



# 8200

## Ruggedized Rubidium Oscillator

### STANDARD FEATURES

- 10MHz Output
- Hermetically Sealed
- Shock/Vibration Hardened
- Digital Monitor & Control
- <1.0 Inches High

### OPTIONAL FEATURES

- 5MHz Output

The Symmetricom 8200 is a ruggedized rubidium oscillator designed for ground tactical, shipboard and airborne applications where superior frequency stability under diverse environmental conditions is required. Advanced communications, navigation and targeting systems require precision oscillators that can withstand a wide range of operating environments with minimal degradation in frequency accuracy and stability. The 8200 support these applications with superior phase noise and excellent short and long term frequency stability.

The 8200 is unique in that it combines excellent short and long term frequency stability in a small, low profile package measuring less than 1.0 inches high.

The long life rubidium lamp and extended crystal control range of the 8200 helps extend operating periods and minimize maintenance intervals. An alarm signal derived from the basic physics operation indicates when output

frequency is outside roughly  $\pm 5 \times 10^{-8}$  of absolute frequency offset. The low temperature coefficient and excellent frequency stability extend holdover performance.

The height and footprint easily meet the requirements for 1U VME applications. Use of a filtered D-Connector for I/O signals minimizes EMI emissions and susceptibility. For ease of integration, the Symmetricom 8200 only needs one input supply voltage and will allow direct plug-in into another circuit board.

The 8200 is designed around proven rubidium technology that has been deployed in numerous airborne, shipboard and ground tactical platforms for over thirty years.



8200 Rubidium Oscillator

## 8200 SPECIFICATIONS

[All specifications at 25°C unless otherwise noted]

### ELECTRICAL SPECIFICATIONS

- **RF Output** **8200**
  - Frequency: 5 or 10MHz
  - Format: Sinewave
  - Amplitude: 0.7V rms nominal
  - Load impedance: 50 ohms @ 5 or 10MHz
  - Connector: SMA
  - Qty: 1

### PERFORMANCE PARAMETERS

- Phase noise (SSB), E(f), dBc/Hz (Static)
  - SB Freq** 10 MHz
  - 1 Hz <-72
  - 10 Hz <-90
  - 100 Hz <-128
  - 1 kHz <-140
  - 10 kHz <-148
- Spectral purity
  - Harmonics: <-50dBc
  - Non-harmonics: <-75dBc (<150MHz)\*  
<-80dBc (>150MHz)  
\* <-70dBc at 147.5MHz ±300kHz
- Aging
  - Monthly (after 1 month): <±5.0E-11/month
- Frequency accuracy at shipment: <±5.0E-11 (@ +25° C)
- Frequency retrace <±5.0E-11 (on-off-on: 24h, 24H, 24H @ 25°C)
- Short term stability  $\alpha_y$  ( $\tau$ ) [Allan deviation]
  - $\tau$  (sec)
  - 1 <3.0E-11
  - 10 <1.0E-11
  - 100 <3.0E-12
- Frequency control
  - Digital freq. adj. res: ±1.0E-6 with 1.0E-12 resolution
  - Analog freq. [Optional] adj. range: ±6.5E-9, 0 - 5V into 5k $\Omega$
- Warm-up -40°C
- Time to lock: <8 min
- Time to <1E-9: <10 min
- Max. @ 28V: <20W
- Input voltage range: +15 to 32 Vdc
- Voltage sensitivity: <5.0E-12  
(10% voltage change from nom. 28 Vdc)

- Input power, quiescent:
  - +28 Vdc @ -40°C baseplate <16W
  - +28 Vdc @ +25°C baseplate <12W
  - +28 Vdc @ +80°C baseplate <8 W
- Lock Status (BITE)
  - TTL low = Lock
  - TTL high = Unlock
- 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 to +80° C baseplate
  - Storage: -55° C to +95° C
  - Sensitivity: <3.0E-10  
over op. temp. range
- Thermal shock (non-operating):
  - MIL-STD-202, Method 107, Test Condition A, 10 cycles -55° C to 85° 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 80,000' (24,384 m)
- Magnetic field sensitivity: dc(≤2Gauss)  
≤ ±4.0E-11/Gauss
- Relative humidity (operating):
  - 0 to 95% RH per MIL-STD-810, Method 507.4
- Salt fog: MIL-STD-810, Method 509.4
- Vibration: MIL-STD-810, Method 514.5, Procedure I
  - Operating: Category 24, Minimum Integrity, 7.7 grms @ 0.04 g<sup>2</sup>/Hz 20 Hz -1kHz, 15 min/axis (maintain lock)
  - Non-operating: Category 24, Minimum Integrity, 15.4 grms @ 0.16 g<sup>2</sup>/Hz 20 Hz -1kHz, 30 min/axis
- Shock: MIL-STD-202, Method 213
  - Operating: 30g, 11msec, half-sine (maintain lock)
  - Non-operating: 50g, 11msec, half-sine
- EMI
  - MIL-STD-461
  - Emissions: CE102, RE102
  - Susceptibility: CS101, CS114, RS103
- MTBF: MIL-HDBK-217F, 76,000 hours. Ground fixed @ +40°C baseplate
- On-Off cycling endurance: 5000 cycles at 10°C baseplate
- Input connector: (1) DB-15 (All input power, monitoring, I/O)
- Dimensions
  - Height: 0.95"
  - Width: 4.00"
  - Depth: 4.63"
  - Volume: 17.6 in<sup>3</sup>
  - Weight: <1.5 lbs



**SYMMETRICOM, INC.**  
2300 Orchard Parkway  
San Jose, California  
95131-1017  
tel: 408.433.0910  
fax: 408.428.7896  
[info@symmetricom.com](mailto:info@symmetricom.com)  
[www.symmetricom.com](http://www.symmetricom.com)