GPS-500

10 MHz OCXO-based GPS Disciplined Oscillator

Key Features

- Specially designed for cost-sensitive LTE applications

- High-performance GPS receiver

- Small footprint and low profile: only 1.6" x 1.9" x 0.63"

- Extended temperature range of -40°C to +85°C

- Holdover stability of <±10µs over 24hrs @+25.0°C (no motion or airflow, 3+ days with GPS)

- 1 PPS output accuracy of ±35 ns to UTC RMS (1-sigma), GPS-locked

Applications

- Unmanned Aerial Vehicles (UAV's)

- Tactical radios

- Underwater systems using GPS for initialization

- LTE

The Symmetricom® GPS-500 is 10 MHz OCXO-based GPS Disciplined Oscillator (GPSDO), which features a very small footprint and low profile (1.6" x 1.9" x 0.63") and an extended operating temperature range (-40°C to +85°C) in a design aimed at cost-sensitive LTE applications. The GPS-500 has a high-performance GPS receiver that can track up to 50 GPS signals, down to levels as low as -158 dBm. The receiver is compatible with GPS, WAAS, EGNOS, and MSAS signals, and is Galileo-ready.

The GPS-500 command set is compatible with Symmetricom's GPS-2000 series of GPSDO's. Additionally, the unit can also be monitored and controlled through an RS-232 port via standard SCPI commands, and it can also generate NMEA-0183 output sentences for easy integration into existing system architectures.

The GPS-500 has two outputs. The first is a 1 PPS LVDS output with ±35 ns accuracy to UTC RMS (1-sigma), once GPS-lock has been achieved. The second is 10 MHz LVDS output, with a low phase noise floor of -155 dBc.

Holdover stability is <±10us over 24hrs @+25.0°C, once the unit has been locked to GPS for 3+ days. Steady-state power consumption is <2.4W at +25°C. The unit can be soldered into a PC board as a through-hole component, or it can be mounted in a socket.

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Specifications

ELECTRICAL SPECIFICATIONS

MODULE SPECIFICATIONS:

1 PPS Accuracy	LVDS level, ±35ns to UTC RMS (1-sigma) GPS locked
Holdover Stability	±15µs over 24hrs @+25.0°C (no motion or airflow, 5+ days with GPS)
RS-232 Control	Full control via SCPI-99 control commands, NMEA-0183
GPS Frequency	L1, C/A 1574MHz
GPS Antenna	Passive or active 5V
GPS Receiver	50 channels, mobile, SBAS WAAS, EGNOS, MSAS capable
Sensitivity	Acquisition –142 dBm Tracking -158 dBm
GPS TTFF	Cold start – <45 sec Warm start – 1 sec Hot start – 1 sec
ADEV	1Ks <1E-10, 10Ks <8E-12 (GPS locked, 25°C, no motion)
TTL Alarm Output	GPS lock and event indicator
Warm Up Time / Stabilization Time	<9 min to 5.0E-9 accuracy at +25°C, no airflow
Supply Voltage (Vdd)	12V ±5%
Power Consumption	<2.4W steady state, <8W warmup
Operating Temperature	-40°C to +85°C
Storage Temperature	-45°C to +85°C
Output Signal Levels	10MHz LVDS, 1PPS LVDS, CMOS option, secondary 10MHz output option

OSCILLATOR SPECIFICATION (OCXO):

Frequency Output	10MHz CMOS
10MHz Retrace	±2E-08 after 1 hour @ +25°C (no GPS)
Frequency Stability	±5E-09 (no GPS)
24-hr Frequency Stability	<1.0E-12 (with GPS, no airflow)
Output Amplitude	LVDS, or CMOS option
Oscillator Heater Warm Up Time	< 3 min @ +25°C
Oscillator Options	DOCXO with SC-cut crystal option

PHASE NOISE

1Hz	-90dBc/Hz
10Hz	-120dBc/Hz
100Hz	-140dBc/Hz
1kHz	-150dBc/Hz
10kHz	-155dBc/Hz
100KHz	-155dBc/Hz
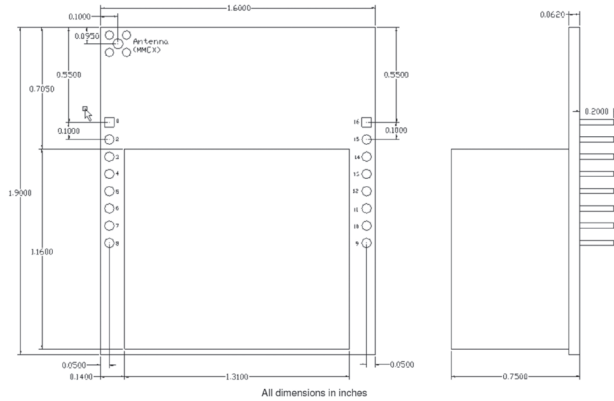
Figure caption To Go here.

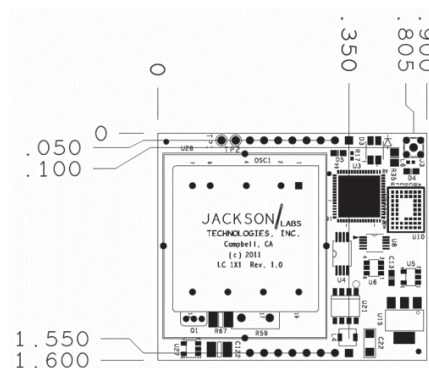| PIN #	FUNCTION	DESCRIPTION
1	LOCK_OK	3.3V CMOS event indicator (no event == 3.3V)
2	GND	GND
3	–1PPS LVDS	LVDS level 1PPS output – negative trace, terminate via 100Ohms to +1PPS LVDS
4	+1PPS LVDS	LVDS level 1PPS output – positive trace or CMOS 1PPS output option
5	GND	GND
6	–10MHz LVDS	LVDS 10MHz output – negative trace, terminate via 100Ohms to +10MHz LVDS
7	+10MHz LVDS	LVDS level 10MHz output – positive trace or CMOS 10MHz output option
8	GND	GND
9	GND	GND
10	TX RS-232	RS-232 level command and control interface transmit trace
11	RX RS-232	RS-232 level command and control interface receive trace
12	ENTER_ISP#	Pull to GND during power-on to enter software update mode. Internally pulled up to 3.3V via 4.7K Ohm resistor. Use open collector to drive this pin
13	1PPS_IN	TTL or CMOS level external 1PPS reference input rising edge aligned. Internally pulled down to GND via 4.7K Ohm resistor
14	GND	GND
15	+12V	+12V Power, +/-5%, <0.6A max during warmup

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