Calix

e9-2 GPON 16 Port Line Card (GP1611)

DESCRIPTION

Service providers looking to ensure their networks meet all the requirements of a next generation network, are looking for new ways to deliver more services faster and of higher quality. Subscribers want the network to be always on and invisible and service providers need it to be operationally fast and easy to turn up new services and subscribers. The Calix AXOS platform enables service providers to deliver an always on network at a rapid pace.

The E9-2 GP1611 line card takes GPON that has long been the technology of choice for delivering fiber based subscriber services and marries it with AXOS, the world's only true Software Defined Access (SDA) architecture that supports the ability to simplify and automate the network, by enabling the consolidation of multiple network functions, including subscriber management, aggregation and OLT onto a single network element, reducing the number of network elements to provision and manage.

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KEY ATTRIBUTES

AXOS: Utilizing AXOS the only true SDA (Software Defined Access) architecture, the GP1611 line card can enable service providers to maintain an always on network, with the ability to optionally take advantage of added AXOS modules such as the AXOS Routing Protocol Module (RPm) and AXOS Subscriber Management Module (SMm)

GPON: Service providers have the flexibility to choose the PON technology that meets their needs. The GPON line card supports standards based GPON technology with high split ratios to enable the utmost in flexibility.

Flexible Service Delivery: Utilize Layer 2 or Layer 3 delivery model for residential/business/mobile services based on your specific needs with carrier class network redundancy options

AXOS PLATFORM

The E9-2 Intelligent Edge System is built on the Calix AXOS platform ensuring faster time to revenue, standards-based APIs and northbound interfaces for simplified OSS/BSS/SDN Controller integration and an always-on network.

CONVERGED SERVICES NETWORKS

The E9-2 enables convergence of residential, business and mobile services into a unified access network. The E9-2 delivers scalable residential IPTV, high-speed internet (HSI), voice and business services. In addition, the E9-2 supports high value business class services allowing operators to use a common access network to deliver higher revenue generating opportunities.

GPON

The Calix E9-2 GP1611 expanded services GPON line card provides multiservice capability over IP/Ethernet-based networks. Each card provides 16 OLT channel termination ports that subtend up to 128 ONTs each, for a card capacity of 2048 ONTs per card.

The GP1611 line card features and capabilities include:

- Non-blocking 2.488 Gbps downstream and 1.244 Gbps upstream bandwidth per port
- GEM (Ethernet) based GPON
- Leveraging OMCI based provisioning model
- Interoperable with Calix Residential SFU and MDU GPON ONTs as well as Business ONTs
- Class B+ ODN, +28 dB link budget, up to 1:64 splits
- Class C+ ODN (as per G.984.2 Amendment 2), +31 dB link budget, up to 1:128 splits

NETWORK RESILIENCY

All Calix E9-2 cards are part of the E9-2 system that supports a flexible set of standards-based network topology protocols for use in aggregation, ring-based transport, and uplink.

- IEEE 802.3ad/802.1AX Link Aggregation

SERVICES DELIVERY

The Calix E9-2 GP1611 expanded services GPON line card delivers a full spectrum of IP access services over fiber networks.

- IPTV – broadcast and Video on Demand (VOD)
- MEF CE 2.0 compliant business services
- High-Speed Internet (HSI) access
- Voice – Native SIP/VoIP and TDM Gateway support

MOBILE BACKHAUL & FRONTHAUL

With integrated network synchronization, Ethernet OAM, advanced timing capabilities, the GP1611 expanded services line card can be used to transport mobile front haul as well as backhaul traffic while also supporting triple play residential and MEF certified business services from a single platform.

Utilizing GPON as the backhaul, service providers can scale to deliver high bandwidth Gfast services to high-density MDUs.

MINIMUM SOFTWARE RELEASE

Calix AXOS E9-2 Release 4.0

PORTS

16 SFP interfaces for 2.5G/1.25G GPON
(16 channels per card)
4 QSFP28 ports (to interconnect with CLX3001 cards)

SERVICES

2k services per card
14 flows per service (upstream)
14k flows per service (downstream)

WAVELENGTH SUPPORT

GPON: 1310nm burst-mode receiver, 1490nm continuous-mode transmit

SPLIT RATIO AND OPTICS*

GPON: 1:128
- Class c+ 31 dB link budget (*Refer to Calix PPG for engineering design guidelines)

QUALITY AND SERVICE

Service classification based on port, SVLAN-ID, CVLAN-ID, p-bit
Strict priority and Weighted Round Robin (WRR) based scheduling
Hierarchical QoS
Congestion avoidance: Tail Drop

STANDARDS AND RFC SUPPORTS

ITU-T G.984 GPON
TR-101 VLAN Service models
IEEE 802.1p CoS Prioritization
IEEE 802.1 MAC Bridges
IEEE 802.1Q VLAN tagging
IEEE 802.1ad VLAN stacking (Q-in-Q) support
RFC 2236 IGMP v2
RFC 3376 IGMP v3
RFC 3810 MLDv2
RFC 3046 DHCP Relay Agent Information Option ("Option 82")
RFC 4541 IGMP Proxy
RFC 4553 Structure Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)
Dynamic Bandwidth Allocation (DBA)
Advanced Encryption Standard (AES)
Forward Error Correction (FEC)

FRAME SIZE

9216 byte frames over GPON

SYNCHRONIZATION

Built-in Stratum-3 clock
1588v2, SyncE (derived via BITS from Aggregation card)

COMPLIANCE

NEBS Level 3 compliance (GR-63-CORE, GR-1089-CORE,
GR-3028)
UL 60950
FCC Part 15 Class A
CE Mark

POWER AND HEAT DISSAPATION

GP1611 power consumption: 205 Watts (with Optics)
Heat dissipation: 700 BTU/Hour

OPERATING ENVIRONMENT

Temperature: 23º to +131º F (−5° to +55° C)
Humidity: 10 to 95% (non-condensing)

STORAGE ENVIRONMENT

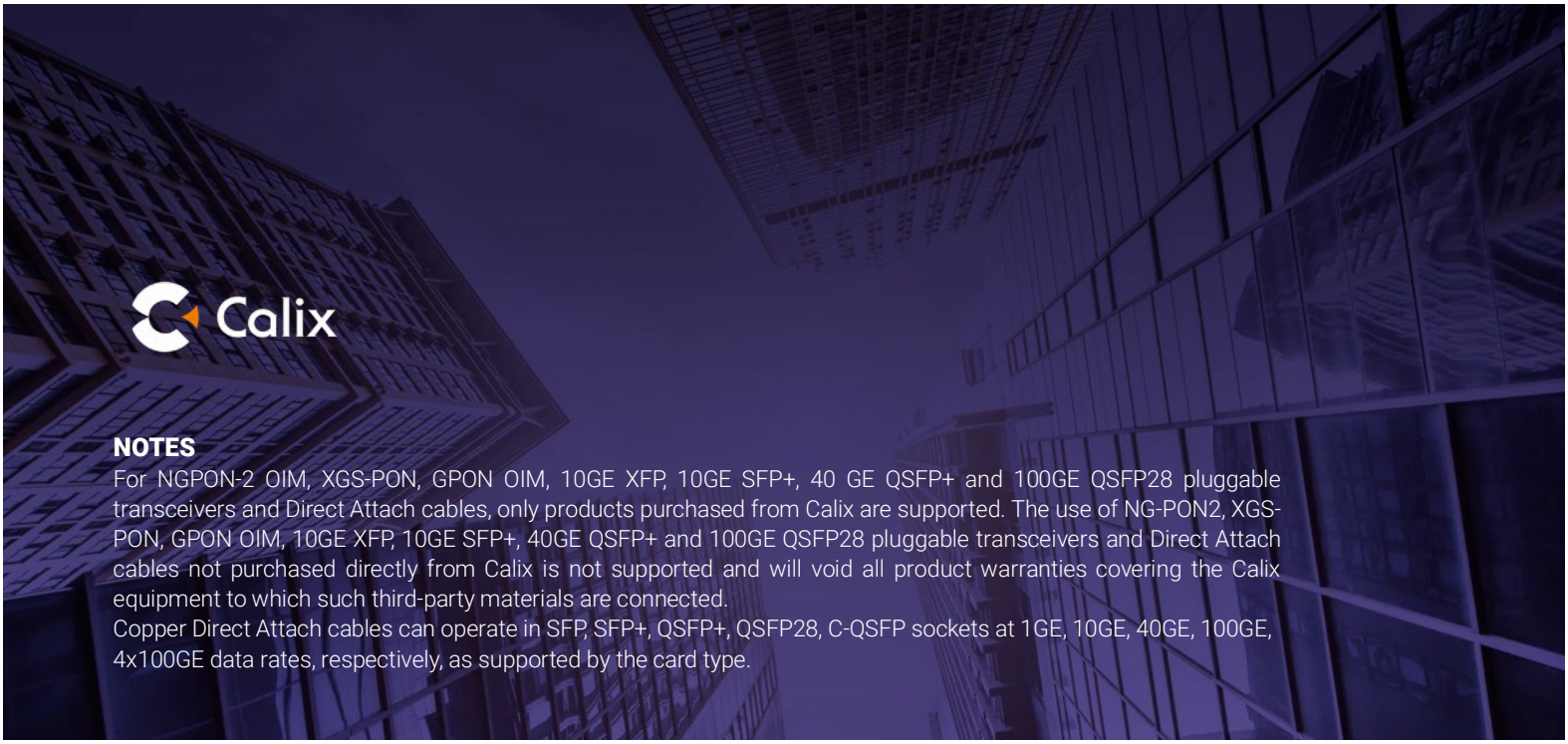
Temperature: −40° to +85° C (−40° F to +185° F)
Humidity: 5 to 95%

DIMENSIONS

Width: 17" (43cm)
Height: 1.7" (4.3cm)
Depth: 13" (33cm)
Card height is 1 RU

WEIGHT

6.25 lbs. (2.83 Kg) – (without optical modules)



NOTES

For NGPON-2 OIM, XGS-PON, GPON OIM, 10GE XFP, 10GE SFP+, 40 GE QSFP+ and 100GE QSFP28 pluggable transceivers and Direct Attach cables, only products purchased from Calix are supported. The use of NG-PON2, XGS-PON, GPON OIM, 10GE XFP, 10GE SFP+, 40GE QSFP+ and 100GE QSFP28 pluggable transceivers and Direct Attach cables not purchased directly from Calix is not supported and will void all product warranties covering the Calix equipment to which such third-party materials are connected.

Copper Direct Attach cables can operate in SFP, SFP+, QSFP+, QSFP28, C-QSFP sockets at 1GE, 10GE, 40GE, 100GE, 4x100GE data rates, respectively, as supported by the card type.

CALIX E9-2 GPON LINE CARD

100-05076 E9-2 GPON 16 port line card (16xGPON OIM)

CALIX GPON OPTICS MODULES

100-05121 .....GPON SFP OIM, Class B+, 20Km, 1490/1310nm Single Fiber Transceiver, C-Temp, AXOS

100-05701 .....GPON SFP OIM, Class B+, 20Km, 1490/1310nm Single Fiber Transceiver, C-Temp, AXOS

CALIX PLUGGABLE TRANSCEIVER MODULES

The E9-2 supports pluggable modules for all service and network interfaces. Refer to the Calix Optical Transceiver Modules Datasheet (#250-00191) for a complete list of modules and specifications.

QSFP+ • 40GE optical Quad Small Form-factor Pluggable (QSFP+) modules

QSFP28 Direct Attach • 40GE-100GE Quad Small Form-factor Pluggable (QSFP-28) Direct Attach Cables

QSFP28 DAC Break Out • 40GE to 4x10GE, QSFP to 4 SFP+ Direct Attach Breakout Cable

C-QSFP-4xQSFP28 DAC Break Out • 4x100GE C-QSFP to 4 x QSFP28 Direct Attach Breakout Cable

GPON OIM • 2.5Gbps GPON (Class B+ ODN with minimum 28dB link budget

ER-GPON OIM • 2.5Gbps Extended Reach GPON (up to 40 km with 1:8 split