Auto-Adaptive XPON ONU OMCI Register Mapping for Nokia OLT Platforms - Official Technical Overview & Hardware Datasheet

AUTO-ADAPTIVE XPON ONU OMCI REGISTER MAPPING FOR NOKIA OLT PLATFORMS - OFFICIAL TECHNICAL OVERVIEW & HARDWARE DATASHEET

EXECUTIVE SUMMARY

This document provides a comprehensive technical overview of the next-generation Auto-Adaptive XPON Optical Network Unit (ONU) series, specifically engineered for seamless interoperability and advanced OMCI (ONT Management and Control Interface) register mapping with Nokia OLT (Optical Line Terminal) platforms. Designed for Tier-1 telecom and enterprise access networks, this hardware series redefines the standard for automated provisioning, zero-touch service activation, and granular performance monitoring across heterogeneous PON infrastructures. By embedding an intelligent, vendor-agnostic adaptation layer, the ONU eliminates manual configuration discrepancies and accelerates service deployment cycles.



HARDWARE ARCHITECTURE & SILICON

The foundational architecture of the Auto-Adaptive XPON ONU is built around a high-performance, dual-core ARM-based network processor featuring a hardware-accelerated OMCI engine. This dedicated engine handles all aspects of the OMCI protocol stack, including the complex Management Information Base (MIB) attribute mapping and conditional attribute processing defined by ITU-T G.988 standards. The unit houses a robust 1G/2.5G/10G tri-speed PON MAC that incorporates a forward error correction (FEC) offload engine to maintain bit-error-rate (BER) thresholds below 1E-15 in high optical loss budgets. The silicon is paired with 512MB of DDR4 memory for deep packet buffering and 512MB of NAND flash for firmware redundancy, ensuring high availability and fail-safe over-the-air updates.

KEY FEATURES & ROUTING LOGIC

- Dynamic OMCI Register Mapping: The ONU features a sophisticated Finite State Machine (FSM) that automatically parses and maps Nokia OLT-specific OMCI registers to the ONU's internal MIB. It supports both proactive and reactive mode mapping, allowing the OLT to discover and manage the ONU's capabilities without manual intervention.
- XPON Auto-Detection & Adaptivity: The unit automatically negotiates transmission modes (Gigabit PON, 10G PON, or XGS-PON) to match the upstream OLT, facilitating future-proof network upgrades with zero hardware replacement.
- Layer 3 Routing & Forwarding: Integrated static routing and RIP (Routing Information Protocol) v2 enable efficient traffic segmentation in enterprise deployments. The ONU supports up to 1000 IPv4/IPv6 forwarding table entries.
- Hierarchical Quality of Service (HQoS): Advanced traffic shaping with up to 8 priority queues per port, utilizing Weighted Fair Queuing (WFQ) and Strict Priority (SP) scheduling algorithms to maintain strict Service Level Agreements (SLAs).
- Security & Authentication: Hardware-accelerated AES-128/256 encryption for data payloads and MACsec for secure point-to-point links. Integrated 802.1X supplicant for network access control.

COMPLIANCE & STANDARDS

- ITU-T G.984.x (GPON), G.987.x (XG-PON), G.9807 (XGS-PON)
- ITU-T G.988 (OMCI Specification)
- IEEE 802.3az (Energy Efficient Ethernet)
- IEEE 802.1p (Priority Queuing), IEEE 802.1Q (VLAN Tagging)
- RoHS and WEEE Directive Compliant
- Safety: UL 60950-1 and IEC 60825-1 (Laser Safety Class 1)
- Telcordia GR-1089-CORE (EMC and Surge Immunity)

TECHNICAL SPECIFICATIONS

Physical & Environmental:

- Form Factor: Wall-mount / Desktop (Compact, Fanless Design)
- Optical Connector: 1 x SC/APC (PON Port)
- Ethernet Interfaces: 1 x 10/100/1000BASE-T (GE) & 1 x 10G/5G/2.5G/1G/100M (Multi-Gigabit RJ-45)
- Operating Temperature: 0°C to +50°C (Standard) / -40°C to +70°C (Industrial Wide-Temp variant)
- Power Supply: External Power Adapter (Input: 100-240V AC, 50/60Hz; Output: 12V DC, 2A)
- Power Consumption: Idle: 4W, Max: 8W

Performance Metrics:

- Maximum PON Throughput: Downstream 9.95 Gbps / Upstream 9.95 Gbps (XGS-PON mode)

- OMCI Response Time: < 50 ms (Average Register Read/Write)

- Forwarding Capacity: 14.88 Mpps (for 64-byte packets)

- Packet Buffer Size: 512 MB

Parameter	**Specification**
Form Factor	Compact Fanless Desktop / Wall-Mount
PON Standard	GPON (2.488G Down / 1.244G Up), XG-PON / XGS-PON (10G Symmetrical)
Optical Power Budget	Class B+: > 20dB / Class C+: > 32dB
OMCI Capabilities	Full MIB Attribute Mapping, Conditional Processing, On-demand Discovery
Forwarding Capacity	14.88 Mpps (64-byte packets)
Power Supply	External 12V DC, 2A (Hot-Swappable option available)

ORDERING SKU INFORMATION

Product Variants:

- Model AXP-1000: Auto-Adaptive XPON ONU with 1 x GE + 1 x Multi-Gig (Default Nokia OMCI Profile).

- Model AXP-1010-IT: Extended Temperature (-40 ° C) variant with same interface suite.

Accessory Kits: Standard mounting brackets, power supply, and quick-start guide are included. SFP modules and fiber patch cords are sold separately for OLT-side connectivity.

Warranty & Support: All hardware includes a standard 1-year advanced replacement warranty. Extended 3-year and 5-year hardware support contracts are available, offering 24/7 technical assistance and firmware update subscriptions.

