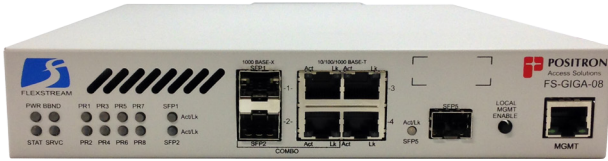


FlexStream FS-GIGA-08 Ethernet Access Device (Up to 1 Gbps) Multi-Pair VDSL2/ADSL2+, G.fast and GigE Fiber



FS-GIGA-08

- **5 GigE Ports:**
 - 1 SFP (Optical)
 - 2 RJ-45 (Electrical)
 - 2 Dual SFP / RJ-45
- **Bonded VDSL2** (8 pairs)
- **Management: RJ-45** (GigE)

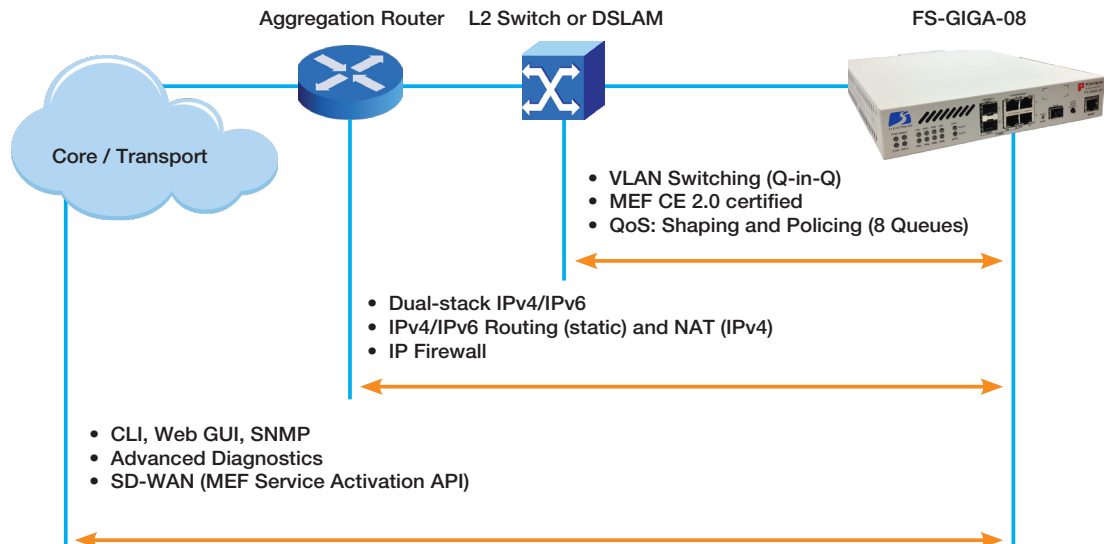
Positron’s FlexStream FS-GIGA-08 Ethernet Access Device (EAD) offers service providers a cost-effective multi-pair bonded VDSL2 Ethernet over Copper (EoCu) and Gigabit Optical. This solution is ideal for the delivery of managed Ethernet services for business customers, small cell backhaul and other demanding applications. As a CE 2.0 certified demarcation device (NID), the FS-GIGA-08 facilitates the provisioning, monitoring and control of end-to-end Ethernet services with comprehensive support for SLA enforcement.

Applications

The FS-GIGA-08 is specifically designed as a carrier grade solution to provide Ethernet services for business Internet access, MTU/MDU, small cell backhaul, L2 VPN, streamed video and Gigabit connectivity. It is environmentally hardened to provide service providers the flexibility to place the unit inside a building or in an outside plant cabinet.

Feature Overview

The FS-GIGA-08 interfaces naturally to an Ethernet switch or to a 3rd party DSLAM/ MSAN over multi-pair VDSL2 with comprehensive support for VLAN and Metro Ethernet Forum standards. The Layer 3 features of the FS-GIGA-08 make it the ideal “light touch” IP Router to complement the role of the aggregation router at the edge of the core/ transport network infrastructure. The FS-GIGA-08 brings the simplicity and scalability of SD-WAN to the world of Managed Ethernet Services. Turning on wholesale and business Ethernet services has never been easier. Of course, the FS-GIGA-08 also offers comprehensive support for SNMP, CLI and web GUI management interfaces.



Bonded VDSL2 and ADSL2+ Access

The FS-GIGA-08 is a standards-based 8-pair VDSL2 and ADSL2+ EAD which provides network operators the means to deliver advanced Ethernet over bonded copper services to business customers at minimal cost over their existing copper infrastructure. The FS-GIGA-08 is fully standards compliant and interoperates with leading 3rd party DSLAMs from Nokia, Calix, Adtran, Huawei and others. When using Vectoring and Impulse Noise Protection (G.INP), the FS-GIGA-08 delivers the best possible VDSL2 performance under all conditions.



Gigabit Fiber Ethernet Access

The FS-GIGA-08 delivers Gigabit Ethernet over all of its Ethernet ports (SFP and RJ-45 port). As such, it offers a seamless migration to Gigabit Ethernet while preserving the same advanced features and management capabilities. The Ethernet ports of the FS-GIGA-08 EAD are configurable in WAN (NNI) or LAN (UNI) mode.

Gigabit Switch/Router Core

At the heart of this platform is an advanced high performance CE 2.0 Ethernet switch/router core incorporating Layer 2 and Layer 3 routing, security and quality of service capabilities. All ports connected to the switch/router core support Gigabit Ethernet speeds.

Layer-3 Support

The Layer 3 IP features of the FS-GIGA-08 are ideal to handle public and private IP address translation in a flattened L2 network infrastructure to deliver carrier Ethernet, Internet and IP services with one device. The FS-GIGA-08 provides extensive dual-stack IPv4/IPv6 support, with static routing.

Metro Ethernet Services

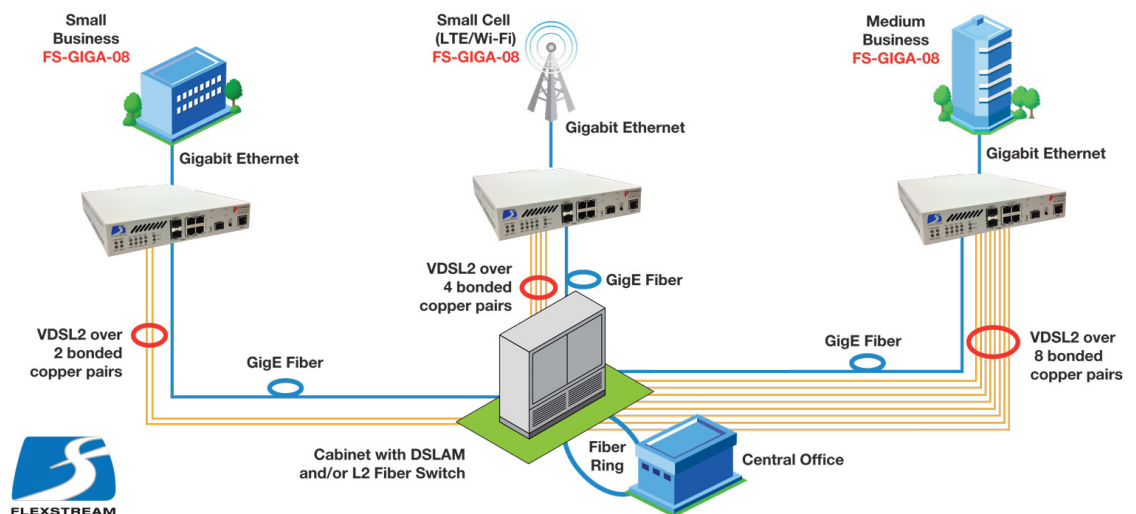
The FS-GIGA-08 is CE 2.0 certified and delivers Ethernet services such as Ethernet Private Lines (EPL and EVPL), Ethernet Private LAN services (EP-LAN and EVP-LAN) and Ethernet Access (ACCESS-EPL and ACCESS-EVPL) as per the Metro Ethernet Forum CE 2.0 standard as well as CE 1.0 (MEF 9 and MEF 14) specifications.

Service OAM Monitoring and Service Turn-up

Monitoring the quality and availability of every dataflow as part of the carrier Ethernet service is achieved with IEEE 802.1ag (ITU-T Y.1731) and IEEE 802.3ah. Circuit delivery validation and trouble shooting can be done using RFC2544 traffic test.

Accelerated Deployment and Service Provisioning

The FS-GIGA-08 is perfectly suited for any managed environment and supports all the common management interfaces such as SD-WAN, XML/SOAP, SNMP, Telnet, SSH, HTTP and HTTPS.



Technical Specifications

Basic Interfaces

- 8 VDSL2, ADSL2+, ADSL2 and RE-ADSL2 pairs
- 1 x 10/100/1000 BaseX Ethernet uplink (SFP port)
- 2 x Gigabit Ethernet ports (RJ-45)
- 2 Dual-mode RJ-45 and SFP 10/100/1000 BaseX Ethernet
- All Ethernet ports are Gigabit full duplex with auto-sense, automatic cross-over
- 1 x Gigabit Ethernet management port
- Link status and activity LEDs

Support for ITU-T VDSL2 & ADSL2+ Standards

- ITU-T G.992.1, G.992.2, G.992.3 (ADSL2), G.992.5 (ADSL2+)
- ITU-T G.993.2 VDSL2, G.993.5 (G.vector)
- ITU-T G.996.1 (G.test), G.997.1 (G.ploam)
- ITU-T G.999.1
- ITU-T G.998.4 (G.INP)
- IEEE 802.3ah EFM bonding

Support for G.fast

- ITU-T G.7000 and G.7001

Outside Plant Pair

- T1.417 spectral compliant
- Resiliency: automatic pair failure protection
- Configurable Impulse Noise Protection and Latency
- BER: 10⁻⁷

Fault Monitoring

- Alarm Generation
- Automatic re-introduction of fixed pairs
- SELT and DELT support under control of the DSLAM

Layer-2 Functionality

- IEEE 802.1d Transparent Bridging
- IEEE 802.1p QoS on Ethernet Level
- IEEE 802.1q VLAN Tagging
- IEEE 802.1ad Provider Bridges or Q-in-Q
- VLAN Switching
- Port-based VLANs
- Bandwidth Profile

Operations and Maintenance (OAM)

- IEEE 802.1ag (ITU-T Y.1731) and IEEE 802.3ah
- RFC2544
- CE 2.0 certified
- MEF E-LINE, E-LAN & E-ACCESS

IP Functionality

- Dual Stack IPv4/ IPv6
- IPv4 NAT/PAT
- DHCP client/server
- Basic and Extended IP filtering
- Static routing

Quality of Service (QoS)

- Traffic Classification and Policing (inbound/outbound)
- Priority Queuing Layer 2 (8 levels, programmable)
- Priority Queuing Layer 3 (DiffServ)
- Traffic Shaping and policing
- Queuing mechanisms: SP, RR, WFQ
- Hierarchical QoS

Performance and Scalability

- Number of concurrent VLANs: 256
- Dynamic bridging: 8K MAC addresses

Maintenance and Management Support

- SD-WAN (as per MEF Service Activation API)
- Command Line Interface (CLI)
- HTTP, HTTPS, GUI Web Interface
- SSH and Password protection
- Radius AAA, TACACS+
- Secure and unsecure FTP/ TFTP for configuration and firmware
- SNMPv1, v2, v3, MIB II, proprietary MIB
- Statistics 15 min and 24 hours
- Traffic monitoring: roundtrip delay, jitter, loss

Mechanical Specifications

- Rackmount unit dimensions: 8.5" (216 mm) Wide x 11.2" (284 mm) Deep x 1.75" (44 mm) High
- Weight: max 3 lbs (1.4 Kg)

Power Supply

- Input: -48 VDC
- Optional:
 - 110-230 VAC – 50/60 Hz
 - ±190 VDC
- Power consumption: 26 W
- Operating Temperature: -40 to +65 °C
- Storage Temperature: -40 to +70 °C
- Relative Humidity: up to 95% non-condensing

Regulatory Approval

- UL 60950
- FCC Part 15 Class A
- Tested to GR-487

Ordering Information

Part Number	Description
Remote Units	FS-GIGA-08
FS-GIGA-08	FS-GIGA-08 rack mount unit with fans (8-pair VDSL2)
FS-GIGA-08-OUT	FS-GIGA-08 wall mount unit without fans (8-pair VDSL2)
NTE Kits	Universal CPE (FS-GIGA-08) in FS-CAB-08 Enclosure
FS-GIGA-08-OUT-DC	8-pair FS-GIGA-08 factory installed in an IP-65 Enclosure Includes a primary pair protection module (5-pin gas tube protectors not included)
FS-GIGA-08-OUT-AC	8-pair FS-GIGA-08 factory installed in an IP-65 Enclosure Includes a primary pair protection module (5-pin gas tube protectors not included) Includes a FS-ACDC-EXT 110-220 VAC to -48 VDC power supply
FS-GIGA-08-OUT-LPWR	8-pair FS-GIGA-08 factory installed in an IP-65 Enclosure Includes a primary pair protection module (5-pin gas tube protectors not included) Includes a FS-LPWR ± 190 VDC to -53 VDC power supply (required 2 dedicated copper pairs)
Ancillaries for Cabinets	Spares, Brackets and Options
FS-PROT-08	Protection module FS-GIGA-08
FS-GAS-TUBE	5-pin gas tube protector
FS-ACDC-EXT	110-220 VAC to -48 VDC power supply
FS-LPWR	2-pair line power ± 190 VDC to -53 VDC power supply (requires 2 dedicated copper pairs)
FS-POLE-BKT	Pole-mount bracket kit
FS-GIGA-SP	Fiber spool
Ancillaries for Rack mount	Spares, Brackets and Options
FS-GIGA-PWR	AC to -48 VDC power supply for FS-GIGA-08 rack mount
FS-GIGA-FB19	19" brackets for FS-GIGA-08 rack mount
FS-GIGA-FB23	23" brackets for FS-GIGA-08 rack mount
FS-GIGA-FFL6	6-pack of air filters for FS-GIGA-08 rack mount
FS-GIGA-FAN	Fan replacement kit for FS-GIGA-08 rack mount

Network Termination Equipment FS-GIGA-08-OUT-AC



Options:

- Sealed enclosure with protection (NEMA4X – IP-65)
- AC/DC power supply
- ± 190 VDC line power module



Doc#: FS-GIGA-08-030217