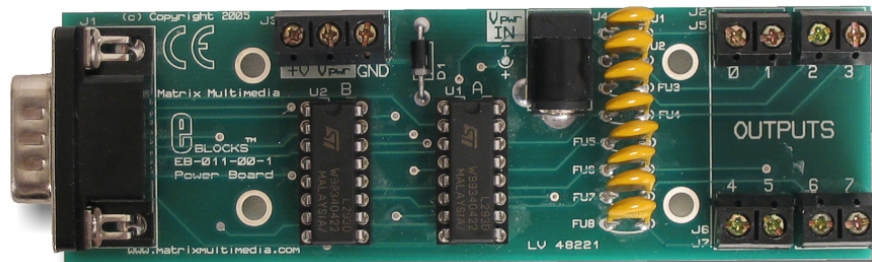


Power board datasheet EB011-00-1



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Appendix 1 Circuit Diagram

1. About this document

This document concerns the Matrix Power Board code EB011 version 1.

The order code for this product is EB011.

1. **Trademarks and copyright**

PIC and PICmicro are registered trademarks of Arizona Microchip Inc.
E-blocks is a trademark of Matrix Multimedia Limited.

2. **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.

C and assembly strategies

Not provided for this product.

3. **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. This product is for development purposes only and should not be used for any life-critical application.

4. **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.com . If you still have problems please email us at: support@matrixmultimedia.co.uk.

2. General information

This E-block allows the use of high power demanding applications – such as running medium sized motors, relays and many other applications. The board allows processors in the E-Blocks range to provide the power demand that is required for these high power applications.

The board uses two 4-channel industry standard power chips – L293D. Each channel can be used individually forming up-to eight 600mA power output stages. Two channels can be grouped together to form a full H-Bridge configuration that allows bi-directional motor control – thus enabling a total power output per H-Bridge of 1200mA.

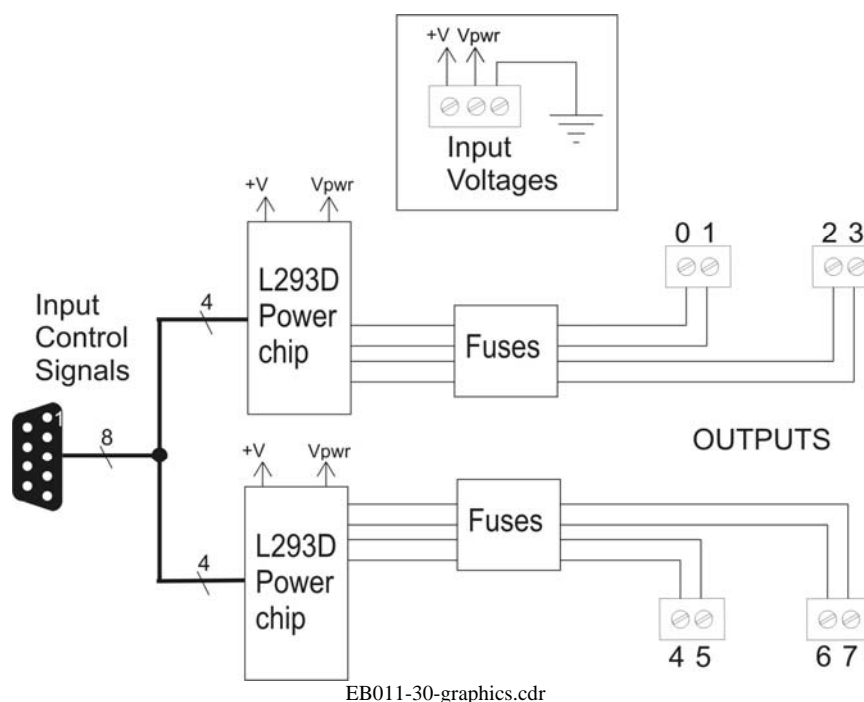
On-Board re-settable fuses automatically trip when too much current is consumed to protect these power chips. These are rated to trip at 500mA in order to protect the L293 chips.

The board is E-Blocks compatible and can be used with ‘up-stream’ devices to boost the available output power of the processor.

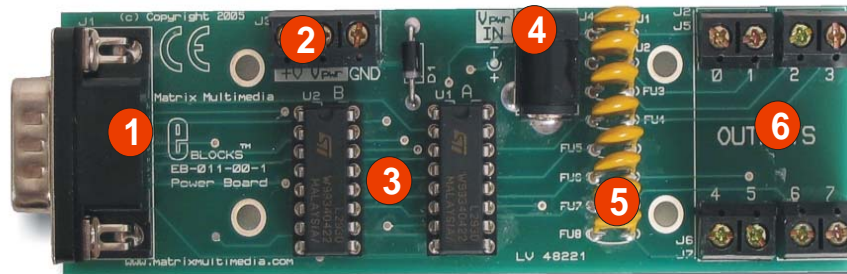
1. Features

- E-blocks compatible
- Low cost
- 8 channels produces up to 600mA (at 36V) each OR
- Up to 4 full H-Bridge configuration outputs enabling up to 1200mA
- IC protection via re-settable fuses

2. Block schematic



3. Power board layout



EB011-74-1.cdr

- 1) 9-way downstream D-type connector
- 2) Power screw terminals
- 3) 2 x L293D power chips
- 4) External PSU socket
- 5) Re-settable Protection fuses
- 6) Output Screw Terminal

4. Testing this product

The following program will test the circuit. The test file can be downloaded from www.matrixmultimedia.com.

The following instructions explain the steps to test and use your Power 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.

These programs requires aPICmicro Multiprogrammer board (EB-006) with a 40-pin PIC16F877A device.

The program will enable you to fully test the functionality of the board.

1. **System Setup**

Multi-programmer board with
PIC16F877A
19.6608 MHz crystal
XT setting

Loaded with "power.hex" firmware

Power board connected to Port B of the Multiprogrammer

Connect "+V" from the Screw terminal of the Power board to "+V" of the Multiprogrammer

Connect an external power supply to the jack (J4) labeled "Vpwr IN" or the screw terminals labeled "Vpwr – this can be taken directly from the "+14" screw terminal of the Multiprogrammer

12V 0.2A Lamp connected to outputs of board

2. **Test Procedure**

Once the Multiprogrammer has been programmed press the reset button. This will restart the program. The program will turn on each output individually then turn on all outputs together. This will allow the outputs to be tested using the lamps. To restart the sequence, press the reset button on the Multiprogrammer.

Please note that this program requires a power supply of approximately 1 to 1.6 amperes. This is used for turning all lamps on. Using a power supply that is not rated to this high power could cause the program to restart. Also note that the power supply that Matrix Multimedia sells (HPPSU2) is only rated at 0.6 Amperes and therefore is not rated appropriately for this test routine.

5. Circuit description

The full circuit is made up of two main components: the 2 x Power chips (L293D) and the output screw terminals.

1. **Power chips – L293D**

The L293D are industry standard push-pull channel drivers that can deliver up-to 600mA per channel. The device accepts standard TTL and DTL logic levels and the output can drive inductive loads. The board has two L293D chips that are fitted in DIL sockets to enable quick and easy replacement of these chips. The two chips are powered from an external supply (up to +36 volts). The load power supply is connected via DC power Jack (J4) labeled “Vpwr IN” or the screw terminals labeled “Vpwr”. When Vpwr is routed to the outputs by the L293 you will find that the output voltage is around 1.5V less than Vpwr due to the voltage drop across internal diodes. The L293D chips also require a 5V supply for the logic side of the device. This is provided directly from the ‘up-stream’ E-Blocks board via the screw terminal labeled “+V” – usually 5V.

The two L293D provide 8 individual channels. The channels can also be grouped in pairs to provide a full H-Bridge configuration that is suitable for bi-directional motor control. Each channel is internally clamped with diodes (which makes them suitable for driving inductive loads) and also externally protected via thermal re-settable fuses. These fuses will ‘trip’ when the current demand is too great for the chip. They will automatically reset themselves when the fuse cools down.

Please note that the ‘up-stream’ processor output supply can also be used to drive the L293D outputs. This is done by connecting the ‘up-stream’ processor voltage (i.e. +5V from screw terminal “+V OUT”) to the both “+V” and “Vpwr” on the Power board screw terminals. If doing this be sure NOT to connect a separate power supply via the DC Power jack (J4) and bear in mind the voltage drop mentioned above.

For further information on the L293D please visit the manufacturer’s website www.st.com to find the datasheet for this device.

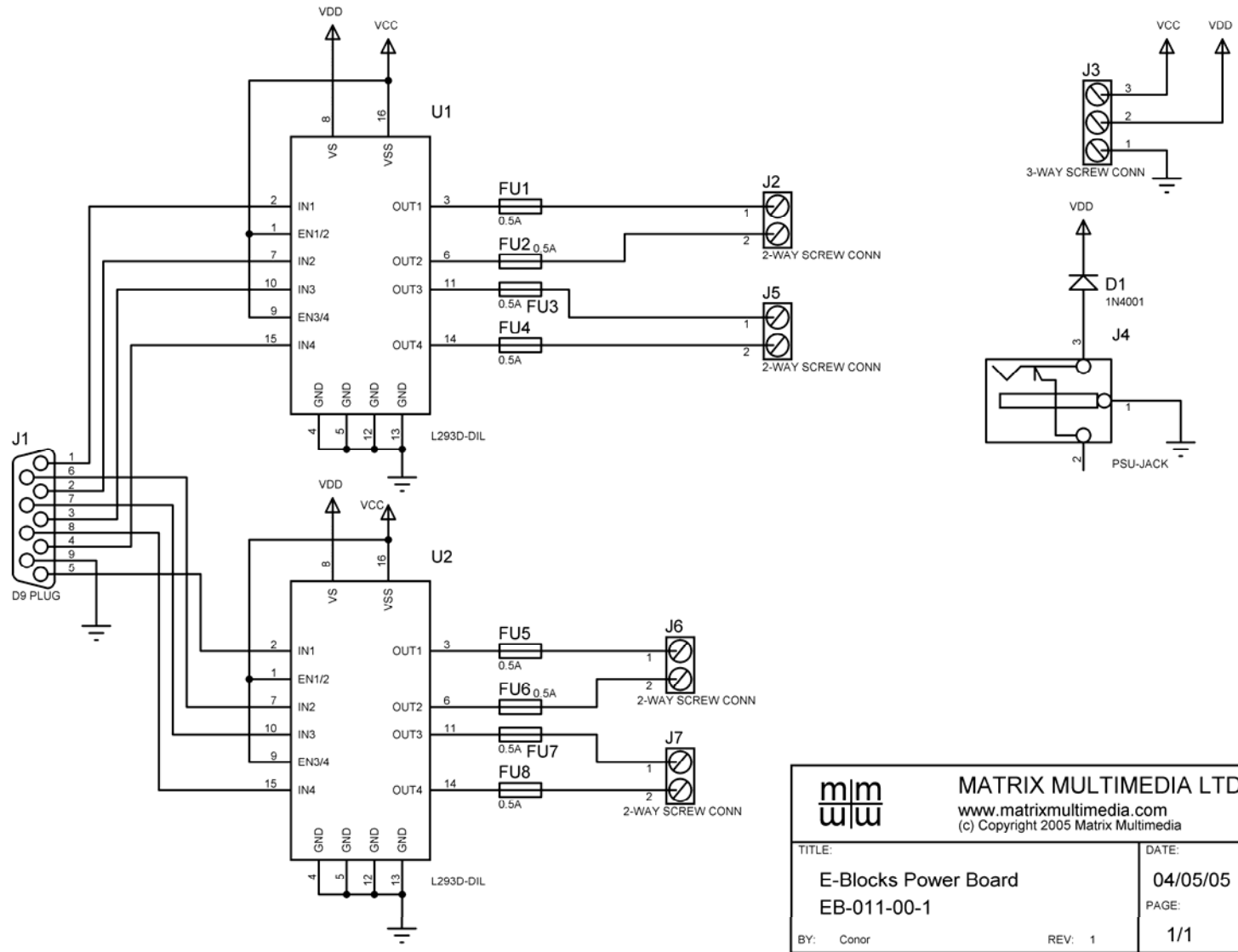
2. **3.3V operation**

This board does not operate off a 3.3V supply. V+ must be a minimum of 5V.

3. **Output screw terminals**

The outputs from the L293D chips are taken directly to the output screw terminals. The screw terminals are labeled OUTPUT 0 – 7. This represents the data lines that control these outputs. For example bit 2 on the input D-type connector will control the output of the L293 at the screw terminal labeled ‘2’.

Appendix 1 – Circuit diagram



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