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# DATUM 8000 LOW PROFILE RUBIDIUM OSCILLATOR

## KEY ADVANTAGES

- **48-Hour Holdover**
- **Aging <5e-11 per month**
- **Single PWB with Surface Mount Technology**
- **Superior Ease of System Integration**
- **Footprint and Height Fits 1U VME Requirements**



Designed for ease of integration into frequency and timing systems, the Datum 8000 offers a low profile and single circuit board construction using surface mount technology. The height and footprint easily meet the requirements for 1U VME applications. Use of both a filter plate connector for I/O signals and an outer mu-metal cover minimizes EMI emissions and susceptibility. For ease of integration, the Datum 8000 only needs one input supply voltage and will allow direct plug-in into another circuit board.



The long life rubidium lamp and extended crystal control range of the Datum 8000 help extend operating periods and minimize maintenance resulting in consistent performance for up to a decade or more. By design, the Datum 8000 provides a stable frequency with good short and long term stability, and excellent spur performance. A 5V CMOS-compatible alarm signal derived from the basis physics operation indicates when output frequency is outside roughly +5E -8 of absolute frequency offset.



Based on many years of refinement, the Datum 8000 Rubidium Oscillator offers high reliability supported by tens of thousands of field units. Suitable applications include digital network timing, navigation timing, and secondary references for simulators and GPS Receivers.

datum

Global Timing Solutions

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# DATUM 8000 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 50Ω
(+7.8 ± 0.8 dBm)

**•Output Impedance:** 50Ω @ 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 1GHz | <-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:**

| | |
|---|---|
| τ=1 sec | <1.5E-11 typ. |
| τ=10 sec | <5E-12 typ. |
| τ=100 sec | <1.5E-12 typ. |

**•Frequency Control:**

| | |
|---|---|
| Internal Trim Range (trimpot) | ≥±1.5E-9 |
| External Trim Range (electronic) | ≥±1.5E-9 (OV to +5V) |

**•Settings Resolution, trim pot:** 1E-11

**•Warm Up:**

| | (@ -20°C) | (@ 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:**

| | |
|---|---|
| ly (70°C)-y(-25°C)l | <6E-10 |
| ly (50°C)-y(-0°C)l | <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:** ≤80%, Non-condensing; meeting or exceeding Bellcore TR-NWT-000063, Issue 5, Section 4.2.1 [over 1.7°C - 49°C ambient]

**•Vibration:** Meets or exceed Bellcore TR-NWT-000063, Issue 5.

| | |
|---|---|
| Operation | Paragraphs 4.5.2, 4.5.4 (no unlock. 1.0 g Peak sine @ 5-500Hz) |
| Non-operating | Paragraph 4.4.1 (1.5 g peak max sine @ 5-500 Hz) |

**•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 Bellcore TR=NWT-000332, (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 |

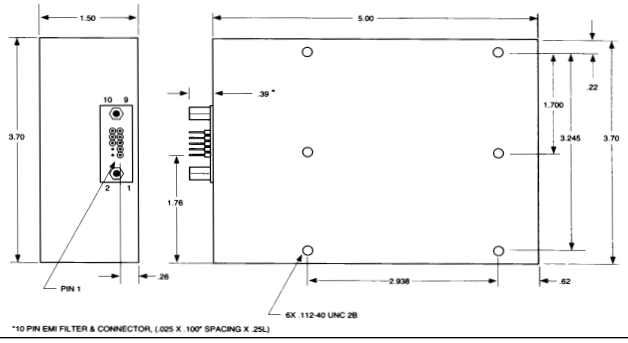
(RELEX software V5.1, part stress, MET 1 case 3)

## 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, text reports or special requirements.

Outline Dimensions




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