



# Epsilon Clock

## Model EC20S



- **High-performance GPS clock**
- **Remote management by SNMP/HTTP, through Ethernet port**
- **Synchronize to a variety of sources**
  - 12 channel reception on L1 (1575 MHz) C/A code
  - 1PPS external
  - NMEA standard
- **Up to 10 x 1PPS TTL outputs**
- **Up to 10 x 10 MHz sine wave outputs**
- **NMEA output**
- **Additional outputs available**

The Epsilon Clock Model EC20S provides accurate and stable time and frequency signals for your high-performance synchronization application. The unit's optimized architecture is well-suited to transmitter synchronization of digital broadcast signals (DVB-T/T2, DVB-H, DVB-SH, T-DMB, FLO, DAB or DRM) in SFN modes, as well as wireless synchronization of BTS (WiMAX, CDMA, TD-SCDMA).

An ovenized oscillator (OCXO) slaved to the input source offers outstanding accuracy and reduces phase noise. The smart EpsilTime™ Kalman-based algorithm allows intelligent input signal filtering, providing adaptability to the quality of the active input reference (GPS, external PPS). If the input reference is disrupted, the oscillator maintains time (SFN) and frequency (MFN & SFN) accuracies in holdover mode.

The Epsilon Clock Model EC20S is also available with an optional Rubidium oscillator, which provides even greater holdover stability. Setup, status, and alarms are accessible through an Ethernet 10/100 Base-T interface, through embedded SNMP protocol, or through the Web User Interface. The antenna cable delay and the choice of time scale (UTC or GPS) are programmable.

## Specifications

### Frequency Output (10 MHz)

		OCXO	Rubidium
<b>Accuracy</b> (Average over 24 hours when GPS locked)		$< \pm 2 \times 10^{-12}$	$< \pm 1 \times 10^{-12}$
<b>Medium Term Stability</b> (without GPS, content temperature, after 2 weeks of continuous operation)		$2 \times 10^{-10}/\text{day}$	$5 \times 10^{-11}/\text{month}$
<b>Short Term Stability</b> (Allan Variance)	@1s	$1 \times 10^{-11}$	$3 \times 10^{-11}$
	@10s	$3 \times 10^{-11}$	$1 \times 10^{-11}$
	@100s	$3 \times 10^{-11}$	$3 \times 10^{-12}$
<b>Temperature Stability</b> (peak to peak)		$1 \times 10^{-9}$ (from 0° to 60°C)	$1 \times 10^{-10}$ (from 0° to 50°C)
<b>Phase Noise</b> (typical, static conditions)	@10 Hz	-120 dBc / Hz	-110 dBc / Hz
	@100 Hz	-135 dBc / Hz	-130 dBc / Hz
	@1 kHz	-145 dBc / Hz	-140 dBc / Hz
	@10 kHz	-150 dBc / Hz	-145 dBc / Hz
	@100 kHz	-150 dBc / Hz	-145 dBc / Hz
<b>Signal Waveform</b> (typical level)		$7 \times 10$ MHz, Sine Wave, squelchable > 12 dBm $\pm$ 2 dB / 50 $\Omega$ (BNC)	
<b>Harmonic Distortion Spurious</b>		-40 dBc -60 dBc	

### Time Output (1PPS)

<b>Accuracy to UTC</b> (GPS locked)	$\pm 25$ ns (1 $\sigma$ )	
<b>Holdover Mode After 4 Hours</b> (at constant temperature, after 24 hours of GPS lock)	$0.8$ $\mu$ s	$0.3$ $\mu$ s
	$10$ $\mu$ s	$2$ $\mu$ s
<b>Signal Waveform and Level</b>	$7 \times 1$ pps / 50 $\Omega$ , squelchable (BNC)	

### Other Inputs/Outputs

<b>GPS Input/ Output For Antenna</b>	L1 GPS C/A code / 5V @ 80 mA (N)
<b>1PPS External Reference</b>	TTL / 50 $\Omega$ (BNC)
<b>Datation Input/Output</b>	NMEA 0183, RS232, or SUB-D 9 points
<b>NTP Output</b>	Stratum 1 time stamp over Ethernet 10/100 Base-T (RJ45)

### Power

<b>Power Supply</b>	AC Supply	90 to 264 V / 48 to 63 Hz (CEE22) $\pm 20$ to $\pm 72$ VDC (XLR)
	DC Supply	
<b>Typical Power Consumption</b> (without options)		20W      30W
<b>Max Power Consumption at Warm Up</b>		25W      50W

### Physical

**Size:** 19" 1U unit (483 x 340 x 44 mm)

**Weight:** < 5kg

### Environmental

**Operating Temperature:**

-5° to 60°C (OCXO)

-5° to 50°C (Rubidium)

**Storage Temperature:** -40° to 85°C

**Relative Humidity:** 95% RH @ 40°C, non-condensing

**CE Compliance:** EN 61000, EN 55022

**Safety:** EN 60950

**RoHS Compliant**

### Operating Mode

- Cold Start-Up Time < 20 minutes
- Hot Start-Up Time < 5 minutes
- Permanent self-test of main functions
- Monitoring of external references
- Squelch of frequency and time outputs
- Status displayed by LEDs

### Options

- Additional 10 MHz outputs (x3)
- Additional 1PPS outputs (x3)

### Accessories

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