



T105, very high precision Time Server



**NTP/SNTP Time server / GPS Primary Clock,
with PoE and advanced I/O synchronization features.
- Static applications -**

HEOL-T105: HIGH ACCURACY SYNCHRONIZATION UNIT

The T105 Time server / GPS 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. **It is dedicated only to static applications.**

Based on a high performance 14 channels GPS 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 TRAIM algorithm, accuracy is guaranteed with only one GPS satellite tracked.

It enables also very fast start-up times, as only one satellite is enough to generate a precise Time-stamp (in static applications).



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.**

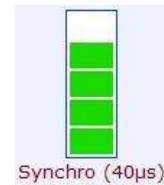
If the satellites signals are completely lost, the **hold-over mode** enables the module to keep sending accurate Ethernet frames, with a drift better than 1ms/day (with **OCXO** option).



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-T105, and monitor its status at a glance (GPS satellites strength signals, Ethernet connections, alarms, input/outputs...).



Automatic **E-mails** can be sent by the HEOL-T105, 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 GPS 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 T105.

A highly accurate **pps (TOP signal)** signal (± 100 ns) is available on SUB-D9 connector (pin 8 for Linux applications) or I/O 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.

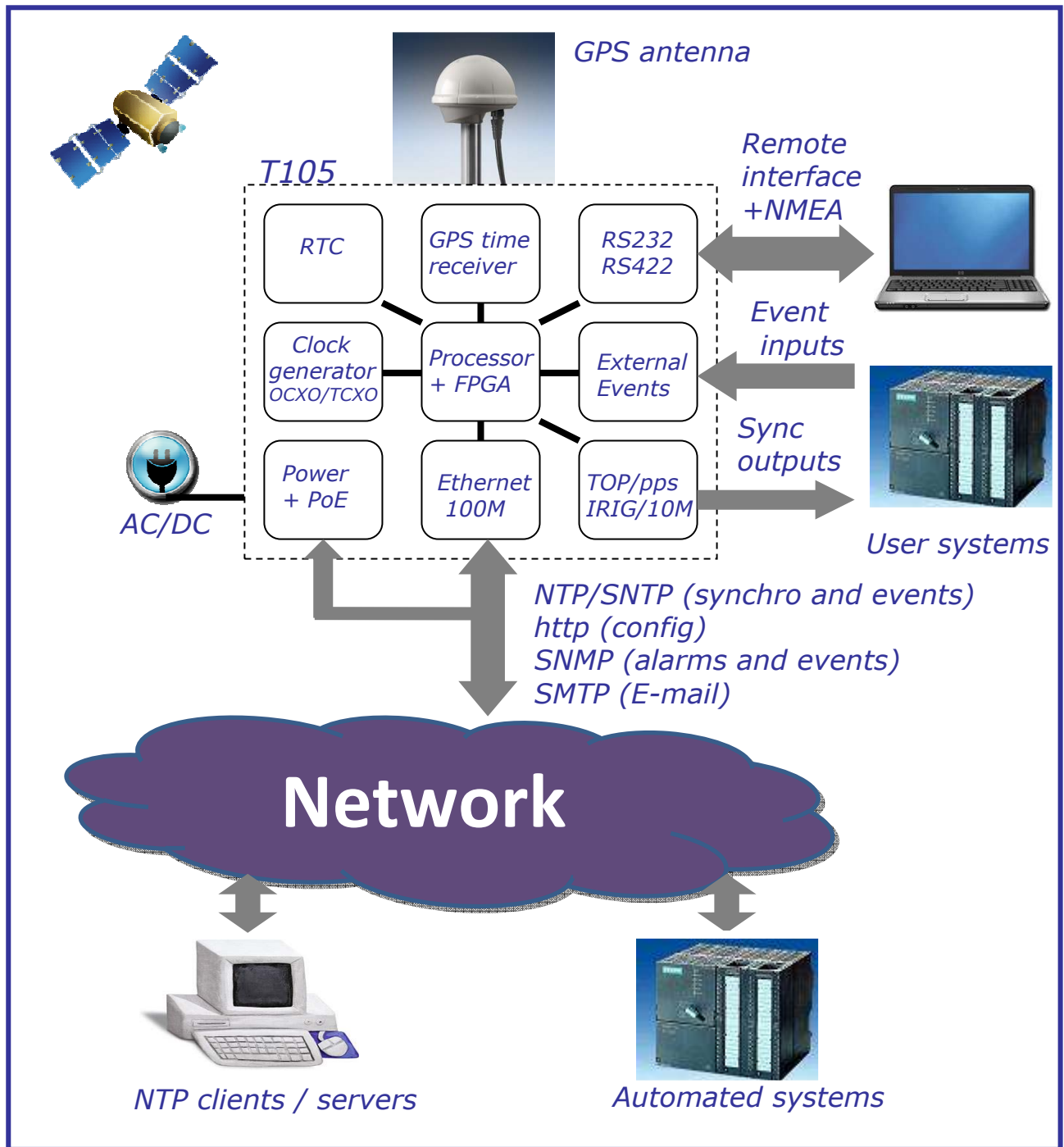
Alarms are displayed through **SNMP** traps (Ethernet interface) or through RS232. SNMP can also be used to configure T105 parameters (instead of http web server).

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 **Power On Ethernet** enables installation of the T105 without the need for additional cables to provide power.

The T105 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.



T105 synoptic and external links

SPECIFICATIONS

GPS Receiver	Type	14 channels
	Sensitivity	-160dBm tracking, -155dBm acquisition
	Time Accuracy (pps)	±15 ns rms (1σ)
	Warm up time - hot start	< 1 minute
	- cold start	< 15 minutes
Self survey mode (with OCXO)	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)	±200ns for Rx (1μs version) ±600ns for Tx (1μs version)
	Timestamp drift when synchronization lost	Standard TCXO option: 200μs/hour OCXO option : less than 1ms/day (at constant temperature)
	Battery powered RTC option	1 millisecond accuracy Autonomy : 6 months Drift ~ 1 s / day (10°C temp. variation)
	Power supply	Input Voltage
Power consumption		T105C: 5W T105R: 8W T105C with OCXO: 7W T105R with OCXO: 10W
Interfaces	Auxiliary DC Power Supply	2.54mm header, anti-extraction
	5V GPS Active antenna	T105C : SMA or TNC T105R : SMA, TNC or 'N'
	Ethernet link	RJ45, 10/100Mbps + POWER
	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.
	Alarm Relay	On I/O connector 2A/250V. 2500V isolation
	Event input	On I/O connector 25V max peak voltage (add R series for more), 2500V isolation, ±100ns accuracy
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 (T105C)	201 x 95 x 26 (mm)
	Weight (T105C)	340 grams
	Dimensions (T105R) -depth with SMA connector	1U -482.6mm (19") 130 mm

-depth with N connector	150 mm
Weight (T105R)	1,85 Kg

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

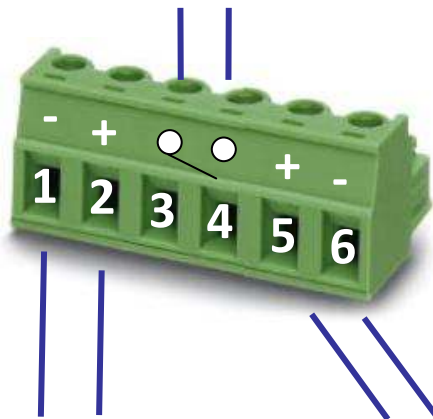
- According to **CE** directive, the T105 module has passed the following tests :
 - EN55022/55011 class B : conducted and radiated emissions.
 - EN61000-4-2: Immunity to electrostatic discharges.
 - EN61000-4-3: Immunity tests on electromagnetic fields radiated at radio-electrical frequencies, with 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-T105x module is RoHS (lead free) compliant.





T105 19" 1U Rack rear view (with 'N' antenna connector)

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

T105R-10 μ s-AC-I/O-OCXOSR-RTC

- Housing R: 19" Rack
C: Compact
- NTP accuracy 1 μ s
10 μ s
100 μ s
1ms
- Power DC : 14 to 60V
DC/POE: DC+Power Ethernet
AC : 110 to 250V (Rack only)
- I/O option I/O connector mounted
(blank : not mounted)
- OCXO option
OCXOSR : standard (0 / +50°C)
OCXOMR : medium (-20 / +65°C)
OCXOHR : high (-40 / +70°C)
- RTC option : for fast start without GPS satellites

If other options are needed, just add the part number of these options at the end of the T105 part number :

- 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 connector option (N only for rack)