An introduction

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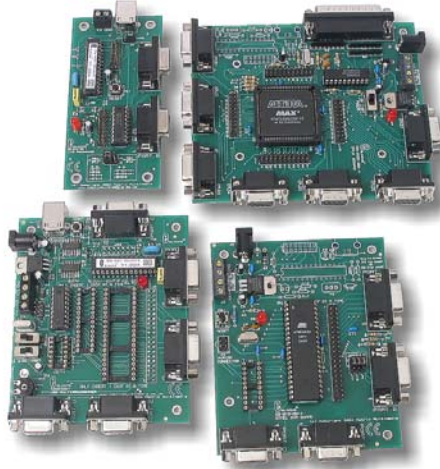On each slide you will see notes in this position – this is my commentary.
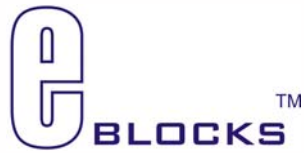
E-blocks are small circuit boards each of which contains a block of electronics that you would typically find in an electronic system.

The range consists of.......

Here is a text definition of E-blocks

'Upstream' boards.....

- PICmicro programmers
- Atmel AVR programmers
- Altera CPLD programmer
- Altera FPGA programmer
- ARM programmer

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This photograph shows (clockwise from top left) The Lite PICmicro programmer, the CPLD programmer board, the Atmel AVR programming board, and the PICmciro Multiprogrammer board.

...and 'downstream' boards....

- ...from simple LED and switch boards

- ...to complex boards like IrDA, internet and Bluetooth.

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Again from top left spiralling clockwise inwards: Patch board, screw terminal board and quad 7-segment display board, Proto board, LCD board, LED board, RS232 board, CAN bus board, X-10 home automation board, D/A and memory board, Switch board, IrDA board, Keypad board, Sensor board

...combined with a choice of programming languages...
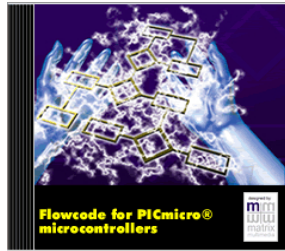
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Actually there are also CD ROMs for Atmel AVR and ARM cores, and for CPLD programming. Our core microcontroller languages are based on Flow chart programming, C programming and Assembly programming.

...that allows you to build a variety of electronic training systems: like this mobile phone....
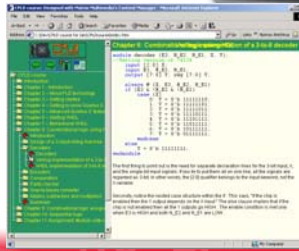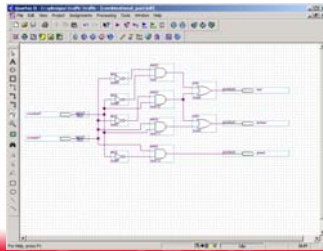
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This picture shows the Deluxe mobile phone trainer. This includes software, storage trays, covers etc.

This shows the CPLD solution with Quartus II design software and full course in VHDL/Verilog.

... or this CAN bus training solution...

- Four CAN nodes
- Based on PICmicro microcontrollers
- Flowcode software and macros included
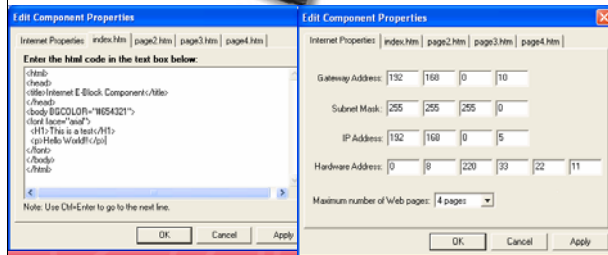- Includes PC based CAN analyser and software

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This shows the CAN bus training solution with Flwocode macro dialog box.

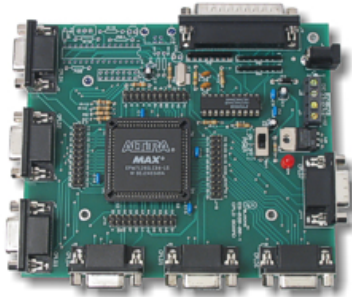This shows the embedded internet solution or digital communications training solution with Flowcode macros

...or....

- IrDA training
- Bluetooth training
- Motors training
- Etc.

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Lots of other training systems can be built
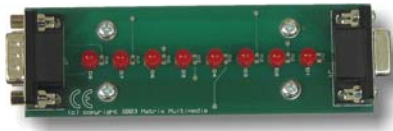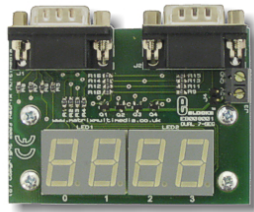
How does the E-blocks system work?

- Up to 7 E-blocks ports on an 'upstream' board

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This CPLD board has 7 E-blocks ports on.

How does the E-blocks system work?

- One or more connections on a 'downstream' board

- Some boards can be used in a bus configuration – beware!
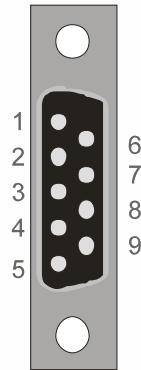
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'downstream' boards have up to two ports. The 7-segment display has one port for cathodes and one for the four anodes, the LED and switch boards have downstream and upstream connectors, but attaching LEDs to I/O lines can change their electrical performance so be careful when using them for bus monitoring on analogue lines.

How does the E-blocks system work?
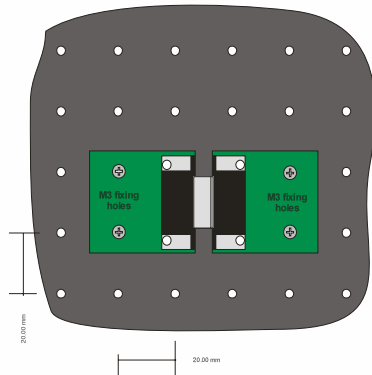
Downstream plug
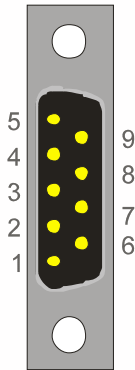
Upstream socket

- Based on 9 way D-type sockets
- 8 bits and earth
- Power wired separately (a problem and an advantage?)

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9 way D-types are used. Power is routed separately. These days we are mixing 3.3V with 5V so this could actually be an advantage. Most E-blocks are 3.3 volt ready.
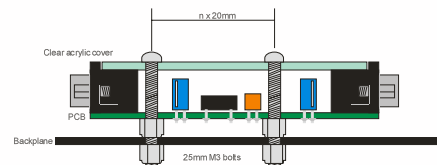
Top left: E-blocks snap together because they are build on a physical grid system. Bottom right: Covers for most E-blocks are available through technical education representatives. Covers prolong E-block life, prevent setting links and chips from being removed/changed. E-Blocks boards can be bolted to metal backplanes to increase security. Bottom left: the backplanes are fitted with slots to allow them to be locked down to a bench with a lap top style lock.

Several ways of use:
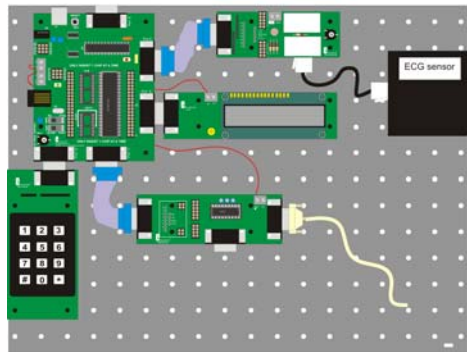
- For learning particular topics e.g.: microcontroller programming, CPLD and E-systems design
- Build you own – permanent – training system
- Training on a particular technology– e.g. CAN bus
- Developing projects is a major area of use – in industry as well as academia

ECG monitoring project

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A key benefit of E-blocks is their flexibility in terms of how they can be used. This is flexibility within one institution, and also is allows different types of institutions to choose how to use E-blocks: Open access labs in Universities want everything bolted to the bench. Some Colleges will want students to build a sequence of different systems. Some Universities will want the flexibility or E-blocks for projects as most projects involve software.

Status of E-blocks – by June 2006

- 41 E-blocks boards
- 7 CD ROMS with utilities and full courses
- Flowcode in 6 languages (French, German, Dutch, Italian, English, Spanish)
- 4 technology solutions (mobile phone, CAN bus, embedded internet, Bluetooth)

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This is changing all the time as we get feedback.

Benefits of E-blocks in education

- High motivation for students
- They can be used for several electronics and computer science disciplines
- Because of this adoption of E-blocks as a lab standard can produce considerable savings across subjects

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In education the benefits of E-blocks are great. They are very flexible, can be used by several academic levels of student, and in several departments.

Benefits of E-blocks in industry

- Rapid development
- Technology transfer: all information to progress the design is provided
- Low cost

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E-blocks are also used by industry for rapid prototyping and technology transfer: where an engineer does not have experience in an aspect of modern electronic system design he/she can easily develop a prototype and learn how to progress the design from the information we provide.

Electronics teaching and development
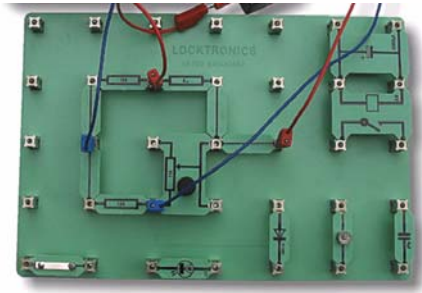
20th century

21st century

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This Locktronics kit is typical of the way we used to teach Electronics – and we still need to do some of this. However the teaching of E-systems, programmable components, and modern digital electronics needs a new approach, and E-blocks satisfies today's requirements. Note that we are not suggesting that Locktronics kits will stop being used. We are actually Locktronics fans!