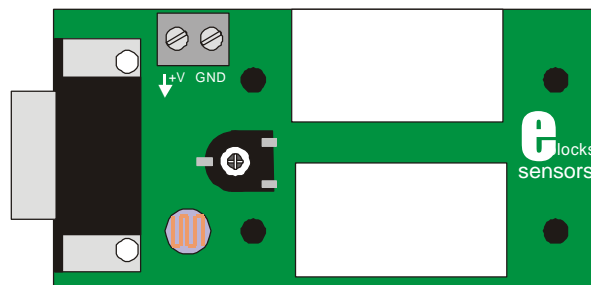


Sensor Board datasheet



Contents

1. About this document
 2. General information
 3. Board Layout
 4. Getting Started
 5. Circuit description
- Appendix
1. Circuit Diagram
 2. Sensors

1 About this document

This document concerns the Matrix Sensor Board code EB-003-00-1.

Trademarks and Copyright

PIC, PICmicro are registered trademarks of Arizona Microchip Inc.

E-blocks is a trademark of Matrix Multimedia Limited.

EB-003-00-1 and associated software and documentation are Copyright ©2004 Matrix Multimedia Limited.

Other sources of information

There are various other documents and sources that you may find useful:

Getting started with E-Blocks.pdf

This describes the E-blocks system and how it can be used to develop complete systems for learning electronics and for PICmicro programming.

PPP Help file

This describes the PPP software and its functionality. PPP software is used for transferring hex code to a PICmicro microcontroller.

Disclaimer

The information in this document is correct at the time of going to press. Matrix Multimedia reserves the right to change specifications from time to time.

Technical support

If you have any problems operating this product then please refer to the troubleshooting section of this document first. You will find the latest software updates, FAQs and other information on our web site:

www.matrixmultimedia.co.uk. If you still have problems please email us at:

support@matrixmultimedia.co.uk. When emailing please state the operating system, the version of PPP you are using.

2 General information

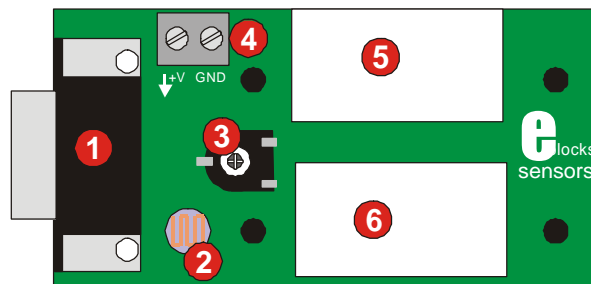
Description

This new Sensor Board is part of the new product range called E-Blocks. The board allows you to connect a range of digital or analogue sensors to any of the I/O ports on the E-Block multi / Lite programmer board. It also allows you to use the on-board light sensor. The standard 9-way D-type connector associated with E-Blocks makes connection.

Features

- E-blocks compatible
- Low cost
- Full range of external sensor to enable plenty of different and interesting experiments
- On-board light sensor
- Downstream D-type connector
- Compatible with most I/O ports in the E-Block range
- Ease to develop programming code using Flowcode icons.

3 Sensor Board Layout



- 1) 9 Way D-type Plug
- 2) On-board light sensor
- 3) Potentiometer – for simulating varying analogue voltage
- 4) Screw Terminals
- 5) External digital sensor
- 6) External analogue sensor

Potentiometer - part of the sensors system - simulates a varying analogue voltage on port A1 for testing code during program development.

4 Getting Started

As can be seen the circuit diagram (Appendix 1) consists of up to 4 sensors, an LDR, a variable resistor to simulate varying analogue signal, an Analogue sensor port and a Digital sensor port. The following shows a procedure to test the functionality of this board. It requires the Vernier motion detector and a Vernier Analogue sensor.

Testing the Sensor Board - sensor.hex

The following instructions explain the steps to test and use your Sensor Board. The instructions assume that PPP is installed and functional. It also assumes that you are confident in sending a program to the PIC via the Multiprogrammer.

The sensor.hex program will take readings from the four sensors connected and display them on the LCD board.

- 1) Ensure power is supplied to all the necessary boards.
- 2) Insert the LCD board (EB-005-00-1) into Port B of the Multiprogrammer
- 3) Insert the Sensor board (EB-005-00-1) into Port B of the Multiprogrammer
- 4) Ensure that both boards are connected to "+V" via the screw terminals
- 5) Ensure that the Multiprogrammer is in correct configuration
 - Fast mode (SW1 towards the centre of the board)
 - Ensure that a 19.6608MHz crystal is inserted in the Multiprogrammer boardSW2 is not used when in Xtal mode so it doesn't matter it's position
- 6) Program the a PIC16F88 with the test program sensor.hex
- 7) Check the LCD display. Altering the conditions, for example block light to the LDR, should change the values on the LCD display.

This should satisfy that the Sensor Board is fully functional!

5 Circuit description

The circuit consists of four main devices. The board has a Light Dependant Resistor (LDR) to enable quick analogue light measurements. RV1 is a potentiometer that can provide a varying analogue voltage. This can be used to simulate an analogue voltage. There are also two connectors, J3 and J4, which are used to connect a wide range of analogue and digital sensors. J3 is the connector used for digital sensors. J4 is used to connect all analogue sensors.

There is also a screw terminal that is included on all E-Blocks that allows you connect +V and GND to the system.

Appendix 2 - Sensors

A complete range of sensors for real world interaction

The follow is a list of sensor that are available to use with the Sensor Board.
A complete list of sensors and their specifications are listed on our web site.

A separate datasheet gives further details on all sensors.



Barometer



Current probe



Dual range force sensor



Differential voltage probe



ECG sensor



Heart rate monitor



Gas pressure sensor

| Product | Code |
|---|--------|
| Bar Tape | HSTAPE |
| Barometer | HSBAR |
| Colourimeter | HSCOL |
| Conductivity probe | HSCON |
| Current probe | HSDCP |
| Differential voltage probe | HSDVP |
| Dissolved oxygen probe | HSDO |
| Dual-range force sensor | HSDFS |
| ECG electrodes | HPELEC |
| ECG sensor | HPEKG |
| Extra long temperature probe | HSTPL |
| Fast response photogate | HSVPG |
| Flow rate sensor | HSFLO |
| Gas pressure sensor | HSGPS |
| Heart Rate Monitor | HSEHR |
| Instrumentation amplifier | HSINA |
| Low-g accelerometer | HSACC |
| magnetic field sensor | HSMG |
| Microphone | HSMCA |
| Motion Detector | HSMD |
| O2 gas sensor | HSO2 |
| pH sensor and amplifier | HSPH |
| Picket Fence | HSPF |
| Radiation Monitor | HSRM |
| Relative humidity sensor | HSRH |
| Respiration monitor belt (requires gas pressure sensor) | HSRMB |
| Rotary Motion sensor | HSRMS |
| Smart Pulley Attachment | HSSPA |
| Thermocouple | HSTCA |
| Three range light sensor | HSLS |
| Turbidity sensor | HSTRB |
| Wide range stainless steel temperature probe | HSTMP |



Instrumentation amplifier



Low g accelerometer



Motion detector



O₂ sensor



Magnetic field sensor



pH sensor



Temperature probe