



# XPRO

## High-Performance Rubidium Oscillator

### STANDARD FEATURES

- 10MHz Output
- 1PPS Output
- $<5E-11$  per month aging
- Digital monitor & control
- RoHs 5/6 compliant

### OPTIONAL FEATURES

- $<1E-11$  per month aging

The Symmetricom XPRO is a high performance rubidium oscillator designed for a wide range of telecommunications and test and measurement applications. The XPRO is a drop in replacement for our venerable LPRO, which has been widely installed in wireless base station applications, RF test equipment and other applications where an embedded high performance oscillator is required.

The XPRO leverages over 35 years of proven rubidium atomic physics with advanced digital electronics architecture to provide an exceptionally stable oscillator that meets the most demanding performance requirements.

The XPRO with its low profile and standard connector interface is designed for ease of integration into time and frequency systems. Great care has been taken in the design to minimize EMI emissions and susceptibility, including the use of a filtered 9 pin D-connector, SMA for the RF output and a shielded outer cover.

The XPRO is designed for long operating periods without maintenance (long life Rb lamp, extended crystal control range). The XPRO, with a  $5E-11$  per month aging, will maintain  $1E-9$  frequency accuracy for 10 years or longer without recalibration. A low aging rate option is available for XPRO that will provide  $1E-11$  per month aging providing an even more robust reference source.

Standard outputs are 10MHz, 1PPS and a rubidium lock status bit. All monitoring and control is done via the RS-232 interface allowing the user access to comprehensive status and control parameters.



XPRO High-Performance Rubidium Oscillator

# XPRO SPECIFICATIONS

## ELECTRICAL SPECIFICATIONS

### RF Output

- Frequency: 10MHz
- Format: Sinewave
- Amplitude: +7.8 ± 0.8dBm
- Load impedance: 50Ω @ 10MHz
- Connector: SMA
- Qty: 1

### 1PPS Output

- Rise time: <5nS
- Pulse width: <20μS
- Level: >4.5V (15pF Load)
- Jitter: <1ns RMS
- Connector: DB-9
- Qty: 1

## PERFORMANCE PARAMETERS

- Phase noise (SSB), E(f), dBc/Hz
- SB Freq
  - 1 Hz <-80
  - 10 Hz <-90
  - 100 Hz <-128
  - 1 kHz <-145
  - 10 kHz <-155
- Spectral purity
  - Harmonics: <-60dBc
  - Non-harmonics: <-80dBc
- Aging
  - Monthly (after 1 month): <±5.0E-11/Month  
<1.0E-11/Month (option)
  - 10 years: <±1.0E-9
- Frequency accuracy at shipment: <±5.0E-11 (@ +25°C)
- Frequency retrace <±2.5E-11 (on-off-on: 24h, 48H, 24H at 25°C)
- Short term stability  $\alpha_y$  ( $\tau$ ) (Allan deviation)
  - $\tau$  (sec)
  - 1 <1.0E-11
  - 10 <3.2E-12
  - 100 <1.0E-12
- Frequency control
  - Analog freq. adj. range: ±1.5E-9 (0 - 5V) Digital freq. adj. res: ±1.0E-6 with 2.0E-12 resolution
- Warm-up
 

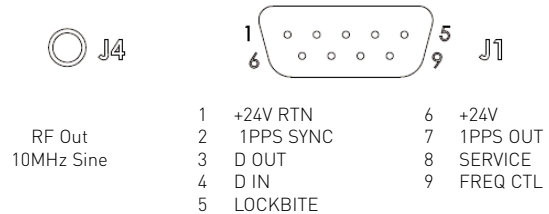
	<b>-20°C</b>	<b>+25°C</b>
Time to lock:	<8.7 min	<6 min
Time to <1E-9:	<10.2 min	<8 min
Time to <4E-10:	<12.7 min	<10.6 min
- Max input (Amps) @24V: <1.45A <1.43A
- Input voltage range: +19 to 32 Vdc
- Voltage sensitivity: 0.72E-11/V (over input voltage range)
- Input power, quiescent
  - +24 Vdc @ -25°C: <13W
  - +19 Vdc @ +65°C: <8.5W
- Lock status (BITE) 5VCMOS
  - low = Lock
  - high = Unlock
- RS-232 control/monitor interface
  - Provides ID, status/monitor information, and frequency/operating parameter adjustments. Protocol: 57,600, 8, 1, None, No flow control.

## ENVIRONMENTAL & PHYSICAL SPECIFICATIONS

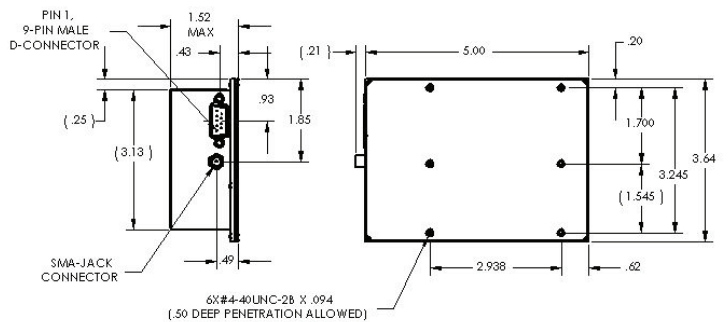
- Temperature
  - Operating: -25°C to +70°C baseplate
  - Storage: -55°C to +85°C
- Sensitivity: <6.0E-10 over op. temp. range <3E-10 (0°C to 50°C)
- Altitude
  - Operating: -200 to 40,000'
  - Non-operating: -200 to 70,000'
- Magnetic sensitivity: dc(≤2Gauss) ≤ ±1.0E-11/Gauss
- RH (operating): ≤85% non-condensing Meet or exceed Telcordia GR-63-CORE Issue .2, April 2002, section 4.1.2
- Vibration:
  - Operating: Meets or exceeds Telcordia GR-63-CORE Issue .2, April 2002 section 4.4.3 and 5.4.2 (no unlock, 1.0g peak sine @ 5 - 100Hz)
  - Non-operating: Telcordia GR-63-CORE, Issue .2, April 2002, section 4.4.4 and 5.4.3, curve 1 or Figure 4-3 (1.5g peak max sine @ 5-500Hz)
- EMI: Compliant to FCC Part 15 Class B (conducted and radiated emissions) and complies with EN55022B emissions (radiated and conducted) and EN55082-1 (immunity).
- MTBF:
 

Ground Benign	Temperature	MTBF
	20°C	1,175,359 hrs
	40°C	591,317 hrs
	60°C	243,402 hrs
- Input connector: (1) DB-9 (All input power, monitoring, 1PPS)
- RF Connector: (1) SMA
- Dimensions
  - Height: 1.5" (3.81cm)
  - Width: 3.7" (12.7cm)
  - Depth: 5.0" (9.4cm)
  - Weight: <1.1lbs (<500g)

## XPRO CONNECTION DIAGRAM



## XPRO OUTLINE DRAWING



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