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Nota di contenuto	Cover; Contents; Foreword; Preface; Acknowledgments; Chapter 1: Signal Paths from Analog to Digital; Introduction; A Refresher; Accuracy vs. Speed-Analog and Digital; Interface Electronics; The Basic Functions for Analog-to-Digital Conversion; Summary; Chapter 1 Quiz; Chapter 2: Signal Paths from Digital to Analog; Introduction; The Digital-to-Analog Portion; Filtering; Conditioning the Signal; Transducing the Signal; Summary; Chapter 2 Quiz; Chapter 3: Sensors; Introduction; Temperature Sensors; Angular and Linear Position; Rotation; Magnetoresistor Sensor; Pressure; Light Sensors Other SensorsSummary; Chapter 3 Quiz; Chapter 4: Signal Conditioning; Introduction; Amplification; Bipolar NPN Amplifier; Amplifier Frequency Response; Coupling; Small-Signal vs. Large Signal; Classes of Amplifiers; Field-Effect Transistor Amplifiers; A N-Channel JFET Amplifier Design; An NPN MOSFET Amplifier; Operational Amplifiers; Conditioning the Output of a Pressure Sensor; A More Sophisticated Pressure Sensor Amplifier; Current Mirror; Applications of

Op Amps; Oscillators; Power Amplifiers; Class B Audio Power Amplifier; Special Signals; RC Time Constants; Frequency Selection
Typical Application of Filters Summary; Chapter 4 Quiz; Chapter 5: Analog-to-Digital and Digital-to-Analog Conversions; Introduction; Decimal Equivalent of a Binary Number; Digital Codes of ADC; A Resistor Network DAC; A Simple Resistor-String DAC; A Simple Current-Steering DAC; Analog-to-Digital Converters (ADC); Successive Approximation Register (SAR) ADC; Capacitor Charge-Redistribution ADC; Highest Speed Conversions; Sample and Hold and Filters; Summary; Chapter 5 Quiz; Chapter 6: Digital System Processing; Introduction; Digital Processor or Digital Computer; What is a Microprocessor?
What is a Microcomputer? System Clarifications; Digital Signal Representations; Clock, Timing and Control Signals; Interrupts; Status Bits; More About Software; Sophisticated Programming Languages; How Parts of a Processor Perform Their Functions; Memory and Input/Output; Addressing Modes; Summary; Chapter 6 Quiz; Chapter 7: Examples of Assembly-Language Programming; Introduction; A Processor for the Examples; About the MSP430 Family; The CPU; Program Memory and Data Memory; Peripherals; Operation Control and Operating Modes; Watchdog Timer; System Reset; Interrupts Oscillators and Clock Generators Timers; Addressing Modes; More on MSP430 Control; Further Thoughts; Labels; Instructions; Operands; Hexadecimal Numbers; Comments; Programming Examples; Subprogram No. 1; Subprogram No. 2; Subprogram No. 3; Variation of Threshold; Summary; Chapter 7 Quiz; Chapter 8: Data Communications; Introduction; The Data Transmission System; Parallel and Serial Transmission; Protocols; High-Speed Data Transmissions; Serial Data Communications Advances; A Return to the Format; Shift Registers; USART Serial Communications; The UART Function with Software.
Technology Advances

Sommario/riassunto

Today's control system designers face an ever-increasing "need for speed" and accuracy in their system measurements and computations. New design approaches using microcontrollers and DSP are emerging, and designers must understand these new approaches, the tools available, and how best to apply them. This practical text covers the latest techniques in microcontroller-based control system design, making use of the popular MSP430 microcontroller from Texas Instruments. The book covers all the circuits of the system, including:
-Sensors and their output signals-Design and app
