Rubidium Frequency Standard

AR61A-08

Full Military Qualifications/ Low Temp. Radiation Hardening

Key Features

- MIL-E-5400 and MIL-STD -810F
- Low phase noise under vibration
- Wide temperature range -54°C to +71°C (95°C Emergency)
- Radiation Hardening
- 26VDC per MIL-STD-704D
- Vibrations: MIL-STD-810F
- Shock: 15g
- Humidity: 100% Sealed Enclosure
- EMI/RFI: MIL-STD-461E
- Fast Warm Up < 3.8 min to lock at -55°C
- Altitude: 50,000 ft
- Low Power: 10W @ steady state
- MTBF: > 150,000 hours @ 50ºC, AIC
- 82.5 x 82.5 x 114.3 mm (3.25 x 3.25 x 4.5 inch)
- 2.2Kg / 4.6 lbs
- Excellent for Airborne applications

Introduction

AR61A-08 is a very high performance Rubidium Frequency Standard, designed to operate reliably in demanding application and harsh environment. It performs over a very wide temperature range, provides high stability, even under sever vibration and very fast warm-up, even at -54°C. The unit meets or exceeds the most severe military requirements. This rugged unit is especially useful in airborne applications as well as mobile ground operation. The AR61A-08 also includes a microprocessor, which optimizes its performance vs. external disturbances. It has a unique holdover mode, which keeps the internal OCXO running with the last memorized frequency when lock is lost. In addition, a built in synthesizer allows a very fine digital frequency control over a wide range.

Applications

- Communication
- Telemetry test fields
- Field calibration

Any other applications which requires accurate source of frequency & time

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SPECIFICATION

All specs are at room temperature, quiescent conditions, sea level ambient unless otherwise specified
Some combinations of options are not available

Outputs	
Frequency	5MHz, Square wave

Output Performance			
Accuracy	±5E–11 @ Shipping		
Long Term Stability (Aging)	4E-11 / month 3.6 E–10 / year		
Short Term Stability (Allan Deviation)	3E-11 @ 1 sec 1E-11 @ 10 sec 3E-12 @ 100 sec		
Waveform	Square wave		
Output Level	+1.3 Vp-p to +2.25 Vp-p / 50Ω load (50 ohm + 2%), Duty Cycle (D.C.) 50+5% without DC voltage.		
Phase Noise dBc / Hz from Carrier	Frequency	Quiescent	Vibration
	1Hz	≤ -80	≤ -70
	10Hz	≤ -115	≤ -85
	100Hz	≤ -140	≤ -103
	300Hz	≤ -148	≤ -116
	1000Hz	≤ -150	≤ -130
	100KHz (Floor)	≤ -153	≤ -153
Non–Harmonic Distortion dBc / Hz from Carrier	100Hz to 100KHz	≤ -138	≤ -130
	100 KHz to 3MHz	≤ -80	≤ -80
Warm-Up Stability	To lock, @ -54ºC, 3.8 minutes To 5E-10 @ -54ºC, 10 minutes		

Power Supply		
Input Voltage	23.4 to 28.6 VDC (MIL-STD-704D) typ. 26VDC	
Power	Warm-up @-55ºC	161 W Peak Max @ 27.3V
	@Steady State	<20W @ 26 VDC, 25ºC <28 W @-54ºC

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Environmental			
		Operating	**None Operating**
Temperature (MIL-E-5400 Class 2)	Temperature	-54ºC to +71ºC	-57ºC to +95ºC
	Stability Over Temperature	±5E-10	
	Emergency Temperature	95ºC 30 minutes Intermittent	
Altitude		Test in accordance with MIL-STD-810, Method 500.4, Procedure II. Up to 50,000ft	Test in accordance with MIL-STD-810, Method 500.4, Procedure I.
Acceleration		N/A	18 G forward, 6.1 G side, 11 G up, 12 G down, 2.7 G aft
Explosive Decompression:		Test in accordance with MIL-STD-810, Method 500.4, Procedure III, except in Step 1, the module is operating.	Test in accordance with MIL-STD-810, Method 500.4, and Procedure III.
Radiation		Contact factory for more details	
Humidity:		MIL-E-5400	Up to 100%, including condensation
Random Vibration		Units: x E-3 g2/Hz @ 10 Hz 3.36 @ 30 Hz 0.84 @ 50 Hz 0.088 @ 100 Hz 0.051 @ 500 Hz 0.030 @ 1000 Hz 0.012 @ 2000 Hz 0.005 Total: 0.24 grms	
Mechanical Shock (Including Shock Mount)		Test in accordance with MIL-STD-810, Method 516.5,Procedure I.	
Explosive Atmosphere		MIL-STD-810, Method 511.4, Procedure I.	
Vibration		Test in accordance with MIL-STD-810, Method 514.5, Procedure I, and duration of 1 hour per axis in each of three mutually perpendicular axes.	Test in accordance with MIL-STD-810, Method 514.5, Procedure I, and duration of 2 hours per axis in each of three mutually perpendicular axes.
Fungus		Show no signs of fungal growth after prolonged exposure to fungus growth as encountered in tropical climates	
Acoustic Noise:		MIL-STD-810, Method 515.5, Total SPL 140dB	
EMI/RFI		MIL-STD-461E	RE102, CS101, CS114, CS115, CS116

Dimensions & Weight		
Size:	Inches, nom, h/w/d	3.25 / 3.25 / 4.5
	cm, h/w/d	8.25 / 8.25 / 11.43
Weight/Volume:	Lbs./cubic inches	4.6 max / 47..5
	Kg/cubic cm	2.2 max / 779

Unit Diagnostics, Control and Calibration	
BIT Output	Composite Lock (98 %)
	No-Fault Logic Level – 0/1 TTL Compatible
Frequency Trim Range	3E–9
Setting Resolution	2E–11
Digital Frequency adjust	Digital Frequency adjusts via TxD RxD, <E-12 steps, >1E-6 range.

Reliability		
Reliability	**MIL-HDBK-217F** Airborne Inhabited Cargo (AIC).	150,000 hours @ 50ºC ambient temp
		114,000 hours @ 60ºC ambient temp.
		80,000 hours @ 71ºC ambient temp

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