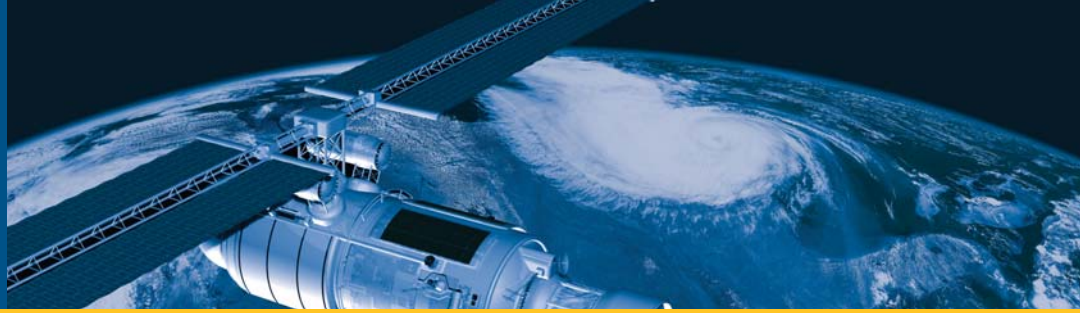
The right one.™



THUNDERBOLT E GPS DISCIPLINED CLOCK

KEY FEATURES

- Double-ovenized quartz oscillator provides stable 10 MHz and 1 PPS output to maximize bandwidth
- Combined GPS receiver and 10 MHz oscillator on one board
- High volume manufacturing provides reliable low-cost products
- Meets holdover specifications of 8 µs over 24 hours

PRECISE GPS CLOCK FOR WIRELESS INFRASTRUCTURE

The Trimble® Thunderbolt® E GPS Disciplined Clock is Trimble's latest offering for GPS synchronization devices targeting the wireless infrastructure. This fifth-generation GPS clock combines a 12-channel GPS receiver, control circuitry, and a high-quality double-ovenized oscillator on a single board, providing increased integrity and reliability at a lower size and cost.

The Thunderbolt E's level of integration makes it a perfect solution for precise timing applications in the wireless industry. Among its uses are synchronizing the E911 positioning infrastructure, and providing precise time and frequency for WiMax and LTE-TDD applications, along with digital broadcast applications.

The architecture is comparable to systems currently used to maintain the tough CDMA, WiMax, and LTE-TDD holdover specification. The Thunderbolt E is available in its enclosure, or as an OEM board.

The Thunderbolt E GPS clock outputs a 10 MHz reference signal and a 1 PPS signal with an over-determined solution synchronized to GPS or UTC time. The PPS output accommodates applications requiring sub-microsecond timing.

The Trimble T-RAIM (Time-Receiver Autonomous Integrity Monitor) algorithm is used to monitor satellites to ensure signal integrity.

Matching the Thunderbolt E GPS Clock with the Trimble Bullet™ antenna creates a system that provides reliable performance in hostile R/F environments. The system can be easily calibrated for different cable lengths.

The high level of integration and volume production techniques make the Thunderbolt E GPS Disciplined Clock an extremely cost-competitive timing solution for volume synchronization applications.

Trimble

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THUNDERBOLT E GPS DISCIPLINED CLOCK

PERFORMANCE SPECIFICATIONS

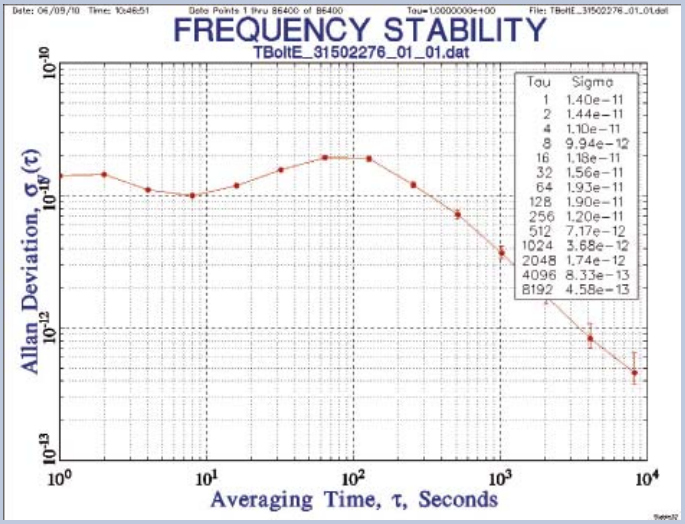
General . . . . . L1 frequency, CA/code (SPS), 12-channel continuous tracking receiver

Update rate . . . . . 1 Hz

PPS accuracy . . . . . UTC 15 nanoseconds (one sigma)

10 MHz accuracy . . . . . 1.16×10^{-12} (one day average)

10 MHz stability . . . . . See graph below



Harmonic level . . . . . –40 dBc/Hz max

Spurious . . . . . –70 dBc/Hz max

Phase noise . . . . . 10 Hz –115 dBc/Hz

100 Hz –130 dBc/Hz

1 kHz –135 dBc/Hz

10 kHz –145 dBc/Hz

100 kHz –145 dBc/Hz

ENVIRONMENTAL SPECIFICATIONS

Operating temp . . . . . –20 °C to +75 °C

Storage temp . . . . . –40 °C to +85 °C

Operating humidity . . . . . 95% (non-condensing)

INTERFACE SPECIFICATIONS

Prime power . . . . . +24 V and return using DC to DC power supply (19 V–34 V)

Mechanical connection uses a two-pin locking connector.

1 PPS Interface Specification

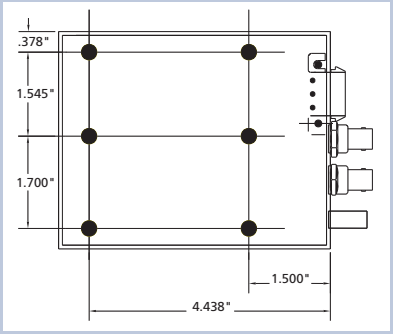
- BNC Connector 0 V to 2.4 V ±10% into 50 Ω 10 microseconds-wide pulse with the leading edge synchronized to UTC within 15 nanoseconds (one sigma) in static, time only mode.
- The rising time is <20 nanoseconds and the pulse shape is affected by the distributed capacitance of the interface cable/circuit.

10 MHz . . . . . BNC connector.
Waveform is sinusoidal 7 dBm ±2 into 50 Ω
5 dBm = 1.125 Vpp
7 dBm = 1.416 Vpp
9 dBm = 1.783 Vpp

Serial interface . . . . . RS-232 through a DB-9/M connector

RF antenna connector . . . . . BNC

Serial protocol . . . . . Trimble Standard Interface Protocol (TSIP) binary protocol @ 9600, 8-None-1



PHYSICAL CHARACTERISTICS

Power consumption . . . . . 12 watts cold; 8 watts steady state

Dimensions . . . . . 5 in L x 4 in W x 2 in H (127 mm x 102 mm x 40 mm)

Mounting . . . . . Six mounting holes for M3 screws. Max. depth 3/8"

Weight . . . . . 0.628 lb (0.285 kg)

Power connector . . . . . Molex 39-30-1020

ORDERING INFORMATION & ACCESSORIES

Please go to www.trimble.com/timing for the latest documentation, software, tools, part numbers and ordering information.

Trimble has relied on representations made by its suppliers in certifying this product as RoHS compliant.

Specifications subject to change without notice.

Trimble Navigation Limited is not responsible for the operation or failure of operation of GPS satellites or the availability of GPS satellite signals.