Epsilon Clock

Model EC22S

- Fully redundant dual GPS clock
  - *Dedicated to applications demanding in quality, reliability and availability:*
  - *Digital Video and Audio Broadcast: DVB-T/H/SH, FLO, T-DMB, ISDB-T*
- Wireless Telecom: CDMA, WiMAX, TDOA caller locations
- Dual High performance OCXO disciplined by GPS
- EpsilTimeTM smart predictive slaving algorithm
- Smart switching with low phase jump, in case of clock failure
- 8 x 1PPS TTL outputs
- 8 x 10 MHz outputs
- Remote management by SNMP/HTTP, through Ethernet port
- RoHS Compliant

The Epsilon Clock™ 22S provides high reliability synchronization solutions with very accurate and stable time and frequency signals. The high performance suits a comprehensive range of applications where excellent accuracy is required, especially synchronization of mobile wireless base stations, emitters for digital audio or video broadcast.

The highest reliability is provided by fully redundant clock modules feeding an automatic fast monitoring and switching controller. Outputs signals are switched with very low phase glitch. Both clock modules integrate their own frequency generation circuit and autonomous power supply. They are hot swappable for online repair. Modules are accessible from the front panel.

A very high performance ovenized oscillator (OCXO) slaved to the GPS input source offers outstanding accuracy and phase noise. It is also improved for excellent temperature stability and very low aging. 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 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.

Setup, status and alarms are accessible by remote control through any internet browser and/or through SNMP protocol. The antenna cable delay and the choice of time scale (UTC or GPS) are programmable on both modules. Alarms via relay contacts are available. Status is displayed on the front panel by LEDs.

Specifications

Frequency Output (10 MHz)

		Very High Performance OCXO
Accuracy (average over 24 hours when GPS locked)		< ± 1 x 10^{-12}
Medium Term Stability (without GPS, content temperature, after 2 weeks of continuous operation)		1 x 10^{-10}/day
Short Term Stability (Allan Variance)	@1s @10s @100s	1 x 10^{-11} 3 x 10^{-11} 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 @100 Hz @1 kHz @10 kHz @100 kHz	-120 dBc / Hz -130 dBc / Hz -140 dBc / Hz -145 dBc / Hz -145 dBc / Hz
Signal Waveform and Level		8 x 10 MHz > 12 dBm ± 2 dB / 50 Ω (BNC)
Harmonic Distortion		-35 dBc

Time Output (1PPS)

Accuracy to UTC (GPS locked)	± 25 ns (1s)
Accuracy to UTC Instantaneous (phase locked)	± 35 ns max
Phase Jump on Switching (phase locked)	70 ns max
Holdover Mode After 4 Hours	0.6 µs
Holdover Mode After 1 Day (at constant temperature, after 24 hours of GPS lock)	7 µs
Signal Waveform and Level	8 x 1pps TTL/ 50 Ω (BNC)
Time of Day Output	NMEA 0183, SUB-D 9 points

Miscellaneous

NTP Output		Stratum 1 time stamp over Ethernet 10/100 Base-T, RJ-45
Status and Remote Control Outputs		Remote control by Ethernet line (RJ-45 connector) Alarm, relay contacts (SUB-D 9 points)
GPS Input/Output for Antenna Amp		2 x L1 GPS C/A code (TNC)/ 5 V @ 80 mA independent
Power Supply	AC Supply DC Supply	100 to 240 VAC / 48 to 63 Hz -48 VDC
Typical Power Consumption at 25° C (without options)		45 W
Max Power Consumption at Warm Up (without options)		55 W

Physical

Size: 483 x 400 x 88 mm (19", 2U)
Weight: < 6.5 kg

Environmental

Operating Temperature: 0° to 40° C
Storage Temperature: -40° to 85° C
Relative Humidity: 95% RH @ 40°C, non-condensing
CE Compliance: EN 300 386/EN 55022
Safety: EN 60950
RoHS Compliant

Operating Features

- Fast warm-up; less than 20 minutes for SFN mode compliant operation
- Permanent self-test of main functions
- Automatic switching on internal or external failure
- Status display by LEDs: GPS locked, Clock status
- Full remote control by SNMP
- Alarm information on relay contact

Accessories

- Active GPS antennas and cables
- Lightning protections/In-line amplifier/Splitters

Options

- Separate clock module

21 September, 2018 - 14172 Rev, (C)
Specifications subject to change or improvement without notice