

# GPS8 & GPS8plus

## GPS Time & Frequency Standard

The GPS8 (and GPS8plus) is a precision time & frequency standards that uses the Global Positioning System (GPS) as a reference to provide a suite of output and interface options. It is designed for use in any applications where reliable time and frequency information is required, e.g. Telecommunications, Power Utility and Military Communications applications.



GPS8



GPS8 PLUS

### Features

- GPS synchronisation
- Crystal oscillator for high frequency stability with option to upgrade
- 1PPS, Pulse & Timecode outputs
- Standard (GPS8) or enhanced (GPS8plus) front panel
- 1 U high standard 19" rack mount
- Equipment configuration stored in non-volatile memory
- FSYNC output capability

#### Front Panel options:

- GPS8 (with LEDs)
- GPS8plus (5 button front panel keypad for equipment configuration and control plus alphanumeric display of time, date and status)

#### Oscillator options:

- Crystal (fitted as standard)
- Temperature Controlled Crystal (TCXO)
- Oven-Controlled Crystal (OCXO)
- Rubidium

### Key Benefits

The GPS8 utilises a high performance 12-channel C/A code GPS receiver. An automatic position-averaging feature enables the best use of GPS when operating in a fixed location.

#### Oscillator

The GPS8 is fitted with an internal oscillator in order that time information can be accurately maintained when no satellites are tracked. The internal oscillator also provides a highly stable frequency standard. An advanced, patented algorithm using the time signal from GPS provides optimal control of the internal oscillator ensuring that the highest frequency accuracy is obtained.

#### Outputs

Four isolated sine wave and two square wave outputs, grouped in pairs, may be configured to provide 1MHz,

5MHz or 10MHz frequency outputs from the disciplined oscillator. Alternatively, these outputs can be configured to provide Telecom Output references (1.544MHz or 2.048MHz) allowing the GPS8 to be used a telecommunications primary reference clock compliant with G.703 sections 6 and 10. An 8kHz "frame" pulse is provided to complement the Telecom outputs.

Front panel LEDs (or alphanumeric display on GPS8plus model) provide status information, and standard serial time code outputs allow time synchronisation to be distributed to computers, displays, and other equipment requiring precision time. These serial data ports may be used both for control of the GPS8, as well as the output of time. A standard 1PPS time mark corrected to UTC is provided for synchronising of calibrating user equipment.



# GPS8 Specifications

## General

Status Indicators: Power, Status, Data Valid, Satellite Tracking, Reject Code

Mechanical: 19inch rack mount, 1U high (45mm), 305mm deep

Alarm status: Voltage free relay/ TTL changeover contacts

Power: 110/230V AC rear panel selectable (24V DC/ 48V DC optional)

Weight: 5kg typical

MTBF: 160,000 hours (GB +25°C)

EMC: CE compliant

## Environmental

### Instrument

Temperature: -10°C to +50°C

Humidity: Up to 95% RH (non-condensing)

### Antenna

Temperature: -40°C to +85°C

Humidity: 100% RH

## Input Synchronisation

### GPS Reception

Satellite code: C/A receiver type parallel 12-channel

Start-up: <20 sec (warm), <120 sec (autonomous), automatic (cold)

Timing Accuracy:  $\pm 150$  nanosecond from UTC (for holdover mode, as per oscillator)

## Outputs Included as Standard

1PPS Output: BNC Connector, Type TTL, On Time Rising Edge

Pulse Output: BNC Connector, Type TTL, Code Options: IRIG-B, 1PPM, 1PPD

Timecode Output: Modulated 1kHz carrier, BNC Connector,

Code options IRIG-B, NASA36, 2137, AFNOR

Serial Interface: 2 ports, 9-way 'D' socket, with RS232 or RS422 interface

## Optional Additional Frequency Outputs

BNC Connector, frequency stability as per oscillator (see table below)

Output options: 1MHz, 5MHz, 10MHz, T1 (1.5544MHz), E1(2.048MHz)

NB T1 & E1 frequencies cannot be mixed

Sinewave 1: 2 x selected frequency (50 Ohm)

Sinewave 2: 2 x selected frequency (50, 75 or 120 Ohm by jumper)

Squarewave: 2 x selected frequency (75 Ohm)

Frame output: BNC connector, 75 Ohm Squarewave, Rate: 8kHz, or

FSYNC, CMOS output at 3.218650818 Hz

## Oscillator Options

Frequency Stability at 25°C

Oscillator		Holdover Stability Per °C	Locked frequency stability over averaging times						Holdover stability for 1 day
Option	Description		1s	10s	100s	1000s	10000s	1 day	
1	TCXO	$1.7 \times 10^{-8}$	$2 \times 10^{-9}$	$5 \times 10^{-10}$	$5 \times 10^{-10}$	$5 \times 10^{-10}$	$6 \times 10^{-11}$	$1 \times 10^{-12}$	30ms
2	OCXO	$1.0 \times 10^{-9}$	$1 \times 10^{-10}$	$4 \times 10^{-11}$	$6 \times 10^{-11}$	$4 \times 10^{-11}$	$4 \times 10^{-12}$	$1 \times 10^{-12}$	60µs
3	Precision OCXO	$1 \times 10^{-11}$	$5 \times 10^{-12}$	$3 \times 10^{-12}$	$1 \times 10^{-11}$	$4 \times 10^{-11}$	$3 \times 10^{-12}$	$1 \times 10^{-12}$	8µs
4	Rubidium	$7 \times 10^{-12}$	$3 \times 10^{-11}$	$8 \times 10^{-12}$	$3 \times 10^{-12}$	$3 \times 10^{-12}$	$2 \times 10^{-12}$	$8 \times 10^{-13}$	3µs
5	Precision Rubidium	$3 \times 10^{-12}$	$2 \times 10^{-11}$	$3 \times 10^{-12}$	$3 \times 10^{-12}$	$1 \times 10^{-12}$	$1 \times 10^{-12}$	$8 \times 10^{-13}$	1µs

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