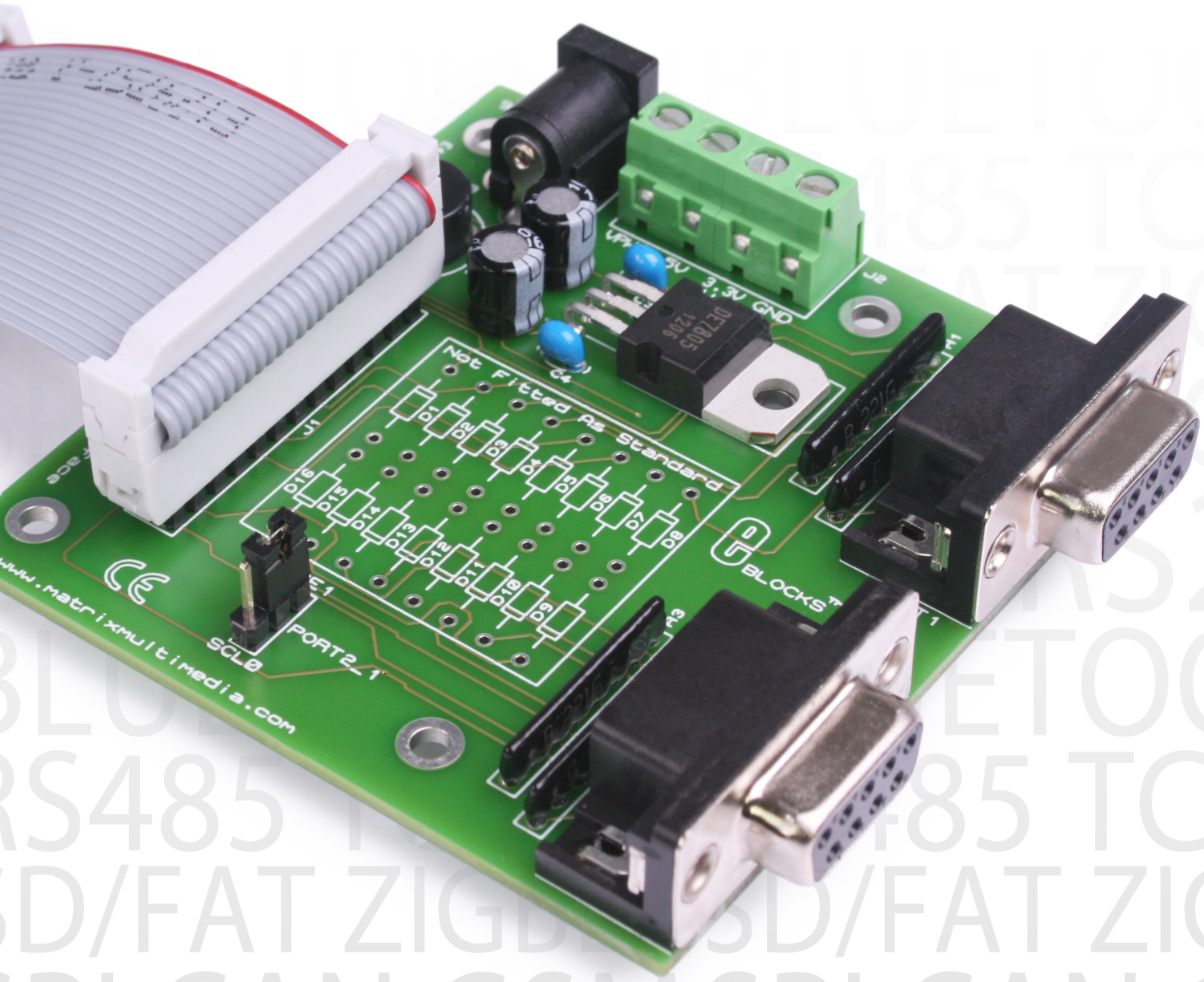
MATRIX

eBLOCKS®

Raspberry Pi board



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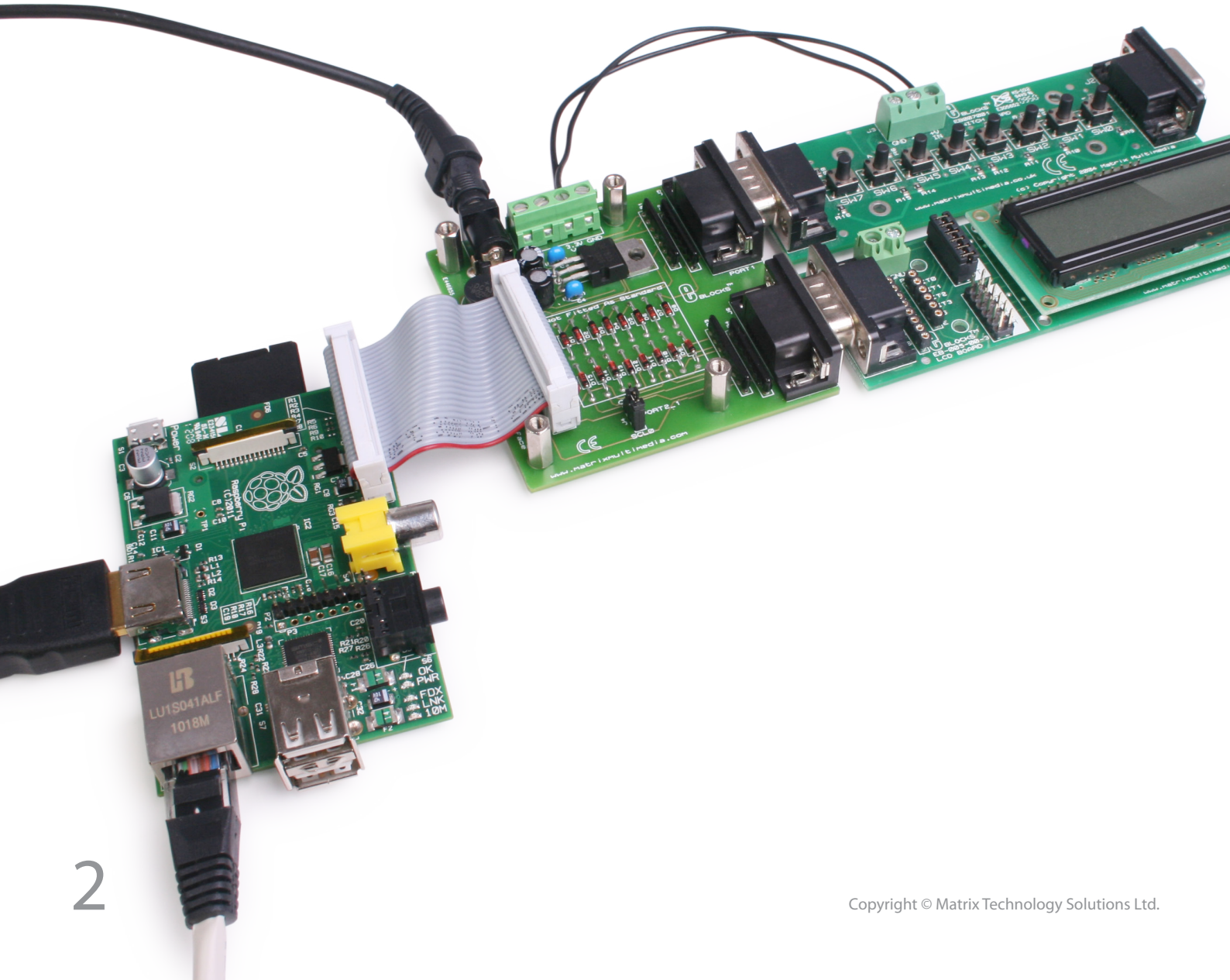

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About this document

This document concerns the EB080 E-blocks Raspberry Pi board.

1. Trademarks and copyright

PIC and PICmicro are registered trademarks of Arizona Microchip Inc. E-blocks is a trademark of Matrix Technology Solutions Ltd.

2. Disclaimer

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

3. Testing this product

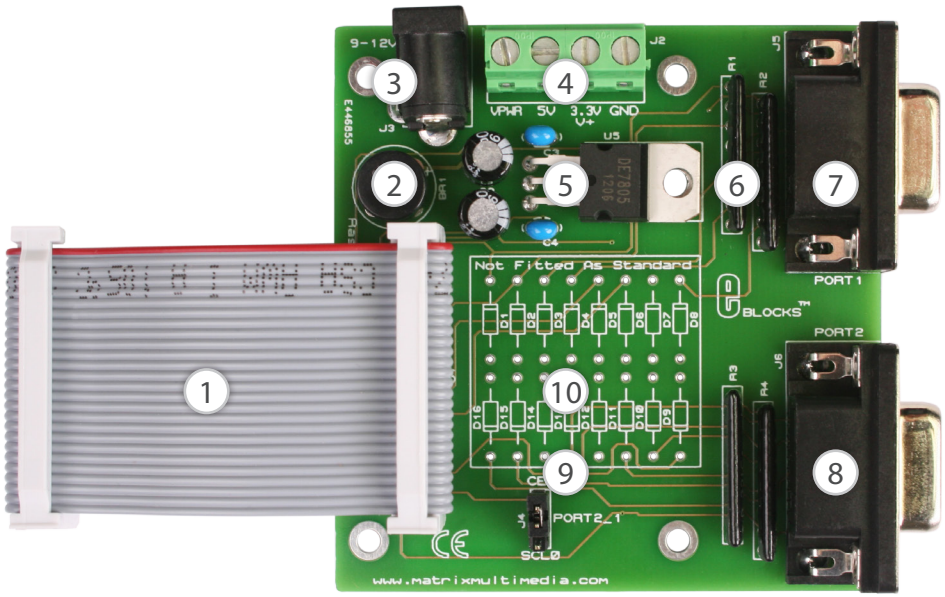
It is advisable to test the product upon receiving it to ensure it works correctly. Matrix provides test procedures for all E-blocks, which can be found in the Support section of the website.

4. Product support

If you require support for this product then please visit the Matrix website, which contains many learning resources for the E-blocks series. On our website you will find:

- How to get started with E-blocks - if you are new to E-blocks and wish to learn how to use them from the beginning there are resources available to help.
- Relevant software and hardware that allow you to use your E-blocks product better.
- Example files and programs.
- Ways to get technical support for your product, either via the forums or by contacting us directly.

Board layout



1. Ribbon cable connection to Raspberry Pi
2. Bridge rectifier
3. DC supply socket
4. Voltage supply screw terminals
5. Voltage regulation circuitry
6. Current limiting I/O protection resistors
7. E-blocks socket port 1
8. E-blocks socket port 2
9. I/O selection jumper
10. Extra 3.3V zener I/O protection (not fitted as standard)

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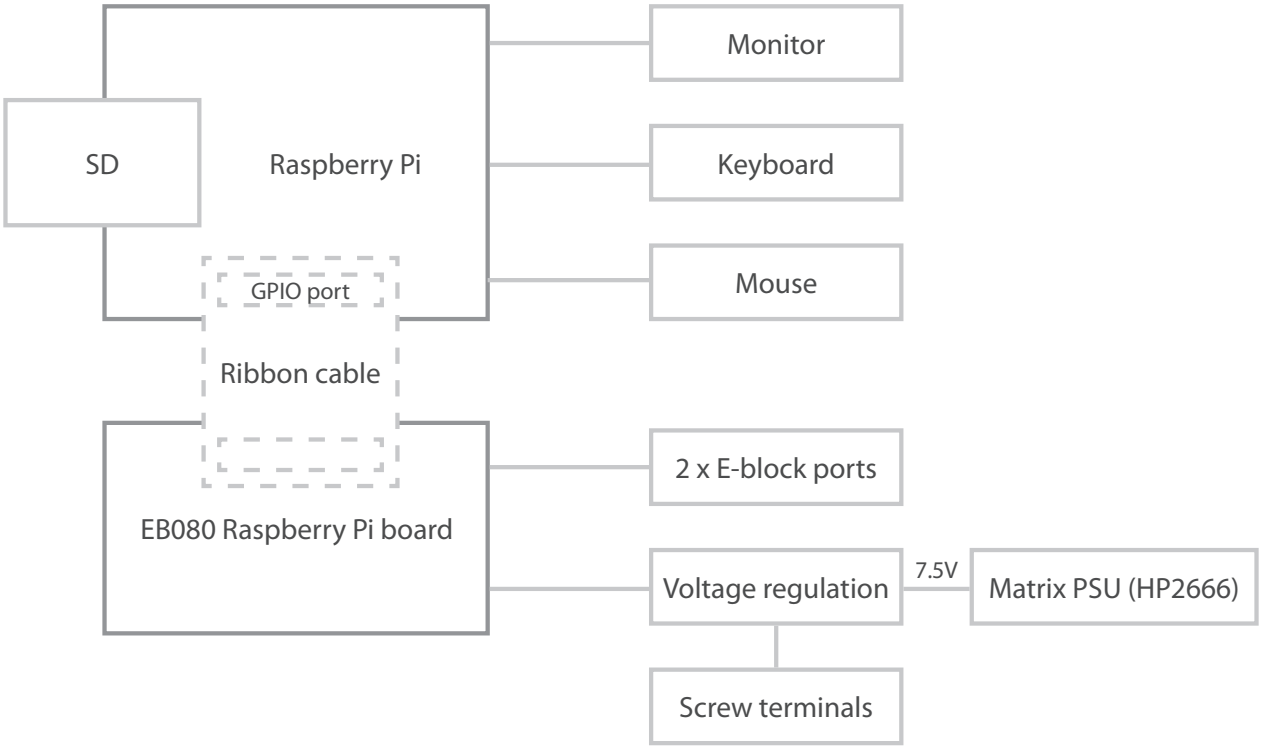
General information

The Raspberry Pi board is part of the E-blocks range of circuit boards. The board allows you to connect a Raspberry Pi device into an E-blocks system. The D-type connectors provide a bus system that enables 'clean' access to all I/O lines. This allows you to use standard E-blocks with the Raspberry Pi upstream microprocessor architecture. All the standard signals from the Raspberry Pi GPIO bus are brought across onto the adapter board including thr 17 standard general purpose I/O pins and the voltage supply pins. The adaptor board can also be used along with a standard Matrix DC power supply (HP2666) to provide power to your Raspberry Pi.

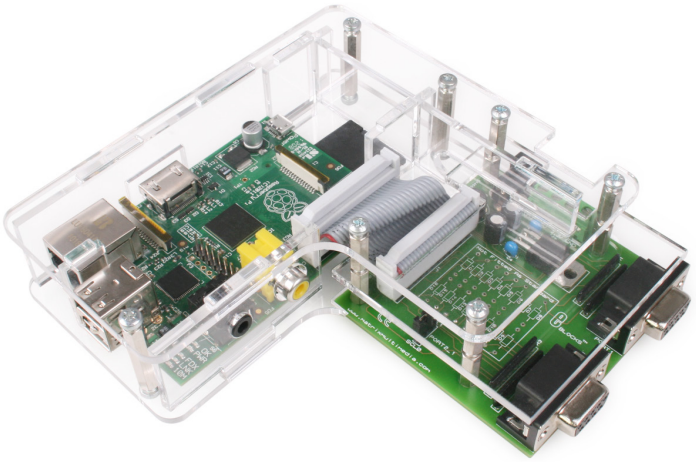
1. Features
- E-blocks compatible
- 2 full 8-bit E-blocks ports
- Example Python macros available
- Can be used to provide power to the Raspberry Pi



EB080 is the code for Raspberry Pi board alone.

EB380 is the product code for the Raspberry Pi board with 26 way IDC cable.

A kit with this adaptor board, a 26 way IDC cable and a rugged plastic case kit which provides physical protection for the RPi board is also available - product code EB385.



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Circuit description

The circuit board consists of a DIL header which is designed to be connected to the Raspberry Pi board via a ribbon cable (supplied) and the GPIO port on the Raspberry Pi. The board also features a DC socket and an onboard voltage regulator to allow you to power the Raspberry Pi from a Matrix DC power supply. We recommend switching the power supply down to 7.5V to allow the voltage regulator to supply enough current to drive the Pi without getting overworked and overheating. The board also features a DC bridge rectifier allowing the power supply to be connected to the DC socket using either polarity.

The GPIO pins are numbered as follows:

GPIO pin number	Extra function	Port 1 pin	GPIO pin number	Extra function	Port 1 pin
11	N/A	0	24	CE0	0
12	N/A	1	5 / 26	SCL / CE1	1
13	N/A	2	3	SDA	2
15	N/A	3	23	SCLK	3
16	N/A	4	21	MISO	4
18	N/A	5	19	MOSI	5
22	N/A	6	8	TX	6
7	N/A	7	10	RX	7

1. Raspberry Pi GPIO

The Raspberry Pi's GPIO pin can be accessed in multiple ways using different languages such as Python or C. Each pin has a unique numerical address on the system and is configurable to work in several modes. 1) input mode allows you to read the voltage on a pin, 2) output mode allows you to output a voltage of 0V or 3V3 to a pin, 3) peripheral mode allows you to use the pin as part of a peripheral such as I^2C, SPI or UART.

Port 2 Pin 1 can be connected to one of two GPIO pins depending on what type of functionality is required.

CE0, CE1, SCLK, MISO and MOSI are configurable as SPI pins.

SCL and SDA are configurable as I^2C.

TX and RX are configurable as UART pins.

Example Python scripts which show you how to access the GPIO pins as inputs or outputs are available from the Matrix website.

2.3.3V operation

This board is compatible with 3.3V and 5V systems. The Raspberry Pi board itself requires a 5V DC power supply but the I/O signals all run at 3.3V.

Great care must be taken when passing voltages to the I/O pins of the Raspberry Pi as voltages over 3.3V will likely damage the port pins.

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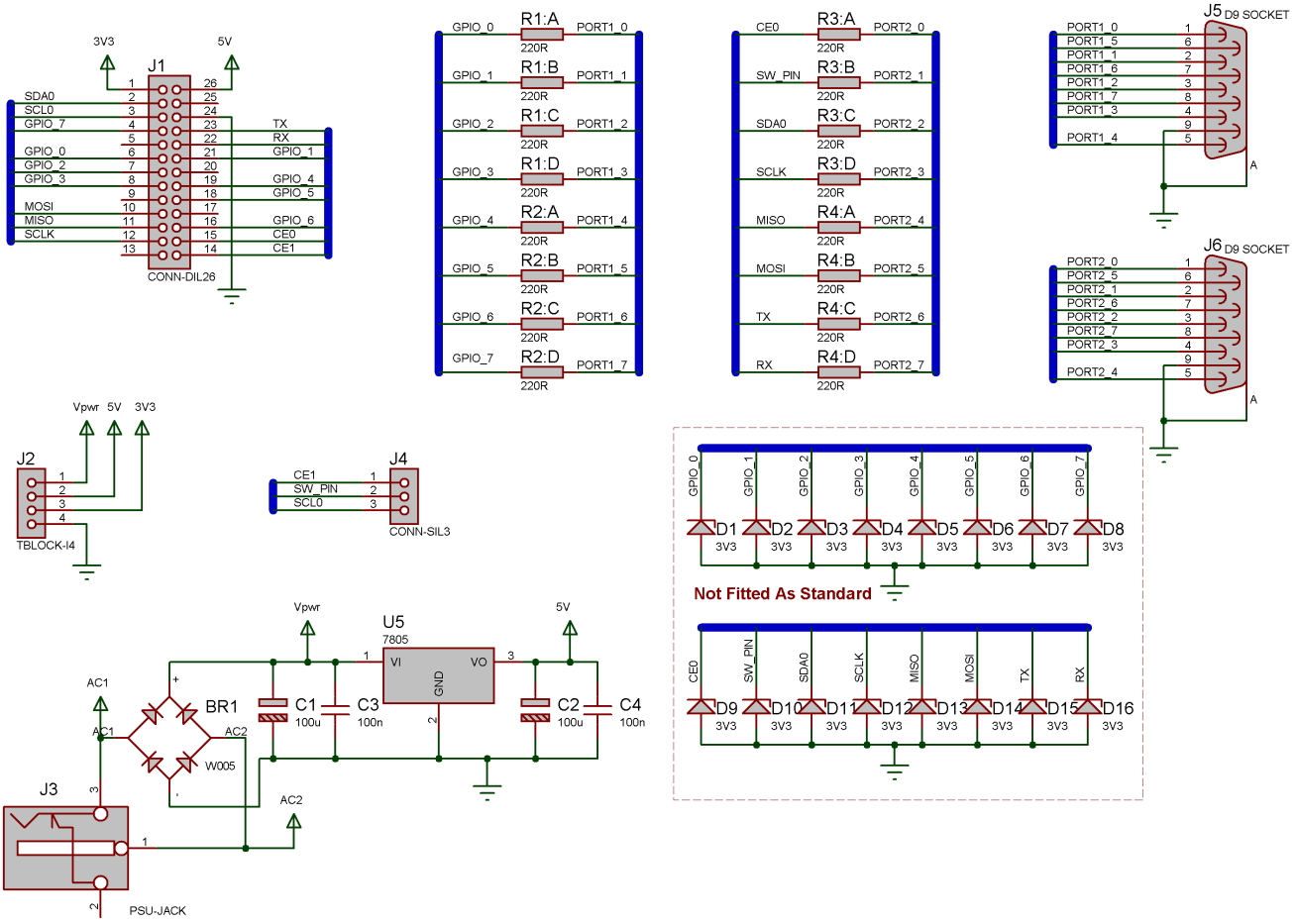
Circuit diagram



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