LPRO

Low Profile Rubidium Oscillator

48-Hour Holdover for Mission Critical Applications

Features

- 10 MHz sine wave
- 1.5 in. total height
- <5E-11/month aging
- Low cost, single PWB design
- Single 24 Vdc supply; wide operating supply range (19 to 32V)
- Alarm signal for $\Delta f/f \geq \pm$ 5E-8 (Rb unlock) 5V CMOS compatible
- Meets TDMA and GSM frequency requirements without an external reference or routine calibration
- CE Compliant

Overview

The LPRO is designed for ease of integration into time and frequency systems because of its low profile and single circuit board design. The height and footprint are designed to accommodate a 1U VME application. Great care has been taken in the design to minimize EMI emissions and susceptibility, including the use of both a filter plate connector for I/O signals and an outer mu-metal cover. It is easy to integrate into a system, requiring only one input supply voltage and allowing direct plug-in into another circuit board. It offers the high reliability of a design that has been refined over many years from the experience gained in fielding tens of thousands of EFRATOM rubidium oscillators. It is a one-board package incorporating surface mount technology.

Suitable applications are telecom networks such as digital cellular/PCS base stations, SONET/SDH digital network timing, etc. Linked with a GPS receiver, the LPRO provides the necessary timing requirements for CDMA cellular and PCS systems. The low temperature coefficient and excellent frequency stability extend holdover performance when the GPS signals are not available.

The LPRO is designed for long operating periods without maintenance (long life Rb lamp, extended crystal control range) with a goal to exceed 10 years. The design provides a stable frequency with a good short and long term stability, and excellent spur performance. The LPRO provides a 5V CMOS-compatible alarm signal derived from the basis physics operation which indicates when output frequency is outside roughly ±5E - 8 of absolute frequency offset.

datum

LPRO

Low Profile Rubidium Oscillator

Electrical Specifications

Unless otherwise indicated, 24 Vdc input @25°C

• Output/Frequency/Waveform: 10 MHz sine wave

• Output Level: 0.55 VRMS ± 0.05VRMS into 50 Ω
[+7.8 ± 0.8 dBm]

• Output Impedance: 50 Ω @10 MHz

• Phase Noise (SSB):

1 Hz	-75 dBc/Hz
10 Hz	-89 dBc/Hz
100 Hz	-128 dBc/Hz
1000 Hz	-140 dBc/Hz
10 kHz	-147 dBc/Hz

• Spurs:

Harmonic:	2nd	<-51 dBc
	Other:	<-65 dBc
Non-Harmonic:	1 Hz to 1 kHz	<-89 dBc
	1 kHz to 10 kHz	<-97 dBc
	10 kHz to 100 kHz	<-100 dBc
	>100 kHz to 1 GHz	<-68 dBc

• Aging:

Monthly (after 1 month):	<5E-11/month
10 years	<1E-9

• Frequency Accuracy At Shipment: ± 5E-11 (25°C)

• Frequency Retrace: <±2.5E-11
(after 24 hrs power on @ 25°C & up to 48 hrs power off)

• Short Term Stability:

t=1 sec	<2.5E-11
t=10 sec	<0.8E-11
t=100 sec	<0.25E-11

• Frequency Control:

Internal trim range (trimpot):	≥ ±1.5E-9
External trim range (electronic):	≥ ±1.5E-9 (0V to +5V)

• Setting Resolution, trim pot: 1E-11

• Warm-up:

	(at -20°C)	(at 25°C)
Time to Lock:	< 8.7 min	< 5.4 min
Time to <1E-9:	<10.2 min	<7.3 min
Time to <4E-10:	<12.7 min	<10.6 min
Max Input (Amps) @24V:	<1.45 amps	<1.43 amps

• Input Voltage Range: +19 to 32.0 Vdc

• Voltage Sensitivity: .72E - 11/V (over input voltage range)

• Input Power, Quiescent: +24Vdc <13W @ 25°C
+19Vdc <7W @ 65°C

• Status Monitor:

Analog	VCXO volts, lamp volts (20 kOhm impedance, filtered)
Digital	LOCK monitor: 5V CMOS load
Lock:	0V to 50 mV (within ~±5E - 8)
Unlock:	4.2 to 4.7V

Environmental Specifications

• Operating Temperature: -25°C baseplate to +70°C BP
(-20°C baseplate to +70°C BP including warm-up)

• Temperature Coefficient:

|y (70°C) -y (-25°C)|	<6E-10
|y (50°C) -y (0°C)|	<3E-10

• Storage Temperature: -55°C to +85°C

• Altitude:

Operating:	-200 ft to 40,000 ft.
Non-operating:	-200 ft to 70,000 ft.

• Magnetic Field Sensitivity, dc (±2 GAUSS): ±4E - 11/GAUSS

• Relative Humidity: ≤85% non-condensing; meet or exceed Telcordia GR-63-CORE Issue 1, October 1995, section 4.1.2.

• Vibration:

Operating	Meets or exceeds Telcordia GR-63-CORE, Issue 1, October 1995, section 4.4.3 and section 5.4.2 (no unlock. 1.0 g peak sine @ 5-100Hz).
Non-operating (transportation)	Telcordia GR-63-CORE, Issue 1, October 1995, section 4.4.4 and section 5.4.3, curve 1 of Figure 4-3. (1.5 g 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 EN50082-1 (immunity).

• MTBF: Per Telcordia GR-63-CORE Issue 1, (Ground Fixed, Controlled)

Amb. Temp:	20°C	25°C	30°C	40°C	50°C	60°C
MTBF (hrs)	381,000	351,000	320,000	253,000	189,000	134,000

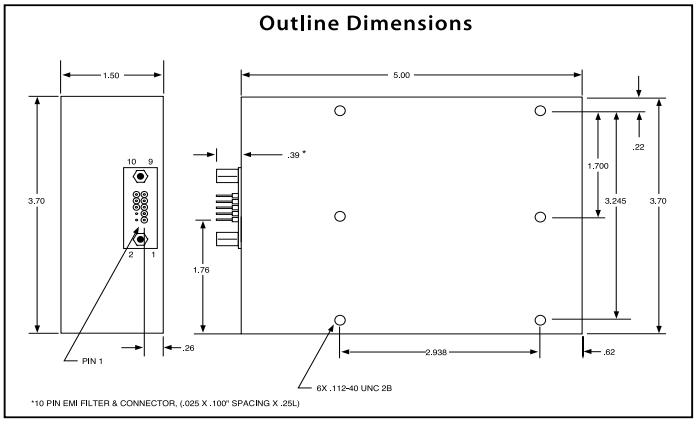
(RELEX software V5.1, part stress, MET 1 case 3)

Physical Specifications

• Weight:	1.10 lbs. max.
• Size:	3.7" X 5.0" X 1.5" H
• Warranty:	2 years
• Extended Warranty:	Consult factory

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

Outline Dimensions



DATUM, Inc.
3 Parker, Irvine, CA 92618-1696
Telephone (949) 598-7600; Fax (949) 598-7650
DATUM GmbH
Fichtenstr 25, D-85649 Hofolding (Munich) Germany
Telephone 081 04-66240; Telex 529701; Fax 081 04-662428

For more information call **1-800-337-2866** in the U.S. Or visit us on the World Wide Web at **http://www.datum.com** for continuously updated product specifications, news and information.

datum