

FACET MICROCONTROLLER SYSTEM DEVELOPMENT WITH E-BLOCKS™ Model 91030-2X



Shown with optional equipment

Description

The FACET Microcontroller System Development course provides comprehensive, hands-on instruction in the terminology, principles, and applications of microcontroller programming. The Microcontroller System Development Board, Model 91030-2X, also enables student learning in programming principles and electronics interfacing through the use of Flowcode™ and microcontroller hardware.

This module features a USB programmable PIC microcontroller and onboard peripherals, including LEDs, switches, 7-segment single or QUAD display, LCD display, keypad, light sensor, variable voltage source for A/D acquisition, and Vernier™ sensors inputs.

Features

- ✓ FACET board can be used as a programmer as well as a development board
- ✓ USB connector for programming interface
- ✓ Compatible with E-Blocks for expanded use and flexibility
- ✓ Full suite of programming software available
- ✓ RC or Xtal operation
- ✓ Powerful Microchip PIC16F877A running at nearly 20 MHz

Software

Flowcode 3 is one of the world's most advanced graphical programming languages for microcontrollers. The great advantage of *Flowcode* is that it allows those with little experience to create complex electronic and robotic systems.

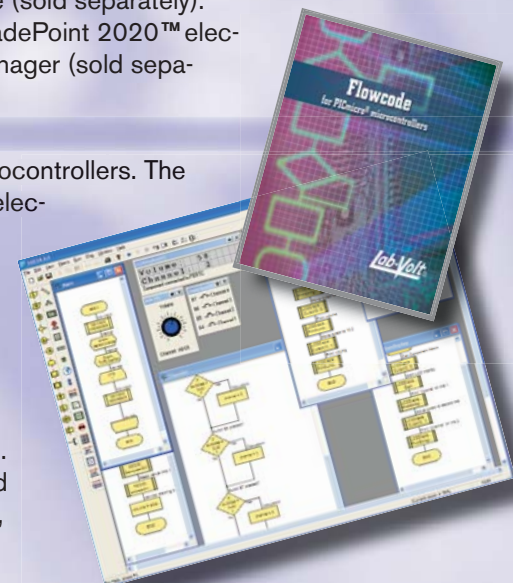
Flowcode is a powerful language that uses macros to facilitate the control of complex devices like 7-segment displays, motor controllers, and LCD displays. The use of macros allows students to control highly complex electronic devices without getting bogged down in understanding the programming involved.

Flowcode is used in education as a means of introducing students to the concepts of programming, and in industry for rapid development and as a means of managing large projects. New features in version 3 include 16-bit arithmetic, strings and string manipulation, improved graphical user interface and printing, support for 18 series devices, Pulse Width Modulation, I2C, a new ADC component and much more.

An extension surface expands the capabilities of this module for breadboarding or for a wide range of projects using optional E-Blocks™ electronics system development kits. The board connects to a PC via USB and can be also used with the optional Assembly or C programming utilities. The microcontroller module of the FACET board acts as a host to the E-Blocks applications and provides a means of integrating with all the other modules on the board.

The FACET Microcontroller System Development Board is the ideal platform for hands-on microcontroller and communications technology training.

- ✓ Five I/O ports
- ✓ Peripheral devices available onboard
- ✓ System customizable to your needs through Tech-Lab® System and Utilities software (sold separately).
- ✓ Compatible with GradePoint 2020™ electronic classroom manager (sold separately).



Starter Components



1. Multiprogrammer Block
2. USB connector (Programming Interface)
3. Power connector – either polarity
4. Reset Button
5. 40-Pin Microcontroller (16F877A)
6. Clock crystal (19.6608 mHz)/RC switch and RC clock speed (10Hz to 1200kHz variable) switch
7. RC clock speed potentiometer
8. Port A I/O – 6 Bits
9. Port B I/O – 8 Bits
10. Port C I/O – 8 Bits
11. Port D I/O – 8 Bits
12. Port E I/O – 3 Bits
13. Seven Segment Display Block
14. Seven Segment Display Anodes I/O
15. Seven Segment Display Cathodes
16. Seven Segment Power Jumper
17. Quad Seven Segment Display
18. 5V and GND Screw Terminals
19. LED Block 1
20. Switch Block 1
21. LED Block 2
22. Switch Block 2
23. LCD Block
24. Sensor Block
25. Analog Port
26. Analog Vernier Sensor I/P
27. Digital Vernier Sensor I/P
28. Light Dependant Resistor
29. Rotation Sensor
30. Keypad Block
31. E-Blocks™ Prototyping area

FACET 91030-2X Topic Coverage

About PICmicro chips

- Digital vs. Analog
- Inputs and Outputs
- Memory
- 16F877A Architecture
- Programming

Digital Outputs, Digital Inputs, and Clocking

- Digital Outputs and Clocking
- Digital Inputs

Loops, Messages, and Calculations

- Basic Loops
- Display a Message
- Calculations and Input Conditioning

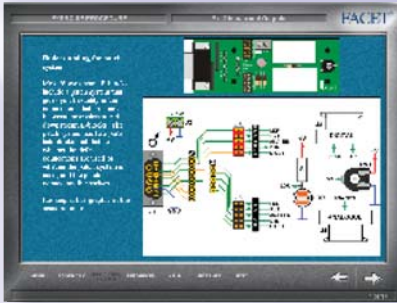
Decisions, Macros, and String Variables

- Decisions and Macros
- The 7-Segment Display
- String Variables and ASCII Code
- A Simple Hi-Fi



FACET 91030: Introduction to Microcontrollers, Courseware Samples

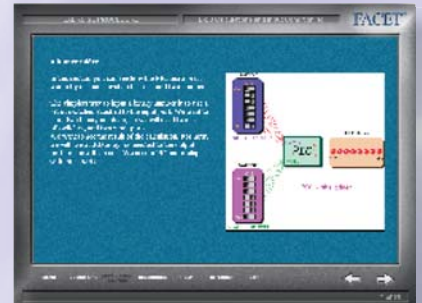
Unit 1: About PICmicro* Chips



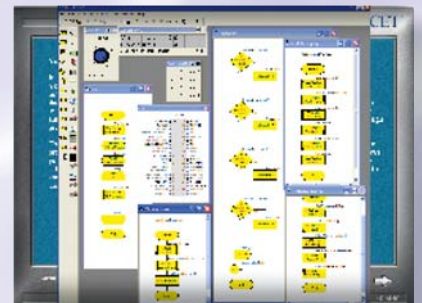
Unit 2: Digital Outputs, Digital Inputs, and Clocking



Unit 3: Loops, Messages, and Calculations



Unit 4: Decisions, Macros, and String Variables



*PICmicro® refers to a group of microcontrollers and is a registered trademark of Microchip Technology, Inc.

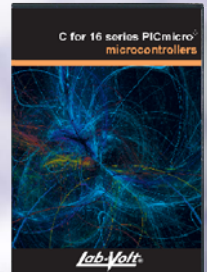
FACET 91030-2X Add-On E-Blocks™ Courses

Five E-Blocks courses are currently available and can be used in conjunction with the FACET Microcontroller System Development Board with the required compatibility accessories, available separately from Lab-Volt Systems, Inc. These courses do not use Tech-Lab® or GradePoint 2020™.

C for 16 PICmicro Microcontroller Programming (PIN 48070)



Provides a complete solution designed for students to learn how to program embedded microcontrollers in C. CD-ROM contains a 50-hour course in C programming and includes E-Blocks boards which can be used to form electronics systems for learning or project work, simulations, tutorials, tests, and exercises.



Bluetooth Communications (PIN 48071)



Provides a hands-on platform for learning about Bluetooth communication protocols and practice. A full copy of *Flowcode* graphical programming software is provided as well as two fully-working E-Blocks Bluetooth systems with Bluetooth transceivers and CODEC boards. A CODEC interface for transmitting digital audio signals is also included.



Digital Communications (PIN 48072)



Allows students to learn and implement TCP/IP communications, understand the OSI model, and carry out a wide variety of investigations into digital communications technology in an internet technology context. Included in this course is a full copy of *Flowcode* graphical programming software and a set of E-Blocks that form an embedded internet solution, including two web server modules. This course can be used at two levels: the technician level, which uses very high-level *Flowcode* macros, and a higher academic level, which when used in conjunction with a PC and a web browser allows students to conduct a range of experiments that build understanding of modern digital communications protocols



Mobile Telephony (PIN 48073)



Provides a hands-on solution for learning about communications technology, system construction, and project development. Up to 20 hours of coursework in developing communication systems that gives students familiar with microcontrollers an understanding of the programming techniques involved in developing communication systems, as well as an understanding of how electronic systems are developed from scratch. A full copy of *Flowcode* graphical programming software is provided, as well as a fully-working mobile phone based on E-Blocks.



Radio Frequency Identification (RFID) (PIN 48074)



This add-on bundle from Matrix Multimedia includes everything you need to rapidly develop RFID-based systems linked to microcontroller hardware. The bundle includes a copy of *Flowcode* V3 professional, an E-blocks RFID board, two Mirfare type RFID cards, two I-code SLI type RFID cards, and a spare 16F877A device. *Flowcode* macros for rapid RFID development are included. Datasheets on each individual item are available separately.

More E-Blocks components and courseware are available through Lab-Volt Systems, Inc.