

μFalcon-MX/G

PTP Edge Grandmaster Clock

Product Overview

The **µFalcon-MX/G** is a compact. high performance, PTP Edge Grandmaster clock. Through high capacity, low latency and high precision synchronization, the µFalcon-MX/G enables 5G RAN operation at its optimal capacity, on both telecom and enterprise environments. This product extensively supports the evolving needs for Timing and Synchronization in constantly а growing number of applications. Geared with integrated GNSS receiver. highly accurate timestamping engines and dedicated packet generators and responders, it delivers consistent and robust high performance.

The **µFalcon-MX/G** supports the Precision Time Protocol (PTP, IEEE1588v2), Synchronous Ethernet (SyncE) and NTP packet-based timing services. These are coupled with a market leading variety of interfaces, including 10/100/1000BaseT and 100/1000/2500M/ 10G optical interfaces (supporting all common types of SFPs). These provide unparalleled flexibility in deployment and connectivity.

The μ Falcon-MX/G can support numerous applications requiring timing. The most common one being mobile backhaul and fronthaul, for LTE/5G, both macro sites and small cells.

The **µFalcon-MX/G**'s extensible hybrid (ASIC-FPGA) Hardware architecture allows for ultimate flexibility and performance.

- Market leading integrated PTP Grandmaster Clock
- Ideal for timing and backhaul in private and public LTE and 5G mobile networks
- Excellent fit for mobile fronthaul
- High performance, high accuracy PTP Grandmaster, BC, TC and OC
- Multiple timing inputs / outputs (GNSS, PTP, SyncE, ToD, 1PPS, 10MHz)
- Unparalleled port configuration flexibility (100/1000/2500M and 10G)
- Redundancy mechanisms
- Compact, low power, fan-less design



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

For packet based timing, The μ Falcon-MX/G 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 **µFalcon-MX/G** is housed in a highly compact, half-19", 1U chassis (150mm deep only), implements a fan-less design, and has an integrated internal, wide range AC or DC power supply.

Technical Specifications

Interfaces & Indicators

 Ethernet: 4 x 100/1000/2500BaseX (SFP) 2 x 10/100/1000BaseT (RJ45) 2 x 1/2.5/10G (SFP+) Supported SFP/SFP+: MM,SM,SFS, xWDM, Copper Sync: All Ethernet ports support PTP, SyncE and NTP GNSS antenna in (SMA, active, 5VDC) IEEE1588/PTP 	 2 x 1PPS/10MHz (SMA) ToD/1PPS (RJ45) BITS (RJ48) 1 xUSB Console LEDs: Link/Activity (per port) Power/Fans (per PSU) CPU
 Functions: Grandmaster (PRTC) Boundary Clock (Class C/D) Ordinary Clock (M/S) Transparent Clock (Class C/D) Profiles supported: Telecom Frequency (G.8265.1) Telecom Phase (G.8275.1, G.8275.2) Default (1588) AVB (802.1AS) Custom 	 Modes supported: 1 and 2 step L2 Multicast L3/UDP Unicast/Multicast IPv4, IPv6 Mixed transport modes E2E and P2P delay VLAN tagging Slave capacity: Up to 128 Unicast @ full packet-rate (optional) Support for max packet rates for Sync, DelReq, Announce
 Synchronous Ethernet (SyncE): G.8261, G.8262 ESMC (G.8264) Physical interfaces: 2 x SMA connectors User configurable for 1PPS/10MHz input/output ToD/1PPS (NMEA) input and output Built-in Stratum 3/3E clock (model dependent) Architecture & Forwarding 	 GNSS: 32 channels Multi-constellation (GPS,GLONASS,Galileo,Beidou) NTP: Server (Future upgradable to HW based) Client BITS: Input and output E1 (2.048Mbps) and T1 (1.544Mbps) 2.048MHz
 Hybrid (ASIC-FPGA) HW architecture 256MB RAM, 256MB flash memory L2 forwarding (802.1D MAC bridging) Flow-based forwarding Performance: wire-speed, on all ports, all frame sizes Switching fabric: 34Gbps, non-blocking MTU: 10K bytes MAC table: 16K 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 Layer 3: Static routes IPv4/IPv6 DHCP (client, server, relay)
 Classification based on L1-L4 information Ingress policing per flow (MEF BW profiles) Two rate, 3-color marking Hierarchical queuing/scheduling Hierarchical shaping Priority based flow control (802.1Qbb) 	 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 Compliant with 3GPP QoS requirements for LTE backhaul

Protection

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 Link: Link aggregation: static or LACP Link Protection OAM & Diagnostics 	 Linear protection: G.8031 Ring protection: G.8032v2 Spanning tree: STP, RSTP, MSTP Loop protection 		
 IEEE802.3ah link OAM IEEE802.1ag CFM (HW assisted) ITU-T Y.1731 PM (HW assisted) RFC2544 traffic generator & analyzer (wire speed) Management	 L2 loopbacks w/ MAC swap Throughput metering SFP diagnostics (SFF-8472) Traffic mirroring and remote mirroring sFlow 		
 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) 	 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 and CoS detailed statistics, RMON; NTPv4 		
 Power Supply: Internal power supply: 20-60VDC, dual feed AC adapter option (FPA40) Power consumption: Maximum: <20W; typical: <15W Physical 	 Passive cooling (no fans) Operating temperature: Standard: -10°C ÷ +50°C (14°F ÷ 122°F) Extended: -40°C ÷ +65°C (-40°F ÷ 149°F) (optional) Storage temperature: -40°C ÷ +80°C (-40°F ÷ 176°F) Humidity: 10-90%, non-condensing 		
 Dimensions (HxWxD): 44x221x150mm (1.73x8.70x5.90 inch) Mounting: 	 Weight: ~0.8Kg (1.76 lb) Accessories: Power cable RS232 cable (console) Rack mounting kit (optional) 		
 Safety: IEC EN60950-1 CE RoHS 	 EMC: FCC CFR 47 part 15, subpart B, Class A EN 300 386 V1.3.3: 05 MEF: CE2.0 		

Typical Application: Private LTE/5G/CBRS



Ordering Information

Model	P/N	Description
µFalcon-MX/G/D	7143	PTP Edge Grandmaster Clock, 4x100/1000/2500BaseX (SFP), 2x10/100/1000BaseT, 2x 1/10GE (SFP+), 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

We've got Timing for you!



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