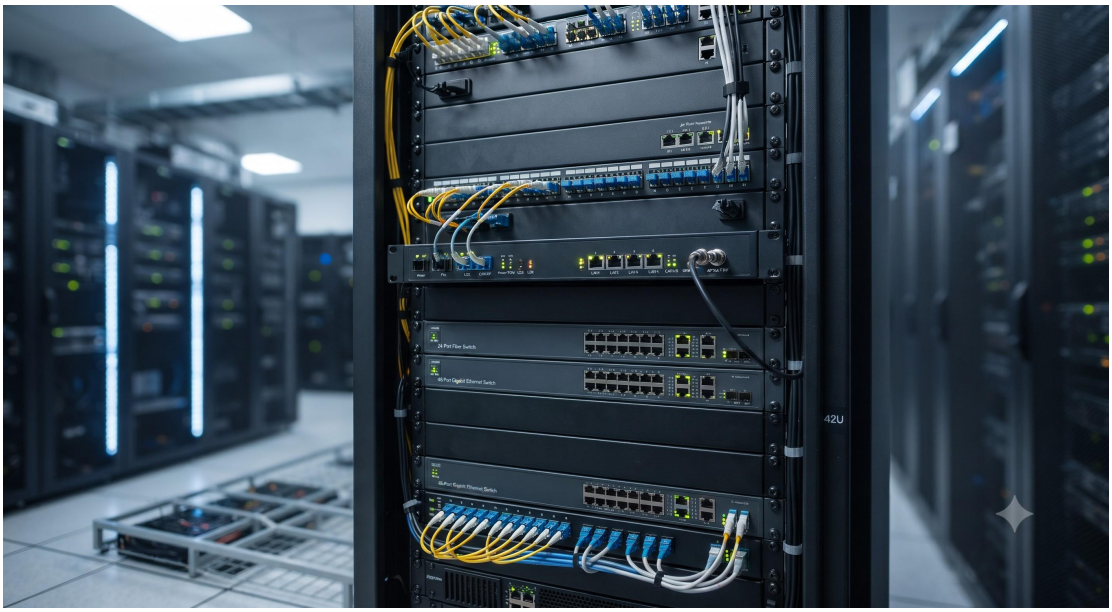
High-Quality Alternative CATV-Enabled GPON ONU Receiver Optical Sensitivity Ranges - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

This document provides a comprehensive technical overview and hardware datasheet for the High-Quality Alternative CATV-Enabled GPON ONU (Optical Network Unit) series. Designed to bridge the gap between robust legacy CATV infrastructure and next-generation GPON (Gigabit Passive Optical Network) architectures, these ONU devices deliver exceptional optical sensitivity and RF performance. They are engineered to meet the stringent demands of triple-play service delivery, ensuring superior Signal-to-Noise Ratio (SNR) and optimal bit error rates even under challenging optical path conditions.

Leveraging a field-proven optical receiver front-end, these units provide a viable, high-performance alternative to incumbent vendors, offering a seamless migration path for network operators seeking to optimize total cost of ownership (TCO) without compromising network reliability or service quality.



HARDWARE ARCHITECTURE & SILICON

The underlying hardware architecture of the ONU is built around a highly integrated system-on-chip (SoC) that combines a high-sensitivity burst-mode receiver with a sophisticated analog front-end for RF video overlay. The silicon design prioritizes low-power consumption and high thermal efficiency, enabling stable operation across a wide industrial temperature range. Key architectural components include:

- Photodetector & TIA: An advanced avalanche photodiode (APD) coupled with a low-noise transimpedance amplifier (TIA) forms the foundation of the optical front-end, maximizing receiver sensitivity.

- GPON MAC & SERDES: An integrated GPON MAC and high-speed Serializer/Deserializer (SERDES) handles upstream burst transmission and

downstream continuous-mode reception per the ITU-T G.984 standard.

- RF Amplifier & Diplexer: A dedicated, high-linearity RF amplifier and diplexer circuit ensures robust CATV signal extraction, maintaining low distortion for analog and digital TV channels.

- Embedded CPU: A powerful ARM-based CPU manages the ONU management and control interface (OMCI), layer-2 bridging, and Quality of Service (QoS) scheduling.

KEY FEATURES & ROUTING LOGIC

The device features a robust layer-2 switching engine capable of wire-speed forwarding with a non-blocking architecture.

- Feature 1: Superior Receiver Optical Sensitivity: The device boasts a receiver sensitivity of down to -28.5 dBm for 2.5Gbps downstream, and -30 dBm for 1.25Gbps upstream, ensuring reliable operation over long-reach PON networks (up to 20km) with a 1:128 split ratio.

- Feature 2: Integrated CATV RF Overlay: Provides a high-output RF signal (up to 80 dBuV) with excellent linearity (CSO/CTB > 60 dBc), eliminating the need for external RF amplifiers in most FTTH deployments.

- Feature 3: Advanced Dynamic Bandwidth Allocation (DBA): Compliant with ITU-T G.984.3 and G.988 standards for efficient upstream bandwidth

management, reducing latency and jitter for real-time services.

- Feature 4: Robust Security: Supports AES-128 encryption for downstream data, ensuring service privacy and network security against eavesdropping.

- Feature 5: Comprehensive Management: Fully manageable via OMCI, TR-069, and SNMP, providing flexible options for remote provisioning, monitoring, and fault diagnosis.

COMPLIANCE & STANDARDS

The device fully complies with the following industry standards, ensuring seamless interoperability with mainstream OLT (Optical Line Terminal) equipment from leading vendors.

- ITU-T G.984.1, G.984.2, G.984.3, G.984.4, G.988.
- IEEE 802.3ah (Ethernet in the First Mile).
- SCTE-40 (Formerly DVS-315) for RF return path and video performance.
- RoHS and WEEE environmental directives.

TECHNICAL SPECIFICATIONS

The following section details the critical optical and electrical parameters of the ONU. The high-quality alternative unit is designed to meet or exceed the

standard specifications for GPON ONUs in the market.

Parameter	Specification
Form Factor	Indoor / Outdoor SFP or Standalone MDU (Compact 1RU / Desktop)
Downstream Wavelength	1490 nm
Upstream Wavelength	1310 nm
CATV Wavelength	1550 nm
Receiver Sensitivity (Downstream)	-28.5 dBm (BER ≤ 10^-10)
Receiver Sensitivity (Upstream)	-30 dBm (BER ≤ 10^-10)
Maximum Optical Input Power	-8 dBm (Downstream)
RF Output Level (CATV)	75 ~ 80 dBuV
RF Frequency Range	54 ~ 1002 MHz
GPON Bit Rate (Down/Up)	2.488 Gbps / 1.244 Gbps
Power Supply	Dual Hot-Swappable Redundant AC/DC (12V DC External Adapter option)
Operating Temperature Range	-10°C to 55°C
Power Consumption	< 10W
MTBF (Mean Time Between Failures)	> 100,000 Hours (Telcordia SR-332)


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RX
TX
RESET