

z505

**High Precision Time Server
synchronized by GPS
for Static and Mobile Applications**



Compact Model

Indoor / Outdoor Antenna

**High Precision Ethernet Time Server / GPS Master Clock
with PoE, Fast start and Advanced Input/Output features
(Indoor or Outdoor use)**

Revision 12

PRESENTATION

The z505 product is a high precision time server synchronized by GPS with PoE (Power-over-Ethernet) on option, for indoor or outdoor use, to provide accurate timing information with high accuracy (1 or 10 microseconds depending upon the version) for network synchronization and measurement applications, without the need to be connected to external network, hence preserving your network insulation.

The z505 product has been designed for static and mobile applications to provide accurate timing information through an Ethernet link (using NTP/SNTP protocol) **with a very large operating temperature range from -40°C to +70°C.**

This GPS reference time module can operate with an outdoor or indoor antenna, depending upon the environmental conditions in which the product is installed.

In case of failure of GPS signals, the z505 unit still provides all its timing functions (hold-over mode).

With the “**Fast Start**” feature in option, z505 needs less than 1 minute at power-up to provide accurate timing information. And if it has already GPS Almanac and Ephemeris loaded in memory, then it is fully operational in about 20 seconds.

Then it becomes possible to power-up z505 only a few minutes per day, to synchronize the different elements of your system.

To provide the time at **power-up** if no GPS signal is available (antenna disconnected or hidden inside a building for example) and if no synchronization is possible with other external time servers (private or public), the internal RTC with TCXO powered by internal lithium battery delivers time during at least 6 months (when power OFF), with 1ms to 100ms accuracy:

- max drift of ± 4 minutes/Year with the temperature range -40°C to +70°C.
- max drift of ± 1 minute/Year with the temperature range 0°C to +40°C.

Based on a high-performance 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.



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 100µs/day** thanks to the OCXO.

A **web server** with secure access allows configuring the z505 and monitoring the status immediately (GPS satellites strength signals, Ethernet connections, alarms, input/output...).

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

One or two **2500V isolated** event inputs (available on specific I/O connector) allows timestamping events from external systems with very high accuracy (± 100 nanoseconds, refer to UTC atomic clock). The timestamp information is reported through the RS232 port, e-mail, SNMP trap or broadcast frame.

Alarm relay is available optionally on specific I/O connector, for driving of external systems in case of failure of the z505 unit.

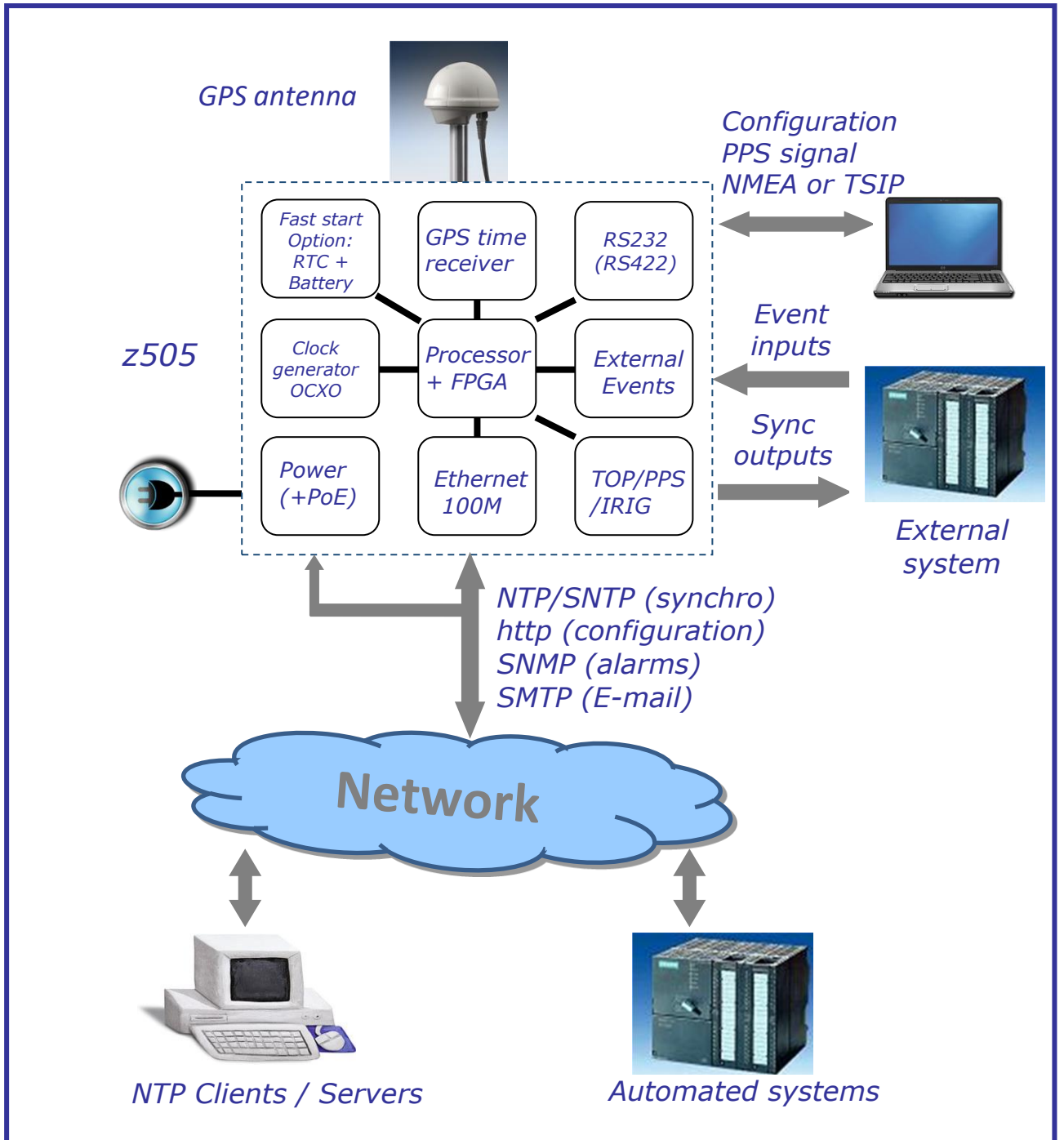
Alarms are reported through SNMP traps (Ethernet interface) or through the RS232 interface. SNMP can also be used to configure z505 parameters (instead of the web server).

A highly accurate **PPS** signal (**TOP** signal) is available on RS232 SUBD9 or specific I/O connector (polarity, period, length, and delay compensation are configurable). It is also available with optional 1500V isolated static relay (in this case the alarm relay is not available).

A RS232 serial port can be accessed for remote control and monitoring (NMEA protocol output). Historic data can be backed-up to an EEPROM (over 8000 status records).

The **Power-over-Ethernet** option enables installation of the z505 without the need for additional cables to provide power.





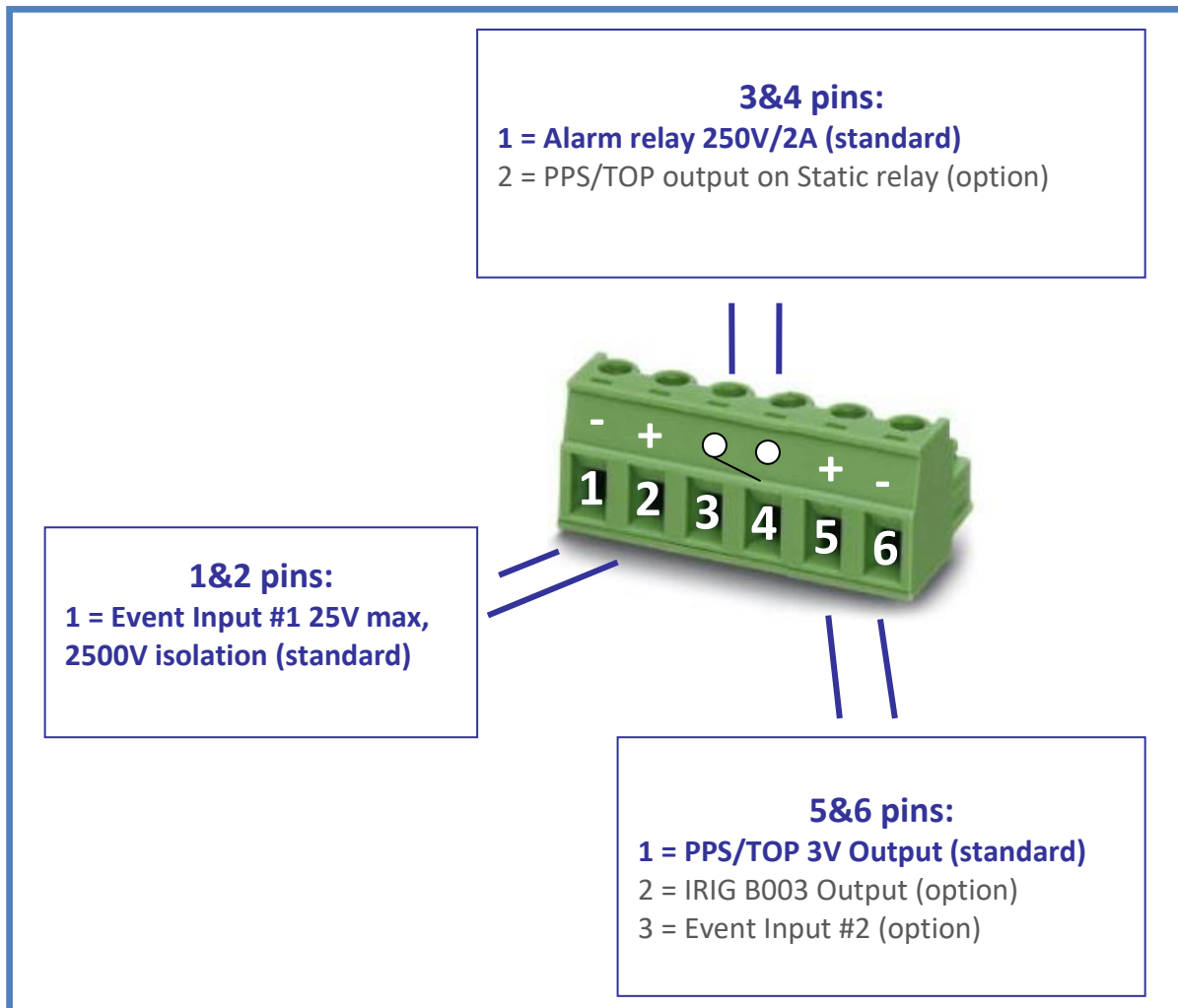
z505 Synoptic and external links



6-pin Input/Output connector

SMA antenna connector

The 6-pin I/O connector gives access to specific functions:



I/O Connector Details

- Opto-isolated event input, for time-stamping external events with $\pm 100\text{ns}$ accuracy (notification via RS232, Email or NTP broadcast frame). The pulse level can be up to $\pm 25\text{V}$ (expandable by adding a series resistor). Threshold voltage is 1V for the rising edge, and 0.5V for the falling edge. It is fully isolated to prevent from any damage (2500VDC).
- 250V/2A Alarm relay output for driving of external systems. When synchronization is lost (user-configurable threshold), or when power is removed, the relay switches from Close to Open. You can disable Relay activity and select the threshold level by configuration.
- Highly accurate PPS signal (TOP signal) ($\pm 100\text{ns}$ accuracy) 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 fast static relay (option #2 for pins 3&4 on the I/O connector). Polarity is programmable, as well as period, pulse length, and compensation delay. Compensation delay can be useful if you have long cables or slow detection components.

With the Static Relay option for z505 (option #2 on pins 3&4 of the I/O connector):
 - If the polarity is 'positive', the relay is closed during the PPS/TOP pulse (switching time is about 200 μs , and can be compensated using compensation delay),

- If the polarity is 'negative', the relay is opened during the PPS/TOP pulse (switching time is about 8µs).

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	24 hours
	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)	Version P10µs: 10µs Version P1µs: 1µs
	Timestamp drift when synchronisation lost	Less than 1ms/day with constant temperature
	Option: RTC powered by battery	1 millisecond accuracy Autonomy: 6 months
Power supply	Input Voltage	Power-over-Ethernet: compliant with IEEE 802.3af Auxiliary: 8 to 36VDC (without PoE) 12 to 48VDC (with PoE)
	Power Consumption	7W
Interfaces	Auxiliary DC Power Supply	2.54mm header, anti-extraction
	GPS Active Antenna	SMA connector
	Ethernet Link	RJ45, 10/100Mbps + Power
	RS232	SUB-D9, 38400/8/No/1 (default) NMEA or TSIP protocol
	PPS Output (Pulse Per Second)	RS232, or fast static relay output on SUB-D9 or 6-pin I/O connector (3.81mm)
	Alarm Relay	On I/O connector 2A/250V. 2500V isolation
	Event Input(s)	On I/O connector 25V max peak voltage (add R series for more), 2500V isolation, ±100ns accuracy
Environmental	Operating Temperature	-40°C (-40°F)/ +70°C (+158°F)
	Storage Temperature	-40°C (-40°F) / +85°C (+185°F)
	Humidity	90% non-condensing
	Maximum altitude	18,000 m
	Maximum speed	515 m/s
	Dimensions	201 x 95 x 27 (mm)
	Weight	340 grams

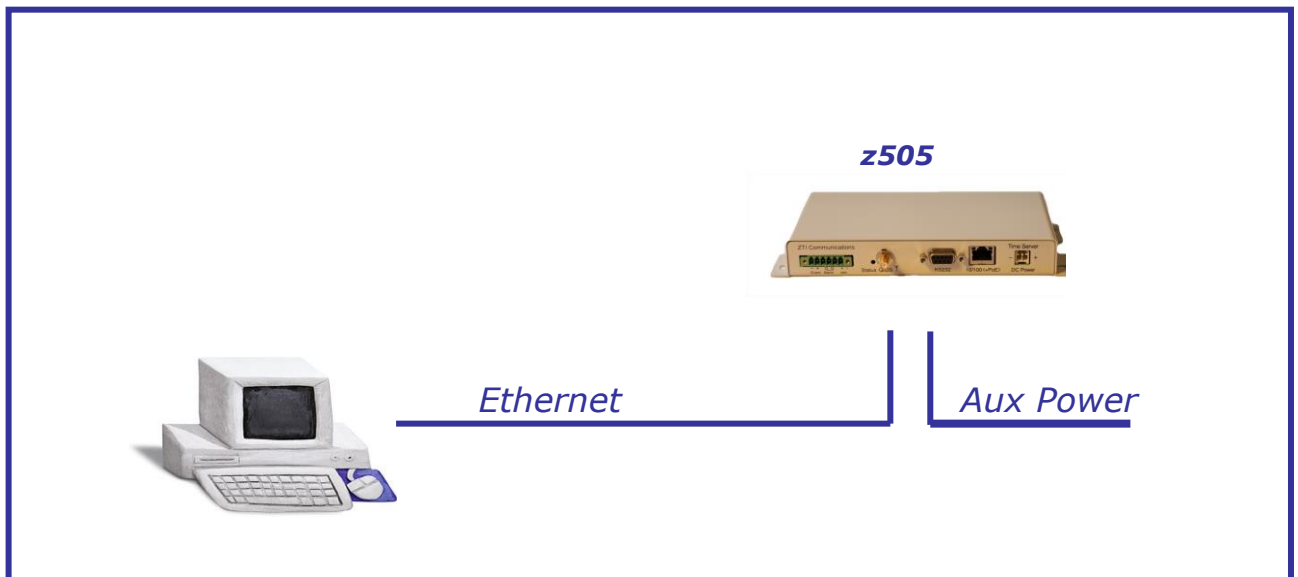
- According to **CE** directive, the z505 unit has passed the following tests:
 - EN55022/55011 class B: conducted and radiated emissions.
 - EN61000-4-2: Immunity to electrostatic discharges.
 - EN61000-4-3: Immunity tests on electromagnetic fields radiated at radio-electrical frequencies, with 10V/m 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).



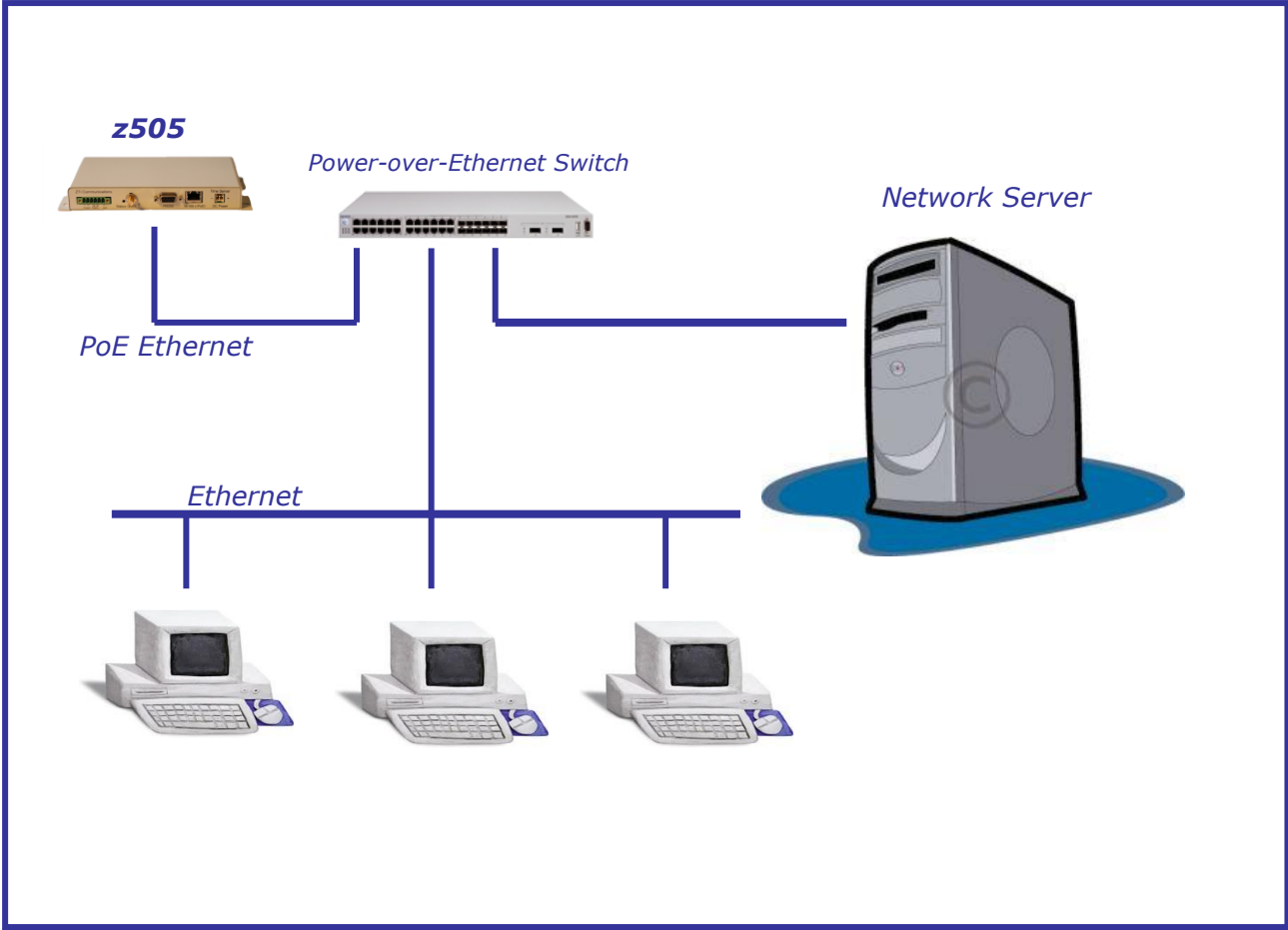
The z505 product is RoHS (lead free) compliant.

Note: the specifications in this document are subject to change without notice.

ZTI Communications is not responsible for the operation or failure of operation of GPS satellites or the availability of GPS satellite signals.



Example of use with direct Ethernet connection and auxiliary power



Example of use with a PoE switch

ORDERING PART NUMBER




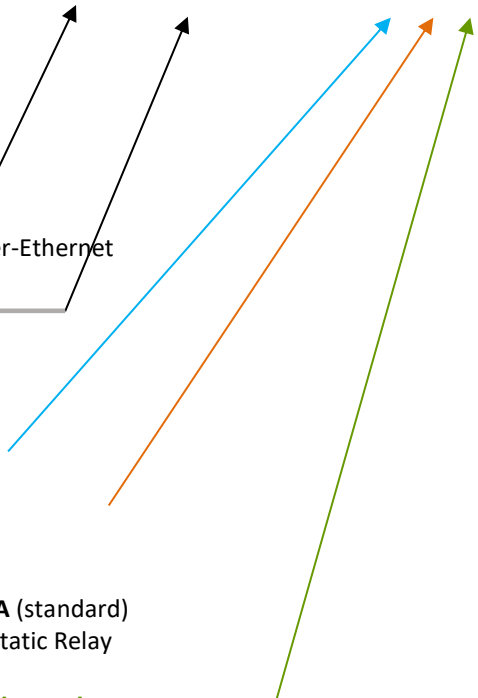
The factory standard part number is:

z505-C / P10 μ s -DC -I/O = 1 1 1

The unit is delivered with a RS232 serial port (RS422 is available on request).
A DIN rail mounting plate is available on request

However, you can request several options as described hereafter.

Options:

- | | | | | | |
|------------------------------------|---|---|---|--|---|
| | | z505-C / P10μs | -DC | - RTC | -I/O = 1 X Y |
| | |  |  |  |  |
| • Timestamp accuracy: | | P10μs (standard)
P1 μ s | | | |
| • Power: | | DC
DC/PoE: DC + Power-over-Ethernet | | | |
| • Fast Start
without satellites | | RTC + Battery | | | |
| • I/O connector: | | | | | |
| | 1 & 2 pins: | | | | |
| | 1 = Event Input #1 (standard) | | | | |
| | 3 & 4 pins options: | | | | |
| | 1 = Alarm Relay 250V/2A (standard) | | | | |
| | 2 = PPS/TOP output on Static Relay | | | | |
| | 5 & 6 pins options: | | | | |
| | 1 = PPS/TOP 3V Output (standard) | | | | |
| | 2 = IRIG B003 Output | | | | |
| | 3 = Event Input #2 | | | | |
| • Antenna connector: | | SMA | | | |
| • Power: | | 8 to 36VDC (version without PoE)
12 to 48VDC (version with PoE) | | | |