FibroLAN

Product Overview

The **µFalcon-ST/G** is a highly integrated, extremely compact, high performance, and cost-effective multiservice delivery and Synchronization system.

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/G** primarily addresses applications requiring support for legacy and IP interfaces, as well as complex and challenging scenarios with strict timing and synchronization characteristics. Such applications include Government oriented applications with mission critical requirements for synchronization of applications, like Command and Control Networks.

The **µFalcon-ST/G** offers a complete toolbox of precision timing support, including an integrated GNSS receiver, BITS clock inputs/outputs, Synchronous Ethernet and 1588-2008 (w/ grandmaster). The unit provides integrated NTP client and server.

With comprehensive support for circuit emulation services, the **µFalcon-ST/G** provides the ultimate aggregation of T1/E1 services, up through Gigabit Ethernet.

The **µFalcon-ST/G** is equipped with 4x10/100/1000BaseT (RJ45) user ports, 8xT1/E1 CES/Sync 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/G** offers advanced Quality of Service (QoS) features including classification and mapping

- Advanced Edge Synchronization Master and Carrier Ethernet system delivering business-class Ethernet, legacy TDM services, timing and mobile backhaul over fiber infrastructure.

- Comprehensive timing and synchronization features, including GNSS receiver, IEEE1588v2, SyncE, external frequency/phase and BITS.

- Integrated NTP client and server

- Flexible configurations for timing distribution over physical and logical interfaces

- MEF CE2.0 certified, supporting Ethernet Private Line/LAN (EPL/EPLAN) and Ethernet Virtual Private Line/LAN (EVPL/EVPLAN).

- Circuit Emulation Services (SAToP, MEF8)

- Ethernet OAM toolbox: 802.1ag, Y.1731, RFC2544, 802.3ah

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/G** 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/G** has a built in packet generator and analyzer to implement RFC2544 for quick service turn-up and verification.

Comprehensive support for Circuit Emulation Services (SAToP, MEF8) allows seamless coexistence of legacy and IP networks, or legacy enterprise services.

The **µFalcon-S** series is MEF CE2.0 certified.

Technical Specifications

Interfaces & Indicators

- 4 x 10/100/1000BaseT (RJ45)
- 4 x 100BaseFX/1000BaseX (SFP)
- 8 x T1/E1 (RJ48)
- Supported SFPs: MM, SM, SFS, CWDM, DWDM
- 1 x RS232 (RJ45) Console

- LEDs
  - Power (per feed), CPU, GNSS
  - Link/Activity (per port)
  - Speed (per port)
  - Signal, LOS (per T1/E1 port)

Synchronization

- Synchronous Ethernet:
  - G.8261, G.8262
  - ESMC (G.8264)
- GNSS receiver:
  - Stratum 1 traceable source
  - Operates on GPS, GLONASS, Galileo, BeiDou, and others
  - Automatic tracking of up to 32 satellites
  - 1xSMA connector (antenna input)
  - 3.3VDC active antenna
  - Generates 1PPS and 10MHz (to sync system internally)
- Accuracy to UTC <100nsec

- 8 x BITS inputs/outputs
  - Support for SSM (E1 and T1)
- IEEE1588-2008 (PTP):
  - Ordinary Clock (master, slave)
  - Transparent Clock
  - Boundary Clock
  - Support for 128 messages per second rate
- Built-in Stratum 3 clock
- Optional OCXO, with 1ppb/day holdover (HOC model)
- 1xSMA connector for 1PPS/Clk (in/out)
- Integrated NTP client and server

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
- Static routes

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

Protection

- Link:
  - Link aggregation: static or LACP
  - Instant Link Protection (<100usec)
- Fault Propagation

- Linear: G8031 (<50msec)
- Ring: G.8032v2 (<50msec)
- Spanning tree: STP, RSTP, MSTP

OAM & Diagnostics

- IEEE802.3ah link OAM
- IEEE802.1ag CFM, ITU-T Y.1731 PM
- RFC2544 traffic generator & analyzer (HW based)

- L2/L3 loopbacks with MAC/IP swap
- Copper TDR, SFP diagnostics (SFF-8472)
- Throughput metering
- Traffic mirroring

Circuit Emulation Services

- 8 x T1/E1 interfaces
- RJ48, 100ohm
- SAToP, CESoPSN*, MEF8 support

- Multiple and flexible encapsulation over Ethernet
- Flexible synchronization schemes (adaptive, line, etc.)

Management

- Interfaces:
  - CLI: Console (RS232), Telnet, SSH1/2
  - SNMP: v1/v2c/v3, extensive MIBs, trap profiles
  - 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)
  - Text based config files
- Alarms:
  - SNMP traps
  - Syslog (internal and remote server)
  - CLI events
  - Dying gasp (802.3ah or SNMP trap)
- Remote temperature reading & alarm
- Per Port/EVC/CoS/RMON/NTPv4 detailed statistics

Power & Environmental

- Power Supply
  - Internal power supply: 20-60VDC, dual feed
  - (AC adapter option)
- Power consumption:
  - Maximum: <27W; typical: <20W

- 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 inch)
- Weight: ~0.8Kg (1.76 lb)
- Mounting: Desktop/Rack/Wall

- Accessories:
  - Power cable
  - RS232 cable (console)
  - Rack mounting kit (optional)

Regulatory & Compliance

- Safety: IEC EN60950-1: 2006
- CE, RoHS
- MEF: CE2.0, MEF9, MEF14, MEF20, MEF22

- EMC:
  - FCC CFR 47 part 15, subpart B, Class A
  - EN 300 386 V1.3.3: Class A

Typical Applications:

BITS Clock Distribution

Wireless Synchronization
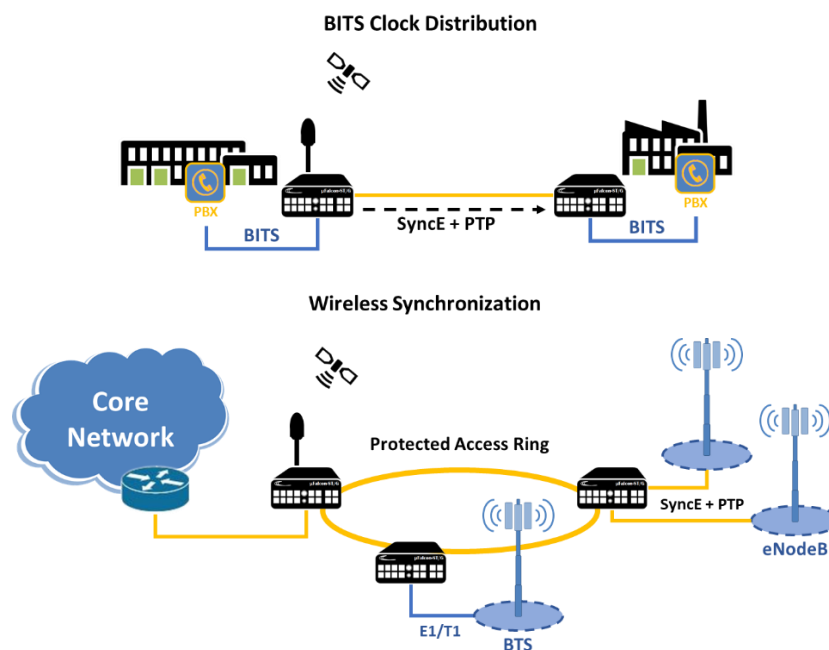
Ordering Information

Model	P/N	Description
µFalcon-ST8/SE/G/D	7094	Edge Timing Master, 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	Edge Timing Master, 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)
µFalcon-ST8/SE/G/HOC/D	7088	Edge Timing Master, 4xUNI, 10/100/1000BaseT ports, 2xUNI SFP ports, 8xE1/T1 ports, 2xNNI SFP ports, SyncE (precision timing) support, integrated GNSS receiver, high stability OCXO, internal DC (20-60VDC) dual feed power supply
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

We've got Timing for you!

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