Falcon-X

10G Carrier Ethernet Aggregation and Demarcation

- 10G aggregation unit for business Ethernet and mobile backhaul services
- MEF CE2.0 services: E-Line, E-LAN, E-Tree, E-Access, for EPL and EVPL
- Robust bandwidth control mechanism and Service Level Agreement (SLA) monitoring per flow
- Complete Ethernet OAM toolbox based on IEEE 802.1ag, ITU-T Y.1731 and RFC2544 for Opex reductions
- Unique Micro-Burst-Detection (MBD) technology for microsecond granular SLA monitoring
- Advanced high speed protection mechanisms for link, path, and ring service resiliency
- High port density delivering a 128Gbps throughput
- Extensive Precision Timing Support, Sync-E and 1588-2008 support
- Compact design, with low power consumption

Product Overview

The **Falcon-X** is a highly integrated, high performance, 10G aggregation and demarcation system, delivering high end Carrier Ethernet services.

This product extensively supports the evolving needs for broadband access services delivery, including high throughput, granular SLA enforcement and monitoring, flexible management capabilities, and a high degree of scalability and flexibility to cater for future requirements and technology trends.

The **Falcon-X** primarily addresses the rapidly-expanding market of mobile backhauling and business access applications.

The **Falcon-X**'s unique Hybrid (ASIC-FPGA) HW architecture supports remote Data Plane Upgrades (DPU) to allow modification and addition of packet processing functions that require **full wire speed performance** that cannot be handled by SW.

The **Falcon-X** supports complete precision timing based on Synchronous **Ethernet and 1588-2008** suitable for all modes of mobile backhaul applications.

The **Falcon-X** series are equipped with 12 or 24x dual-rate FE/GE SFP access (UNI) ports, and 2 or 4x 10G SFP+ PowerLink (NNI) ports. The UNI ports operate at full wire speed, resulting in a total processing capacity of 128Gbps (non-blocking).

The **Falcon-X** offers advanced Quality of Service (QoS) features including classification and mapping based on layer 1 through layer 4 attributes, rate limiting per service, and shaping per port, and queue.

All MEF defined services (EPL, EVPL, ELAN, etc) can be configured on the **Falcon-X** series and can also be protected through use of high performance mechanisms, based on G.8031 and G.8032v2, for link, path, and ring resilience.

These features, combined with a highly flexible fault propagation mechanism and unique fast failure detection algorithms yield a comprehensive and sophisticated device that can handle virtually any network topology.

The system implements current OAM standards (802.3ah, 802.1ag, Y.1731) with HW assist as well as proactive measurements and alarming facilities. To complete the OAM toolset, the Falcon-X has a built in packet generator and analyzer to implement RFC2544 for quick service turn-up and verification.

A **unique Micro-Burst-Detection** (MBD) technology for microsecond granular SLA monitoring is incorporated in the system, helping to detect, alert, and report nearly invisible traffic anomalies, which is essential in highly QoS-sensitive applications, such as financial, healthcare, etc.

The **Falcon-X** series is MEF CE2.0 compliant (all service types).

The **Falcon-X** series are packaged in a robust 19"/1RU housing that allow the installation of hot swappable redundant AC and/or DC power supplies.

All the above result in a market leading system.

Technical Specifications

Interfaces & Indicators

- 12-24 x SFP (100/1000BaseX) FE/GE ports
- 2-4 x 10G SFP+, PowerLink ports
- Supported SFP/SFP+: MM, SM, SFS, CWDM, DWDM, Copper
- 1 x RS232 (RJ45) Console
- 1 x Ethernet 10/100/1000BaseT (RJ45, Out-of- Band)
- 1 x USB port (management, console)
- *LEDs:*
  - Power
  - Alarm
  - Link/Activity (per port)
  - Speed (per port)

Architecture & Forwarding

- Hybrid (ASIC-FPGA) HW architecture
- Data Plane Upgradable (DPU)
- 128MB RAM, 256MB flash memory
- L2 forwarding (802.1D MAC bridging)
- Flow-based forwarding
- Performance: wire-speed, on all ports, all frame sizes
- Total throughput: 128Gbps, non-blocking
- MTU: 10K jumbo frames
- MAC table: 32K addresses
- VLANs: 4K concurrent
- Provider bridging: 802.1ad (Q-in-Q)
- Private VLANs
- L1-L4 ACLs
- *Multicast:*
  - IGMPv3 snooping
  - MLD snooping
  - Up to 8K MC groups

Quality of Service

- Classification based on L1-L4 information (incl. 802.1p, DSCP, MPLS EXP*, SIP/DIP, S/D logical port), 64kbps-10Gbps
- Ingress policing per flow (DLB w/ CIR/EIR, CBS/EBS)
- Two rate, 3-color marking
- 8 HW queues/port
- Egress shaping per queue (CoS)
- Egress shaping per port
- Scheduling: Strict and DWRR (WFQ equivalent)
- 4 drop precedence levels w/ WRED and tail drop for CA
- P-bit and DSCP remarking
- Storm control: UC, MC, BC
- QoS control Lists (policy settings)

Protection

- *Link*:
  - Link aggregation: static or LACP
  - Instant Link Protection (<100usec)
- Linear protection: G.8031 (<50msec)
- Ring protection : G.8032v2 (<50msec)
- *Fault propagation:*
  - Port, service, combinations
  - Inverse, block actions/logic
  - Multiple concurrent rules
- Spanning tree: STP, RSTP, MSTP

OAM & Diagnostics

- IEEE802.3ah link OAM
- IEEE802.1ag CFM
- ITU-T Y.1731 PM (HW based measurements)
- RFC2544 traffic generator & analyzer (up to wire speed)
- L2 loopback w/ MAC swap
- Micro Burst Detection (MBD) with logging and reporting
- Throughput metering
- Copper TDR
- SFP diagnostics (SFF-8472)
- Traffic mirroring

Management

- *Interfaces*:
  - CLI: Console (RS232), Telnet, SSH1/2
  - SNMP: v1/v2c/v3, extensive MIBs
  - Web: HTTP/HTTPS
  - Management VLAN
  - IPv6 management
- *Authentication:*
  - RADIUS, TACACS+
  - Multiple local users
  - User access levels (15)
  - Management ACLs
  - 802.1x (port/MAC based)
- DHCP client & relay (incl. option 82)
- Link discovery: LLDP, CDP snooping
- *Operations:*
  - Remote System Update (TFTP or Web)
  - Configuration upload/download (TFTP or Web)
  - Auto-configuration
- *Alarms:*
  - SNMP traps
  - Syslog (internal and remote server)
  - CLI events
  - Dying gasp (SNMP trap)
- Remote temperature reading & alarm
- Per port and CoS detailed statistics
- NTPv4

Synchronization

- Synchronous Ethernet
- G.8261, G.8262
- ESMC (G.8264)
- Built-in Stratum 3 clock
- Sync interfaces (SMA): 1PPS, Clk (Input/Output)
- *IEEE1588-2008 (PTP):*
  - Ordinary Clock (master, slave)
  - Transparent Clock
  - Boundary Clock

Power & Environmental

- Dual redundant hot swappable Internal power supply
- AC/DC: 100-240VAC, 50/60Hz or 125VDC
- DC: 20-60VDC, ST connector
- *Power consumption:*
  - Maximum: <70W
  - Typical: <60W
- *Operating temperature:*
  - Standard: -10°C ÷ +50°C
  - Extended: -40°C ÷ +65°C
- Storage temperature: -40°C ÷ +80°C
- Humidity: 10-90%, non-condensing

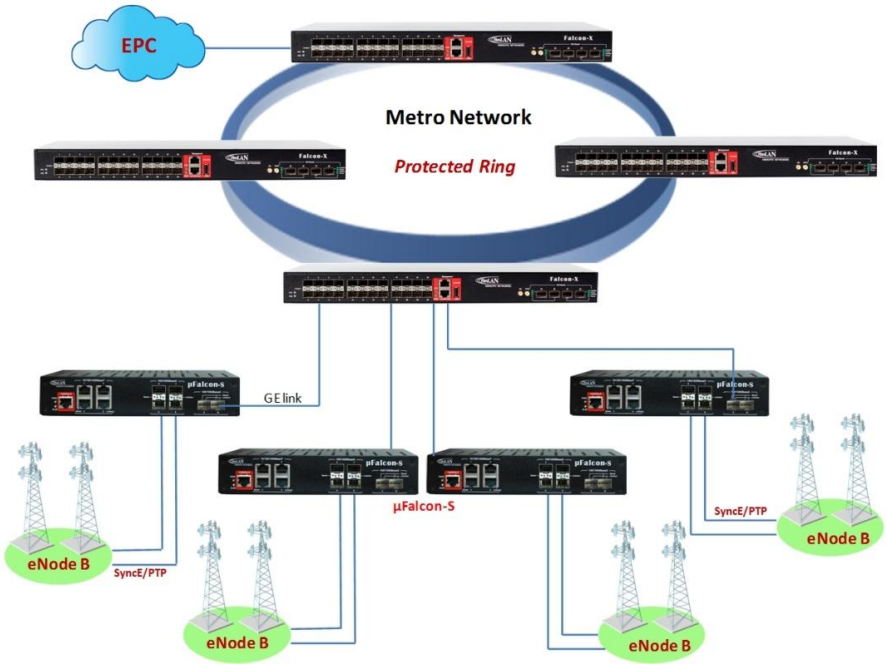
Physical

- 1U, 19”, ETSI compatible
- Dimensions (HxWxD): 44x440x244xmm
- Weight: 3.7Kg
- *Mounting:*
  - Desktop
  - Rack (19”, 23”)
  - Wall
- *Accessories:*
  - Power cable
  - Console cable
  - Rack mounting kit (optional)

Regulatory & Compliance

- *Safety:*
  - IEC EN60950-1
- *EMC:*
  - EN 300 386 V1.3.3: 05
  - AS/NZS CISPR22:06
  - FCC CFR 47 part 15, subpart B, Class A
- MEF: CE2.0
- CE
- RoHS

Typical Application: Wireless Backhaul



Ordering Information

Model	Part #	Description
Falcon-X/424	7040	Multi Service Aggregator/NTU, 24x100/1000BaseX SFP ports, 4x10GE SFP+ ports, 1 removable AC/DC (100-240VAC/125VDC) power supply
Falcon-X/212	7041	Multi Service Aggregator/NTU, 12x100/1000BaseX SFP ports, 2x10GE SFP+ ports, 1 removable AC/DC (100-240VAC/125VDC) power supply
Falcon-X/400	7042	Multi Service Aggregator/NTU, 4x10GE SFP+ ports, 1 removable AC/DC (100-240VAC/125VDC) power supply
Falcon-X/424/D	7043	Multi Service Aggregator/NTU, 24x100/1000BaseX SFP ports, 4x10GE SFP+ ports, 1 removable DC (20V÷60V) power supply
Falcon-X/212/D	7044	Multi Service Aggregator/NTU, 12x100/1000BaseX SFP ports, 2x10GE SFP+ ports, 1 removable DC (20V÷60V) power supply
Falcon-X/400/D	7045	Multi Service Aggregator/NTU, 4x10GE SFP+ ports, 1 removable DC (20V÷60V) power supply
FPS10012/A	7106	Redundant power supply, AC/DC (100-240VAC/125VDC), 50 to 60Hz, 100W
FPS10012/D	7107	Redundant power supply, DC (20-60V), 100W

Specifications are subject to change w/o prior notice

Note: for a complete list of available Falcon-X models please contact Fibrolan

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