CRYSTAL OSCILLATOR DESIGN AND TEMPERATURE COMPENSATION

Marvin E. Frerking

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By **Marvin E. Frerking**

Frequency stability requirements of crystal oscillators become more stringent as their uses in communications technology become more sophisticated. Here is a book that answers the need for a thorough, up-to-the-minute, practical guide to crystal oscillators for designers of oscillator circuits. It shows how to design and optimize nearly any crystal oscillator used in commercial or military electronics, including logic gate and integrated circuit oscillators, and covers fully the latest technology in the field.

A selection guide is included which allows the designer to choose the best circuit for his specific application. Each oscillator circuit is analyzed, with its design equations and optimization procedures. Schematic diagrams for more than 20 circuits are included, with equations covering the entire frequency spectrum from several kHz to 150 MHz. The author provides a brief but comprehensive survey of basic oscillator theory, quartz crystal technology, and active circuits prior to discussing actual oscillator design.

Also presented are tests which can be conducted on the engineering models to determine with reasonable assurance whether the circuit will perform properly when produced in quantity. A thorough treatment of temperature compensation is presented that enables the design engineer to improve the stability of the oscillator by as much as two orders of magnitude. A unique method using a microprocessor is compared with three other methods of temperature compensation currently in use or under development—analog, digital, and hybrid.

(Continued on back flap)

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October 5,1999

Dr. John Vig
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