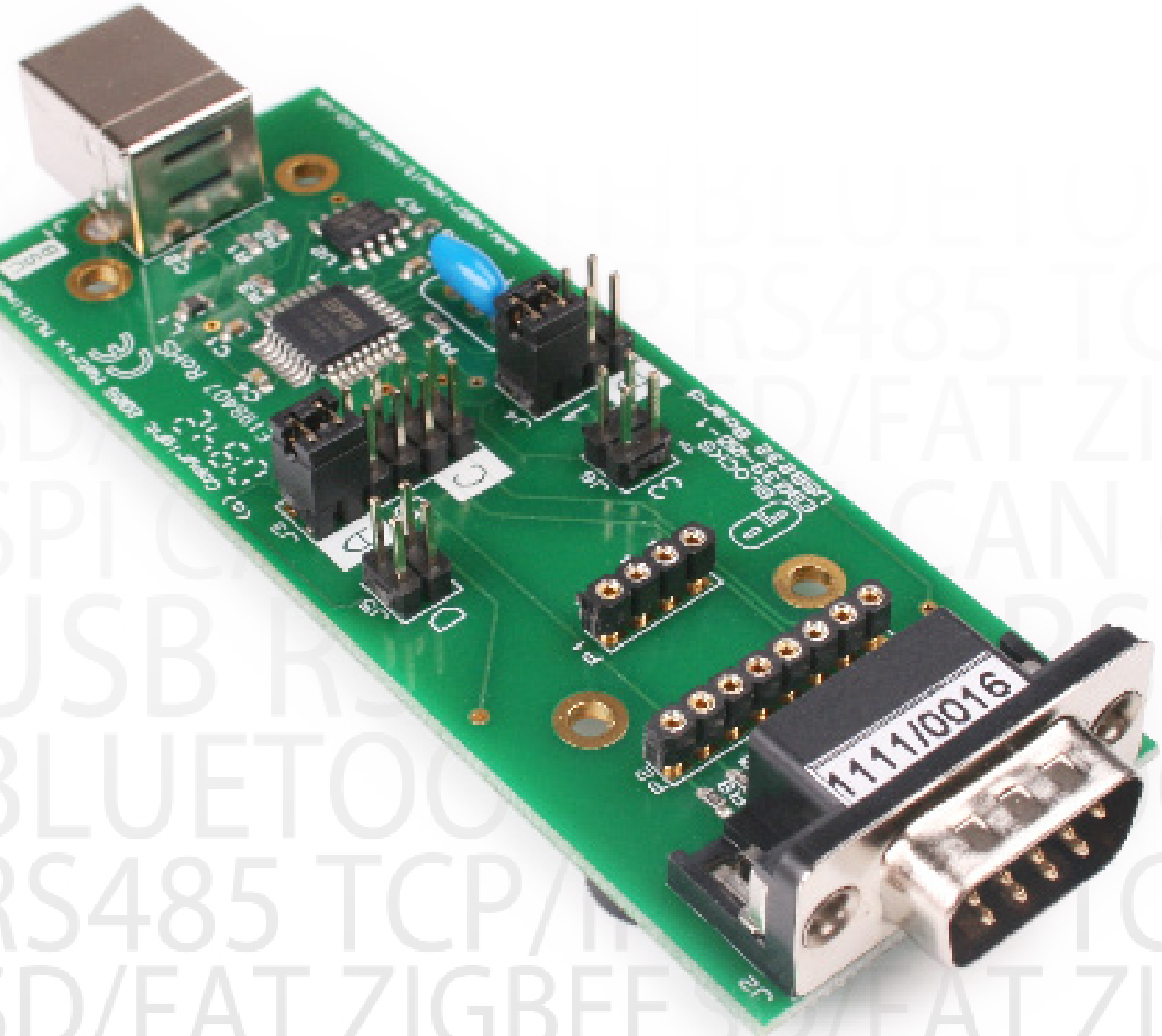
MATRIX

eBLOCKS®

USB232 board



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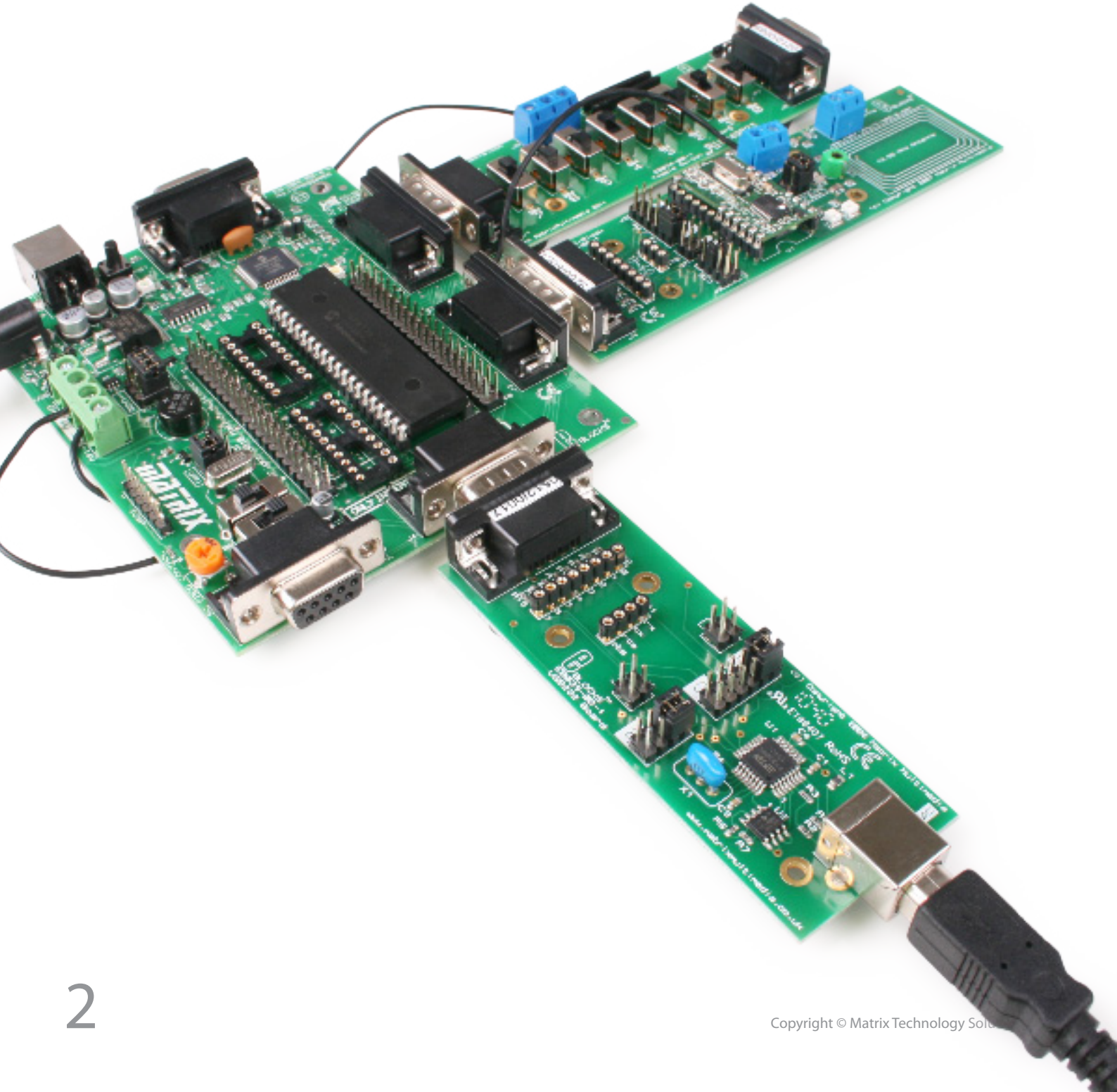


About this document

This document concerns the EB039 E-blocks USB232 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

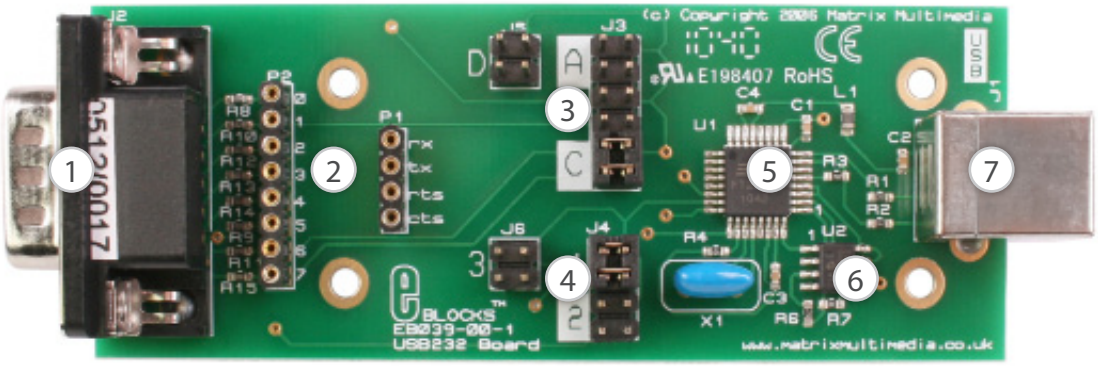
It is advisable to test the product upon receiving it to ensure it works correctly. Matrix provides test procedures for all E-blocks, which can be found in the Support section of the website.

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. 9-way downstream D-type connector
2. Patch system
3. RX / TX jumper selection
4. RTS/CTS jumper system
5. FT232BL chip
6. EEPROM with USB ID
7. USB socket

General information

This interface board allows you to easily add a USB communications interface to your project. The board contains a FTDI FT232BL interface chip which provides an interface between a USB interface and a microcontroller UART using RS232 protocols. A virtual COM port driver is available which allows you to interface the board to Windows, Mac and Linux based applications including Visual Basic and Visual C++ etc. The FTDI device is able to communicate with data transfer speeds of up to 3M baud.

1. Features

- E-blocks compatible
- Low cost
- Provides a USB interface for all your projects
- Data transfer rates of up to 3M baud
- USB 1.0 and USB 2.0 compatible

For more details of the FTDI device's capabilities please refer to www.ftdichip.com.

Circuit description

The circuit on the EB039 is made up of a FTDI FT232BL device and associated EEPROM, and a patch system linking the FT232BL to the upstream board.

1. FT232BL

The FT2323BL is a single chip device that allows asynchronous data transfer between a computer with a USB port and your hardware project. The device supports a range of data transfer protocols based on RS232 like signals (TTL voltage levels) which allows data transfer at rates up to 3M baud.

The device connects to the USART of a microcontroller using the TX, RX, CTS and RTS lines via a patch system.

On the PC (Windows, Linux or Mac), there are 2 types of drivers available. The first provides a "virtual" COM port functionality, which will allow legacy serial port applications to access the USB232 E-block as if it was connected to a standard serial COM port. These are known as Virtual COM Port (of VCP) drivers.

The second set of drivers (known as D2XX drivers) provide direct access to the I/O lines of the FT232BL device. These provide a faster communication speed and allow for more flexibility in your design.

2. EEPROM

There is an EEPROM on the EB039 E-block, which is used to store information that identifies the board as a USB device. This EEPROM also contains a unique serial number.

3. Patch system

The D type plug, J2 is used to connect the USB232 board to your E-blocks system. As with most E-blocks downstream boards the patch system allows you to preselect the connections between the key signals on the board and the upstream board. Many E-blocks systems are optimised for the PICmicro range of devices but the key signals, TX and RX, are on different pins for different PICmicro devices. The following table shows you the TX and RX connections for several PICmicro devices:

Chip	Signal	Port bit	D-type pin
16F88	RX	RB2	Pin 3
	TX	RB5	Pin 6
16F627a	RX	RB1	Pin 2
	TX	RB2	Pin 3
16F877a	RX	RC7	Pin 8
	TX	RC6	Pin 7

The jumpers A, B, C allow you to quickly configure RX and TX for several ranges of PICmicro device. If you are not using one of the devices in the table then you will need to select jumper D to make your own configuration. This is achieved by identifying the USART pins on the PICmicro, then by selecting the corresponding links between the USB232 board and the upstream device.

Jumper setting A	Jumper setting B	Jumper setting C		Jumper setting D
		PIC16F devices	PIC16C devices	
PIC16f87	PIC16f627/A	PIC16F73	PIC16C63	PATCH SYSTEM
PIC16F88	PIC16F628/B	PIC16F737	PIC16CR63	
	PIC16F648A	PIC16F74	PIC16C65/A/B	
		PIC16F746	PIC16RC65	
		PIC16F76	PIC16C66	
		PIC16F767	PIC16C73/A/B	
		PIC16F77	PIC16FC74/A/B	
		PIC16F777	PIC16C745	
		PIC16F870/1	PIC16C765	
		PIC16F873/A	PIC16C77	
		PIC16F874/A	PIC16C773	
		PIC16F876/A	PIC16C774	
		PIC16F877/A	PIC16C774	

Table 1. Jumper settings for TX and RX selection.

Jumper settings 1, 2 and 3 are used to set the correct pins for CTS and RTS. The following tables illustrate the correct jumper settings.

Jumper setting 1		Jumper setting 2		Jumper setting 3	
CTS	RTS	CTS	RTS	CTS	RTS
Bit 4	Bit 0	Bit 5	Bit 4	Patch	Patch

Table 2. Jumper settings for RTS and CTS selection.

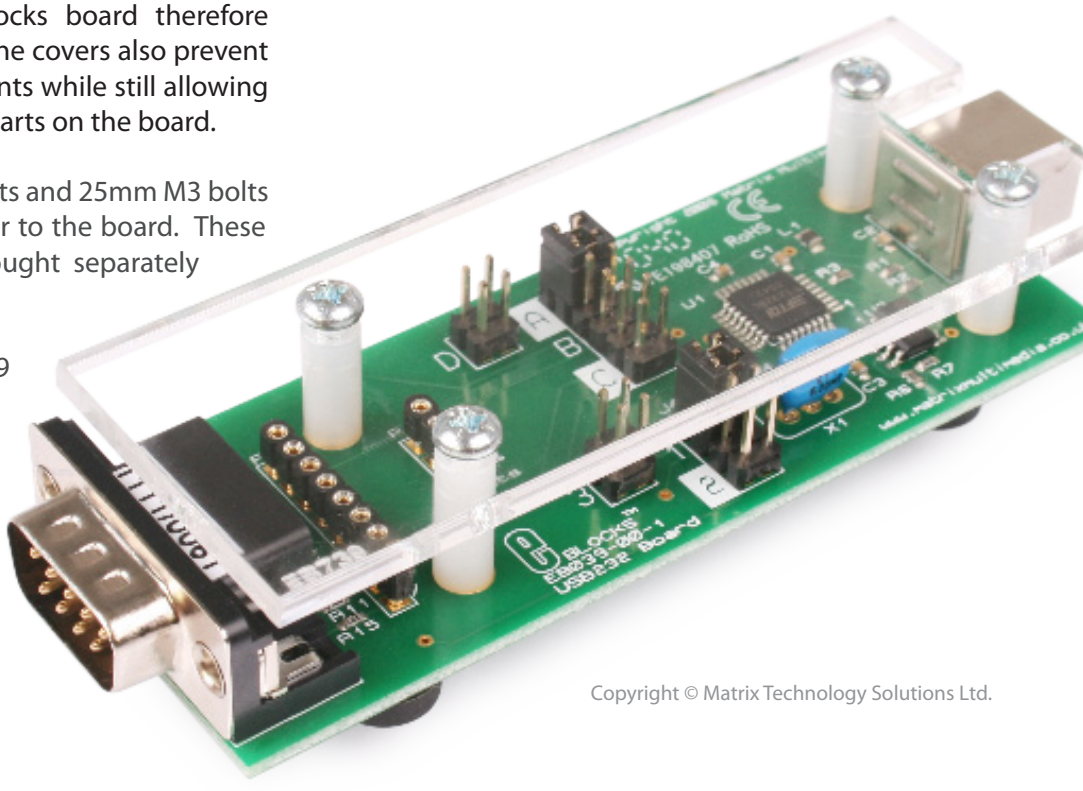
(NOTE: Jumper setting 2 is used in conjunction with our Bluetooth module and should not be used when the USB232 E-block is connected to a microcontroller).

Protective cover

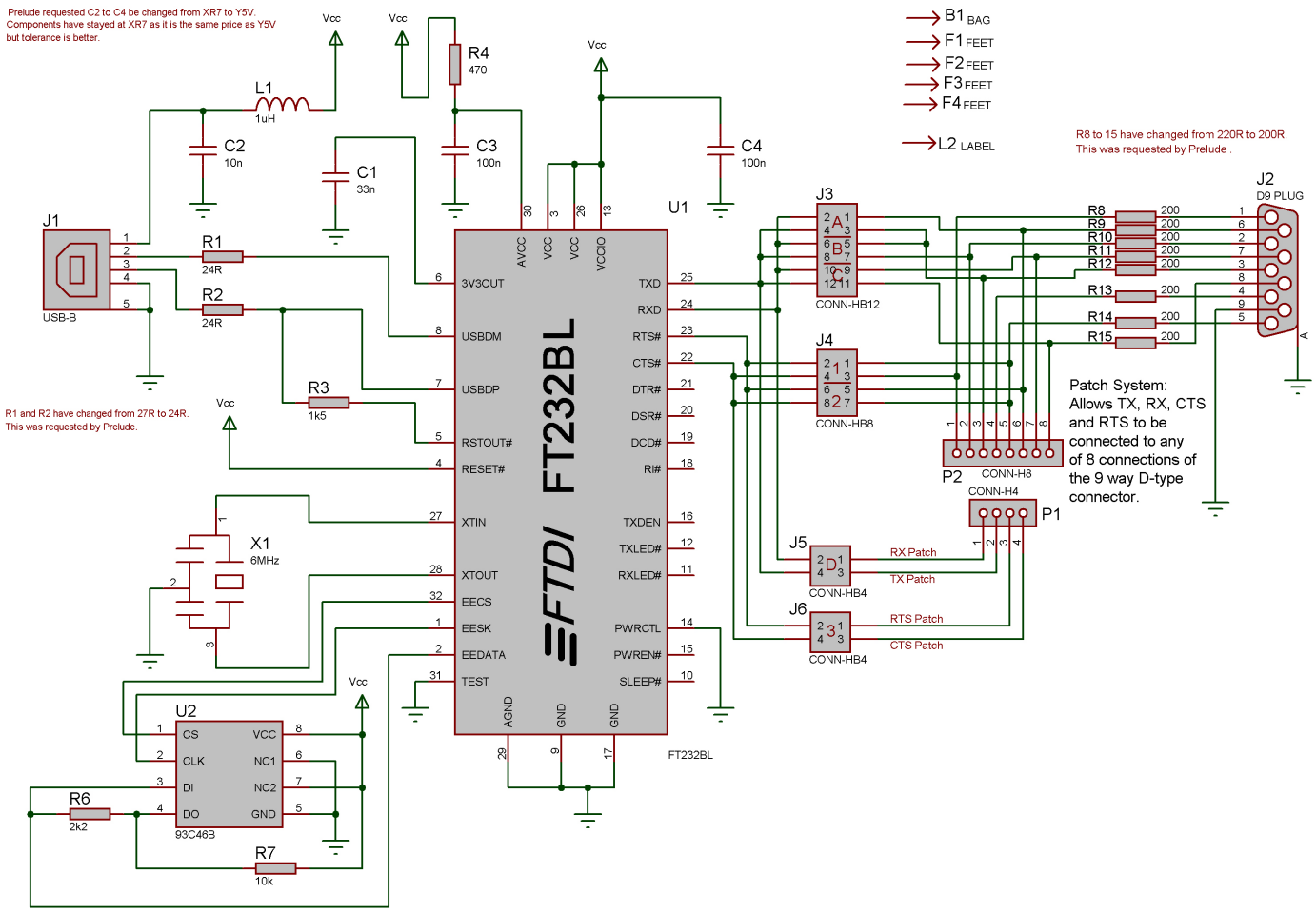
Most of the boards in the E-blocks range can be fitted with a plastic cover as an optional extra. These covers are there to protect your E-blocks board therefore extending the life of the board. The covers also prevent the removal of external components while still allowing for the adjustment of applicable parts on the board.

12mm M3 spacers, anti-slip M3 nuts and 25mm M3 bolts can be used to attached the cover to the board. These are not included but can be bought separately from our website.

The order code for the EB039 USB232 board is EB739.



Circuit diagram



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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