Epsilon Clock

Model EC1S

- **Compact GPS Clock module**
- **GPS 12 channel reception on L1 (1575 MHz) C/A code**
- **Continuous Time Integrity Monitoring (TRAIM)**
- **Automatic self survey with robust 0D fixed mode**
- **Antenna propagation delay compensation**
- **1PPS TTL output**
- **10 MHz sine wave output**
- **Time of Day output**
- **Two auxiliary input/output for a full range of applicability**
- **RoHS Compliant**

The Epsilon Clock™ 1S provides a compact synchronization solution with very accurate and stable time and frequency signals. The high performance suits a comprehensive range of applications where excellent accuracy is required especially for synchronization of telecom wireline infrastructure, mobile wireless base stations, emitters of digital audio or video broadcast.

An ovenized oscillator (OCXO) slaved to the GPS input source offers outstanding accuracy and phase noise. The oscillator in conjunction with the EpsilTime™ smart predictive slaving algorithm mitigates the effects of inherent GPS noise and complies to the most stringent holdover mode requirements, such as CDMA-3G, if GPS is lost. Furthermore, the 10 MHz frequency reference is cycle locked to the 1PPS, meaning that there are always exactly ten million cycles between 1PPS occurrences. This unique feature is essential to avoid phase jumps and wander between time and frequency references.

Two optional SMA connectors along with a customizable internal module allow a range of dedicated versions in terms of performance and functionality such as software adjustable frequencies for TV broadcast, SDH/E1 synchronization for SSU functionality.

Set-up and control of the EC1S is via a serial interface. Status is displayed by 2 LEDs. Alarms are via relay contacts. The antenna cable delay and the choice of time scale (UTC or GPS) are programmable.

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Specifications

Frequency Output (10 MHz)

	High Performance OCXO
Accuracy (Average over 24 hours when GPS locked)	< ± 2 x 10^{-12}
Medium Term Stability (without GPS, content temperature, after 2 weeks of continuous operation)	2 x 10^{-10}/day
Short Term Stability (Allan Variance)	@1s 1 x 10^{-11} @10s 3 x 10^{-11} @100s 3 x 10^{-11}
Temperature Stability (peak to peak)	1 x 10^{-9} (from 0° to 60°C)
Phase Noise (typical, static conditions)	@10 Hz -120 dBc / Hz @100 Hz -130 dBc / Hz @1 kHz -145 dBc / Hz @10 kHz -145 dBc / Hz @100 kHz -145 dBc / Hz
Signal Waveform Typical Level	1 x 10 MHz, sine wave 5 dBm / 50 Ω (SMA)
Harmonic Distortion / Duty Cycle	-40 dBc

Time Output (1PPS)

Accuracy to UTC (GPS locked)	± 25 ns (1σ)
Holdover Mode After 4 Hours	0.8 µs
Holdover Mode After 1 Day (at constant temperature, after 24 hours of GPS lock)	12 µs
Signal Waveform and Level	1PPS TTL / 50 Ω (SMA)

Other Inputs/Outputs

GPS Input/ Output For Antenna Amp	L1 GPS C/A code (TNC) / 5 V @ 80 mA
Status and Remote Control Outputs	Remote control and Time of Day, RS-232C serial lines (HE-501 connector) Alarm: relay contacts (HE-501 connector)

Power

Power Supply (DC supply required)	19-36 V (Mini Mat and Lock connector) (10-18 Vdc or 37-72 Vdc on request)
Typical Power Consumption at 25° C (without options)	7 W
Max Power Consumption at Warm Up (without options)	10 W

Physical

Size: 127 x 102 x 44 mm (1U)
Weight: < 600 g

Environmental

Operating Temperature: -5° to 60°C
Storage Temperature: -40° to 85°C
Relative Humidity: 95% RH @ 40°C, non-condensing
CE Compliance: EN 300 386 / EN 55022
Safety: EN60950
RoHS Compliant

Operating Mode

- Cold start-up time: < 20 minutes
- Permanent self-test of main functions
- Status display by 2 x LEDs (GPS locked, Clock status)
- Full remote control by RS-232C

Optional DDS Outputs

- 1 x software adjustable frequencies within the 1 MHz - 50 MHz range (AUX2). Programmable with EpsilWin32 supervision software.

Optional Time Outputs

- 1PPS, 10 MHz on auxilary outputs AUX1 and AUX2

Optional SDH/E1 Synchronization Output

- 2.048 MHz (AUX1) input used as external reference and 2.048 MHz (AUX2) output

Accessories

- Active GPS antennas and cables
- Lightning protections / In-line amplifier / Splitters
- EpsilWin32 software for remote control / supervision
- AC - DC Power Supply
- Mounting kit for 19" chassis

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