

## GPS Disciplined Oscillator (OCXO) & Time Reference

### Features

- Sine wave or CMOS/TTL output
- Short term stability  $< 2 \times 10^{-12}$  at 1sec
- Accuracy to 25ns RMS UTC
- Ultra Low phase noise -115dBc at 1Hz
- Operating temperature  $< -40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$
- National & International Traceable Reference consumption



Rear panel

### Description

The E8-Y provides a stable and accurate calibration-free GPS time & frequency with multiple outputs signal formats is a cost effective solution for applications require frequency reference. This reference maintains high time and frequency accuracy required for demanding applications. The E8-Y provides low noise, traceable, calibration-free time & frequency reference. These time & frequency standards maintain high time & frequency accuracy required for demanding applications. The E8-Y may be considered as a primary reference clock.

### Applications

- $< 1 \times 10^{-12}$  frequency accuracy
- No Drift
- 50ns 1PPS accuracy to UTC
- RS232 NMEA NTP Time Reference
- Excellent holdover performance
- No Calibration
- Excellent holdover performance up to measurement time up to 1000s
- National & International traceable reference
- Time and frequency standard for calibration & RF laboratories

#### Standard configuration:

1 x 10MHz sine BNC connector, Phase noise option 1, Short term stability option A x 1PPS BNC connector  
Data & Settings: RS232 and USB  
See options to add Ethernet port and NTP server

### Related frequency reference products

- **E8000:** Low Noise 1U 19" rack mount GPS disciplined OCXO up to 12 output, 1 to 100MHz
- **E8010:** Low Noise 1U 19" rack mount GPS disciplined rubidium 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

## E8-Y Specification

### Outputs *See options*

10MHz	+9dBm ( $\pm 2$ dBm) into 50 Ohms, 0.56V <sub>rms</sub> (Specify for 75Ω load)
Connector	BNC standard (SMA optional)
No. outputs	Maximum 8 outputs
Standard outputs	1 x 10MHz, 1 x 1PPS

### Frequency Stability *Allan Deviation*

	Standard	Options B	Options C
Frequency	10MHz	10MHz	10MHz
$\tau = 1s$	$\leq 1 \times 10^{-11}$	$\leq 2 \times 10^{-12}$	$\leq 8 \times 10^{-13}$
$\tau = 10s$	$\leq 2 \times 10^{-11}$	$\leq 4 \times 10^{-12}$	$\leq 2 \times 10^{-12}$
$\tau = 100s$	$\leq 1 \times 10^{-11}$	$\leq 4 \times 10^{-12}$	$\leq 3 \times 10^{-12}$
$\tau = 1000s$	$\leq 8 \times 10^{-12}$	$\leq 2 \times 10^{-12}$	$\leq 8 \times 10^{-13}$

### 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	$< -45$ dBc

### Spurious

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

Accuracy	$\pm 35$ 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	6μ sec.
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### Frequency aging in Holdover mode

Per day	$2 \times 10^{-10}$	No GPS lock <sup>1</sup>
Per month	$20 \times 10^{-10}$	

### Warm-up time

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

1. In the event of GPS signal loss E8-Y automatically switch to holdover mode.

**Included with shipment:** Calibration certificate, Certificate of Conformance and 24 month warranty.

### Environmental

Temperature :	Operating	-40°C +70°C
	Storage	-50°C +90°C
Temp stability :	No GPS Lock	-20°C +70°C 0.1x10 <sup>-9</sup>
	Locked to GPS	-20°C +60°C $< 1 \times 10^{-10}$

Relative humidity : 92% non-condensing

Magnetic Field sensitivity :  $2 \times 10^{-11}$  Gauss

Atmospheric pressure :  $1 \times 10^{-13}$  Per mbar

Approximate MTBF : 100,000 Hrs, Stationary

Dimensions without cover 122 x 105 x 60mm LWH

### Power supply

External DC supply:	+12V
Power consumption:	8W Max at start (25°C) 3W at steady state

### Data output & monitoring

RS232 & USB	Options D
	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
- Option 93:** Extend lower start up temperature to  $< -40$ °C

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.

**Customize outputs & optional configurations**

E8-Y is a versatile GPS disciplined Oscillator which can be configured with distribution card (option 09), built-in battery backup to allow to be portable, NTP server module and remote access via Ethernet port (TCP port) for monitoring and control. The E8-Y 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 your application.



**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.



**Examples of configurations**

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 ±3dB  
 Voltage: +5V  
 Connector: TNC  
 L1 GPS, 1575.42MHz ±1.023MHz  
 ROHS compliant



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