

Model 1083B GPS Satellite-Controlled Frequency Standard/Comparator



The Arbiter Systems[®], Inc. Model 1083B GPS Satellite-Controlled Frequency Standard/Comparator delivers performance comparable to atomic frequency standards, but at a fraction of the price.

The outstanding long-term accuracy of the GPS system and the excellent short-term stability of Wenzel Streamline 10 MHz, third overtone SC-cut ovenized quartz oscillator combine to produce traceable, standard frequency outputs of 1 MHz, 5 MHz, and 10 MHz with outstanding spectral purity and long-term stability. These outputs are suitable for use as the frequency reference for counters and signal generators, or for multiplication to microwave frequencies. An output of one pulse per second (1 PPS) is also provided for time standard applications. The Model 1083B can also be equipped with a frequency measurement option (1083Bopt09) that allows the 1083B to measure the deviation and Allan Variance of a 1 MHz, 5 MHz, or 10 MHz signal and the deviation of a 1 PPS signal.

With the addition of a vacuum fluorescent display (VFD) and keyboard, the Model 1083B is ideal for both attended and unattended operation. All functions of the Model 1083B are available via the front panel and the serial interface. In addition to status and control information, the Model 1083B provides both UTC and local time, antenna position, and frequency deviation. Eight LEDs monitor operating status. The Model 1083B is equipped with an 85 to 264 Vac/110 to 275 Vdc power supply with an IEC-320 detachable cordset.

Additional 1 MHz, 5 MHz, and 10 MHz signals are available (up to eight total outputs) eliminating the need for a separate distribution amplifier. For additional 1 PPS outputs, use the Arbiter Systems[®] Model 1073A Distribution Amplifier. The Model 1073A provides a total of up to 12 additional outputs.

The GPS Data Backup Battery is included in the Model 1083B. This feature improves acquisition time by supplying constant power to the real-time clock and RAM in the GPS receiver module.

Model 1083B Specifications

Receiver Characteristics

Timing Accuracy

Specifications apply at the 1 PPS output, in the presence of Selective Availability (SA), as of date of publication.

UTC/USNO	±150 ns peak
Typical	< 40 ns rms, over 24 hours

Allan Variance

After warm-up; locked to GPS, including the affects of SA.

1 second	5×10^{-11}
1 day	5×10^{-13}

Oscillator

Type	Wenzel Streamline 10 MHz, third-overtone SC-cut ovenized
Stability	1 day: 1.0×10^{-9} Over Temperature: 1.5×10^{-8}
Warm-up	6 hours

Position Accuracy

10 meters, rms, 90% confidence

Satellite Tracking

Twelve (12) channel, GPS-L1, C/A code (1575.42 MHz). Receiver simultaneously tracks up to twelve satellites. Results from all tracked satellites are averaged in Position-Hold Mode or, with Position-Hold Mode off, using least-squares estimation.

Acquisition

150 seconds typical, cold start
15 minutes, 90% confidence, cold start
40 seconds, typical, with almanac < 1 month old
15 seconds, typical, with ephemeris < 4 hours old

The GPS Data Backup Battery is included in the Model 1083B. This feature improves acquisition time by supplying constant power to the real-time clock and RAM in the GPS receiver module.



I/O Configuration

Connectors

Outputs	Four 50-ohm BNC; three sine wave and one 1 PPS. Maximum of eight sine wave and one 1 PPS
Inputs	one BNC: 50-ohm or High Impedance

Output Signals

Sine Wave, 1 MHz, 5 MHz, and 10 MHz, +11 dBm (2.5 Vpp) nominal into 50 ohms
1 PPS, 5 V CMOS; 10 ohms source impedance; drive capability ±75 mA

Input Signals

1 PPS or sine wave: 1 MHz, 5 MHz, or 10 MHz

General

Physical

Size	1 RU rack mount; 260 mm deep FMS. 508 x 381 x 203 mm (20 x 15 x 8 in.), shipping
Weight	2 kg (4.5 lbs), net 5.5 kg (12 lbs), shipping
Antenna	0.75 in. pipe (1 in. - 14 marine) thread Cable Connection: F-type Size: 77.5 dia. x 66.2 mm (3.05 x 2.61 in.) Weight: 170 grams (6.0 oz)
Antenna Cable	RG-6 type, 15 m (50 ft) provided weight: 0.69 kg (1.52 lbs) per 15 m

Environmental

Temperature	Operating: 0° to +50° C (-20° to +70° C typical) Nonoperating: -40° to +75° C
Humidity	Noncondensing
EMC	Radiated susceptibility: passes walkie-talkie test Conducted emissions: power supply complies with FCC 20780, Class A and VDE 0871/6.78 Class A

Interface

Operator

Display	2 x 20 character vacuum fluorescent
Functions	Time: UTC or local Position: latitude, longitude, altitude Receiver and clock status 1 PPS (input) deviation

Model 1083B Specifications

Interface (Continued)

Status LEDs	Operate (green) Stabilized (green) Unlocked (red) Fault (red)
Input LEDs	50 ohm (green) 1 PPS (green) 1 MHz (green) 5 MHz (green) 10 MHz indicated by illumination of the 1 MHz and 5 MHz LEDs
Keyboard	Eight keys
Setup	Local time offset Daylight Saving Time: On/Off/Automatic Out-of-Lock time: 1 to 99 minute(s), Off, or Zero Delay Cable delay Clock offset Frequency/Time Measurement: 1 MHz/5 MHz/10 MHz/1 PPS, Deviation/Allan Variance, Interval, Data Points, Termination Auto-Survey: On/Off, Survey duration Position Hold: Off/3D/Altitude Serial port: RS-232
System	
RS-232	1200 to 19,200 baud; 7 or 8 data bits; 1 or 2 stop bits; even/odd/no parity Interrogate mode Broadcast modes include standard ASCII (IRIG-J), Extended ASCII, ASCII with Time Quality, ASCII with Time Quality and Year, and Vorne large-display, Measurement Deviation Male 9-pin D-subminiature

Power Requirements

Standard	
Voltage	85 to 264 Vac, 47 to 440 Hz, 20 VA max. or 110 to 370 Vdc, 15 W maximum
Inlet	IEC-320 with fuse and mating cordset. Specify option P01-P10

¹ For cable lengths greater than 75 m (250 ft)

Certifications and Approvals

CE mark/label and certificate

Options

Options may be ordered in any combination except where noted otherwise. The available options are listed below and described in the Options and Accessories section, see page 32.

I/O Options

<u>Option Description</u>	<u>Order No.</u>
1 MHz Sine Wave, BNC	1083BoptxA
5 MHz Sine Wave, BNC	1083BoptxB
10 MHz Sine Wave, BNC	1083BoptxC
Frequency Measurement Capability	1083Bopt09

The x denotes the output number, up to 8.

Accessories

Included

<u>Description</u>	<u>Order No.</u>
GPS Antenna, pipe mountable	AS0087800
15 m (50 ft) RG-6 Antenna Cable	CA0021315
Rack Mount Kit	AS0028200
Operation Manual	AS0034100
Power Cord (see page 35)	P01-P10

Available

<u>Description</u>	<u>Order No.</u>
15 m (50 ft) RG-6 Antenna Cable	CA0021315
30 m (100 ft) RG-6 Antenna Cable	CA0021330
45 m (150 ft) RG-6 Antenna Cable	CA0021345
60 m (200 ft) RG-6 Antenna Cable	CA0021360
75 m (250 ft) RG-6 Antenna Cable	CA0021375
GPS Antenna Mounting Bracket	AS0044600
21 dB In-Line Preamp	AS0044700 ¹
GPS Surge Protector Kit	AS0049000
Antenna Grounding Block Kit	AS0048900
300 m (1000 ft) Roll RG-11 Cable	WC0004900
RG-6 Crimp Tool	TF0006400
RG-11 Crimp Tool + 25 F-type Connectors	AS0044800
High Interference GPS Antenna and Mounting Adapter Kit	AS0062000
Rack Slide Kit	AS0033100