Datasheet

Thunderbolt PTP - GM200

Thunderbolt GM200 Grandmaster Clock

The Protempis Thunderbolt® PTP Grandmaster Clock is designed for Public & Private Wireless, Data and Industrial networks that require timing & phase synchronization. It provides Continuous availability of UTC traceable time for phase synchronization, a must for LTE Advanced/5G networks and services. The GM200 employs Protempis' Industry-leading GNSS solution & Holdover technology. It can tolerate harsh environmental conditions supporting both indoor & outdoor deployments with an extended industrial operating temperature range.

Small Cell Phase Synchronization

The GM200 is designed with small cells in mind but also meets the macro base station requirements for synchronization. The Thunderbolt supports small cell networks that require phase synchronization. The most efficient way to implement phase synchronization for LTE & LTE-A /5G services is to deploy the grandmaster clock close to the target eNodeB to provide 1.5 us of phase alignment. By reducing network hops between the grandmaster and LTE base stations, the risk of network re-configuration, and load variance on IEEE-1588 signal quality is reduced. The GM200 suits this strategy perfectly due to its small size, low cost, superior accuracy & reliability, and flexibility of deployment options.

The types of Applications range from power, utility, broadcast, financial, oil & gas and enterprise.

Ideal for LTE-A & 5G Services

CoMP, eICIC, eMBMS and Carrier Aggregation services require that synchronization networks are requalified and redesigned to support phase synchronization. Non-compliance with phase sync specifications will result in low or no service from LTE-A/5G equipment and degraded bandwidth leading to potential service outages. By engineering current networks to support phase synchronization, LTE-A/5G services downtime can be mitigated. Phase synchronization can easily be supported by current sync networks with the GM200 by adding it where needed. Given its low cost, it can be added to any network requiring support for the stringent phase synchronization specifications that LTE-A/5G services require performing at their optimal levels. High reliability assures that the GM200 can be deployed in edge and/or aggregation networks.

ORAN 5G

More Telcos are adopting the Open RAN architecture, this allows best-of-breed timing technologies like the Protempis' GM200 to be used in the 5G infrastructure. The GM220 can function as a PTP Grand Master distributing precise timing over a packet-based network.

Private 5G & Industrial Data Networks

With the introduction of CBRS, private Industrial Data networks, third-party providers and municipalities are building their own networks. Private 5G allows an alternative to WI-FI. The benefit is better range and coverage when compared to WI-FI. Having Protempis' proven timing technologies on your side helps make private cellular networks a viable option.

Key Features

- IEEE-1588 PTP Grandmaster Clock
  - o Multiple PTP Profiles (G.8265.1, G.8275.1, G.8275.2, Telecom-2008 Profile, IEEE802.1AS, Enterprise Profile, Broadcast Profile (SMPTE)
- Multi-Constellation (GPS, GLONASS, Beidou, Galileo and QZSS)
- 15ns (1-sigma) time accuracy relative to GNSS reference
- Holdover of ±1.5us over 4 hours (Constant temperature and when locked to GPS for 7 days)
- ITU-T G.8272 PRTC
- Inputs: GNSS, 1588-PTP, and SyncE
- Outputs: 1588-PTP, NTP, SyncE, PPS, and 10MHz
- ITU-T G.8272 PRTC
- 1G SFP (SyncE)
- Electrical and Optical (100/1000 Base-T, 1000 Base SX, 1000 Base LX)
- Supports Optical Fiber with Sync E
- Dedicated management port (1xRJ45)
- Network Management: SNMP, Web UI, CLI
- VLAN support
- Rack Mountable
- IPv4 and IPv6
- Industrial Temperature –40°C to +85°C

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General Specification

Inputs: .....GNSS, 1588-PTP, SyncE
Outputs: .....PPS, 10MHz, NTP, PTP, SyncE

Ethernet Ports:
1x Mgmt. 10/100/1000 Base T RJ45
1x 1G 100/1000 Base T, 1000 Base SX, 1000 Base LX SFP
1x 1G 10/100/1000 Base T RJ45

Serial Management .....9-Pin Comm EIA-232
GNSS Antenna .....SMA

Protocols:
IEEE-1588 (PTP), NTPv4, SyncE, IPv4, IPv6, TELNET, SFTP,
SSH, RADIUS, TACACS+, SNMP, DAYTIME, TIME, NMEA TOD
Network Management…….. SNMPv2/v3, HTTPS, CLI

User Interfaces:
CLI ..... Monitoring and Management
Web UI .....Monitoring and Management

Performance

Time of day accuracy .....15ns (1-sigma) reference GNSS
Timestamp accuracy .....<10 ns RMS
Frequency accuracy .....1.16x10-12 (one-day avg)

Time Accuracy
Tracking to GPS……. …..…… <15ns (locked)
Holdover…….. < ±1.5µs/4hrs (7 days locked)
Power consumption…….5W average, 10W maximum

Physical Characteristics

Dimensions in cm (L x W x H) .....20.8 x 20 x 4.4
(19" half-rack x 1U)
Weight .....< 3Kg (6 lbs.)

Power

DC Power, dual feed .....-36VDC to -72VDC
Current consumption .....330mA (max)

Regulatory & Standards

Operating Conditions
Temperature .....-40°C to +85°C
Humidity .5%-95% RH non-condensing (+60°C)
Storage Temperature .....-55°C to +105°C

Safety & Health:
UL EN 62368-1
CE, VCCI CISPR32 class A
GR-63; Level 3
ETSI (EN55032/EN55024) EN 300019, Class T3.2
Electrical .....EMC, ESD Immunity & susceptibility
FCC Part 15 Class B / ICES 003 Class-B
Korea KN32 / KN35 Class A
EN…….301 489-1, EN 301 489-19 EN 303 413
IEEE 613-1
Telcordia GR-1089
IEC:60950-1

PTP Profiles:
IEEE-1588, ITU-T G.8265.1,
ITU-T G.8275.1, ITU-T G.8275.2, Telecom-2008
IEEE 802.1AS, Enterprise Profile, Power (C37.238 2011)
Broadcast (SMPTE ST-2059-2)

Synchronization:
ITU-T .....G.8265.x, G.8275.x (PRTC/T-GM)
IEEE .....PTP (IEEE 1588v2)
IETF NTPv4 (RFC5905)

Product Compliant with the following directive:
2014/53/EU (RED Directive)
2011/65/EU (RoHS2 Directive)
2012/19/EU (WEEE Directive)

Please go to **www.protempis.com** for the latest documentation and tools, part numbers and ordering information.

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