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	Autore	Wilmshurst Tim
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	Nota di contenuto	Front cover; Title page; Copyright page; Table of contents; Introduction; Acknowledgements; Section 1 Getting Started with Embedded Systems; 1 Tiny computers, hidden control; 1.1 The main idea - embedded systems in today's world; 1.1.1 What is an embedded system?; 1.2 Some example embedded systems; 1.2.1 The domestic refrigerator; 1.2.2 A car door mechanism; 1.2.3 The electronic 'ping- pong'; 1.2.4 The Derbot Autonomous Guided Vehicle; 1.3 Some computer essentials; 1.3.1 Elements of a computer; 1.3.2 Instruction sets - CISC and RISC; 1.3.3 Memory types; 1.3.4 Organising memory 1.4 Microprocessors and microcontrollers 1.4.1 Microprocessors; 1.4.2 Microcontrollers; 1.4.3 Microcontroller families; 1.4.4 Microcontroller packaging and appearance; 1.5 Microchip and the PIC microcontroller; 1.5.1 Background; 1.5.2 PIC microcontrollers today; 1.6 An introduction to PIC microcontrollers using the 12 Series; 1.6.1 The 12F508 architecture; 1.7 What others do - a Freescale microcontroller; Summary; References; Section 2 Minimum Systems and the PIC® 16F84A; 2 Introducing the PIC® 16 Series and the 16F84A; 2.1 The main idea - the PIC 16 Series family; 2.1.1 A family overview 2.1.2 The 16F84A 2.1.3 A caution on upgrades; 2.2 An architecture overview of the 16F84A; 2.2.1 The Status register; 2.3 A review of memory technologies; 2.3.1 Static RAM (SRAM); 2.3.2 EPROM (Erasable

	Programmable Read-Only Memory); 2.3.3 EEPROM (Electrically Erasable Programmable Read-Only Memory); 2.3.4 Flash; 2.4 The 16F84A memory; 2.4.1 The 16F84A program memory; 2.4.2 The 16F84A data and Special Function Register memory ('RAM'); 2.4.3 The Configuration Word; 2.4.4 EEPROM; 2.5 Some issues of timing; 2.5.1 Clock oscillator and instruction cycle; 2.5.2 Pipelining; 2.6 Power-up and Reset 2.7 What others do - the Atmel AT89C2051 2.8 Taking things further - the 16F84A on-chip reset circuit; Summary; References; 3 Parallel ports, power supply and the clock oscillator; 3.1 The main idea - parallel input/output; 3.2 The technical challenge of parallel input/output; 3.2.1 Building a parallel interface; 3.2.2 Port electrical characteristics; 3.2.3 Some special cases; 3.3 Connecting to the parallel port; 3.3.1 Switches; 3.3.2 Light-emitting diodes; 3.4 The PIC 16F84A parallel ports; 3.4.1 The 16F84A Port B; 3.4.2 The 16F84A Port A; 3.4.3 Port output characteristics 3.5 The clock oscillator 3.5.1 Clock oscillator types; 3.5.2 Practical oscillator considerations; 3.5.3 The 16F84A clock oscillator; 3.6 Power supply; 3.6.1 The need for power, and its sources; 3.6.2 16F84A operating conditions; 3.7 The hardware design of the electronic ping- pong; Summary; References; 4 Starting to program - an introduction to Assembler; 4.1 The main idea - what programs do and how we develop them; 4.1.1 The problem of programming and the Assembler compromise; 4.1.2 The process of writing in Assembler; 4.1.3 The program development process 4.2 The PIC 16 Series instruction set, with a little more on the ALU
Sommario/riassunto	This book is a hands-on introduction to the principles and practice of embedded system design using the PIC microcontroller. Packed with helpful examples and illustrations, it gives an in-depth treatment of microcontroller design, programming in both assembly language and C, and features advanced topics such as networking and real-time operating systems. It is accompanied by a CD-ROM containing copies of all programs and software tools used in the text and a 'student' version of the C complier. Designing Embedded Systems with PIC Microcontrollers: Principles and Applications is i