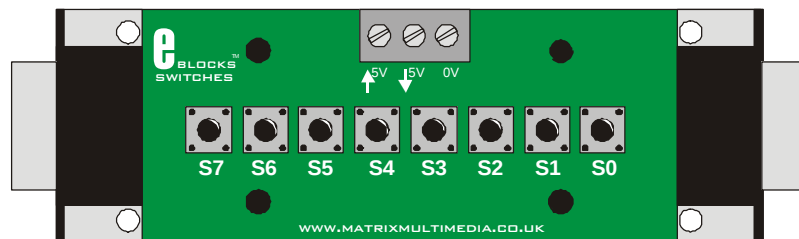
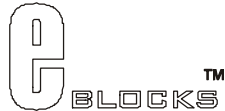


Switch Board datasheet



Contents

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

1 About this document

This document concerns the Matrix Switch Board code EB-007-00-1.

Trademarks and Copyright

PIC, PICmicro are registered trademarks of Arizona Microchip Inc.

E-blocks is a trademark of Matrix Multimedia Limited.

EB-007-00-1 and associates 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

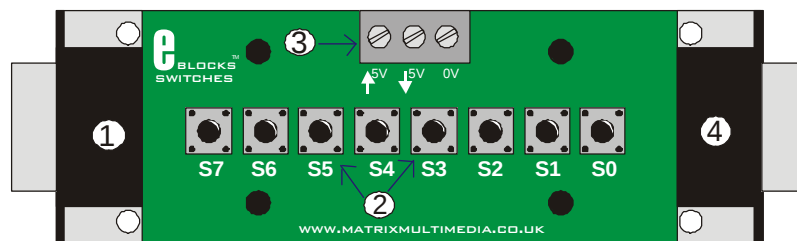
Description

This Switch Board is part of the E-Blocks range. The board allows you to connect up to 8 switches to any of the I/O ports on the E-Block Multi / Lite programmer board. The standard 9-way D-type connector associated with E-Blocks makes the upstream and downstream connection. Further E-Blocks can be connected to this E-Block. The two D-type connectors provide a bus system that enables 'clean' access to all I/O lines. A +5 volt connection is required to enable the switching from logic level 0 (0V) to logic level 1 (+5V). Connecting a wire, using the screw terminal blocks provided on most E-Block boards, makes this easily achievable.

Features

- E-blocks compatible
- Low cost
- Compatible with most I/O ports in the E-Block range (up to 8 I/O lines via 9 way D-type connector)
- Upstream and downstream D-type connectors
- Ease to develop programming code using Flowcode icons.

3 Switch Board Layout



- | | | |
|----|---------------------|-----------|
| 1) | 9 Way D-type Plug | |
| 2) | 8 x Switches | SW0 – SW7 |
| 3) | Screw terminal | |
| 4) | 9 Way D-type socket | |

4 Getting Started

As can be seen the circuit diagram consists of 8 simple switches in circuit with 8 resistors. To test this board you will need to apply 5V to the screw terminal connector and, using a multimeter, check that 5V appears at the relevant pin on J1 as each switch is pressed. Alternatively you can use a simple program to mirror the input on one port to the output on another to check each switch is operating correctly, this is done in the program switches.hex.

Testing the Switch Board – switches.hex

The following instructions explain the steps to test and use your Switch 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 switches.hex program will light up all the corresponding light on the LED Board.

- 1) Ensure power is supplied to all the necessary boards.
- 2) Insert the Switch Board into Port B of the Multiprogrammer Board
- 3) Insert the LED Board onto Port A of the Multiprogrammer Board
- 4) 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 board
- 5) Program the a PIC16F88 with the test program switches.hex
- 6) Press each push button switch (SW0 – SW4)
 - This should illuminate each corresponding LED (D0- D4)

Note. This only tests that the SW0 – SW4 work, this is due to the fact that Port A on the Multiprogrammer only has five bits associated with this port (A0-A4). When switches.hex is running placing a LED Board in a bus configuration (J1 of LED board connected to J2 of Switches board. By pressing each switch, each corresponding LED will illuminate in turn, this will enable you to fully check the board.

This should satisfy that the Switch Board is fully functional!

5 Circuit description

The circuit board consists of 8 digital inputs on a ‘downstream’ 9-way D-type plug. This routes each bit of the bus to an identical switch circuit and to a 9 way D-type socket that can be used for adding further E-blocks in a bus configuration.

This switch circuit board assumes that to operate correctly each input on the upstream processor board will be configured as a high impedance input. With this in mind each circuit consists of a 4k7 ‘pull down’ resistor which, when the switch is open circuit, ensures a logic level 0 at the output from the switch board and processor input pin. When a switch is pressed then the output from the switch board is effectively connected to a 390 ohm resistor to the positive rail (usually 5V), or to logic 1. When the switch is pressed the effect of the 4k7 pull down resistor in each circuit can be deemed to be negligible.

Using the switch board in a bus configuration

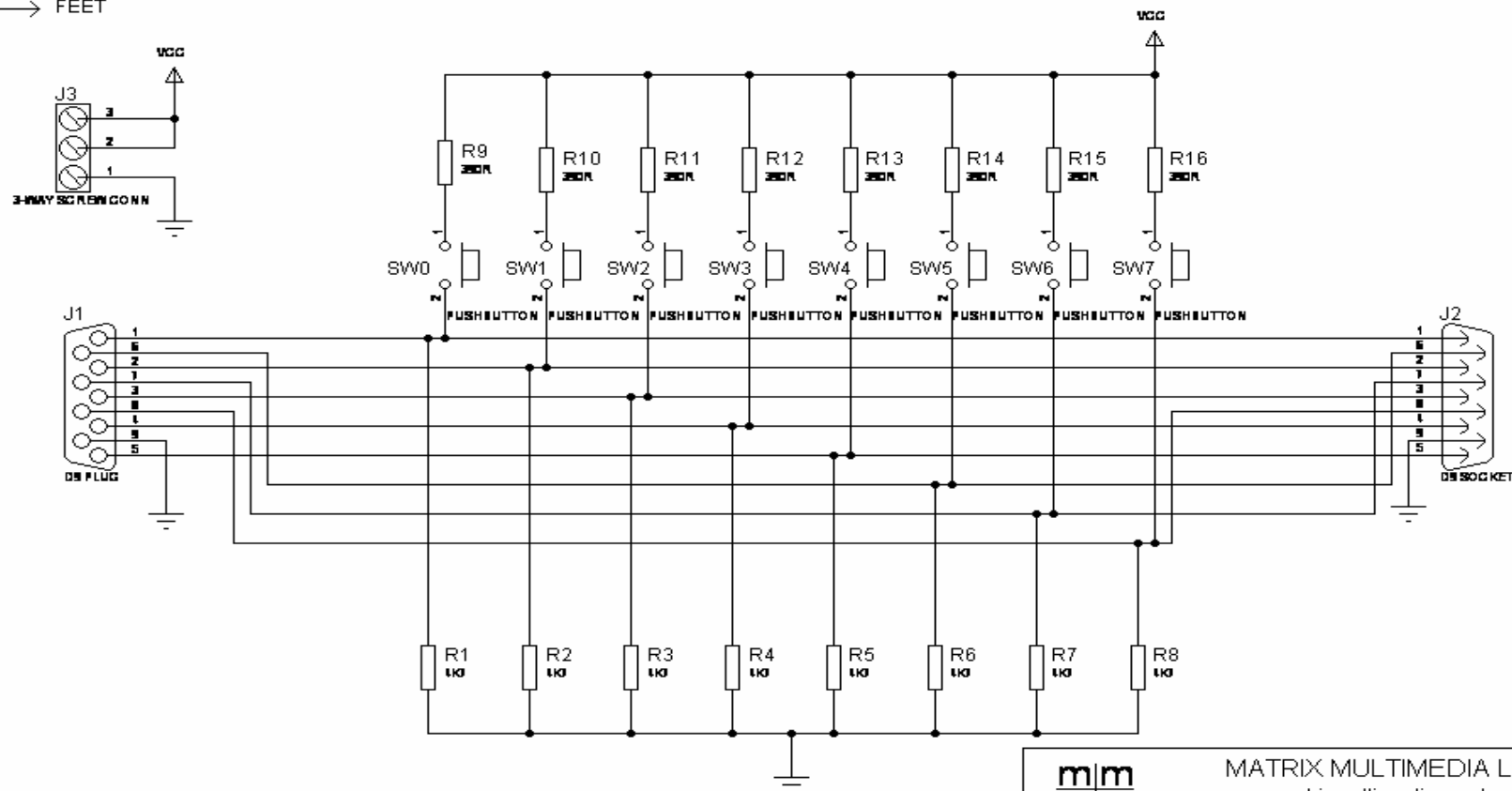
Care must be taken when connecting another E-block to the switch board. In this case users must make sure that the impedance placed on each line of the bus is such that the fundamental operation of the switch circuit is not impeded.

Matrix Multimedia Switch Board

Appendix 1 - Circuit diagram

THIS SYSTEM INCLUDES:-

→ FEET



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