

# FSP 150-GE100Pro Series

Programmable Carrier Ethernet and IP demarcation

## Benefits

- **Universal use**  
A unique, comprehensive combination of features for future-proof network demarcation
- **Adtran ConnectGuard™ security**  
Securing traditional leased lines without compromising bandwidth or latency.
- **Multilayer technology**  
Extending Ethernet demarcation with forwarding, filtering and advanced monitoring capabilities for IP traffic
- **Timing excellence**  
Assured, highly precise frequency-, phase-, and time-synchronization featuring SyncE and IEEE 1588 PTP
- **Temperature hardened**  
Different construction practice for rack-mount indoor but also fanless outdoor applications
- **Ensemble management and control**  
Ensemble Controller with future-proof SDN control and open API

## Overview

**As complexity increases, network demarcation devices need to continuously extend their capabilities.**








Communication service provider need one product family for Ethernet and IP, indoor or outdoor, sophisticated security and highly precise synchronization.

Change is the norm. Today, your business customer wants Ethernet connectivity. Tomorrow, it's IP services. Frequency synchronization is no longer sufficient for your mobile network as time synchronization is mandatory for 4G. Meanwhile, your customers decide that they won't accept unencrypted transmission. The one constant is that requirements keep changing – and at an unprecedented pace. Our FSP 150-GE100Pro series belongs to the successful FSP 150 ProNID family. It enables network operators to offer true multi-service access by combining the demarcation of Carrier Ethernet 2.0 and IP services with a rich set of features in a single device. What's more, there's a range of designs from ultra-compact to rack-mountable devices, all aligned with distinct customer demand. The comprehensive FSP 150-GE100Pro series provides the perfect answer to any demarcation requirement.



# FSP 150-GE100Pro Series

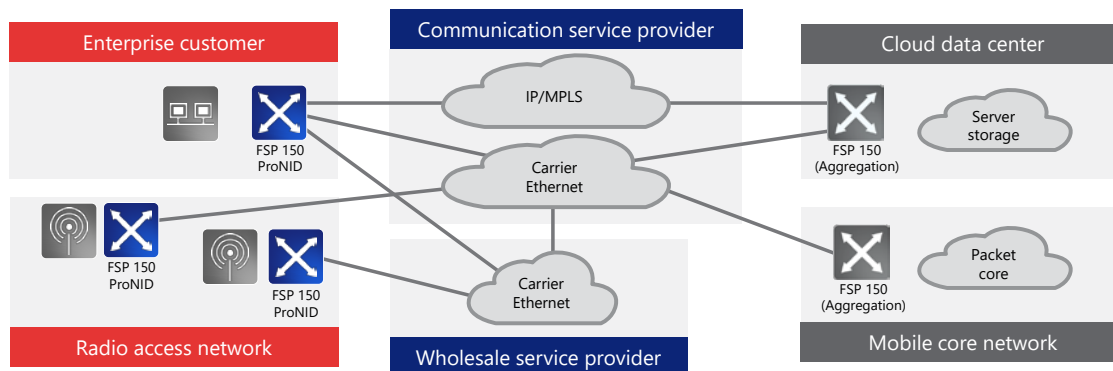
## FSP 150-GE100Pro Series at a glance

	Product	Key Application
	GE101Pro	Ultra-compact business services and cloud access demarcation device
	GE102Pro (H)	Business services and cloud access demarcation device featuring redundant power supply
	GE112Pro (m)	Compact business services and cloud access demarcation for outdoor enclosures
	GE112/114Pro	Multi-tenant demarcation device for business services and cloud access
	GE114Pro (C)	Secure business services and cloud access over untrusted connectivity networks
	GE112Pro (H) GE114Pro (HE)	Multi-tenant demarcation device for business services and cloud access featuring redundant power supply
	GE114Pro (SH) / (CSH)	Cell site demarcation device featuring assured synchronization delivery and optional encryption

## Applications in your network



### Cloud access, business services and cell site demarcation

- The perfect choice in multi-technology Carrier Ethernet and IP connectivity networks with a unique set of network demarcation features
- Best mobile edge demarcation product featuring environmentally hardened design, minimum space requirements and ultra-low power consumption
- Single product family addressing a wide range of applications and avoiding spiraling cost of multiple sole-purpose devices
- Well prepared for future network architectures with central SDN control in combination with proven, highly reliable network management solution



# FSP 150-GE100Pro Series

## Product specifications

	Access capacity (ports)	Network capacity (ports)	Synch.	Encryption	Operating temperature	Power supply	Size	Power consumption (nominal)
<sup>1</sup> GE101Pro	1xGE	1xGE	–	–	0°C to +45°C	External, AC	Ultra compact	6.5W
<sup>2</sup> GE102Pro(H)	1xGE	2xGE	–	–	0°C to +45°C	Integrated, DC or AC	1 RU (H) full width	15W
<sup>3</sup> GE112Pro (m)	2xGE	2xGE	–	–	–40°C to +70°C	External, AC or DC	1 RU (H) compact	19W
<sup>4</sup> GE112Pro	2xGE	2xGE	–	–	–40°C to +65°C	Integrated, DC or AC	1 RU (H) half width	19W
<sup>5</sup> GE112Pro (H)	2xGE	2xGE	–	–	–40°C to +65°C	Modular, DC or AC	1 RU (H) full width	21W
<sup>6</sup> GE114Pro	4xGE	2xGE	–	–	–40°C to +65°C	Integrated, DC or AC	1 RU (H) half width	23W
<sup>7</sup> GE114Pro (C)	4xGE	2xGE	–	 Connect Guard™	–40°C to +65°C	Integrated, DC or AC	1 RU (H) half width	23W
<sup>8</sup> GE114Pro (HE)	4xGE	2xGE	–	–	–40°C to +65°C	Modular, DC or AC	1 RU (H) full width	24W
<sup>9</sup> GE114Pro (SH)	4xGE	2xGE	SyncE, PTP	–	–40°C to +65°C	Modular, DC or AC	1 RU (H) full width	30W
<sup>10</sup> GE114Pro (CSH)	4xGE	2xGE	SyncE, PTP	 Connect Guard™	–40°C to +65°C	Modular, DC or AC	1 RU (H) full width	30W

### Access capacity

- One<sup>1</sup> 10/100/1000BaseT or 100/1000BaseX (SFP) port
- One<sup>2</sup> 10/100/1000BaseT or 100/1000BaseX (SFP) port
- Two<sup>3</sup> ports:
  - one dedicated 100/1000BaseX (SFP) port
  - one 10/100/1000BaseT or 100/1000BaseX (SFP) port
- Two<sup>4,5</sup> / Four<sup>6-10</sup> 10/100/1000BaseT or 100/1000BaseX (SFP) ports

### Network interface

- One<sup>1</sup> 10/100/1000BaseT or 100/1000BaseX (SFP) port
- Two<sup>2,3</sup> 100/1000BaseX (SFP) ports
- Two<sup>4-10</sup> 10/100/1000BaseT or 100/1000BaseX (SFP) ports
- One network port can be defined as an additional access port<sup>2-10</sup>

### Network interface redundancy<sup>2-10</sup>

- IEEE 802.1AX link aggregation – active/standby<sup>2-10</sup> or load balancing<sup>3-10</sup>
- ITU-T G.8032 Ethernet ring protection<sup>3-10</sup>

### Synchronization<sup>9-10</sup>

- ITU-T G.8261 / G.8262 / G.8264 Synchronous Ethernet on all interfaces
- Sync status message support
- IEEE 1588v2 Precision Time Protocol
- ITU-T G.8265.1 and G.8275.1 PTP Telecom Profile
- BITS-in and BITS-out
- BITS sync status messaging
- 1 PPS in/out
- 10MHz

### VLAN support

- 4096 VLANs (IEEE 802.1Q customer-tagged) and stacked VLANs (Q-in-Q service provider tagged)
- 2-tag management (push/pop/swap) for c-tag and s-tag
- IEEE 802.1ad provider bridging (c-tag, s-tag)
- Ethertype translation
- 8<sup>1,2</sup> / 32<sup>3-5</sup> / 64<sup>6-10</sup> Ethernet virtual circuits (EVC)
- 9612 Byte per frame MTU transparency
- EoMPLS encapsulation

# FSP 150-GE100Pro Series

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## Layer 2 traffic management

- Acceptable client frame policy: tagged or untagged
- Service classification based on IEEE 802.1p, 802.1Q and IP-TOS/DSCP
- VLAN tag priority mapping (IEEE 802.1ad PCP encoding)
- MEF-compliant policing (CIR/CBS/EIR/EBS) with three-color marking and eight classes of service
- Port shaping on transmit for both client and network ports
- MEF 10.3 hierarchical policing with token-share envelopes
- DiffServ supporting WFQ/SP mix

## Layer 3 traffic management

- L2-L4 access control lists (ACL) for classification
- VRF-lite virtual routing and forwarding supporting IPv4 and IPv6
- BGP and OSPF dynamic routing
- DHCP relay agent
- DCSP remarking
- VRRP, NAT

## Operation, administration and maintenance (OAM)

- IEEE 802.3ah EFM-OAM link management
- IEEE 802.1ag connectivity fault management (CFM) with hardware assistance
- ITU-T Y.1731 performance monitoring
- ITU-T Y.1564 service activation testing
- Terminal and facility loopbacks on port- and EVC-level for all interfaces
- Cable diagnostics with benchmarks (electrical interfaces only)
- Embedded RFC 2544 test generator and analyzer (ECPA)
- MEF-compliant Layer 2 control protocol disposition and extensive filter options for Layer 2 packet types
- Link loss forwarding to signal local link and network path failures
- Dying gasp message for power failure alarming (EFM-OAM and SNMP trap option)
- Port mirroring (local and remote)<sup>3-9</sup>

## Performance monitoring

- RFC 2819 RMON Etherstats on a per-port and per-service basis
- 15-minute and 1-day performance data bins
- IEEE 802.3ah/ITU-T G.8021 PHY level monitoring
- ITU-T Y.1731 single- and dual-ended frame loss measurement<sup>2-9</sup>
- Synthetic frame loss and delay measurement for multi-point service monitoring

- TWAMP sender/reflectors for L3 based service assurance
- Multi-CoS monitoring on EVCs scaling up to 32<sup>1,2</sup>/64<sup>3</sup>/128<sup>4-10</sup> simultaneous SOAM flows
- Threshold-setting and threshold-crossing alerts
- Physical parameter monitoring for SFP optics, including TCAs
- Temperature monitoring and thermal alarms

## ConnectGuard™ security<sup>7,10</sup>

- L2 MACsec encryption at line rate on a per-EVC basis
- End-to-end encryption mode with one or two VLAN tags transmitted in the clear
- Robust AES encryption algorithm (AES-128/AES-256)
- Key distribution based on IEEE 802.1X
- Diffie-Hellmann key exchange process (2048/4096 bits)
- Tamper resistant and evident enclosure
- Full interoperability with all FSP 150 ConnectGuard™-enabled products

## Low-touch provisioning

- DHCP/BOOTP auto-configuration
- IEEE 802.1x port authentication (supplicant and authenticator)
- Text-based configuration files
- TFTP/SCP for software image upgrade and configuration file copy

## Management and security

### Local management

- Serial connector (RJ45) using CLI<sup>3-10</sup>
- Local LAN port (RJ45) using CLI, SNMP and Web GUI interfaces<sup>2-10</sup>
- USB (Type B Micro) using CLI<sup>1</sup>
- USB (Type B Mini) using CLI<sup>2</sup>
- 3G/LTE/WiFi USB interface

### Remote management

- Maintains in-band VLAN and MAC-based management tunnels
- Fully interoperable with other FSP 150 products

### Management protocols

- IPv4 and IPv6 DCN protocol stacks, including dual-stack operation and 6-over-4 tunnels
- Telnet, SSH (v1/v2), HTTP/HTTPS, SNMP (v1/v2c/v3)
- NETCONF/YANG, OpenFlow

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## Secure administration

- Configuration database backup and restore
- System software download via FTP, HTTPS, SFTP or SCP (dual flash banks)
- Remote authentication via RADIUS / TACACS
- SNMPv3 with authentication and encryption
- Access control list (ACL)

## IP routing

- DHCP, RIPv2 and static routes, ARP cache access control

## System logging

- Alarm log, audit log and security log

## Regulatory and standards compliance

- MEF CE 2.0 certified
- IEEE 802.1Q (VLAN), 802.1p (Priority), 802.1ag (CFM), 802.3ah (EFM), 802.1x
- ITU-T Y.1731, G.8010 / Y.1306, G.8011.1+2, G.8032<sup>3-10</sup>
- MEF-6.1, -9, -10.2, -11, -14, -20, -21, -22.1, -23.1, -25, -26.1, -30, -33, -35, -36
- IETF RFC 2544 (Frame Tests), RFC 2863 (IF-MIB), RFC 2865 (RADIUS), RFC 2819 (RMON), RFC 5357 (TWAMP)
- MEF-compliant ITU-T Y.1564 Service Activation Testing
- ETSI 300 132-2, ETS 300-019-2
- Telcordia GR-499, GR-63-CORE, SR-332<sup>2-10</sup>
- Safety IEC / UL / EN 62368-1, 21CFR1040.10, EN 60825, EN 50371, EN 300-386, EN 50160, IEC 60320 / C14
- EMI EN 300-386, GR-1089-CORE, ETS 300-132, FCC Part 15, Class A<sup>3-10</sup>, Class B<sup>1,2</sup>, Industry Canada

## Environmental

- Dimensions (W x H x D):
  - 113mm x 38mm x 113mm / 4.5" x 1.5" x 4.5"<sup>1</sup>
  - 436mm x 44mm x 211mm / 17.1" x 1.7" x 8.3"<sup>2</sup>
  - 145mm x 34mm x 152mm / 5.7" x 1.3" x 6.0"<sup>3</sup>
  - 220mm x 44mm x 218mm / 8.7" x 1.75" x 8.6"<sup>4,6,7</sup>
  - 443mm x 44mm x 208mm / 17.4" x 1.7" x 8.2"<sup>5</sup>
  - 443mm x 44mm x 218mm / 17.4" x 1.7" x 8.6"<sup>8-10</sup>
- Operating temperature:
  - 0°C to +45°C / 32°F to 113°F<sup>1,2</sup>
  - -40°C to +70°C / -40°F to 158°F (hardened environment)<sup>3</sup>
  - -40°C to +65°C / -40°F to 149°F<sup>4-10</sup> (hardened environment)
- Storage temperature: -40°C to +70°C / -40°F to 158°F (GR-63-CORE)
- Humidity: 5 to 95%, BI (non-condensing)
- Power supply:
  - External 110 / 240VAC, -48 to -72VDC power adapter<sup>1,3</sup>
  - Fixed, redundant PSUs, 110/240VAC, -36 to 72VDC with over-voltage and over-current protection<sup>2</sup>
  - Integrated PSU<sup>4,6,7</sup> / redundant modular hot-swappable PSU<sup>5,8-10</sup>: 110/240VAC, -48 to -72VDC with over-voltage and over-current protection
- Power consumption:
  - Nominal: 6.5W<sup>1</sup>, 12.5W<sup>2</sup>, 19W<sup>3,4</sup>, 21W<sup>5</sup>, 23W<sup>6,7</sup>, 24W<sup>8</sup>, 30W<sup>9,10</sup>
  - Maximum: 10W<sup>1</sup>, 15W<sup>2</sup>, 23W<sup>3,4</sup>, 25W<sup>5</sup>, 28W<sup>6,7</sup>, 29W<sup>8</sup>, 35W<sup>9,10</sup>
- Dry-contact environmental alarm inputs<sup>8</sup>

## Product legend

<sup>1</sup> FSP 150-GE101Pro

<sup>2</sup> FSP150-GE102Pro (H)

<sup>3</sup> FSP 150-GE112Pro (m)

<sup>4</sup> FSP 150-GE112Pro

<sup>5</sup> FSP 150-GE112Pro (H)

<sup>6</sup> FSP 150-GE114Pro

<sup>7</sup> FSP 150-GE114Pro (C)

<sup>8</sup> FSP 150-GE114Pro (HE)

<sup>9</sup> FSP 150-GE114Pro (SH)

<sup>10</sup> FSP 150-GE114Pro (CSH)

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