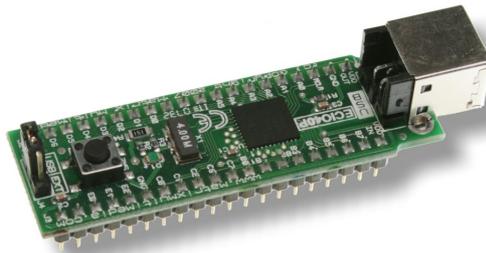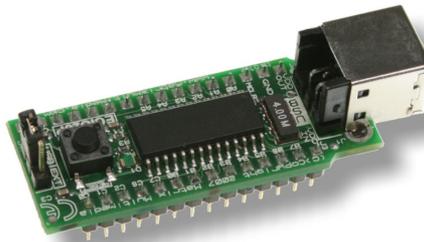# ecio
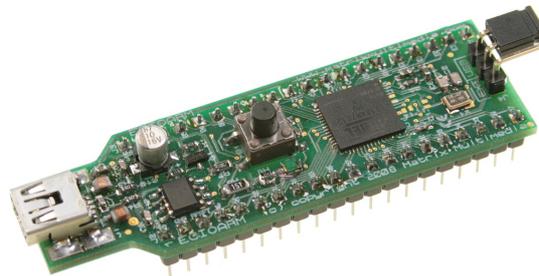
- **USB programmable microcontrollers**

- **0.6"DIP footprint**

- **Supplied with a free version of Flowcode**

- **E-blocks compatible**

ECIO40P

ECIO28P

ECRM40

English Spanish Greek

Thai Dutch French

Romanian Finish Italian

Vietnamese German Slovenian

Danish Hungarian Japanese

Slovak Mandarin Turkish

Portuguese

matrix

Introduction

What does it do?

ECIO devices are powerful USB programmable microcontrollers with 28 and 40 pin DIL (0.6") footprints.

Benefits

- Allows you to add USB programmability to your projects
- Low cost microcontroller programming, platform for development and learning

Features

- Programmable from USB
- Includes bootloader software
- Can draw power from USB
- Usable with LabView and VB, C++ etc

Description

The ECIO family of USB programmable microcontrollers provides an incredibly simple way of adopting microcontroller technology into your projects. The device behaves just like a normal microcontroller - but when you plug the USB lead in and press the reset switch you can send a new program to the device. This makes the ECIO one of the lowest cost USB programmers in the World.

Currently there are three products in the range: ECIO28P and ECIO40P, and the ECRM40. ECIO-28P and ECIO- 40P devices are based on PICmicro 18 series devices - the 18F2455 and the 18F4455 respectively. The ECRM40 is based on an Atmel AT91 ARM 7 processor.

ECIO microcontrollers are pre-programmed with a bootloader program which allows you to send a new program to the microcontroller via USB. ECIO is compatible with hex code from any appropriate compiler. ECIOs are directly compatible with Flowcode - a graphical programming language which greatly simplifies the code generation process - but can also be used with any C compiler.

ECIO is suitable for use where direct programming from USB is required: for projects, or where systems need reprogramming in the field.

ECIO is well supported with a wide range of learning and development tools including Flowcode and E-blocks.
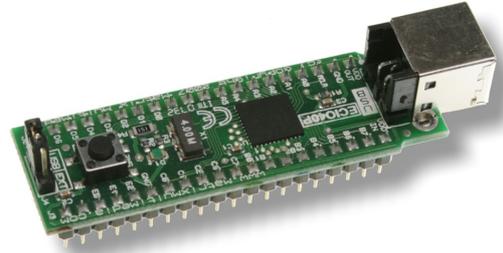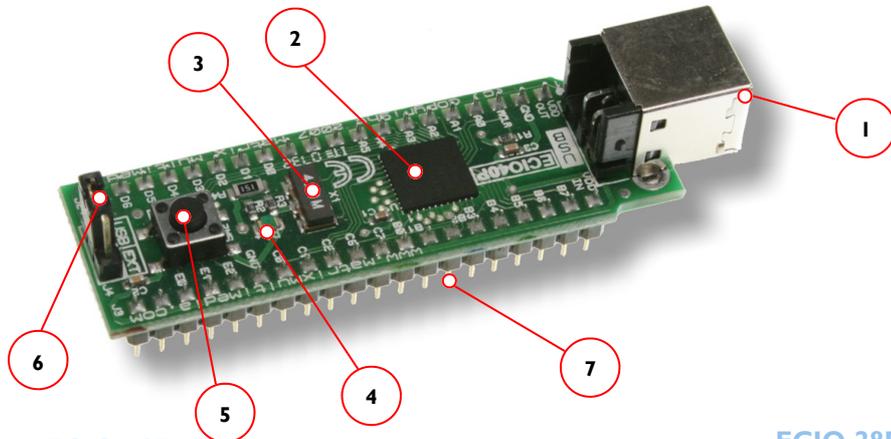

ECIO-40P
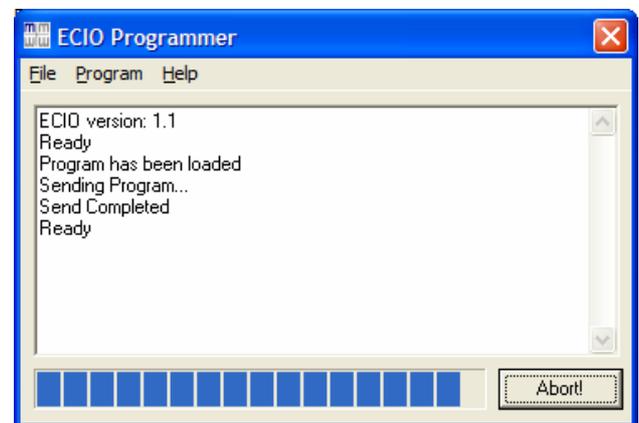
Download software

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Package details - ECIO28P, ECIO40P

1. USB socket
2. PICmicro microcontroller device
3. 4MHz ceramic resonator
4. Power / Programming LED
5. Reset switch
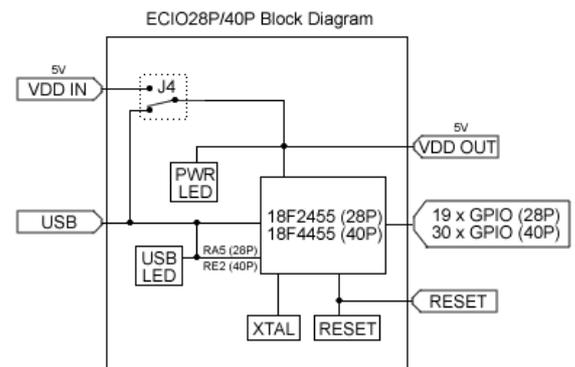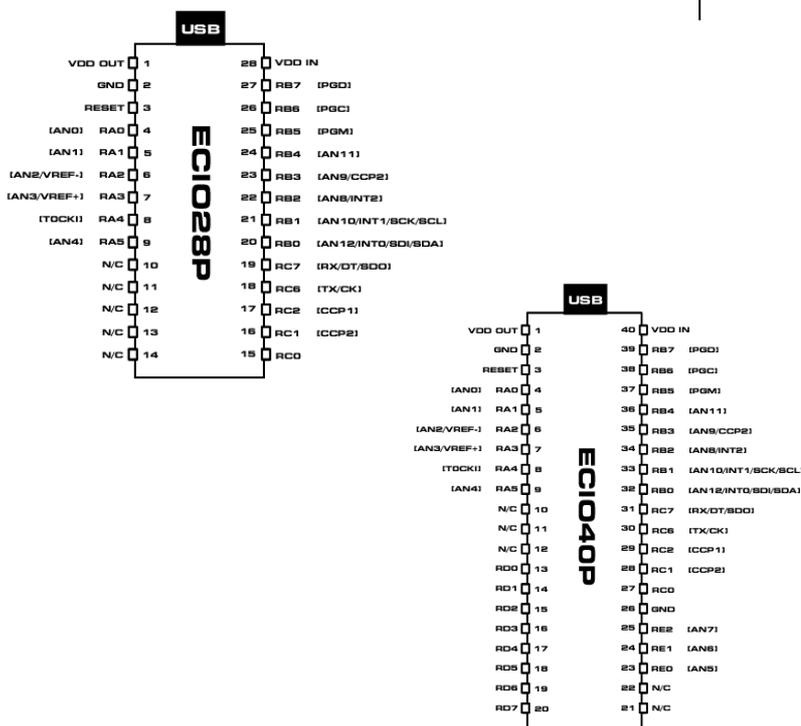6. Power selection jumper
7. Device pins - 0.6" DIL compatible

Picture shows ECIO-40P. ECIO-28P is similar.

ECIO-40P

Processor	8 bit 18 series PICmicro
Base chip:	PIC18F4455
Oscillator:	4MHz ext., 48MHz internal
IO lines:	30
A/D:	13 x10 bit
A/D sample rate	100ksps
Program memory	24K Bytes
RAM	2K bytes
EEPROM	256 bytes
Power	5V, USB or external
PWM channels	5
Timers	1 x 8 bit, 3 x 16 bit
Interfaces	EUSART, MI2C, SPI, USB2.0
Package	40 pin DIP, 0.6", compatible

ECIO-28P

Processor	8 bit 18 series PICmicro
Base chip:	PIC18F2455
Oscillator:	4MHz ext., 48MHz internal
IO lines:	19
A/D:	10 x10 bit
A/D sample rate	100ksps
Program memory	24K Bytes
RAM	2K bytes
EEPROM	256 bytes
Power	5V, USB or external
PWM channels	2
Timers	1 x 8 bit, 3 x 16 bit
Interfaces	EUSART, MI2C, SPI, USB2.0
Package	28 pin, 0.6", DIP compatible

ECIO28P/40P Block Diagram

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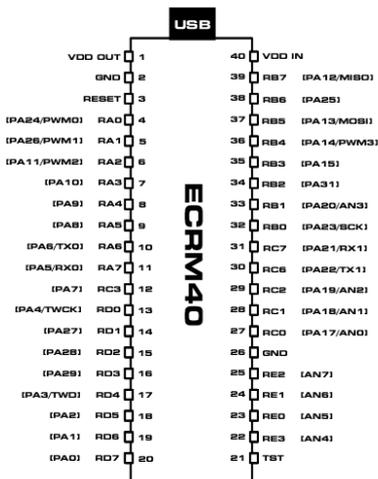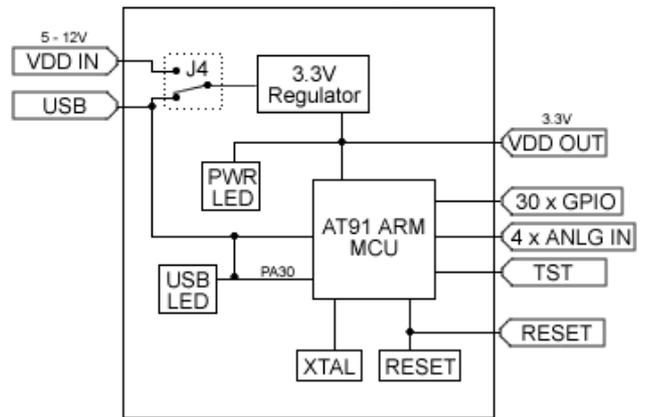# Package details - ECRM40P
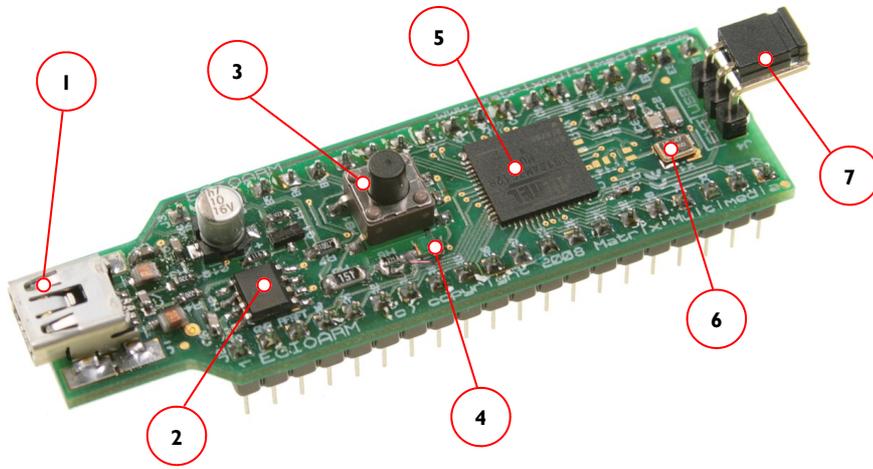
1. USB socket - miniature version
2. 3.3V regulator
3. Reset switch
4. Power / Programming LED
5. ARM microcontroller device
6. 18.43 MHz ceramic resonator
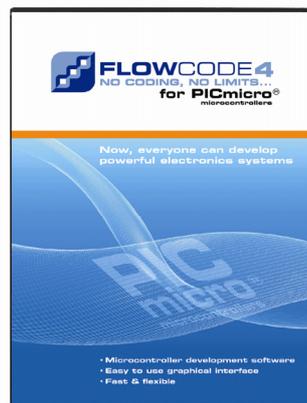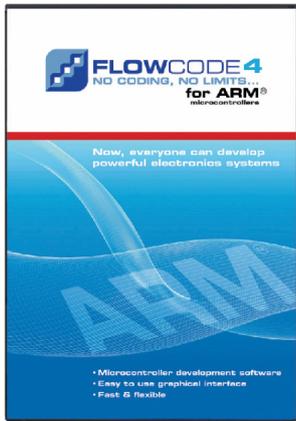7. Power selection jumper
8. Device pins

ECRM40

Processor	32 bit, AT91 ARM 7 core
Base chip:	AT91SAM7S128
Oscillator:	18.43MHz ext, 47.92MHz internal
IO lines:	34
A/D:	8 x10 bit
A/D sample rate	300ksps
Program memory	128K Bytes
RAM	32K bytes
EEPROM	0 (internal ROM overwrite)
Power	5V, USB or external
PWM channels	4
Timers	3 x 16 bit, 2 x 32 bit
Interfaces	2 x EUSART, MI2C, SPI, USB2.0
Package	40 pin DIP, 0.6", compatible

ECRM40 (Pin diagram)

USB

Pin	Name		Pin	Name	
1	VDD OUT		40	VDD IN	
2	GND		39	RB7	[PA12/MISO]
3	RESET		38	RB6	[PA25]
4	RA0	[PA24/PWM0]	37	RB5	[PA13/MOSI]
5	RA1	[PA26/PWM1]	36	RB4	[PA14/PWM3]
6	RA2	[PA11/PWM2]	35	RB3	[PA15]
7	RA3	[PA10]	34	RB2	[PA31]
8	RA4	[PA9]	33	RB1	[PA20/AN3]
9	RA5	[PA8]	32	RB0	[PA23/SCK]
10	RA6	[PA6/TX0]	31	RC7	[PA21/RX1]
11	RA7	[PA5/RX0]	30	RC6	[PA22/TX1]
12	RC3	[PA7]	29	RC2	[PA19/AN2]
13	RD0	[PA4/TWCK]	28	RC1	[PA18/AN1]
14	RD1	[PA27]	27	RC0	[PA17/AN0]
15	RD2	[PA28]	26	GND	
16	RD3	[PA29]	25	RE2	[AN7]
17	RD4	[PA3/TWD]	24	RE1	[AN6]
18	RD5	[PA2]	23	RE0	[AN5]
19	RD6	[PA1]	22	RE3	[AN4]
20	RD7	[PA0]	21	TST	

ECIO ARM Block Diagram

VDD IN (5 - 12V)
USB
J4
3.3V Regulator
VDD OUT (3.3V)
PWR LED
USB LED
AT91 ARM MCU
PA30
30 x GPIO
4 x ANLG IN
TST
RESET
XTAL
RESET

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Flowcode software

ECIO devices are fully compatible with Flowcode4 - 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 systems in minutes. Flowcode achieves this in two steps: firstly users drag and drop flowchart symbols onto the screen, and fill in the dialog boxes when prompted. Then Flowcode compiles the flow chart into code that is downloaded to a microcontroller which executes the program.

Flowcode is available in many languages including: Danish, Dutch, English, Finnish, French, German, Greek, Spanish, (full translation) and also: Italian, Mandarin, Romanian, and Thai (menus only).
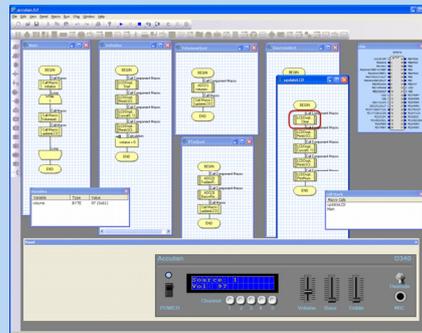
Design
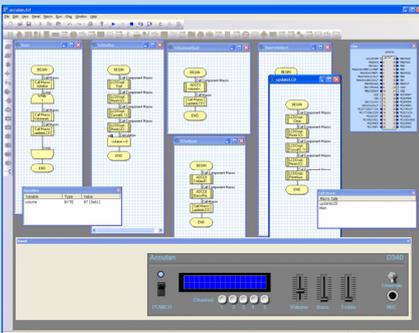
Flowcode contains standard flow chart icons and electronic components that allow to you to create a virtual electronic system on screen. Drag icons and components onto the screen to create a program, then click on them to set properties and actions.

- Easy to use interface
- Allows complex programs to be developed and managed quickly
- All I/O and expansion options are supported in Flowcode

Simulate

Once your system is designed you can use Flowcode to simulate it in action. Test the system's functionality by clicking on switches or altering sensor values, and see how your program reacts to the changes in the electronic system.

- Simulation aids understanding
- Debug before download
- Shorten the design cycle

Download
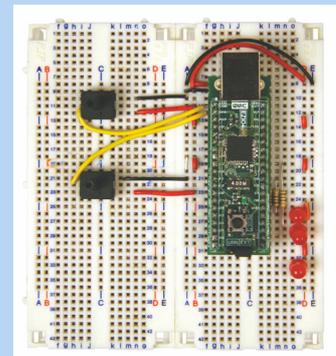
When you are happy with your design click one button to send the program directly to the ECIO device. Remove the USB lead and press the reset button and your program starts to run.

- One button download
- Compiles to C then ASM
- Link in your own C files

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ECIO™ in use

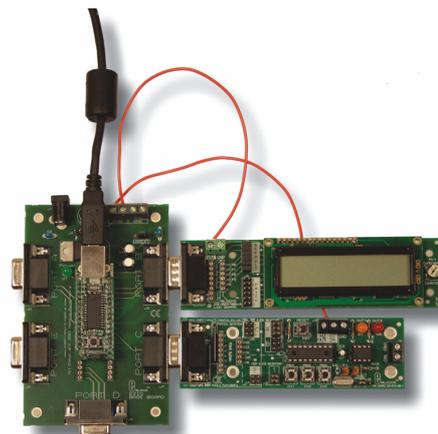There are several ways of using the ECIO:

With a prototype board

ECIO devices are really useful when used in conjunction with a prototype board: the ECIO unit simply plugs into the matrix of holes and the surrounding components are wired in using single strand wire. The ECIO can be used with an external power supply or the unit can draw power from the USB lead itself.
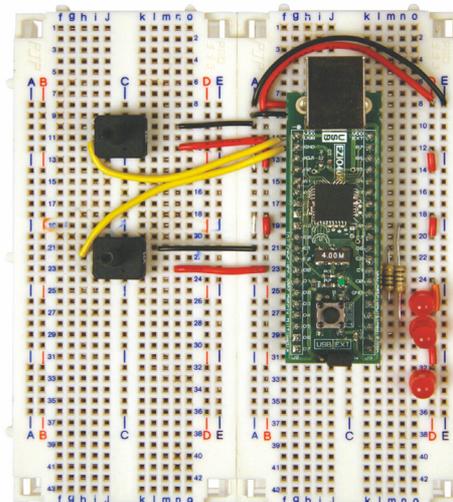
With E-blocks

If you have larger projects, or you want to connect more advanced systems together, then you can use the E-blocks adaptor panel (EB061) shown here. This allows you to connect a large range of boards from simple LED's and switches through to CAN sub-systems, etc. This is ideal for prototyping larger and more complex systems.

With your own hardware

If you are developing your own hardware you can use the ECIO board as a component: adding ECIO to your system allows you to develop a product that can be reprogrammed in the field.

Use with LabView, Visual Basic and other packages

ECIO can easily be integrated with third party PC based control packages like Lab View and Visual Basic. This is enabled by a DLL and a suite of sample programs that can be downloaded to the ECIO to provide a fully controllable slave device from PC based applications.

Using a proto board

Using ECIO with E-blocks
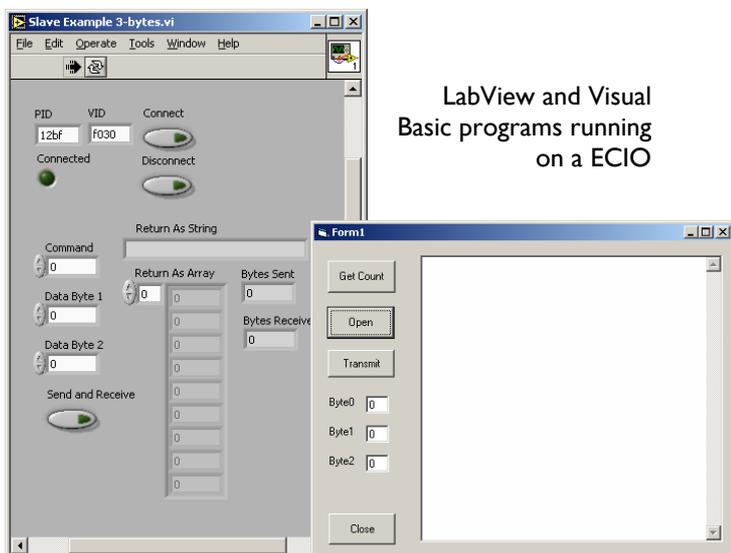
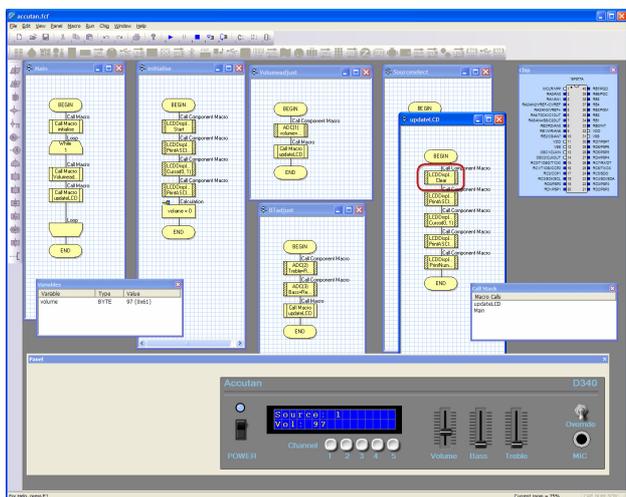LabView and Visual Basic programs running on a ECIO
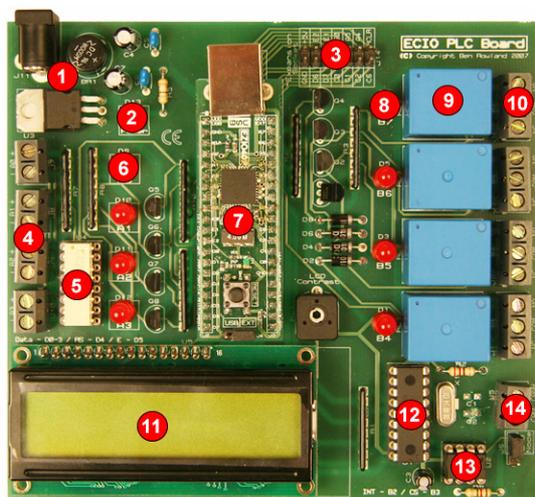
Using ECIO in a custom development

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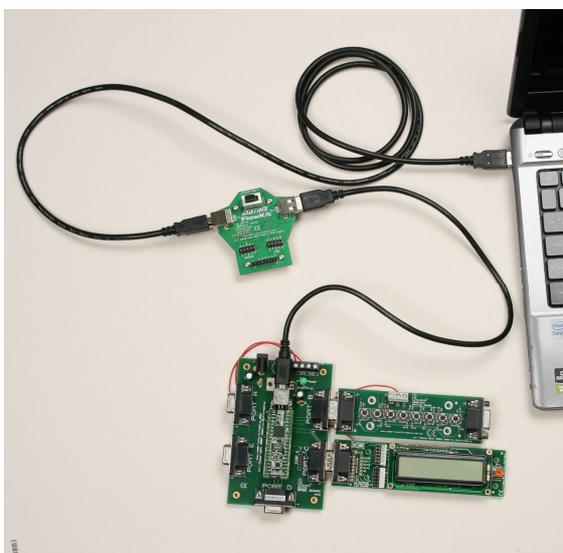# Using FlowKit with ECIO

The FlowKit main board

The system is controlled within Flowcode 4.2+ where the icon just executed is clearly marked

What does it do?

The FlowKit can be connected to hardware systems to provide a real time debug facility where it is possible to step through the Flowcode program on the PC and step through the program in the hardware at the same time. This function is available with Flowcode for PICmicro V4.2 or later.

Benefits

- Helps to solve programming problems
- Seamless program and debug

Features

- Compatible with ECIO, MIAC and Formula Flowcode systems via the USB lead
- Available for Flowcode for PICmicro V4.2 and later
- Allows start, step, and play of programs
- Allows users to see and alter variable values

Description

Whilst Flowcode simulation allows debug of a system to a first pass, FlowKit takes debug to a new level by running the program in the hardware and on the screen at the same time. The system is controlled from within the Flowcode environment where controls allow users to start, stop, pause and step through their program one icon at a time. Under user control the Flowcode software shows the location of the program in the flow chart, the value of all variables in the program, and allows users to alter the variable values when the program is paused.

Using Flowkit with ECIO and E-blocks adaptor board

Note that use of FlowKit with ECIO for ARM is not currently supported.

Ordering information

FlowKit pack   HP299
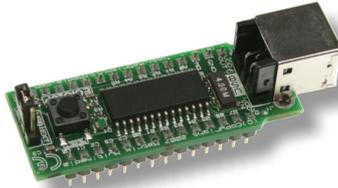
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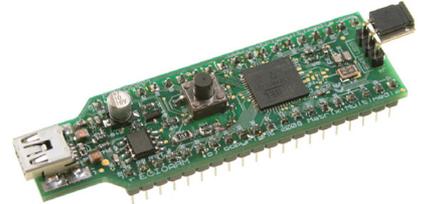**ecio**

Product codes and ordering

ECIO devices
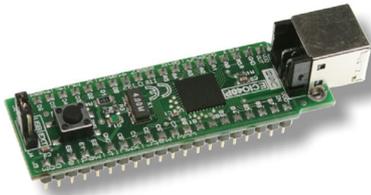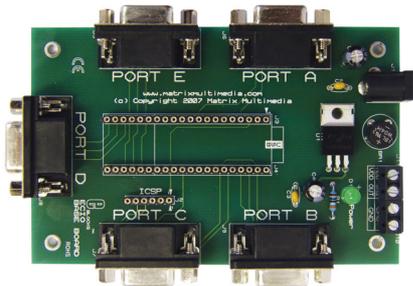

40 pin 18F4455 PICmicro device
ECIO40P

28 pin 18F2455 PICmicro device
ECIO28P

40 pin AT91 ARM device
ECIOARM

E-blocks application board - EB061

EB061 is compatible with all ECIO devices - both ARM and PICmicro.
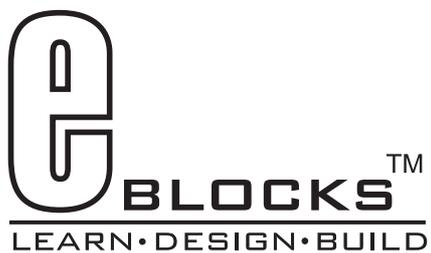
Build your own PLC bundle - EB481

The build your own PLC bundle includes an E-blocks LED board, LCD board, Switch board, Relay board, Opto-isolator board, ECIO application board, ECIO 40 pin PIC board, international power supply, and a full copy of Flowcode version 4 for PICmicro.

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