



8130A

Militarized Rubidium Oscillator

KEY FEATURES

- Modern Militarized Design
- 5 and 10 MHz Sinewave Outputs
- RS-232 Digital Control and Monitoring
- Ruggedized High Performance Rb Physics Package
- 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 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 wave
- Output level (2 outputs): $7.0 \pm 1.5\text{dBm}$ (each output)
0.5 V rms nominal into 50Ω
- Output impedance: 50Ω nominal @ 5 or 10 MHz
- Quiescent 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: $<-30\text{dBc}$
 - Non-harmonics: $<-80\text{dBc}$
- Aging
 - Monthly (after 1 month): $<5.0\text{E}-11/\text{month}$
 - 10 years: $<1.0\text{E}-9$
- Frequency accuracy at shipment: $1.0\text{E}-11$ (@ $+25^\circ\text{C}$)
- Frequency retrace: $<5.0\text{E}-11$
- Short term stability σ (τ)

t (sec)	Standard 10 MHz	Low Noise 10MHz
1	$<3.0\text{E}-11$	$<3.0\text{E}-11$
10	$<1.0\text{E}-11$	$<3.0\text{E}-11$
100	$<3.0\text{E}-12$	$<3.0\text{E}-12$
- Frequency control
 - Analog freq. adj. range: $1.0\text{E}-9$
 - Digital freq. adj. res: $3.4\text{E}-13$
- Warm-up

	at -40°C	at $+25^\circ\text{C}$
Time to lock:	<14 min	<8 min
Time to $2.0\text{E}-10$:	<19 min	<12 min
$5.0\text{E}-10$:	<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 $< 12\text{W}$ @ $+25^\circ\text{C}$ baseplate
 $+28$ Vdc $< 8\text{W}$ @ $+68^\circ\text{C}$ 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.

ENVIRONMENTAL & PHYSICAL SPECIFICATIONS

- Temperature
 - Operating: -40°C ambient to $+68^\circ\text{C}$ baseplate
 - Storage: -62°C to $+85^\circ\text{C}$
 - Sensitivity: $<3.0\text{E}-10$ over op. temp. range
- Thermal shock (non-operating)
 - MIL-STD-202, Method 107, Test Condition A, 10 cycles -40°C to $+68^\circ\text{C}$
- Orientation sensitivity: $<5.0\text{E}-11$ for any orientation
- Pressure sensitivity: $<1.0\text{E}-13/\text{mbar}$
- Altitude
 - Operating: Sea level to 40,000' (12,192 m)
 - Non-operating: Sea level to vacuum
- Static acceleration: $<5.0\text{E}-11$ for 10 g in any direction
- Magnetic field sensitivity: $<2.0\text{E}-11/\text{Gauss}$
- 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
 - Emissions: CE102, RE102
 - Susceptibility: CS101, CS114, RS103
- MTBF
 - MIL-HDBK-217F, 90,000Hrs. @ $+40^\circ\text{C}$ baseplate
- 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

ORDERING INFORMATION

- | | Part No. |
|-------------------------------|-----------|
| • 8130 STD Configuration | 13633-101 |
| • 8130 with M100 Adapter | 13633-104 |
| • 8130 with (2) 10MHz Outputs | 13633-106 |
| • 8130LN (2) 10MHz Outputs | 13633-102 |
| • 8130LN (2) 5MHz Outputs | 13633-109 |



SYMMETRICOM, INC.
2300 Orchard Parkway
San Jose, California
95131-1017
tel: 408.433.0910
fax: 408.428.7896
info@symmetricom.com
www.symmetricom.com