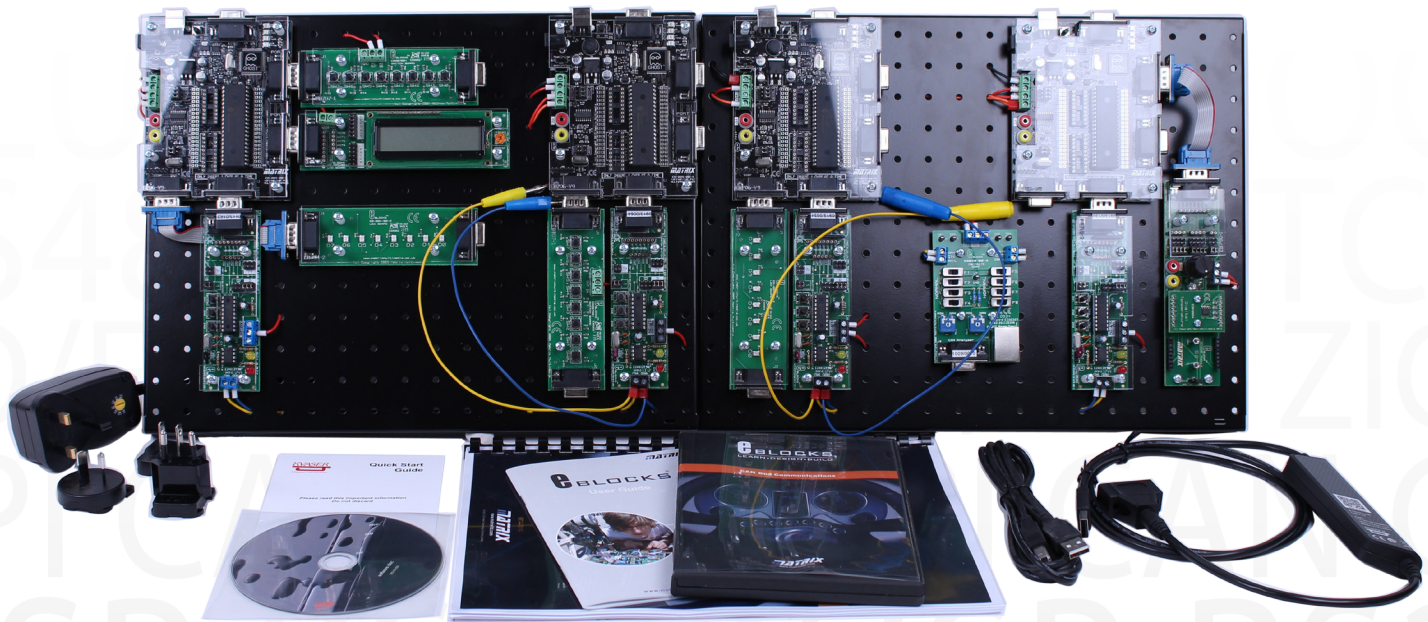# BLOCKS®

CAN bus solution

General information

Provides a solution for teaching and learning about CAN bus technology for all levels of student - Automotive and beyond.

1. Features

- Allows rapid development of CAN systems
- Suitable for investigation of the CAN pro-tocol
- Includes full CAN diagnostic and message generation tools
- Complete suite of hardware modules and sensors
- CAN Flowcode macros available
- Includes Flowcode

2. Benefits

- Allows students to investigate CAN at a high level without getting bogged down in programming detail
- Flowchart software allows students to con-centrate on CAN strategy and protocol

Solution description

This training solution is designed to facilitate the development and investigation of systems that use the CAN bus protocol for communications. The solution is comprised of four fully programmable CAN nodes which mimic Electronic Control Units (ECUs) in an automotive application. These are mounted on rugged backplanes and are fitted with ancillary circuit boards which mimic the functions of indicator lamps, switches and sensors. Flowcode software allows students to program each of the four nodes in flow charts to form a fully functioning CAN system. The solution is suitable for automotive students who simply need to understand how CAN works, and for electronic students who want to understand more details of the CAN protocol. The software supplied operates at several levels so that different types of student are exposed to the only relevant details of the CAN system. A CAN bus analyzer and message generator is supplied with the solution.

All E-blocks boards are fitted with clear acrylic covers which prevent links and chips from being removed. The solution is assem-bled and tested in the Factory, and is shipped in rugged plastic trays for storage and transport.

A Professional Academic PIC single user licence of Flowcode V6 graphical programming software is provided. Flowcode allows students to understand communications programs and strategies without getting bogged down in the complexity of C or Assembly code. The system can also be used with C and Assembly code (software not provided).

A 50+ page printed and bound manual with student exercises is included. This is also available in electronic form (Word and PDF) along with fully worked exampled on CD ROM.

Learning objectives

This equipment and associated curriculum is designed for two levels of student:

- Firstly the equipment can be used for automotive technicians to gain an appreciation of CAN technology and the equipment used in fault finding CAN systems, and how that fault finding takes place. These technicians are expected to download and review programs made in flow charts, but are not expected to carry out any programming tasks. Level 1 learning outcomes are:
- To understand what a microcontroller is and that it can be programmed with software to perform different tasks, To understand the nature of an ECU and the main component parts of an ECU. To understand that software can change the way an ECU operates. To understand the nature of CAN and the basic CAN protocol, and the basic structure of a CAN network.

- Secondly the equipment can be used by more advanced students to gain an understanding of CAN technology and to allow them to construct networks which communicate in CAN and higher level protocols. These students are expected to develop their own CAN networks using flowcharts with CAN macros provided. The use of flow charts here will allow the students to understand CAN protocols and communication without the need for the students to get bogged down in the processes of lower level CAN bus software construction. Level 2 CAN learning outcomes are all those in Level1 and:
- To understand CAN transmit and receive messages and the top level CAN protocols. To understand CAN message structure. To understand and construct a fully operational CAN system with four nodes working at once. To gain an insight into higher level protocols like DeviceNET and CANopen.

Further information

1. **Learning time**
Dependant on course structure and options chosen from the teacher's man-ual. Approximate figures:
Automotive: 3 hours
Electronics: up to14 hours

2. **Prerequisites**
- Some understanding of electronics
- Windows skills

3. **System requirements**
PC with CD ROM drive and Windows XP or greater.

4. **Futher information**
A separate datasheet is available for each of the E-blocks boards included in the pack. Please see our web site for details.

5. **Order code**
The order code for this product is EB237.

6. **Also consider**
Mobile phone training solution
Zigbee training solution
USB training solution
Embedded internet training solution
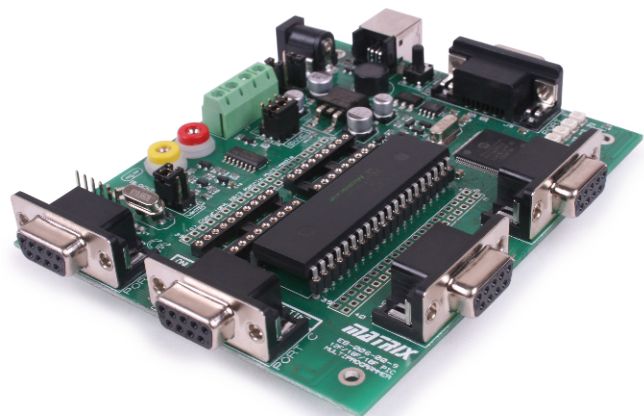RFID training solution
Bluetooth training solution
FPGA Solution

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Solution Contents

The table gives a list of the major items of the pack contents.

Datasheets on any individual item are available

from the resource section of the Matrix TSL website www.matrixtsl.com

Qty	Description
1	CAN bus teachers notes
1	CAN bus solution CD ROM
1	Flowcode V6 Professional Academic PIC single user licence
1	USB CAN sniffer
2	Adjustable power supply
1	USB lead
2	E-blocks LED board
1	E-blocks LCD board
4	E -blocks USB Multiprogrammer board
2	E -blocks Switch board
4	E -blocks CAN board
1	E- blocks Sensor interface
1	E- blocks Kvaser analyser interface board

MATRIX

Matrix Technology Solutions Ltd
The Factory
33 Gibbet Street
Halifax, HX1 5BA, UK

t: +44 (0)1422 252380
e: sales@matrixtsl.com

www.matrixtsl.com

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