

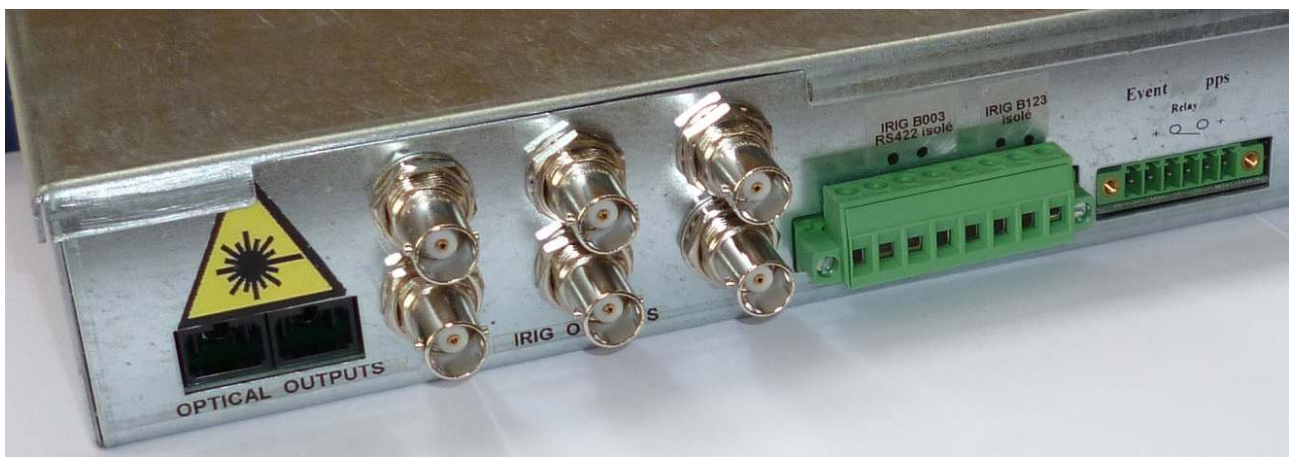


T116, Time server

20 channels Event recorder
IRIG & Pulse generator
Fiber Optic outputs



**GPS disciplined Time Station, 20 events isolated inputs, IRIGB003, IRIGB123 and pulse generator, with isolated or optical outputs
-Static and Mobile applications-**



INTRODUCTION

The T116-FO time server is a time server, synchronized to GPS, providing the following functions :

- NTP/SNTP server, broadcast and unicast modes.
- IRIG modulated (B123) and un-modulated (B003) generator, available on BNC connector, optical port (SC connector), or isolated output. Coupled with the T047 optical/IRIG transceiver, you will have the ability to synchronize distant IRIG clients, linked to T116-FO server by an optical fiber (up to 2 km).
- Programmable pulse generator, (up to 6 isolated, high current capacity outputs). Outputs are available on fast static relay, 5V, or differential RS422.
- LCD display with timing and status information.
- Daylight saving time management (winter/summer time), selectable for NTP, IRIG, LCD display.
- In option, internal RTC with sub-millisecond accuracy, powered by lithium battery, to provide time without GPS reference.
- The recorder functions timestamps external events (TTL input, or other signal levels), on a rising or falling edge, and can record (in Flash memory) up to 500 000 successive events on the 20 channels. The time-stamp resolution is 10 nanoseconds, and events are displayed in real time on the web server. The data file containing timestamps/channel information can be downloaded later through the web server.

Thanks to the use of a high performance **GPS** receiver and **FPGA**, the overall absolute accuracy (referred to UTC atomic clock) is better than **100 nano-seconds**, and **10 nano-seconds** in relative accuracy.

Using these GPS functions, you can, for example, synchronize 2 systems separated from several hundred or thousands of kilometers, with a very high precision (less than 100ns).

Based on a high performance 12 channels Timing 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.

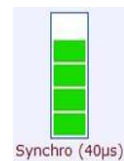


The T116 provides **Ethernet** interface, for configuration via web server, automatic E-mails, **SNMP** access; Ethernet provides also accurate timing information through the **SNTP/NTP** protocol.

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 - reference is UTC atomic clock.

If the satellites signals are completely lost, the **hold-over mode** enables the module to keep an accurate timing reference, with a maximum drift of 500µs/day (with **OCXO** option).

A **web server** with secure access allows you to configure the HEOL-T116, and monitor its status at a glance (GPS satellites strength signals, Ethernet connections, alarms, input/outputs...).



Alarms are displayed through **SNMP** traps (Ethernet interface) or through RS232. SNMP can also be used to configure T116 parameters (instead of http web server).

Automatic **E-mails** can be sent by the HEOL-T116, periodically or when alarms appear. This function is fully configurable via the http server.

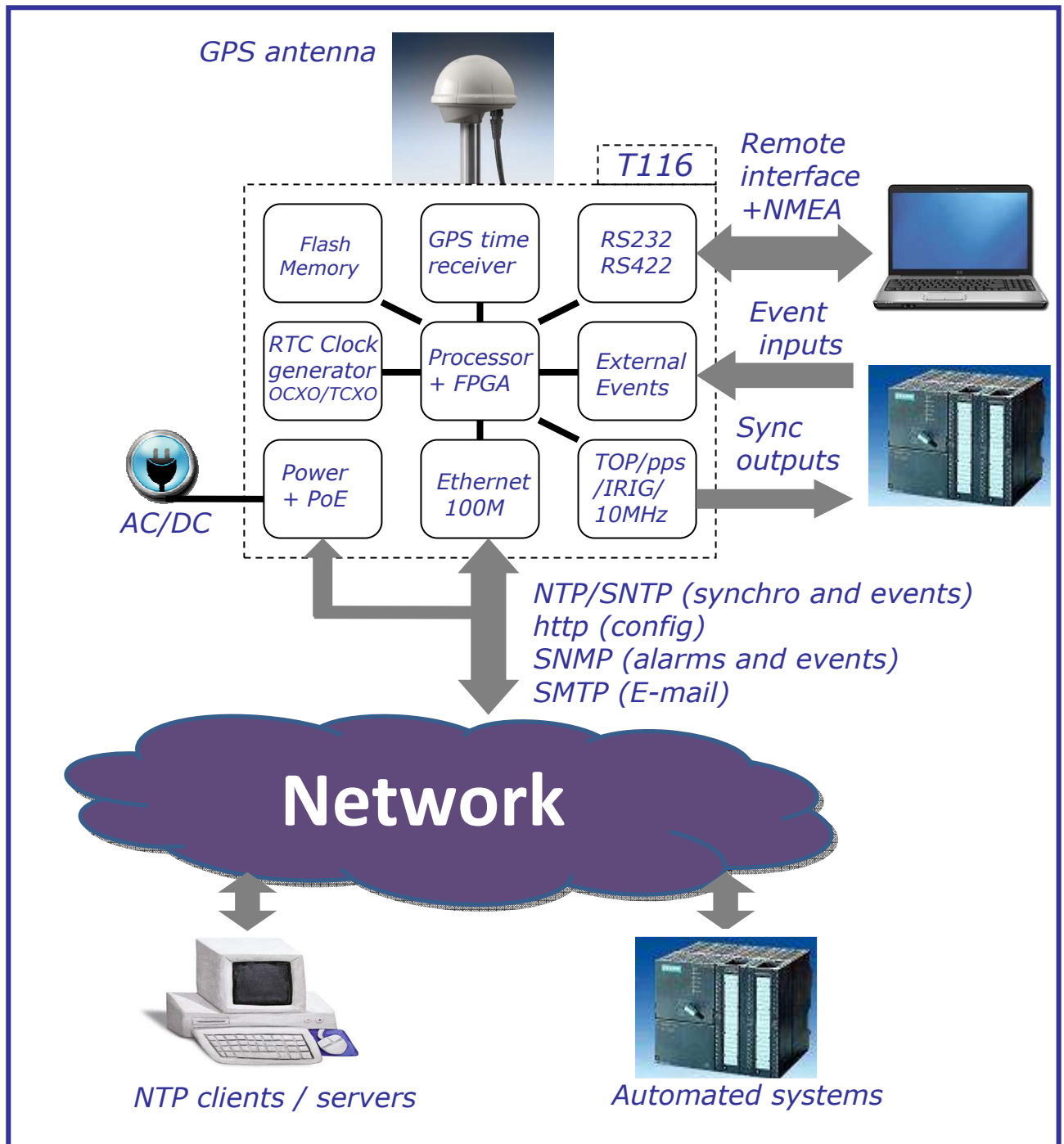
The **alarm relay** can drive your external systems in case of failure of the T116.

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

The **Power On Ethernet** enables installation of the HEOL-T116x without the need for additional cables to provide power.



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



T116 synoptic and external links

SPECIFICATIONS

GPS Receiver	Type	12 channels
	Sensitivity	-155dBm
	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
NTP server	Timing Ethernet protocol	SNTP V4, 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 500µs/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 47/63Hz, (400 Hz on request)
	Power consumption	10W (12W with OCXO)
Interfaces	Auxiliary Power Supply	2.54mm header, anti-extraction
	GPS Active antenna	SMA, TNC or 'N'
	Ethernet link	RJ45, 10/100Mbps + POWER
	Remote RS232 / RS422	SUB-D9, 38400/8/No/1 (default)
	pps output	On SUB-D9, BNC, or I/O connectors 5V logic level, RS422, RS232, 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
	IRIG Optical outputs (x2) (optical output can also drive pps signal, on request)	SC connector Wavelength 820nm Up to 2km with 62.5/125µm fiber
	IRIG electrical output	IRIGB003 or IRIGB123 (other on request) On I/O connector or BNC connector.
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	1U -482.6mm (19")
-depth with SMA connector	130 mm
-depth with N connector	150 mm
Weight	1,85 Kg

- According to **CE** directive, the HEOL-T116x 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-T116x module is RoHS (lead free) compliant.



Factory I/O connector

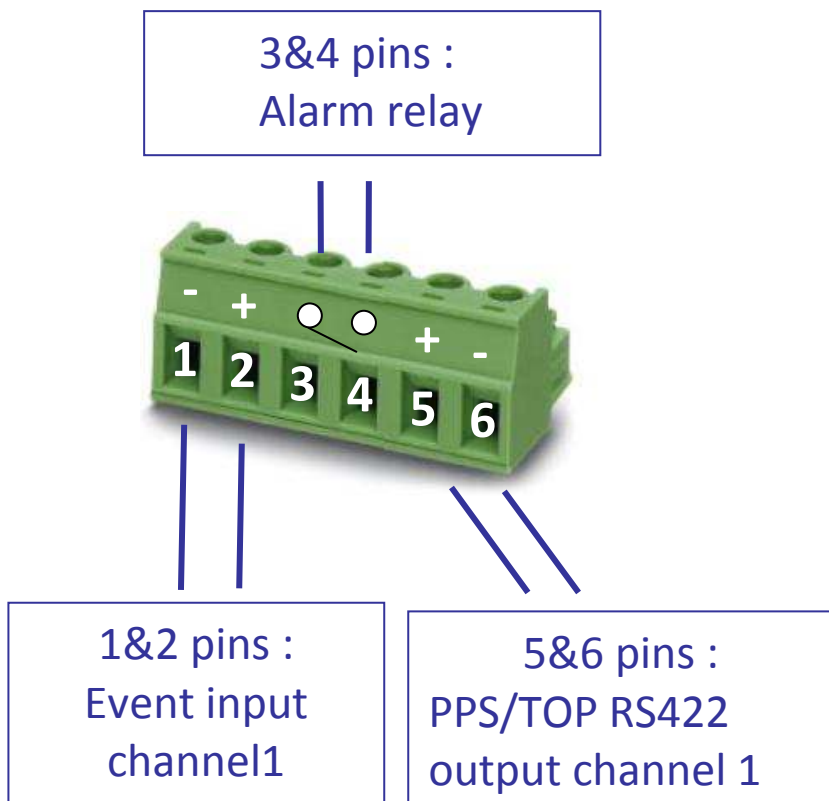
T116 rear view

BNC₁ to BNC₆

I/O₁ to I/O₆



T116 with IRIG Fiber Optic outputs, rear view



T116 factory default I/O connections

ORDERING PART NUMBER

T116-1 μ s-DC-FLASH-OCXOSR-RTC-DST

- TimeStamp 1 μ s
accuracy 10 μ s
100 μ s
1ms
- Power DC : 14 to 60V
DC/POE: DC+Power Ethernet
AC : 110 to 250V
AC/POE: AC+Power Ethernet
- FLASH option : 128M flash
memory to store Event data
- 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
- DST option : Local Time and Daylight Saving Time management

For the I/O options, just add the part number of these options at the end of the T116 part number :

- xEVENT for Event input (x = 1 to 20); on I/O connector
- xIRIG003 for IRIG-B003 output (x = 1 to 7) ; on I/O connector
- xIRIG003b for IRIG-B003 output (x = 1 to 7) ; on BNC connector
- xIRIG123 for IRIG-B123 output (x = 1 to 6) ; on BNC connector
- xPPS422 for PPS/TOP output in differential RS422 level (x = 1 to 7) ; on I/O connector
- xPPS5V for PPS/TOP output in 5V level (x = 1 to 7) ; on I/O connector
- xPPS5Vb for PPS/TOP output in 5V level (x = 1 to 7) ; on BNC connector
- xPPSREL for PPS/TOP output on fast static relay (x = 1 to 7) ; on I/O connector
- FO for Optical IRIG link to T047.

Total number of outputs can not exceed 8.

You can also request the following changes for serial port and antenna:

- 422: for RS422 serial port instead of RS232
- N or TNC connector option instead of SMA

Annex : Example of use of T116 Event inputs for seismic impact measurement.

