



9500

Satellite Master Oscillator

KEY FEATURES

- Output Frequency: 4 MHz - 25 MHz
- Power Consumption: 3.6W @ 25° C
- Size: 4.25" x 6.0" x 8.62"
- Radiation Rated to: 100 K Rad
- Frequency Aging @5MHz: 5.0E-11/Day, 1.5E-8/Year
- Temperature Coefficient
Standard: <math><1.0E-11/^{\circ}C</math>
Optional: <math><3.0E-12/^{\circ}C</math>
- Temperature Range: -20° C to +60° C
- Observed Allan Variance: 1.0E-13, 1-100 Second
- DAC Frequency Tuning

Symmetricom's 9500 is a master oscillator that produces a highly stable, low noise reference frequency output. Particularly suited to space applications, it delivers superior stability performance unsurpassed in the commercial community.

A mixture of through-hole and surface mount technology is enclosed in an insulating dewar to minimize environmental effects making this high performance oven-controlled quartz crystal oscillator ideal for satellite installations.

The oscillators EEE part selection is in accordance with MIL-STD-975/PPL-21 for Grade 1 or Grade 2 applications. The manufacture of these parts is in accordance with military specifications and are procured from approved QML/QPL sources of supply. The environmentally rugged 9500 features a SC-cut

quartz resonator and sustaining electronics controlled at precise temperature to achieve temperature insensitive performance, excellent short term stability, phase noise and aging characteristics.

These oscillators are suitable for direct installation as a component in equipment and systems as well as for use as a master frequency standard, local oscillator and time base.

The 9500 series satisfies a range of applications that include:

- A navigation payload frequency reference
- A GPS space borne frequency reference
- A land-mobile system frequency standard
- A satellite system on board frequency standard
- A remote station primary frequency standard



9500 Satellite Master Oscillators

9500 Specifications

ELECTRICAL SPECIFICATIONS

- Output level/load (duty cycle): 7.0dBm
(Optional TTL)
(Capable of multiple outputs)
- Electrical frequency control (EFC) Range: $\pm 2.0E-7$ Typical
- Short/long term stability
 - 1 second (Allan Deviation): 1.0E-12
 - 10 second (Allan Deviation): 5.0E-13
 - 100 second (Allan Deviation): 5.0E-13
 - 1000 second (Allan Deviation): 1.0E-12
- Frequency aging @5 MHz
 - Per day: 5.0E-11
 - Per year: 1.5E-8
- Phase noise @ 5MHz:

Offset frequency	L (f)
1 Hz	-116dBc/Hz
10 Hz	-140dBc/Hz
100 Hz	-150dBc/Hz
1K Hz	-157dBc/Hz
10K Hz	-165dBc/Hz
100K Hz	-165dBc/Hz
- Frequency vs. temperature: $\pm 3.0E-10$
- Harmonic distortion: -100dBc
- Non-harmonic distortion: -90dBc
- Frequency retrace: $\pm 2.0E-8$
(After up to 24 hrs. off & 1 hour on at 25°C)
- Input voltage
 - Range: 22 to 38 Vdc
 - Sensitivity (Ripple, variation): 200 mVpp, $\pm 2\%$

- Power
 - Steady state: 3.6 Watts @25°C
 - Vacuum: 2.9 Watts @25°C
- Warm-up power: 8 Watts
- Warm-up time from +25° C: ≤ 120 minutes to 2.0E-8
- Operating temperature range: -20°C to +60°C
- Storage temp. (non-operating): -40°C to +100°C
- Acceleration sensitivity @5 MHz:
 - Typical: 4.0E-9 per g
 - Option 1: 2.0E-9 per g (worst case axis)
- Random vibration: 20 grms
- Pyrotechnic shock: 3000 gs.
- Radiation rated: 100 krad (Si) Min.
- Mean time between failure: >10 million hours
(MIL-HDBK-217E)
- Physical
 - Size: 4.25" x 6.0" x 8.62"
(10.97 cm x 15.24 cm x 21.89 cm)
 - Weight: 96 ounces (2.72 Kg)
 - Volume: 219.81 cu inches (3604.8 cubic cm)

OPTIONS

- Serial DAC tuning
- Discrete telemetry and control
- Shock/vibration isolation



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