Lassen PT GPS Timing Module

Low-power, micro-sized GPS solution for timing applications

Key Features and Benefits

- **1 PPS output synchronized to UTC within 40 ns**

- **100 mW @ 3.3 V**

- **26 x 26 x 6.4 mm**

- **TSIP and NMEA 0183 protocols**

- **Flash memory**

The very first timing receiver to use the latest Trimble FirstGPS architecture is the small, low cost, 3.3Vdc, Lassen PT embedded timing module. It adds precise GPS or UTC time and synchronization to timing applications. The accuracy available now will provide for both your current needs with expansion for future requirements. The Lassen PT uses the same field proven hardware construction as the extremely reliable Lassen SQ (PVT module) but with many more software features added to enhance timing performance and accuracy. This modular design also allows for both reduced integration time and low implementation risk.

FirstGPS Architecture/Hardware

The FirstGPS architecture provides a low cost, high reliability module with timing synchronized to UTC within 40ns (one sigma). The Lassen PT module's tiny form factor (26mm X 26mm X 6.4mm) includes a metal shield, and can easily fit into your application. This highly integrated module contains the Trimble Colossus RF ASIC and an IO/C33 DSP/CPU with flash memory.
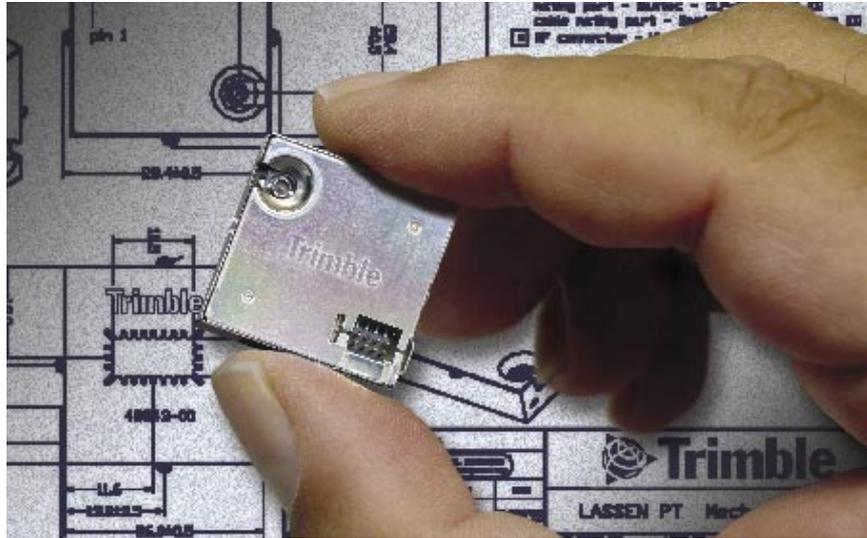
Approximate actual size of the Lassen PT GPS Timing Module

Network Security

The Lassen PT implementation can be made completely inside the network firewall which allows for a completely independent, traceable, dependable, GPS timing and synchronization source for the ultimate in network security (no Internet connection required). The low cost, yet high accuracy and reliability of this receiver will allow the integrator to put timing and synchronization into many products where cost or size had previously been a limitation.

Starter Kit

Evaluation of the Lassen PT is easy with the Starter Kit, which includes everything you need to get started. It includes an active, external 3.3Vdc Bullet antenna, 75 feet of RG-6 cable (TNC-TNC), TNC to SMA adapter, AC/DC power adapter, a starter kit enclosure including a mother board that provides serial output, and a serial interface cable. Reference manual and monitor programs are provided on CD-ROM.

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Key Timing Features

- Automatic Self-survey insures an accurate reference position for precise timing accuracy.
- Overdetermined Timing Mode which is used only in stationary timing applications after completion of Self Survey. In this mode, the Lassen PT does not navigate or update positions or velocities but maintains the PPS output, solving only for the receiver clock error (bias) and error rate (bias rate) providing an extremely accurate solution.
- Cable delay calibration allows the user to compensate for the time delay caused by the cable between the antenna and the receiver.
- TSIP Timing Superpackets provide comprehensive timing output information in Trimble Standard Interface Protocol which enables the user to streamline their software development and implementation
- TRAIM – (Timing Receiver Autonomous Integrity Monitoring) assures high PPS integrity by eliminating erroneous measurements while the receiver is in the Overdetermined Timing Mode.

PHYSICAL CHARACTERISTICS

Enclosure:	Metal enclosure with solder mounting tabs
Outside Dimension:	26 mm W x 26 mm L x 6.4 mm H (1.02" W x 1.02" L x 0.25" H)
Weight:	Approximately 5.7 grams (0.2 Ounce) including the shield

INTERFACE CHARACTERISTICS

Connectors:

	I/O:	8-pin (2x4) Male Header, Micro Terminal Strip FTS-103-02-F-DV
	RF:	Low-Profile Coaxial Connector H.FL-R-SMT(10), 50 Ohm
Serial Port:		1 serial Port (transmit/receive)
PPS:		3.3 V CMOS compatible TTL level pulse Once per second with the rising edge of the pulse synchronized with UTC
Protocols:		TSIP @ 9600 baud, 8 Bits NMEA 0183 v3.0 @ 4800 baud, 8 Bits
NMEA Messages:		GGA, VTG, GLL, ZDA, GSA, GSV and RMC Messages selectable by TSIP command; Selection stored in flash memory

PERFORMANCE SPECIFICATIONS

General:	L1 (1575.42 MHz) Frequency, C/A Code, 8-channel, continuous tracking receiver, 32 correlators
Update Rate:	TSIP @ 1 Hz; NMEA @ 1 HZ

Accuracy:

Horizontal Position:	< 6 meters (50%), < 9 meters (90%)
Altitude Position:	< 11 meters (50%), < 18 meters (90%)
Velocity:	0.06 m/sec
PPS:	within 40 ns to UTC (1 Sigma)

Acquisition:	Reacquisition: < 2 sec. (90%) Hot Start: < 14 sec (50%), < 18 sec (90%) Warm Start: < 38 sec (50%), < 45 sec (90%) Cold Start: < 90 sec (50%), < 170 sec (90%) Cold start requires no initialization. Warm start implies last position, time and almanac are saved by backup power. Hot start implies ephemeris also saved.
Sensitivity:	-130 dBm
Dynamics:	Acceleration: 4g (39.2 m/sec2) Motional Jerk: 20 m/sec3
Operational Limits:	Altitude < 18000m or velocity < 515m/s (COCOM Limit) Either limit may be exceeded but not both

ELECTRICAL CHARACTERISTICS

Prime Power:	+3.0 VDC – 3.6 VDC (Typ. 3.3 V)
Power Consumption:	GPS board only: 100 mW @ 3.3 V
Backup Power:	+2.5.VDC to +3.6VDC
Ripple Noise:	Max 60 mV, peak to peak from 1Hz to 1MHz
Antenna Fault Protection:	Short-circuit detection and protection

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature:	-40 °C to + 85 °C
Storage Temperature:	-55 °C to + 105 °C
Vibration:	0.008 g2/Hz 5Hz to 20 Hz 0.05 g2/Hz 20Hz to 100 Hz -3 dB/octave 100Hz to 900 Hz
Operating Humidity:	5% to 95% R.H. non-condensing, +60C
Altitude:	-400 to 18000 m max

ACCESSORIES

Rooftop Antenna:	Bullet III, TNC (F) 3.3Vdc with 30dBi gain.
Antenna Cable:	75 feet of RG6 with TNC - TNC
Adapter:	TNC-SMA
Transition cable:	RF transition cable for connecting the RF module with External cable (H.FL to bulkhead SMA). Cable Length: 5.1 inches

FOR MORE INFORMATION

- E-mail us at: timing@trimble.com
- Visit our website at http://www.trimble.com/timing

Specifications subject to change without notice

* All GPS receivers are subject to degradation of position and velocity accuracies under Department of Defense imposed Selective Availability (S/A)