

700GE Optical Network Terminals



DESCRIPTION

Calix 700GE optical network terminals (ONTs) are 2.5 Gbps GPON and 1.0 Gbps Active Ethernet (AE) ONTs that deliver a wide array of information, communication and entertainment services over fiber. These high-performance ONTs set the standard with two or four Gigabit Ethernet (GE) interfaces that provide unmatched IPTV video and data services. The versatile 700GE line of ONTs also features optional 1 GHz RF video with RF return, HomePNA 3.1 networking and two or four POTS lines via integrated VOIP or TDM gateway. Calix 700GE ONTs incorporate extensive Internet protocol (IP) functionality into seven ONT models that can be deployed indoors or outdoors.

The 700GE ONTs are designed for the industry-leading Calix C-Series, E-Series and B-Series platforms. Calix 700GE ONTs terminate a GPON or AE fiber link at the subscriber's location and provide industry-standard interfaces for the customer premises equipment. The ONTs enable subscribers to receive broadband data, IP or RF video, and VOIP or TDM gateway voice on a single fiber. At the ONT, the optical signal is converted to the appropriate electrical signals for transmission over the residence's existing twisted pair, CAT5, and coaxial cables. Selecting a Calix ONT with integrated HomePNA 3.1 technology allows the home's existing coaxial cables to operate as a high-speed LAN.

700GE ONTs are easy to install, activate, and maintain. Innovative software management tools allow the service provider to quickly configure, activate and upgrade the ONTs from a remote location. Extensive troubleshooting capabilities, remote software downloads, and easy-to-use service profile menus ensure that services are delivered and ONTs are maintained without needless truck rolls and hardware upgrades.

Smart Activate is the most recent example of an innovative software tool from Calix. Smart Activate simplifies installation and turn-up by using a laptop or phone to configure and activate the ONT at the premises. The craftsman can install and turn up an ONT without assistance from the central office or use of special equipment.

The Calix 725GE ONT offers an RF return feature for GPON deployments that allows two-way communication between the video headend and the consumer set-top box. RF return path signaling enables many advanced features such as Video on Demand, Impulse Pay-Per-View, and Internet gaming over an RF overlay network. Calix RF return operates in the 5 to 42 MHz RF frequency range and supports set-top boxes meeting Out-of-Band SCTE 55-1, SCTE 55-2, and DOCSIS Set-Top Gateway (DSG) return path standards.

Calix is also expanding the reach of GPON beyond the traditional 20 km boundary. Extended reach GPON supports links between the ONT and OLT of up to 40 km. This additional coverage allows service providers to edge-out their GPON networks and economically serve sparsely populated outlying locales without adding remote cabinets.

Calix outdoor ONTs are hardened to withstand a full range of outdoor temperatures. When placed outside, the ONT is housed in an environmentally sealed enclosure that protects it from the elements. For an indoor installation, the ONT can be mounted on a bracket specially designed for wall-mount and structured wiring enclosure applications.

Outdoor and indoor installations use a 120 Volt, 60 Hz AC power supply that provides battery backup of lifeline POTS in the event of local AC power loss. Battery charge and battery life are monitored and reported through the Calix Management System (CMS).

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KEY ATTRIBUTES

- Standards-based Full Service Access Network (FSAN), ITU-T GPON and IEEE AE compliant
- 2.5 Gbps GPON and 1.0 Gbps AE, with auto-detect optics enables a seamless transition between WAN interfaces
- Two or four Gigabit Ethernet (GE) interfaces with symmetrical GE bandwidth for IPTV and data services
- RF video bandwidth to 1 GHz for extended digital programming
- RF return for reverse path communication — GPON only
- A variety of configuration options provide:
 - VOIP or TDM POTS, two or four lines via integrated SIP IAD or H.248 MG, MGCP, GR-303, TR-08 mode II, GR-57 TDM gateway
 - Two or four 10/100/1000 BaseT Ethernet interfaces; fully independent for service separation, auto-negotiating
 - Integrated HomePNA 3.1 networking over the home's existing coaxial cables
- Indoor and outdoor applications:
 - Outdoor installation features a small, environmentally hardened enclosure that withstands the rigors of the outside plant environment; Telcordia GR-49 compliant
 - Indoor installation offers a range of mounting options including: the standard enclosure for added security and protection; a wall-mount bracket for indoor cabinets and indoor wall mounts; a multi-ONT enclosure that houses up to four 700GE ONTs and can be used for indoor or outdoor applications
- Lifeline service power source with in-home battery backup and alarm monitoring
- Complete OAM&P support via Calix Management System (CMS)
- Supports multiple data service profiles
- Traffic Management and Quality of Service (QOS):
 - 802.1Q VLANs
 - 802.1P Service Prioritization
 - Q-in-Q Tagging
 - Multiple VLANs
 - Per-Port Rate Shaping
 - Rate Limiting
- MEF-UNI support for Ethernet demarcation applications:
 - MEF EVCs for E-Line and E-LAN
 - L2-VPNs using MEF service models

SERVICES SUPPORTED

Calix 700GE ONTs deliver high-speed data, POTS, IPTV, and RF video.

- Supports voice, video and data services on a single fiber
- Voice: Two or four VOIP or TDM POTS lines, via SIP IAD or H.248 MG, GR-303, TR-08, GR-57 TDM gateway, full lifeline telephony support (CLASS and E911)
- Video: IPTV—supports IGMP multicasting and proxy; RF video—supports analog and digital RF video to 1 GHz; optional RF return
- Data: Two or four 10/100/1000 BaseT Ethernet ports with service separation and GE bandwidth

SPECIFICATIONS

700GE Optical Network Terminals

MECHANICAL—OUTDOOR ENCLOSURE

Height: 12 in (30.48 cm)
Width: 10 in (25.4 cm)
Depth: 4 in (10.16 cm)
Outdoor installed height: 50–60 in
(1.3 to 1.5 m) above ground
Installed weight: 4 lbs (1.76 kg)

RECOMMENDED OUTDOOR CLEARANCES

Left side: 12 in (30.48 cm)
Right side: 6 in (15.24 cm)
Front: 36 in (91.44 cm)
standing room
Rear: None

PON CHARACTERISTICS

Max. split: 64 GPON
Max. reach: 40 km (25 miles)
Maximum Attenuation:
GPON – Class B+, 28 dB
1490 ± 10 nm optical receiver:
–27.0 to –8.0 dBm
–26.5 to –7.5 dBm (725GE ONT)
1310 ± 20 nm optical
transmitter: 0.5 to 5.0 dBm,
0.0 to 4.5 dBm (725GE ONT)

POINT-TO-POINT (AE) CHARACTERISTICS

Max. reach: 50 km (31 miles)
1490 nm optical receiver:
–22.0 to –3.0 dBm
1310 nm optical transmitter:
–5.5 to 0.0 dBm

INTERFACES

Telephony: Binding post
Data/IPTV: 10/100/1000 BaseT
Ethernet ports, RJ-45 connectors
RF Video/HPNA: F-connector,
75 Ohms
AE/PON: Single 9/125 μm (single
mode) fiber, SC/APC connector,
minimum 50 dB return loss
Power: Screw-down plug

TELEPHONY

General: POTS via SIP IAD, H.248
MG or TDM gateway
Number of lines: 2 or 4
RENs per line: 5 maximum
RENs per unit: 10 maximum
Subscriber premises—physical
connection: 22 or 24 AWG to
twisted pair binding posts;
premises isolating RJ-11 test jack
(one per line)
Drop length: Maximum 1000 feet
(305 m) using 26 AWG wire
Input impedance: 600 Ohms
DSO Output: 25 mA
Ring Voltage: 56–84 VAC

DATA

Drop length: 328 feet (100 m)
maximum using CAT5 cable
Auto MDI/MDIX crossover for
1000BASE-TX, 100BASE-TX,
and 10BASE-T ports
Traffic Management and QOS:
802.1Q VLAN; 802.1P Voice,
Video, Data and Management
Priorities; Q-in-Q tagging; Per-Port
Rate Shaping; Rate Limiting

INTEGRATED HPNA 3.1

Embedded CG3210 chipset
Software version: 1.9.4
Data rate: Up to 180 Mbps simplex
(PER < 10⁻⁷)
Spectral mode B: RF signal: Fc = 12
to 28 MHz
Spectral mode E: RF signal: Fc = 12
to 44 MHz
Full-duplex
Max loss budget: 42 dB

VIDEO PON—OPTICAL INPUT (GPON)

Wavelength: 1555 ± 5 nm
Signal strength at 3.4% OMI
(AGC range): –5.0 to 2.0 dBm
–4.5 to 2.5 dBm (725GE ONT)

VIDEO PON—OPTICAL OUTPUT (GPON)

Wavelength: 1610 ± 5 nm
Optical output power: –0.5 to
2.5 dBm (725GE ONT)

VIDEO-ANALOG RF OUTPUT (GPON)

Bandwidth: 54 to 550 MHz
Return loss: 10 dB minimum
Signal strength (with AGC range):
18 ± 2 dBmV
Flatness: ± 1.0 dB
Tilt: 1.0 dB ± 1.0 dB from 54 to
550 MHz
Channel loading: Analog RF CATV –
up to 80 channels
CNR: 48 dBc minimum
CSO: –53 dBc maximum
CTB: –53 dBc maximum
Hum modulation: 1% maximum

VIDEO-DIGITAL RF OUTPUT (GPON)

Bandwidth: 550 to 1003 MHz
Return loss: 8 dB minimum
Signal strength (within AGC range):
12 ± 2 dBmV
Flatness: ± 1.0 dB
Tilt: 4.0 dB ± 1.0 dB from 550 to
1003 MHz
Channel loading: Digital Video –
over 740 channels (SD)
Modulation error ratio (MER): 35 dB
Group delay: 20 ns (6 MHz span)

VIDEO—REVERSE PATH RF INPUT (GPON)

Bandwidth: 5 to 42 MHz
Compatibility: SCTE 55-1, SCTE 55-2
DOCSIS Set-Top Gateway (DSG)



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ENVIRONMENTAL

Operating temperature: Indoor ambient temperature –40 to 149°F (–40 to 65° C), Outdoor ambient temperature with Calix enclosure –40 to 114° F (–40 to 46° C) plus solar load

Rate of change in operating temp: 15° F (8.3° C) per hour maximum

Shipping and storage temperature: –40 to 140° F (–40 to 60° C)

Operating/storage relative humidity: 0 to 95 % non-condensing

Altitude: –200 to 10,000 feet (–61 to 3,048 m) above sea level

Misc: Salt fog resistant; wind-driven rain protection; anti-dust enclosure

POWER

Screw-down terminal block plugs for 7-wire alarms and power interface

CERTIFICATION AND COMPLIANCE

Emissions: FCC Part 15 Class B, IC ICES-003 Class B

Safety: UL 60950 and UL 1697 approved, CE Mark (711GE, 716GE and 717GE only)

Telcordia: GR-1089, GR-49

ITU-T: G.984.1, G.984.2, G.984.3, G.984.4

IEEE: 802.3, 802.3AB, 802.3U, 802.1P, 802.1Q

MEF: 9 and 14



RESIDENTIAL BATTERY BACKUP

Residential battery backup source (local): UPS mounted at subscriber's home

Power termination: Maximum length of 70 feet (21.3 m) DC power and alarm cable with seven 16/24 AWG conductors connected to a UPS

Input voltage: 12 VDC (nominal)

Input voltage range: 10.5 to 16 VDC

Input current: 750 mA (nominal)

Battery backup time rated capacity:

8 hours based on Telcordia

GR-909 calculation methods using recommended UPS. Contact Calix for recommended UPS.

ORDERING INFORMATION

Calix 700GE Optical Network Terminals

711GE ONT CE (100-03246)	2 POTS, 2 Gigabit Ethernet -CE
712GE ONT (100-03247).....	2 POTS, 2 Gigabit Ethernet, 1 HPNA
716GE ONT CE (100-03248)	2 POTS, 4 Gigabit Ethernet -CE
717GE ONT CE (100-03249)	4 POTS, 4 Gigabit Ethernet -CE
721GE ONT (100-01716).....	2 POTS, 2 Gigabit Ethernet, 1RF Video
722GE ONT (100-03251).....	2 POTS, 2 Gigabit Ethernet, 1RF Video/HPNA
725GE ONT (100-01719).....	2 POTS, 2 Gigabit Ethernet, 1RF Video with RF Return
726GE ONT (100-01720).....	2 POTS, 4 Gigabit Ethernet, 1RF Video
727GE ONT (100-01721).....	4 POTS, 4 Gigabit Ethernet, 1RF Video

Calix 700 ONT Enclosures and Wall Mount Bracket

SFU ENCL-ST (100-01578)	SFU ONT Enclosure with Splice Tray
SFU ENCL-ST-PP (100-01580)	SFU ONT Enclosure with Splice Tray and Primary Protection
SFU ENCL-OA (100-01579)	SFU ONT Enclosure with OptiTap Adaptor
SFU ENCL-ST (100-01581)	SFU ONT Enclosure with OptiTap Adaptor and Primary Protection
700 SLACK STRG-NG (100-00986).....	700 ONT Slack Storage Enclosure SFU-NG
700 SWEB (100-01409).....	700 ONT Wall Mount Bracket

