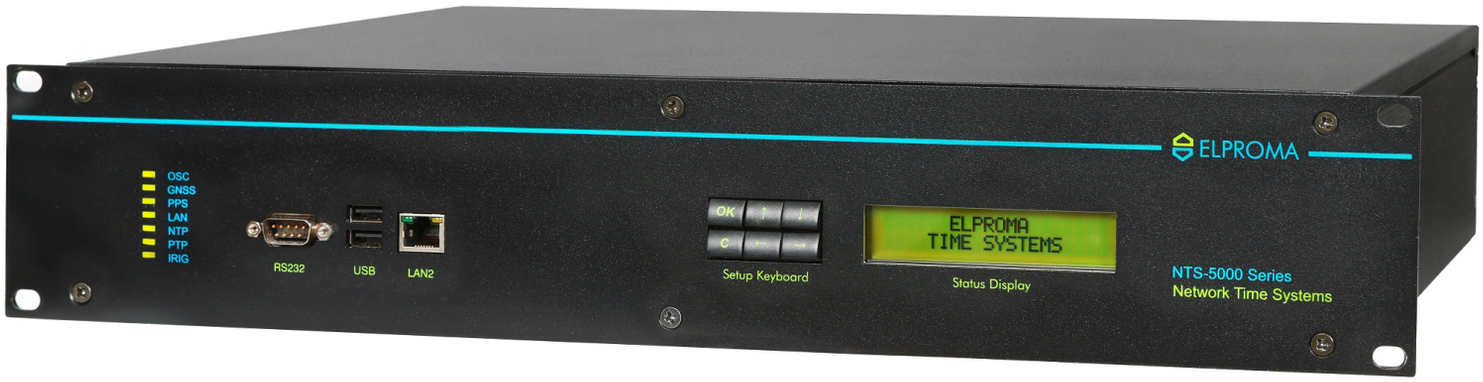
ELPROMA **RESILIENT**

TIME SYSTEMS

Security • Synchronization • Reliability • Performance

5G TELECOM DVB-T2 AVB | INDUSTRY 4.0 SMART FACTORY | ENERGY UTILITY SMART GRID | ICT & CLOUD DATA CENTRES | BANKS STOCK EXCHANGE



Synchronization

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

Security

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

Why NTS-5000 is a wise choise?

- OCP Facebook choice of GNSS-receiver for Data Centers.
- Asian biggest single Smart Grid deployment (300pcs).
- European #1 single Air Traffic Ctrl. deployment (50pcs).
- They trusted us: EU Parliament, Stock Exchanges, NATO.

Reliability

- STARLINK / IRIDIUM LEO backup**
- DCF77 / 225kHz Solec K. backup**
- 5071A HROG-10 full UTC backup*
- 30x remote NTP servers backup
- HA CARP redundancy

Performance

- Internal stability < 2 ns
- GNSS accuracy < 5 ns
- PTP accuracy < 25 ns
- IRIG DCLS FO* <100 ns
- Rb holdover (1d) 0,5 µs
- Rb holdover (7d) 3,7 µs
- OCXO holdover (1d) 0,6 µs
- OCXO holdover (7d) 47 µs

Product advantages over NTS-4000

- Dual Rubidium & OCXO ultra-long holdover

Product advantages over NTS-3000

- LAN modularity from std. 2 up to max. 20
- More sync I/O and higer PTP accuracy
- 2U freedom of future upgrades

NTS-5000 Rb OCXO

NTP/PTP IEEE1588 Modular Time Server

The NTS-5000 Rb OCXO is a carrier-grade GRANDMASTER clock with advanced cyber-security capabilities. Server is created from scratch in 2024, keeping 100% backward compatibility to original 2004 appliance. It has built-in dual redundancy for each critical function. It is based on a state-of-the-art FPGA chipset that offers a powerful free space margin for flexible product growth through the coming decades.

It offers a technology suite to meet the synchronization needs of evolving Industry 4.0 IT/OT networks - specially 5G, smart grid, data centres, financial markets. The server provides robust synchronization services ensuring accuracy, stability, security and reliability for any wide-area distributed architecture or any critical infrastructure. When used with Elproma's external LEVEL-2** GPS L1 anti-jamming filter and LEVEL-3** GNSS simulator, the NTS-5000 time server ensures resilient timing, even in GNSS-denied, heavily jammed RF environments. It is PRS / PRC / PRTC compliant. Custom built 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. 30x 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 AM o TTL (selectable)**
- opt. 2×IRIG DCLS FO**
- opt. 4×IRIG DCLS FO rs422**

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-50xx

- 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-52xx

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	< 100 ns	IRIG DCLS FO
< 5 ns	GNSS receiver	< 2 µs	IRIB-B AM/TTL
< 20ns	PTP-2-PTP hw-stamps	< $5x10E^{-11}$	/sec HQ OXCO
<100ns	PPS, PPM, PPH	< $11x10E^{-11}$	/day Rubidium

Days	1d	2d	3d	4d	5d	6d	7d	14d
ERROR µs	0,5	1,2	1,8	2,4	2,9	3,3	3,7	3,9

Rubidium UTC holdover accuracy degradation on each next day of server operation

Days	1d	2d	3d	4d	5d	6d	7d	14d
ERROR µs	0,6	2,8	7,2	13,7	22,1	32,9	45,9	184

OCXO osc. UTC holdover accuracy degradation on each next day of server operation

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, 20-70VDC, 370VDC
- 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.(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-5000 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-5000 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-5000 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-5000 Series 2U Back panel