



T101, high precision Time Server

T101Rack



**NTP/SNTP Time server / GPS Master Clock,
with PoE and advanced Input/Output synchronization features.**

HEOL-T101x V3: PERFORMANCE and EASY INTEGRATION

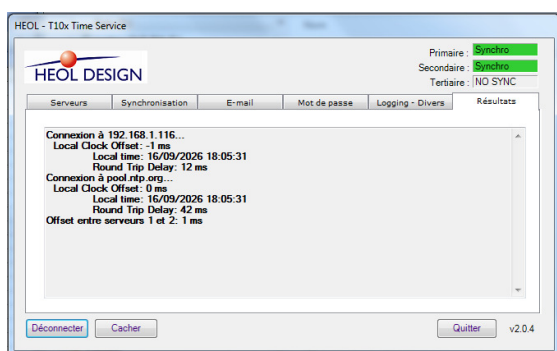
The T101 Time server / GPS Clock has been designed to provide accurate timing information through an Ethernet link (using NTP/SNTP protocol), for Network synchronization and measurement applications, without the need to be connected to external Network, hence preserving your Network insulation.

Based on a high performance 12 channels GPS chipset (with **-155dBm** sensitivity), it delivers 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.



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 'e' version) - reference is UTC atomic clock. This accuracy is achievable **even with only 1 satellite being tracked**.

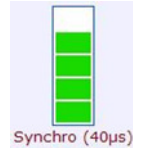
If the satellites signals are completely lost, the **hold-over mode** enables the module to keep sending accurate Ethernet frames, with a drift better than 1ms/day (with **OCXO** option). The **10MHz** output from the OCXO (square-wave or sinus) can also be available on the I/O connector.



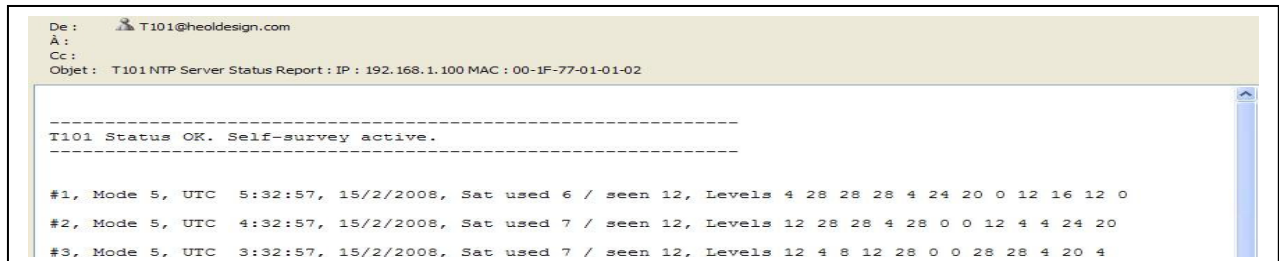
The T101 **Time Service software** can be installed on any host computer, to synchronize computers using NTP/SNTP protocol.

Accuracy and specific alarms are displayed at every connection.

A **web server** with secure access allows you to configure the HEOL-T101x, 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-T101x, 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.

Alarm relay is available, for driving your external systems in case of failure of the T101.

Alarms are displayed through **SNMP** traps (Ethernet interface) or through RS232. SNMP can also be used to configure T101 parameters (instead of http web server).

A highly accurate **pps (TOP)** signal (± 40 ns) is available on SUB-D9 or I/O connector (polarity, period, length, and delay compensation are configurable by user). It is also available with optional 1500V isolated static relay.

IRIG-B003 and **A003** output available in RS422 or TTL level (please contact HEOL DESIGN for this option).

A RS232 or RS422 serial port can be accessed for remote control and monitoring (with NMEA protocol output).

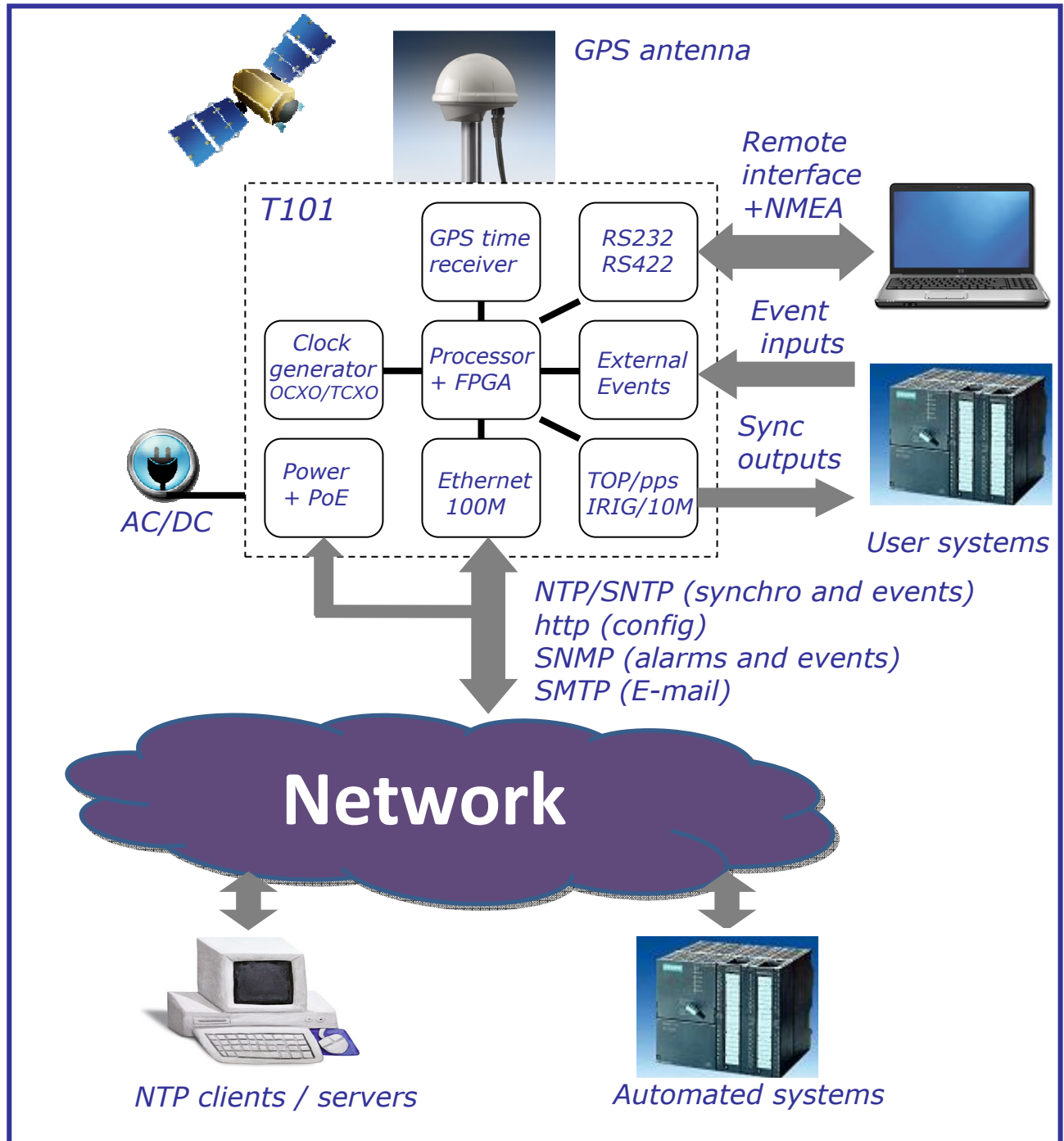
Historic data can be backed-up to an EEPROM (over 8000 status records).

The **Power On Ethernet** enables installation of the HEOL-T101x without the need for additional cables to provide power.



The T101 is available in 2 different **metal housings**, either compact or 19" rack mounted form factor.

This rack unit displays on a LCD module the status and timing information.



T101 synoptic and external links

SPECIFICATIONS

GPS Receiver	Type	12 channels
	Sensitivity	-155dBm/-185dBw
	Position Accuracy	<5 meters
	Time Accuracy (pps)	±40 ns
	Time to First Fix	< 45 seconds (90%)
	Warm up time	< 15 minutes for full accuracy
	Active antenna voltage	5V or 3V, configurable
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 ('e' version) ±600ns for Tx ('e' version)
	Timestamp drift when synchronization lost	Standard TCXO option: 200µs/hour OCXO option : less than 1ms/day (at constant temperature)
Power supply	Input Voltage	Power On Ethernet : compliant with IEEE 802.3af. Auxiliary: 12 to 60 VDC (-48V Telecom compliant) or 85/250VAC, 110/250VDC (T101R) 47/63Hz, (400 Hz in option)
	Power consumption	4W (T101C), 6W (T101R) +3W with OCXO option
Interfaces	Auxiliary DC Power Supply	2.54mm header, anti-extraction
	GPS Active antenna	T101C : SMA T101R : SMA or 'N'
	Ethernet link	RJ45, 10/100Mbps + POWER
	Remote RS232 / RS422	SUB-D9, 38400/8/No/1
	pps output	RS422, RS232, or fast static relay output. on SUB-D9 or I/O connector (3.81mm)
	Alarm Relay	2A/250V. 2500V isolation
	Event input	25V max peak voltage (add resistor if higher), 2500V isolation, ±100ns accuracy
Environmental	Operating Temperature	-20 / +65°C
	Storage Temperature	-40 / +85°C
	Maximum altitude	18000 m
	Maximum speed	515 m/s (T101 V3)
	Humidity	90% non-condensing
	Dimensions (T101C)	180 x 90 x 27 (mm)
	Weight (T101C)	340 grams
	Dimensions (T101R)	1U -482.6mm (19")
	-depth with SMA connector	420mm (enclosure width)
	-depth with N connector	130 mm 150 mm
	Weight (T101R)	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 HEOL-T101x 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-T101x module is RoHS (lead free) compliant.



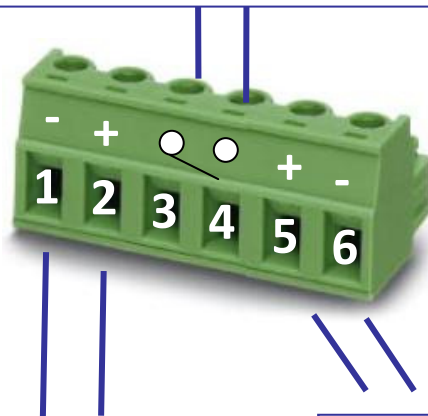
T101 compact model



T101 19" 1U Rack rear view (with 'N' antenna connector)

3&4 pins options:

- A = Alarm relay
- S = PPS/TOP output on Static relay
- Ow = 10MHz OCXO square wave output
- Os = 10MHz OCXO sinus output



1&2 pins options:

- E = Event input #1

5&6 pins options:

- 1 = PPS/TOP 3V output
- 2 = PPS/TOP RS422 output
- 3 = IRIG B003 3V output
- 4 = IRIG B003 RS422 output
- 5 = Event input #2

I/O connector details

ORDERING PART NUMBER

T101R-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 T101 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)