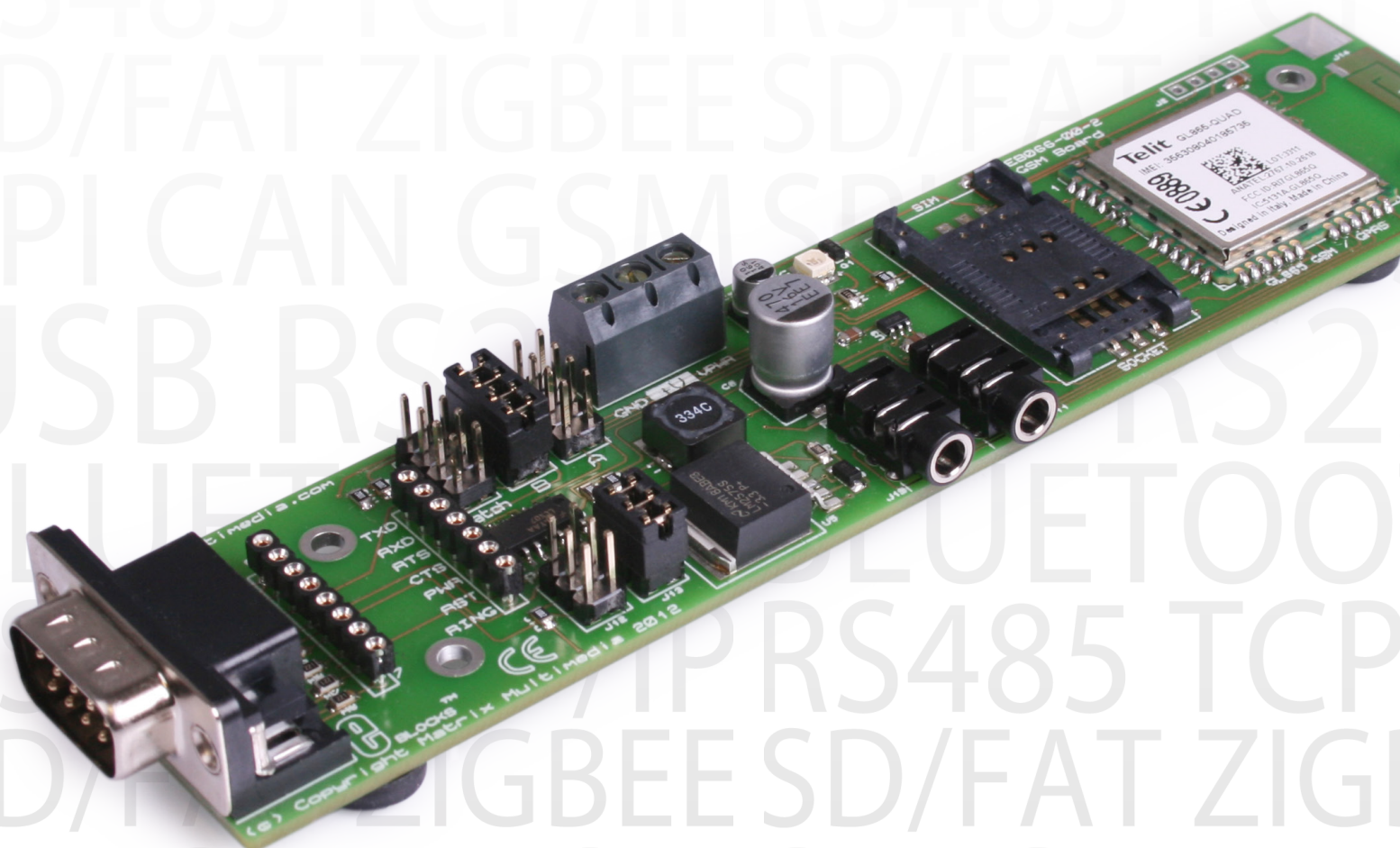


# **EBLOCKS<sup>®</sup>**

## Quad Band GSM/GPRS Board



# Contents

---

About This Document	2
General Information	3
Board Layout	4
Testing This Product	5
Circuit Description	6
Circuit Diagram	7

## About This Document

---

This document concerns the Matrix Multimedia Quad Band GSM/GPRS board, order code EB066-00-2.

### 1. Trademarks and copyright

PIC and PICmicro are registered trademarks of Arizona Microchip Inc. E-blocks is a trademark of Matrix Multimedia Ltd.

### 2. Disclaimer

The information provided within this document is correct at the time of going to press. Matrix Multimedia 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.

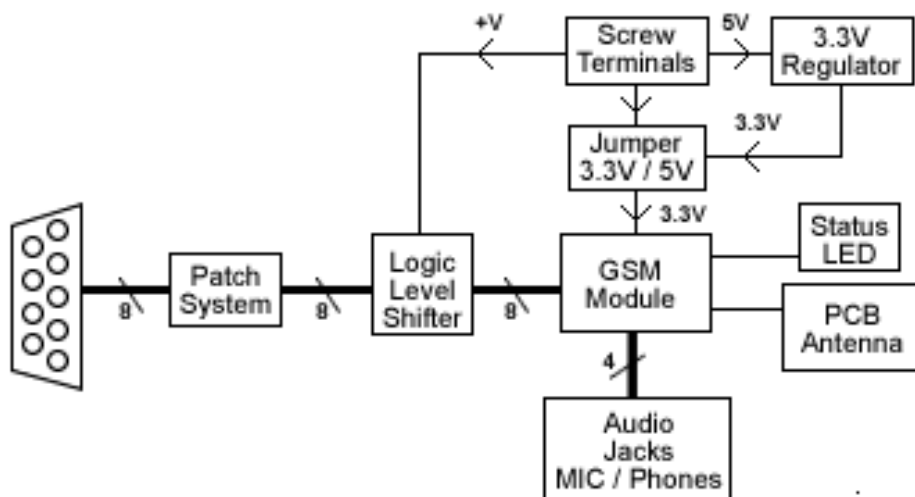
# General Information

The Quad Band GSM/GPRS E-block board allows easy access to the mobile phone GSM/GPRS networks. The onboard GSM/GPRS module can be used to make or receive wireless voice calls and is also capable of sending and receiving SMS text messages. The GSM/GPRS E-block comes complete with onboard PCB antenna, SIM card socket, 2.5mm audio jacks for MIC and Headphone audio connection and LED to display the network connection status.

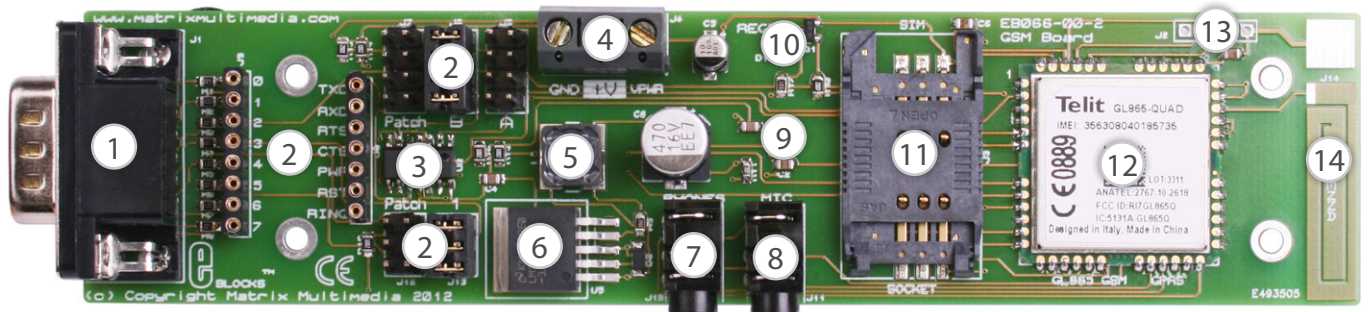
## 1. Features

- Quad band GSM/GPRS connection
- Voice communications
- SMS text based communications
- MIC and Headphone sockets
- SIM card socket
- Network status LED and signal
- PCB mounted antenna
- 5V and 3.3V compatible
- E-blocks compatible.

## 2. Block Diagram



# Board Layout



- |    |                                    |     |                                       |
|----|------------------------------------|-----|---------------------------------------|
| 1. | Downstream 9-way D type connector. | 8.  | Microphone socket                     |
| 2. | Patch System                       | 9.  | 2V8 GSM Supply Reference              |
| 3. | Logic level voltage shifter IC     | 10. | GSM/GPRS network status LED           |
| 4. | Screw terminals                    | 11. | SIM socket                            |
| 5. | Switch mode inductor               | 12. | GSM/GPRS module                       |
| 6. | 3V8 Switch mode regulator          | 13. | GSM/GPRS module firmware upgrade port |
| 7. | Headphones socket                  | 14. | PCB antenna                           |

## Signal Connections using the Patch System

Signal	A (16F88)	B (16F877A)	Patch
Transmit Data (TXD)	Bit 5	Bit 6	Patch
Receive Data (RXD)	Bit 2	Bit 7	Patch
Request to send (RTS)	Bit 6	Bit 2	Patch
Clear to send (CTS)	Bit 7	Bit 5	Patch

Signal	1	Patch
Reset	Bit 1	Patch
Ring	Bit 3	Patch

# Testing This Product

The following instructions describe the test procedure for the EB066-00-2 Quad Band GSM board.

## 1. System Setup

Multi-programmer board (EB-006) with:

EB006 Options	Setting
Power supply	External, 14V
PICmicro device	16F877A
SW1 (Fast/Slow)	Don't care
SW2 (RC/Xtal)	XTAL
Xtal frequency	19.6608MHz
Port A	
Port B	LCD EB005
Port C	GSM EB066
Port D	Keypad EB014
Port E	
Test program	GSM.HEX

## 2. Test procedure

- Connect EB005 (LCD board) to PORTB of the Multiprogrammer.
- Connect EB066 (GSM board) to PORTC of the Multiprogrammer.
- Connect EB014 (Keypad board) to PORTD of the Multiprogrammer.
- Ensure that the GSM EB066 has the following jumper configuration:
  - o J5 = No Jumper
  - o J6 = 4-Way Jumper Fitted
  - o J7 = No Jumper
  - o J12 = No Jumper
  - o J13 = 4-Way Jumper Fitted

- Connect a wire from the +V screw terminal of the Multi-programmer to +V terminal of LCD board.
- Connect a wire from the +V screw terminal of the Multi-programmer to +V terminal of GSM board.
- Connect a wire from the 14V screw terminal of the Multi-programmer to +VPWR terminal of GSM board.
- Insert a "Pay as you go" type SIM card into the GSM module (contract SIMs are encrypted and won't work).
- Connect USB cable to computer.
- Ensure 13.5V power supply is working correctly.
- Open PPP.
- In PPP open file GSM.HEX.
- In PPP click on "Send To PICmicro" icon. A pop up window will inform you of status. If status is ok a "Program Sent And Verified" window will be observed on the screen.
- Wait for the LED on the EB066 to flash on then off for around 3 seconds indicating a connection to the GSM network.
- The LCD will display instructions on sending a SMS message.
- Enter a number to send the message to using the keypad, finish with # key.
- Enter a message using the keypad, finish with # key.
- Confirm the number you entered by pressing #
- Confirm the message you entered by pressing #
- When asked press # to send the SMS message.
- Ensure that the AT commands are appearing on the LCD correctly.
- The test routine has passed if the message is received by the remote mobile phone or other GSM device.

# Circuit Description

## 1. AT Commands

The GSM module uses a serial connection to transfer commands and data to and from the microcontroller. To do this there is a standard called AT commands which the microcontroller uses to perform functions on the GSM. AT commands are simply strings of serial data starting with the characters "AT" standing for "Attention".

Here are some of the more generic AT commands available on the GSM module.

ATD07712345678;	- dial the number specified
ATA	- answer an incoming call
ATH	- disconnect an active call

For a list of all the supported AT commands please refer to the datasheet available from here.  
<http://www.telit.com/module/infopool/download.php?id=542>

## 2. 5V / 3.3V Operation

The GSM module requires a supply voltage of 3.8V and I/O signal voltage of 2.8V. To allow the module to work with 3V3 and 5V systems a voltage shifting circuit has been fitted onto the board. Care must be taken to connect the correct screw terminal to the correct voltage source.

Note: Powering the board with the external voltages setup incorrectly is likely to cause irreversible damage to the module. Please take care when wiring up the external voltages to unplug your power supply and double check your connections before plugging it back in.

## 3. SIM Card socket

SIM cards used with the module must be pre-pay ("Pay As You Go") rather than contract based as contract based SIM cards are normally heavily encrypted by the service provider.

## 4. Status LED

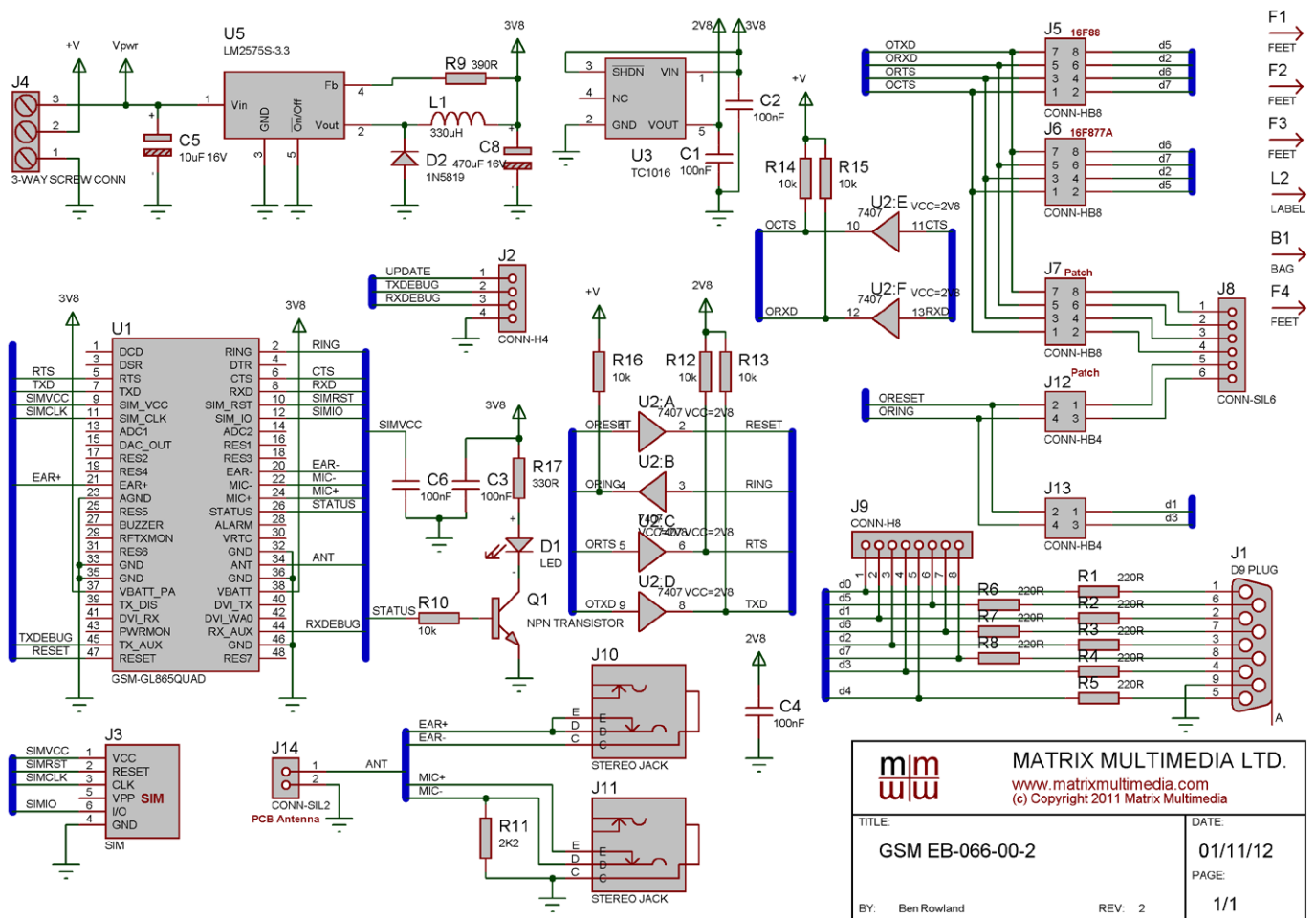
The LED on the board will flash every second when the GSM module is trying to establish communications with the GSM network. Once the communications have been established and a good signal is being received the LED will flash quickly and then remain off for around 3 seconds. When the module is in a call or communicating with the GSM network the LED will remain constantly lit.

## 5. Onboard Antenna

The on-board antenna provides good signal strength even in weaker areas so no external antenna connection has been provided.



# Circuit Diagram



<b>mim</b> <b>wlw</b>		<b>MATRIX MULTIMEDIA LTD.</b> <a href="http://www.matrixmultimedia.com">www.matrixmultimedia.com</a> (c) Copyright 2011 Matrix Multimedia	
TITLE: <b>GSM EB-066-00-2</b>		DATE: <b>01/11/12</b>	
BY: Ben Rowland		REV: 2	
		PAGE: <b>1/1</b>	



Matrix Ltd.  
The Factory  
33 Gibbet Street  
Halifax, HX1 5BA, UK

t: +44 (0)1422 252380  
e: [sales@matrixmultimedia.co.uk](mailto:sales@matrixmultimedia.co.uk)

[www.matrixmultimedia.com](http://www.matrixmultimedia.com)

EB066-30-2