

GPS Disciplined Rubidium & Time Reference

Features

- Dual GPS system - full redundancy system
- <1.5us holdover per 24 hours
- Short term stability $<8 \times 10^{-13}$ at 1000sec
- Accuracy to ± 25 ns RMS UTC
- Ultra Low phase noise -115dBc at 1Hz
- NTP, PTP and IRIG output



Description

The E8010 provides a stable and accurate calibration free GPS time & frequency with multiple outputs signal formats in an easy to install 1U rack mountable chassis. This reference maintains high time and frequency accuracy required for demanding applications. The added advantage of the internal rubidium module is that there is no measurable difference between the stability when locked to GPS or in Holdover mode with measurement times up to 1000s.

Features

- RS232, USB & Ethernet interface
- Remote access & software interface
- Optional Dual GPS module
- Optional upgrade to NTP or PTP server
- Available frequencies 1Hz to 100MHz
- Built-in self calibration
- UKAS calibration certificate available
- Excellent holdover performance
- Battery back up and redundancy switchover
- Time and frequency standard for calibration & RF laboratories

Related frequency reference products

- **E8-Y**: Low cost and Low Noise Desktop Frequency reference 1 to 4 outputs
- **E8000**: Low Noise 1U 19" rack mount GPS disciplined OCXO up to 12 output, 1 to 100MHz
- **E80-GPS**: Low cost and Low Noise Desktop GPS disciplined OCXO 1 to 4 outputs
- **E8-X**: Low cost Desktop GPS disciplined TCXO 1 to 4 outputs

E8010 Specification

Outputs *See options*

10MHz	+9dBm (± 2 dBm) into 50 Ohms, 0.56V _{rms} (Specify for 75Ω load)
Connector	BNC standard (SMA available)
No. outputs	Maximum 16 outputs
Standard outputs	1 x 10MHz, 1 x 1PPS

Frequency Stability *Allan Deviation*

	Standard	Options B	Options C
Frequency	10MHz	10MHz	10MHz
$\tau = 1s$	$\leq 1 \times 10^{-11}$	$\leq 2 \times 10^{-12}$	$\leq 8 \times 10^{-13}$
$\tau = 10s$	$\leq 2 \times 10^{-11}$	$\leq 4 \times 10^{-12}$	$\leq 1 \times 10^{-12}$
$\tau = 100s$	$\leq 1 \times 10^{-11}$	$\leq 4 \times 10^{-12}$	$\leq 1 \times 10^{-12}$
$\tau = 1000s$	$\leq 8 \times 10^{-12}$	$\leq 1 \times 10^{-12}$	$\leq 7 \times 10^{-13}$

Phase Noise (SSB)

	Standard	Options 2	Options 3
Frequency	10MHz	10MHz	10MHz
1Hz	-100 dBc	-110 dBc	-115 dBc
10Hz	-125 dBc	-136 dBc	-140 dBc
100Hz	-145 dBc	-150 dBc	-154 dBc
1 kHz	-150 dBc	-155 dBc	-155 dBc
10KHz	-158 dBc	-160 dBc	-160 dBc

Frequency accuracy

10MHz	$< 1 \times 10^{-12}$
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Harmonics

	Standard	Options C
	< -30 dBc	< -40 dBc

Spurious

100 KHz BW	< -100 dBc	< -100 dBc
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1PPS Output

Accuracy	± 25 ns
Jitter	< 2 ns RMS averaged over 100 seconds
Pulse Width	1 millisecond
Output level	CMOS 0-5V

Timing accuracy in **Holdover**

Per 24 hours	1.5μ sec.
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Frequency aging in **Holdover mode**

Per day	$< 5 \times 10^{-12}$	No GPS lock ¹
Per month	3×10^{-11}	

Warm-up time

< 15 minutes, time to lock at room temperature 25°C

1. In the event of GPS signal loss the E8010 automatically switch to holdover mode.

Included with shipment: Calibration certificate, Certificate of Conformance, product test sheet and 24 month warranty.

Environmental

Temperature :	Operating	-40°C +70°C
	Storage	-40°C +90°C
Temp stability :	No GPS Lock	-20°C +70°C 0.1x10 ⁻⁹
	Locked to GPS	-20°C +60°C $< 1 \times 10^{-10}$
Relative humidity :	92% non-condensing	
Magnetic Field sensitivity :	2x10 ⁻¹¹ Gauss	
Atmospheric pressure :	1x10 ⁻¹³ Per mbar	
Approximate MTBF :	100,000 Hrs, Stationary	
Dimensions without cover	44 x 250 x 444mm LWH	

Power supply

AC power:	90 to 240V
Power consumption:	22W Max at start (25°C) 6W at steady state

Data output & monitoring

	Options D
RS232 & USB	Ethernet

Built-in options

Option 01:	Redundant switchover for external power back-up
Option 02:	Output 2.048MHz (2048kHz)
Option 03:	Output 1544kHz
Option 04:	13MHz Output
Option 05:	TTL Output
Option 07:	10.24MHz Output
Option 08:	10.23MHz Output
Option 09:	Add 6 Output Distribution Card
Option 10:	26MHz Output
Option 11:	1MHz Output
Option 12:	5MHz Output
Option 18:	Extended warranty to 3 years
Option 20:	Discipline to external GPS 1PPS or 10MHz input
Option 42:	Low noise floor -170dBc at 10KHz
Option 47:	High gain GPS antenna, up to 50meters of cable
Option 52:	Rack Mount 19" 2U
Option 62:	AC Input 110V
Option 64:	DC input: Specify +12V, +24V, +48V or +60V
Option 75:	Add internal battery, up to 4 hours of battery life.
Option 90:	Full dual GPS redundancy system.
Option 91:	NTP, PTP server module. Specify
Option 92:	IRIGB003, IRIGB123. Specify

Contact us to configure this product to meet your requirement.
Designed and manufactured in the U.K.

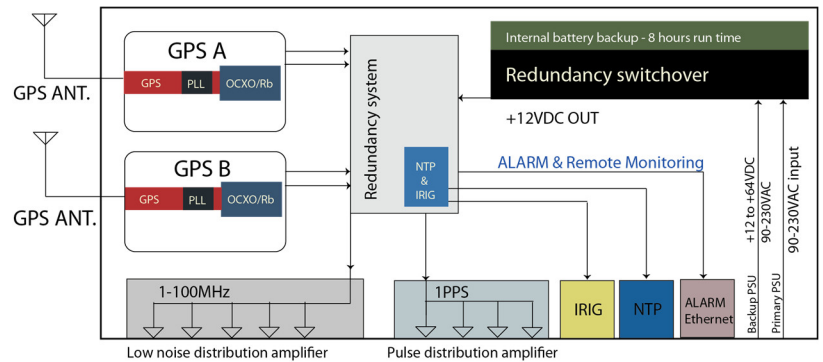
GNSS Internal Receiver Specification:

Type: GNSS Position Lock
 Number of Channels: 72
 GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1 SBAS L1
 C/A: WAAS, EGNOS, MSAS, GAGAN Galileo E1B/C
 Frequency Band: L1 (1575.42MHz)
 Tracking Code: C/A Code
 Tracking Capability: up to 24 Satellites

Sensitivity: Tracking & Navigation
 Tracking & Nav: -167 dBm
 Cold start (aided): -157 dBm
 (autonomous): -148 dBm
 Reacquisition: -160 dBm
 Acquisition GPS & GLONASS GPS & BeiDou
 Cold starts: 25sec. 28sec.
 Warm Start: 2 sec. 2sec.

Optional Dual GPS redundancy system

E8010 is configurable with dual GPS system, power supply and remote access via Ethernet port (TCP port) for monitoring and control. The total phase error of ± 30 ns of output 1PPS and 10MHz in relation to GPS 1PPS at switchover from GPS A to GPS B is unique in its class. The E8010 can be configured to output any frequency between 1 to 100MHz of a preferred signal format. Standard connectors are BNC and SMA. Contact our sales team to specify a different output connector to suit



Standard GPS Antenna

All Quartzlock GPS frequency references are supplied with our standard GPS Antenna, Manual, Test sheet, Calibration certificate and Certificate of conformance. The standard GPS antenna has 28dB gain sufficient to provide strong GPS signal to main GPS reference unit when placed near a window or mounted outdoor.



Standard GPS antenna Terminated with 5 meters of RG174 coaxial cable

High Gain GPS Antenna

The High Gain GPS Antenna is designed for stationary application and all weather and harsh environment to provide a strong signal. This antenna is also a high-quality solution for adding GPS RF signals to marine GPS navigation systems. The high gain GPS antenna can be setup with up to 50 meters of cable. The high gain GPS antenna is supplied with stainless steel antenna mount.

High Gain GPS Antenna specifications

Waterproof, weatherproof
 Operating Temp -40°C to +85°C
 Gain: 35dB ± 3 dB
 Voltage: +5V
 Connector: TNC
 L1 GPS, 1575.42MHz ± 1.023 MHz
 ROHS compliant



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