



Net.Time-S is a slave clock designed to provide PTP and SyncE synchronization to a number of clients in applications in the mobile, broadcasting and power utilities business. It selects one input to become time reference that are monitored permanently to assure timing quality.

Datasheet

Net.Time-S slave clock

Net.Time-S is a slave clock suitable to deploy timing services at large scale across 4G/LTE, 3G, WiMax, GPON and Backhaul networks by means of both PTP and SyncE signals. It distributes highly accurate signals to its clients including frequency, phase and time-of-the-day information. The most outstanding feature of Net.Time is the capacity to monitor an test the quality of the input signal that is being used as time reference in order to satisfy the highest demands of synchronization and sintonization.

1. TIMING SOURCE

1.1. GNSS RECEIVER

- Built-in GPS/GLONASS receiver
- SMA connector to antenna
- Antenna: L1 band

1.2. SLAVE RECEIVERS

- SyncE (optical, electrical)
- PTP (optical, electrical)
- E1 (2048 kHz, 2048 Mb/s)
- T1 (1544 kHz, 1544 Mb/s)
- 1 PPS
- TOD (Time-of-day)

1.3. INTERNAL CLOCKS

- OCXO
- TCXO

1.4. ACCURACY

Holdover mode

| Metric | TCXO | OCXO |
|-------------------|------------|-----------|
| Ageing | 10 ppb/day | 1 ppb/day |
| Temp. Sensitivity | 2 ppm | 10 ppb |

2. PTP AND SYNC E SYNCHRONIZATION

2.1. SYNCHRONIZATION OUTPUTS

2.1.1 Frequency

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

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

2.1.2 Phase

- 1 x PPS

2.1.3 Time of the Day

- 1 x TOD

2.2. PTP SLAVE FUNCTION

- Protocol: Port state, Best clock, Master identity
- Method: 2-step clock
- Communication: Unicast, Multicast.
- Switching method: AMT, BMCA

2.2.1 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
- Ethernet / IP
- IEEE 802.1Q / DSCP / CoS
- ARP
- DNS
- DHCP

4. TESTING AND STATISTICS

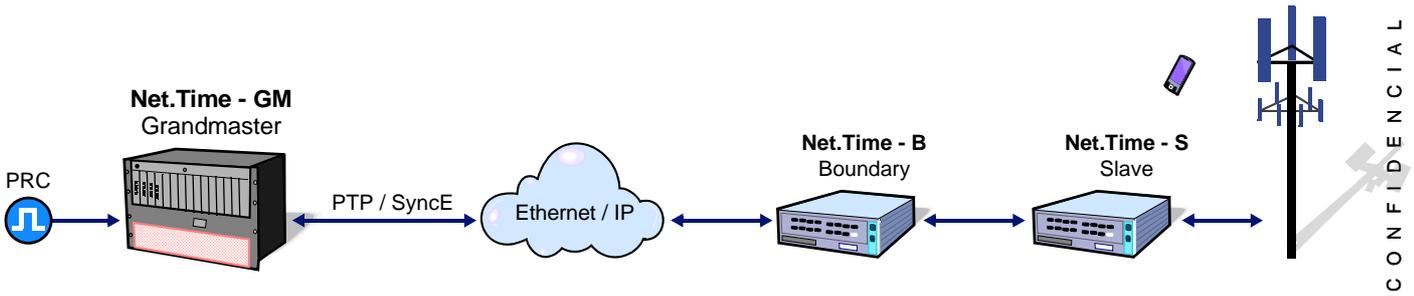
4.1. ETHERNET AND IP COUNTS

Separate reports per each Port

- Type: BPDUs, SSMs, VLAN, Q-in-Q, Control, Pause
- Size: Classification, Under/Oversized, Fragments, Jabbers
- Cast: Uni/Multi/Broadcast (%)
- Errors: Frames, Packets
- Bit rates: IP, UDP, ICMP, Current, Max, Min, Avg

| Wireless Architecture | Frequency range | | Phase | Timing Alternatives |
|-----------------------|-----------------|--------|--------------------------------|---------------------|
| GSM, 3G, LTE-FDD | 16 ppb | 50 ppb | Not required | TDM, SyncE, PTP |
| CDMA-TDD | 16 ppb | 50 ppb | ±3 μs to ±10 μs | PTP, GPS |
| LTE-TDD | 16 ppb | 50 ppb | ±1.5 μs to ±5 μs (large cells) | PTP, GPS |
| LTE-TDD | 16 ppb | 50 ppb | ±1 μs to ±1.5 μs (small cells) | PTP, GPS |
| Wimax-TDD | 16 ppb | 50 ppb | ±0.5 μs to ±5 μs | PTP, GPS |

Table 1. Frequency & Phase requirements of wireless networks.



4.2. PTP TEST & MONITORING

- IEEE 1588 messages
- Sync Packet Delay: Current, Max, Min, Avg, std Dev, Range
- Sync Packet Delay Variation: Current, Max, Min, Avg
- Sync Inter Packet Gap: Current, Max, Min, Avg
- Delay Request: Current, Max, Min, Avg, std Dev, Range
- RTD with Path Delay Mechanism: Current, Mean
- Correction field: Current, Max, Min, Avg
- G.8260 Floor packet: count (FPC), rate (FPR), % (FPP)
- Measurements of PTP input
- Wander: TIE, MTIE, TDEV

4.3. SYNC E TEST & MONITORING

- Measurements of input reference
- Frequency (O.174): Line (MHz), offset (ppm), drift (ppm/s)
- Wander (O.172): TIE, MTIE, TDEV
- QL trace in SSM (ITU-T G.781 Options I, II, III)

4.4. ETHERNET 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, Web

5.2. INTERFACES

5.2.1 Network

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

5.2.2 Time

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

6. ERGONOMICS

6.1. FRONT PANEL

- Display: OLED 256 x 64 pixels
- Keypad: Up, Down, Left, Right, Page Up, Page Down, Esc
- LEDs: Power, System, Alarm, Clock
- Console: RJ45
- USB: upgrades, configuration, results, user files
- Power On/Off

6.2. BACK PANEL

- Network and Time interfaces
- Redundant Power Supply: (AC+AC or AC+DC or DC+DC)
- VDC: -40 to -60V
- VAC: 110 to 240V

6.3. MECHANICAL

- Fanless
- 19" / ETSI/1U/240 mm rack mount
- Weight: 4.2 kg / 8.7 lb
- Operating temp.: -10°C to +50°C
- Operating Humidity: 10% to 90%



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| Clock | Description | Operation |
|----------------------------|---|---|
| Ordinary | Single-port device that can be a master or slave clock | Read/Write time stamps |
| Grandmaster | Ordinary clock that manages the reference time | Write time stamps and responds time request from other clocks |
| Slave | Ordinary clock that keeps synchronized to the masters and provides synchronization to its clients | Write time stamps and responds time request from other clocks |
| Boundary | Multi-port device that can be a master or slave clock | Read/Write time stamps |
| Transparent (end-to-end) | Multi-port device that is not a master or slave clock but a bridge between both forwarding / correcting PTP messages | Write corrections |
| Transparent (peer-to-peer) | Multi-port device that is not a master or slave clock but a bridge between both forwarding / correcting Sync and Follow-up messages | Write corrections |

Table 1. IEEE 1588v2 Device Description