about the OSCM card, see http://www.cisco.com/en/US/prod/collateral/optical/ps5724/ps2006/product_data_sheet09186a00801a1641.html.

OSC-CSM Card Functions

The functions of the OSC-CSM card are:

- OSC-CSM Card Power Monitoring
- See "Alarms and thresholds"
- See "Card level indicators"
- See "Port-Level Indicators"

OSC-CSM Card Power Monitoring

Physical photodiodes P1, P2, P3, and P5 monitor the power for the OSC-CSM card. Their function is as follows:

- P1: The returned power value is calibrated to the LINE RX port, including the insertion loss of the previous filter (the reading of this power dynamic range has been brought backward towards the LINE RX output).
- P2: The returned value is calibrated to the LINE RX port.
- P3: The returned value is calibrated to the COM RX port.
- P5: The returned value is calibrated to the OSC TX port, including the insertion loss of the subsequent filter.

The returned power level values are calibrated to the ports as shown in the following table.

Table 3: OSC-CSM Port Calibration

Photodiode	CTC Type Name	Calibrated to Port	Power	PM Parameters
P1	Input Line	LINE RX	Channel Power	Supported
			OSC Power	
P2	Input Line	LINE RX	OSC Power	Supported
P3	Input Com	COM RX	Channel Power	Supported
P5	Output OSC	OSC TX	OSC Power	Supported

The OSC power on the LINE TX is the same as the power reported from P5.

The PM parameters for the power values are listed at Optics and 8b10b PM Parameter Definitions.

For information on the associated TL1 AIDs for the optical power monitoring points, refer the “CTC Port Numbers and TL1 Aids” section in Cisco ONS SONET TL1 Command Guide.