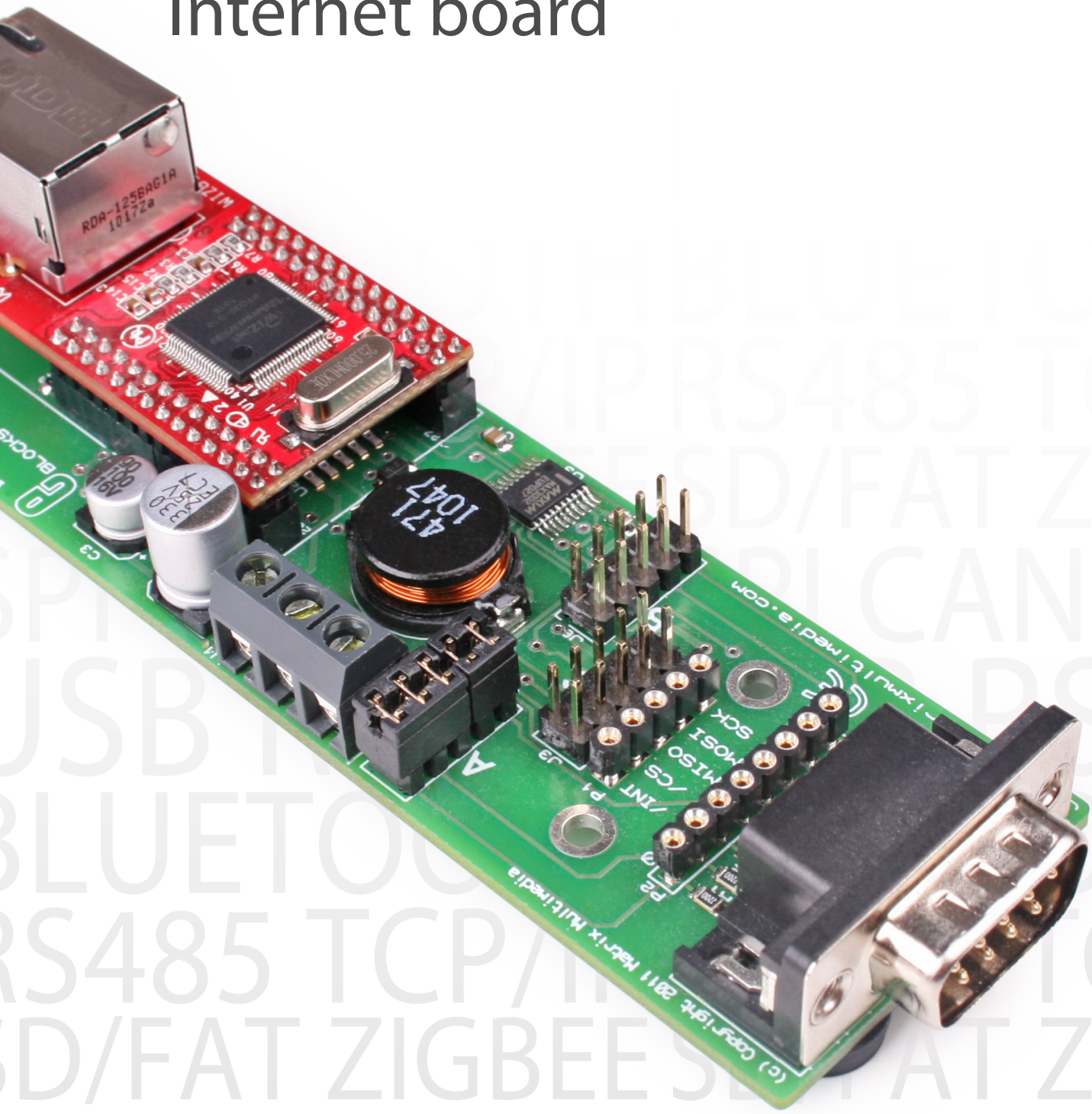
MATRIX

eBLOCKS®

Internet board



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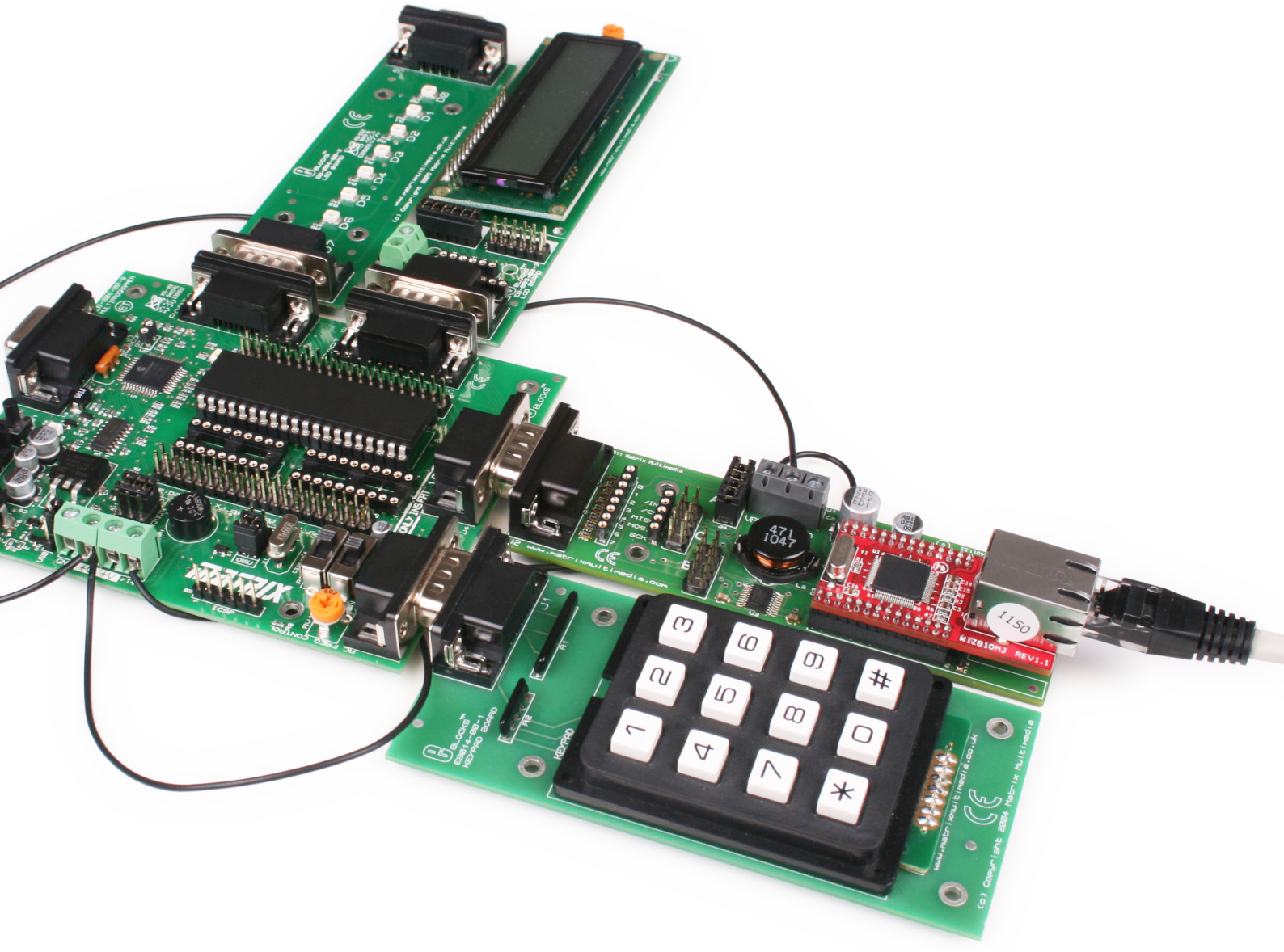


About this document

This document concerns the EB018 E-blocks CAN bus 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

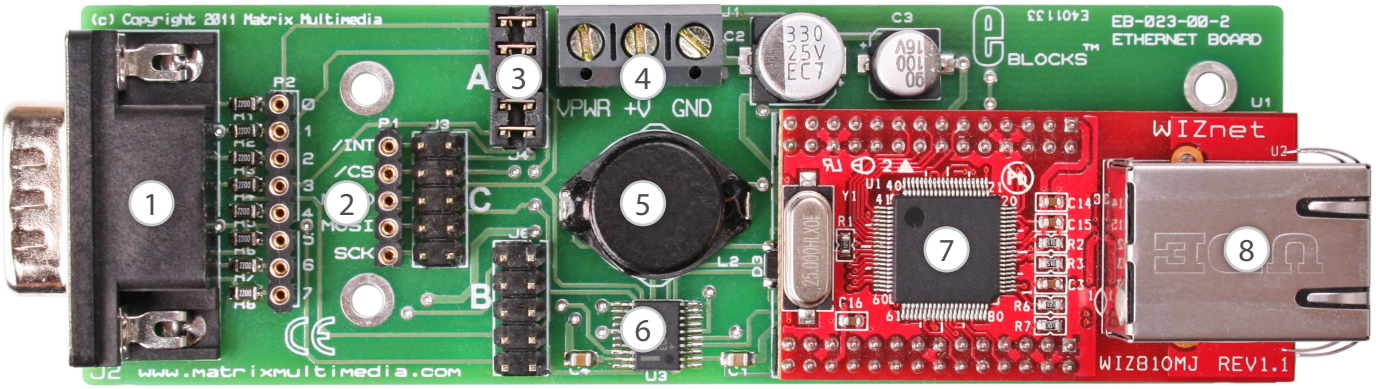
It is advisable to test the product upon receiving it to ensure it works correctly. Matrix provides test procedures for all E-blocks, which can be found in the Support section of the website.

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. Patch selection jumper pins
4. Power screw terminals
5. High efficiency switch mode power supply
6. Logic level voltage shifter
7. Wiznet module WIZ810MJ
8. RJ45 connector

General information

The internet board allows internet and Ethernet capabilities to be easily added to your microprocessor and FPGA designs. It consists of a TCP/IP stack, a physical-layer chip and an ethernet socket.

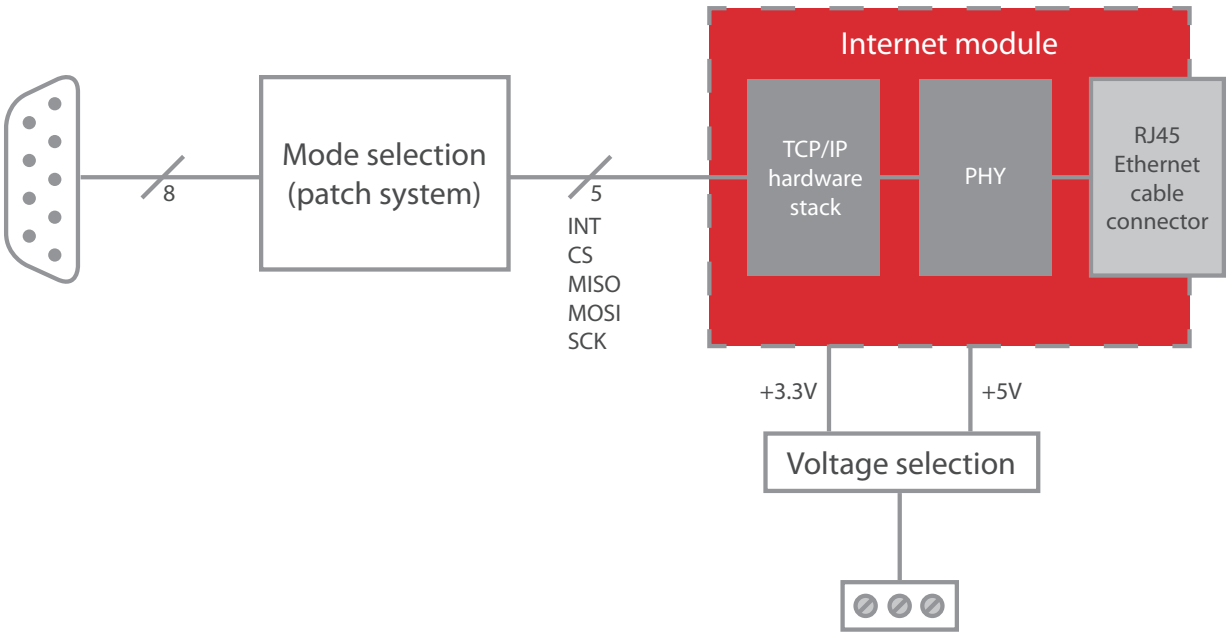
Communication between this internet board and a microcontroller is achieved using a standard SPI interface.

Flowcode components are available that simplify the use of third E-block. One is a "WebServer" component that facilitates the creation of an embedded web server with no knowledge of TCP/IP protocols needed. Another Flowcode component, the TCP/IP component, allows users to create a custom application using various protocols (TCP, UDP, IP or Ethernet), such as ARP scanners, SMTP email clients, hardware firewalls, etc.

C and assembly users can access all the features of this device without the need to embed an extensive TCP/IP stack into their own firmware.

1. Features

- E-blocks compatible
- Supports 10/100 base TX
- Supports half/full duplex operation
- Supports auto-negotiation
- IEEE 802.3/802.3u compliant
- Operates with 3.3V or 5V systems
- Supports network status indicator LEDs
- Includes hardware internet protocols: TCP, IP Ver.4, UDP, ARP
- Includes hardware Ethernet protocols: DLC, MAC
- Supports four independent connections at the same time
- Supports SPI bus interface with unique chip select pin
- Supported natively in Flowcode



Circuit description

The EB023 internet board circuit can be observed on page 6. It is made up of three main components: the hardware TCP/IP stack IC, the voltage regulation and selection system and the patch system.

1. Hardware TCP/IP stack IC

The hardware TCP/IP stack IC used is the Wiznet internet module WIZ810MJIC. The TCP/IP stack IC is an all-in-one network module, ideal component to develop internet enabled systems. The module communicates via a standard SPI compatible bus. This means that most processors can easily and rapidly communicate with the module, enabling a quick development time.

2. Voltage regulation / selection system

The TCP/IP stack IC requires a core voltage of +3.3 volts. However the I/O lines are +5V tolerant allowing the board to run from either a +5V system or from a +3.3V system. The board can be used with a +5V system (ie. E-blocks PICmicro multiprogrammer) or a +3.3V system (i.e. E-blocks FPGA board). An on-board voltage regulator is used to generate the +3.3V required by the TCP/IP stack IC.

The board requires two wired connections to supply power to the board. The +V power connection specifies the voltage of the microcontroller I/O and should be connected to the +V on the programmer board. The VPWR supply voltage is used to provide the power to the TCP/IP stack IC allowing the module to run without drawing too much current via the regulator on the programmer board.

+V = 3.3V or 5V
VPWR = 9 to 14V
Warning - care should be taken with the VPWR signal. if this comes into contact with the +V signal then you risk damaging the IC's on the board.

3. Patch system

The internet board, like all E-blocks, is designed with flexibility in mind. Therefore the internet board can be used with any 'upstream' processor board. To facilitate this a patch system has been provided on this board. This patch system allows the user to either select the default setting of the board (generally used for PICmicro® microcontrollers) or to wire the connectors to any pins of the D-type connector that they require.

The communications between the internet board and the upstream processor board is via an SPI compatible bus (SDI, SDO, CS and SCK signals).

4. Default settings (A or B)

To use the default setting of the internet board, the jumper links should be placed on header pins J6. Jumper setting A and B are used for selecting the appropriate pins for SDI, SDO, CS and SCK, the dedicated SPI compatible lines. Both these jumper settings route the interrupt line from the internet board to bit 0 of the upstream device.

Header pins J3 are provided to allow the use of the patch settings.

The microcontroller that is being used determines which port and which jumpers are used. For example, if a PIC16F877A is being used, the internet board must be connected to port C, with the jumper settings to A. The following tables illustrate the correct jumper settings.

Jumper setting A	Jumper setting B	Jumper setting C
PIC16F873/A	PIC16F87	PATCH SYSTEM
PIC16F874/A	PIC16F88	
PIC16F876/A	PIC16F818	
PIC16F877/A	PIC16F819	
CONNECT BOARD TO PORT C	CONNECT BOARD TO PORT B	
MISO = C4	MISO = C1	All connections are as set by the user
MOSI = C5	MOSI = C2	
CS = C1	CS = C3	
SCK = C3	SCK = C4	
INT = C0	INT = C0	

Note: The TCP_IP Flowcode component requires an SPI peripheral.

5. Using splitter cables

Splitter cables can be used to connect more than one internet board to a single programmer. The SDI, SDO and SCK lines need to be the same for each board connected to the splitter cable. However each board requires a separate CS line. Due to this constraint you will need to use the patch system when using more than one internet board on a splitter cable.

6. 3.3V operation

This board is compatible with upstream boards operating off 3.3V.

Quick start guide using Flowcode

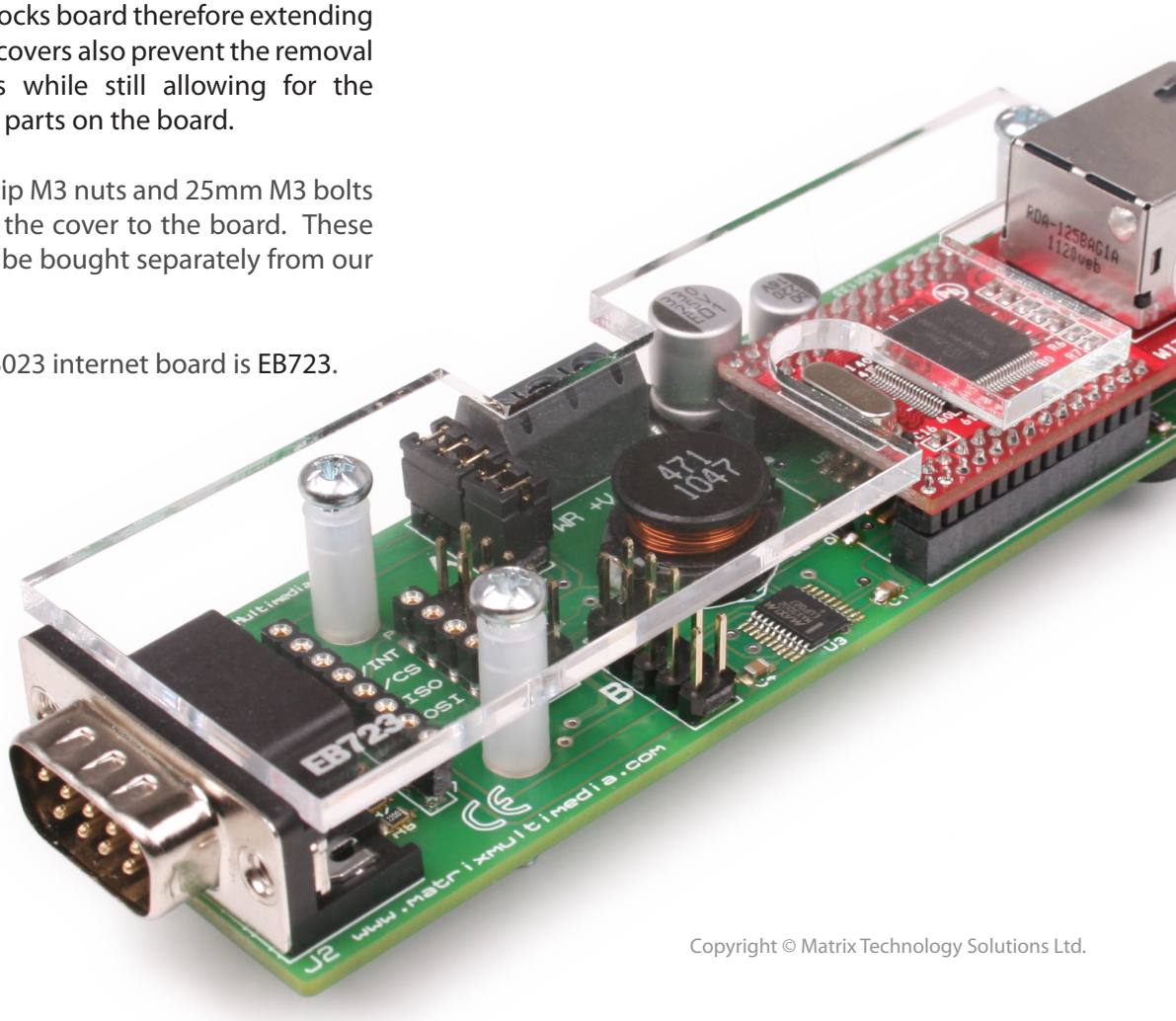
1. Ensure that you have a chip which supports an SPI peripheral; refer to the chip datasheet to ensure your device supports SPI and which port it is located on.
2. Connect your EB023 device to the upstream board on the relevant port with the SPI peripheral.
3. Confirm the device is correctly powered, running appropriate wires between the +V on the upstream board to the +V terminal on the EB023 and the +14V on the upstream board to the VPWR terminal on the EB023. The upstream board also needs to be powered correctly (please refer to your upstream board datasheet for more information).
4. Ensure your jumper settings are correct for the chip you are using, please refer to the jumper settings table in this datasheet to verify.
5. Test the chip clock is setup correctly. This is usually best done with a one second LED flasher program. (A small program that flashes an LED on and off every second, this is to determine whether the chips clock is set up correctly).
6. Create a new Flowcode program and add the appropriate component to your project.
7. Ensure that the properties of this component are set up to represent this EB023 V2 device and its setup within your hardware.
8. Some Flowcode components may require you to initialise them before using the other associated macros.

Protective cover

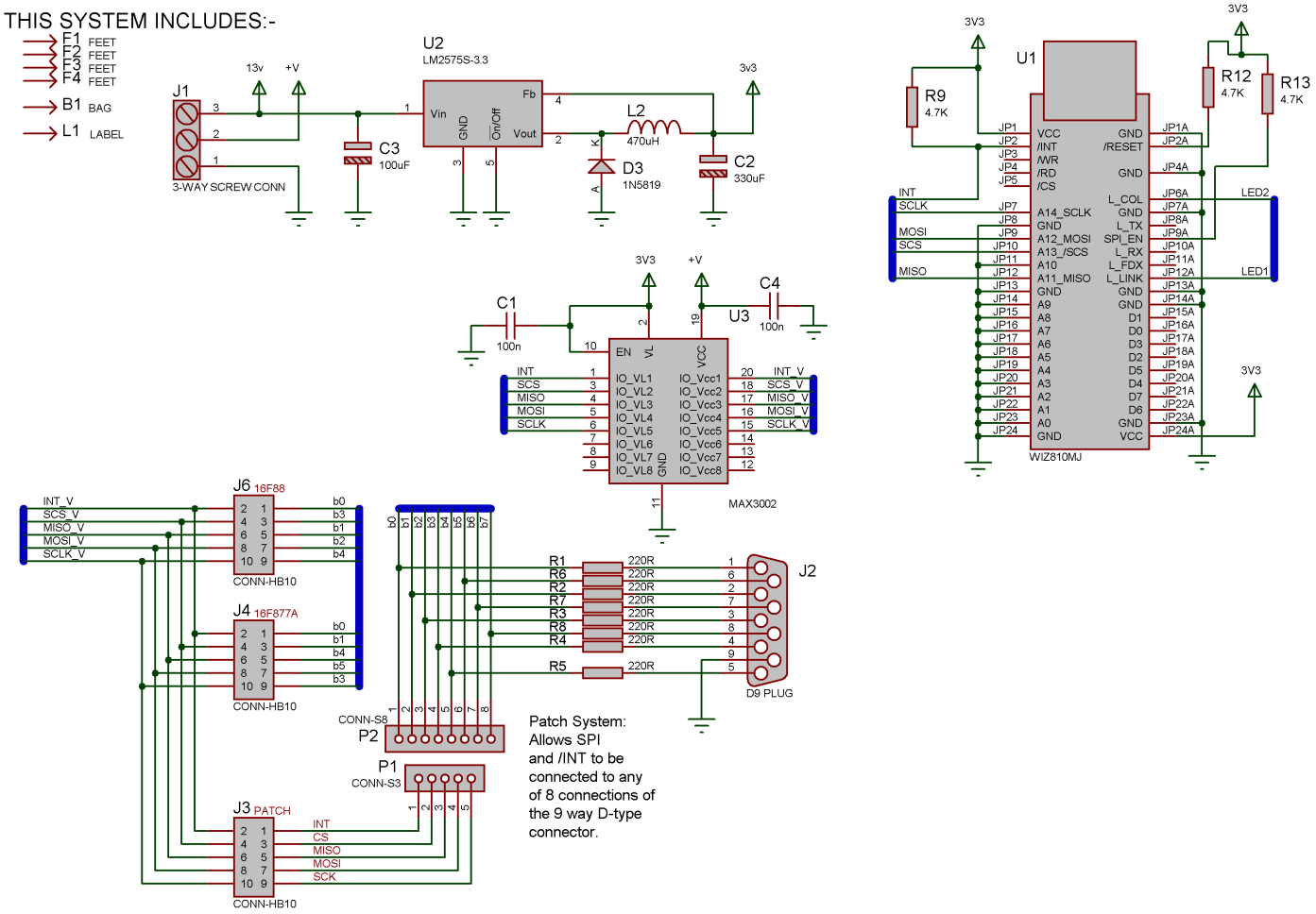
Most of the boards in the E-blocks range can be fitted with a plastic cover as an optional extra. These covers are there to protect your E-blocks board therefore extending the life of the board. The covers also prevent the removal of external components while still allowing for the adjustment of applicable 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 EB023 internet board is EB723.



Circuit diagram



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