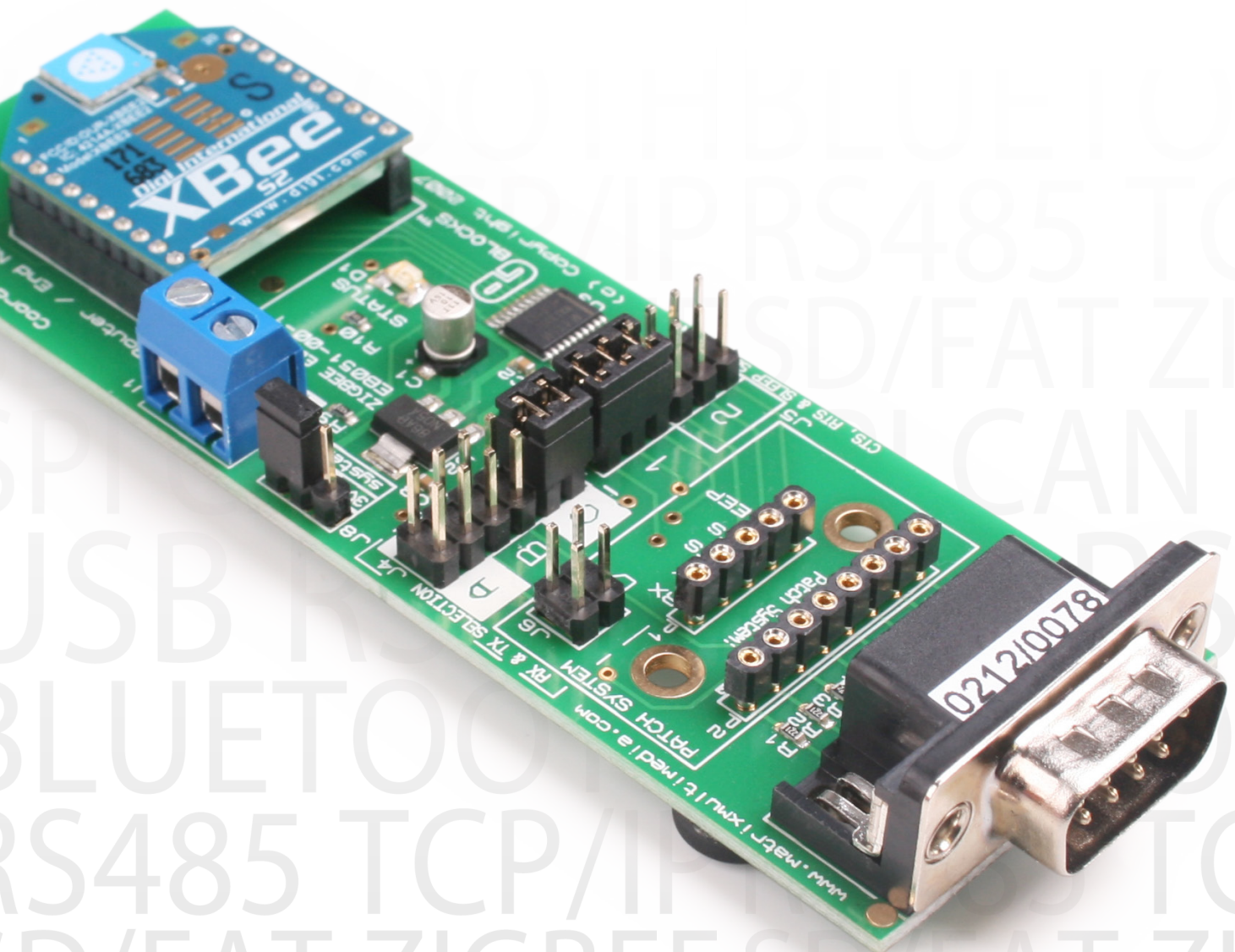


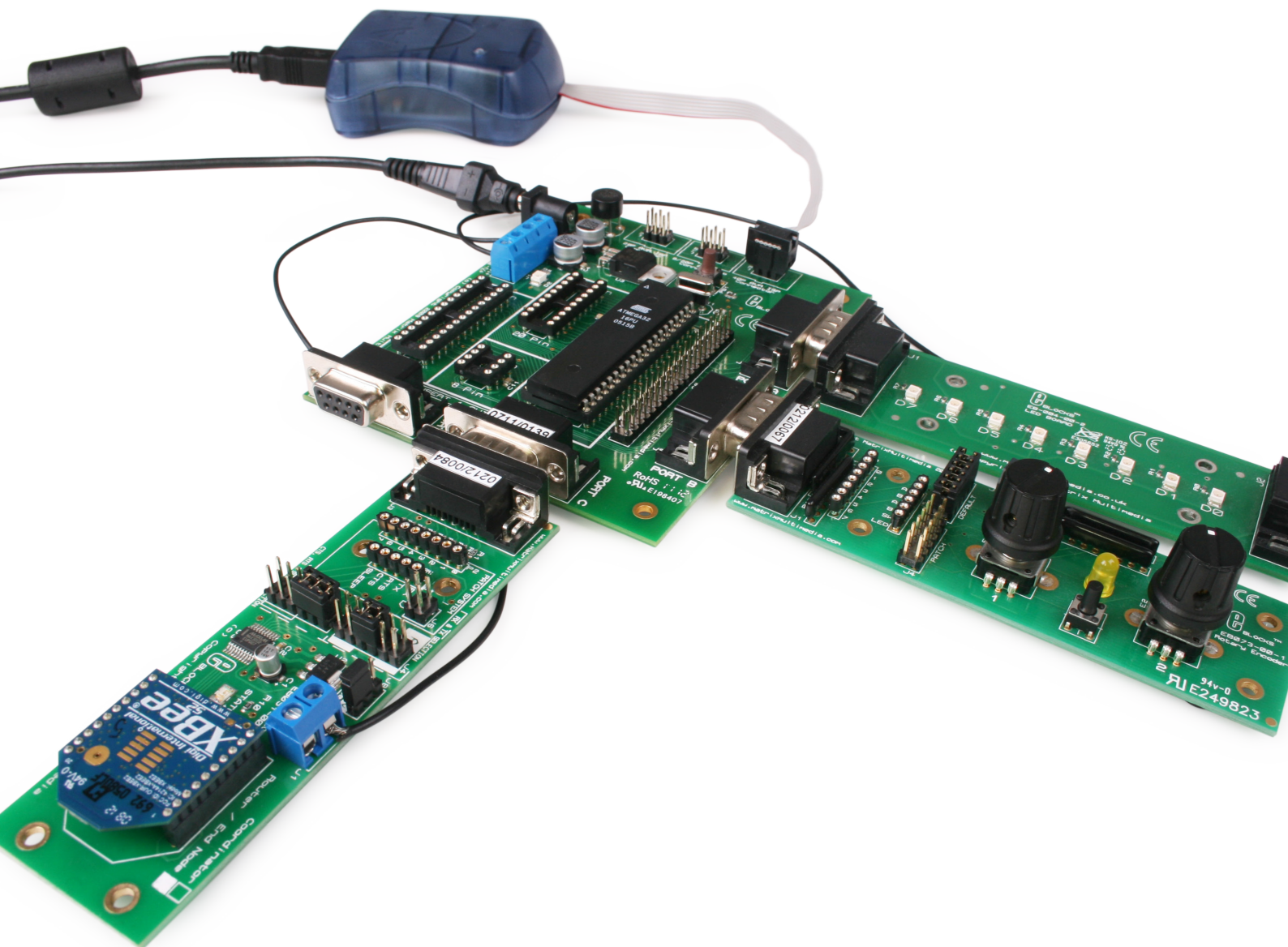
EBLOCKS[®]

ZigBee board



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About this document

This document concerns the EB051R E-blocks ZigBee 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

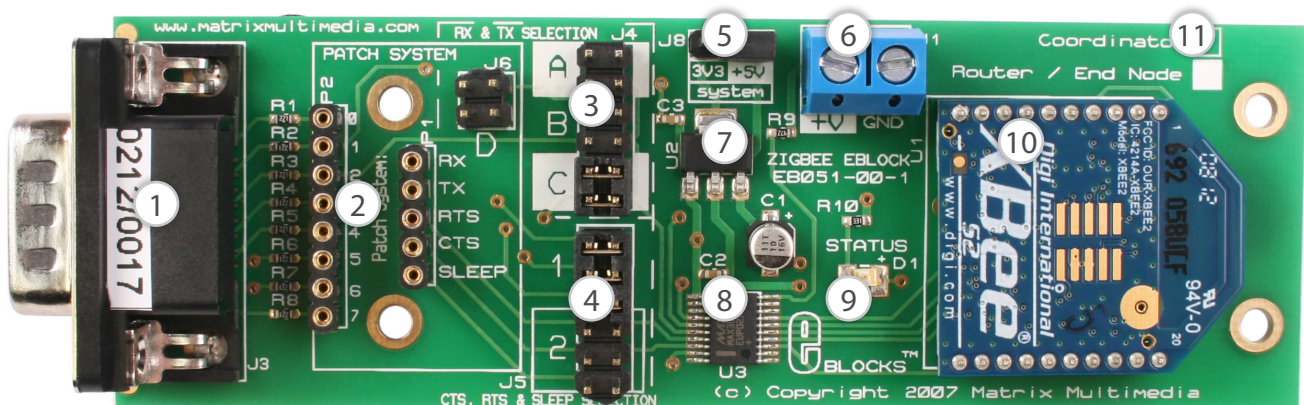
for all E-blocks, which can be found in the Support section of the website.

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 and TX UART routing selection
4. CTS, RTS and SLEEP routing selection
5. Input supply voltage select
6. Input supply voltage screw terminals

7. 3.3V regulator
8. Voltage level shifter
9. Status LED
10. XBEE ZigBee module
11. Coordinator / Router / End device marking

General information

Provides a ZigBee node interface that can connect to or create a ZigBee network.

EB051C - Coordinator ZigBee node, used to start, configure the network and allow other nodes to join.

EB051R - Router / End device node, used to connect and communication to networks started by a EB051C.

ZigBee is a software-based protocol that sits on top of the 802.11 RF wireless devices standard similar to Bluetooth. Unlike Bluetooth, ZigBee is capable of forming large networks of nodes and boasts advanced features such as mesh networking, simple addressing structures, route detection, route repair, guaranteed delivery and low power operation modes.

The EB051 ZigBee E-blocks are fully compliant with both the ZigBee pro (07) and ZNET (08) ZigBee standards. The boards can be used to create a network of dynamic moveable ZigBee nodes, or to interface with an existing ZigBee network.

ZigBee provides a transparent layer for sending and receiving data from the network. Therefore once the module has been configured and assigned to the correct address then sending and receiving data is as simple as sending and receiving RS232 bytes through the chip's UART.

1. Features

- ZigBee wireless communications
- Flowcode macros available
- Compatible with global RF standards
- Onboard ZigBee module
- Status LED
- Full 2007 ZigBee Pro / ZNET compliance
- 128-bit AES Encryption
- Range of approx. 100m per node

2. ZigBee operation

The ZigBee boards use a V2 XBEE module to interface to the ZigBee network. These modules are compliant with the 2007 ZigBee Pro / ZNET standard.

The V2 XBEE modules come in two varieties. One is configured to be the ZigBee network coordinator (EB051C) and the other is configured to be either a router node or an end device node (EB051R). The variety of the module is marked at the top right hand side of the

ZigBee board.

- Coordinator nodes are responsible for creating the ZigBee network and allowing other ZigBee nodes to join. Only one coordinator node can exist on any single network.
- Router nodes are responsible for routing signals to other routers or to end nodes.
- End device nodes are responsible for collecting or depositing real world data to and from the ZigBee network.

The Coordinator node and Router nodes are capable of handling up to eight children devices. The children devices can consist of either other Router nodes or End device nodes. If an End device node is configured to sleep then the parent device associated for that node will be responsible for buffering any incoming data. Therefore if you are using sleeping End devices you must make sure to poll the parent for data every time the device comes out of sleep mode.

3. 3.3V system compatibility

The board is compatible with 3.3V and 5V systems.

4. Communications

The XBEE modules are configured by means of using a TTL level RS232 bus to send and receive AT commands. This protocol requires a start bit, eight data bits and stop bit.



The baud rate for the XBEE modules is set to 9600, with no parity and flow control lines RTS and CTS that can be used. AT commands are strings of ASCII data that are sent over the RS232 bus. For more information on the AT commands used by the XBEE module please refer to the V2 XBEE datasheet.

Example AT command

ATID 234 - assigns a personal area network identifier of 0x234 or 564 in decimal.

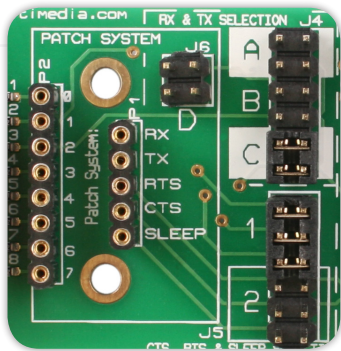
5. V2 XBEE module

For further data regarding the XBEE module please see the module datasheet, available on the Matrix website.

Circuit description

The circuit consists of 5 digital I/O lines on a downstream 9-way D-type plug. This routes the transmit (TX), receive (RX), clear to send (CTS), request t send (RTS) and sleep (SLEEP) lines to the XBEE ZigBee module.

Example of jumper settings C and 1, configured for use with a PIC16F877A.



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	PIC16C74/A/B	
		PIC16F777	PIC16C745	
		PIC16870/1	PIC16C765	
		PIC16F873/A	PIC16C77	
		PIC16F874/A	PIC16C773	
		PIC16F876/A	PIC16C774	
		PIC16F877/A		

RX and TX jumper settings

Jumper setting 1	Jumper setting 2
RTS - Pin 0	PATCH SYSTEM
CTS - Pin 4	
SLEEP - Pin3	

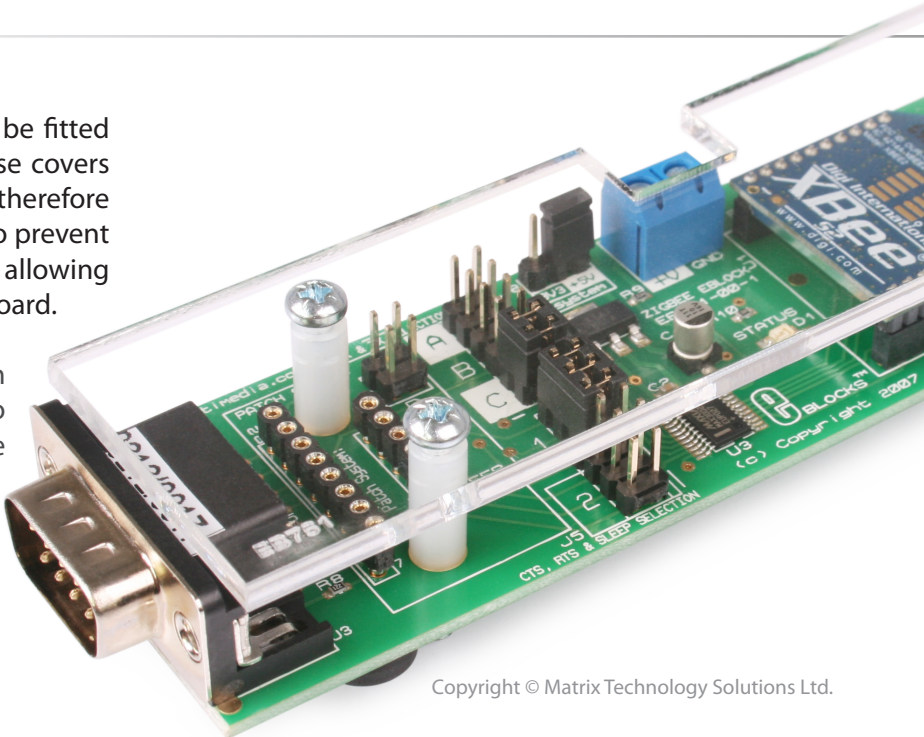
CTS, RTS and Sleep jumper settings

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 EB051 ZigBee board is EB751.



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F1 FEET
F2 FEET
F3 FEET
B1 BAG
L1 LABEL





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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