



# 8130A

## Militarized Rubidium Oscillator

### KEY FEATURES

- Modern Militarized Design
- COTS/smd/pem Devices for Lower Cost, Enhanced Features and Improved Performance
- RS-232 Digital Control and Monitoring
- Ruggedized High Performance Rb Physics Package
- Dual 5 or 10 MHz Sine or Squarewave Outputs
- Separate Heater and Electronic Power Lines
- Low Phase Noise Option
- Internal Temperature Compensation Option

The Symmetricom 8130A is an enhanced version of our popular M-100 rubidium oscillator. This modern, off-the-shelf militarized rubidium oscillator is ideal for use in tactical applications where shock, vibration, humidity and other environmental factors are a challenge. The circuit boards are conformal-coated for moisture resistance, and special precautions are taken for improved shock and vibration hardening. Use of a filtered power/monitor connector minimizes EMI emissions and susceptibility. Designed for ease of integration into frequency and timing systems, the Symmetricom 8130A offers a smaller size MIL atomic frequency reference with a heritage of over 25 years of proven experience in the design, qualification and production of atomic frequency references.

The long life rubidium lamp and extended crystal oscillator control range of the Symmetricom 8130A minimizes maintenance requirements. The Plastic Encapsulated Microcircuits (PEM) devices are subjected to a proprietary qualification process for improved reliability.

The 8130A provides a stable frequency with good short and long-term stability, and excellent overall performance. The unit includes an RS-232 digital interface for monitoring and frequency adjustments.

Suitable applications include ground, ship-board and airborne navigation, timing and other tactical applications that need the performance level associated with rubidium technology in a militarized off-the-shelf package.



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## 8130A Specifications

### ELECTRICAL SPECIFICATIONS

- Output frequency/waveform: 5 or 10 MHz sine or square wave
- Output level (2 outputs):  $7.0 \pm 1.5\text{dBm}$  (each output)  
0.5 V rms nominal into  $50\Omega$
- Output impedance:  $50\Omega$  nominal @ 5 or 10 MHz
- Phase noise (SSB), E(f), dBc/Hz
 

SB Freq	Standard 10 MHz	Low Noise 5 MHz	Low Noise 10MHz
1 Hz	-70	-95	-85
10 Hz	-90	-125	-115
100 Hz	-120	-140	-140
1 kHz	-135	-150	-150
10 kHz	-140	-150	-150
100 kHz	-140	-150	-150
- Spectral purity
 

Harmonics:	<-30dBc
Non-harmonics:	<-80dBc
- Aging
 

Monthly (after 1 month):	<3.0E-11/month
10 years:	<1.0E-9
- Frequency accuracy at shipment:  $1.0\text{E}-11$  (@  $+25^\circ\text{C}$ )
- Frequency retrace: <5.0E-11
- Short term stability  $\sigma$  ( $\tau$ )
 

t (sec)	Standard 10 MHz	Low Noise 10MHz
1	<3.0E-11	<3.0E-11
10	<1.0E-11	<3.0E-11
100	<3.0E-12	<3.0E-12
- Frequency control
 

Analog freq. adj. range:	1.0E-9
Digital freq. adj. res:	3.4E-13
- Warm-up
 

	at $-40^\circ\text{C}$	at $+25^\circ\text{C}$
Time to lock:	<14 min	<8 min
Time to 2.0E-10:	<19 min	<12 min
5.0E-10:	<17 min	<10 min
Max. input (Watts) @ 28 V:	<35 Watts	<35 Watts
Steady-state (Watts) @ 28 V:	<22 Watts	<15 Watts
- Input voltage range: +22 to 32 Vdc, protected against reverse polarity and transients  
(Separate heater and electronic power lines)
- Voltage sensitivity:  $5.0\text{E}-12$  (10% voltage change from nom. 28 Vdc)
- Input power, quiescent: +28 Vdc < 12W @  $+25^\circ\text{C}$  baseplate  
+28 Vdc < 8W @  $+68^\circ\text{C}$  baseplate
- Status indicators (TTL logic)
 

Lock (BITE)	Oven demand
RF O/P	
Light	
- Analog monitors (0-12Vdc):
 

Light	Control voltage
Lamp oven	Cavity oven
Signal	
- RS-232 control/monitor interface
 

Provides ID, status/monitor information, and frequency/operating parameter adjustments. Protocol: 9600, 8, 1, None, No flow control.

Note: Consult factory for application support, complete SCD, test reports or special requirements.

### ENVIRONMENTAL & PHYSICAL SPECIFICATIONS

- Temperature
 

Operating:	-40°C ambient to +68°C baseplate
Storage:	-62°C to +85°C
Sensitivity:	<3.0E-10 over op. temp. range
- Thermal shock (non-operating)
 

MIL-STD-202, Method 107, Test Condition A, 10 cycles -40°C to +68°C
- Orientation sensitivity: <5.0E-11 for any orientation
- Pressure sensitivity: <1.0E-13/mbar
- Altitude
 

Operating:	Sea level to 40,000' (12,192 m)
Non-operating:	Sea level to vacuum
- Static acceleration: <5.0E-11 for 10 g in any direction
- Magnetic field sensitivity: <2.0E-11/Gauss
- Relative humidity (operating): 0 to 95% RH per MIL-STD-810, Method 507.1, Procedure II
- Salt fog: MIL-STD-810, Method 509.1, Procedure 1
- Vibration
 

Operating:	MIL-STD-810E, Method 514.4, Category 10
Non-operating:	MIL-STD-202, Method 204, Test Condition A, 0.3 in. DA (Sine) 10g to 500 Hz
- Shock
 

Non-operating:	MIL-STD-202, Method 213, Test Condition J, 30g, 11msec, half-sine
Acoustic noise:	MIL-STD-810, Method 512.2
- EMI
 

MIL-STD-461 for Class A1 and A3 Equipment	
Emissions:	CE03, CE07, RE02
Susceptibility:	CS01, CS02, CS06, RS02, RS03
- MTBF
 

MIL-HDBK-217F,	90,000Hrs. @+40°C baseplate
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- On-Off cycling endurance: 3600 cycles at any temperature
- Life: 20 years
- Dimensions
 

Height:	2.87" (7.28 cm)
Width:	2.92" (7.41 cm)
Depth:	4.04" (10.26 cm)
- Weight: <2.0 lbs. (0.90 Kg) maximum
- Warranty: 1 year

### OPTION

- 8130 with M-100 Adapter Kit

### Part No.

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