z300

High Precision Time Server synchronized by GPS

z300-C (Compact version)

z300-R (Rack version)

Indoor / Outdoor Antenna

High Precision Time Server / GPS Master Clock with PoE and advanced input/output features (Indoor or Outdoor use)

Revision 7

PRESENTATION

ZTI has selected a high precision time server synchronized by GPS with PoE (Power over Ethernet) for indoor or outdoor use, produced by Heol Design to provide accurate timing information for network synchronization and measurement applications.

The z300 time server has been designed to provide accurate timing information trough an Ethernet link, for network synchronisation and measurement applications, without the need to be connected to an external network, hence preserving your network insulation.

Based on a high performance 12 channels GPS chipset (with -155dBm/-185dBw 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 ±200 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 of 100µs/hour.

A **web server** with secure access allows you to configure the z300, and monitor its status at a glance (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.

A **2500V isolated** event input allows you to time-stamp external event with very high accuracy (±40 nanoseconds, refer to UTC atomic clock). The timestamp information is reported by e-mail or broadcast frame.

Alarm relay is available, for driving your external systems in case of failure of the z300.

A highly accurate **pps** (**TOP** signal) signal (**±40ns**) is available on SUB-D9 or 6 pts connector (polarity, period, length, and delay compensation are configurable by user). It is also available with optional 1500V isolated static relay.

In option **IRIG**-B003 and A003 output available in RS422 or TTL level (please contact ZTI 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 z300 without the need for additional cables to provide power.

z300 is available in 2 different **metal housings**, either compact (z300-C) or 19'' rack (z300-R) mounted form factor.
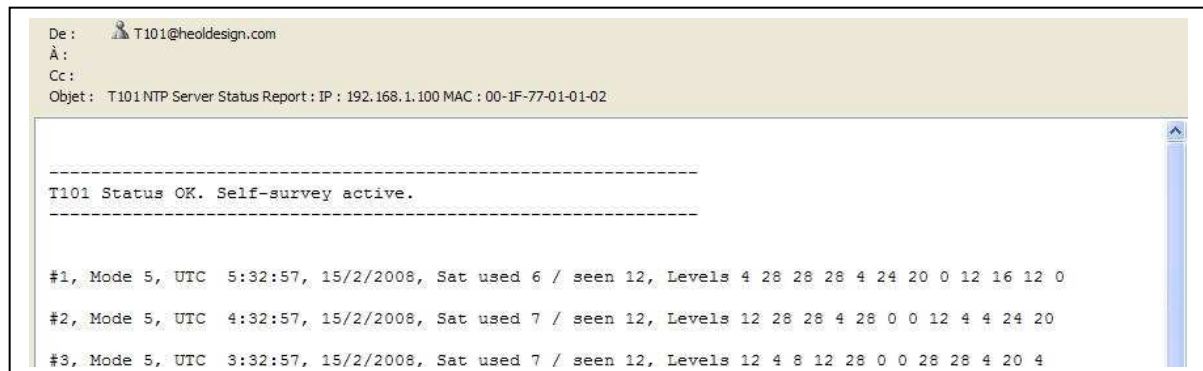The rack unit displays on a LCD module the status and timing information.

Note: the specifications in this document are subject to change without notice.
ZTI is not responsible for the operation or failure of operation of GPS satellites or the availability of GPS satellite signals.

MAIN FEATURES

- Ultra-high sensitivity of **-155dBm/-185dBw**, enabling high performance in obscured, low signal and indoor environments.
- Absolute NTP/SNTP timestamp accuracy better than **10µs** in self-survey mode (static use).
- Time to first timing information output is around **2mn**.
- **SNTP** protocol (RFC2030) for timing information, broadcast or unicast mode (broadcast periodicity is configurable).
- **IPv4** compliant.
- Alarms and periodic status reported through **E-mail.**

```
De :        T101@heoldesign.com
À :
Cc :
Objet :  T101 NTP Server Status Report : IP : 192.168.1.100 MAC : 00-1F-77-01-01-02


-------------------------------------------------------------
T101 Status OK. Self-survey active.
-------------------------------------------------------------


#1, Mode 5, UTC  5:32:57, 15/2/2008, Sat used 6 / seen 12, Levels 4 28 28 28 4 24 20 0 12 16 12 0

#2, Mode 5, UTC  4:32:57, 15/2/2008, Sat used 7 / seen 12, Levels 12 28 28 4 28 0 0 12 4 4 24 20

#3, Mode 5, UTC  3:32:57, 15/2/2008, Sat used 7 / seen 12, Levels 12 4 8 12 28 0 0 28 28 4 20 4
```

- **Opto-isolated input**, for time-stamping external events with **200ns accuracy** (time stamp information reported through E-mail or NTP).
- **Alarm relay** output for driving your external systems.
- Highly accurate **pps** signal (**TOP** signal) (**±40ns**) available on SUB-D9 or 6 pts connector (polarity, period, length, and delay compensation are configurable by user). It is also available with optional 1500V isolated static relay.
- **http** web server for monitoring and configuration :
  - Intuitive bar-graph for easy monitoring status,
  - UTC time and date, with time stamp accuracy indication,
  - NTP server activation and monitoring,
  - Status, alarms, E-mail notifications,
  - WGS84 position,
  - Characteristics of satellites tracked,
  - IP address (DHCP or fix-address), network statistics,
  - PPS and alarm relay outputs settings ,
  - Event input function configuration
  - And more…

  for ease use in **any operating system**.
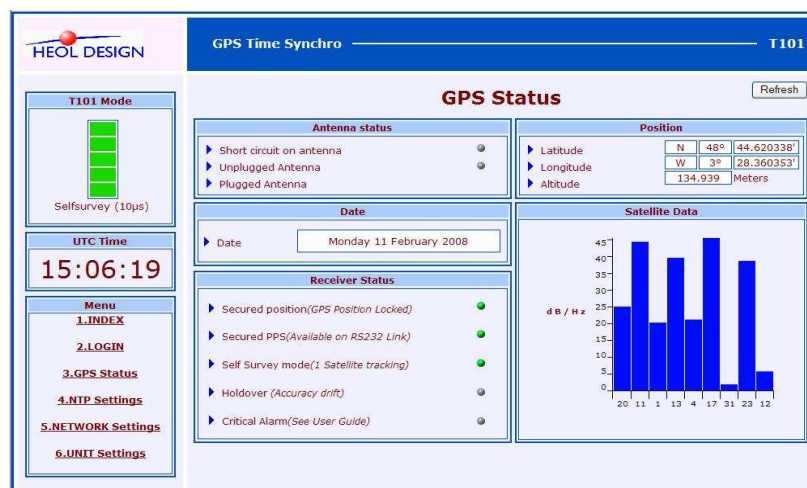
- A RS232 or RS422 serial port can be accessed for remote control and monitoring (with NMEA protocol output; other protocol on request).
- Historic data backed-up to an EEPROM (over 8000 status records).
- Available in 2 different **metal housings**, either compact (z300-C) or 19'' rack mounted form factor (z300-R).
  The rack unit displays on a LCD module the status and timing information.
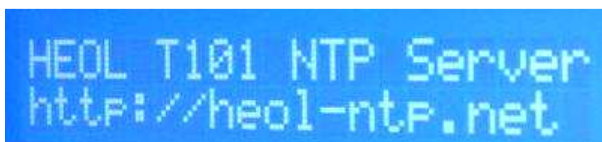
- Power supply through Ethernet (POE) or by:
  - Auxiliary connector DC 12/60 V (z300-C)
  - Power connector AC 110/240 V (z300-R)
- Power-Good and status LEDs on front panel.
- Protection against open or short circuit on the antenna.
- Robust power supply, protected against transients and reverse polarity.

- According to $C\epsilon$ directive, the z300 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 z300 module is RoHS (lead free) compliant.

Specifications

GPS Receiver	Type	12 channels
	Sensitivity	-155 dBm/-185 dBw
	Position Accuracy	<5 meters
	Time Accuracy (PPS)	±40 ns
	Cold start (Time to First Fix)	< 45 seconds (90%)
	Active Antenna Voltage	5V or 3V, configurable
Timing Generator	Timing Ethernet Protocol	SNTP V4, Broadcast/Unicast (100 requests per second maximum)
	Configuration / Monitoring	http server
	Absolute Timestamp Error (refer to UTC time)	±200ns for Rx ('e' version) ±600ns for Tx ('e' version)
	Timestamp drift when synchronisation lost	100µs/hour with +/- 10°C temperature variation.
Power supply	Input Voltage	Power On Ethernet: compliant with IEEE 802.3af. Auxiliary: 12 to 60VDC (z300-C) or 85/250VAC, 110/250VDC (z300-R)
	Power Consumption	4 W (z300-C), 6W (z300-R)
Interfaces	Auxiliary Power Supply	2.54mm header, anti-extraction
	GPS Active Antenna	z300-C: 'SMA' connector z300-R: 'SMA' or 'N' connector
	Ethernet Link	RJ45, 10/100Mbps + POWER
	Remote RS232 / RS422	SUB-D9, 38400/8/No/1
	PPS (Pulse per Second) Output	RS422, RS232, or fast static relay output. on SUB-D9 or 6 pin connector (3.81mm)
	Alarm Relay	2A/250V. 2500V isolation
	Event Input	25V max peak voltage, 2500V isolation, ±40ns accuracy
Environmental	Operating Temperature	-20°C / +70°C
	Storage Temperature	-40°C / +85°C
	Humidity	90% non-condensing
	Dimensions (z300-C)	180 x 90 x 27 (mm)
	Weight (z300-C)	340 grams
	Dimensions (z300-R) - depth with SMA connector - depth with N connector	1U - 482.6 mm (19") 130 mm 150 mm
	Weight (z300-R)	1,85 Kg

MECHANICAL DRAWINGS
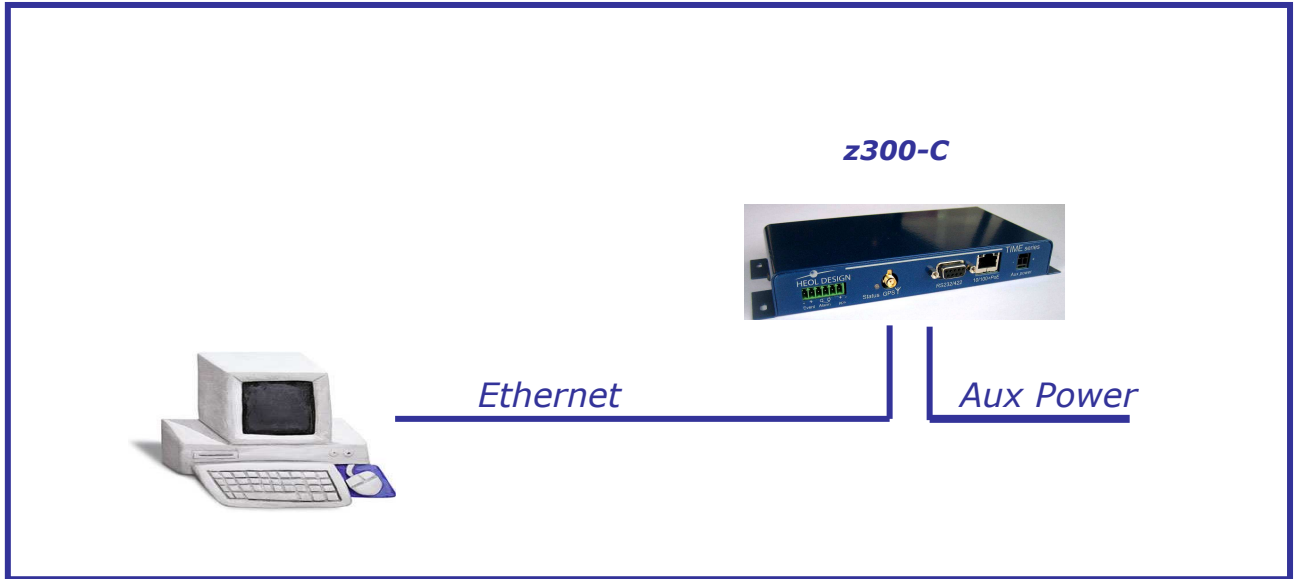
z300C - Compact housing

z300R (Rack housing) - 19U Rack Front view

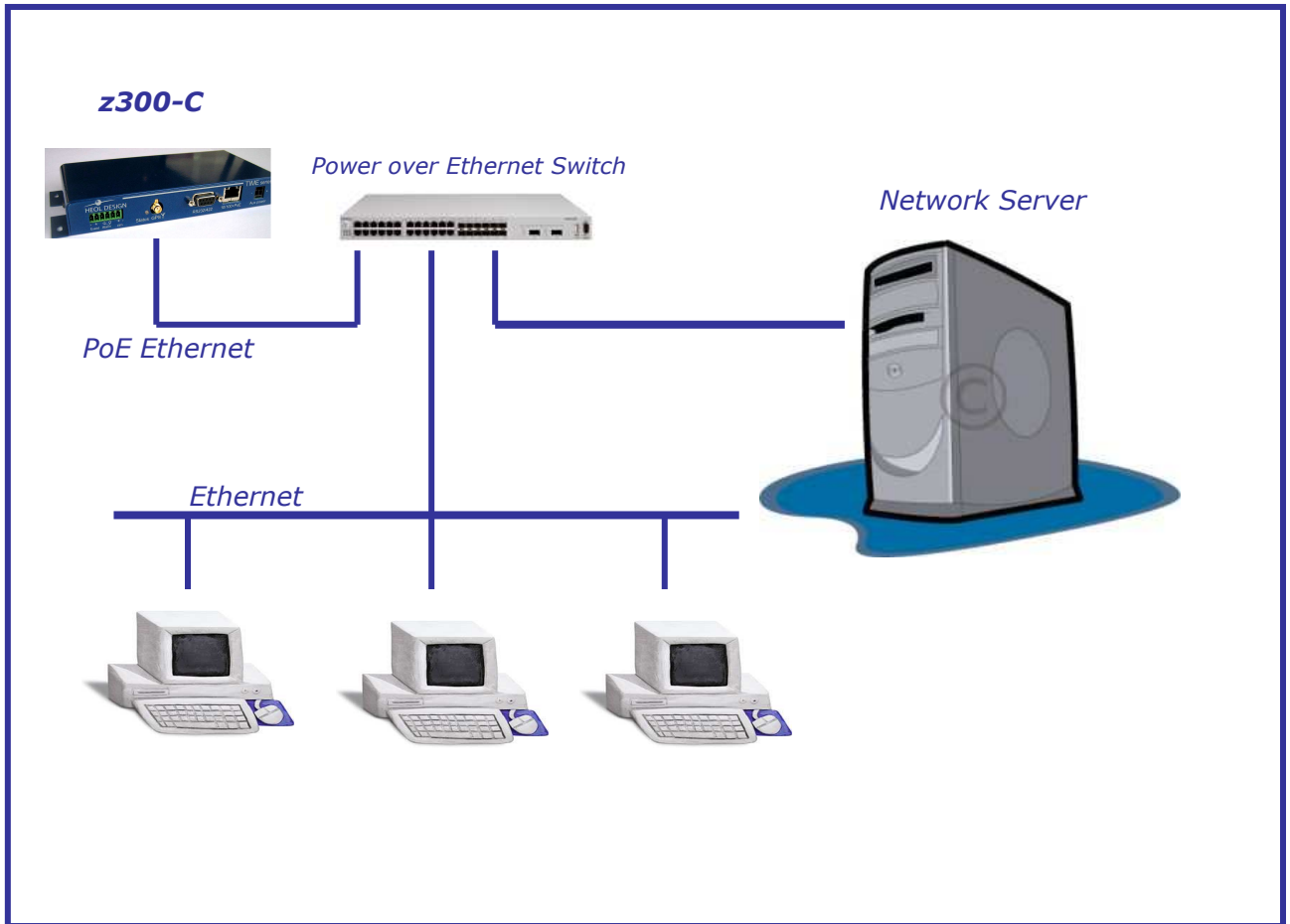### z300R (Rack housing) - 19U Rack Rear view

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 z300C–V2-A-232.
However, you can request several options as described hereafter.

Compact housing: **z300-Ce-V2-A -232-2-S**

- Timestamp accuracy: e: 200/600ns
                                  (blank: 10µs)

- Serial link: 232: RS232 (default)
                              422: RS422

- Power   2: DC 12 to 60 Volts

- PPS/TOP option   S: Static relay on output 3-4

19" Rack housing: **z300-Re-V2-A -232–X-S**

- Timestamp accuracy: e: 200/600ns
                                  (blank: 10µs)

- Antenna connector: A: SMA (default)
                                  N: 'N' plug

- Serial link: 232: RS232 (default)
                              422: RS422

- Power   2: DC 12 to 60 Volts
                              3: AC 110 to 250 volts

- PPS/TOP option   S: Static relay on output 3-4