



zHDI100

Cased GPS High Precision Timing



Indoor / Outdoor Antenna

Revision 1.1

PRESENTATION

ZTI has selected a high precision GPS Time receiver (reference: zHDI100) produced by Heol Design (France) to provide an accurate pps (pulse per second) signal for use in measurement and industrial applications.

This GPS timing module is designed for use in indoor or outdoor static applications, requiring accurate time stamp reference information.

Based on a high performance GPS chip (with -155dBm / -185dBw sensitivity), it delivers accurate pps signal, even in areas of very poor signal level environments (**indoor**, urban canyons and signal obscured environments).

The antenna 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 zHDI100 module can generate very accurate and stable pps signal, even when only 1 satellite is visible and being tracked. If the satellites signals are completely lost, the **hold-over mode** enables the module to keep sending the pps signal, with low drift over time.

There are various forms of GPS based equipment on the market designed for synchronisation, but ZTI has selected a unique GPS receiver platform that allows the direct generation of a GPS steered output frequency and 1pps signal, with the ability of the receiver to maintain GPS lock even in extremely poor signal strength areas. This unique ability allows the GPS antenna used in the system to be sited in far more convenient locations (even inside buildings) with reduced cabling requirements and often the removal of any lightning strike protection.



The zHDI100 module is RoHS
(lead free) compliant.

*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

- Complete 12-channel GPS receiver
- Ultra-high sensitivity of **-155dBm (-185dBw)**, enabling high performance in urban canyon and indoor environments.
- Highly accurate pps (pulse per second signal), **±30ns**.
- Time to First Fix is quicker than **45s**.

- Configuration parameters backed-up to an EEPROM.
- **Antenna voltage:** 3V (standard) or 5V (on request).
- **Protection** against open or short circuit on the antenna.
- Back-up capacitor with an autonomy of **80 hours** for hot start-up after a power cut.
- **Protected power supply** accepting from 7 to 40 V (compliant with automotive standards 12 and 24 V).
- Communication port outlet in **RS232** level (**RS422** level with transient protection upon request). NMEA protocol, with configurable baudrate.
- Compact ruggedized **metal housing**.

The zHDI100 module is designed specifically for GPS synchronisation applications, and will automatically enter a Self Survey mode of operation on power up. The Self Survey mode allows the receiver to continuously calculate its geographic position for a period of 20 minutes (the pps is valid during this period but its accuracy will fluctuate relative to the positional error).

After the 20 minutes self survey period, the zHDI100 module will automatically calculate an average of the geographical position and fix this value in the receiver firmware, which allows the pps to be more accurately controlled, **even when only one satellite is being tracked**.

If no satellite is tracked, the pps is still delivered thanks to **Holdover** mode, with a drift better than 100µs/hour at room temperature.

Another feature of the zHDI100 module is the ability to maintain a positional fix at extremely low GPS signal strengths, and to track satellites down to levels of -155dBm (-185dBw) which equates to signal strengths typically seen deep inside buildings. This means that the antenna does not need to be located externally, up a mast or on the rooftop as is the norm. This considerably reduces the cost and complexity of deployment in terms of antenna cabling and the need for lightning strike protection and significantly reduces the costs associated with maintenance.

CONNECTION

- For the power supply, automobile type locking connector.
- For the aerial, SMB type.
- For the communication and pps signal, one female DB9 (PORT 1):

Pin DB9	Function
1	NC
2	Rx
3	Tx
4	NC
5	GND
6	NC
7	NC
8	PPS (RS232 level)
9	NC
Shield	GND

SUMMARY OF THE CHARACTERISTICS**Performances**

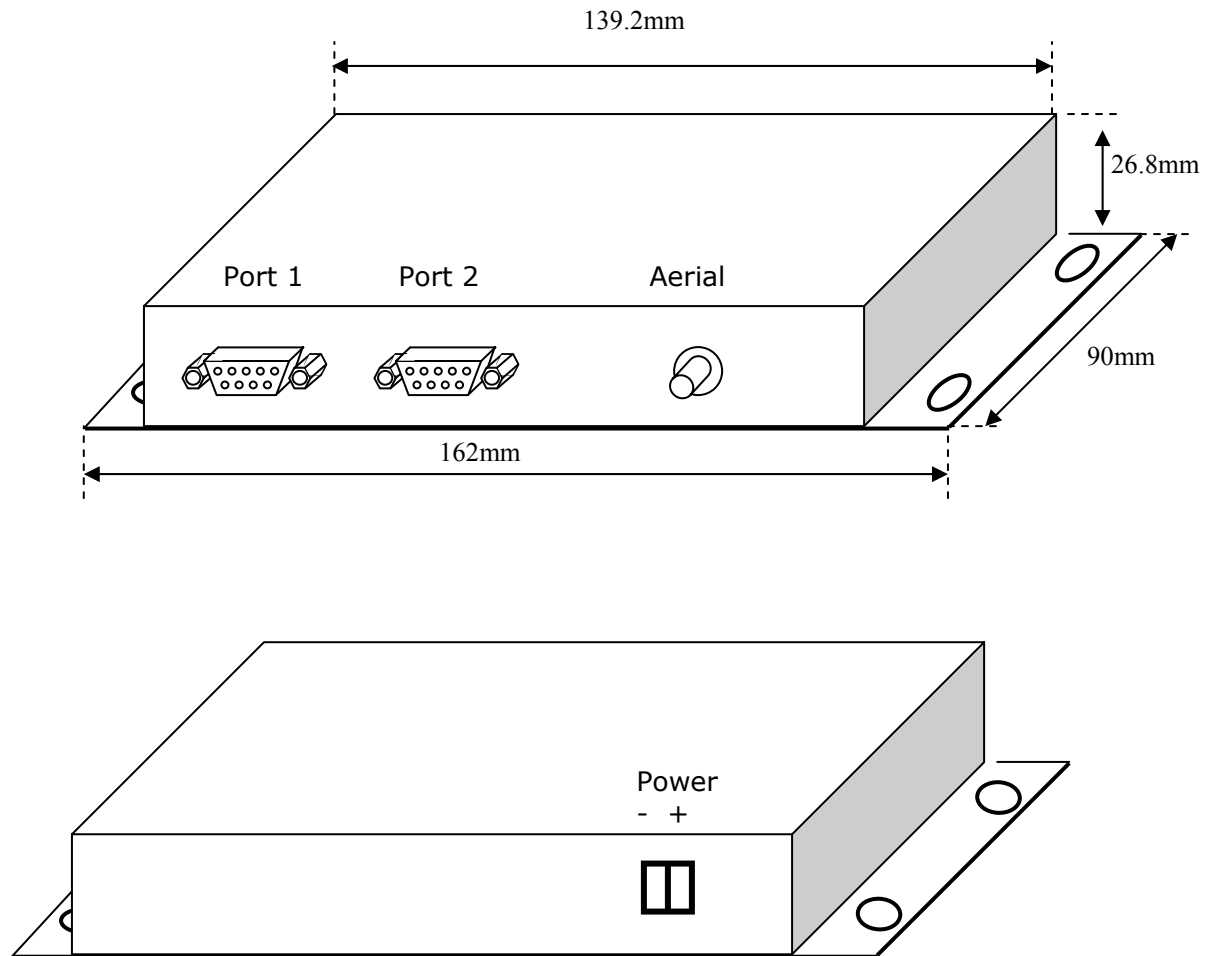
Receiver	12 channels
Update speed	1Hz
Accuracy	Horizontal <5 meters (outdoor),50 meters (indoor)
	Time (pps) ± 30 ns
Initial acquisition time	Cold (Time to First Fix) < 45 seconds (90%)*
	Warm start < 38 seconds (90%)*
	Hot start < 5 seconds (90%)*
Reacquisition signal after signal lost	< 0.5 seconds (typical)*
Altitude	< 18 000 m
Speed	< 515 m/sec maximum
Acceleration	4 g (39,2m/sec ²)

* Aerial field cleared

Environmental characteristics

Power supply	7 to 40 Volts / 2.4 Watts
Operating Temperature	-40/+75 °C
Storage Temperature	-55/+105°C
Overall dimensions	162x98x26mm
Weight	450 grams

Physical characteristics



Factory settings of the serial port

The communication PORT1 is set in standard as follows:

NMEA protocol, 38400 Baud, 8 bits, no parity, 1 stop bit.

Baudrate can be modified by the user, in the range 1,200 Baud / 230,400 Baud.

Note: PORT2 = No connect / reserved for future use.

Ordering part number

The factory standard part number is zHDI100.

EMC compatibility

The zHDI100 module has successfully completed compliance testing against the following standards listed below (in accordance with the **CE** directive):

- EN55022 class B (conducted and radiated emissions) dated January 1999, with 10dB margin.
- EN61000-4-3 published in 2002: "Immunity tests on electromagnetic fields radiated at radio-electrical frequencies", with 10V/m electromagnetic field.
- EN61000-4-6 published in February 1997: "Immunity tests on conducted interference, induced by radio-electrical fields".
- EN61000-4-4 (Immunity to rapid transients) dated June 1995, with 2kV transients.
- EN61000-4-2 (Immunity to electrostatic discharges) dated June 1995.

For Information:

The EN61000-4-3 standard is identical to the CEI 1000-4-3 standard and replaces ENV50140.

The EN61000-4-3 standard (see note A) is mentioned in the EN50082-generic standard for electrical and electronic equipment designed for use in industrial environments.

The NF EN61000-4-6 standard is identical to the CEI 1000-4-6 standard and replaces ENV50141. The EN61000-4-6 standard (see note B) is mentioned in the EN50082-2 generic standard for electrical and electronic equipment designed for use in industrial environments.