

# Specifications-2U-01

## GPS-Disciplined-Rubidium Clock

### 2U-01

Miniature GPS-Rubidium  
Main Features



#### Main Features

- 5, 10 MHz output or any frequency to 100 MHz
- Ageing to  $2 \times 10^{-11}$  per month
- High Thermal Stability to  $2 \times 10^{-11}$  (0 to 50 °C)
- Low 1 second Allan Deviation of  $5 \times 10^{-12}$
- 5V, 12V and 24 V versions a
- Low Cost

#### Optional Features

- Programmable Frequency Outputs
- External locking input. Synchronize rubidium to external signal (GPS, 1pps, 10 MHz etc.)
- Very Low Phase Noise options
- Fully encased versions with AC power supplies and multiple outputs

## Output

### General Description

Precision Test Systems manufacturer and supplies many different types of rubidium oscillators. Rubidium oscillators

are typically 30 times more stable than the best crystal oscillators but often don't cost much more. Outputs can be Sinewave, Squarewave (TTL, ECL, CMOS levels). Different frequencies like 1 pps or any frequency to 100 MHz.

### Applications

- UMTS and CDMA Base Stations
- Satellite, Communication and Navigation Systems
- General Workshop frequency standard
- Replacement for expensive low ageing crystal oscillators

Output frequency

10 MHz sine wave

Amplitude 0.5 Vrms,  $\pm 10\%$

Output Pulse: 1 pps

Phase noise (SSB)  $< -95 \text{ dBc/Hz}$  (1 Hz offset)  $< -130 \text{ dBc/Hz}$  (10 Hz),  $< -145 \text{ dBc/Hz}$  (100 Hz)

Spurious  $< -130 \text{ dBc}$  (100 kHz BW)

Harmonic distortion  $< -25 \text{ dBc}$

Return loss  $> 25 \text{ dB}$  @ 10 MHz

Accuracy at shipment  $\pm 5 \times 10^{-11}$

Ageing (after 30 days)  $< 1 \times 10^{-11}$  (72 hours),  $< 5 \times 10^{-11}$  (monthly),  $< 5 \times 10^{-10}$  (yearly)

Short-term stability  $< 2 \times 10^{-11}$  (1 s),  $< 1 \times 10^{-11}$  (10 s),  $< 2 \times 10^{-12}$  (100 s)

**(Allan deviation)  $< 1 \times 10^{-11}$  (10 s),  $< 2 \times 10^{-12}$  (100 s)**

Holdover 72 hour Stratum 1 level

**Time Drift:  $< 1 \text{ us}/72 \text{ hours}$  typical (after 30 days continuous operation)**

Frequency retrace  $\pm 5 \times 10^{-11}$  (72 hrs. off then 72 hrs. on)

Stability  $< 5 \times 10^{-12}$

Trim range  $\pm 2 \times 10^{-9}$  (0 to 5 VDC),  $\pm 1 \text{ ppm}$  (via RS-232)

Warm-up time  $< 6 \text{ minutes}$  (time to lock),  $< 7 \text{ minutes}$  (time to  $1 \times 10^{-9}$ )

Voltage sensitivity  $< 2 \times 10^{-11}$  (1 VDC supply change)

## Electrical

Input voltage +24 VDC (nom.), +22 VDC (min.), +30 VDC (max.)

Current 2.2 A (warm-up), 0.6 A (steady-state), at 25 °C (Note 1)

Protection ±30 VDC to any pin except rf out

RF protection 100 mA (stable w/ any termination)

Cal reference out 5.00 ±0.05 VDC

RS-232 9600 baud, 8 bits, no parity, 1 stop bit,

0 to 5V levels with X-on/X-off protocol

1 pps measurement ±10 ns (accuracy), ±1 ns (resolution)

1 pps output set ±10 ns (accuracy), ±1 ns (resolution)

## Environmental

Operating temperature -20 °C to +65 °C (baseplate)

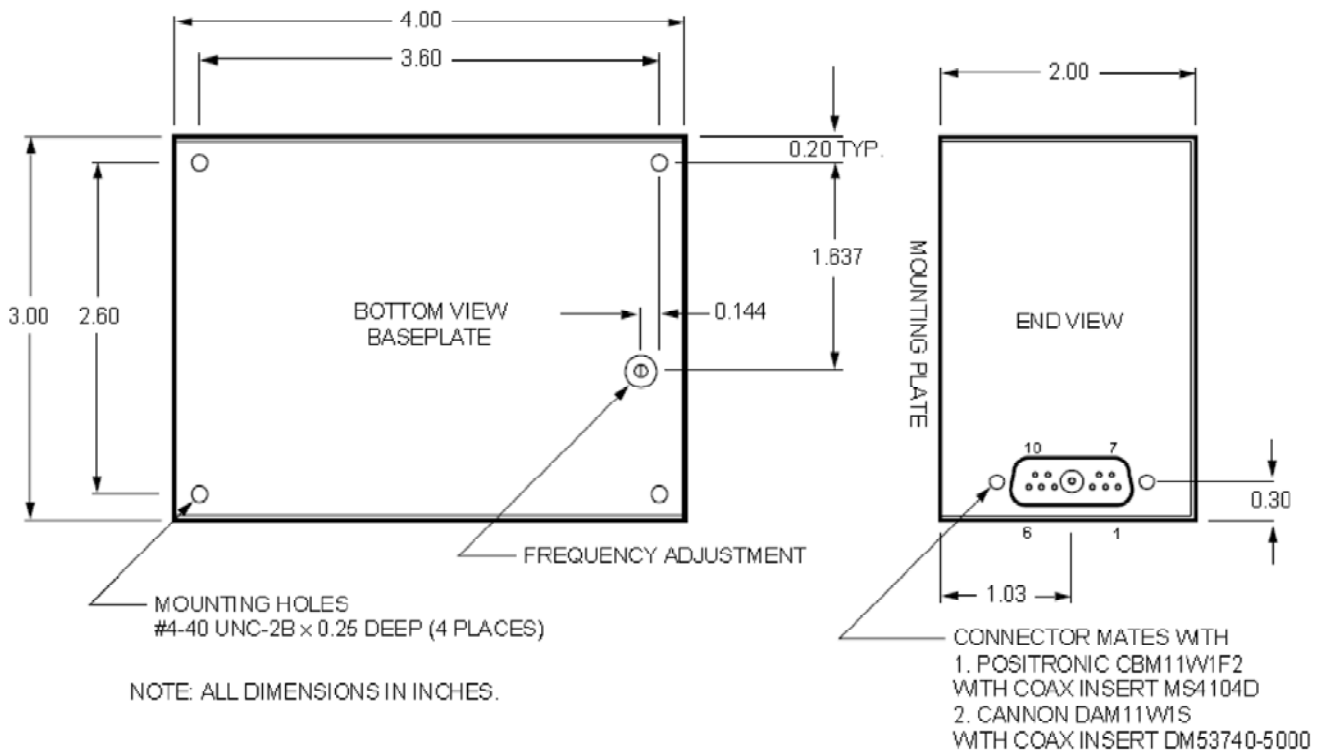
Temperature stability  $\pm 1 \times 10^{-10}$  (-20 °C to +65 °C baseplate)

Storage temperature -55 °C to +85 °C

Magnetic field  $< 2 \times 10^{-10}$  for 1 Gauss field reversal

Relative humidity 95 % (non-condensing)

## Mechanical



# Connector Pin 's assignment

- 1 LOCK/1PPS Lock indication and 1pps output.
  - 2 POT WIPER Ext. freq. calibration. Nom:+2.50 V. 0-5 V for  $\cdot \}2x10^{-9}$
  - 3 POT - Ground reference for external frequency calibration.
  - 4 TXD RS-232 data output or photo I/V monitor output
  - 5 1PPS\_IN 1pps input for time-tagging or photo-amp output
  - 6 +24(HEAT) +24 Vdc supply for discharge lamp and heaters
  - 7 RXD/EFC RS-232 data input or EFC monitor output
  - 8 POT + +5.00 Vdc reference output for external freq. cal. pot.
  - 9 +24(CLEAN) +24 Vdc supply for electronics (not heaters or lamp)
  - 10 GROUND Case ground and power supply return
- coax 10MHz 10 MHz sine output on center conductor

## Miscellaneous

Design life 20 yrs.  
Size 50.08 × 70.62 × 20.54 (HWD)  
Weight 1.32 lbs.  
Baseplate threads 4-40 (4 places)  
Connector Mates with ITT/Cannon

## DAM11W1S series

## Options

Built in GPS receiver  
External 1pps input (output 1 pps is aligned to rising edge of input 1 pps)  
Warranty Two year parts and labor on defects in materials and workmanship