8.20 130G Single Port Tunable Coherent Mux Transponder - 10 clients (130SCX10)

8.20.1 Overview

The 130SCX10 is a second generation 10x10G MUX optical transponder, which supports multiplexing of upto ten 10G client signals into one single OTU4 line interface. The 130SCX10 card features Soft Decision FEC (SD-FEC) as a user provisionable option. Soft Decision FEC is a proprietary 23% overhead FEC providing higher error correction performance than hard-decision FEC's. SD-FEC provides more net coding gain (11.2 dB) than previous generation FEC offered on first generation 100G cards, which used AFEC. Although the pack is known as a “100G” pack, the actual line rate is either 130 Gb/s (with SD-FEC) or 112 Gb/s (with AFEC).

Pre-FEC TCA can be automatically set based on FEC type for 130SCX10.

8.20.2 Physical design

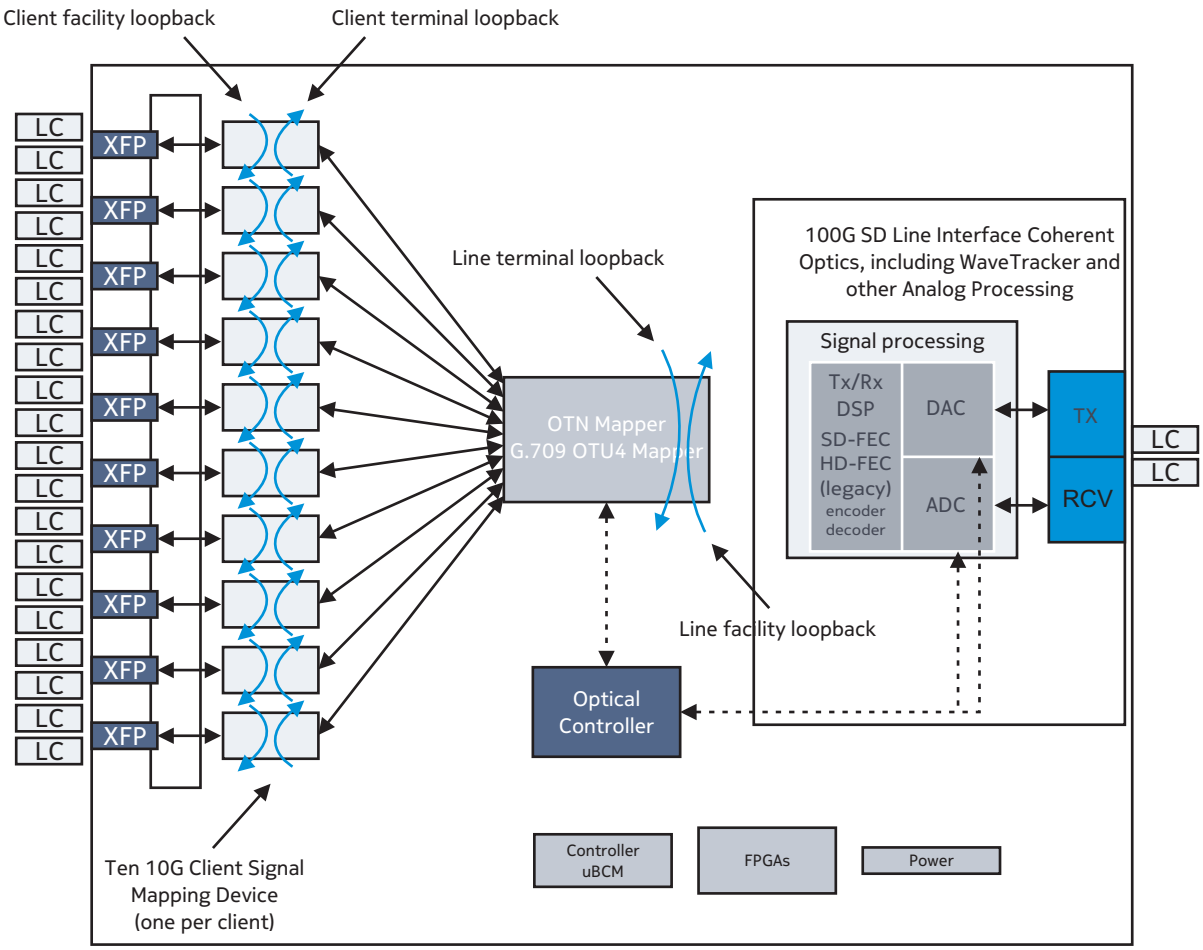
The 130SCX10 OT is a two-slot-wide full-height pack. The 130SCX10 supports one bi-directional optical line interface port (L1). The line port uses fixed, non-pluggable optics and an LC connector. It also supports ten client interfaces with XFP modules (B&W, CWDM). The 130SCX10 card contains two LEDs, a card status LED and the line interface LED. Each client port has a dedicated port status LED and an Ethernet LED. The Ethernet LEDs are not utilized on this card. The behavior of the utilized LEDs is described in, 13.9 “Common LEDs of WDM cards” (p. 1582).

8.20.3 130SCX10 functional description

The following illustration shows a block diagram of the 130SCX10 OT.

The 130SCX10 provides client access through up to ten XFP modules (B & W, CWDM). Short, long, and extended reach XFP modules are supported. Client signal processing includes Status, Alarms, PM, FEC, and pre-mapping of the client signal.

Figure 8-80 130SCX10 OT block diagram



Line interface

The 130SCX10 has a tunable coherent non-pluggable optical interface. The line bit rate is OTU4 (129.280281 Gb/s ± 20 ppm) when provisioned for SD-FEC mode, and OTU4 (111.8099736 Gb/s ± 20 ppm) when provisioned for AFEC mode. See 15.4.11 “Optical fixed line-side WDM OT interfaces” (p. 1774), for the full specification details of the 130SCX10 line interface.

Client interfaces

The 130SCX10 OT supports client XFPs that support the following client interfaces:

- STM-64/OC-192
- 10G LAN PHY
- OTM-0.2
- FC-800 (Fibre channel)

For more details about the XFPs available for the 130SCX10, including ordering information, see Table 12-44, “112SCX10, 112SNX10, 130SCX10, and 130SNX10 Client XFPs” (p. 1550).

The 130SCX10 supports the following client signal types.

Table 8-16 130SCX10 Client signal types

Client signal type	Operating bit rate	Standard
10 GbE LAN	10.3125 Gb/s	10 GbE (IEEE802.3e)
FC800	8.5 Gb/s	ANSI INCITS 364-2003
OC-192	9.95328 Gb/s	GR-253-CORE
STM-64	9.95328 Gb/s	ITU-T G.707
10 GbE WAN	9.95328 Gb/s	10 GbE (IEEE802.3e)
OTU2 [1] (OTU1e) (OTU2e)	10.709 Gb/s 11.049 Gb/s (overclocked) 11.096 Gb/s (overclocked)	ITU-T G.709

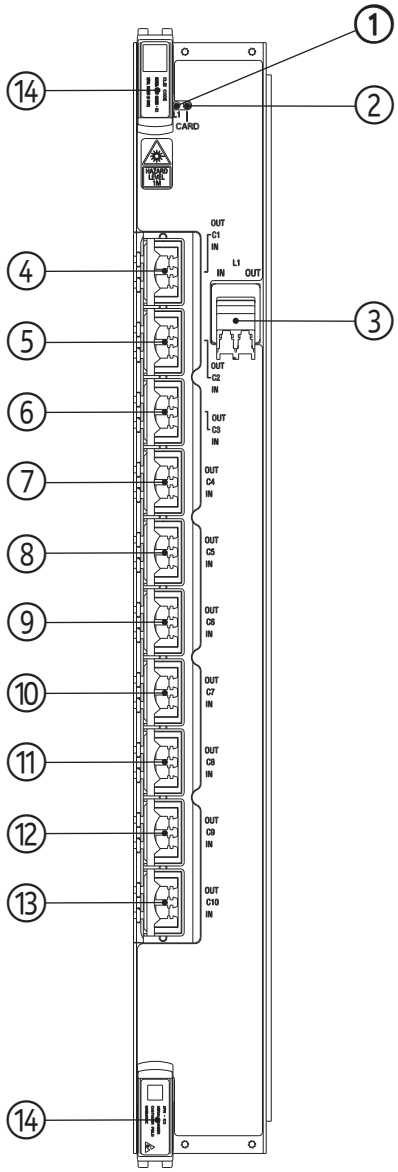
Notes:

1. Using the CLI, the client port can be set to one of the following values: OC-192, STM-64, 10 GbE, OTU2 or FC800. When configured for OTN the client port is set to OTU2, and the OTURATE parameter is configured for either 10.709, 11.049, or 11.096, where 10.709 is OTU2, 11.049 is OTU1e, and 11.096 is OTU2e.

8.20.4 130SCX10 front view

The following figure illustrates a front view of the faceplate of the 130SCX10.

Figure 8-81 130SCX10 faceplate



Legend:

1	LEDs “L1”
2	LEDs “CARD”
3	“L1” interface
4	“C1” interface
5	“C2” interface

6	“C3” interface
7	“C4” interface
8	“C5” interface
9	“C6” interface
10	“C7” interface
11	“C8” interface
12	“C9” interface
13	“C10” interface
14	Card latch

8.20.5 Visual Indications

For information about the LEDs on the front panel, see 13.9 “Common LEDs of WDM cards” (p. 1582).

8.20.6 Location

For information about the applicable shelves and slot ranges, refer to “Shelf slot ranges” (p. 1487).

Note: To ensure sufficient thermal management, the 130SCX10 cards require the high-power fan (FAN32H) to be used in the 1830 PSS-32 shelf.

8.20.7 Application: Using Eight 130SCX10 cards in a 1830 PSS-32 shelf

The 1830 PSS-32 shelf can support up to eight 130SCX10 cards plus common equipment assuming typical power consumption for all cards. Prudent engineering practice demands some margin to accommodate component and environmental variation. In this application note we describe the steps necessary to operate eight 130SCX10 cards (or their equivalent) in a 1830 PSS-32 shelf and the restriction imposed by that configuration on office supply voltage.

Important! If the magnitude of the office voltage at interface A (the point of connection to the supply) falls below 44 V and one of the shelf power filters fails, the circuit breakers on the power modules may disconnect the shelf from the main power to protect the service wiring. Under some worse case scenarios this shelf configuration will draw more than 70 A when the magnitude of the voltage falls below 44 V.

Note: Service wiring must be of sufficient gauge to carry more than 70 A to meet the electrical code and UL standards.

Eight of these cards deployed in a 1830 PSS-32 dissipate 2640 W. This is in addition to the shelf infrastructure of two EC cards + two PFDC70 + FAN32H + USRPNL (if this is a single shelf system) = 3007 W The total load is greater than the 2730 W capacity of the power supply for the shelf which is limited to 70 A per side by the circuit breakers on the highest capacity power entry modules available. The minimum voltage magnitude is -39.0 V measured at the power filter card – that is where the low voltage cut-off circuitry disconnects the system from the battery plant. When a circuit

breaker is tripped, manual intervention is needed to reset it and the system will not recover unattended when the low voltage condition is over.

Up to seven cards can be used without any configuration changes even under worse case conditions. Before the eighth card is inserted into the shelf certain reconfiguration steps need to be taken to permit the eighth card to operate properly without unnecessary alarms or put the user at elevated risk of losing some or all traffic in a shelf.

The important constraint is that the user of this configuration must guarantee that the input voltage to the network element at interface A not fall below 44 V in magnitude relative to the return at interface A (battery voltage is negative relative to the return). “Interface A” is the point at which the power leads are fastened to the power entry modules. Voltage can be measured at faceplate test points, and is measured by the system by data acquisition at an equivalent internal location.

Since this will most likely be a multi-shelf system do not deploy the eight high power consumption cards in the master shelf. This will allow the system to continue partial operation and connection with the network operating system even when the office voltage falls below what is required to support the load of the shelf full of Optical Transponders.

Note: In multi-shelf systems, the shelf requiring the floor voltage above the minimum operating voltage should not be the master shelf of the network element to prevent loss of all operations under low voltage conditions.

8.20.8 Protection

The following protection configurations are supported:

- OCH (OPSA)
- OSNCP protection managed by consequent action on Signal Fail (SF) and Signal Degrade (SD) from the line side ports of an OT
- OSNCP (OPSB/OPSB5)
- OMSP