

Calix E7-2 VDSL2-48 r2

DESCRIPTION

The Calix E7-2 VDSL2-48 r2 card combines 48 VDSL2/ADSL2+ subscriber ports and integrated splitters with integrated 10G/1G Ethernet transport to provide a very compact, high-density DSL solution. One E7-2 VDSL2-48 r2 line card can be plugged into a Calix E7-2 shelf to create a compact, very high-density DSL node, with Ethernet aggregation and transport, ideal for copper based IP services delivery across the access network. The E7-2 VDSL2-48 r2 card features vectoring and 8 pair bonding, which supports a full set of residential and business services.



KEY ATTRIBUTES

HIGH DSL AND POTS INTERFACE DENSITY: The Calix E7-2 VDSL2-48 r2 line card is equipped with 48 VDSL2/ADSL2+ Fallback ports. The line card supports 48 integrated splitter ports to support analog POTS services. One VDSL2-48 r2 line card can be installed in an E7-2 chassis, providing an industry leading density of 48 DSL and POTS overlay ports in a 1RU high chassis for copper based access.

INTEGRATED VECTORING SUPPORT: The E7 VDSL2-48 r2 line cards support unit level and system level vectoring, enabling higher subscriber bandwidth connectivity. The E7-2 is unique in the industry because it supports 96 ports of system level vectoring without requiring an external vector control processor. When using the E7 VCP-192 or E7 VCP-384 vector control processor, the E7 supports system level vectoring up to 384 ports.

COPPER BONDED SERVICES/TRANSPORT: The E7-2 VDSL2-48 r2 enables service providers to deliver high bandwidth symmetric services using copper bonding in locations where fiber may not be available. The line card delivers services over up to 8 bonded pairs per subscriber for services or to a next hop cabinet location for transport.

INDUSTRY STANDARDS COMPLIANCE: The Calix E7-2 VDSL2-48 R2 card complies with all applicable ADSL/VDSL2 ITU standards including G.992.1 (ADSL/G.dmt), G.992.2 (G.Lite), G.992.3/4 (ADSL2), G.992.5 (ADSL2+), G.993.2 (VDSL2), G.994.1 (G.hs), G.998.2 (VDSL2 Ethernet Pair Bonding), G.998.1 (ATM-based multi-pair bonding), G.998.4 (G.inp), G.993.5 (G.Vector), and ANSI T1.413, ensuring interoperability with a wide range of CPE.

NATIVE IPTV SUPPORT: The E7-2 supports industry standard IGMP Proxy 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 DSL subscriber interfaces.

NETWORK INTERFACE OPTIONS: All E7-2 VDSL2-48 R2 Ethernet interfaces use industry standard pluggable modules, including Small Form-Factor Pluggable (SFP) optical copper Gigabit Ethernet, SFP+ 10GE optical modules, and copper Direct Attach cables. The SFP ports can be run at 1 Gigabit or 2.5 Gigabit Ethernet data rates. SFP+ ports also support 1GE SFP modules, extending the versatility of the SFP+ ports to allow additional 1GE or 10GE transport flexibility.

HIGH AVAILABILITY ETHERNET TRANSPORT: The E7-2 system bridges the gap between traditional DSL service access nodes and Ethernet switches, as it is designed to provide both copper pair service drops and Ethernet-based transport and aggregation. The VDSL2-48 R2 card includes four GE and two 10GE ports for use as uplink and transport from the local E7-2 system, or to subtend additional E7-2 chassis to extend DSL access capacity. Multiple E7-2 systems can be linked together at 2.5GE or 10GE data rates using low cost copper cables.

NETWORK RESILIENCY: All Calix E7-2 cards support 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

With multiple 1GE/2.5GE and 10GE interfaces, the VDSL2-48 R2 card can reside in ERPS transport rings, and provide Link Aggregation RSTP-protected uplink to network services.

DELIVERING "QUALITY OF EXPERIENCE": The E7-2 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 differentiation within the E7-2 network.

SPECIFICATIONS

Calix E7-2 VDSL2-48 R2

MINIMUM SYSTEM REQUIREMENTS

Calix E7-2 shelf support only
One VDSL2-48 42 line card per E7-2 chassis
Calix E7-2 Software Release 2.4

DIMENSIONS (W x L x H)

14 x 10.1 x 1.5 inches
35.6 x 25.7 x 4 cm

PORTS

48 ports VDSL2/ADSL2+ Fallback
48 integrated splitter ports
4 SFP sockets at 1GE/2.5GE rates
2 SFP+ sockets at 1GE/10GE rates
1 Vector Control Interface port

VDSL2 ETHERNET PACKET TRANSFER MODE

VDSL2 ITU-T G.993.2
ITU-T G.994.1 G.hs or Handshake
Compliant with IEEE STD 802.3AH-2004, Ethernet in the First Mile (EFM)

ADSL2+ FORMAT

Full-rate ANSI T1.413, Issue 2
G.DMT full-rate ITU-T G.992.1
G.Lite ITU-T G.992.2
ADSL2 ITU-T G.992.3 including Annexes A/L/M
ADSL2+ ITU-T G.992.5 including Annex A/M
ITU-T G.994.1 G.hs or Handshake

XDSL MULTI-PAIR BONDING

ITU-T G.998.1 ADSL2+ ATM-based multi-pair Bonding
ITU-T G.998.2 VDSL2 PTM-based multi-pair Bonding

E7-2 PORT CONCENTRATION

One VDSL2-48 R2 line cards per E7-2; 48 DSL and VF Splitter ports per 1RU chassis

MAXIMUM LINE RATES

VDSL2 (1 pair): Selectable in 64-Kbps increments
Profile 17a: up to 140 Mbps downstream, 60 Mbps upstream.
Profile 12a/b; up to 100Mbps downstream, 30 Mbps upstream
Selectable in 64-Kbps increments
Profile 8a/b/c/d; up to 80Mbps downstream, 20 Mbps upstream
2 pair VDSL2 Bonding:
Profile 17a: Aggregate data rate: up to 160 Mbps downstream, 120 Mbps upstream
8 pair VDSL2 Bonding:
Profile 17a: Aggregate data rate: up to 918Mbps downstream, 340 Mbps upstream
ADSL2+: up to 24 Mbps downstream, 3 Mbps upstream.
Selectable in 64-Kbps increments
ADSL2+ Bonding (2 pairs): up to 45 Mbps downstream, 5 Mbps upstream, selectable in 64-Kbps increments
Full rate ADSL: up to 8 Mbps downstream, 896 Kbps upstream.
Selectable in 64-Kbps increments

POWER DISSIPATION

Maximum and normal operating condition *TBD* (profile 17a)
Heat dissipation: *TBD* BTU/Hour

OPERATING ENVIRONMENT

Temperature: -40° C to +70 ° C
(-40° F to +158° F)
Humidity: 10 to 95%
(non-condensing)

STORAGE ENVIRONMENT

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

STANDARDS SUPPORT

Broadband Forum TR-101
DHCP Relay, and Layer 2 DHCP Relay w/ DHCP Option 82 insertion
Broadband Forum TR-114 "VDSL2 Performance Test Plan", and TR-115 "VDSL2 Functionality Test Plan".
IGMPv2 & IGMPv3 Proxy and Snooping
IEEE 801.X (EAPOL)
IEEE 802.1Q VLAN tagging
IEEE 802.1p Prioritization
IEEE 802.1ad QinQ (Provider Bridges)
IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
IEEE 802.1AX / 802.3ad Link Aggregation
PPPoA to PPPoE conversion, and PPPoE Intermediate Agent
IETF RFC 2684 bridged encapsulation
IETF RFC 4562 MAC-Forced Forwarding
SNMP V2c and SNMPv3
Secured management access as per HTTPS and SSHv2

COMPLIANCE

UL-60950, Standard for Safety, Issue 1, April 1, 2003
FCC 47 CFR (ICES-003) Part 15 Class A
NEBS Level 1 and NEBS Level 3;
GR-1089-CORE Sect. 7, Electrical Safety
GR-3028-CORE Thermal Management in COs
GR-63-CORE Physical Protection, Issue 4

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3rd Party Modem Interoperability

Calix continues to test VDSL2 and ADSL2+ modems against the different DSL Service Platforms supported. These modems must be commercially available, and candidates for service deployment by Calix customers. Extensive rate/reach and data throughput performance testing is performed against all of modems. Qualification testing is conducted for physical layer, HIS/data as well as IPTV/Video service performance. Customer Advisory Bulletins (CAB) documents are available from Calix summarizing completed testing; new versions of the document will provide updates to tests that are in progress. Please refer to up to date CABs from Calix for the latest list of qualified and supported modems.

ORDERING INFORMATION

CALIX E7-2 LINE CARDS

100-03881..... E7-2 VDSL2-48 r2card; 48x VDSL2 Overlay ports w/splitters, 4x 1GE/2.5GE SFP, 2x 1GE/10GE SFP+

CALIX OPTICAL AND COPPER PLUGGABLE MODULES

Calix offers a full suite of optical and copper modules for E7-2 line cards.

SFP+ 10GE optical Small Form-factor Pluggable modules

SFP 1GE optical modules may also be used in SFP+ ports at a 1Gpbs rate

Copper Direct Attach cables are supported in SFP and SFP+ ports at 1GE, 2.5GE and 10GE data rates

Notes: - For 10GE XFP, 10GE SFP+, Direct Attach cables and 2.5GE pluggable transceivers, only modules purchased directly from Calix are supported.