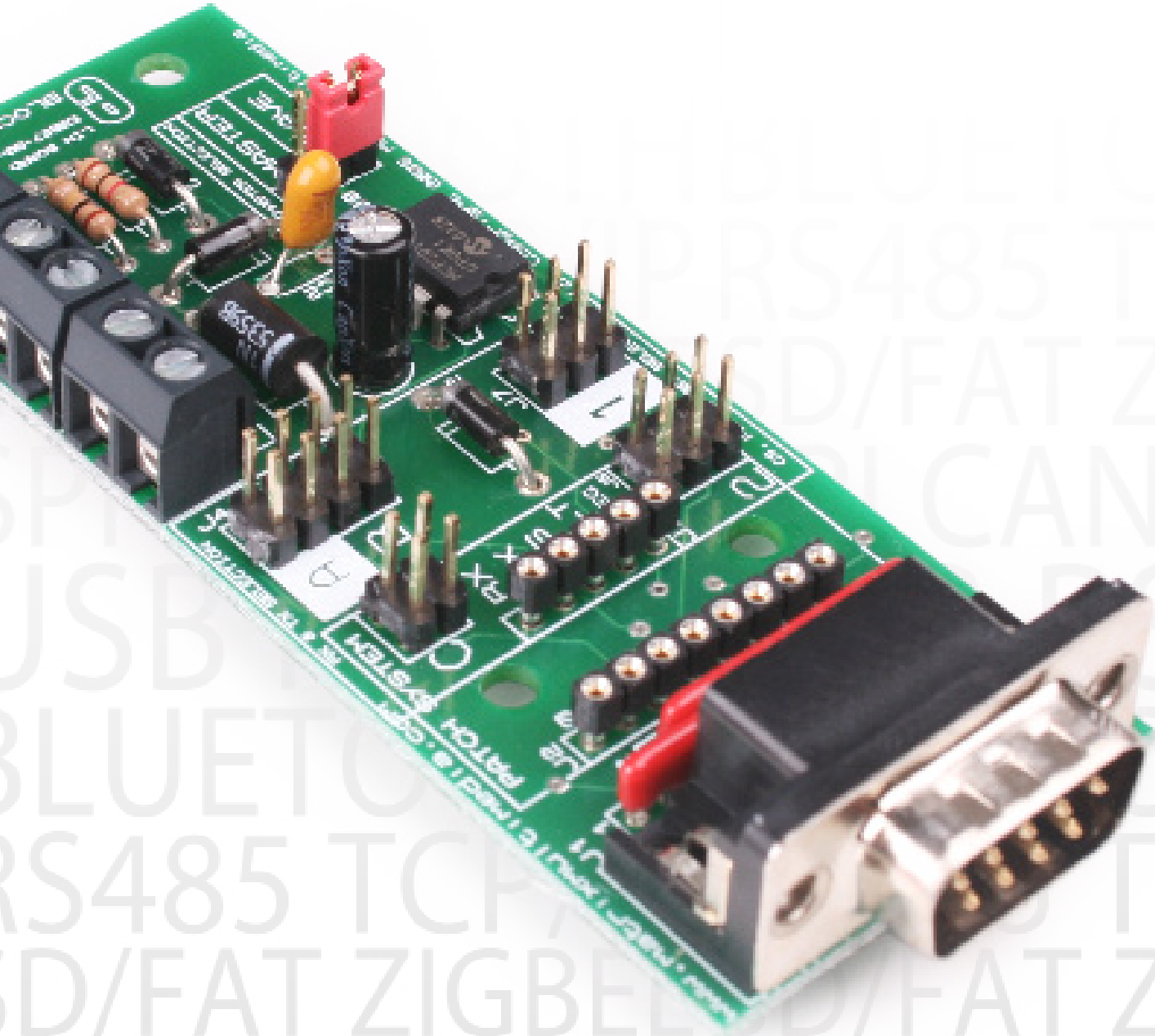
MATRIX

eBLOCKS®

LIN bus board



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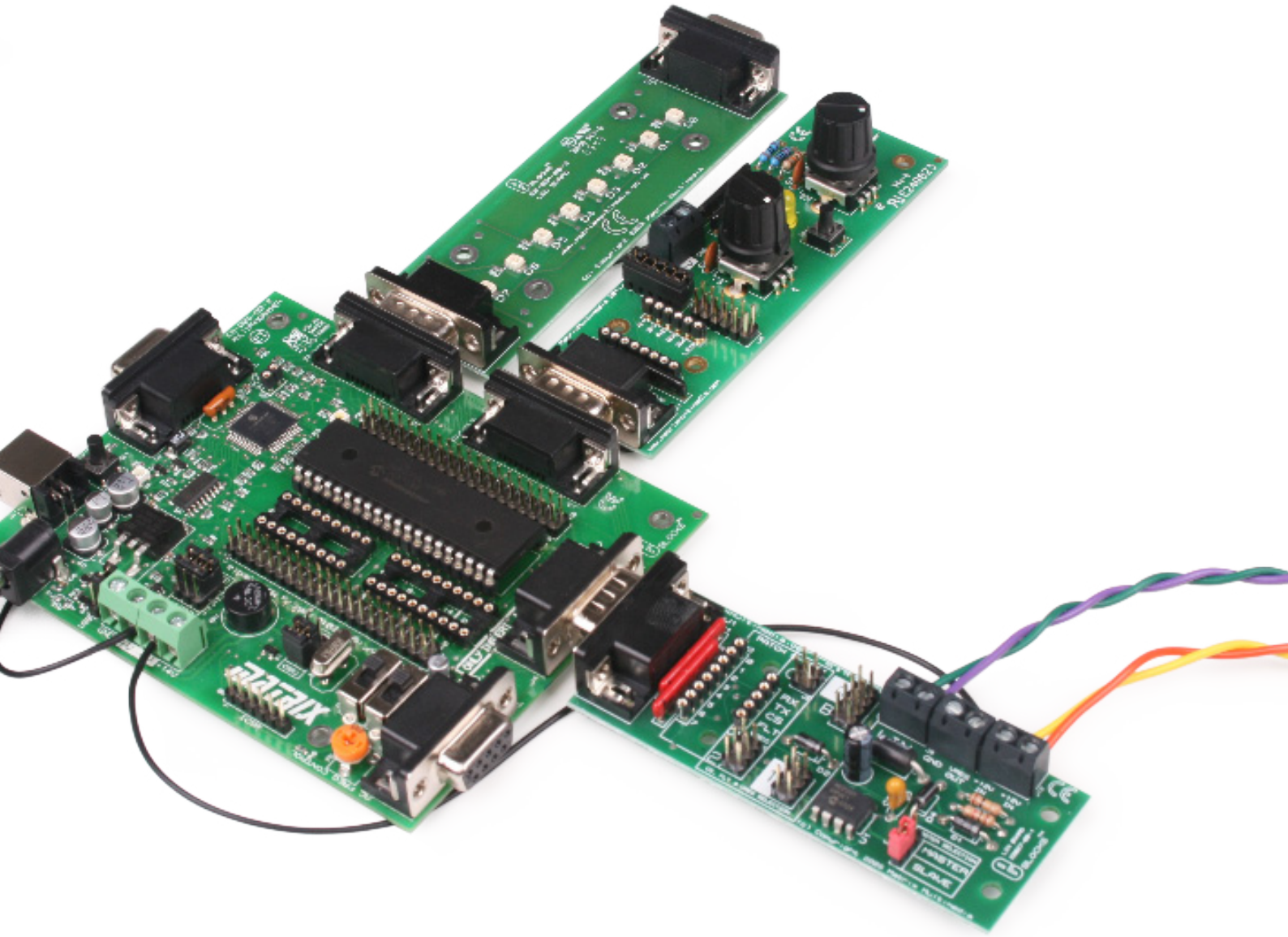

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About this document

This document concerns the EB027 E-blocks LIN bus board.

1. Trademarks and copyright

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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

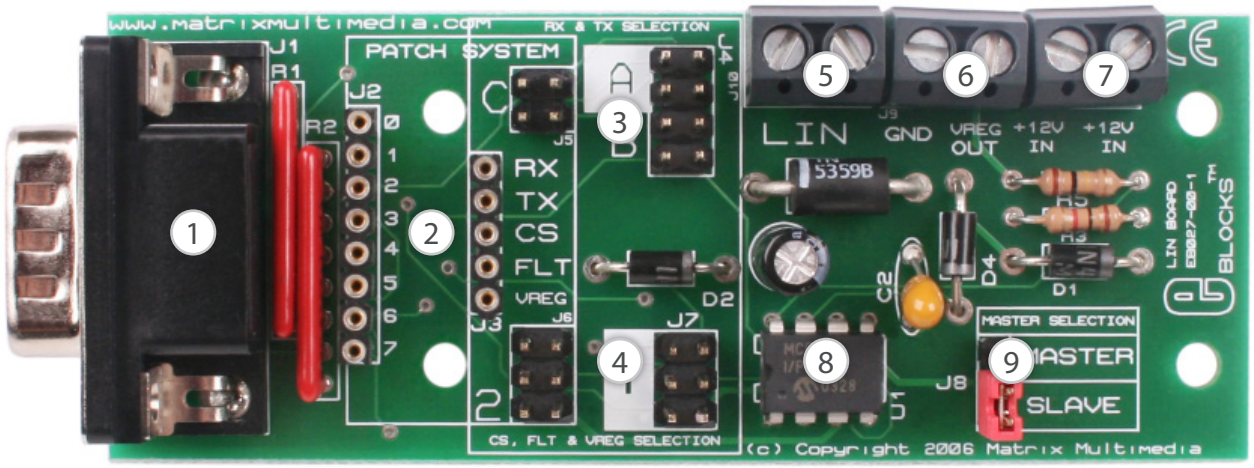
It is advisable to test the product upon receiving it to ensure it works correctly. Matrix provides test procedures for all E-blocks, which can be found in the Support section of the website.

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 and TX selection jumper pins
4. Chip select, fault and VREG selection jumper pins
5. LIN output screw terminals
6. Voltage output screw terminals
7. 12V voltage input screw terminals
8. MCP201 LIN controller chip
9. Master / slave jumper

For PIC16F88, insert board to port B and jumper settings = A & 1
For PIC16F877A, insert board to port C and jumper settings = B & 1

General guide for RX and TX settings:

Jumper at A	Jumper at B	Jumper at C
PIC16F88	PIC16F7x	Patch system
PIC16F87	PIC16F7x7	
PIC16F818	PIC16F87x	
PIC16F819	PIC16F87xA	
Connect to port B	Connect to port C	

General guide for /INT and /CS settings:

Jumper settings	Description
1	Hardwired /CS and /INT selection /CS = Bit 4, FLT = Bit 0, Vreg = Bit 1
2	Patch system

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General information

This E-block allows investigation of the LIN bus communication protocol. The board allows LIN to be added to PICmicro® microcontrollers and other processors that do not have a LIN peripherals embedded. The board uses a LIN transceiver (MCP201). The microcontroller acts as the LIN controller for transmitting and receiving LIN information. The LIN transceiver converts the LIN controller signals into a signal level used by the LIN bus, and vice versa.

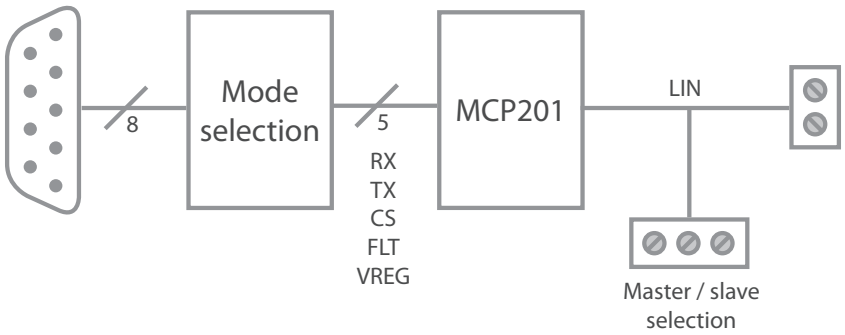
Users will need to consult the MCP201 datasheet for information on programming and using this device. The datasheet for this can be found on the Microchip website.

A set of jumper links are available which allows the LIN E-block to easily be set for most PICmicro® microcontroller devices. The patch system available on board makes this board compatible with numerous other devices.

The upstream device (i.e. multiprogrammer) connected to this board must have an integrated UART module available, or the firmware must be able to send TTL level RS232 compatible waveforms.

1. Features

- Transmit and receive via LIN bus
- Enable non LIN embedded processors access to LIN protocol



Circuit description

The circuit as can be seen in the circuit diagram on page 6 is made up of three main components: the patch system, the voltage regulation and the LIN transceiver (MCP201)

1. Patch system

The design of the product enables you to use this board with many standard PICmicro devices. This is achieved by identifying the upstream device, then selecting the corresponding jumper setting on the LIN board. This will configure the board with the correct pin-out for the Microcontroller selected. Jumper setting A, B and C are used for selecting the appropriate pins for RX and TX: the dedicated RS232 lines. Jumper settings 1 and 2 are used to set the correct pins for /CS and /FLT and VReg.

The microcontroller that is being used determines which port and which jumper. For example, if a PIC16F877A is being used, the LIN board must be connected to port C, with the jumper settings to B & 1.

The table on the following page illustrates the correct jumper settings:

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Jumper setting A		Jumper setting B	Jumper setting C
PIC16F devices	PIC16C devices		
PIC16F72	PIC16C62B	PIC16F87	Patch system
PIC16F73	PIC16C63A	PIC16F88	
PIC16F737	PIC16C65	PIC16F818	
PIC16F74	PIC16C66	PIC16F819	
PIC16F747	PIC16C67		
PIC16F76	PIC16C72A		
PIC16F767	PIC16C73B		
PIC16F77	PIC16C74B		
PIC16F777	PIC16C76		
PIC16F872	PIC16C77		
PIC16F873/A	PIC16C773		
PIC16F874/A	PIC16C774		
PIC16F876/A			
PIC16F877/A			
CONNECT BOARD TO PORT C		CONNECT BOARD TO PORT B	

Table 1. Jumper settings for SDO, SDI & SCK selection

The following table (table 2) shows the settings that can be used for /CS and /INT:

Jumper setting 1		Jumper setting 2	
/CS	/INT	/CS	/INT
Bit 0	Bit 6	Patch	Patch

Table 2. Jumper settings for /INT and /CS selection

The patch system allows the user to route RX, TX, CS, Fault, Vreg to any of the 8 input bits required. This allows great flexibility, as the user can then use a different device other then those specified in table 1. When using the CAN board with upstream devices that are not mentioned in the above table, such as Atmel AVR® board or other processor boards, then the patch system will be required.

2. Voltage regulation

The LIN E-block requires a 12V supply to power the LIN transceiver circuitry. This 12V can be supplied from the +14V screw terminal of the multiprogrammer.

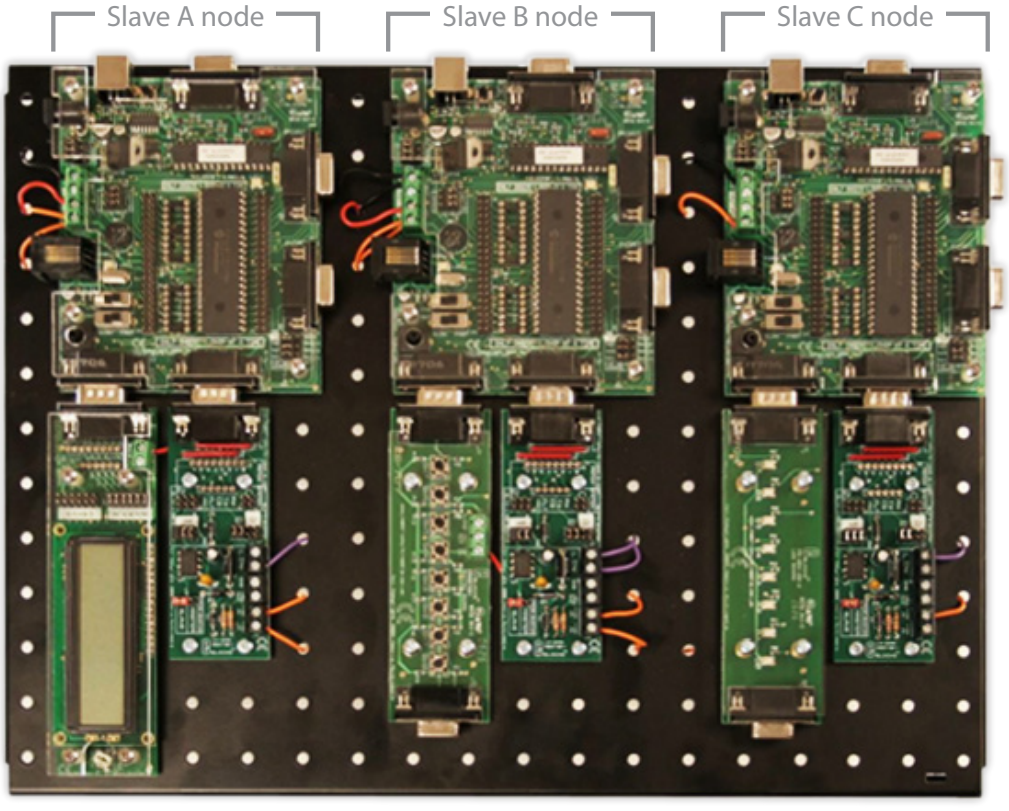
3. LIN transceiver - MCP201

The MCP201 LIN transceiver is an interface between the microcontroller and the LIN bus. It converts betweem the logic levels of the microcontroller and the analogue signals of the LIN bus.

The LIN signals are connected to the screw terminal J10,. note that there are two terminals on every board so that you can pass the LIN signal on without having two wires in the same terminal. Similarly there are two 12V screw terminals to provide the same functionality.

4. 3.3V operation

Due to the 12V supply needed by the LIN E-block this board is not compatible with 3.3V systems.



LIN slave nodes

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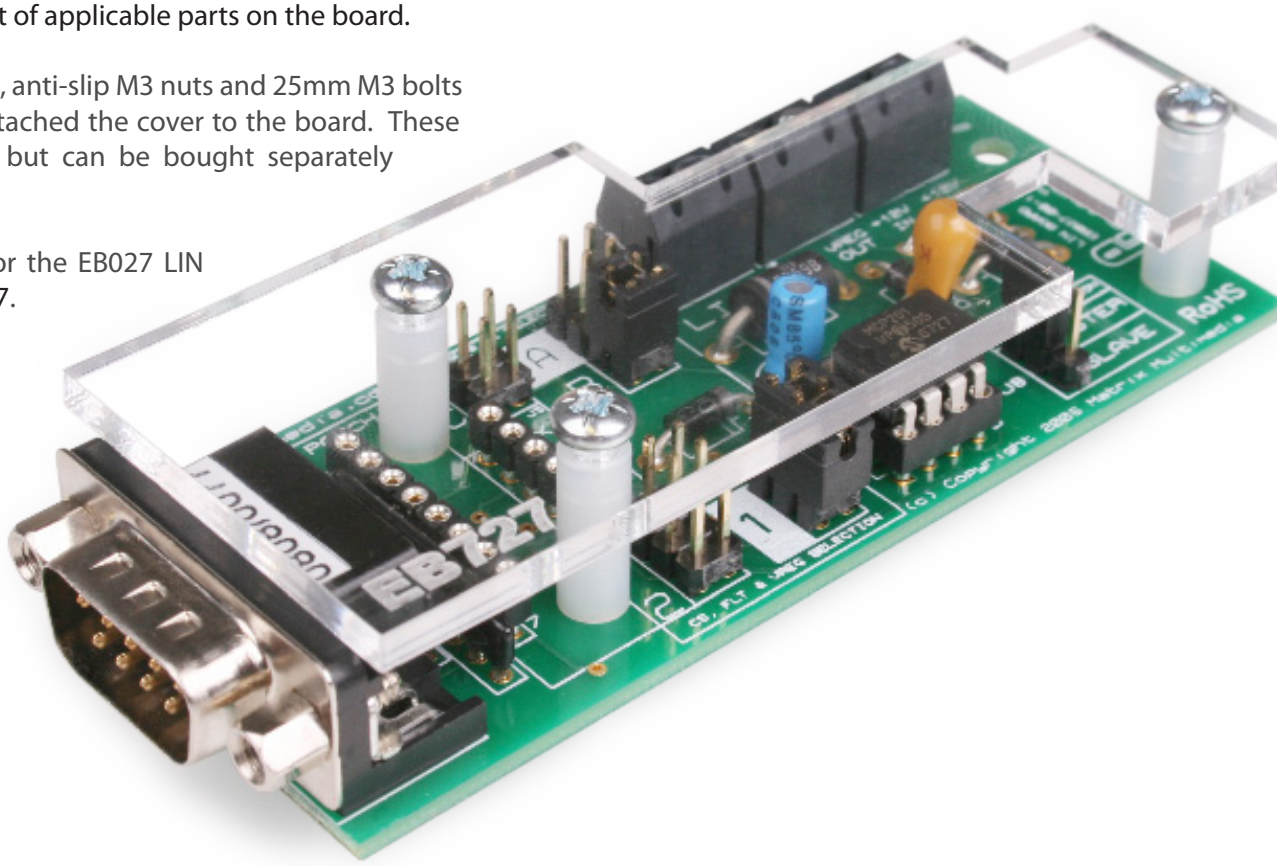
Protective cover

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 EB027 LIN bus board is EB727.



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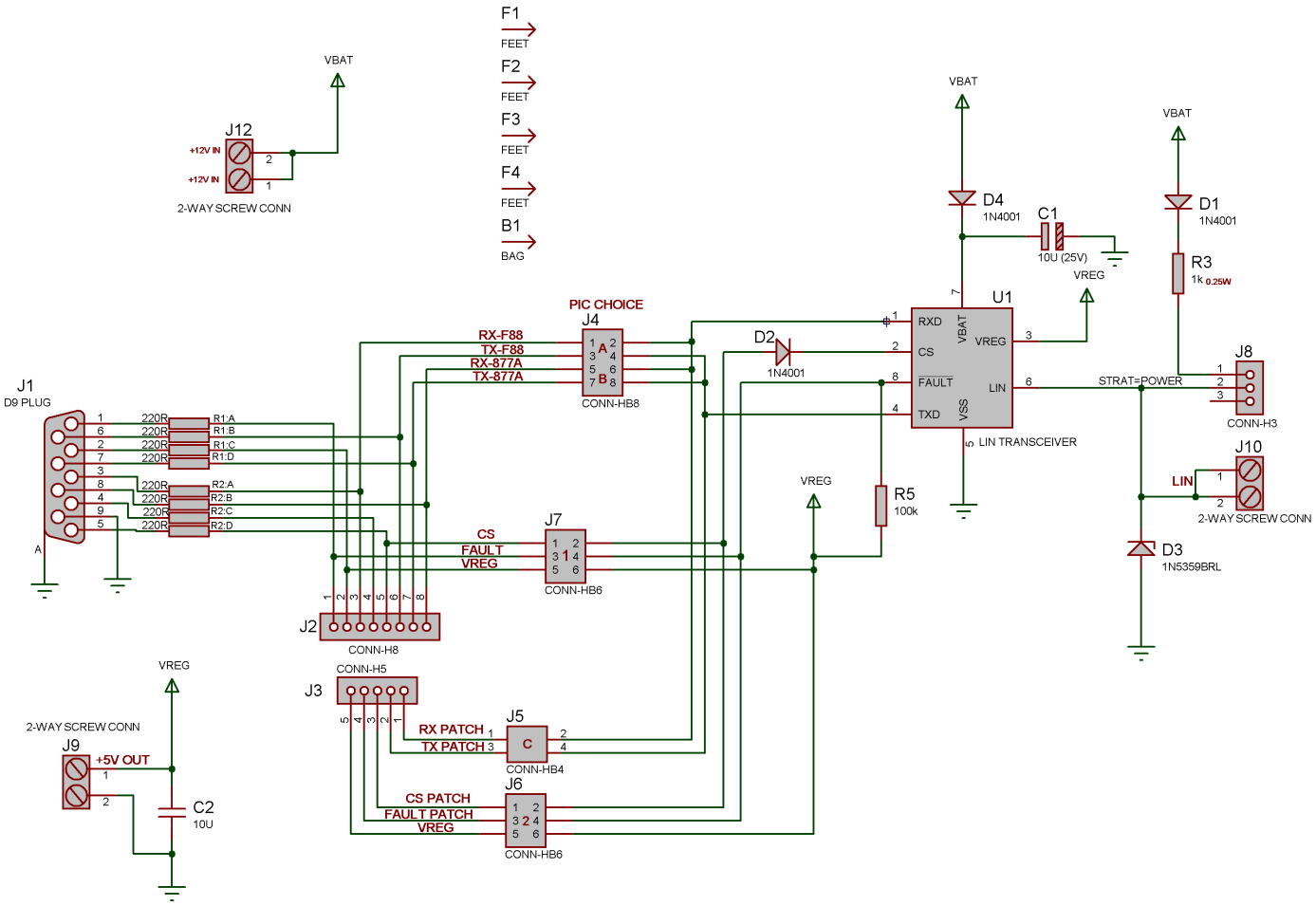
Circuit diagram



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