PRODUCT DATASHEET

Calix E7-2 AXOS GPON-8 r2

DESCRIPTION

The Calix E7-2 AXOS GPON-8 r2 line card combines an ITU G.984-compliant Gigabit Passive Optical Network (GPON) card with the AXOS network operating system built specifically for the needs of the access network to accelerate time-to-revenue, eliminate service disruptions, and reduce operational complexity for service providers. The Calix E7-2 AXOS GPON-8 r2 line card provides eight ITU G.984-compliant GPON interfaces, eight Gigabit Ethernet (GE) CSFP ports (four CSFP sockets which also support SFP modules), and four ports of integrated 10-Gigabit Ethernet (two XFP ports, two SFP+ ports).



KEY ATTRIBUTES

GPON AND POINT-TO-POINT ETHERNET: The Calix E7-2 AXOS GPON-8 r2 card provides multiservice capability over IP/Ethernet-based networks. Each GPON-8 r2 provides eight GPON OLT ports that subtend up to 128 ONTs each, for a card capacity of 1024 GPON ONTs, or 2048 per E7-2 1RU chassis. An additional four SFP/CSFP sockets per card can provide high-bandwidth, point-to-point Ethernet services to individual subscribers or be used to aggregate other Ethernet devices. The Calix E7-2 GPON-8 r2 card can co-exist with other Calix E7-2 AXOS line cards in a shelf.

GPON-8 r2 card features and capabilities include:

- Based on ITU G.984 GPON family of standards—including G.988
- GPON: 2.488 Gbps downstream, 1.244 Gbps upstream
- GEM (Ethernet) based GPON
- Interoperable with Calix ONTs, including the GigaFamily
- Integrated 10GE and GE/2.5GE aggregation and transport
- Class B+ ODN, +28 dB link budget, up to 20 km at 32-way splits
- Class C+ ODN, +32 dB link budget with Forward Error Correction (FEC), up to 35 km at 32-way split, up to 60 km at 2way split
- Hardened for central office and remote terminals

INTEGRATED HIGH-CAPACITY AGGREGATION: The E7-2 AXOS GPON-8 r2 card is built on a core Layer 2 and Layer 3 switch capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. Each GPON OLT port has a dedicated 2.5Gbps switch interface. Industry standard pluggable modules are used for all interfaces, including ITU G.984 compliant GPON, GE and 2.5GE optical SFP, 10GE XFP, and 10GE SFP+. The GPON-8r2 supports (4) CSFP (Compact SFP) modules that are mechanically compatible with the industry-ubiquitous SFP module. Each CSFP module supports two independent bidirectional transceivers (1490nm Tx / 1310nm Rx), each capable of operating at a 1 Gbps bi-directional rate. The SFP+ ports also support SFP modules and Direct Attach copper cables.

IP SERVICES DELIVERY: The Calix E7-2 AXOS GPON-8 r2 card delivers a full spectrum of IP access services over GPON and Point-to-Point Ethernet networks.

- Secure AES encryption on the PON
- IPTV broadcast and Video on Demand (VoD)
- MEF compliant business services
- High-Speed Internet (HSI) access
- Voice Native SIP/VoIP and TDM Gateway support
- T1 services
- CATV: 1550nm RF video overlay; 1610nmRF return

NETWORK RESILIENCY: All Calix E7-2 AXOS GPON-8 r2 cards support a flexible set of standards-based network topology protocols for use in aggregation, ring-based transport, and uplink.

- ITU G.8032 Ethernet Ring Protection Switching (ERPS)
- ITU G.8032v2 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation
- ITU G.983.5 Type B Protection and enhanced survivability for GPON OLTs

MOBILE BACKHAUL: With integrated network synchronization, hierarchical QoS and support for T1 services, the E7-2 AXOS GPON-8 r2 card transport uncompromised mobile broadband traffic while also supporting triple play residential and MEF certified business services from a single platform. A powerful collection of classification, policing, and scheduling algorithms let operators manage per-subscriber and per-service traffic flows to maintain priority/delay/loss service differentiation within the E7 network.

SCALABLE IPTV SUPPORT: The E7 supports industry standard IGMP snooping to identify and replicate multicast video sent between the set-top box and the video distribution network, providing efficient, scalable, high-quality IPTV distribution on both GPON and Ethernet interfaces.



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MINIMUM SYSTEM REQUIREMENTS

Calix AXOS Software Release 3.1.3

DIMENSIONS (W x H x L)

 $14 \times 10.1 \times 0.78$ inches $35.6 \times 25.7 \times 2$ cm

WEIGHT

2.08 lbs. (0.94 kg)

PORTS

- 8 GPON OLT ports
- 8 CSFP 1GE ports (4 CSFP sockets, also support SFP modules)
- 2 SFP+ ports supporting 10GE and GE optical modules
- 2 XFP ports supporting 10GE optical modules

PACKET SWITCHING CAPACITY

Wire speed forwarding across all Ethernet and GPON OLT ports 64,000 MAC addresses per system 9,000 byte jumbo frames 2,000 byte frames over GPON 4,096 VLANs 4,000 IGMP Multicast channels

QUALITY OF SERVICE

Service classification based on port, SVLAN-ID, CVLAN-ID, P-Bit Port and flow-based policing to 1 Mbps increments 8 CoS queues per port Strict priority scheduling with minimum bandwidth guarantee Congestion avoidance: Tail Drop

STANDARDS AND RFC SUPPORT

TR101 VLAN Service models IEEE802.1 ag Connectivity Fault Management (G.8032 support) IEEE 802.1D Rapid Spanning Tree IEEE 802.1 p CoS Prioritization IEEE 802.1 MAC Bridges IEEE 802.1Q VLAN tagging IEEE 802.1 ad VLAN stacking (Q-in-Q) support IEEE 802.1w RSTP IEEE 802.3ad/802.1AX Link Aggregation RFC 2236 IGMP v2 RFC 3376 IGMP v3 RFC 3046 DHCP Relay Agent Information Option ("Option 82") RFC 4541 IGMP snooping RFC 4553 Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP) ITU-T G.8032 Ethernet Ring Protection Switching (ERPS)/Enhanced EAPS ITU-T G.8032v2 Ethernet Ring Protection Switching (ERPS) ITU-T G.984 GPON ITU G.984.1 Type B Protection Dynamic Bandwidth Assignment (DBA) NIST Advanced Encryption Standard (AES)

SYNCHRONIZATION

Synchronization enabled by E7 line cards External reference timing Built-in Stratum-3 clock Hardware-ready to support Synchronous Ethernet, IEEE 1588v2

COMPLIANCE

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

POWER SPECIFICATIONS

GPON-8 r2 power/heat dissipation: 85 Watts (Maximum) 75 Watts (Typical)

OPERATING ENVIRONMENT

Temperature: -40° to +65° C (-40° F to +149° F) Humidity: 10 to 95% (non-condensing)

STORAGE ENVIRONMENT

Temperature: -40° to $+85^{\circ}$ C $(-40^{\circ}$ F to $+185^{\circ}$ F) Humidity: 5 to 95%



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CALIX ONTs

The E7-2 AXOS GPON-8 r2 card supports the Calix family of ONTs, including 700GX, 700GE, 836GE, and 800G GigaFamily. Calix ONTs support auto sensing GPON and GE network interfaces, allowing service providers to manage service changes without subscriber onsite technical support.

ORDERING INFORMATION

CALIX E7-2 AXOS LINE CARDS

100-04665......E7-2 AXOS GPON-8 r2 (8x GPON OIM, 4x GE SFP, 2x 10GE SFP+, 2x 10GE XFP)

CALIX PLUGGABLE TRANSCEIVER MODULES

The E7-2 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.

SFP	1GE and 2.5GE optical and copper Small Form-factor Pluggable (SFP) modules
SFP+	10GE optical Enhanced Small Form-factor Pluggable (SFP+) modules
CSFP Option 2	1GE optical dual-port Compact Small Form-factor Pluggable (CSFP) Option 2 modules
XFP	10GE optical Small Form-factor Pluggable (XFP) modules
Direct Attach	Multi-rate copper Small Form-factor Pluggable (SFP/SFP+) cables
AXOS GPON B+ OIM	2.5Gbps GPON (Class B+, 20km, C-Temp, AXOS)
	2.5Gbps GPON (Class B+, 20km, I-Temp, AXOS)
AXOS GPON C+ OIM	2.5Gbps GPON (Class C+, 60Km, I-Temp, AXOS)

Notes:

- For AXOS GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables, and all transceivers used in CSFP Option 2 sockets only products purchased directly from Calix are supported. The use of GPON OIM, 10GE XFP, 10GE SFP+ 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.
- Only AXOS GPON OIMs are supported by the E7-2 AXOS GPON-8 r2 card
- SFP modules may also be used in SFP+ sockets at 1GE rate.
- Copper Direct Attach cables can operate in SFP and SFP+ sockets at 1GE, 2.5GE, and 10GE data rates as supported by the card type.

