GPS10e: GPS Disciplined Frequency Standard

**Key Features**

- 10 MHz Sine & Square Outputs
- 1 pps Output aligned to UTC
- All outputs locked to GPS Satellites
- Accuracy to parts in $10^{-12}$ (1 week)
- Never needs calibration
- Supplied with AC Power Supply

- Low Price and High Quality Construction
- Optional rack mount case with 5 or 10 extra outputs with built-in distribution amplifier
- RS232 port with NMEA-0183 output
- Many Options Available
- Supplied with GPS Antenna and 5m of cable.

**General Description**

The GPS10e is a low cost 10 MHz, GPS disciplined, frequency standard. The above picture shows the bench mount version, but a 19” rack mount case is also available. The GPS10e uses the Global Positioning Service (GPS) set of satellites to discipline a TXCO or OXCO crystal oscillator. Long-term frequency accuracy of parts in $10^{-12}$ is achieved.

**Applications**

- Calibration of Frequency Counters and other test equipment
- Frequency Reference for DTV, DAB, VHF, UHF, CDMA, Tetra etc
- Production frequency reference
- Network Time Protocol in Banks, Financial companies, utilities, 2 way radio workshops, TV studios.

**Outputs**

There is a 10 MHz, sinewave output, a 10 MHz CMOS squarewave output and a 1 pps (pulse per second) output. The 1 pps output is aligned to UTC time within ± 30 ns (typical). Options to increase the outputs to 10 are available.
**RS232 and USB Interface**

A RS232 interface allows interrogation of the GPS10e. Optional USB or Ethernet converters are available. Software is available to display the GPS receiver’s status. The GPS10e outputs the NMEA-0183 protocol.

**External Locking**

The GPS10e can either lock to the GPS satellite system, an external 10 MHz signal or an external 1 pps signal. A mode switch selects what locking method to use. A “Multi” mode allows the GPS10e to automatically lock to any of the external references signals, selecting the GPS signal first, then if that’s not available the external 10 MHz, then if that’s not available, the external 1 pps signal.

**Options**

- Antenna Amplifier allowing the GPS antenna to be placed up to 350 m away from the GPS10e.
- 19” Rack mount case with five or ten fully isolated sinewave or squarewave outputs.
- Fixed or variables frequency outputs, up to 10 GHz. E.g. 0 – 1640 MHz in 0.01 Hz steps.
- USB Interfaces, Ethernet Interface and Alarm Relay Output.
- Redundancy. Two units operate together with automatic switchover if one unit fails.
- Higher stability oscillators. TXCO is standard. OXCO or rubidium is optional.

**Software**

Free window software is available to continuously monitor the GPS10e. A screen print-out of the software is shown below.
# GPS 10e Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outputs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sinewave Output Frequency</td>
<td>10 MHz</td>
<td>Other frequencies optionally available</td>
</tr>
<tr>
<td>Squarewave Output Frequency 1</td>
<td>10 MHz</td>
<td>Other frequencies optionally available</td>
</tr>
<tr>
<td>Squarewave Output Frequency 2</td>
<td>1 pps</td>
<td>Aligned to UTC time ± 30 ns</td>
</tr>
<tr>
<td>Observation Time 1 seconds</td>
<td>≤ 2.5 x 10⁻¹⁰ / ≤ 5 x 10⁻¹¹</td>
<td>GPS10E in full lock for &gt; 1 week. &gt; 3 satellites in view. Ambient temperature 0 °C to +40 °C. Temperature change less than 1 °C per hour</td>
</tr>
<tr>
<td>Observation Time 10 seconds</td>
<td>≤ 6 x 10⁻¹¹ / ≤ 3 x 10⁻¹¹</td>
<td></td>
</tr>
<tr>
<td>Observation Time 100 seconds</td>
<td>≤ 2 x 10⁻¹¹ / ≤ 1 x 10⁻¹¹</td>
<td></td>
</tr>
<tr>
<td>Observation Time 1 week</td>
<td>≤ 1 x 10⁻¹² / ≤ 1 x 10⁻¹²</td>
<td></td>
</tr>
</tbody>
</table>

**Allan Deviation when locked to GPS Satellites (typical TXCO / OXCO)**

- Observation Time 1 seconds: ≤ 2.5 x 10⁻¹⁰ / ≤ 5 x 10⁻¹¹
- Observation Time 10 seconds: ≤ 6 x 10⁻¹¹ / ≤ 3 x 10⁻¹¹
- Observation Time 100 seconds: ≤ 2 x 10⁻¹¹ / ≤ 1 x 10⁻¹¹
- Observation Time 1 week: ≤ 1 x 10⁻¹² / ≤ 1 x 10⁻¹²

**Output Drift when GPS10E NOT Locked to GPS Satellites (Holdover TXCO / OXCO)**

- Drift due to aging: ≤ 5 x 10⁻⁷ per day / ≤ 2 x 10⁻⁹ per day
- Drift due to temperature: ≤ 5 x 10⁻⁷ / ≤ 2 x 10⁻⁸

**GPS Receiver**

- Number of Channels / Frequency: 12 parallel @ 1575.42 MHz
- Acquisition Time / Positioning Accuracy: < 50 s typical / < 25 m
- Jamming Immunity: -70 dBm @ 1575.42 MHz
- Antenna: Active micro strip patch
- Datum: WGS-84
- Operating Temperature: 0 °C to +50 °C
- Storage Temperature: -20 °C to +60°C
- Power Inlet: 9 - 12 VDC
- Interface: RS232 @ 38400 baud
- Dimensions (bench case): 162 mm wide x 162 mm deep x 44 mm high
- Dimensions (rack mount version): 483 mm wide x 300 mm deep x 44 mm high
- Supplied Accessories: Antenna, AC Power Adapter, Manual
- Simultaneous operation. L1 Frequency With current position / time data. No SA Measured at active antenna input Powered by GPS10e. Waterproof
- NMEA-0183 output message
- AC Power Adapter also supplied
- Battery backup optionally available

**Miscellaneous**

- Option 01 / 01B / 01C: 19” Rack Mount Case with 5 or 10 outputs
- Option 03: Redundancy
- Option 04: Upgrade oscillator from TXCO to OXCO
- Option 05: LCD Display and switchboard.
- Option 09A / Option 09B: IRIG-B Output / IRIG-B Input
- Option 38: NTP Server
- Needs 19” Rack Mount Case
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- Needs 19” Rack Mount Case

Consult Precision Test Systems for further details of other options. Not all options can be fitted at the same time.

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Full specifications available from www.ptsyst.com. Specifications and features subject to change without notice (131016)