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Nota di contenuto	Cover; TOCContents; Preface; CH1. System Design; Dynamic Range; Calibration; Bandwidth; Processor Throughput; Avoiding Excess Speed; Other System Considerations; Sample Rate and Aliasing; CH2. Analog-to-Digital Converters; ADCs; Types of ADCs; ADC Comparison; Sample and Hold; Real Parts; Microprocessor Interfacing; Clocked Interfaces; Serial Interfaces; Multichannel ADCs; Internal Microcontroller ADCs; Codecs; Interrupt Rates; Dual-Function Pins on Microcontrollers; Design Checklist; CH3. Sensors; Temperature Sensors; Optical Sensors; CCDs; Magnetic Sensors; Motion/Acceleration Sensors Strain GaugesCH4. Time-Based Measurements; Measuring Period versus Frequency; Mixing; Voltage-to-Frequency Converters; Clock Resolution and Range; Extending Accuracy with Limited Resolution; CH5. Output Control Methods; Open-Loop Control; Negative Feedback and Control; Microprocessor-Based Systems; On-Off Control; Overshoot; Proportional Control; Proportional, Integral, Derivative Control; Motor Control; Predictive Control; Measuring and Analyzing Control Loops; PID Software Examples; Things to Remember in Control Design; CH6. Solenoids, Relays, and Other Analog Outputs; Solenoids;

Heaters

CoolersLEDs; DACs; Digital Potentiometers; Analog Switches; CH7. Motors; Stepper Motors; DC Motors; Tradeoffs between Motors; Power-Up Issues; Motor Torque; A Real-World Stepper Application; CH8. Electromagnetic Interference; Ground Loops; Electrostatic Discharge; CH9. High-Precision Applications; Input Offset Voltage; Input Resistance; Frequency Characteristics; Temperature Effects in Resistors; Voltage References; Temperature Effects in General; Noise and Grounding; Printed Circuit Board Layout; Statistical Tolerancing; Supply-Based References; Summary; CH10. Standard Interfaces IEEE 1451.2Fieldbus; CH11. Analog Toolbox; Microcontroller Supply and Reference; Resistor Networks; Multiple Input Control; AC Control; Voltage Monitors and Supervisory Circuits; Driving Bipolar Transistors; Driving MOSFETs; Reading Negative Voltages; Example Control System; Appendix A Opamp Basics; Opamp Configurations; General Opamp Design Equations; Nonresistive Elements; Reversing the Inputs; Comparators; Hysteresis; Instrumentation Amplifiers; Appendix B Pulse Width Modulation; Why PWM?; Real Parts; Frequency Limitations; Resolution Limitations; Power-Supply Considerations; PWM and EMI Audio ApplicationsPWM Hardware; PWM Software; Appendix C Useful URLs; Semiconductors; Motors; Other; Appendix D Python Code for Chapter 11; Excel Data for Chapter 4; Glossary; IDXIndex

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Sommario/riassunto

Analog Interfacing to Embedded Microprocessors addresses the technologies and methods used in interfacing analog devices to microprocessors, providing in-depth coverage of practical control applications, op amp examples, and much more. A companion to the author's popular Embedded Microprocessor Systems: Real World Design, this new embedded systems book focuses on measurement and control of analog quantities in embedded systems that are required to interface to the real world. At a time when modern electronic systems are increasingly digital, a comprehensive source on interfacing the re

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