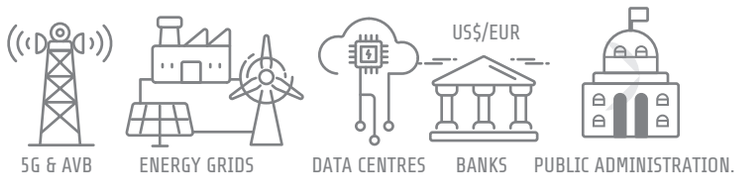
ELPROMA **RESILIENT**

TIME SYSTEMS

Security • Synchronization • Reliability • Performance



Synchronization

- PTP IEEE1588 Grandmaster
- NTP STRATUM-1 Time Server
- GPS Galileo Glonass Beidou time

Security

- SAT Time-firewall w/ ANT auto-OFF
- GNSS anti-jamming/spoofing
- GPS L1 jammed signal mitigation**
- GNSS simulation for RF-denied env.**
- GNSS city-canyon multipath mitigation

Reliability

- STARLINK / IRIDIUM LEO backup**
- DCF77 / 225kHz Solec K. backup**
- 5071A HROG-10 full UTC backup*
- 20x remote NTP servers backup
- HA CARP redundancy

Performance

- Internal stability < 2 ns
- GNSS accuracy < 5 ns
- PTP accuracy < 20 ns
- OCXO holdover (1d) 0,6 µs
- OCXO holdover (7d) 47 µs

Product advantages over NTS-3000

- Single HQ OCXO holdover for GPS less opeation
- More I/O sync incl. 1PPS-out, 10MHz, IRIG-B AM
- Higher PTP accuracy thanks to hw stamping
- NTS is std. 1U, but it can be 2U offering freedom for the future upgrades.

Why NTS-4000 is a wise choise?

- OCP (Facebook) choice or GNSS-rcv for Data Centers.
- African biggest single Smart Grid energy deployment (50pcs).
- European biggest single Stock Exchange deployment (10pcs).
- They trusted us: PUB-administration, NMI-metrology, Enterprises.

NTS-4000 HQ OCXO

NTP/PTP IEEE1588 Modular Time Server

The NTS-4000 HQ OCXO is a professional GRANDMASTER clock with advanced cyber-security capabilities. Server is created from scratch in 2024, keeping 100% backward compatibility to original 2008 appliance. It basis on a state-of-the-art FPGA chipset that offers a powerful free space margin for the future.

It offers a technology suite to meet the synchronization needs of evolving Industry 4.0 IT/OT networks: NIS2 public administration, LTE/5G telecom, energy smart grid, data centers, financial market, enterprises. The server provides robust synchronization services ensuring accuracy, stability, security and reliability.

When used with Elproma's external LEVEL-2** GPS L1 anti-jamming filter and LEVEL-3** GNSS simulator, NTS-4000 time server ensures resilient timing, even in GNSS-denied, heavily jammed RF environments. Product supports HA CARP networking redundancy. Custom built appliance (ext. options) grooves to 3U**.

Made in EU

CE

ISO 9001
QUALITY
ASSURANCE

* extra feature not requiring hardware update ** requiring additional hardware

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Ref. Time

- std. 1x GNSS receiver • opt. 2nd GNSS receiver
  - std. supporting GPS, Galileo, Glonass, Beidou
  - opt. supporting DCF77 or 225 kHz Solec Kuj.
- opt. 1x 5071A* / HROG-10* direct synchronization
- std. 20x backup NTP serves (incl. eTimePL** system)

Inputs

- std. 2x GNSS physical or simulated signal LEVEL-3
- std. 2×ToD time-scale ref. (clock + calendar)
  - opt. direct 5071A*/HROG-10* for UTC/TAI
  - opt. backup STARLINK / IRIDIUM modem**
- std. 1×1PPS frequency ref.
- std. 1×IRIG-B AM
- opt. 2×IRIG DCLS FO**

ANT1/ANT2 IO support both physical GNSS and simulated LEVEL-3 signals

Outputs

- std. 2x GNSS simulation signal LEVEL-3 compatible
- std. 2x ToD ToD (Time of a Day code multiple std.)
- std. 1×1PPS frequency ref.
- std. 1×10MHz frequency ref. or 2.048 MHz*
- std. 1×IRIG-B AM
- opt. 2x IRIG-B TTL level 5V, 2x IRIG-B ST FO IRIG-B DCLS
- opt. 4x IRIG-B RS422 DCLS, 1x MOSFET PPS/PPM/PPH
- opt. 4x ALARM RELAYS

ANT1/ANT2 support GNSS NMEA183 signal simulation LEVEL-3 compatible

LAN

- std. (main) 2x 100/10 Mbps x86 sw time-stamps
- opt. (ext) 8x 1 GbE (SFP/RJ45) sw time-stamps
  (ext) 16x 1 GbE (SFP/RJ45) sw time-stamps
  (ext) 24x 1 GbE (SFP/RJ45) sw time-stamps

NTS-40xx

- std. (main) or 2x 1 GbE (SFP) FPGA hw time-stamps
  or 4x 1 GbE (SFP) FPGA hw time-stamps
- opt. (ext) 4x 1 GbE (SFP) FPGA hw time-stamps
- std. (config) 1x 100/10 Mbps for management

NTS-42xx

Notes! Choose base std. platform between new FPGA and x86 archtecture.
The FPGA hw supports x10,000 better PTP sync accuracy than x86.
The old 8/16 GbE ports x86 std. extentions are requiring 2U size.
The old 24 GbE ports are custom built requiring 3U size chassis.
The new 2/4 GbE port bssed on FPGA supports 1pcs. 4x1GbE ext..

PTP & NTP

- **IEEE1588:2008** Grandmaster, submaster (slave)
  one-step, peer-to-peer, transport UDP, RAW layer2
  Profiles: telecom G.8275.1, G.8275.2, G.8265.1
  default, power IEEE C37.238*, pwr. utility*
  AVB 802.1AS, automotive, enterprise, HA*
  Performance: up to 128 msg/s (per port LAN)
  up to 1000 clients (per port LAN)
- **Stratum 1 NTP Time Server** (all NTP versions)
  Stratum 2 NTP/SNTP Client synced to Stratum 1
  Performance: up. to 10 000 clients/s per port LAN
  up to 100,000 NTP clients/port LAN
  1024s polling up to 10 mln.NTP clients/port LAN

Accuracy , Stability , Holdover

< 2 ns Server internal
< 5 ns GNSS receiver
< 20ns PTP-2-PTP hw-stamps
<100ns PPS, PPM, PPH
< 100 ns IRIG DCLS FO
< 2 µs IRIB-B AM/TTL
< 5x10E -11 /sec HQ OXCO

Protocols

- IEEE 1588-2008 (PTP Precision Time Protocol)
- NTPv4, NTPv3 (NTP Network Time Protocol)
- IRIG, AFNAR*, STANAG4430*, NASA36* (contact for more)
- SyncE* (Synchronous Ethernet)
- Cs5071A*/HROG-10* (direct sync ToD+PPS to UTC/TAI)
- IPv4 / IPv6** • DHCP • SSH • SFTP • TELNET • SYSLOG
- VLAN (1x PTP-slave, 9x PTP-master, 10x NTP) • HA CARP
- MIB-2 SNMPv3 supporting UNSYNC and JAM-attack to OSS soft.
- Zabbix (supports default management) • OSS via MIB 2

Environmental

- Redundant power: 110-230VAC or 120-370VDC or 20-70VDC. • Max. current consumption: 1A(AC) / 2A(DC)
- Max. power consumption: 60W (typical), 80W (max)
- Operating temperature –5°C to +60°C
- Storage temperature: –55°C to +80°C
- Humidity: 5% to 95% (non condensing) • MTBF 391000h
- std.(1U): 44,4 (H)×484 (W)×300 (D) mm • Weight: 4.2 kg
- opt.(2U): 88,8 (H)×484 (W)×300 (D) mm • Weight: 6.1 kg
- opt.(3U): 133,2 (H)×484 (W)×300 (D) mm • Weight: 7.9 kg

Security & Reliability

- NTS-4000 has built-in advanced GNSS satellite traceability.
- The SNMP supports MIB 2 compatible to any OSS software. Our MIB 2 file defines one of the world's most significant event traps database, that incl. GNSS jamming & spoofing.
- Built-in crypto std. RSA, MD5, DES, SSL, SHA-1, SHA-2.
- When equipped with LEVEL2** filter or LEVEL3** simulator, NTS-4000 ensures resilient UTC time even in GNSS-denied, heavily jammed RF environment. Server can also receive a Time Sync Attack alarms from wide area National Cyber Protection System (e.g. ARGOS**). When connected to ground National Time Dissemination System (eCzasPL**), the NTS-4000 time server does not need GPS /GNSS at all. In case of unexpected GNSS receiver security vulnerability the other vendor replaceable GNSS modules are available.

* extra feature not requiring hardware update ** requiring additional hardware

NTS-4000 Series 1U Back panel

NTS-4000 Series 2U Back panel