

C for 16 series PICmicro® microcontrollers CD

What does it do?

This is a self contained CD ROM for both learning C programming for PICmicro® microcontrollers and for project work.

Benefits

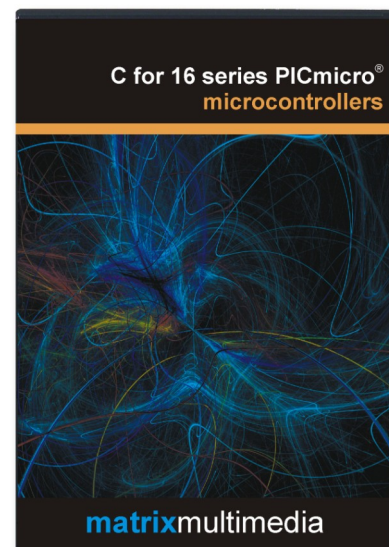
- Unique microcontroller simulations shortens learning curve
- This is a complete solution for learning including tutorials, IDE and C compiler

Features

- A full course in C programming
- Includes C compiler and IDE
- Includes virtual PICmicro MCU microcontroller simulations
- Examples and exercises included

Description

This CD ROM - written by David and Rob Miles of Durham and Hull Universities - provides you with a complete solution to teaching and learning C programming for the PICmicro microcontroller. The course is structured in two parts: firstly students are taken through the fundamentals of C programming in a series of on-screen tutorials that makes use of our virtual microcontroller to explain to students how C works. This well proven methodology centres around a simulation of the microcontroller which allows students to clearly see the effects on the chip and internal variables and registers as each line of C code executes. Once students have understood the basics they carry out a series of labs using the Integrated Development Environment and compiler provided, to help build on their understanding. Tests and exercises to reinforce learning are provided. Once the students have build sufficient expertise in C programming they are able to use the software tools supplied on the CD for a wide range of projects. This product is designed to work seamlessly with our E-blocks PICmicro MCU Multiprogrammer and Version 3 development board, but will also operate with third party programmers.



CD ROM is shipped in a DVD case

Those wanting to produce commercial products using the compiler will need to purchase a commercial licence of the Boost C compiler included on the CD ROM. This new version is designed with the PIC16F88 in mind.

Learning time

Approximately 40 hours

Prerequisites

- An understanding of digital electronics
- Windows skills
- Elementary programming skills

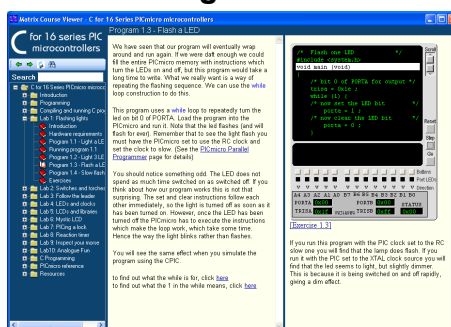
Included on the CD ROM

- Complete course in C programming with exercises
- Boost C compiler (non-commercial version)
- Download software

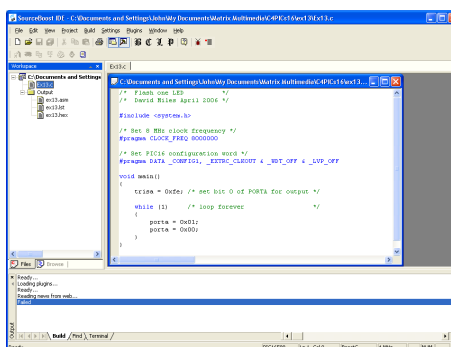
How to use this CD ROM

This CD ROM can be used as a programme of self study at home or in industry. It is also suitable for use with undergraduates as part of a structured course, thereby freeing up lecturers to provide one-to-one tutorial assistance.

Screen images

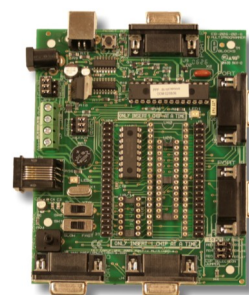


Typical tutorial screen showing the Virtual C microcontroller

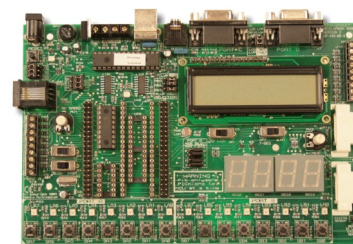


IDE and compiler screen

Also consider



EB006 PICmicro MCU Multiprogrammer



Version 3 development board

C for 16 series PICmicro® microcontrollers CD

Learning objectives

Study of the CD ROM—will achieve the following objectives:

- Gain a thorough understanding of C programming for PICmicro microcontrollers from basic techniques through to advanced concepts such as serial communication, and interrupts.
- Develop the skills and techniques required to write C programs of some complexity from scratch.
- Develop a good understanding of how electronic systems are controlled.

CD ROM contents

The CD ROM is divided into two sections: a suite of Labs with real applications, and a section on C programming:

General contents

Introduction

About the course, Navigation, How to use this course, What is a PICmicro microcontroller?, the Virtual C PICmicro MCU, Sourceboost and Boost C, Development hardware

Programming

Conventional programs, Embedded programs, Writing programs, High and low level, High level C, Low level PICmicro MCU code, Getting your programs into a compiler, writing our programs.

Compiling and running C programs

The Build process, Setting up the programmer, Starting the compiler, Compiling your program, Linking your program, Downloading your program, Program file locations, Project files, Using other PICmicro microcontrollers, Using pragma to configure the chip.

Lab 1: flashing lights

Lab 2: Switches and torches

Lab 3: Follow the leader

Lab 4: LEDs and Clocks

Lab 5: LCDs and libraries

Lab 6: Mystic LCD

Lab 7: The E lock

Lab 8: reaction timer

Lab 9: Inspect your morse

Lab 10 – Analogue fun

C Programming contents

What is a C program?

Introduction, Comments, The main function header, The main function body, The end of the line, Exercises

Variables

Introduction, Types, Floating point, Characters, Integers, Choosing variables, Identifiers, Declaration, Multiple declarations, Initialization, Names, Assigning statements, Expressions, Operators and Operands, Constant operands, Operators and divide, Working on bits, Shifting bits, Shortcut operators, Unary operators, Casting Exercises

Conditional Statements

Introduction, Logical operators, Equality, Using else, Cunning conditions, Complicated conditions, Unary operators in conditions, Exercises.

Statements and Blocks

Introduction, Blocks in Blocks, Global and local variables, Local variable scope, Global variables, Global and local in Boost C, Exercises.

Looping the loop

Introduction, While loop, Counting with the while loop, The for loop, Breaking out of loops, Continuing loops, Exercises.

Functions

Introduction, When to use a function, Functions which return values, Functions which accept parameters, Functions which return values, More than one parameter, Exercises.

Arrays

Introduction, The need for arrays, Declaring an array, elements in an array, Sorting array elements, Into the next dimension, Exercises.

Switches

Introduction, The switch condition, Switches and breaks, Exercises.

Pointers

Introduction, Arrays and pointers, Declaring a pointer, Using a pointer, Comparing a pointer, Null pointers, Functions and pointers, Finding out the size, Strings, Exercises.

Structures

Introduction, Creating structures, How structures work, Pointers in structures, Structures in structures, Exercises.

The pre-processor

Introduction, The #include directive, magic numbers and #define, Conditional compilation, Exercises.

Software engineering in C

Introduction, Deciding on specification, Deciding how to test, creating the functions, Using the functions, Making a project, External data, And finally...

PICmicro reference

Introduction, Bits and bytes, Hex and decimal, Ready reckoner, Exercises, The PIC microcontroller, the PICmicro range, Architecture, Programming the PICmicro, The workign register, File registers, Bank selection, Special function registers, PORTA and PORTB, TRISA and TRISB, Interrupts, Timer, Watchdog, Sleep, EEPROM memory, Development board, Exercises.

Compiling and running programs

Introduction, Compiling your program, assembling your program, downloading your program, Boost C PIC functions, Boost C project files.

Versions available

EL543ST Student/home version

EL543SI Single user version

EL543SL Site licence version

Note that student versions are missing selected exercises and content more applicable to institutions. Student/home version are not available to educational institutions or companies.

System requirements

PC with CD ROM drive and Windows 98 or greater. Site licence version is compatible with all major network configurations.

Hardware requirements

PIC programmer board fitted with a PIC16F88. Compatible with E-blocks PICmicro microcontroller Multiprogrammer and version 3 development board.