OEM Bridged ONU Layer 2 Forwarding Interoperability on Alcatel-Lucent OLT Platforms - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

This document serves as the definitive technical specification and engineering reference for the OEM Bridged ONU, a carrier-grade optical network unit meticulously architected for seamless Layer 2 forwarding interoperability with Alcatel-Lucent Optical Line Terminal (OLT) platforms. Designed for service providers, system integrators, and enterprise network architects, this hardware platform provides a transparent, high-performance bridge between GPON fiber infrastructure and customer-premises equipment, ensuring deterministic low-latency performance and protocol-transparent connectivity. This device represents a paradigm shift in fiber access network design, delivering a purpose-built bridging solution for next-generation Fiber-to-the-Home (FTTH) and Fiber-to-the-Business (FTTB) deployments .



CORE INTERNAL TOPOLOGY

At the heart of this OEM Bridged ONU lies a state-of-the-art, power-optimized GPON Media Access Control (MAC) chipset, purpose-built for bridging applications. The architecture comprises a highly integrated System-on-Chip (SoC) featuring an advanced Packet Processing Engine (PPE) capable of wire-speed forwarding. The device leverages a single-mode SC/APC optical transceiver for the upstream PON interface, providing a robust physical layer connection capable of sustaining a 2.488 Gbits/s downstream rate and a 1.244 Gbits/s upstream rate .

The architecture utilizes a store-and-forward switching mechanism, ensuring deterministic latency and error-free packet propagation. The non-blocking internal fabric guarantees that the 2.5 Gbps PON uplink and the

10/100/1000Base-T Ethernet port can operate at full line-rate simultaneously, preventing any data bottleneck and ensuring peak performance for high-bandwidth applications. The system supports a MAC address table of up to 1,024 entries, enabling efficient frame filtering and forwarding in diverse network topologies . It fully supports bidirectional Forward Error Correction (FEC) and RS(255,239) FEC CODEC, extending optical reach and ensuring data integrity. The inclusion of a Dying-Gasp check and report mechanism provides critical last-gasp status notification upon power loss, a vital feature for fault management and network reliability .

SWITCHING SUBSYSTEM CAPABILITIES

The ONU operates as an IEEE 802.1D compliant bridge, offering a transparent, high-speed data pipe. It forwards all frames based on MAC address learning, with no IP routing functionality, preserving the end-user's public IP connectivity from the OLT directly to the customer premises equipment (CPE), thereby eliminating double-NAT issues. The device supports up to 32 T-CONT (Transmission Containers) and 256 GEM Ports, providing granular service delineation and traffic management capabilities for advanced service provisioning . It also features hardware-based priority queuing for enhanced Quality of Service (QoS), adhering to IEEE 802.1p Class of Service (CoS) classification, ensuring latency-sensitive traffic like VoIP and video conferencing

receive preferential treatment over best-effort data .

Operational Advantages:

- FLUENT INTEROPERABILITY: Full compliance with ITU-T G.984.x standards ensures flawless Layer 2 interoperability with Alcatel-Lucent OLT platforms, allowing for seamless network integration and the extension of advanced OLT management capabilities to the customer edge .
- NETWORK TRANSPARENCY: Operates as a transparent bridge, preserving the end-user's public IP addressing and eliminating double-NAT issues. This makes it an ideal solution for enterprise-grade connectivity where public IP preservation is paramount.
- CARRIER-GRADE ROBUSTNESS: Supports advanced OAM (Operations, Administration, and Maintenance) functions including PLOAM (Physical Layer OAM), OMCI (ONU Management and Control Interface) for remote management, and DBA (Dynamic Bandwidth Allocation) for optimized upstream bandwidth utilization .
- ENHANCED SECURITY: Incorporates AES-128 encryption for secure data transmission over the GPON network, safeguarding subscriber data integrity and confidentiality in accordance with ITU-T G.984 standards .
- RESILIENT POWER DESIGN: Features an 11 V to 14 V DC input with low power consumption (<2.5W typical), enabling flexible deployment options and

reducing operational expenditures .

SPECIFICATION MATRIX

Parameter	**Specification**
Form Factor	Compact Desktop / Wall-Mountable (OEM Enclosure)
GPON Uplink Port	1 x SC/APC Single-Mode Fiber (ITU-T G.984 Compliant)
Client Port	1 x 10/100/1000Base-T (RJ45) with Auto-Negotiation & MDI/MDIX
Switching Capacity	Non-Blocking, Full-Duplex
Forwarding Rate	Line-Rate at 64-Byte Packets
Packet Buffer Memory	128 KB Integrated RAM
MAC Address Table	Up to 1,024 Entries
Power Supply	External DC 12V / 0.5A (AC Adapter Included)
Power Consumption	< 2.5 W (Typical)
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity (Operating)	10% to 90% (Non-Condensing)
Dimensions (W x D x H)	130 x 95 x 30 mm

Weight	~0.2 kg (Unit Only)

REGULATORY COMPLIANCE

The OEM Bridged ONU is designed and tested to meet the most stringent global regulatory and telecom standards, ensuring global deployment readiness and network operator confidence.

- ITU-T G.984.1/2/3/4: Full compliance with the GPON standard suite, guaranteeing interoperability and performance .
- IEEE 802.3-2005: Compliance with Ethernet standard for 10/100/1000Base-T interface .
- IEEE 802.1Q: VLAN tagging and frame handling support .
- IEEE 802.1p: Class of Service (CoS) for QoS prioritization .
- FSAN (984.4): Compliant OMCI interface for ONT management .
- CE, FCC, RoHS: Certified for electromagnetic compatibility, radio frequency emissions, and environmental safety .
- UL 60950-1: Safety standard compliance .
- ITU-T K.21: Surge immunity and lightning protection, ensuring resilience in outside-plant deployments .



TARGET BACKBONE TOPOLOGIES

This ONU is optimized for a range of access network architectures:

- FTTH (Fiber-to-the-Home): Delivering ultra-broadband services to residential subscribers .

- FTTB (Fiber-to-the-Business): Providing high-speed, symmetrical connectivity for enterprise and SOHO environments .

- MDU/MTU (Multi-Dwelling/Tenant Units): Facilitating cost-effective service delivery in apartment complexes and office buildings.

- SOHO (Small Office/Home Office): Offering reliable and secure connectivity for professional applications.

The device's compact, fanless, desktop/wall-mountable form factor allows for

flexible and discreet installation in space-constrained environments, directly addressing the needs of modern, high-density fiber access networks.