

# Calix E7-2 GPON-4 r2



## DESCRIPTION

The Calix E7-2 GPON-4 r2 line card provides four ITU G.984-compliant Gigabit Passive Optical Network (GPON) interfaces and eight Gigabit Ethernet (GE) interfaces, along with four ports of integrated 10-Gigabit Ethernet. The E7-2 GPON-4 r2 line card can be plugged into one or both of the two universal slots within a Calix E7 shelf. Each PON supports up to 64 Optical Network Terminations (ONTs) for a total of 512 GPON plus 16 point-to-point Ethernet subscribers per 1RU E7 chassis. The E7-2 GPON-4 r2 card supports a full set of Ethernet services and network topology protocols on the Ethernet ports and can be used interchangeably with other E7-2 line cards to create a redundant system configuration.

## KEY ATTRIBUTES

### GPON AND POINT-TO-POINT ETHERNET:

The Calix E7-2 GPON-4 r2 card provides multiservice capability over IP/Ethernet-based networks. Each GPON-4 r2 provides 4 GPON OLT ports that subtend up to 64 ONTs each, for a card capacity of 256 GPON ONTs, 512 per E7-2 1RU chassis. Additional eight GE ports per card can provide high-bandwidth, point-to-point Ethernet services to individual subscribers or be used to aggregate other devices using 1G/2.5G Ethernet trunks.

Multiple E7-2 shelves can be linked together using low cost, industry standard 10GE SFP+ copper cables, resulting in a high-density configuration serving over 1000 GPON ONT subscribers in as little as 2RU space (1:64 split). GPON-4 r2 card features and capabilities include:

- Based on ITU G.984 GPON family of standards
- GPON: 2.488 Gbps downstream, 1.244 Gbps upstream
- GEM (Ethernet) based GPON
- Interoperable with Calix family of 700 ONTs and 836GE RSG
- Integrated 10GE and GE/2.5GE aggregation and transport
- Class B+ ODN, +28 dB link budget, up to 20 km at 32-way splits
- Extended reach GPON up to 40 km with 1:8 split
- 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 2-way split
- Hardened for central office and remote terminals

**SECURE IP SERVICE DELIVERY:** The Calix E7-2 GPON-4 r2 card delivers a full spectrum of IP access services over encrypted 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/E1 services
- CATV: 1550nm RF video overlay; 1610nm RF return

**NETWORK RESILIENCY:** All Calix E7 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/E1 services, the GPON-4 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.

## PRODUCT DATASHEET

# Calix E7-2 GPON-4 r2

### INTEGRATED HIGH-CAPACITY AGGREGATION:

The E7-2 GPON-4 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+.

### 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 GPON and Ethernet interfaces.

## SPECIFICATIONS

### MINIMUM SYSTEM REQUIREMENTS

Calix E7-2 shelf & FTA/FTA-2 (two GPON-4 r2 line cards per shelf)  
Calix E7 Software Release 2.2

### DIMENSIONS (W x H x L)

14 x 10.1 x 0.78 inches  
35.6 x 25.7 x 2 cm

### WEIGHT

2.02 lbs. (0.92 kg)

### PORTS

4 GPON OLT ports  
8 SFP ports support GE and 2.5GE optical, and 100/1000BaseT copper modules  
2 XFP ports supporting 10GE  
2 SFP+ ports supporting 10GE and GE modules

### PACKET SWITCHING CAPACITY

Wire speed forwarding across all Ethernet and GPON OLT ports  
32,000 MAC addresses per system  
9,000 byte jumbo frames  
1500 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 1Mbps 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  
IEEE 802.1ag Connectivity Fault Management (G.8032 support)  
IEEE 802.1D Rapid Spanning Tree  
IEEE 802.1p CoS Prioritization  
IEEE 802.1 MAC Bridges  
IEEE 802.1Q VLAN tagging  
IEEE 802.1ad 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

### COMPLIANCE

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

### POWER SPECIFICATIONS

GPON-4 r2 power/heat dissipation: 75 Watts

### OPERATING ENVIRONMENT

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

### STORAGE ENVIRONMENT

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

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## CALIX ONT s

The E7-2 GPON-4 r2 card supports Calix 700GX, 700GE, 836GE, 800G GigaCenter, and T-Series ONTs, including Single Family Unit (SFU), Small Business Unit (SBU), Multi-Dwelling Unit (MDU). Rack-mount models and 836GE RSG. Calix 700GX 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 LINE CARDS

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100-03656.....E7-2 GPON-4 r2 line card (4x GPON OIM, 8x GE SFP, 2x 10GE XFP, 2x 10GE SFP+)

### CALIX PLUGGABLE TRANSCEIVER MODULES

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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  
Direct Attach .....Multi-rate copper Small Form-factor Pluggable (SFP/SFP+) cables  
XFP.....10GE optical Small Form-factor Pluggable (XFP) modules  
GPON OIM .....2.5Gbps GPON (Class B+ ODN with minimum 28dB link budget, up to 1:64 splits)  
ER-GPON OIM .....2.5Gbps Extended Reach GPON (up to 58 km with 1:4 split)

#### Notes:

- For GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables, 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.
- 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.

