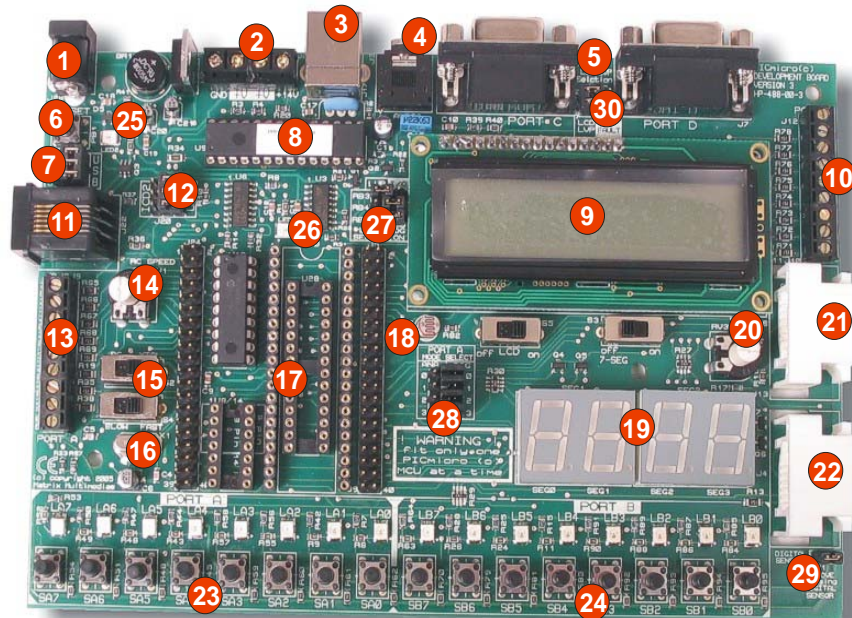


Improvements over version 2 development board include:

- USB programmable
- Can be powered via USB (no need for power supply)
- E-Blocks compatible [5]
- Compatible with Microchip's ICD2 programmer/debugger
- Removable crystal / faster crystal as standard [16]
- Fitted with the advanced 16F88 device rather than PIC16F84
- More LED's / switches on port A
- New programming software (PPP) routines
- More expansion options



Referring to the photograph above the items on the board are as follows:

1. Power supply connector
2. 5V outputs for E-blocks connection
3. USB connector
4. Single bit audio output
5. E-blocks connectors for ports C and D
6. Reset switch
7. Power selector link block—USB or Power connector
8. USB interface chip
9. 2 line 16 character alphanumeric display
10. Screw terminal connectors for port B
11. In Circuit Debug socket
12. ICD/USB programming selection
13. Screw terminal connectors for port A
14. RC speed potentiometer
15. Oscillator mode selection switches
16. Removable crystal
17. Sockets for programming 8, 14, 18, 28 and 40 pin PICmicro devices
18. On-board light sensor
19. Quad 7-segment displays
20. Analogue input potentiometer
21. External analogue sensor input
22. External digital sensor input
23. Port A switches and LEDs
24. Port B switches and LEDs
25. Power indicator
26. Programming indicator
27. LVP pin selector
28. External sensor selectors
29. Digital sensor enable

The following pages give further information.

This flexible development board allows you to learn both how to program PICmicro microcontrollers as well as program a range of 8, 14, 18, 28, and 40 pin devices from the 12, 16 and 18 series PICmicro ranges. All programming software is included in the PPP utility which is supplied with the board.

Makes it easier to teach and learn PICmicro programming

- Designed for learning and teaching
- 3 CD ROM based resources in assembly, C, and flow chart programming are available.
- Large range of add-ons and security options make this ideal for educational use

Makes it easier to develop PICmicro projects

- Compatible with the E-blocks™ range of circuit boards
- Supports low cost Flash-programmable PICmicro devices
- Fully featured displays - 16 individual LEDs, quad 7-segment display and LCD display
- On-board sensors
- Compatible with more than 30 additional sensors
- Fully protected expansion bus for project work

General description

The PICmicro development board is designed for learning PICmicro programming and for developing PICmicro based projects. The board allows a wide range of flash PICmicro microcontrollers to be programmed and executed through the 'PPP' software utility supplied. The board is tightly integrated to our range of software utilities and courses which provide complete solutions for learning PICmicro programming at a variety of levels.

The board is shipped with a PIC16F88 – an 18 pin device with up to 15 I/O lines configured in two ports – A and B. The '88 device is one of the newer devices from Arizona Microchip and is surprisingly powerful with on-board A/D, internal clock, internal USART and a host of other functions and features.

The nature of the PICmicro range of devices is such that 12, 14, 18, 28, and 40 pin devices are – to some extent – upwards compatible, and the DIL sockets on the board are therefore be connected in parallel. Only one PICmicro microcontroller should be inserted at any time.

The board has been designed to allow those with little or no experience of embedded microcontroller programming to be able to produce highly functional designs in as short a time as possible. With this in mind we have included switches on port A and B input/output pins, a quad 7-segment display, a 2 line 16 character alphanumeric display, a choice of crystal or RC oscillator, simple on-board analogue sensor (light) and sensor simulator (potentiometer) and the ability to interface the board to a host of external sensors including motion, temperature, pH, humidity etc. Ports A and B are also connected to screw terminals on the sides of the board via 150ohm resistors which protect the device on the board itself.

The board can be used with ZIF sockets if required: please bear in mind that you may need to insert one or more turned pin DIL sockets to raise the height of some ZIF sockets to clear surrounding components.

Full tutorials in programming the PICmicro in assembly code, C, and flowcharts are available. These sets of tutorials are available on CD ROM and require no other software - all compilers and development environments are included on the CDs themselves.

Add-on options

There are a range of more than 70 add-ons for this board which allow you to customize it to form the basis of a superb educational or development solution:

Sensors

There are over 30 sensors – ranging from simple temperature probes to heart rate monitors – that can be plugged into the two white sensor sockets. A full list is given below. There are several different types of sensor and for educational use we recommend that you select a range of sensors with different characteristics and coding techniques as follows:

Sensor	Output/action	Coding strategy
Temperature probe	Simple potential divider	A/D conversion, calibration, value look up, display
Motion detector	Gives out a digital pulse correlating to distance	Pulse time measurement, conversion display
Heart rate monitor	Gives out an analogue voltage pulse	Data slicing, timing,
Photogate and pulley wheel	When IR light path is interrupted, digital output changes	Various

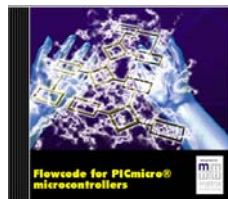


You can plug in a range of additional sensors into the board like this motion sensor

Three CD ROMs with tutorials and software are available:



C for PICmicro microcontrollers



Flowcode for PICmicro microcontrollers



Assembly for PICmicro microcontrollers



For added security the development board can be mounted on a rugged metal platform....



...which can be locked down to a bench with a Kensington lock....



...the resulting assembly can be fitted into our high quality plastic trays for storage....



..and these trays are compatible with a range of furniture and trolleys for storage and classroom use.

Some of the E-blocks boards that can be added to the development board include:



E-blocks IrDA transceiver board



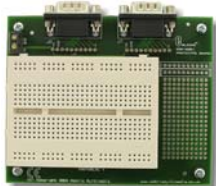
E-blocks keypad



E-blocks internet server board



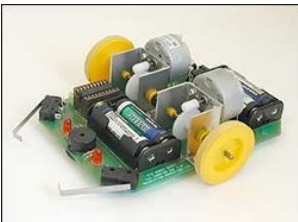
X-10 home automation board



E-blocks breadboard



E-blocks D/A and memory board



This PICmicro MCU buggy is great for student motivation and project work

Add-on options - continued

Board protection and storage

Your board is shipped with rubber feet and a layer of thin neoprene foam which can be stuck to the back of the board to protect it from short circuits which could be caused by loose wires on the bench.

Individual boards can be fitted with clear acrylic covers which will prevent the chips from being removed from the board.

Your board can be mounted on a rugged metal backplane which will help it last longer in a tough lab environment, and facilitate incorporation with E-blocks. The backplanes can be locked to a bench using a standard Kingston lock like those used for securing lap tops. The backplanes also fit into standard GrateNells trays which in turn can be fitted into storage solutions or trolleys for ease of distribution within your labs.

E-blocks™ boards

Ports C and D of the PICmicro MCU are fed out onto 9 way D-type connectors at the back of the board. These can be used to add one of 25 separate E-blocks boards to the development board. E-blocks vary from simple LED and switch boards through to more complex subassemblies like Bluetooth boards, CAN bus, internet boards, IrDA transceivers etc.

The addition of E-blocks boards allows you to considerably expand the functionality of your system to develop a very wide range of electronic systems.

PPP send utility

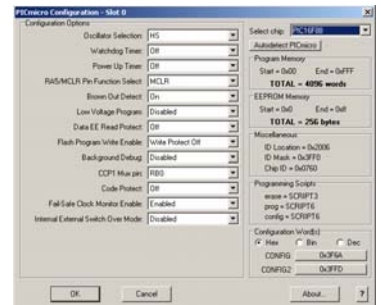
PPP is a highly functional utility for managing the HEX code that is sent into your PICmicro microcontroller. This software is supplied free of charge on with all development boards. ASCII-encoded and HEX files generated by Microchip's MPASM, or our own CD ROMs, can be sent to a device using PPP. PPP uses a simple user interface which is explained in the accompanying help file. PPP is supplied free with the development board. PPP allows you to change the settings for your PICmicro in terms of the oscillator options, code protection, watchdog and brown out enable/disable etc.

Documentation

Documentation on the development board is supplied in PDF format on the ELSAM CD ROM shipped with each board. This includes a full board description and circuit diagram. Information on the PPP software utility is provided in the accompanying help file.



Small refinements like compatibility with ZIF sockets and removable clocking crystal, makes the development board ideal for project work.



PPP programming software allows you to configure target devices....



...and display hex contents

Minimum requirements

Pentium 100MHz, USB port, 2 Megabytes of hard drive space, 16 Megabytes of RAM, Windows 98/ME/2000/XP.

Supported devices

Currently PPP and the development board support the following devices:

PIC12F629, PIC12F675, PIC12F635, PIC12F683

PIC16F627A, PIC16F627, PIC16F628A, PIC16F628, PIC16F630, PIC16F648A, PIC16F676, PIC16F684, PIC16F688, PIC16F636, PIC16F716, PIC16F72, PIC16F737, PIC16F73, PIC16F747, PIC16F74, PIC16F767, PIC16F76, PIC16F777, PIC16F77, PIC16F818, PIC16F819, PIC16F83, PIC16F84A, PIC16F84, PIC16F870, PIC16F871, PIC16F872, PIC16F873A, PIC16F873, PIC16F874A, PIC16F874, PIC16F876A, PIC16F876, PIC16F877A, PIC16F877, PIC16F87, PIC16F88

PIC18F242, PIC18F248, PIC18F252, PIC18F258, PIC18F442, PIC18F448, PIC18F452, PIC18F458, PIC18F1220, PIC18F1320, PIC18F2220, PIC18F2320, PIC18F2331, PIC18F2410, PIC18F2420, PIC18F2431, PIC18F2439, PIC18F2455, PIC18F2510, PIC18F2515, PIC18F2520, PIC18F2525, PIC18F2539, PIC18F2550, PIC18F2585, PIC18F2586, PIC18F2610, PIC18F2620, PIC18F2680, PIC18F2681, PIC18F4220, PIC18F4320, PIC18F4331, PIC18F4410, PIC18F4420, PIC18F4431, PIC18F4439, PIC18F4455, PIC18F4510, PIC18F4515, PIC18F4520, PIC18F4525, PIC18F4539, PIC18F4550, PIC18F4585, PIC18F4586, PIC18F4610, PIC18F4620, PIC18F4680, PIC18F4681