

# Time and Frequency GPS Clock Model: 8821



## 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 an 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. Model 8821A is 1.75 inches high (1U), while the Models 8821D is 3.5 inches high (2U). All models are supplied with an active antenna.



## Specifications:

Internal Oscillator Options Parameters	B4A OCXO (Standard Model 8821)	Rubidium Oscillator (Standard Model 8821D)
Accuracy while Tracking (one-hour averaging)	$<1 \times 10^{-11}$	$<1 \times 10^{-12}$
Frequency Accuracy in Holdover	$<1 \times 10^{-9}/\text{day}$	$<2 \times 10^{-11}/\text{day}$
1 PPS Drift in Holdover	1-3 $\mu\text{s}/\text{hour}$ (first 8 hours)	$<+2 \mu\text{s}/24 \text{ hrs}$
Phase Noise @ 10 Hz Offset	$<-100 \text{ dBc}$	$<-90 \text{ dBc}$
Phase Noise @ 100 Hz Offset	$<-130 \text{ dBc}$	$<-128 \text{ dBc}$
Phase Noise @ 1 KHz Offset	$<-135 \text{ dBc}$	$<-140 \text{ dBc}$
Phase Noise @ 10 KHz Offset	$<-140 \text{ dBc}$	$<-148 \text{ dBc}$
Harmonic Distortion	$<-40 \text{ dBc}$	$<-30 \text{ dBc}$
Spurious	$<-100 \text{ dBc}$	$<-80 \text{ dBc}$

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

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

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## High Rate Output (Sinewave)

Frequency:	Same as internal oscillator (10 MHz standard)
Level:	1 Vrms $\pm$ 10%
Drive:	50 $\Omega$
Coherence:	Phase coherent to 1 PPS
Connector:	BNC, Female

## 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 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

Specifications subject to change without notice.