

Application - Defense (Military) ■ SatCom ■ Wireless

- Range Timing
- Communications Networks
- Satellite Ground Stations
- Test and Measurement Systems

Features

- GPS Referenced Time and Frequency
- Choice of Three Oscillator Types
- Frequency, Rates, and Time Code Outputs



Description:

The Model 8821 GPS Clock incorporates a twelve-channel parallel GPS receiver, a disciplined crystal oscillator, and a precise time and frequency generator in a single cost effective assembly. Phase offset of the 1 PPS output, referenced to UTC, is typically less than 100 nanoseconds when one or more satellites are being tracked. Oscillator options include single oven crystal oscillator, double oven crystal oscillator, or rubidium oscillator.

The Model 8821 incorporates automatic oscillator calibration by GPS, automatic leap second correction and built-in calendar for automatic leap year updates. By using the remote setup feature, the operator may set up for automatic daylight savings time corrections. These features, plus a very high MTBF, and an RS-232 remote status-monitoring feature virtually eliminate the need for site visits for setup, calibration, and maintenance.

Two size versions are offered. Models 8821A and 8821C are 1.75 inches high (1U), while Models 8821B and 8821D are 3.5 inches high (2U). All models are supplied with an active antenna.

Specifications:

Internal Oscillator Options  
Parameters

	B4A OCXO (Standard Models 8821A & C)	B7A OCXO (Standard Models 8821B & D)
Accuracy while Tracking (one-hour averaging)	<1 X 10 <sup>-11</sup>	<1 X 10 <sup>-11</sup>
Aging rate when coasting*	<1 X 10 <sup>-9</sup> /day	<1 X 10 <sup>-10</sup> /day
1 PPS coasting drift* (first 8 hours)	1-3 μs/hour	<500 ns/hour
Phase noise @ 10 Hz offset	<-100 dBc	<-105 dBc
Phase noise @ 100 Hz offset	<-130 dBc	<-125 dBc
Phase noise @ 1 KHz offset	<-135 dBc	<-140 dBc
Phase noise @ 10 KHz offset	<-140 dBc	<-145 dBc
Harmonic distortion	<-40 dBc	<-30 dBc
Spurious	<-100 dBc	<-100 dBc

\*Coasting factors apply only if there has been an antenna or receiver failure or if antenna is blocked from view of all satellites.

Other Frequencies

Option B7 also available for output of 1.544 MHz, 2.048 MHz, or 5 MHz from the Models 8821B & D.

Specifications subject to change without notice.

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### Synchronization

The position of the antenna is determined by measuring the pseudo-range to four satellites and computing the position of these satellites using ephemeris data.

### Receiver Specifications

Receiver  
Description: L1 C/A code pseudo-ranging

Channels: Twelve independent, continuous tracking channels

Acquisition  
Time: Less than two minutes

### Navigation Outputs

Latitude, longitude, and height with a position accuracy of  $\pm 30$  meters, 2 drms (without SA) are available on the RS-232 ports.

### Tracking Modes

In its default tracking mode, the Model 8821 automatically tracks one to twelve satellites, as available, on a stationary platform.

Two other modes, one for use on a moving platform and the other for use with an operator-entered fixed position, can be selected.

### Timekeeping

The Model 8821 normally accumulates Universal Time (UTC). By command, this may be changed to local time. When local time is used, automatic daylight savings time adjustments are made at preprogrammed dates. Leap second and leap year adjustments are made automatically. Time is available on the RS-232 ports with a resolution of one millisecond.

### IRIG B Time Code Output

Format: Modulated IRIG B 122

Level: 3 Vpp nominal

Drive: Will drive 50  $\Omega$

Mod. Ratio: Adjustable 2:1 to 6:1

Phase: Modulated code on-time mark adjustable to within  $\pm 10$  microseconds of on-time reference.

### Rate/DC Code Output

Frequency: One of the following may be selected: 1 PPH, 6 PPH, 12 PPH, 1 PPM, or 1 PPS - 1 MPPS in decade steps. IRIG B DC may be output in place of a selected rate.

Levels: TTL

Drive: 50  $\Omega$

Coherence: Within one microsecond of UTC

Connector: BNC, female

### 1 PPS Output

Levels: TTL

Pulse Width: 100 microseconds

Drive: 50  $\Omega$

Coherence: Within 100 nanosecond of UTC

Connector: BNC, female

Specifications subject to change without notice.

### High Rate Output (Sinewave)

Frequency: Same as internal oscillator (10 MHz standard, others optional)

Level: 1 Vrms  $\pm$  10%

Drive: 50  $\Omega$

Coherence: Phase coherent to 1 PPS

Connector: BNC, Female

### Optional Output Frequencies

Other available frequency outputs (Model 8821B & D only) include 5 MHz, 1.544 MHz, and 2.048 MHz.

### Optional TTL Rate Output

TTL levels on High Rate Output in place of sinewave. Drive is 50 $\Omega$ .

### Status Output

Three contacts of a Form-C relay provide tracking status output on a 9-pin connector. Contact rating is 1/2 amp. Also on this connector is status at TTL logic levels.

### Remote Setup and Status

Remote setup and status commands are via the RS-232 Port.

### Physical

Model 8821A chassis is 19" wide X 1.72" high X 9" deep.  
Model 8821B chassis is 19" wide X 3.47" high X 9" deep.  
Model 8821C chassis is 19" wide X 1.72" high X 12" deep.  
Model 8821D chassis is 19" wide X 3.47" high X 12" deep.

Weight is 9 pounds.

Power: 100 - 240 VAC, 48 - 440 Hz  
(24 or 48 Vdc Optional)

### Temperature

Main Unit: -10<sup>0</sup> to + 50<sup>0</sup> C  
Antenna: -40<sup>0</sup> to + 70<sup>0</sup> C

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