# Product Overview

H660EM optical network terminal is targeted for all subscribers requiring high-speed data interfaces in a cost-effective indoor housing. Fully compliant with ITU-T G.984 standards, the H660EM supports data rates of 1.25Gbps upstream and 2.5Gbps downstream. With our leading-edge GPON technology, users can enjoy bandwidth-intensive multimedia services such as real-time audio, and gaming much easier and faster than ever before.

The H660EM provides one GPON uplink port, 1 Gigabit Ethernet (10/100/1000Base-T) ports, 3 Fast Ethernet (10/100Base-T) ports, and Wireless LAN interface that enhance the ability to deliver demanding data/Wi-Fi services, therefore, trying hard to maintain high standards while still charging reasonable prices. The H660EM supports the delivery 24/7 of all types multiple of services, such as High-Speed Internet at L2 bridge or L3 route (with support of NAT/static route); VoIP (SIP/H323 protocol), video services (IPTV) at L2 bridge. H660EM can also provide L2 bridge service for Layer 2 VPN, IP Camera monitoring, or any L2 service at L2 bridge, and/or Layer VPN service is terminated at ONT

The H660EM contains both built-in wire-speed L2 switch and L3 routing gateway with port forwarding, NAT and NAPT address translation, Internet WAN (PPPoE client, Static IP address, DHCP client) support for high speed Internet service.

Service Scenario for PON
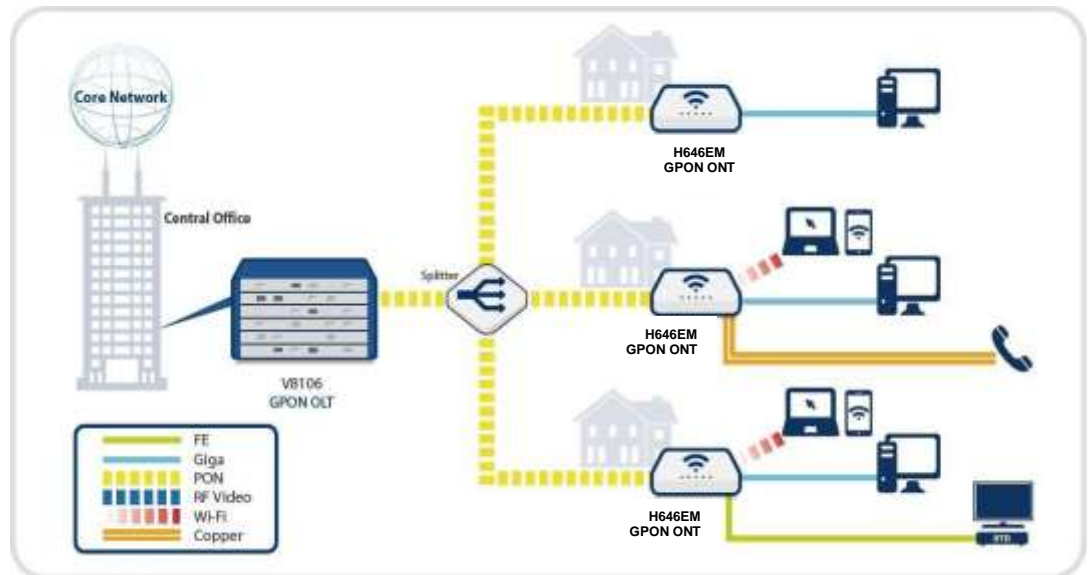
A PON consists of an Optical Line Termination (OLT) located at the Central Office and a set of Multi Dwelling Units (MDUs) or Optical Network Terminals (ONTs) located at the customer's premises. Between them is the optical distribution network (ODN) comprised of fibers and passive optical splitters or couplers. A splitter is a device that divides an optical signal into two or more signals. The OLT connects the PON to the IP network that controls and manages the PON clients. An MDU (ONT) connects the user-specific network to the PON. The ONT can be utilized by a single subscriber or used as a multi-dwelling gateway for a local network.

ONT acting as a router, establishing a PPPoE connection session and performing DHCP, NAT / PAT functions so that client on the LAN can access the Internet. Acting as an L2 bridge device as the setting environment for PPPoE/DHCP connection session from STB (IPTV) devices; telephones (VoIP) and computers (HSI) are located behind ONT devices.

Interface Layout

The following drawing shows the interface layout of the product.
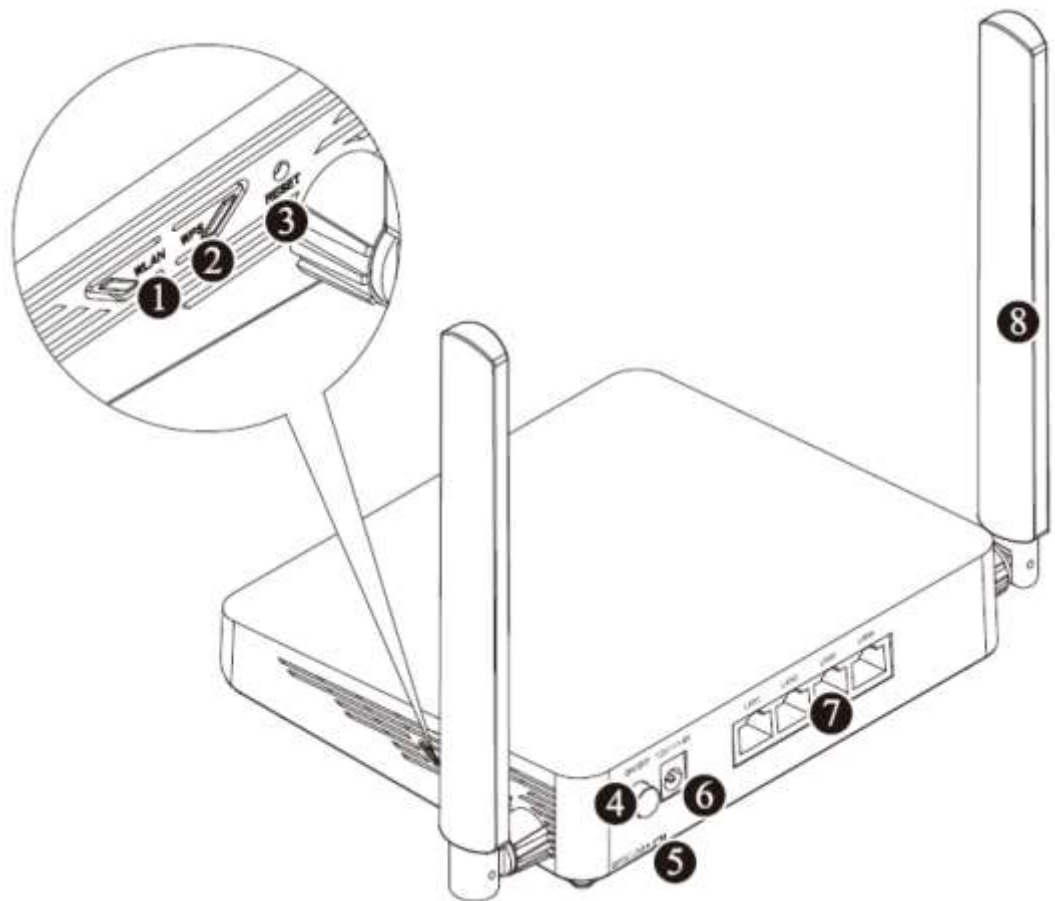
Interface Name	Description	Connector Type
① WLAN	Enable Wi-Fi function.	-
② WPS	Enable WPS process.	-
③ RESET button	Restore the unit to default setting.	-
④ ON/OFF button	Turn on/off/reboot the unit.	-
⑤ Optic Line	Connect to OLT via a passive optical splitter. 1 GPON uplink interface.	SC/APC
⑥ Power port	Connect an external power supply.	-
⑦ LAN 1-4	Connect to PC or LAN. 1 10/100/1000Base-T interfaces for data communication. 3 10/100Base-T interface for data communication.	RJ45
⑧ Antenna	Transmit and receive Wi-Fi packets.	-

V2.2

Operating Status LEDs

The status of the ONT is indicated by the LEDs located on the front of unit. LED indicators illuminate to show normal ONT operation, and will blink and/or turn off to indicate the status or errors. Refer to the following table for details of each LED state.

PWR PON ALM Internet   2.4/5G WPS LAN1 LAN2 LAN3 LAN4
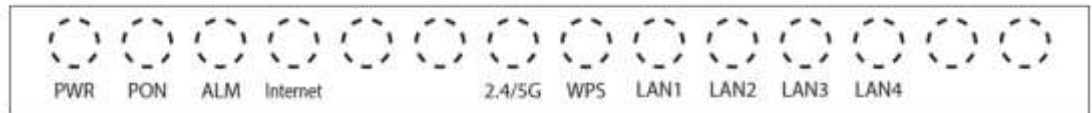
Label	Color	Status	Description
PWR	Green	On	The system is turned on.
	Off		The system is turned off.
PON	Red	On	No optic signal. And the unit has not been registered.
	Green	On	Optic signal normal. Normally registered. OMCI success.
		Blinking	Firmware being downloaded.
ALM	Red	On	No optic signal, firmware update failure or other faults.
	Off		Received optical power is normal.
Internet	Green	On	In service.
	Off		Not in service.
2.4/5G	Green	On	The 2.4G Wi-Fi function enabled.
	Blue	On	The 5G Wi-Fi function enabled.
		Blinking	The 2.4/5G Wi-Fi function enabled.
	Off		Wi-Fi function disabled.
WPS	Green	On	WPS connection successfully established (for 5 seconds).
		Blinking	WPS in progress.
	Off		Disabled or process finished successfully.
LAN 1-4	Green	On	The link is up.
		Blinking	Transmit or receive activity is present on the service port.
	Off		The link is down.

Product Specifications

Capabilities

System

- 128MB Flash/Embedded 128MB SDRAM
- CPU: 900MHz with dual-core
- GPON Interface Capacity:
  Up 1.25Gbps / Down 2.5Gbps

GPON ONT

- ITU-T G.984.x, G.988 compliant
- AES 128-bit encryption
- Bidirectional Forward Error Correction (FEC)
- Support up to 8 T-CONTs & 32 GEM ports per device
- Flexible mapping GEM port and T-CONT
- OMCI channel encryption with variable lengths
- Priority queues and scheduling on Upstream
- Dying Gasp
- Support TR255 for IoP

L2 Features

- IEEE 802.1q (VLAN)
- IEEE 802.1ad (QinQ)
- VLAN 4K (1 – 4094)
- Source MAC learning via VLAN,PON/LAN port
- 2K MAC address table
- Maximum 8 bridge group (8 WAN bridge)
- Support transparent control protocol packet (BPDU, IGMP, OSPFv2, RIPv1, PIMv2, ARP, VRRPv2) through L2 bridge mode/QinQ

Multicast

- IGMP v1/v2/v3
- IGMP snooping/proxy
- MLDv1/v2

Quality of Service

- HW-based internal IEEE 802.1p (CoS)
- Support SP+WRR; Queue capacity ≥ 4Mbyte
- 802.1Q (VLAN tag) QoS mapping, ToS/CoS
- 8 queues per port

Management

- ITU_T 984.4 compliant OMCI interface
- IEEE802.3x flow control
- LED indications for maintenance
- Support management ONT by TR069,TR142 via ip-host 1
- ONT service provisioning (By OLT via OMCI)
- Web-based management
- Remote management by http/Telnet/SSH via WAN interface
- Restore factory default setting by Web GUI or OLT via OMCI
- Diagnostic tool in WEB GUI (ping, trace)
- Backup/Restore/Reset configuration in Web GUI
- Local/Remote upgarde via Web GUI or OMCI
- Parental control
- Auto Reboot
- Network Time Protocol NTP
- Dual OS for upgrade/rollback firmware
- Display ONT Serial Number or SLID (base on text string that input by user) on WEB GUI.

Wireless LAN

- IEEE 802.11 a/b/g/n/ac compliant
- Multiple SSIDs (4 SSID in 2.4Ghz and 4 SSID in 5Ghz), separate user traffic base per SSID.
- Up to 32 devices can accessed simultaneously
- Operating Frequencies : 2.4GHz, 5GHz
- Antenas: 2T2R MIMO, Max. data rate: 300Mbps in 802.11n, 867Mbps in 802.11ac
- Auto/Manual Channel width 20 MHz/ 40 MHz/ 80MHz (11ac)
- Auto/Manual Wifi channel selection
- Security: WEP(64/128bits), WPA-PSK (TKIP) & WPA2-PSK (AES)
- Wi-Fi Protected Setup (WPS:PBC)
- Enable/Disable Wifi (enable by default)
- Wifi Tx Power (Standard(50%)/ Medium(75%)/ High(100%)
- Wifi Client list

Security Features

- Unique password login WEB GUI
- Activation with automatic discovered Serial Number and password (LOID/SLID).
- VLAN Filter on LAN/WAN
- Unicast MAC address is learned by VLAN or basic interface
- L2 access control by (LAN MAC, Wifi MAC) Filter
- L3 access control by (LAN IP Address) Filter
- URL Filter
- BPDU Filter
- Prevent: DOS/DDOS attack
- Not allow storing and executing strange code automatically.
- Disable Web managerment on WAN by default
- Integrated stateful packet inspection IPv4/IPv6 firewall with ACL

Residential Gateway Unit Features

- Support VLAN (Tag,Untag, Transparent, Passthrough) for L2/L3 WAN
- WAN L2: Bridge
- WAN L3: PPPoE/ DHCP/IPoE
- L2 MTU size: 2000; L3 MTU size: 1500
- IPv4/IPV6/Dual stack
- Static route; Default route
- DNS proxy: Auto/Manual; DNS Relay server (DNS relay, DNS transparent)
- NAT/NAPT; NAT session management (by default 4K NAT session, maximum 8K NAT session); NAT loop back
- Port forwarding
- DMZ
- DHCP server in LAN interface
- DDNS (No IP, Dyn DNS)
- Port Mapping between WAN vs LAN/WLAN
- Support up to 5 VPN session via L2TP / IPSec / PPTP protocols in Passthrought mode (L2 throughput ≥ 200Mbps, L3 Throughput ≥ 90Mbps).

Physical Specifications

Mechanics

- Dimensions:
    215x139.96x187cm
    215x139.96x40cm (Antennas folded)
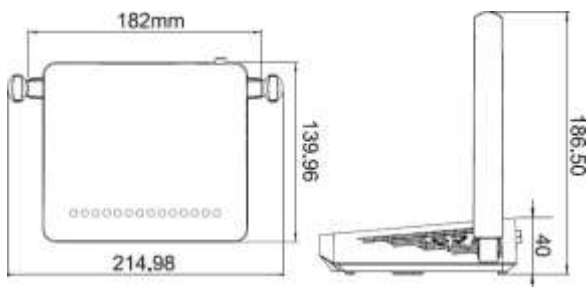
Environmental Conditions

- Operating temperature
    23 to 122°F (-5 to 50°C)
- Storage temperature
    -22 to 140°F (-30 to 60°C)
- Operating humidity
    5 to 90% (non-condensing)

Interface Parameter

- GPON interface
    1 GPON port (SC/APC type)
- Gigabit Ethernet interface
    1 10/100/1000Base-T ports (RJ45),
    IEEE 802.3ab compliant
- Fast Ethernet i/f
    3 10/100Base-TX ports (RJ45)
    IEEE 802.3u compliant
- Wireless LAN interface
    IEEE802.11a/b/g/n/ac compliant
    Antennas: 2x2 MIMO 2.4GHz/5GHz
    dual external, maximum data rate:
    300Mbps in 802.11n, 867Mbps in
    802.11ac
    Tx Power (EIRP): >= 18dBm
    Antenna Gain: 5 dBi

Power Voltage (AC/DC Adapter)

- Switching power adapter
- Input: 100-240VAC, Nominal frequency 50/60Hz (adaptive frequency range 47-63Hz)
- Output: 12VDC/1.0A
- Nominal Power: 12W
- Power efficiency ≥ 80%
- Limited input current: 250mA Max
- Maximum inrush current: 30A
- ONT nominal load current: 150mA
- Protect from overvoltage input: ≥ 2KA@8µs/20µs, uses MOV accessories.
- Output voltage limit ≤ 5% of nominal voltage
- Ripple and output noise voltage : ≤ ± 1% Nominal Voltage
- Over voltage when power off: ≤ 110% Nominal Voltage
- Nominal output current greater than 3.3 times the average load current
- Overcurrent resistant: ≥ 150% of nominal load current, output voltage in overcurrent protection mode ≤ 20% of nominal output voltage
- Overcurrent protection, output short circuit: Adapter will stop working when operating in overcurrent protection,short circuit and resume operation when the output is no longer overcurrent or short circuit.
- Insulation between input (AC) and output (DC): ≥ 1.5kV, leakage current <5mA
- Insulation resistance between input (AC) and output (DC): ≥ 10 MΩ
- AC power plug: 2-pin round type
- DC power connector 5.5mm x 2.1mm
- DC power cable: Flexible double copper wire length ≥ 1.5 m, cross- section copper conductor suitable for rated power (≤ 6A / mm2)
- IEC 60950 safety
- Not affect the device when the power is turned on and off continuously.
- Operating temperature: 0 to 40°C
- Operating humidity: 20-85% RH

Ordering Information

Base Standard

H660EM
 	
G-PON (Class B+, ITU-T G.984), 1-Port 10/100/1000Base-T, 3-Port 10/100Base-TX,Wi-Fi (802.11a/b/g/n/ac)
  - PON MAC : Econet, Flash 128MB & SDRAM 128MB
  - SC/APC Connector type
  - External antenna
  - Power Adaptor : Input 100~240VAC, Output 12V/1.0A
  -

The software functions can be adjusted without notice depends on firmware version!

Maximum wireless signal rate derived from IEEE standard 802.11 specifications. Actual data throughput and wireless coverage will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate and wireless coverage!