



# 9960

## Hybrid Space Qualified Temperature Compensated Crystal Oscillators

### STANDARD FEATURES

- Exceptional Long Term Frequency Accuracy
- Less than  $\pm 1$ ppm Temperature Stability
- 10 MHz to 1.2 GHz Output Frequency
- Mil-prf-38534 Class H or K Certified
- Fixed Frequency and Voltage Controlled
- Sine Wave, PECL Outputs
- Low Aging and Phase Noise
- Optimized Phase Noise
- Radiation Hardened
- Environmentally Robust
- Custom Applications

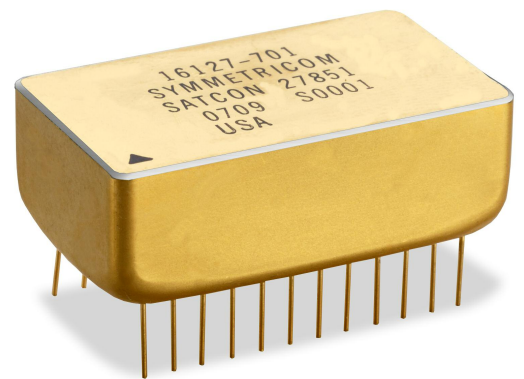
Symmetricom's thirty-five years of legacy of high reliability and performance quartz oscillators are now available in hybrid construction for applications that require minimal size, weight and power. The model 9960 is a temperature compensated crystal oscillator (TCXO) capable of fixed frequency and voltage controlled operation and is based on hybrid manufacturing technology.

The 9960 series of oscillators utilize 3rd or 5th overtone AT cut crystals in a Colpitts configuration with optional multiplication circuitry and output amplifier or driver stages. The precision crystals are contained within hermetic or vacuum sealed packages housed within the hybrid circuit package resulting in the lowest end of life frequency drift possible. Compensation is achieved by characterization of the individual crystals over temperature and the incorporation of specific components to offset the effect of changes in the temperature.

Output type and package are available in industry standard configurations to meet standard and custom applications.

These hybrid oscillators are based on heritage designs and manufacturing techniques proven for reliability in numerous space applications. The hybrids are manufactured in a mil-prf-38534 class K facility in a class 100,000 clean room that provides for the maximum reliability.

The model 9960 has demonstrated excellent performance after exposure to high levels of shock, vibration and radiation consistent with the rigorous requirements of space applications.

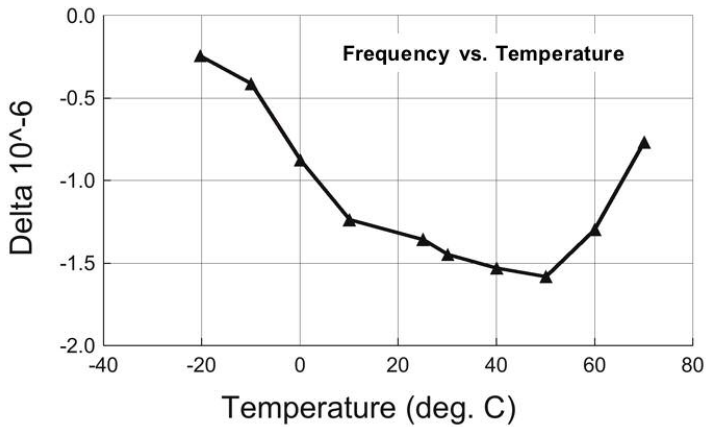


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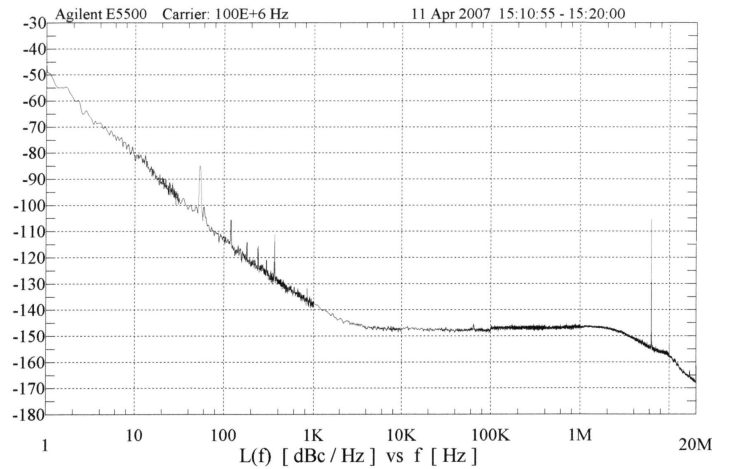
# 9960 Specifications

## ELECTRICAL SPECIFICATIONS

	9960	9961	9962
• Frequency:	10 MHz	100 MHz	100 MHz
• Package:	0.510" high	0.510" high	24 pin flatpack 0.30" high
• Aging			
ppm first year:	0.5	1	1
ppm over 10 years:	3	5	8
• Output:	7 dBm	7 dBm	7 dBm
• Tuning range:			
• Settability:	<0.5 ppm	<0.5 ppm	<0.5 ppm
• Phase noise:			
@ 1Hz dbc/Hz	-80	-45	-42
@ 10Hz dbc/Hz	-110	-75	-74
@ 100Hz dbc/Hz	-125	-105	-105
@ 1kHz dbc/Hz	-142	-135	-135
@ 10 kHz dbc/Hz	-155	-150	-150
• Temperature stability			
-40°C to 85°C:	N/A	±2	±2
-20°C to 70°C:	N/A	±1	±1
0°C to 50°C:	±0.5	±0.5	±0.5
• Power supply:	12 VDC +/-5% 15 mA	12 VDC +/-5% 15 mA	12 VDC +/-5% 15 mA
• Acceleration sensitivity:	2e-9/g	2e-9/g	2e-9/g
• Vibration:	20 grms for 20 minutes	20 grms for 20 minutes	20 grms for 20 minutes
• Acceleration	3000 g's	3000 g's	3000 g's
• Shock	500 g's 1 ms	500 g's 1 ms	500 g's 1 ms
• Radiation (total dose)	100 krad(Si)	100 krad(Si)	100 krad(Si)



Temperature Coefficient



Phase Noise



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