

## GPS 4

### GPS SYNCHRONIZED TIME AND FREQUENCY STANDARD

- 8 Channel GPS Receiver
- Frequency Synthesizer
- High Stability Time & Frequency Outputs
- Compact Chassis
- 1PPS and 10MHz Outputs
- Two Serial Ports
- IRIG B Time Code Output
- Sophisticated Oscillator Control



The GPS 4 from Brandywine Communications is a compact, state of the art time and frequency standard. The ultra-precise time and frequency outputs are referenced to the GPS satellite system.

Applications for the GPS 4 include precision frequency reference in the telecommunications industry, accurate time standard for power utilities and a time reference for precisely synchronizing computer clocks.

The GPS 4 utilizes a high performance 8 channel GPS receiver to discipline an on board, ultra-stable oven controlled crystal oscillator (OCXO). An advanced oscillator control algorithm assures the highest frequency accuracy is obtained. The automatic position-averaging feature makes the best use of GPS when operating in a fixed location. The highly accurate on board oscillator assures excellent holdover performance ensuring accurate time and frequency even during periods when no GPS satellites are being tracked.

Two serial data ports are included with the GPS 4. Time and status is provided over one port while status and system control is available over the second port.

Four LED status indicators are supplied on the GPS 4 front panel. The status indicators allow a quick visual check of the operating status of the GPS 4.

The 1PPS time mark output may be used for synchronizing or calibrating other equipment. The 1PPS pulse is supplied through a standard BNC connector. The rising edge of the 1PPS pulse is on time.

A 10MHz sine wave with exceptional purity and superior holdover performance is a standard output.

Distribution of precise time to computers, displays and other equipment is made easy by the standard IRIG B time code output.

An on-board frequency synthesizer outputs three optional frequencies, (19.6608MHz, 2.048MHz and 1.544MHz) which simplifies system integration by eliminating the need for external frequency synthesizers.

## Specifications

### 1 PPS Output

Connector	BNC
Type	TTL into 50 Ohms
On Time Edge	Rising edge

### Serial Interface

Number of Ports	2
Connector	DB9
Type	RS-232 or RS-422 (option)
Baud Rate	50-19,200
Time Port	
Data	Time and Date
Message Rate	1PPS Continuous
Control Port	System set up and control

### IRIG B Time

Carrier Frequency	1kHz
Data	Seconds through Days
Amplitude	3Vpp into 600 Ohms
Modulation Ratio	3.3 to 1
Connector	BNC

### Environmental

Temperature	
Instrument	-10°C to +60°C ( $\Delta T$ 15°C per hour)
Antenna	-40 to +85°C
Humidity	To 95% non-condensing
Power	15 Vdc
Optional	24 Vdc, -48 Vdc
Dimensions	5.8" x 5.5" x 1.5"
Weight	3lb typical
EMC Emission	To EN50081-1 as EN55022
EMC Immunity	To EN50082-1 as EN1000-4-2 ESD, IEC 801-3 HF Field, IEC 801-4 Burst

### 10MHz Sine Wave

Connector	BNC
Level	1 Vrms into 50 Ohms
Accuracy	5x10 <sup>-12</sup> /24 hours when locked
Holdover	1x10 <sup>-10</sup> /24 hours average
Phase Noise	
100Hz	-140dBc/Hz
1000Hz	-150dBc/Hz
10000Hz	-155dBc/Hz
Stability	
1Sec	1x10 <sup>-11</sup>
10Sec	1x10 <sup>-11</sup>
100Sec	8x10 <sup>-12</sup>
1000Sec	1x10 <sup>-11</sup>

### GPS Specifications

Satellite Signal	GPS L <sub>1</sub> 1575.42 MHz
Satellite Code	C/A 1.023 Mhz
Receiver Type	Parallel 8 Channel, 8 Satellites tracked continuously and simultaneously
Position Accuracy	2.4m horizontal, 5m altitude with respect to WGS-84 after 24 hours of position averaging
Warm start	<20 seconds
Autonomous Start	<120 seconds
Cold Start Requirement	Automatic. No input of time or position required

### Timing Accuracy

Tracking satellites	±100 ns. Absolute UTC Std Deviation 34 ns. Hourly mean 25 ns
Holdover Mode	<8 µsec/8 hours

### Synthesizer Output Options

Frequencies	19.9608MHz, 1.544MHz, 2.048MHz
Accuracy	Same as 10MHz
Amplitude	TTL into 50 Ohms
Connector	BNC

### Status Indicators

Power Good	Flashes when out of tolerance
Locked	Illuminated to system locked to GPS
Holdover Mode	GPS input lost, making corrections to osc. based on learned information
Alarm	Illuminated when: a. Internal GPS receiver fault b. System Power Failure c. PLL out of lock

### Hardware Status/Control Lines

Connector	DB-9
Levels	Open Collector
Max Pull up Voltage	+5Vdc
Sink Current	30ma
Status bit 1	/Time Lock
Status bit 2	/System good
Reset Input	/System Reset Input

### Options

IRIG B DC Shift

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