



T103, Time Server



**Time server / GPS Primary Clock,
with PoE and advanced Input/Output features
- Mobile Applications, down to -40°C -**



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

HEOL-T103 : PERFORMANCE and EASY INTEGRATION

The T103 server has been designed to provide accurate timing information through an Ethernet link, for Network synchronization and measurement applications, without the need to be connected to external Network, hence preserving your Network insulation. It can be used in both **static** and **mobile** applications.

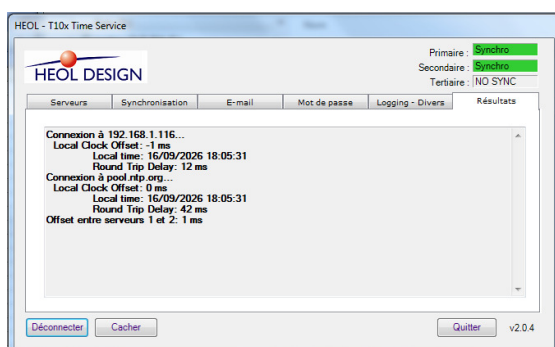
Based on a high performance 12 channels GPS chipset (with **-160dBm** sensitivity), it delivers accurate timing information, even in poor signal level conditions (**indoor**, urban canyons and signal obscured environments). The antenna (protected against short-circuit) does not need to be located up 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.



Warm-up time can be reached **in less than 1 minute**, providing accurate timing information for mobile applications which are battery operated.

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.

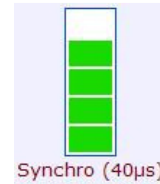
If the satellites signals are completely lost, the **hold-over mode** enables the module to keep sending accurate Ethernet frames, with a drift better than 1ms/day (with **OCXO** option).



The Heol **Time Service software** can be installed on any host computer, to synchronize it using SNTP protocol.

Accuracy and specific alarms are displayed at every connection.

A **web server** with secure access allows you to configure the T103, and monitor its status at a glance (GPS satellites strength signals, Ethernet connections, alarms, input/outputs...).



Automatic **E-mails** can be sent by the T103, periodically or when alarms appear. This function is fully configurable via the http server.

A **2500V isolated** event inputs allows you to time-stamp external events with very high accuracy (± 100 nano-seconds , refer to UTC atomic clock). The TimeStamp information is report through RS232/RS422, SNMP trap, E-mail or Broadcast frame). A second event input is available in option.

In option, a 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 T103.

A highly accurate **pps (TOP signal)** signal ($\pm 100\text{ns}$) 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 T103 parameters (instead of http web server).

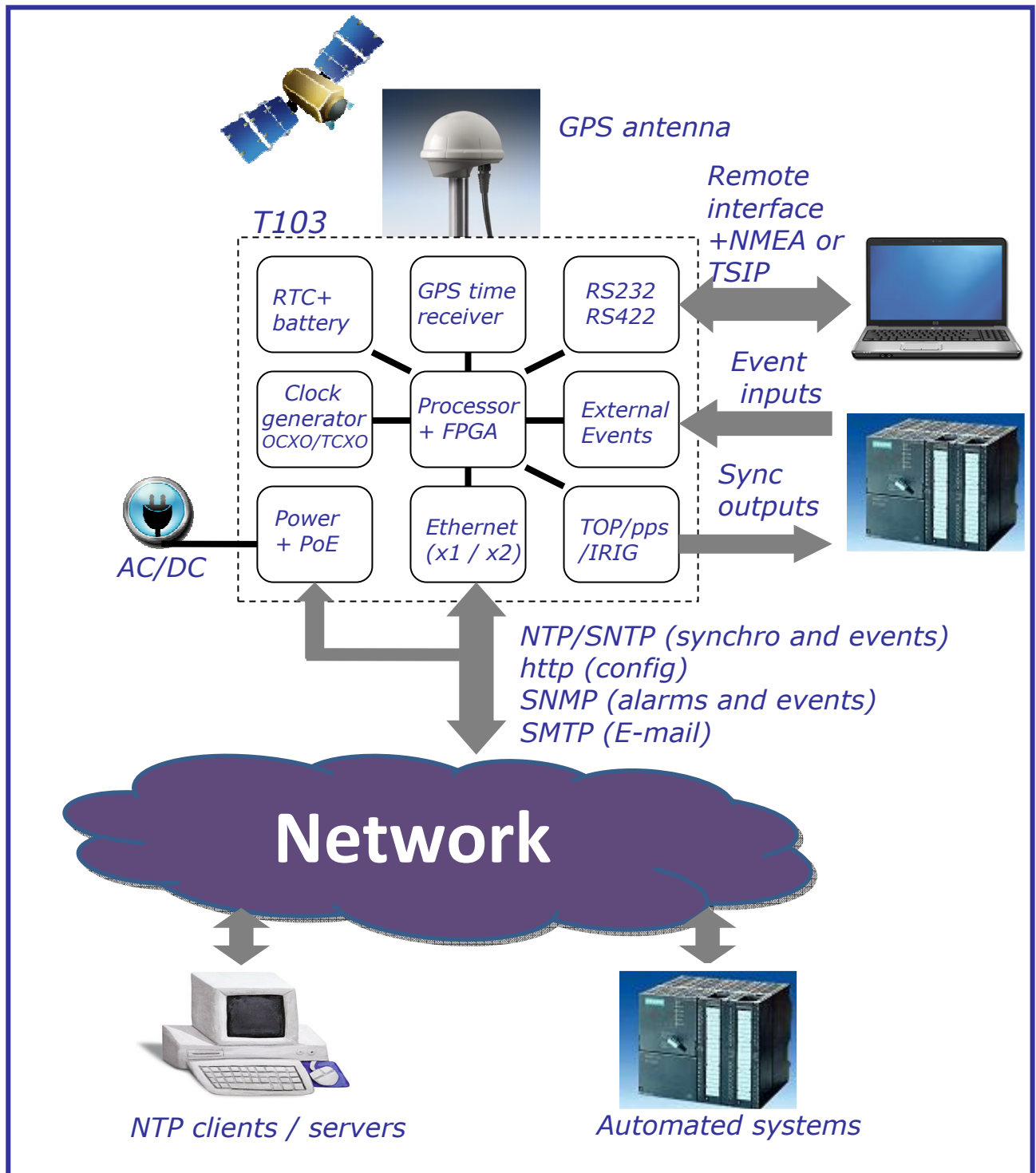
A RS232 or RS422 serial port can be accessed for remote control and monitoring (protocol output : TSIP or NMEA, selectable through web server).

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

The **Power On Ethernet** enables installation of the T103 without the need for additional cables to provide power (except for T103R2 version).

The T103 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.

The rack unit can also provide 2 Ethernet ports on the rear panel (both with identical features).



T103 synoptic and external links

SPECIFICATIONS

GPS Receiver	Type	12 channels
	Sensitivity	-160dBm
	Position Accuracy	<2.5 meters
	Time Accuracy (pps)	±100 ns (static) ±200 ns (mobile)
	Cold start (Time to First Fix)	< 39 seconds (90%)
	Warm up time	< 1 minute
	Self survey mode (with OCXO)	24 hours
	Active antenna voltage	5V
Timing Generator	Timing Ethernet protocol	SNTP V4, Broadcast/Unicast (100 requests per second maximum)
	Configuration / monitoring	http server or SNMPv1 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 Ethernet: IEEE 802.3af compliant Auxiliary: 14 to 60 VDC (-48V Telecom compliant) or 85/250VAC, 110/250VDC (Rack) 47/63Hz, (400 Hz on request)
	Power consumption	T103C: 5W T103R: 8W T103C with OCXO: 7W T103R with OCXO: 10W
Interfaces	Auxiliary Power Supply	2.54mm header, anti-extraction
	GPS Active antenna	T103C : SMA or TNC T103R : SMA, TNC or 'N'
	Ethernet link	T103C-T103R: RJ45, 100Mb + POWER T103R2: 2xRJ45, 100Mb or 1Gb
	Remote RS232 / RS422	SUB-D9, 38400/8/No/1 (default) NMEA protocol
	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 inputs	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
Maximum altitude	18 000 m
Maximum speed	515 m/s
Dimensions (T103R)	1U -482.6mm (19")
-depth with SMA connector	130 mm
-depth with N connector	150 mm
-weight	1,85kg
Dimensions (T103C)	201 x 95 x 26 (mm)
- weight	0,34kg

- According to **CE** directive, the T103 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-T103 module is RoHS (lead free) compliant.



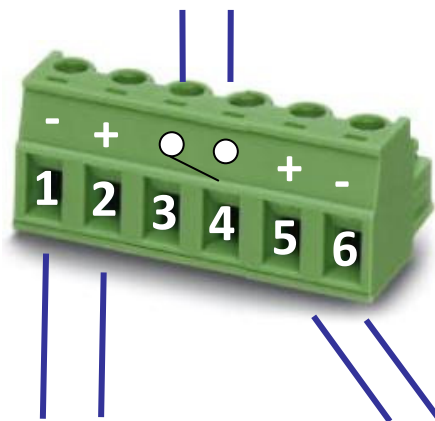


T103 19'' 1U Rack rear view (dual Ethernet version)

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**T103R-10 μ s-AC-I/O-OCXOSR-RTC**

- Housing R: 19" Rack
C: Compact
R2: Rack with dual Eth
- 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 T103 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)