



Net.Time -GM is a Grandmaster clock designed to be deployed in the backhaul of Ethernet / IP networks to deliver SyncE and PTP timing services including frequency, phase and time-of-day up to 64 clients of LTE, PON, Wimax and Circuit Emulation Networks.

Datasheet

Net.Time-GM grandmaster clock

Net.Time GM is a general purpose PTP Grandmaster conceived to supply synchronization to clients connected to Ethernet / IP networks such as 4G / LTE base stations and Synchronous Ethernet as well. Once locked to a GPS it delivers highly accurate timestamps, alternatively 10 MHz, 1PPS, T1/E1 and TOD can be used as backup. For testing purposes the unit can loopback Ethernet frames to remote instruments executing quality and capacity test. The unit is a rack mount chassis, with AC/DC power source.

1. SYNCHRONIZATION SOURCES

1.1 GNSS RECEIVER

- 1 x GPS: SMA connector
- Antenna: L1 band

1.2 ALTERNATIVE RECEIVERS

- 10 MHz
- E1 (2048 kHz, 2048 Mb/s)
- T1 (1544 kHz, 1544 Mb/s)
- PPS
- TOD (Time-of-Day)

1.3 CLOCK MODULES

- OCXO
- Rubidium

1.4 TIME ACCURACY

- Locked to GPS: timestamp < 100 ns
- Holdover mode

Metric	OCXO	Rubidium
Phase < ±1.5 μs	1 hour	24 hour
Phase < ±5.0 μs	4 hour	72 hour
Phase < ±10.0 μs	12 hour	120 hour
Frequency < 16 ppb	1 month	5 year

2. PTP AND SYNC E SYNCHRONIZATION

2.1 SYNCHRONIZATION OUTPUTS

Frequency

- 1 x E1 (2048 kHz, 2048 Mb/s)
- 1 x T1 (1544 kHz, 1544 Mb/s)

Phase

- 1 x PPS

Time of the Day

- 1 x TOD

2.2 PTP MASTER FUNCTION

- Capacity: 8, 16, 32, 64 clients
- Up to 128 msg/client per second

- Protocol: Port state, Best clock, Master identity
- Method: 2-step clock
- Communication: Unicast, Multicast

Profiles

- ITU-T G.8265.1 (telecom),
- IEEE 1588 (default)

2.3 SYNCHRONOUS ETHERNET

- 2 x SyncE (optical and electrical)
- Full ESMC / SSM support
- QL over SSM according ITU-T G.781

3. PROTOCOLS

- IEEE 1588-2008
- IP
- Ethernet
- IEEE 802.1Q
- DSCP / CoS
- ARP
- DNS
- DHCP
- SNMP
- TELNET
- SSH

4. TESTING AND STATISTICS

4.1 ETHERNET AND IP

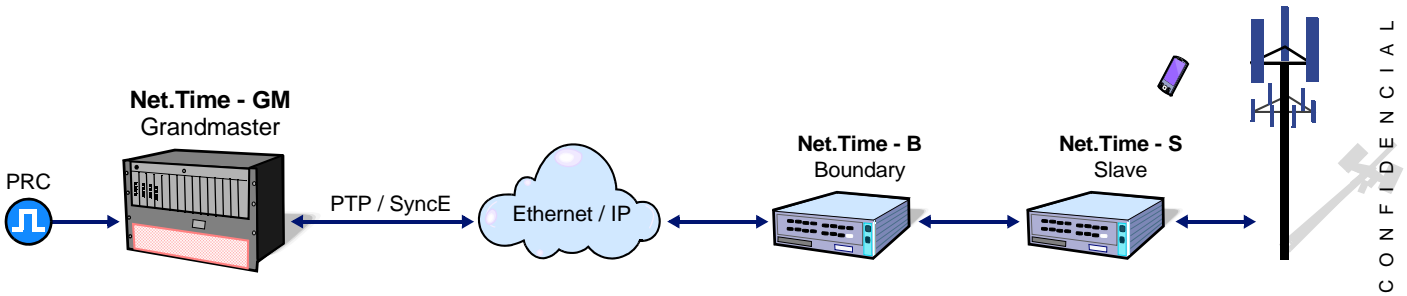
Separate traffic statistics for Port A and B

- BPDUs, SSMs, VLAN, Q-in-Q, Control, Pause counts
- Under/Oversized, Fragments, Jabbers
- Uni/Multi/Broadcast counts and % of capacity
- Frame and Packet Errors
- IEEE 1588, IP packets, Errors
- IP, UDP, ICMP counts and rates
- Tx / Rx rates: Current, Max, Min, Avg
- Classification per size

4.2 AUTOMATIC TESTS

Loopback response to remote test (i.e BER, RFC2544)

- Layer 1-4 loopback
- Loop frames matching filter conditions or loop all
- Loop controls for broadcast and ICMP frames



5. PLATFORM

5.1 MANAGEMENT

- Local: CLI
- Remote: SNMP, SSH, Telnet, Web
- Firmware upgrade through USB port

5.2 INTERFACES

Ethernet PTP/Sync

- Elect: 10/100/1000BASE-T
- SFP: 10BASE-T, 100BASE-TX, 100BASE-FX, 1000BASE-X
- Configurable in / out Port

Operational

- BNC: 10 MH, PPS, E1/T1
- RS232: TOD (time of the day)
- RJ45: T1 / E1

Control

- RJ45: management and monitoring
- USB: firmware update

5.3 ERGONOMICS

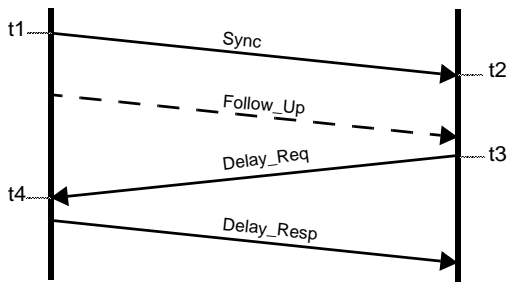
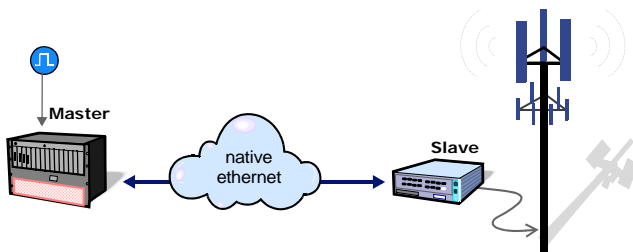
- 256 x 64 pix OLED display
- Front panel keypad
- 4 x LED: Alarm, Holdover, Activity, GPS
- Power: -40 to -60VDC (redundant) or 110 to 240VAC
- Operating temp.: -10°C to +50°C
- Operating Humidity: 10% to 90%

5.4 MECHANICAL

- Fanless
- 19" / ETSI/1U/240 mm rack mount
- Weight: 4.2 kg / 8.7 lb



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$$\text{Offset} = \frac{(t2 - t1) - (t4 - t3)}{2}$$

$$\text{Latency} = \frac{(t2 - t1) + (t4 - t3)}{2}$$

Delay Request-Response mechanism used by PTP