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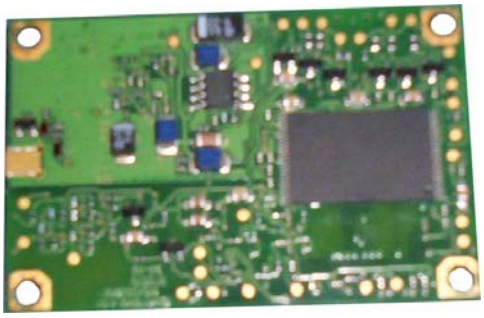
# M12M TIMING ONCORE™ RECEIVER

## Preliminary Specification



12 Channel simultaneous operation
Fully calibrated to UTC at USNO
Performance using clock granularity message
< 2nS 1 Sigma average
< 6nS 6 Sigma average
Performance not using clock granularity message
< 10nS 1 Sigma average
< 20nS 6 Sigma average
155mW Power consumption

M12M Timing Oncore™ Receiver is a 12 channel precise GPS timing module that gives you up to nano seconds accuracy of time synchronization. Features included precise, programmable, one-pulse-per-second (1PPS) or 100 pulse-per-second (100PPS) outputs. Built with cost effective in mind, you can equip your stationary applications with precise GPS or UTC time synchronization at an affordable cost. M12M Timing also incorporates the Timing RAIM (Receiver autonomous integrity monitoring) algorithm to ensure validity and reliable GPS measurements.

Design to work in tough conditions, M12M undergoes various drop and temperature test before rolling out into the market.

## Accurate Timing

Extensive testing of M12M Timing Oncore™, ensures a high level of performance accuracy of 2 nano seconds.

## Automatic Site Survey mode

Averages a total of 10,000 valid 2D and 3D position fixes to determine precise position, simplifies system installation for static timing applications.

## Fast timing update

Using position-hold Modes, M12M enables fast time resolution rather than positioning update.

## RF Jamming Immunity

Provide up to 10dBm of immunity, utilizing the Adaptive Tracking Loops algorithm built in the firmware.

## Clock granularity message

Utilizing M12M Timing Oncore™'s clock granularity software output, 1 PPS output can be resolved within only 2 nano seconds of UTC time immediately, reducing noise and accelerating host clock disciplining process.

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## Technical Specifications

| | | |
|---|---|---|
| **General Characteristics** | Receiver Architecture | 12 parallel channel<br>L1 1575.42 MHz<br>C/A code (1.023 MHz chip rate)<br>Code plus carrier tracking (carrier aided tracking) |
| | Tracking Capability | 12 simultaneous satellite vehicles |
| **Performance Characteristics** | Dynamics | Velocity: 1000 knots (515 m/s) > 1000 knots (515 m/s); at altitudes < 60,000 ft.(18000m)<br>Acceleration: 4g<br>Jerk: 5 $m/s^3$<br>Vibration: 7.7g per Military Standard 810E |
| | Acquisition Time<br>(Time To First Fix, TTFF)<br><br>(Tested at –40ºC to +85ºC) | < 15 s typical TTFF-hot (with current almanac, position, time and ephemeris)<br>< 40 s typical TTFF-warm (with current almanac, position, time)<br>< 150 s typical TTFF-cold (No stored information)<br>< 1.0 s internal reacquisition (typical) |
| | Positioning Accuracy | < 5 m, 1-sigma<br>< 10 m, 2-sigma |
| | Timing Accuracy<br>1 Pulse Per Second (PPS), or 100 PPS | Performance using clock granularity message:<br>< 2 ns, 1-sigma<br>< 6 ns, 6-sigma<br>Performance not using clock granularity message:<br>< 10 ns, 1-sigma<br>< 20 ns, 6-sigma |
| | Datum | WGS-84 default<br>One user definable datum |
| **Antenna** | Antenna Requirements | Active antenna module powered by receiver module (80mA max)<br>10dB to 50dB external antenna gain measured at receiver input<br>3 Vdc or 5 Vdc antenna power provided via header connector |
| **Serial Communication** | Output Messages | Latitude, longitude, height, velocity, heading, time<br>Motorola binary protocol at 9600 baud<br>NMEA 0183 (GGA, GLL, GSA, GSV, RMC, VTG, ZDA)<br>Software selectable output rate (continuous or poll)<br>TTL interface (0 to 3 V) |
| **Electrical Characteristics** | Power Requirements | 2.8 Vdc to 3.3 Vdc; 50 mVp-p ripple (max) |
| | "Keep-Alive" BATT Power | External 2.2 Vdc to 3.2 Vdc, 5 uA typical @ 2.7 Vdc @ 25ºC |
| | Power Consumption | 155 mW @ 3 V without antenna |
| **Physical Characteristics** | Dimensions | 40.0 x 60.0 x 13.0 mm (1.57 x 2.36 x 0.53 in.) |
| | Weight | Receiver 12.5 g |
| | Connectors | Data/power: 10 pin (2x5) unshrouded header on 0.050 in. centers (straight configuration)<br>RF: right angle MMCX |
| | Antenna to Receiver Interconnection | Single coaxial cable (with power on center conductor to support active antenna)<br>Antenna sense circuit |
| **Environmental Characteristics** | Operating Temperature | -40ºC to +85ºC |
| | Storage Temperature | -40ºC to +105ºC |
| | Humidity | 95% over dry bulb range of +38ºC to +85ºC |
| | Altitude | 18,000 m (60,000 ft.) maximum<br>> 18,000 m (60,000 ft.) for velocities<br>< 515 m/s (1000 knots) |
| **Miscellaneous** | Standard Features | Position hold with automatic site survey<br>Clock granularity error message<br>T-RAIM (Timing Receiver Autonomous Integrity Monitoring) |
| | Optional Features | Lithium battery backup |

Additional Information is available at www.ilotus.com.sg or by contacting i-lotus at the following:

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