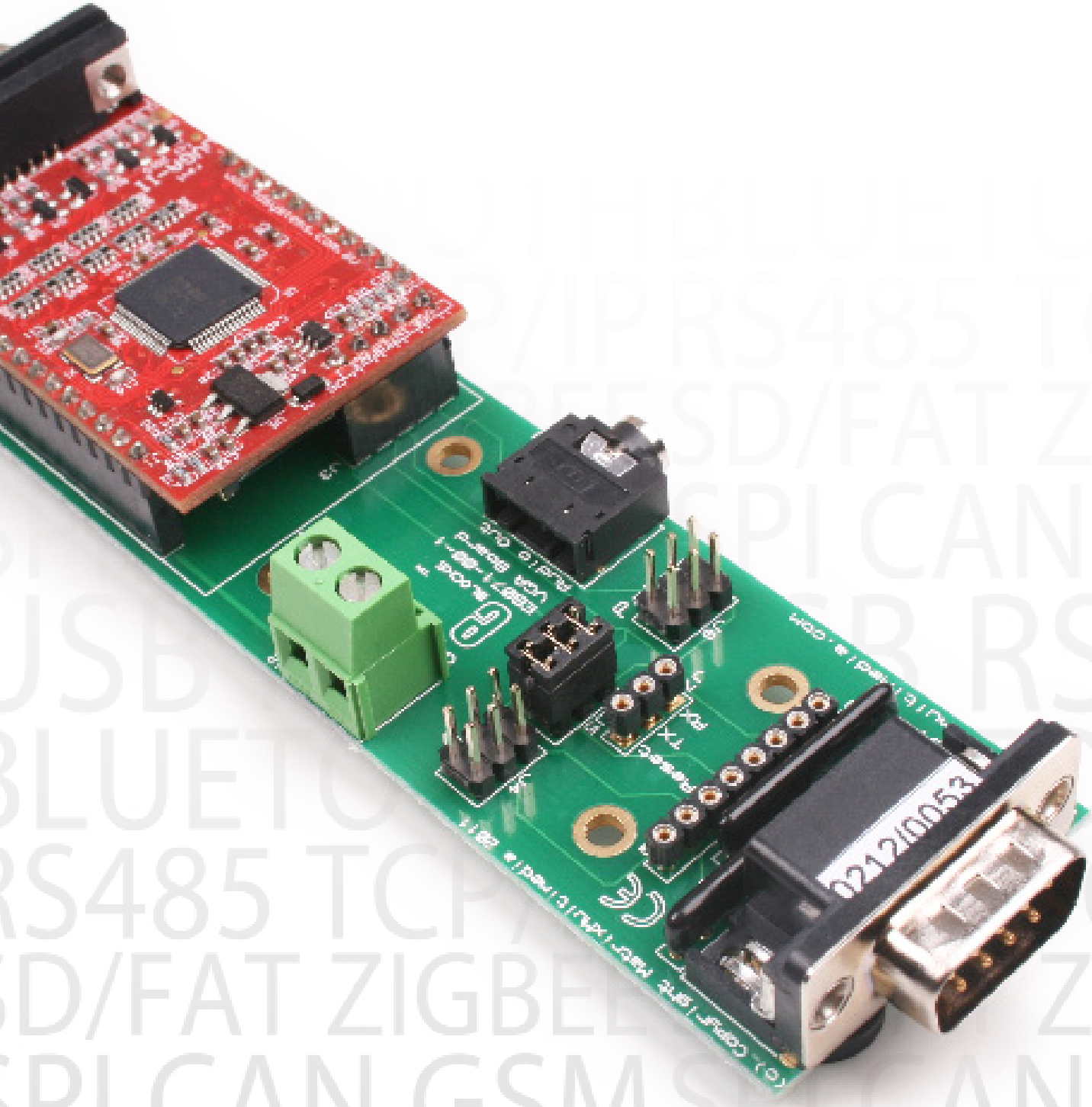
MATRIX

eBLOCKS®

VGA multimedia board



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About this document

This document concerns the EB071 E-blocks VGA multimedia 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

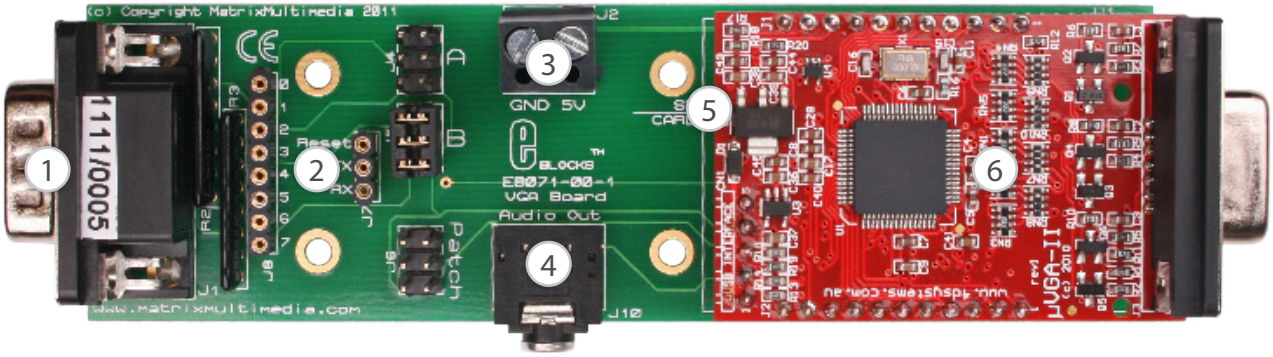
It is advisable to test the product upon receiving it to ensure it works correctly. Matrix provides test procedures for all E-blocks, which can be found in the Support section of the website.

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 D-type plug
2. Patch system
3. Screw terminals
4. Mono audio jack connector
5. SD card socket
6. 4D VGA module

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General information

This board allows text and graphics to be displayed on a VGA style PC monitor or television. The board comes complete with an intelligent graphics controller chip, which handles all of the communications between the board and the display. The controller chip is connected to the E-blocks D-type connector via a UART so commands can be sent from the host microcontroller to the display. The board's features include an audio output and a micro SD card socket which can be used to display images, animations, stream audio and write screen captures to discs.

1. Features

- Simple VGA control
- Multiple resolutions (320x240), (640 x 480), (800 x 480)
- Onboard SD card
- Onboard mono headphone jack connector
- 4D systems intelligent display controller

2. Connections

The patch system on the board is used to allow the onboard signals to be connected through to any of the 8 digital channels or through to another board or port.

The connections for the patch jumper system are shown below.

By default the jumper settings can be used with certain chips:

- Jumper A - 16F88
- Jumper B - 16F877A

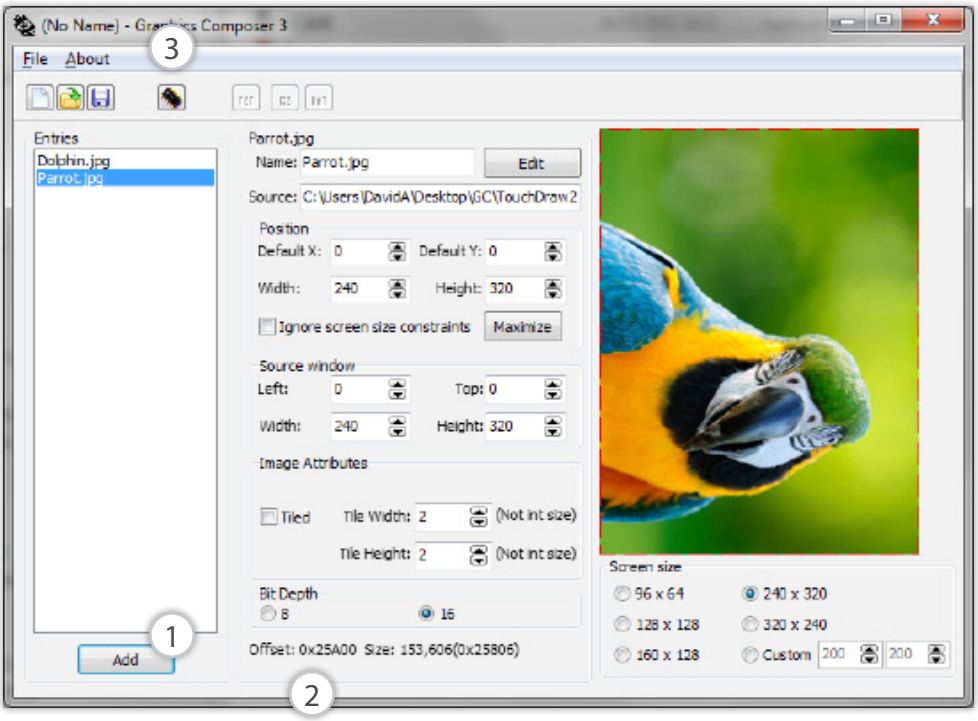
Signal	A	B	Patch (J7)
Reset	Pin7	Pin5	Reset
TX	Pin5	Pin6	TX
RX	Pin2	Pin7	Rx

3. Using with Flowcode

To use this E-block with Flowcode add a gLCD component to your project, from there you can use the component Help File for more information on the macro specifics.

4. Reading from the SD card slot

- Wav files: These files can be read without any other processing.
- Movie files: This display device supports many different movie formats, please see the 4D display documentation for supported file types. Please be aware than when playing a movie file the audio cannot be played at the same time.
- Image files: To read image files from the SD card, the images need to be processed by a tool called the "Graphics Composer". Please see the 4D display website to obtain this software.



5. Using the Graphics Composer software

The Graphics Composer software is fairly simple to use. A sample screen shot of the software is shown below.

(1) Use the 'Add' button to browse for an image file to attach to the graphics project.

(2) Once a picture has been added it will be given an 'offset' to the first picture, this is a memory location which is sometimes sent as high and low parts. In the above example, 0x25A00 would be sent as:

- High - 0x2
- Low - 0x5A00

(3) Finally, when you have added all the media to the project, you finish by clicking the 'Build' button, this will generate two files which you must add to your SD card. These two files are readable by the hardware and allow you to access the media you added.

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Circuit description

The EB071 VGA display circuit diagram can be seen on page 6.

1. Module commands

The VGA module uses the Picaso type controller chip from 4D Systems. The VGA display is controlled by issuing byte commands using a serial UART connection from the host microcontroller.

To allow the UART connection to work you first have to send out an auto baud command to allow the module to start up. The UART baud rate must be set to 9600bps in your program.

For a complete list of commands please refer to the 4D Systems Picaso command datasheet. These are not needed when using Flowcode.

2. The SD interface

The SD card interface is again controlled by passing commands over the UART to the 4D systems module which then performs actions on the SD card. Functions available include dumping the display to the card, recalling photos or images from the card to the display, scripts to output objects to the display, audio streaming and raw file read/write access.

3. 3.3V operation

The EB071 can operate with 5V and 3.3V systems but the voltage connected to the screw terminal must be 5V.

Voltages greater than 5V on either the screw terminals or the signal connections will cause irreversible damage to the module.

4. The audio jack connector

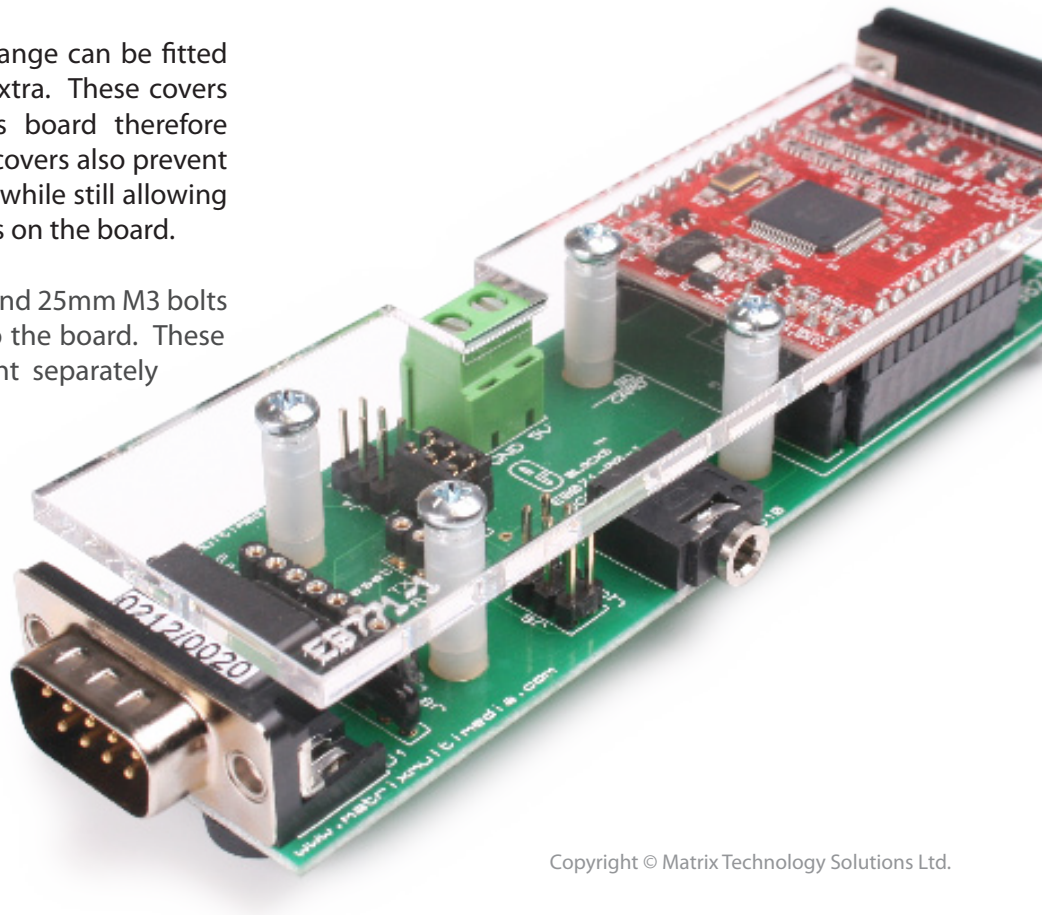
The data for the audio jack comes directly from the 4D module. Notes or sequences of notes can be output to the audio connector by sending the appropriate commands to the display.

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 EB071 VGA multimedia board is EB771.



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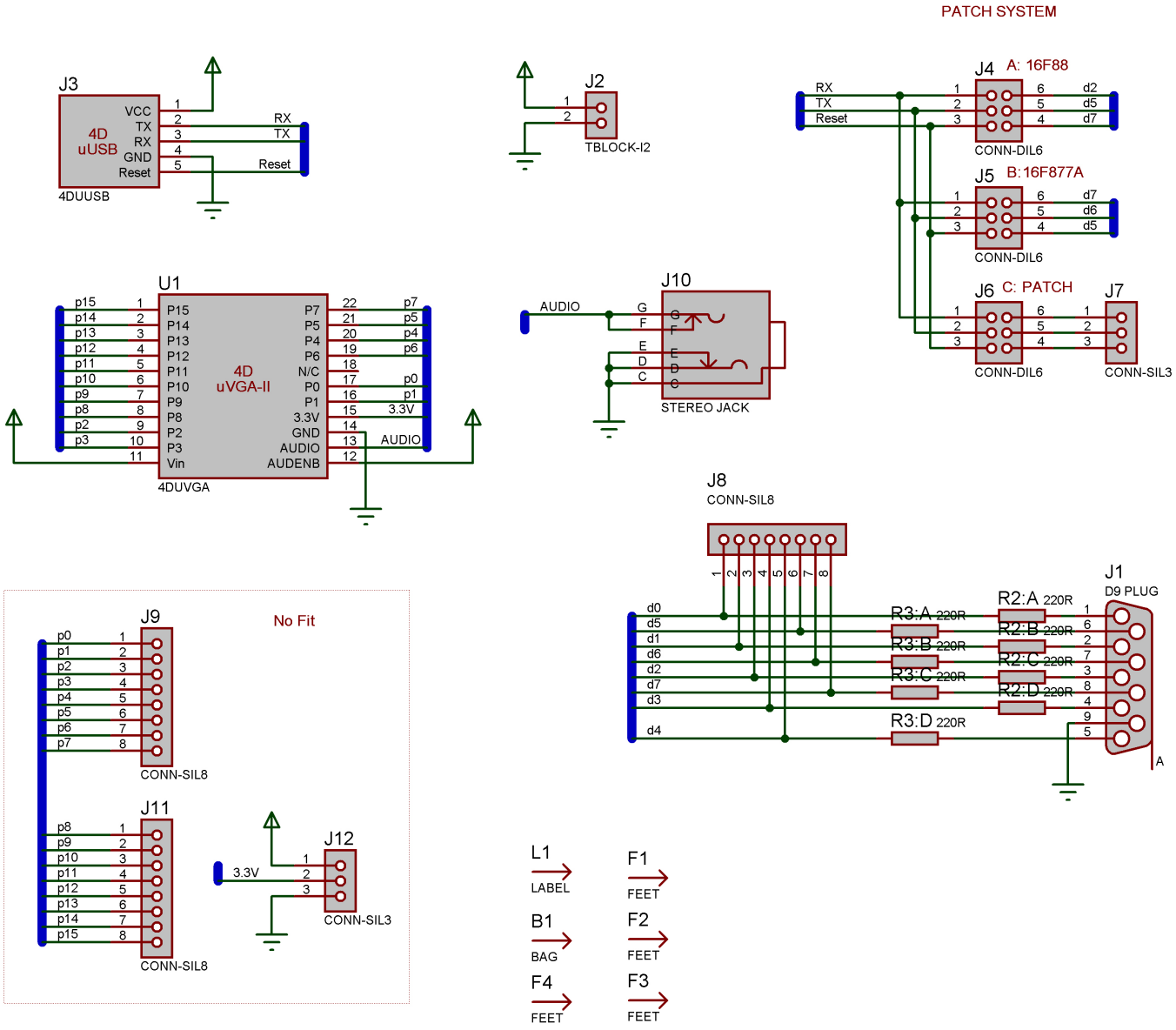
Circuit diagram



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EB071-30-1