HEOL DESIGN

T109

GPS/GLONASS/BEIDOU/GALILEO/QZSS
Time Server with OSNMA

**NTP Time server / Multi-GNSS Primary Clock,
with OSNMA authenticated synchronization,
and additional administration Ethernet port**

HEOL DESIGN

Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com

HEOL-T109: HIGH ACCURACY SYNCHRONIZATION UNIT

The T109 Time server / Multi-GNSS Clock has been designed to provide very accurate timing information trough an Ethernet link (using NTP/SNTP protocol), for Network synchronization and measurement applications, without the need to be connected to external Network, hence preserving your Network insulation.

It provides 2 RJ45 connectors for 2 fully isolated networks :
-1 Ethernet port for NTP synchronization
-1 Ethernet port for administration (configuration and monitoring through the web server, SNMPv3 or SSH).

Based on a high performance GPS/GLONASS/GALILEO /BEIDOU/QZSS timing chipset (with **-160dBm** sensitivity), it delivers extremely accurate timing information, even in poor signal level conditions (**indoor**, urban canyons and signal obscured environments). The antenna (protected against short-circuit) does not need to be located up a mast or on the rooftop as is the norm, which considerably **reduces the cost and complexity** of deployment in terms of antenna cabling and lightning strike protection and reduces the cost of maintenance.
Authenticated Galileo signals are also guaranteed thanks to OSNMA service (in option).

Thanks to its self-survey mode, the accuracy of the timestamp (compliant with SNTP protocol) is better than **±200 nanoseconds** for the receive packet and **±600 nanoseconds** for the transmit packet (with the 1µs version) - reference is UTC atomic clock. This accuracy is achievable even with only 1 satellite being tracked.

If the satellites signals are completely lost, the **hold-over mode** enables the module to keep sending accurate Ethernet frames, with a drift better than 500µs/day (with **OCXO** option), or 1µs/day with **RUBIDIUM** oscillator.

The **Time Service software** can be installed on any host computer, to synchronize computers using NTP/SNTP protocol.
Accuracy and specific alarms are displayed at every connection.

HEOL DESIGN
Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com

A **web server** with secure access allows you to configure the HEOL-T109, and monitor its status at a glance (GNSS satellites strength signals, Ethernet connections, alarms, input/outputs…).

Automatic **E-mails** can be sent by the HEOL-T109, periodically or when alarms appear. This function is fully configurable via the http server.

A 2500V isolated event input allows you to **time-stamp events from external systems**, with ±100 nanoseconds accuracy, refer to UTC atomic clock. The TimeStamp information is reported through RS232, SNMP trap, E-mail or Broadcast frame. A second event input is available in option.

In option, an battery powered internal RTC can provide timing information if no GNSS satellites are available at power-up (antenna disconnected or hidden inside a building).

Alarm relay is available, for driving your external systems in case of failure of the T109.

A highly accurate **pps** (**TOP** signal) signal is available on SUB-D9 connector (pin 8 for Linux applications) or I/O or BNC connector (polarity, period, length, and delay compensation are configurable by user). It is also available with optional 1500V isolated static relay (in this case Alarm relay is not available).

In option, **IRIG**-B003 output is available on the I/O connector. IRIG-B123 is also available on request.

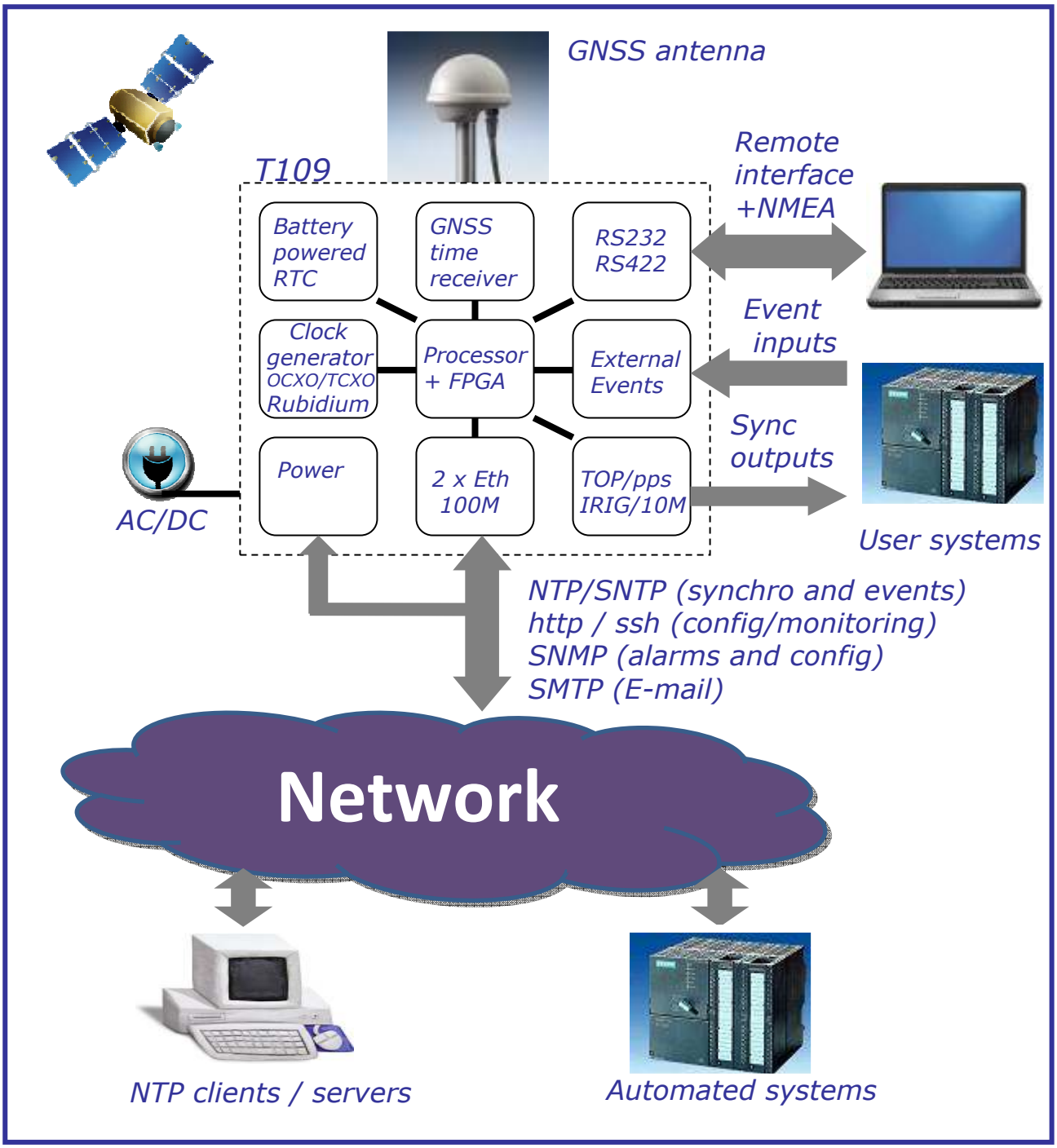
10MHz sinewave output is also available on request, with a frequency accuracy better than 1.10e-12 when locked to GNSS (with Rubidium oscillator).

Alarms are displayed through **SNMPv1/v3** traps or through RS232. SNMP can also be used to configure T109 parameters (instead of http web server).

A RS232 or RS422 serial port can be accessed for remote control and monitoring (protocol output : TSIP or NMEA, selectable through web server).

The T109 is available in 19’’ rack mounted form factor, with a LCD module that displays the status and timing information.

Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com



T109 synoptic and external links

Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com

SPECIFICATIONS

GNSS Receiver	Type	32 channels , selectable constellations : GPS/GLONASS/GALILEO/BEIDOU/QZSS+SBAS Full L1/L2/L5 bands for GNSS receiver with OSNMA option
	Sensitivity	-160dBm tracking, -148dBm acquisition
	Time Accuracy (pps)	±15 ns rms (1σ)
	Warm up time - hot start - cold start	< 1 minute < 2 minutes
	Self survey mode (with OCXO or Rubidium)	24 hours
Timing Generator	Timing Ethernet protocol	NTP / SNTP V4, NTP Broadcast/Unicast (200 requests per second maximum) on Ethernet port #1
	Configuration / monitoring	http server, SNMPv1/v3, SMTP, SSH, Syslog on Ethernet port #2
	Absolute timestamp error (refer to UTC time)	±200ns for Rx (1µs version) ±600ns for Tx (1µs version)
	Timestamp drift when synchronization lost (at constant temperature)	Standard TCXO option: 200µs/hour OCXO option : less than 500µs/day HQ-OCXO option : less than 10µs/day Rubidium option : less than 2µs/day
	Battery powered RTC option	1 millisecond accuracy Autonomy : 6 months Max drift 1 s / day
Power supply	Input Voltage	DC Aux: 5V or 5 to 36V or 85/250VAC, 110/250VDC (Rack), 47/63Hz single or dual input
	Power consumption	T109R: 10W T109R with OCXO: 12W T109R with Rubidium: 15W
Interfaces	Auxiliary DC Power Supply	2.54mm header with locking clip
	5V GNSS Active antenna	SMA, TNC, BNC or 'N'
	Ethernet link	2 x RJ45, 100Mbps + 1Gbps for admin
	Remote RS232 / RS422	SUB-D9, 38400/8/No/1
	pps output	On SUB-D9 (pin 8, for Linux applications) On I/O connector : RS422 level, or on fast static relay. ON BNC connector in option
	Alarm Relay	On I/0 connector 2A/250V. 2500V isolation
	Event input	On I/0 connector (up to 16 inputs). 25V max peak voltage, add resistor for higher 2500V isolation, ±100ns accuracy
	10MHz output option	On BNC connector frequency accuracy < 1.10e-12 after 1 day GPS lock (with Rubidium option)

Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com

	IRIG-B003 output option	On I/0 connector Differential RS422 level
Environmental	Operating Temperature	From 0/50°C to -40/+85°C, depending Upon the option
	Storage Temperature	-40 / +85°C
	Humidity	90% non-condensing
	Dimensions -depth with SMA connector -depth with N connector	1U height 482.6mm / 19'' (front plate width) 420mm (enclosure width) 130 mm 150 mm
	Weight	2.4 Kg

Note : Heol Design is not responsible for the operation or failure of operation of GNSS satellites or the availability of GNSS satellite signals.

- According to CE directive, the T109 module has passed the following tests :
  - EN55022/55011 class B : conducted and radiated emissions.
  - EN61000-4-2: Immunity to electrostatic discharges.
  - EN61000-4-3: Immunity tests on electromagnetic fields radiated at radio-electrical frequencies, with 10V/m electromagnetic field.
  - EN61000-4-4: Immunity to rapid transients.
  - EN61000-4-5: Immunity to surge.
  - EN61000-4-6: Immunity tests on conducted interference, induced by radio-electrical fields.
  - EN61000-4-8: Immunity to Power frequency magnetic field (30 A/m)
  - EN61000-4-11: Voltage dips, short interruptions and voltage variations immunity tests.

- Compliance with the International Safety Standard for Information Technology (IEC/EN 60950).

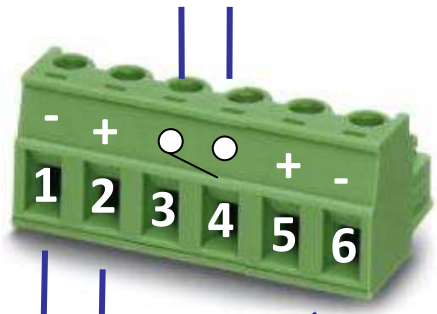
- The HEOL-T109x module is RoHS (lead free) compliant.

RoHS compliant 2002/95/EC

Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com

T109 19'' 1U Rack rear view

3&4 pins :
Alarm relay
or PPS/TOP output on Static relay (option PPSREL)



1&2 pins :
Event input #1

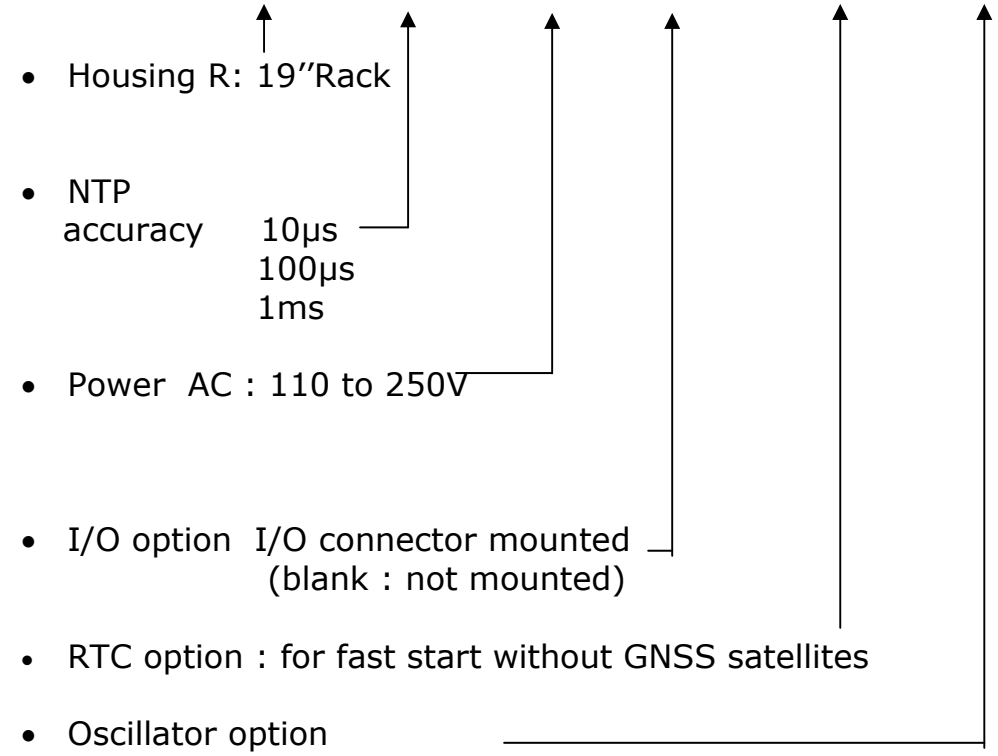
5&6 pins :
PPS/TOP RS422 output
or IRIG B003 output (option IRIG)
or Event input #2 (option EVENT2)

I/O connector details

Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com

ORDERING PART NUMBER

T109R-10µs-AC-I/O-RTC-OCXO



- Housing R: 19’’Rack
- NTP accuracy 10µs
  100µs
  1ms
- Power AC : 110 to 250V
- I/O option I/O connector mounted
  (blank : not mounted)
- RTC option : for fast start without GNSS satellites
- Oscillator option
  OCXO: 25ppb stability over -40/+85°C
  HQ-OCXO : 0 / +50°C
  RUB : Rubidium : 0 / +50°C
  (blank : standard TCXO)

If other options are needed, just add the part number of these options at the end of the T109 part number :
-OSNMA for authenticated Galileo synchronization
-422 for RS422 serial port instead of RS232
-EVENT2 for secondary Event input
-IRIG for IRIG-B003 output
-PPSREL for PPS/TOP output on fast static relay
-N or TNC or BNC connector option
-10M for 10MHz sinewave output on BNC connector

Pole Phoenix – 22560 PLEUMEUR BODOU - FRANCE contact@heoldesign.com