



Intelligent Modular System



What could unparalleled flexibility and network convergence mean to you?

The E7-2 is a highly extensible, standards-based Ethernet service access platform that offers service providers a modular chassis-based option to address the emerging bandwidth challenges of today's world. As next-generation Ethernet services gain momentum in the marketplace and begin to extend out from the metropolitan area networks, they will drive demand for versatile, cost-effective aggregation out at the network edge.

By adding the AXOS platform, the E7-2 is now even more of a disruptive and compelling enabler to next generation networks that connect the world. The Calix AXOS E7-2 Intelligent Modular System is a breakthrough evolutionary system that provides a transformational path to next generation networks, fiber technologies, and Software Defined Access. The E7-2 is the industry's benchmark for a modular, small form factor, environmentally hardened access solution for service providers. The E7-2 leads a rapidly expanding family of AXOS E-Series systems capable of supporting both centralized and decentralized network architectures that range from the data center edge, central office, or headend, to the remote cabinet, or MDU.

Functional Description

ETHERNET SERVICE ACCESS PLATFORM:

Residential and business services are converging as more subscribers work from home offices and internet “over the top” video services consume an increasing percentage of both enterprise and service provider network capacity.

IP and Ethernet are the dominant network and transport protocols, and all services – voice, data, and video – are rapidly migrating to a packet-based architecture. High performance applications demand high performance solutions; the Calix E7-2 Ethernet Service Access Platform meets the demanding requirements of Ethernet services access networks.

The Calix E7-2 delivers a wide array of high performance applications, including 10GE Ethernet transport, delivery of high density residential triple play services over GPON and point-to-point (Active) Ethernet, copper pairs (VDSL2/ADSL2+), Metro Ethernet Forum (MEF) compliant business services, mobile backhaul, and protected GE aggregation of other Calix platforms.

HIGH DENSITY SUBSCRIBER ACCESS

With two cards per system, the E7-2 provides flexible, high density subscriber access options in a 1RU shelf:

- 96 VDSL2/ADSL2+ & POTS Combo (48 Overlay)
- 16 GPON and 8 GE ports (1024 ONTs)
- 48 point-to-point GE ports (48 ONTs)

- 8 XGS-PON/NG-PON2 ports

With Multi-dwelling unit (MDU) ONTs, the subscribers per 1RU system can exceed several thousand.

MODULAR CHASSIS ARCHITECTURE

The Calix E7-2 modular chassis enables a pay-as-you-grow architecture, combining the most advantageous attributes of a small form factor product with a large chassis-based system.

- 1RU design can expand from a single slot, for very low first install cost, to multiple chassis to add subscriber growth yielding a near linear cost curve
- Twenty line cards are managed as a single chassis for operational efficiency
- Mix and match line cards in a common chassis – no common control equipment required
- Line cards can be added or replaced without uninstalling/installing power, alarms, or cables – reducing MTR from hours to minutes
- Subscribers are easily aggregated and network resources efficiently shared across protected trunk facilities
- Hardened 1RU system delivers GPON and Ethernet with 10GE transport from CO, cabinet or pole mount
- Resilient, hot-swappable line cards and fan tray

With the E7-2, service providers no longer need to decide between a single service product and a high growth chassis solution. E7-2 provides low first install cost, operational efficiency and near linear incremental cost per subscriber, enabling Calix customers to maximize their business return.

FULL SPECTRUM OF SERVICES

The E7 delivers a full spectrum of access services over GPON and Point-to-Point Ethernet using the family of Calix ONTs, including Single Family Unit (SFU), Small Business Unit (SBU), Multi-Dwelling Unit (MDU), and rack-mount models.

- 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 video: RF video overlay with RF return

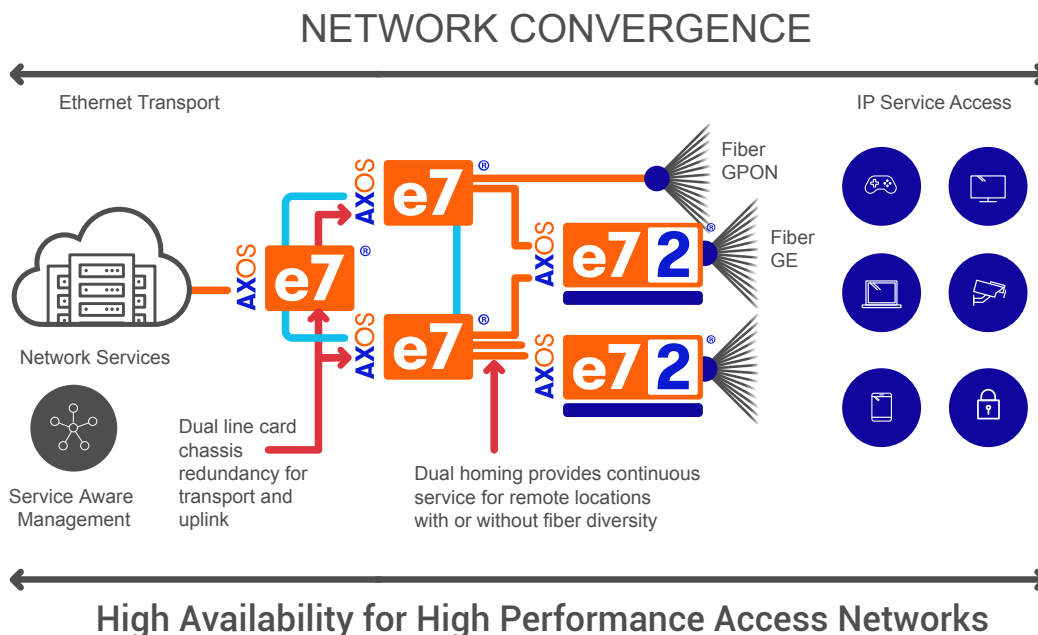
Calix ONTs support auto sensing GPON and GE network interfaces, allowing service providers to manage service changes without subscriber onsite technical support.

DELIVERING “QUALITY OF EXPERIENCE”

The E7 provides per-subscriber and per-service hierarchical QoS to deliver uncompromised triple play and business services. A powerful collection of classification, policing, queuing 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

IPTV services are by far the most demanding in terms of quality, and user expectations are very high. 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.



INTEGRATED HIGH-CAPACITY AGGREGATION

The E7 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. This capacity makes the E7 ideal for aggregation and transport of IP/Ethernet services across the access network.

The E7 platform supports industry standard pluggable modules for all service and network interfaces, including ITU G.984 compliant GPON, Small Form-Factor Pluggable (SFP) Gigabit Ethernet, XFP 10GE ports, and SFP+ 10GE ports.

NETWORK RESILIENCY

The Calix E7 supports a flexible set of standards-based network topology protocols for use in aggregation, ring-based transport, and uplink applications.

- ITU G.8032 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation

SERVICE AWARE MANAGEMENT

The E7, along with the Calix Management System (CMS), allows operators

to manage services while understanding their relationship to the network infrastructure. Service-oriented management includes rapid service provisioning, service templates and policies, and service assurance. Comprehensive network management tools let operators create physical

and logical topology maps, engineer traffic flows, and manage network commissioning and software upgrades. Network inventory, alarm surveillance and PM collection are enabled by the E7 system. The E7 provides locally hosted Web GUI, CLI and SNMP interfaces

SPECIFICATIONS

Backplane Bandwidth

- 100 Gbps between slots

Slots

- 2 universal line card slots
- 1 Fan Tray slot

Dimensions (W x H x D)

- 17.5 x 1.7 x 11.45 inches
- 44.5 x 4.3 x 29.1 cm
- Height is 1 RU

Weight

- 5.9 lb (2.7 kg) E7 shelf
- 7.4 lb (3.4 kg) shelf with Fan Tray

Operating Environment

- Temperature: -40 to +65° C (-40° F to +149° F)
- Humidity: 10 to 95% (non-condensing)
- Operating altitude: 10,000 ft (3,049 m)

Storage Environment

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

Management Support

- Calix CMS network management
- Calix CLI and Web GUI for local management interface
- SNMP v2c and v3 performance and fault monitoring

Management Interfaces

- Ethernet 10/100 (RJ-45 connector on Calix E7-2 Fan Tray)
- Ethernet 10/100 (RJ-45 connector on back of Calix E7-2)
- RS-232 (RJ-11 connector on Calix E7-2 Fan Tray)

Synchronization

- Synchronization is enabled by the E7-2 line cards as required
- External reference timing
- Built-in Stratum-3 clock
- Hardware-ready to support Synchronous Ethernet

Alarm I/O Interfaces

- Wire wrap pin access on E7 back
- User definable alarm inputs: 7; outputs: 1

Fiber Interfaces

- All optical ports use pluggable optics (SFP, XFP, SFP+)
- LC or SC connectors on modules

Analog/Metallic Interfaces

- Two standard 25-pair RJ-21 connectors per slot

Timing I/O Interfaces

- Access through wire wrap pins on the back of the Calix E7
- BITS clock (sink and source)
- STANDARDS COMPLIANCE NEBS Level 3 compliance (GR-63-CORE, GR-1089-CORE, GR-3028)
- UL 60950
- FCC Part 15 Class A

Power Feeds

- Integrated power management on Calix E7-2 line cards
- Redundant -48/60 VDC battery feeds (A and B)
- Input Range: -42.5VDC to -72VDC
- Fuse: 7.5 Amps (A and B)



SPECIFICATIONS

Fan Tray Assembly (100-014551)

Fans:

- 4 fans housed in fan tray
- Resilient design maintains system cooling with one fan failure

Management Interfaces

- Ethernet 10/100 (RJ-45 connector)
- RS-232 (RJ-11 connector)

System Information

- 7-segment LCD display System Controller (MGT) – GREEN

Shelf Alarm Indicator

- Critical (CR) - RED
- Major (MJ) - RED
- Minor (MN) - AMBER
- Alarm Cut-Off (ACO) button

Power Specifications

- Min Input Power: 22 Watts @ -48V
- Max Input Power: 65 Watts @ -48V

Maintenance

- Field-replaceable air filter (not used in RT locations) Hot-swappable fan tray assembly



Fan Tray Assembly 2 (100-03590)

Fans:

- 4 fans housed in fan tray
- Resilient design maintains system cooling with one fan failure
- Variable speed operation depending on operating temperature*

Management Interfaces

- Ethernet 10/100 (RJ-45 connector)
- RS-232 (RJ-11 connector)

System Information

- 7-segment LCD display System Controller (MGT) – GREEN

Shelf Alarm Indicator

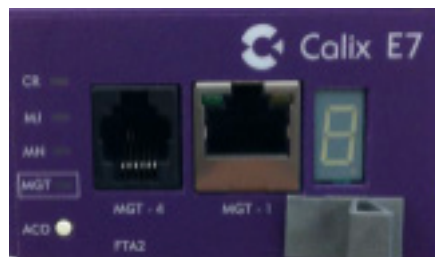
- Critical (CR) - RED
- Major (MJ) - RED
- Minor (MN) - AMBER
- Alarm Cut-Off (ACO) button

Power Specifications

- Min Input Power: 8.5 Watts @ -48V
- Max Input Power: 48 Watts @ -48V

Maintenance

- Field-replaceable air filter (not used in RT locations) Hot-swappable fan tray assembly



Notes: For GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers, 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, Active Ethernet CSFPs, 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 CSFP Option 2 sockets, and in SFP+ sockets at 1GE rate.
- Copper Direct Attach cables can operate in SFP, CSFP Option 2, and SFP+ sockets at 1GE, 2.5GE, and 10GE data rates as supported by the card type.

ORDERING INFORMATION

Calix E7-2 Ethernet Service Access platform

- 000-00372** E7-2 Chassis with Fan Tray Assembly and Installation Kit
- 100-01451** E7-2 Fan Tray Assembly
- 000-00228** E7-2 Fan Tray Assembly Filter, Package of 10 units
- 100-03590** E7-2 Fan Tray Assembly 2 (FTA2)*
- 000-00760** E7-2 Fan Tray Assembly 2 (FTA2) Filter, Package of 10 units

Note: *Variable speed operation under software control requires a minimum of E7 Release 2.2 software. In releases prior to 2.2, the FTA2 fan speeds are identical to the original FTA.

The 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.

- CSFP Option 2** 1GE optical dual-port Compact Small Form-factor Pluggable (CSFP) Option 2 modules
- 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)

Calix Mount Kit

- 100-03382**..... E7-2 ETSI Rack Mount Kit