µFalcon-ST

Mobile Backhaul
Multipurpose, Multiservice NID/EDD/Switch

- Carrier Ethernet demarcation device delivering business-class Ethernet, legacy TDM services and mobile backhaul over fiber infrastructure
- MEF certified, supporting Ethernet Private Line (EPL) and Ethernet Virtual Private Line (EVPL) services with flexible mapping of the user traffic into Ethernet flows
- Circuit Emulation Services (SAToP, CESoPSN, MEF8) with flexible and advanced synchronization options, including SyncE, 1588v2 (OC, TC and BC), external and integrated GNSS receiver
- Robust bandwidth control mechanism and Service Level Agreement (SLA) monitoring per Ethernet flow starting at customer premises
- Complete Ethernet OAM toolbox based on IEEE 802.1ag, ITU-T Y.1731, RFC2544 and Y.1564 for Opex reduction
- Unique Micro-burst detection (MBD) technology for microsecond granular SLA monitoring (patent pending)
- Advanced high speed protection mechanisms for link, path, and ring service resiliency

Product Overview

The **µFalcon-ST** is a highly integrated, extremely compact, high performance, and cost-effective Mobile Backhaul and Ethernet Demarcation Device.

This product extensively supports both legacy and evolving needs for broadband 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 **µFalcon-ST** primarily addresses the rapidly-expanding market of mobile backhauling and business access applications.

With comprehensive support for circuit emulation services, the **µFalcon-ST** provides the ultimate aggregation of 2G through LTE base stations and smooth migration between these mobile technologies.
The **µFalcon-ST**'s unique Dual Hybrid Core architecture (DHC) supports remote Data Plane Upgrades (DPU). The upgrade allows modifications of the HW core that handles packet processing functions at **full wire speed performance**.

The **µFalcon-ST** is also offered with complete precision timing support based on Synchronous **Ethernet and 1588-2008** for LTE mobile backhaul applications. It is also available with an **integrated GNSS receiver**.

The **µFalcon-ST** is equipped with 4x10/100/1000BaseT (RJ45) user ports, 4 or 8xE1/T1/J1 CES ports, and 4xSFP ports acting as UNIs/NNIs. The user ports can be used in a flexible manner and can all operate at full wire speed, leading to a total processing capacity of 20Gbps (non-blocking).

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

All MEF defined services (EPL, EVPL, ELAN, etc) can be delivered with the **µFalcon-ST** series and can further be protected through use of high performance mechanisms, based on G.8031 and G.8032v2, for link, path, and ring protection.

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), HW assisted, as well as proactive measurements and alarming facilities. To complete the OAM toolset, the **µFalcon-ST** has a built in packet generator and analyzer to implement RFC2544 and Y.1564 for quick service turn-up and verification.

Comprehensive support for Circuit Emulation Services (SAToP, CESoPSN and MEF8) allows seamless coexistence of 2G (based on TDM), 3G and LTE mobile networks, or legacy enterprise services.

A **unique Micro-Burst Detection** (MBD, patent pending) 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 **µFalcon-ST** series is MEF CE2.0 certified.

The **µFalcon-ST** is housed in a highly compact, half-19", 1RU chassis (only 150mm/6" deep), and has an integrated internal, dual feed DC power supply (AC optional).

Technical Specifications

Interfaces & Indicators

- 4 x 10/100/1000BaseT (RJ45)
- 4 x 100BaseFX/1000BaseX (SFP)
- 4/8 x E1/T1/J1 (RJ48)
- Supported SFPs: MM, SM, SFS, CWDM, DWDM
- 1 x RS232 (RJ45) Console
- *LEDs:*
  - Power
  - Link/Activity (per port)
  - Speed (per port)
  - Signal, Los (per TDM port)

Architecture & Forwarding

- Dual Hybrid Core (DHC) HW architecture
- Data Plane Upgradable (DPU)
- 128MB RAM, 32MB flash memory
- L2 forwarding
- Flow-based forwarding
- Performance: wire-speed, on all ports, all frame sizes
- Total throughput: 20Gbps, non-blocking
- MTU: 9600 bytes
- MAC table: 8K 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 info
- Ingress policing per flow
- Two rate, 3-color marking
- 8 HW queues/port
- Egress shaping per queue/CoS
- Egress shaping per port
- Scheduling: Strict and DWRR
- P-bit and DSCP remarking
- Storm control: UC, MC, BC

Circuit Emulation Services

- 4/8 x E1/T1/J1 interfaces
- RJ48, 120/100ohm
- SAToP, CESoPSN*, MEF8 support
- Multiple and flexible encapsulation over Ethernet & IP/MPLS
- Flexible synchronization schemes (adaptive, line, 1588 and more)

Protection

- *Link*:
  - Link aggregation: static or LACP
  - Instant Link Protection (<100usec)
- Linear: G.8031 (<50msec)
- Ring: 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 & Y.1564* traffic generator & analyzer (HW based)
- L2/L3 loopbacks with MAC/IP 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 (802.3ah or SNMP trap)
- Remote temperature reading & alarm
- Per port and CoS detailed statistics
- NTPv4

Synchronization

- *Synchronous Ethernet*
- G.8261, G.8262
- ESMC (G.8264)
- *GNSS receiver (optional):*
  - 1xSMA connector (SYNC) antenna input
  - Generates 1PPS and 10MHz
- *IEEE1588-2008 (PTP):*
  - Ordinary Clock (master, slave)
  - Transparent Clock
  - Boundary Clock
- Built-in Stratum 3 clock
- 1xSMA connector for 1PPS/Clk (in/out)

Power & Environmental

- Power Supply
  - Internal power supply: 20-60VDC, dual feed
  - (AC adapter option)
- *Power consumption:*
  - Maximum: <27W
  - Typical: <20W
- Passive cooling (no fans)
- *Operating temperature:*
  - Standard: -10°C ÷ +50°C (14°F ÷ 122°F)
  - Extended: -40°C ÷ +65°C (-40°F ÷ 149°F)
- Storage temperature: -40°C ÷ +80°C (-40°F ÷ 176°F)
- Humidity: 10-90%, non-condensing

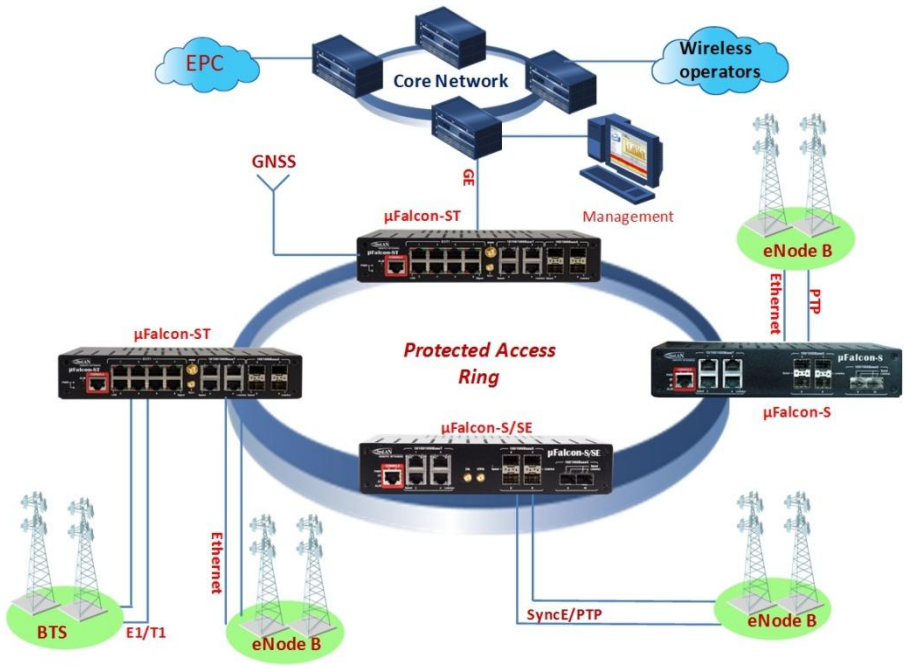
Physical

- Dimensions (HxWxD): 44x221x150mm (1.73x8.70x5.90")
- Weight: ~0.8kg (1.76lb)
- *Mounting:*
  - Desktop
  - Rack
  - Wall
- *Accessories:*
  - Power cable
  - Console cable
  - Rack mounting kit (optional)

Regulatory & Compliance

- *Safety:*
  - IEC EN60950-1: 2006
- *EMC:*
  - EN 300 386 V1.3.3: Class A
  - FCC CFR 47 part 15, subpart B, Class A
- MEF: **CE2.0**, MEF9, MEF14, MEF20, MEF22
- CE
- RoHS

Typical Application: Multi-generation Wireless Backhaul



Ordering Information

Model	Part #	Description
µFalcon-ST4/SE/D	7090	Multi Service NTU, 4xUNI,10/100/1000BaseT ports, 2xUNI SFP ports, 4xE1/T1 ports, 2xNNI SFP ports, SyncE (precision timing) support, internal DC (20-60VDC) dual feed power supply
µFalcon-ST4/SE/D/ET	7091	Multi Service NTU, 4xUNI,10/100/1000BaseT ports, 2xUNI SFP ports, 4xE1/T1 ports, 2xNNI SFP ports, SyncE (precision timing) support, internal DC (20-60VDC) dual feed power supply, extended temperature range (-40°C ÷ +65°C)
µFalcon-ST8/SE/D	7092	Multi Service NTU, 4xUNI,10/100/1000BaseT ports, 2xUNI SFP ports, 8xE1/T1 ports, 2xNNI SFP ports, SyncE (precision timing) support, internal DC (20-60VDC) dual feed power supply
µFalcon-ST8/SE/D/ET	7093	Multi Service NTU, 4xUNI,10/100/1000BaseT ports, 2xUNI SFP ports, 8xE1/T1 ports, 2xNNI SFP ports, SyncE (precision timing) support, internal DC (20-60VDC) dual feed power supply, extended temperature range (-40°C ÷ +65°C)
µFalcon-ST8/SE/G/D	7094	Multi Service NTU, 4xUNI,10/100/1000BaseT ports, 2xUNI SFP ports, 8xE1/T1 ports, 2xNNI SFP ports, SyncE (precision timing) support, integrated GNSS receiver, internal DC (20-60VDC) dual feed power supply
µFalcon-ST8/SE/D/G/ET	7095	Multi Service NTU, 4xUNI, 10/100/1000BaseT ports, 2xUNI SFP ports, 8xE1/T1 ports, 2xNNI SFP ports, SyncE (precision timing) support, integrated GNSS receiver, internal DC (20-60VDC) dual feed power supply, ext. temp. range (-40°C ÷ +65°C)
FPA40	7108	AC (100-240V) to DC (48V) power adapter, 40W

Specifications are subject to change w/o prior notice

GNSS accessories (antenna, cable, etc.) are available – contact for details

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

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