GPON/Active Ethernet ONT

Overview

iPhotonix GPON/Active Ethernet (AE) optical network termination (ONT) incorporates a highly scalable integrated networking approach leveraging GPON's inherent reach and passive nature to deliver advanced network access solutions using the most simplified architecture. iPhotonix ONTs are Optical Line Terminal (OLT) agnostic and interoperable with OLT systems from several vendors making them the ONTs of choice when operators design their networks to deploy cost-effective FTTx solutions. iPhotonix ONTs are built using the latest 4th generation SoCs leveraging the latest advances technology, along with unrivaled hardware acceleration, QoS and efficient power management that meets the bandwidth demands of businesses and backhaul needs of wireless operators.

Highlights

Optical Interface

The iPhotonix iVolve ONTs terminate GPON fiber via a single SC/APC type optical connector and complies with GPON Standard ITU-T Rec. G984.2 Amendments. The ONT receives data at 2.488 Gbps and sends upstream data at 1.244 Gbps over 1490 nm, 1310 nm wavelengths respectively. The following physical layer features are supported:

- Class B+ and optionally Class C optics.
- Class I laser Transceiver complies with FDA21 CFR
- 1040.10 and 1040.11.
- Received Optical Power monitoring

POTS (Plain Old Telephone System) Service

The iPhotonix Indoor GPON ONT supports plain old telephone voice services over two RJ-11 or IDC equipped connectors:

- VoIP Softswitch or CLASS 5 based high quality voice service through two POTS lines or VoIP access through four Ethernet interfaces
- Support for all protocols in one software load (SIP, MGCP, H.248

Local Area Network (LAN) Interface

- Multiple high-speed LAN interface
- Provider configurable bandwidth and Class of service
- IGMP v2 and v3 proxy
- IEEE 802.1d transparent bridge (RFC-2684)
- PPPoE Client and DNS/DHCP Server functionality
- LAN functions including Bridging, Routing, Filtering, NATP translation
- MAC level ITU 802.1p QoS standards for Streaming IP video and IPTV content delivery Wi-Fi Access Point interface (WLAN)

Data over Coax Services

The iVolve series supports MoCA 2.0 for transporting data over existing coaxial cable enabling service providers to cost effectively deliver high-speed data, IPTV, VoD and Voice over IP (VoIP)

WiFi Interface

The iVolve series supports simultaneous operation of both IEEE 802.11n and IEEE 802.11ac. 5th generation Wi-Fi 802.11ac chipset to reach speeds of up to 1.3Gbps using the 5GHz band, which is three times faster than 802.11n Wi-Fi. At the same time, it maintains full backward compatibility with all previous Wi-Fi protocols. Powerful two-way transmission and a signal-boosting high-gain amplifier design give the improved two-way transmission that extends Wi-Fi range and coverage by up to 150%. This extended reach means the elimination of dead spots at any location, offering fast and uninterrupted HD streaming and smooth multiplayer gaming. Support WPA, WPA2 authentication hardware accelerated AES-128 encryption with support for TKIP & IEEE 802.1x and PBC or PIN WPS authentication. iVolve supports up to 4 SSIDs

2x2 MIMO for 2.4GHz 11b/g/n WIFI

- Compliant with IEEE 802.11n, 2.4GHz, 20/40MHz
- 2.4GHz WIFI link speed is up to 300Mbps
- 2.4GHz throughput > 140Mbps at 40MHz bandwidth
- Transmit Power 20dBm (100mW)

3x3 MIMO for 5GHz 11a/n/ac WIFI

- Compliant with IEEE 802.11ac, 5GHz, 20/40/80MHz
- 5GHz WIFI link speed is up to 1.3Gbps
- 5GHz throughput > 600Mbps at 80MHz bandwidth
- Transmit Power 23dBm (200mW)

Technical Specifications:

Services and Features:

Optical
- 2.5 Gbps downstream, 1.244 Gbps upstream
- Optical wavelengths: 1490 +/-10nm Rx, 1310 +/-20nm Tx
- Launch power: 0.5 to +5 dBm
- Receiver Sensitivity: -27 dBm
- Input power overload: -8 dBm
- Received optical power monitoring
- Configurable GPON/Active Ethernet

GPON
- Serial number discovery and Registration ID provisioning
- ITU-T G.984/G.988 compliance
- DBA support via mode-0 DBRu (piggy-back) reporting
- Dying Gasp
- Downstream Advanced Encryption Standard (AES) support
- Forward Error Correction (FEC)
- Upstream Traffic Management using Priority-based or Rate-controlled scheduling
- Support for up to 8 T-CONTS with multiple priority queues per T-CONT
- Multiple GEM ports with flexible mapping between TCONTs and Priority queues
- pBit based GEM port and upstream Priority queue selection
- IPTV traffic filtering (Multicast GEM port)

OAM and Management
- ITU-T G.984.4/G.988 management
- Remote firmware upgrade and automatic rollback
- Webserver for local management
- SIP configuration from remote server
- ACS - CWMP (TR-069) configuration, performance monitoring, diagnostics and software download
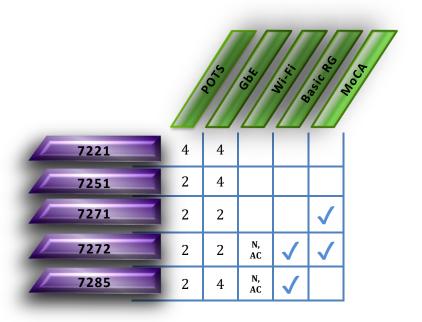- TR-101, TR-111, TR-124, TR-143

Enterprise LAN
- RJ-45 IEEE 802.1 10/100/1000 Base-T interfaces
- MDI/MDIX auto-sensing and auto-negotiation
- 802.1d Ethernet bridging and switching
- 802.1p marking/remarking, DSCP mapping
- 802.1Q including VLAN translation, filtering, tagging, stacking (QinQ)
- Up to 25 VLAN groups per port
- Automatic MAC address learning, aging and filtering
- Up to 1024 MAC address entries
- Up to 256 multicast groups
- IGMP v2/v3 Snooping with immediate leave
- Downstream pBit and flow based LAN port queue selection
- Downstream Flow and port based Rate Limiting
- WAN DHCP Client and LAN DHCP Server
- Network Address and Port Translation
- Firewall and WAN, LAN Security

MoCA 2.0
- Up to 100 MHz bandwidth
- 400 Mbps sustained data throughput over coax
- 500 Mbps sustained data throughput between 2 node ptp connections.
- 800 Mbps sustained data throughput over coax
- 1 Gbps sustained data throughput between 2 node ptp connections.
- Remote configuration and boot interface
- On-chip RF transceiver
- Configurable classifier and queue management for classifying incoming and outgoing Ethernet frames based on MAC and 802.1Q tags.
  - MAC Source and Destination address classification
  - VLAN PRI
  - MAC Source address learning and MoCA node id to MAC Destination address mapping
  - Support up to 64 MAC Addresses
  - Support Unicast, Multicast and Broadcast
- MoCA Management Protocol
- Decapsulate/Encapsulate Ethernet packets from/into MoCA frames
- MoCA uses the internal Gigabit media independent interfaces (GMII) for full-duplex communication with the on-board MAC interface.
- Support up to 15 MoCA nodes
- Support aging and LRU-based bridge table updates
- Support rate limit per interface
- Support up to 8 802.1p priority queues
- Support packet classification as prescribed in Layer 2 and DSCP header fields
- Operating Frequency spectrum from 500 MHz to 1650 MHz
- Improved packet error rate of 1 per 100 million and 3.5ms low latency to support HD video
- Backward compatible with MoCA 1.x
- Compatible with existing devices on the coax with no interference
- Compatible with existing services on the coax with no interference

Voice
- RJ-11 and/or IDC connectors
- 5 REN per line, Loop start, Balanced and unbalanced ringing
- Country specific coefficients and tones
- Metallic loop testing (GR-909)
- SIP (RFC 3261), MGCP (RFC 3435), H.248 (RFC 3525)
- DTMF dialing and encoding by RELAY or IN-BAND method
- CLASS service support (Caller ID, Call Waiting, Call Forwarding Call transfer, ETC.)
- Echo Cancellation
- G.711 (μ & a law), G.726-32, G.722, G.729
- T.38 and IN-BAND Fax
- Voice Activity Detection and Comfort Noise Generation
- Proven interoperability with major soft switch and voice gateway vendors
- DHCP Client or static IP configuration
- Official Metaswitch and BroadSoft certifications

Model	POTS	GbE	Wi-Fi	Basic RG	MoCA
7221	4	4			
7251	2	4			
7271	2	2			✓
7272	2	2	N, AC	✓	✓
7285	2	4	N, AC	✓	

Wi-Fi AP (WLAN)

- WPA-PSK/WPA2-PSK and TKIP/AES
- 64/128/256-bit data encryption keys
- 20MHz and 40MHz channel bonding
- Supports IEEE 802.11e QoS Enhancement (WMM)
- Supports IEEE 802.11i (WPA, WPA2) Open, shared, pair-wise key authentication
- Frame aggregation for increased MAC efficiency (A-MPDU, A-MSDU)
- Transmit Opportunity (TXOP) Short Inter- Frame Space (SIFS) bursting for higher multimedia bandwidth
- 20MHz and 40MHz (channel bonding) band width transmission capability
- DSSS with DBPSK and DQPSK, CCK modulation
- OFDM with BPSK, QPSK, 16QAM, and 64QAM modulation ; coding rates : 1/2, 2/3, 3/4, 5/6

Wi-Fi Data Rate:

- **802.11a : 6,9,12,18,24,36,48,54 Mbps**
- **802.11b : 1, 2, 5.5, 11 Mbps**
- **802.11g : 6,9,12,18,24,36,48,54 Mbps**
- **802.11n : up to 450 Mbps**
- **802.11ac : up to 1300 Mbps**

Antenna (7285 model):

- **High-power AC antenna design**
- **22.2 dBm (167mW) Antenna x 3 = 500mW**

LED Indicators

o Power o Battery o Fail o LAN o Data o Management
o Network o POTS

Dimensions (H x W x D) and Weight

Size: 8.66 x 6.30 x 1.18 inches (220 x 160 x 30 mm)
Weight: 5 lbs. (2.27 kg)

Environmental

Indoor: -5°C to +46 °C (-40°F to +114 °F).
Humidity: 5% to 90%

Regulatory Compliance

EMC: FCC PART 15, SUBPART B, CLASS B, EN 55022, EN 55024, EN 300 386, CLASS B, CE, RoHS6, WEEE Compliant   Safety: UL/CSA 60950, IEC 60950, ETSI
 FDA – FCC 47 CFR Part 15, Class B and FDR 21 CFR 1040.10 and 1040.11 Class 1

STATUS LEDs

CABLE TV

ON/OFF SWITCH

POWER INPUT

UPS INPUT

2 POTS INTERFACES

4 GBE INTERFACES

FIBER TERMINATION

ON/OFF   PWR   UPS   POTS1   POTS2   ETH1   ETH2   ETH3   ETH4   CATV