



T108-V2

GPS/GLONASS/BEIDOU/GALILEO/QZSS Time Server



**NTP Time server / Multi-GNSS Primary Clock,
with advanced I/O synchronization features.
- Static / Mobile applications -**

HEOL-T108: HIGH ACCURACY SYNCHRONIZATION UNIT

The T108 Time server / Multi-GNSS Clock has been designed to provide very accurate timing information through 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.

Based on a high performance 32 channels 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.

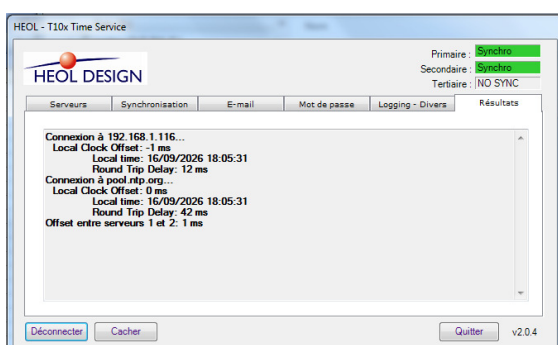


With Time-Receiver Autonomous Integrity Monitoring (T-RAIM) algorithm, accuracy is guaranteed in the weakest signal environments.

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.

Authenticated Galileo signals are also guaranteed thanks to **OSNMA** service (in option), preventing from spoofing attacks. Contact us for more details.



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.

A **web server** with secure access allows you to configure the HEOL-T108, 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-T108, 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 very high accuracy (± 100 nanoseconds, 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 T108.

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).

DCF77 RF signal can also be used (in option) as a second source of synchrnization, in case of loss of GNSS signals.

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

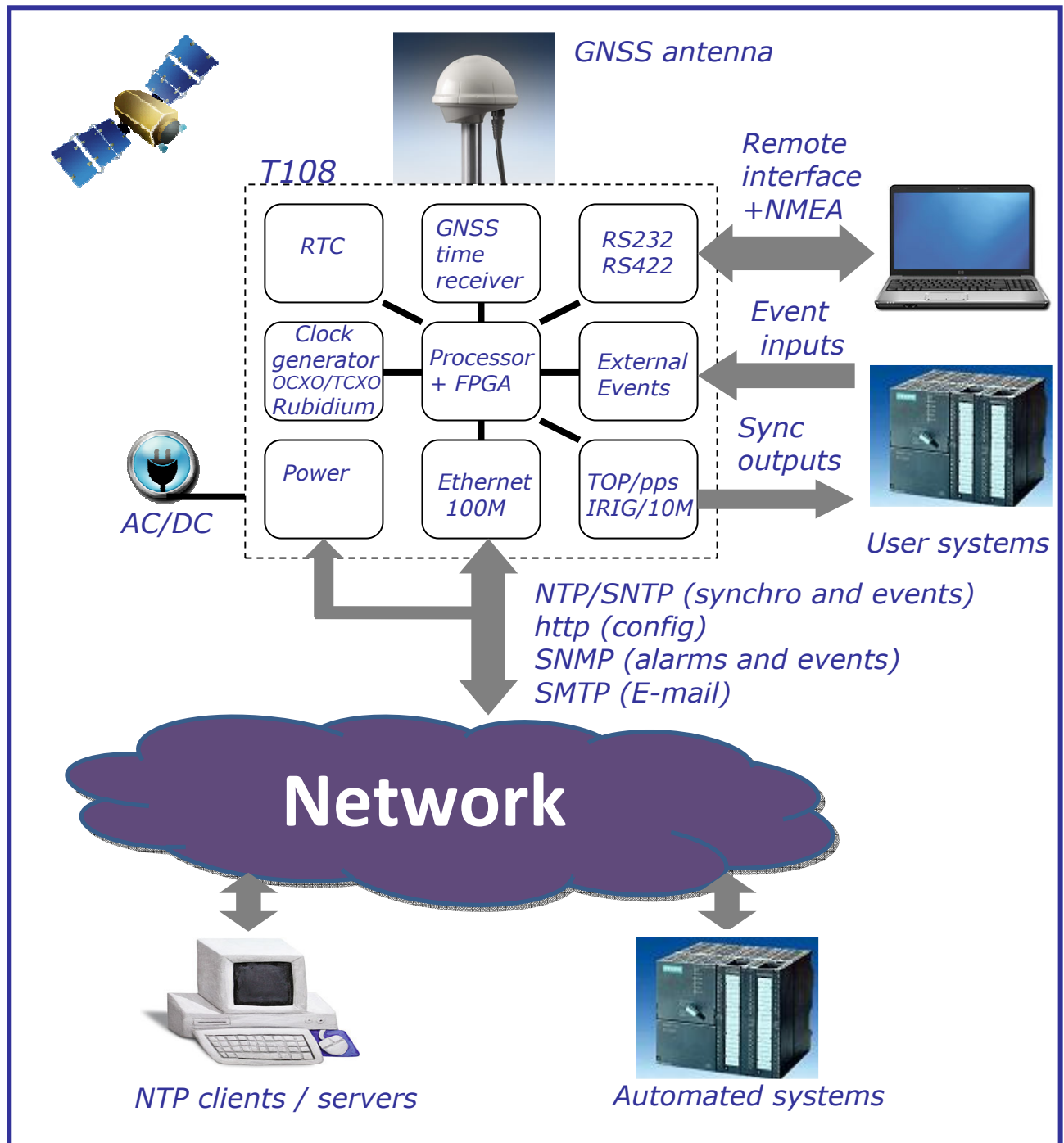
10MHz sinewave output is also available on request, with a frequency accuracy better than $1.10e-12$ when locked to GNSS (with Rubidium oscillator).

Alarms are displayed through **SNMP** traps (Ethernet interface) or through RS232. SNMP can also be used to configure T108 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).

Historic data can be backed-up to an EEPROM (up to 8000 status records).

The T108 is available in a compact (DIN rail adaptable) or 19" rack mounted form factor, with a LCD module that displays the status and timing information.



T108 synoptic and external links

SPECIFICATIONS

GNSS Receiver	Type	32 channels GPS/GLONASS/GALILEO/BEIDOU/QZSS+SBAS
	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	SNTP V4, NTP Broadcast/Unicast (100 requests per second maximum)
	Configuration / monitoring	http server or SNMP manager
	Absolute timestamp error (refer to UTC time)	± 200 ns for Rx (1μ s version) ± 600 ns for Tx (1μ s version)
	Timestamp drift when synchronization lost (at constant temperature)	Standard TCXO option: 200 μ s/hour OCXO option : less than 500 μ s/day Rubidium option : less than 5 μ s/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	T108C: 5W T108R: 8W T108C with OCXO: 7W T108R with OCXO: 10W T108R with Rubidium: 13W
Interfaces	Auxiliary DC Power Supply	2.54mm header with locking clip
	5V GNSS Active antenna	T108C : SMA or TNC T108R : SMA, TNC, BNC or 'N'
	Ethernet link	RJ45, 10/100Mbps
	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/O connector 2A/250V. 2500V isolation
	Event input	On I/O connector 25V max peak voltage, add resistor for higher 2500V isolation, ± 100 ns accuracy
	10MHz output option	On BNC connector frequency accuracy < $1.10e-12$ after 1 day GPS lock (with Rubidium option)
	IRIG-B003 output option	On I/O 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 (T108C)	201 x 95 x 26 (mm)
Weight (T108C)	340 grams
Dimensions (T108R)	1U height 482.6mm / 19" (front plate width) 420mm (enclosure width)
-depth with SMA connector	130 mm
-depth with N connector	150 mm
Weight (T108R)	1,85 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  directive, the T108 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-T108x module is RoHS (lead free) compliant.



T108 Compact version

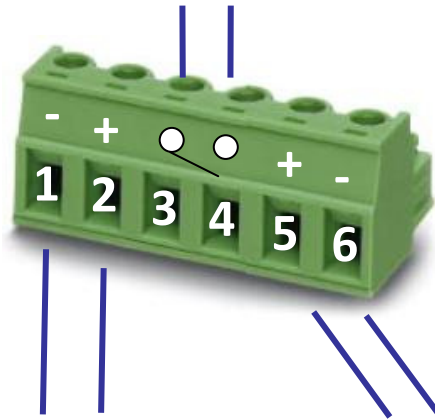


T108 19" 1U Rack rear view

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

ORDERING PART NUMBER**T108R-V2-10 μ s-AC-I/O-RTC-OCXO**

- Housing R: 19" Rack
C: Compact
- NTP accuracy 10 μ s
100 μ s
1ms
- Power DC1 : 5 to 36V
DC5 : 5V +/-10%
AC : 110 to 250V (Rack only)
2AC : Dual supply 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
RUB : Rubidium (Rack in AC version): 0 / +50°C
(blank : standard TCXO)

If other options are needed, just add the part number of these options at the end of the T108 part number :

- 422 for RS422 serial port instead of RS232
- EVENT2 for secondary Event input
- DCF for DCF77 receiver signal and antenna
- IRIG for IRIG-B003 output
- PPSREL for PPS/TOP output on fast static relay
- N or TNC or BNC connector option (N only for rack)
- 10M for 10MHz sinewave output on BNC connector
- OSNMA for authenticated Galileo synchronization