Falcon-MTS

Master Timing & Synchronization System

- High capacity, versatile master timing system
- Suitable for any application requiring accurate timing and synchronization
- High performance GNSS receiver for Stratum 1 traceable timing
- Field replaceable Rubidium module for Stratum 2 holdover performance
- BITS input and outputs (up to 33)
- HW based 1588v2 high capacity Grandmaster
- Gigabit Ethernet ports (RJ45/SFP, 8 total) for maximum deployment flexibility
- ToD/1PPS (RJ45/RS422) interfaces
- Clock/1PPS inputs/outputs (SMA) for direct external synchronization
- Integrated NTP client and server
- Compact design (1RU), low power consumption
- Comprehensive front panel indications
- User friendly management interfaces (Telnet, SSH, SNMP, Web)

Product Overview

The **Falcon-MTS** is a highly integrated, fully featured, high accuracy master timing and synchronization distribution system. It addresses multiple applications including mobile backhauling, transportation, healthcare, finance and others.

This product extensively supports the distribution of Stratum 1 traceable timing for both legacy and modern networks, based on a multi-constellation (e.g. GPS) integrated GNSS subsystem.

Synchronization in networks has always been a key functionality. This has become even more challenging when modern transport networks are based on

asynchronous packet infrastructure, while at the same time functional and accuracy requirements are becoming tighter and more demanding.

The **Falcon-MTS** has the ability to drive sync to both local systems (typically core machines), via its physical interfaces (e.g. BITS) as well as remote edge devices via SyncE and 1588 (PTP).
The unit provides integrated NTP client and server.

The system features an expansion slot for an optional Rubidium Clock Module (RBCM-x), to allow long periods of Stratum 2 level holdover.

Based on a unique HW architecture, the **Falcon-MTS** presents an industry leading degree of flexibility and scalability. It can drive hundreds of PTP slaves (including Unicast) at full packet rate.

The **Falcon-MTS** is equipped with 4x10/100/1000BaseT (RJ45) ports and 4xSFP ports for packet based communication and timing. All ports can be used in a flexible manner and operate at full wire speed, leading to a total processing capacity of 16Gbps (non-blocking).

Timing is delivered over a multitude of physical interfaces, including BITS (33 outputs), 10MHz, 1PPS (SMA), ToD/1PPS (RS422/RJ45) and SyncE.

For packet based timing, the **Falcon-MTS** implements the 1588v2 standard, as Grandmaster, Boundary Clock or Transparent Clock. In all modes of operation, hundreds of slaves can be supported, including Unicast, at full packet rate.

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

Technical Specifications

Interfaces & Indicators

- 4 x 10/100/1000BaseT (RJ45)
- 4 x 100BaseFX/1000BaseX (SFP)
- Supported SFPs: MM, SM, SFS, CWDM, DWDM
- 1 x RS232 (RJ45) Console
- 32 x BITS output (E1/T1, 4 x DB25)
- 1 x BITS input/output
- 1 x ToD/1PPS input (RJ45), 1 x ToD/1PPS output (RJ45)
- 1 x GNSS active antenna (TNC, 5VDC)
- 2 x 10MHz/1PPS input/output (SMA)

- *LEDs:*
  - Power (per PS)
  - Link/Activity (per GE port)
  - Speed (per GE port)
  - BITS active (per E1/T1)
  - PTP, Holdover
  - GNSS, Rb (Rubidium module)
  - CPU, Alarm

Architecture & Packet Forwarding

- Dual Hybrid Core (DHC) HW architecture
- Data Plane Upgradable (DPU)
- 128MB RAM, 32MB flash memory
- L2 and flow based forwarding
- Performance: wire-speed, on all ports, all frame sizes
- Total throughput: 16Gbps, 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

Sync Inputs

- *Global Navigation Satellite System (GNSS) receiver:*
  - Stratum 1 traceable source
  - Operates on GPS, GLONASS, Galileo, BeiDou and others
  - Optimized for timing applications
  - Automatic tracking of up to 32 satellites
  - Cable delay compensation
  - TNC connector active antenna (5VDC)
  - Generates 1PPS and 10MHz (internally)
- BITS – T1, ESF/SSM; E1, CRC4/SSM

- SyncE on GE ports
- *1588-2008 (PTP):*
  - Ordinary Clock (slave)
  - Boundary Clock
- *External:*
  - SMA connectors
  - 1PPS or 10MHz
- ToD/1PPS, RS422, RJ45

Sync System

- Designed to deliver Stratum 1 traceable timing
- High accuracy clock center
- Flexible locking to inputs and distribution to outputs
- Frequency and phase sync

- *Holdover:*
  - Built in OCXO for Stratum 3E
  - Optional Rb module for Stratum 2 (>7 days)

Sync Outputs

- BITS outputs – T1, ESF/SSM; E1, CRC-4/SSM
- Synchronous Ethernet
- G.8261, G.8262, ESMC (G.8264)
- SMA connectors for Clock/1PPS
- ToD/1PPS interfaces (RJ45, RS422)
- NTP server
- NTPv4 client

- *IEEE1588-2008 (PTP):*
  - Ordinary Clock (GM)
  - Boundary Clock
  - HW based Sync and Delay Req. processing
  - Eth and UDP modes
  - Multicast and unicast
  - Up to 400 unicast slaves @ full message rate (SW option)
  - 1 and 2 step operation

OAM & Diagnostics

- IEEE802.3ah link OAM
- IEEE802.1ag CFM
- ITU-T Y.1731 PM
- Throughput metering

- CopperLinkTest (TDR on Ethernet Copper ports)
- 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
- Multiple IP interfaces/subnets, static routes

- *Operations:*
  - Remote System Update (FTP/TFTP or Web)
  - Configuration upload/download (FTP/TFTP or Web)
  - Text based (CLI) configuration files
  - 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

Protection

- Link aggregation: static or LACP
- Linear: G.8031 (<50msec)

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

Power & Environmental

- Dual, redundant, hot swappable power supplies
- AC/DC: 100-240VAC, 50/60Hz or 125VDC
- DC: 20-60VDC, ST connector
- *Power consumption:*
  - Maximum: <45W (including RBCM)
  - Typical: <30W

- *Operating temperature:*
  - Standard: -10°C ÷ +50°C (14°F ÷ 122°F)
  - Extended: -25°C ÷ +60°C (-13°F ÷ 140°F)
- Storage temperature: -40°C ÷ +80°C (-40°F ÷ 176°F)
- Humidity: 10-90%, non-condensing

Physical

- 1RU/19", ETSI compatible
- Dimensions (HxWxD): 44x440x244mm (1.73x17.33x9.60")
- Weight: ~3.9Kg (8.6 lb), including RBCM
- *Mounting:*
  - Desktop
  - Rack (19", 23")
  - Wall

- *Accessories:*
  - Power cable
  - Console cable
  - Rack mounting kit (optional)
  - BITS hydra to 8 x RJ48 (optional)
  - GNSS antenna cables (optional)
  - GNSS antenna (optional)

Regulatory & Compliance

- *Safety:*
  - IEC EN60950-1
- *EMC:*
  - EN 300 386 V1.3.3: 05
  - FCC CFR 47 part 15, subpart B, Class A

- MEF: CE2.0, MEF9, MEF14, MEF20, MEF22
- CE
- RoHS
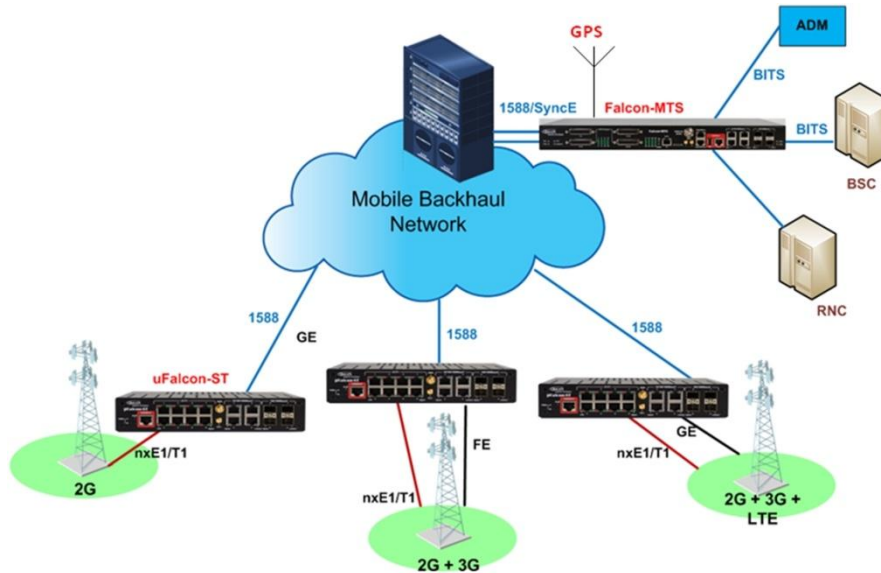
Ordering Information

Model	Part #	Description
Falcon-MTS/A	7054	Master Timing System, 4x10/100/1000BaseT ports, 4x1000BaseX SFP ports, 32xBITS outputs, Rb module (RBCM-x) ready, 1 removable AC power supply (FPS10012/A)
Falcon-MTS/D	7055	Master Timing System, 4x10/100/1000BaseT ports, 4x1000BaseX SFP ports, 32xBITS outputs, Rb module (RBCM-x) ready, 1 removable DC power supply (FPS10012/D)
Falcon-MTS/SWL/PTP-1	7056	SW license for enhanced capacity PTP Master
RBCM-1	7110	Rubidium Clock Module, type 1

Specifications are subject to change w/o prior notice
Note: for a complete list of available Falcon models please contact Fibrolan

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