Huawei OptiX OSN 8800 Board Compatibility - Modular Expansion and Line Card Compatibility Guide

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MODULAR EXPANSION AND LINE CARD COMPATIBILITY GUIDE

EXECUTIVE SUMMARY

This document serves as the official technical reference for board compatibility and modular expansion within the Huawei OptiX OSN 8800 series intelligent optical transport platform. As a carrier-grade MS-OTN solution, the OptiX OSN 8800 is architected to support a comprehensive ecosystem of service processing, switching, and optical interface boards. This guide delineates the validated compatibility matrices, subrack slot mappings, and cross-connect board requirements essential for system integration and capacity expansion planning.

The OptiX OSN 8800 series — comprising the T64, T32, T16, and Universal Platform Subracks (UPS) — delivers up to 6.4 Tbit/s of non-blocking electrical cross-connect capacity and supports 40G/100G/200G line rates. Its modular design enables seamless integration with the broader Huawei OSN product family, including the OSN 9800, OSN 6800, and OSN 1800, facilitating end-to-end OTN/WDM backbone and metro network deployments.

CHASSIS OVERVIEW AND SUBRACK COMPATIBILITY

The foundation of board compatibility is the physical subrack architecture. The OptiX OSN 8800 is available in four primary subrack variants, each with distinct slot counts, physical dimensions, and cross-connect capabilities. Understanding these parameters is critical for determining which boards are supported in a given deployment scenario.

OptiX OSN 8800 T16 Subrack

The T16 subrack is the most compact variant, with a 16-slot capacity and dimensions of 450 mm (H) x 447 mm (W) x 295 mm (D). It serves as an ideal solution for metro aggregation and edge applications where space is at a

premium. The T16 supports line mode operation for NS4 series boards when equipped with the TN16UXCM cross-connect board.

OptiX OSN 8800 T32 Subrack

The T32 subrack doubles the capacity to 32 slots and is housed in a 900 mm (H) x 498 mm (W) x 290 mm (D) chassis. This platform is commonly deployed in regional backbone and metro core networks. Board compatibility on the T32 is notably flexible: it supports both line mode and relay mode for various boards, but certain configurations — such as line mode for TN56NS4 and later NS4 generations — require the TN52UXCH or TN52UXCM cross-connect boards, along with the requisite "OSN 8800 T32 standard subrack speedup" license.

OptiX OSN 8800 T64 Subrack

The flagship T64 subrack is the highest-density variant, accommodating 64 service board slots in a 900 mm (H) x 498 mm (W) x 580 mm (D) chassis. It is purpose-built for national backbone and large-scale regional networks. The T64 subrack is available in standard and enhanced variants. The enhanced T64 subrack is mandatory for NS4 boards operating in line mode, and requires the TNK2USXH + TNK2UXCT cross-connect board combination.

OptiX OSN 8800 Universal Platform Subrack (UPS)

The UPS variant offers 16 slots (15 for AC configurations) in a compact 442 mm (W) x 295 mm (D) x 397 mm (H) footprint. While it provides a subset of the capabilities of the T-series subracks, it ensures compatibility with a wide range of service boards for smaller-scale deployments.

EXPANSION SLOTS AND LINE CARDS

The OptiX OSN 8800 employs a universal slot architecture based on Intelligent Interface Units (IU). Each slot is designated by an IU number, and board compatibility is strictly defined by the slot range applicable to each subrack model.

The following table provides a high-level summary of the valid slot ranges for common board types across the OSN 8800 subrack variants.

Parameter	**T16 Subrack**	**T32 Subrack**	**T64 Subrack**	**Universal Platform Subrack**
Service Board Slots	16	32	64	16 (DC) / 15 (AC)

Dimensions (W x D x H)	447 x 295 x 450 mm	498 x 290 x 900 mm	498 x 580 x 900 mm	442 x 295 x 397 mm
Empty Chassis Weight	18 kg	35 kg	65 kg	8 kg
Max Electrical Cross-Connect	1.28 Tbit/s (SDH)	6.4 Tbit/s (OTN)	6.4 Tbit/s (OTN)	Varies by configuration
NS4 Line Mode Support	Yes (with TN16UXCM)	Yes (Enhanced T32 with TN52UXCH/TN52UXCM + license)	Yes (Enhanced T64 with TNK2USXH + TNK2UXCT)	No
Supported Line Rates	40G/100G/200G	40G/100G/200G	40G/100G/200G	40G/100G/200G
Max WDM Channels	96 (Extended C-Band)	96 (Extended C-Band)	96 (Extended C-Band)	96 (Extended C-Band)

BACKPLANE INTERCONNECT LOGIC

The backplane of the OptiX OSN 8800 is engineered to support high-speed, low-latency data and control plane traffic. The cross-connect boards are the central nervous system of the platform, responsible for non-blocking ODUk (k=0, 1, 2, 2e, 3, 4, flex) and VC electrical switching. The compatibility of service boards is not only determined by physical slot placement but also by the capabilities of the installed cross-connect boards.

Line Mode vs. Relay Mode Compatibility

A critical distinction in board compatibility is the operational mode: Line Mode and Relay Mode. Understanding this distinction is essential for configuring NS4 family boards and ensuring optimal performance.

Line Mode: In this mode, the service board interfaces directly with the cross-connect board for full ODUk-level grooming and switching. This mode provides the highest degree of operational flexibility and bandwidth utilization efficiency. However, it imposes specific requirements on both the subrack variant and the cross-connect board installed.

Relay Mode: In relay mode, the service board operates with reduced cross-connect functionality, often acting as a simple pass-through or optical-electrical-optical (OEO) regenerator. This mode is generally supported

across a wider range of subrack configurations but does not leverage the full switching capacity of the platform.

The compatibility matrix for NS4 boards (TN54NS4, TN56NS4, TN57NS4, TN58NS4, TN59NS4) illustrates this interdependence clearly.

- General T64 Subrack: Supports only Relay Mode for NS4 boards.
- Enhanced T64 Subrack: Supports Line Mode for NS4 boards when paired with TNK2USXH + TNK2UXCT cross-connect boards.
- General T32 Subrack: Supports Relay Mode for most NS4 boards. Line Mode is supported for TN56NS4 and later boards, but requires TN52UXCH/TN52UXCM cross-connect boards and a specific speedup license.
- Enhanced T32 Subrack: Supports Line Mode for NS4 boards with the appropriate cross-connect board configuration.
- T16 Subrack: Supports Line Mode for NS4 boards when equipped with the TN16UXCM cross-connect board.

Cross-Connect Board Compatibility

The cross-connect boards are the central switching fabric of the system. Different cross-connect boards offer varying switching capacities and support different service types. The table below summarizes the compatibility

requirements for key board categories. The choice of cross-connect board directly influences which service boards can be deployed and their operational mode.

FULL MODULE PARAMETERS

Service Processing Boards

The OptiX OSN 8800 supports a wide array of service processing boards designed for diverse transport applications.

Line Service Processing Boards (NS2, NS3, NS4 Families)

These boards are responsible for aggregating client-side services and interfacing with the WDM optical layer. The NS2 family provides 10G/40G/100G line-side interfaces with a variety of FEC encoding options (HFEC, SDFEC, SDFEC2). For instance, the TN53NS2 board maps client signals such as 8xODU0, 4xODU1, or 1xODU2 into a single OTU2 signal for WDM transmission.

NS4 boards (TN54NS4 to TN59NS4) are 100G-class line cards that support a 150000 ps/nm-C Band-Tunable wavelength-ePDM-QPSK optical interface. The transition from TN54NS4 (HFEC/SDFEC) to TN59NS4 (SDFEC2/FEC) represents a

generational improvement in FEC coding gain, enabling longer reach transmission and enhanced optical tolerance.

Optical Layer Processing Boards (FIU, ITL, MCS)

The Fiber Interface Unit (FIU) and Interleaver (ITL) boards are fundamental components of the optical layer. The TN11ITL board, for example, multiplexes and demultiplexes C-band signals and provides an in-service monitoring port for optical spectrum analysis.

The TN51MCS0816 board is a sophisticated multi-cast switching board supporting 8-degree ROADM configurations with 16 add/drop multiplexing ports. This board facilitates colorless, directionless, and contentionless (CDC) optical-layer grooming, supporting up to 96 DWDM channels in the extended C-band.

Protection and Monitoring Boards

The platform includes specialized boards for optical performance monitoring. The Optical Doctor (OD) system and Fiber Doctor (FD) system, integrated via the U2000 network management system, enable real-time online monitoring of OSNR, optical power, and BER across all wavelengths, significantly enhancing

network maintainability.

RELEVANT STANDARDS AND COMPLIANCE

The OptiX OSN 8800 platform and its associated boards adhere to a comprehensive set of industry standards and telecommunications regulations. Compliance with these standards ensures interoperability and operational reliability in multi-vendor environments.

- ITU-T G.694.1 (DWDM Frequency Grid): The platform supports the extended C-band (1529.16 nm to 1567.13 nm) with 100 GHz or 50 GHz channel spacing, enabling a maximum of 96 wavelengths per fiber.
- ITU-T G.709 (OTN Framing): All OTN service boards support the standardized Optical Transport Unit (OTU) and Optical Data Unit (ODU) frame structures, including overhead processing and Forward Error Correction (FEC) mechanisms.
- ITU-T G.873.1 (Optical Transport Network ASON): The platform supports GMPLS/ASON-based optical and electrical layer intelligence for automated end-to-end service provisioning and restoration.
- IEEE 1588v2 and Sync-E: Precise clock transport is supported for 3G/4G/5G mobile backhaul applications.
- Regulatory Compliance: The hardware complies with applicable CE, ISO, and RoHS environmental and safety standards.

CONCLUSION

The Huawei OptiX OSN 8800 series offers a highly modular and scalable platform for building next-generation OTN/WDM transport networks. Board compatibility is governed by a precise interplay between the chosen subrack variant, the installed cross-connect boards, and the specific requirements of the service cards themselves. By adhering to the compatibility matrices and operational guidelines outlined in this document, network planners can ensure successful integration, optimal performance, and future-proof scalability of their optical infrastructure.