

Features

- Superior shock and vibration performance characteristics
- 48-Hour Holdover
- Aging $<5E-11$ per month
- Single PWB with Surface Mount Technology
- Superior Ease of System Integration
- Meets GSM Frequency Requirements



RUBIDIUM PRODUCTS

Modules, Instruments and Militarized Components

8100 Ruggedized Rubidium Oscillator



Overview

The Datum 8100 is an enhanced version of our popular commercial rubidium oscillator. This ruggedized COTS rubidium oscillator is ideal for use in tactical applications where shock, vibration sensitivity, excess relative humidity and other environmental effects are a challenge. Designed for ease of integration into frequency and timing systems, the Datum 8100 offers a low profile and single circuit board construction that uses surface mount technology. The circuit board is conformal-coated for increased moisture resistance, and special precautions are taken for improved shock and vibration tolerance. The height and footprint easily

meet the requirements for 1U VME applications. Use of both a filtered D-Connector for I/O signals and an outer mu-metal cover minimizes EMI emissions and susceptibility. For ease of integration, the Datum 8100 only needs one input supply voltage and will allow direct plug-in into another circuit board.

The long life rubidium lamp and extended crystal control range of the Datum 8100 helps extend operating periods, minimize maintenance and gives acceptable performance of more than a decade. By design, the Datum 8100 provides a stable frequency with good short and long-term

stability, and excellent spur performance. A 5V CMOS-compatible alarm signal derived from the basic physics operation indicates when output frequency is outside roughly $+5E-8$ of absolute frequency offset. The low temperature coefficient and excellent frequency stability extend holdover performance.

Suitable applications include shipboard, airborne, navigation timing, range timing and other tactical applications that need the performance level associated with rubidium technology in a commercial off the shelf (COTS) package.



Timing, Test & Measurement

8100 Ruggedized Rubidium Oscillator



Specifications

Electrical Specifications

Output/Frequency/Waveform		10 MHz sine wave
Output Level (+7.8 ± 0.8 dBm)		0.55 V rms ± 0.05 V rms into 50Ω
Output Impedance		50Ω @10 MHz
Phase Noise (SSB)	1 Hz	-75 dBc/Hz
	10 Hz	-89 dBc/Hz
	100 Hz	-128 dBc/Hz
	1000 Hz	-140 dBc/Hz
	10 kHz	-147 dBc/Hz
Spurs		
Harmonic	2 nd	<-51 dBc
	Other:	<-65 dBc
Non-Harmonic	1 Hz to 1 kHz	<-89 dBc
	1 kHz to 10 kHz	<-97 dBc
	10 kHz to 100 kHz	<-100 dBc
	>100 kHz to 1 GHz	<-68 dBc
	Aging	
Monthly (after 1 month):	<5E-11/month	
10 years	<1E-9	
Frequency Accuracy At Shipment		±5E-11(25° C)
Frequency Retrace		<±2.5E-11
(after 24 hrs power on @ 25° C & up to 48 hrs power off)		
Short Term Stability		
	τ =1 sec	<2.5E-11
	τ =10 sec	<0.8E-11
	τ =100 sec	<0.25E-11
Frequency Control		
Internal trim range (trimpot):		≥ ±1.5E-9
External trim range (electronic):		≥ ±1.5E-9(0V to +5V)
Warm-up		
	(at -20° C)	(at 25° C)
Time to Lock	<8.7 min	<5.4 min
Time to <1E-9	<10.2 min	<7.3 min
Time to <4E-10	<12.7 min	<10.6 min
Max. Input (Amps) @ 24 V	<1.45 amps	<1.43 amps
Input Voltage Range		+19 TO 32 Vdc
Voltage Sensitivity		.72E-11/V (over input voltage range)
Input Power, Quiescent		+24Vdc <13W@25° C
		+19Vdc <7W@65° C
Status Monitor		
Analog	VCXO volts, lamp volts	
	(20 kOhm impedance, filtered)	
Digital	LOCK monitor: 5V CMOS load	
Lock	<0.2V (CMOS Low)	
Unlock	>2.5V (CMOS High)	

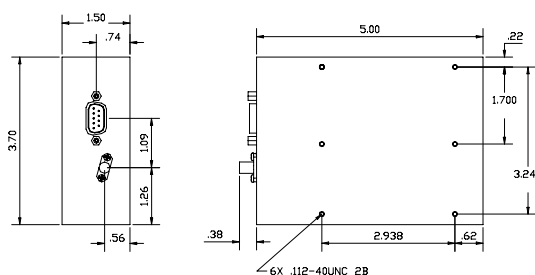
Environmental Specifications

Operating Temperature	-25° C baseplate to +70° C BP 0° C to +50° C	
Temperature Coefficient	γ (70° C)-γ(-25° C)	<6E-10
	γ (50° C)-γ(0° C)	<3E-10
Storage Temperature	-55° C to +85° C	
Altitude	Operating	-200 ft to 70,000 ft.
	Non-operating	-200 ft to 70,000 ft.
Magnetic Field Sensitivity, dc (±2 GAUSS)	±4E-11/GAUSS	
Relative Humidity	≤ 80%, Non condensing; meet or exceed Bellcore TR-NWT-000063, Issue 5, Section 4.2.1 (over 1.7° C-49° C ambient)	
Vibration	Non-Operating	Mil Std 202 Method 214 Test Cond. 1-3 G's RMS Random
	EMI	Compliant to FCC Part 15 Class B (conducted and radiated emissions) and complies with EN55022B emissions (radiated and conducted) and EN50082-1 (immunity)
MTBF	Per Bellcore TR-NWT-00332, (Ground Fixed, Controlled)	
	Amb. Temp	20° C
MTBF (hrs)		
381,000		
351,000		
320,000		
253,000		
189,000		
134,000		
(RELEX software V5.1, part stress, MET 1 case 3)		

Physical Specifications

Weight	1.10 lbs. maximum
Size	3.7" x 5.0" x 1.5" H
Warranty	2 years
Extended Warranty	Consult factory
Note: Consult factory for application support, test reports or special requirements.	

Outline Dimensions



Specifications subject to change without notice.