USB / RS232 Radio MODEM

Features:

- Plug 'n' Play RF Modem
- Direct Cable Replacement
- Range 1KM
- Host Data Rates up to 38,400 Baud
- RF Data Rates to 115Kbps
- Waterproof IP68 Enclosure
- 8 User Selectable Channels
- CE Compliant for Licence Free Use
- FCC Approved for Use in USA
- 100mW Transmit Power (+20dBm)

Applications

- USB/RS232 Cable Replacement
- M2M Communications
- Remote Networking

Description

The BLIZZARD radio modem is a simple to use and very versatile. It can operate as a PC or M2M, one to one cable replacement link, multiple master/slave arrangements or broadcast modes.

Operation Modes

One-to-One operation: for point to point cable replacement.

Broadcast Mode: where a single master BLIZZARD addresses many other BLIZZARDS concurrently. (Using many BLIZZARD modem set to the same address),

One-to-Many: a network consisting a master BLIZZARD and many slave BLIZZARD (the slaves all have the same address)

Many-to-One: where the transmitters all send to a single receiver address.

Ordering Information

Part No	Description
BLIZZARD-868	Radio Modem 868MHz
PSU-12V1AIN-IP	Power Supply 12V 1A IP67

Overview - What's in the box?




Supplied with the Blizzard modem:

1. Modem PCB assembly
2. IP68 enclosure with sealing gaskets and cable gland
3. RS232 cable lead
4. USB cable lead
5. Screw fit M4 thread antenna.

NOTE: In order to make use of the IP68 waterproof enclosure then it may be necessary to cut off and replace the connector on the end of the cable lead because it is not possible to pass through the cable gland.
Alternatively - use the USB lead.

NOTE: It is not possible to connect an external antenna to the BLIZZARD.

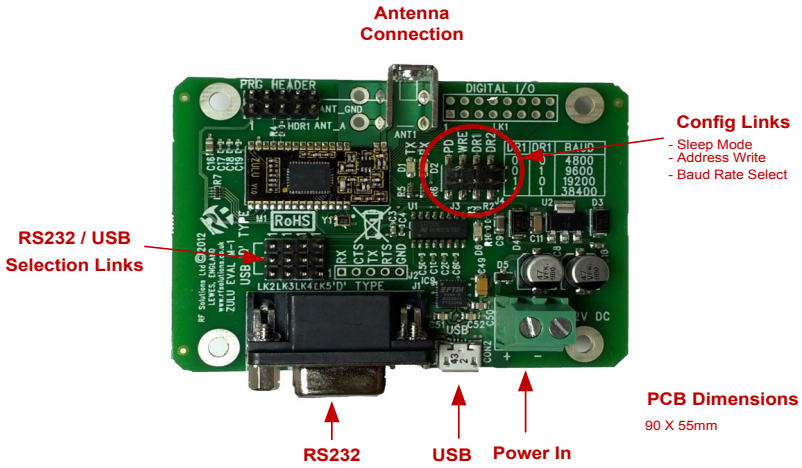
The schematic diagram of the PCB assembly showing connections required to interface the on board connectors is provided later in this datasheet.

Notes on optimising range

In order to obtain greatest range ensure the following:

1. Use an external 12Vdc supply (i.e. don't rely on the USB power cable)
2. Use the slowest RF data rate setting
3. Position the BLIZZARD high off the ground and in free space.

Inside the Blizzard Modem



USB / D links (LK2,3,4,5)

For USB connect all links from centre to 'USB' side
For RS232 connect all links from centre to 'RS232' side

Power

When using USB host connection there is no requirement to provide external power although the range will be improved with an external 12V source

Serial data format

Baud rate: Defined by DR1 and DR2 Pins, 8 data bits, No parity, 1 stop bits.
Flow control:Hardware CTS / RTS

CTS, RTS

Clear-to-Send and Request-to-Send are standard data flow control used in RS232 systems.
Note:
If you do not intend to use handshaking, it is possible to tie the RTS pin to GND and use the modules without. In this configuration the BLIZZARD modem module will send all data in its buffer after a 10ms timeout. Up to 57bytes can be buffered before data is lost. A minimum of 15ms should be al-lowed before new data is sent to the module after each packet. This is not a recommended method of operation.

Tx / Rx LED

The LED's operates whenever there is RF activity.

DR1 - DR2

These inputs define the host interface baud rate. They are read when RESET pin goes high. Tip: It is good practice to operate the host interface at half the speed of the RF data rate (set by Register R5)

DR1	DR2	Host baud rate
Open	Open	4,800
Open	Fitted	9,600
Fitted	Open	19,200
Fitted	Fitted	38,400

Operational Overview

Networking

One-to-One: For point to point data communication

One-to-Many/Broadcast: A network consisting a master and many slaves (all receivers have the same address)

Many-to-One: Where all transmitters with different addresses send to a single receiver address.

Note: Because each BLIZZARD modem module can be given a unique address, multiple BLIZZARD networks can co-exist in the same area. This type of operation requires clear timing between transmissions or corruption of packets can occur.

Addressing Networks

Each BLIZZARD modem module has a generic pre-configured default address (7F7F7F). This can be modified during configuration. When data received via RF it is examined and the address header embedded with -in it is compared with its address. Only data received with matching address will be processed and out-put to the host, all other data will be discarded.

When sending data, the BLIZZARD modem module has a default destination address set to 7F7F7F, this can be user configured.

By setting the two addresses appropriately the above network types can be easily achieved.

Operating Modes

Configuration Mode: In configuration mode the BLIZZARD modem module can receive commands to set internal registers to define its eventual operation. In this mode the BLIZZARD modem module is 'Offline' and cannot send or receive RF data.

Normal Operation: The BLIZZARD modem module is 'Online' automatically transmitting and receiving data from its serial interface across its RF network.

Acknowledge Secure Mode: In this mode each time a BLIZZARD modem module transmits an RF packet, an additional 'packet ID' is added. This ID is a rolling verification counter to receiving BLIZZARD modem modules.

Any correctly addressed receiving BLIZZARD modem module replies with an RF acknowledgment also containing the 'packet ID'. If the transmitting BLIZZARD fails to receive the expected acknowledgement it will transmit the packet again (up to 10 times).

Host Terminal Software

Any Terminal emulation program can interface the Blizzard modem, one we have found to be easy to use and powerful is 'Terminal' This can be downloaded from :
https://sites.google.com/site/terminalbpp/

Ping-Pong Mode

This test mode is built into the modem to enable two modems to pin pong signals to each other and report the (RSSI) on the originating modem. To initiate ping pong;

1. Connect modems to host PC USB ports
2. Run your terminal emulation program
3. Determine the USB port modem is connected to (from device manager under computer properties)
4. Set the terminal emulation to 'port' as above, 8, n, 1, CTS/RTS,
5. Enter AT mode by sending '+++'
6. Send the character 'P' from one modem. This modem will now ping and report back the reply with RSSI indication

Configuration Mode (offline)

Commands can be set using a standard Terminal program or by sending the relevant ASCII characters.
Each Command must be followed by the Carriage Return <CR> or 'Enter' except "+++"
Note All commands are entered in upper case

Command	Description	Response from Blizzard
+++	Enter Configuration Mode Note: This command must be sent as a string with no characters in front or behind. This is to ensure that the +++ is not mistakenly received in mid-data. (<CR> is not to be used with +++).	Blizzard responds with status info
?	Retrieve the current register values	Blizzard responds with all register values
F	Pre-configured factory defaults; R1=7F7F7F R2=7F7F7F R3 = Ch2 (869.450MHz) R4 = 7 (+20dBm) R5 = 1 (19K2)	'OK'
H	Help	Brief description of commands available
P	Ping Mode This sends a ping request . On receiving, the recipient Blizzard Modem will respond with its address and the level of RSSI (Received Signal Strength) The Ping command is continuously repeated every 1 second until any command or character is entered.	The originating BLIZZARD modem module will respond with the recipient BLIZZARD modems' address. eg. Received from 7F7F7F (D5) Where 7F7F7F = the recipient address D5= RSSI RSSI Is a hex value corresponding to the received signal strength Min = 20hex Max =E0hex
S	Save Configuration	'SAVED'
Q	Exit configuration mode and return to	No response

Register Setting (Configuration Mode)

The internal registers enable various parameters to be controlled.
To set a register type 'R#=x' where # is the register number (1-6) and **x** is the value to set
For example, to set the channel to channel 3 type : R3=3<CR>
(Where <CR> is carriage return or enter on the keyboard) The modem will then return 'OK' or 'Error' if an incorrect command is entered. Save the changes by typing : S<CR>
The modem will return with 'SAVED'
Default values are shown in **BOLD**

Register	Value Range	Description	Example
R1	0000 - FFFFFF (24 bit address)	Sets the recipient Blizzard modem Address	R1=0001 (Data sent is addressed to Blizzard modem with address 0001)
R2	0000 - FFFFFF (24 bit address)	Set own Blizzard Modem address	R2=F001 (Data sent is from Blizzard modem with address F001)
R3	CH0 to CH4	Set RF channel	R3=2 (Transmit on Channel 2)
R4	0 = +1dBm 1 = +2dBm 2 = +5dBm 3 = +8dBm 4 = +11dBm 5 = +14dBm 6 = +17dBm **7 = +20dBm**	Set the RF Transmit Power output*	R4=7 (sets Transmit Power to max)*
R5	0 = 9,600 **1 = 19,200** 2 = 28,800 3 = 56,000	Set the RF baud rate*	R5=3 (sets the RF data rate to 56Kbps)

*Note :

- Reducing Tx power reduces battery consumption!
- Reducing the baud rate will increase the range!

RF Channel Selection 868MHz version

The EU standard sets maximum power transmission limits dependent on frequency, bandwidth and application. Please check the relevant standards are being met when implementing your Application. A rough guidance applicable to the BLIZZARD channel numbers is given below

Channel Number	Frequency Centre (MHz)	EU Power Allowance mW / dBm	Notes
0	868.400	25 / 14	Applicable standard - EN300-220
1	868.900	25 / 14	
2	**869.450**	**100 / 20**	
3	869.600	100 / 20	
4	869.800	25 / 14	

Technical Specifications

Absolute maximums:
Temperature range: Storage –50 to +125°C.
Weight: SMT version 7grams, DIP Part 13grams

Parameter	Min	Max	Units
Supply Voltage	-0.3	25	V
Voltage on any Input	-0.3	Vcc+0.	V
Max Input power (thro Antenna)		+10	dBm

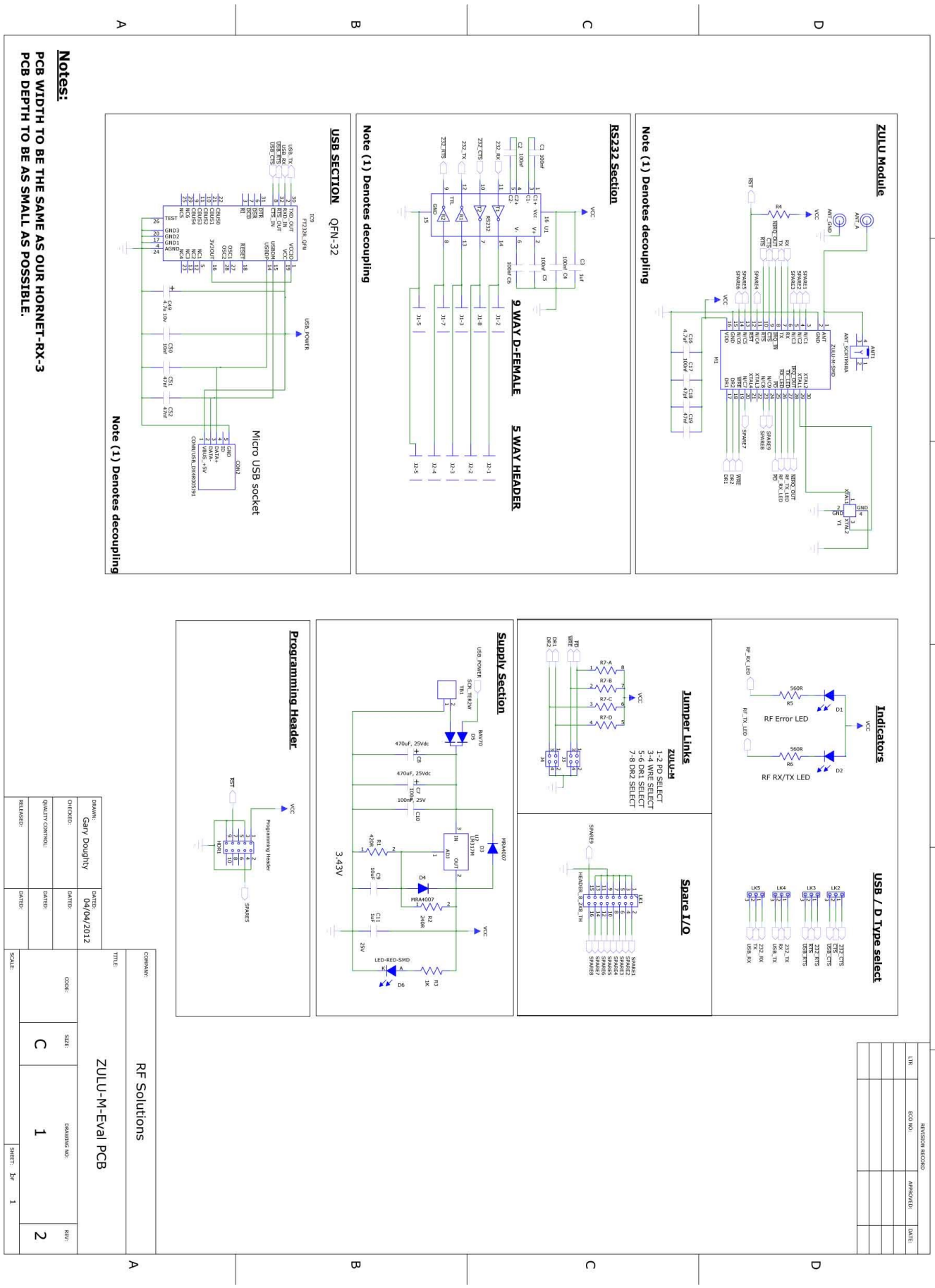
DC Characteristics

Parameter	Min	Typical	Max	Units
Supply Voltage	9		25	V
Operating Temperature	-40		+85	°C
Blizzard Tx Supply Current: When Transmitting When sleeping		 100 1		 mA uA
Blizzard Rx Supply Current: When Receiving When sleeping		 18.5 1		 mA uA

AC Characteristics

Parameter	Min	Typical	Max	Units
Operating Frequency 868MHz	868		870	MHz
Operating Frequency 915MHz	915.00		915.27	
Operating Temperature	-40		+85	°C
Band width per channel		100		KHz
Deviation		45		KHz
Blizzard Tx MAX Output Power			+20	dBm
Blizzard Tx—Rx FSK Raw RF Data Rate			256	Kbps
Blizzard Rx Sensitivity		-116		dBm

Blizzard Modem Schematic



Reader Response

It is our intention to provide you with the best documentation possible to ensure successful use of your RF Solutions product.

If you wish to provide your comments on organization, clarity, subject matter, and ways in which our documentation can better serve you, please email us your comments to the technical publications manager

Application:

Would you like a reply? Y / N

Datasheet: DS-BLIZZARD-2

Questions:

1. What are the best features of this document?
2. How does this document meet your hardware and software development needs?
3. Do you find the organization of this document easy to follow? If not, why?
4. What additions to the document do you think would enhance the structure and subject?
5. What deletions from the document could be made without affecting the usefulness?
6. Is there any incorrect or misleading information (what and where)?

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Waste Batteries and Accumulators Directive 2006/66/EC
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Environment Agency producer registration number:
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