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Physics : Measurement Science, Instrumentation

Herres, David

Oscilloscopes: A Manual for Students, Engineers, and Scientists

- Introduces physical basis and characteristics of electrical and naturally occurring waves and how wave energy at the oscilloscope input becomes waveforms on the display
- Explains use of oscilloscopes in many applications in engineering and physics
- Reinforces concepts covered with case examples and end of chapter questions and solutions
- Describes the instrument's circuitry, methods for digitizing analog signals, signal processing and display, debugging prototypes, and troubleshooting faulty equipment
- Includes the oscilloscope's history, evolution, and recent development

This text presents readers with an engaging while rigorous manual on the use of oscilloscopes in laboratory and field settings. It describes procedures for measuring and displaying waveforms, gives examples of how this information can be used for repairing malfunctioning equipment and developing new designs, and explains steps for debugging pre-production prototypes. The book begins by examining how the oscilloscope displays electrical energy as traces on X and Y co-ordinates, freely transitioning without loss of information between time and frequency domains, in accordance with the Fourier Transform and its modern correlate, the Fast Fourier Transform. The book continues with practical applications and case studies, describes how oscilloscopes are used in diagnosing pulse width modulation (PWM) problems—looking at serial data streaming and analyzing power supply noise and premises power quality issues—and emphasizes the great functionality of mixed-signal as opposed to mixed-domain oscilloscope, and earlier instruments. Featuring many descriptions of applications in applied science and physics, *Oscilloscopes: A Manual for Students, Engineers, and Scientists* is ideal for students, faculty, and practitioners.

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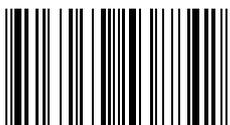
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