

# Pic Projects And Applications Using C A Project Based Approach

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2024-09-25

## **EATON PARKER**

*Programming 32-bit Microcontrollers in C* Newnes

A microcomputer is a term used to describe systems that have a microprocessor, a memory (Data & Program), and input and output (I/O) devices. Additionally, other components such as timers, counters, and analog to digital (ADC) converters may be included in some microcomputer systems. Thus, a microcomputer system ranges from a large computer that has a hard disk, CD ROM, and printers to a bite-size single-chip embedded microcontroller. In this book, we will cover single silicon chip microcomputers. Such microcomputer systems are well-known by the name Microcontrollers, and they are used in many devices in almost every house, such as TV remote control units, microwave ovens, cookers, Mp3 players, personal computers, washing machines, and refrigerators. In this book, we will cover the following topics: -Introduction to PIC Microcontroller -Advantages of PIC Microcontroller -Main differences between a microcontroller and a computer -Common uses of PIC Microcontroller in real-life applications -Different Memory types and different PIC Microcontrollers families -How to choose the right Microcontroller for your Project

[Microcontroller Theory and Applications with the PIC18F](#) Newnes  
**MASTER PIC MICROCONTROLLER TECHNOLOGY AND ADD POWER TO YOUR NEXT PROJECT!** Tap into the latest advancements in PIC technology with the fully revamped Third Edition of McGraw-Hill's *Programming and Customizing the PIC Microcontroller*. Long known as the subject's definitive text, this indispensable volume comes packed with more than 600 illustrations, and provides comprehensive, easy-to-understand coverage of the PIC

microcontroller's hardware and software schemes. With 100 experiments, projects, and libraries, you get a firm grasp of PICs, how they work, and the ins-and-outs of their most dynamic applications. Written by renowned technology guru Myke Predko, this updated edition features a streamlined, more accessible format, and delivers: Concentration on the three major PIC families, to help you fully understand the synergy between the Assembly, BASIC, and C programming languages Coverage of the latest program development tools A refresher in electronics and programming, as well as reference material, to minimize the searching you will have to do WHAT'S INSIDE! Setting up your own PIC microcontroller development lab PIC MCU basics PIC microcontroller interfacing capabilities, software development, and applications Useful tables and data Basic electronics Digital electronics BASIC reference C reference 16-bit numbers Useful circuits and routines that will help you get your applications up and running quickly

[A Practical Approach](#) Elsevier

This book is a collection of projects based around various microcontrollers from the PIC family. The reader is carefully guided through the book, from very simple to more complex projects in order to gradually build their knowledge about PIC microcontrollers and digital electronics in general. On completion of this book, the reader should be able to design and build their own projects and solve other practical problems in digital electronics. Many books in this area are theory based and can tend toward being overly explanatory in their approach to the subject. Courses are moving towards being more practically oriented and this book provides the ideal companion to students completing projects with PIC microcontrollers.

[From USB to RTOS with the PIC 18F Series](#) Newnes

"Expert assembly programmers: Learn how to write embedded

control applications in C; Expert 8-bit programmers: Learn how to boost your applications with a powerful 16-bit architecture; Explore the world of embedded control experimenting with analog and digital peripherals, graphic, displays, video and sound"-- Cover.

**For Beginners and Experts** Publitrone-Elektor

[PIC Projects and Applications Using CA Project-based Approach PIC BASIC: Programming and Projects](#) Newnes

This hands-on book covers a series of exciting and fun projects with PIC microcontrollers. For example a silent alarm, a people sensor, a radar, a night buzzer, a VU meter, a RGB fader, a serial network, a poetry box and a sound super-compression. You can build over 50 projects for your own use. The clear explanations, schematics, and pictures of each project on a breadboard make this a fun activity. You can also use this book as a study guide. The technical background information in each project explains why the project is set up the way it is, including the use of datasheets. This way you'll learn a lot about the project and the microcontroller being used, and you can expand the project to suit your own need . . . making it ideal for use in schools and colleges. This book can also be used as a reference guide. The explanation of the JAL programming language and all of the expansion libraries used is unique and found nowhere else. Using the index, you can easily locate projects that serve as examples for the main commands. But even after you have built all the projects it will still be a valuable reference guide to keep next to your PC. Four microcontrollers are discussed, the 12f675, 16f628, 16f876A, and 16f877, as well as how to migrate programs from one microcontroller to another. All software used in this book can be downloaded for free, including all of the source code, a program editor, and the JAL open source programming language. This powerful and yet easy to learn language is used by hobbyists

and professionals world-wide. A hardware kit is also available for purchase separately that contains all the parts to get you started, including a few microcontrollers. There is even a free support website with additional information, FAQ, and links.

#### Programming 8-bit PIC Microcontrollers in C Newnes

PIC in Practice is a graded course based around the practical use of the PIC microcontroller through project work. Principles are introduced gradually, through hands-on experience, enabling students to develop their understanding at their own pace. Dave Smith has based the book on his popular short courses on the PIC for professionals, students and teachers at Manchester Metropolitan University. The result is a graded text, formulated around practical exercises, which truly guides the reader from square one. The book can be used at a variety of levels and the carefully graded projects make it ideal for colleges, schools and universities. Newcomers to the PIC will find it a painless introduction, whilst electronics hobbyists will enjoy the practical nature of this first course in microcontrollers. PIC in Practice introduces applications using the popular 16F84 device as well as the 16F627, 16F877, 12C508, 12C629 and 12C675. In this new edition excellent coverage is given to the 16F818, with additional information on writing and documenting software. \* Gentle introduction to using PICs for electronic applications \* Principles and programming introduced through graded projects \* Thoroughly up-to-date with new chapters on the 16F818 and writing and documenting programs

#### **PIC Microcontroller Projects in C** Apress

The new generation of 32-bit PIC microcontrollers can be used to solve the increasingly complex embedded system design challenges faced by engineers today. This book teaches the basics of 32-bit C programming, including an introduction to the PIC 32-bit C compiler. It includes a full description of the architecture of 32-bit PICs and their applications, along with coverage of the relevant development and debugging tools. Through a series of fully realized example projects, Dogan Ibrahim demonstrates how engineers can harness the power of this new technology to optimize their embedded designs. With this book you will learn: The advantages of 32-bit PICs The basics of 32-bit PIC programming The detail of the architecture of 32-bit PICs How to interpret the Microchip data sheets and draw out their key points How to use the built-in peripheral interface

devices, including SD cards, CAN and USB interfacing How to use 32-bit debugging tools such as the ICD3 in-circuit debugger, mikroCD in-circuit debugger, and Real Ice emulator Helps engineers to get up and running quickly with full coverage of architecture, programming and development tools Logical, application-oriented structure, progressing through a project development cycle from basic operation to real-world applications Includes practical working examples with block diagrams, circuit diagrams, flowcharts, full software listings an in-depth description of each operation

#### **with Interactive Hardware Simulation** Elsevier

This comprehensive tutorial assumes no prior experience with PICBASIC. It opens with an introduction to such basic concepts as variables, statements, operators, and structures. This is followed by discussion of the two most commonly used PICBASIC compilers. The author then discusses programming the most common version of the PIC microcontroller, the 15F84. The remainder of the book examines several real-world examples of programming PICs with PICBASIC. In keeping with the integrated nature of embedded technology, both hardware and software are discussed in these examples; circuit details are given so that readers may replicate the designs for themselves or use them as the starting points for their development efforts. \*Offers a complete introduction to programming the world's most commonly used microcontroller, the Microchip PIC, with the powerful but easy to use PICBASIC language \*Gives numerous design examples and projects to illustrate important concepts \*Accompanying CD contains the source files and executables discussed in the book as well as an electronic version of the book *Advanced PIC Microcontroller Projects in C* CRC Press \*Just months after the introduction of the new generation of 32-bit PIC microcontrollers, a Microchip insider and acclaimed author takes you by hand at the exploration of the PIC32 \*Includes handy checklists to help readers perform the most common programming and debugging tasks The new 32-bit microcontrollers bring the promise of more speed and more performance while offering an unprecedented level of compatibility with existing 8 and 16-bit PIC microcontrollers. In sixteen engaging chapters, using a parallel track to his previous title dedicated to 16-bit programming, the author puts all these claims to test while offering a gradual introduction to the

development and debugging of embedded control applications in C. Author Lucio Di Jasio, a PIC and embedded control expert, offers unique insight into the new 32-bit architecture while developing a number of projects of growing complexity. Experienced PIC users and newcomers to the field alike will benefit from the text's many thorough examples which demonstrate how to nimbly side-step common obstacles, solve real-world design problems efficiently and optimize code using the new PIC32 features and peripheral set. You will learn about: \*basic timing and I/O operation \*debugging methods with the MPLAB SIM \*simulator and ICD tools \*multitasking using the PIC32 interrupts \*all the new hardware peripherals \*how to control LCD displays \*experimenting with the Explorer16 board and \*the PIC32 Starter Kit \*accessing mass-storage media \*generating audio and video signals \*and more! TABLE OF CONTENTS Day 1 And the adventure begins Day 2 Walking in circles Day 3 Message in a Bottle Day 4 NUMB3RS Day 5 Interrupts Day 6 Memory Part 2 Experimenting Day 7 Running Day 8 Communication Day 9 Links Day 10 Glass = Bliss Day 11 It's an analog world Part 3 Expansion Day 12 Capturing User Inputs Day 13 UTube Day 14 Mass Storage Day 15 File I/O Day 16 Musica Maestro! 32-bit microcontrollers are becoming the technology of choice for high performance embedded control applications including portable media players, cell phones, and GPS receivers. Learn to use the C programming language for advanced embedded control designs and/or learn to migrate your applications from previous 8 and 16-bit architectures.

#### An Introduction to Microelectronics McGraw Hill Professional

Go beyond the jigsaw approach of just using blocks of code you don't understand and become a programmer who really understands how your code works. Starting with the fundamentals on C programming, this book walks you through where the C language fits with microcontrollers. Next, you'll see how to use the industrial IDE, create and simulate a project, and download your program to an actual PIC microcontroller. You'll then advance into the main process of a C program and explore in depth the most common commands applied to a PIC microcontroller and see how to use the range of control registers inside the PIC. With C Programming for the PIC Microcontroller as your guide, you'll become a better programmer who can truly say they have written and understand the code they use. What You'll

Learn Use the freely available MPLAB software Build a project and write a program using inputs from switches Create a variable delay with the oscillator source Measure real-world signals using pressure, temperature, and speed inputs Incorporate LCD screens into your projects Apply what you've learned into a simple embedded program Who This Book Is For Hobbyists who want to move into the challenging world of embedded programming or students on an engineering course.

*Designing Embedded Systems with PIC Microcontrollers* Elsevier  
Extensively revised and updated to encompass the latest developments in the PIC 18FXXX series, this book demonstrates how to develop a range of microcontroller applications through a project-based approach. After giving an introduction to programming in C using the popular mikroC Pro for PIC and MPLAB XC8 languages, this book describes the project development cycle in full. The book walks you through fully tried and tested hands-on projects, including many new, advanced topics such as Ethernet programming, digital signal processing, and RFID technology. This book is ideal for engineers, technicians, hobbyists and students who have knowledge of the basic principles of PIC microcontrollers and want to develop more advanced applications using the PIC18F series. This book includes over fifty projects which are divided into three categories: Basic, Intermediate, and Advanced. New projects in this edition: Logic probe Custom LCD font design Hi/Lo game Generating various waveforms in real-time Ultrasonic height measurement Frequency counter Reaction timer GPS projects Closed-loop ON/OFF temperature control Bluetooth projects (master and slave) RFID projects Clock using Real-time-clock (RTC) chip RTC alarm project Graphics LCD (GLCD) projects  
Barometer+thermometer+altimeter project Plotting temperature on GLCD Ethernet web browser based control Ethernet UDP based control Digital signal processing (Low Pass Filter design) Automotive LIN bus project Automotive CAN bus project Multitasking projects (using both cooperative and Round-robin scheduling) Unipolar stepper motor projects Bipolar stepper motor projects Closed-loop ON/OFF DC motor control A clear introduction to the PIC 18FXXX microcontroller's architecture Covers developing wireless and sensor network applications, SD card projects, and multi-tasking; all demonstrated with the block and circuit diagram, program description in PDL, program listing, and

program description Includes more than 50 basic, intermediate, and advanced projects

*PIC Projects for Non-Programmers* John Wiley & Sons

From cell phones and television remote controls to automobile engines and spacecraft, microcontrollers are everywhere. Programming these prolific devices is a much more involved and integrated task than it is for general-purpose microprocessors; microcontroller programmers must be fluent in application development, systems programming, and I/O operation as well as memory management and system timing. Using the popular and pervasive mid-range 8-bit Microchip PIC® as an archetype, *Microcontroller Programming* offers a self-contained presentation of the multidisciplinary tools needed to design and implement modern embedded systems and microcontrollers. The authors begin with basic electronics, number systems, and data concepts followed by digital logic, arithmetic, conversions, circuits, and circuit components to build a firm background in the computer science and electronics fundamentals involved in programming microcontrollers. For the remainder of the book, they focus on PIC architecture and programming tools and work systematically through programming various functions, modules, and devices. Helpful appendices supply the full mid-range PIC instruction set as well as additional programming solutions, a guide to resistor color codes, and a concise method for building custom circuit boards. Providing just the right mix of theory and practical guidance, *Microcontroller Programming: The Microchip PIC®* is the ideal tool for any amateur or professional designing and implementing stand-alone systems for a wide variety of applications.

*PIC Projects and Applications Using C* Packt Publishing Ltd  
*Embedded Systems with PIC Microcontrollers: Principles and Applications* is a hands-on introduction to the principles and practice of embedded system design using the PIC microcontroller. Packed with helpful examples and illustrations, the book provides an in-depth treatment of microcontroller design as well as programming in both assembly language and C, along with advanced topics such as techniques of connectivity and networking and real-time operating systems. In this one book students get all they need to know to be highly proficient at embedded systems design. This text combines embedded systems principles with applications, using the 16F84A, 16F873A and the 18F242 PIC microcontrollers. Students learn how to apply

the principles using a multitude of sample designs and design ideas, including a robot in the form of an autonomous guide vehicle. Coverage between software and hardware is fully balanced, with full presentation given to microcontroller design and software programming, using both assembler and C. The book is accompanied by a companion website containing copies of all programs and software tools used in the text and a 'student' version of the C compiler. This textbook will be ideal for introductory courses and lab-based courses on embedded systems, microprocessors using the PIC microcontroller, as well as more advanced courses which use the 18F series and teach C programming in an embedded environment. Engineers in industry and informed hobbyists will also find this book a valuable resource when designing and implementing both simple and sophisticated embedded systems using the PIC microcontroller. \*Gain the knowledge and skills required for developing today's embedded systems, through use of the PIC microcontroller. \*Explore in detail the 16F84A, 16F873A and 18F242 microcontrollers as examples of the wider PIC family. \*Learn how to program in Assembler and C. \*Work through sample designs and design ideas, including a robot in the form of an autonomous guided vehicle. \*Accompanied by a CD-ROM containing copies of all programs and software tools used in the text and a 'student' version of the C compiler.

*PIC Basic Projects* Newnes

*PIC Projects and Applications Using C* details how to program the PIC microcontroller in the C language. The book takes a learn-by-doing approach, with applications covering topics such as inputs, outputs, keypads, alphanumeric displays, analogue-to-digital conversion, radio transmitters and receivers, data EEPROM, interrupts and timing. To aid debugging, the book provides a section detailing the use of the simulator and in-circuit debugger. With this book you will learn: How to program the PIC microcontroller in C Techniques for using the simulator and debuggers to find faults on your code The ins and outs of interfacing circuits, such as radio modules and liquid crystal displays How to use the PIC on-board functions, such as interrupts and timing modules, and make analogue measurements Relevant parts of the language are introduced and explained when required for those new to the subject Core principles are introduced gradually for self-paced learning Explains how and

why a software program works, and how to alter and expand the code

*45 Projects for PIC, AVR and ARM* John Wiley & Sons

Extensively revised and updated to encompass the latest developments in the PIC 18FXXX series, this book demonstrates how to develop a range of microcontroller applications through a project-based approach. After giving an introduction to programming in C using the popular mikroC Pro for PIC and MPLAB XC8 languages, this book describes the project development cycle in full. The book walks you through fully tried and tested hands-on projects, including many new, advanced topics such as Ethernet programming, digital signal processing, and RFid technology. This book is ideal for engineers, technicians, hobbyists and students who have knowledge of the basic principles of PIC microcontrollers and want to develop more advanced applications using the PIC18F series. This book includes over fifty projects which are divided into three categories: Basic, Intermediate, and Advanced. New projects in this edition: Logic probe Custom LCD font design Hi/Lo game Generating various waveforms in real-time Ultrasonic height measurement Frequency counter Reaction timer GPS projects Closed-loop ON/OFF temperature control Bluetooth projects (master and slave) RFid projects Clock using Real-time-clock (RTC) chip RTC alarm project Graphics LCD (GLCD) projects Barometer+thermometer+altimeter project Plotting temperature on GLCD Ethernet web browser based control Ethernet UDP based control Digital signal processing (Low Pass Filter design) Automotive LIN bus project Automotive CAN bus project Multitasking projects (using both cooperative and Round-robin scheduling) Unipolar stepper motor projects Bipolar stepper motor projects Closed-loop ON/OFF DC motor control A clear introduction to the PIC 18FXXX microcontroller's architecture Covers developing wireless and sensor network applications, SD card projects, and multi-tasking; all demonstrated with the block and circuit diagram, program description in PDL, program listing, and program description Includes more than 50 basic, intermediate, and advanced projects.

**DIY Microcontroller Projects for Hobbyists** Elsevier

Learn how to use microcontrollers without all the frills and math. This book uses a practical approach to show you how to develop embedded systems with 8 bit PIC microcontrollers using the XC8

compiler. It's your complete guide to understanding modern PIC microcontrollers. Are you tired of copying and pasting code into your embedded projects? Do you want to write your own code from scratch for microcontrollers and understand what your code is doing? Do you want to move beyond the Arduino? Then *Programming PIC Microcontrollers with XC8* is for you! Written for those who want more than an Arduino, but less than the more complex microcontrollers on the market, PIC microcontrollers are the next logical step in your journey. You'll also see the advantage that MPLAB X offers by running on Windows, MAC and Linux environments. You don't need to be a command line expert to work with PIC microcontrollers, so you can focus less on setting up your environment and more on your application. What You'll Learn Set up the MPLAB X and XC8 compilers for microcontroller development Use GPIO and PPS Review EUSART and Software UART communications Use the eXtreme Low Power (XLP) options of PIC microcontrollers Explore wireless communications with WiFi and Bluetooth Who This Book Is For Those with some basic electronic device and some electronic equipment and knowledge. This book assumes knowledge of the C programming language and basic knowledge of digital electronics though a basic overview is given for both. A complete newcomer can follow along, but this book is heavy on code, schematics and images and focuses less on the theoretical aspects of using microcontrollers.

This book is also targeted to students wanting a practical overview of microcontrollers outside of the classroom. *PIC Projects and Applications Using C* McGraw-Hill Prof Med/Tech The Newnes Know It All Series takes the best of what our authors have written over the past few years and creates a one-stop reference for engineers involved in markets from communications to embedded systems and everywhere in between. PIC design and development a natural fit for this reference series as it is one of the most popular microcontrollers in the world and we have several superbly authored books on the subject. This material ranges from the basics to more advanced topics. There is also a very strong project basis to this learning. The average embedded engineer working with this microcontroller will be able to have any question answered by this compilation. He/she will also be able to work through real-life problems via the projects contained in the book. The Newnes Know It All Series presentation of theory, hard fact, and project-based direction will be a continual aid in

helping the engineer to innovate in the workplace. Section I. An Introduction to PIC Microcontrollers Chapter 1. The PIC Microcontroller Family Chapter 2. Introducing the PIC 16 Series and the 16F84A Chapter 3. Parallel Ports, Power Supply and the Clock Oscillator Section II. Programming PIC Microcontrollers using Assembly Language Chapter 4. Starting to Program—An Introduction to Assembler Chapter 5. Building Assembler Programs Chapter 6. Further Programming Techniques Chapter 7. Prototype Hardware Chapter 8. More PIC Applications and Devices Chapter 9. The PIC 1250x Series (8-pin PIC microcontrollers) Chapter 10. Intermediate Operations using the PIC 12F675 Chapter 11. Using Inputs Chapter 12. Keypad Scanning Chapter 13. Program Examples Section III. Programming PIC Microcontrollers using PicBasic Chapter 14. PicBasic and PicBasic Pro Programming Chapter 15. Simple PIC Projects Chapter 16. Moving On with the 16F876 Chapter 17. Communication Section IV. Programming PIC Microcontrollers using MBasic Chapter 18. MBasic Compiler and Development Boards Chapter 19. The Basics—Output Chapter 20. The Basics—Digital Input Chapter 21. Introductory Stepper Motors Chapter 22. Digital Temperature Sensors and Real-Time Clocks Chapter 23. Infrared Remote Controls Section V. Programming PIC Microcontrollers using C Chapter 24. Getting Started Chapter 25. Programming Loops Chapter 26. More Loops Chapter 27. NUMB3RS Chapter 28. Interrupts Chapter 29. Taking a Look under the Hood Over 900 pages of practical, hands-on content in one book! Huge market - as of November 2006 Microchip Technology Inc., a leading provider of microcontroller and analog semiconductors, produced its 5 BILLIONth PIC microcontroller Several points of view, giving the reader a complete 360 of this microcontroller *Programming PIC Microcontrollers with XC8* Newnes MASTER PIC MICROCONTROLLER TECHNOLOGY AND ADD POWER TO YOUR NEXT PROJECT! Tap into the latest advancements in PIC technology with the fully revamped Third Edition of McGraw-Hill's *Programming and Customizing the PIC Microcontroller*. Long known as the subject's definitive text, this indispensable volume comes packed with more than 600 illustrations, and provides comprehensive, easy-to-understand coverage of the PIC microcontroller's hardware and software schemes. With 100 experiments, projects, and libraries, you get a firm grasp of PICs, how they work, and the ins-and-outs of their most dynamic

applications. Written by renowned technology guru Myke Predko, this updated edition features a streamlined, more accessible format, and delivers: Concentration on the three major PIC families, to help you fully understand the synergy between the Assembly, BASIC, and C programming languages Coverage of the latest program development tools A refresher in electronics and programming, as well as reference material, to minimize the searching you will have to do WHAT'S INSIDE! Setting up your own PIC microcontroller development lab PIC MCU basics PIC microcontroller interfacing capabilities, software development, and applications Useful tables and data Basic electronics Digital

electronics BASIC reference C reference 16-bit numbers Useful circuits and routines that will help you get your applications up and running quickly

A Project-based Approach Elsevier

PIC Microcontrollers are a favorite in industry and with hobbyists. These microcontrollers are versatile, simple, and low cost making them perfect for many different applications. The 8-bit PIC is widely used in consumer electronic goods, office automation, and personal projects. Author, Dogan Ibrahim, author of several PIC books has now written a book using the PIC18 family of microcontrollers to create projects with SD cards. This book is ideal for those practicing engineers, advanced students, and PIC

enthusiasts that want to incorporate SD Cards into their devices. SD cards are cheap, fast, and small, used in many MP3 players, digital and video cameras, and perfect for microcontroller applications. Complete with Microchip's C18 student compiler and using the C language this book brings the reader up to speed on the PIC 18 and SD cards, knowledge which can then be harnessed for hands-on work with the eighteen projects included within. Two great technologies are brought together in this one practical, real-world, hands-on cookbook perfect for a wide range of PIC fans. Eighteen fully worked SD projects in the C programming language Details memory cards usage with the PIC18 family