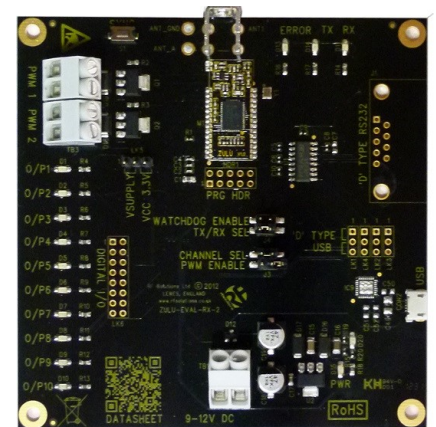
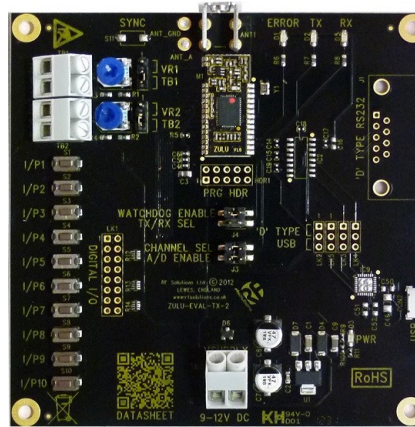




Smart Radio Telemetry Module

Features

- Small Form Factor
- 2 Analogue I/O (10bit)
- Data Reception LED
- Secure Data Protocol
- Easy Pairing Process
- One to One operation
- M100mW Transmit Power
- 10 Digital Input / Outputs
- Range up to 2,000 Metres
- 868MHz Operating Frequency
- 10 Channel Transceiver Module
- 90-100KHz PWM
- CE Compliant, Licence Free Use



Applications

- Remote Control
- Remote Networking
- Remote Switching
- Remote Traffic Lights

Description

The ZULU Telemetry Module provides a reliable Transceiver based industrial Remote Switch with up to 2,000 metres range. Two modules are combined to provide a simple network of radio switching.

Each unit is supplied ready to operate, once paired with another Module a remote control system is created. Connections for Power, antenna and Input / Output are the only connections required.

Ordering Information

Part No	Description
ZULU-EVALT	Radio Telemetry Module SMT Package
PSU-12V1A-UK	Power Supply 12V 100mA

The following descriptions apply to the Zulu Module in TRANSMITTER Mode

When configured as a Transmitter the ZULU Module will automatically default to low power sleep mode until any input state change takes place.

On receipt of an input state change the ZULU TX will transmit a packet showing the status of all inputs (multiple state changes can take place simultaneously).

The ZULU TX will remain "awake" until:

1. The paired ZULU RX Module has acknowledged, or
2. A timeout value of 4 retry transmissions. (Pin 14 output will then be flashed)

Analogue / Digital (pin 3)

This input configures Input 1-2 to be analogue or Digital inputs.

Note: this input is read at power up only.

Analogue Inputs (4,5)

If enabled each input is 10bit A/D which can accept a voltage between 0 -Vcc.

Each input is sampled ten times per second, and the value is averaged before transmission.

ZULU TX will transmit whenever there is a change in the detected input voltage of 0.025V.

If no change of voltage is measured then the ZULU TX will not transmit. A nominal 1uF capacitor is recommended across the analogue inputs in order to prevent noise being read and transmitted.

Note: A maximum of three RF packets are sent per second.

Digital Inputs

High Impedance Inputs, LVCMOS / LVTTTL compatible.

Can be connected directly to CMOS/TTL logic or switch inputs connected to 0V (active low).

A change on the input will cause the ZULU TX to wake, read the inputs and initiate RF transmission.

Watchdog Input (pin 13)

The watchdog is designed to enable the ZULU RX to be aware of any potential problems with the RF link to a sync'ed ZULU TX.

When activated the ZULU TX will automatically transmit a call in packet a regular basis every 10seconds. Input statuses are not sent as part of the watchdog signal.

Note: This pin is only read on power up. Watchdog is only valid on a 1-1 system.

RF Fault (pin 14)

Direct drive to LED. Each time the ZULU TX transmits the status of its inputs, it expects an acknowledgement from the paired receiver. If this is received then the RF Fault LED is not used.

If no acknowledgement is received RF Fault is flashed.

RF Fault LED Status	Description
OFF	Receiver has acknowledged correctly
Flashing at 1Hz	No acknowledgment received

The following descriptions apply to the ZULU module in RECEIVER mode

Analogue outputs (pin 4, 5)

If enabled the ZULU RX outputs PWM signal.

The PWM may be used directly (e.g. for motor control).

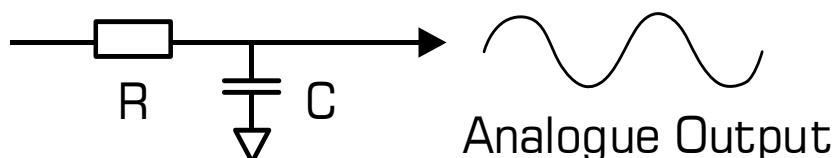
The PWM signal is a proportional digital output representing the analogue input.

If the analogue input is 0V then the PWM output will be '0'.

If the analogue input is $1/2V_{cc}$ then the PWM output will be a square wave with 50% duty cycle, (operating at approx 90-100KHz).

If the analogue input is V_{cc} then the PWM output will be '1'.

In order to re-create an analogue signal (representing the analogue input at the transmitter) the output should be fed through an RC network as above.



Digital outputs

CMOS / TTL compatible outputs. Can be connected directly to CMOS/TTL logic or drive.

Analogue / Digital (pin 3)

This input configures output 1-2 to be analogue or digital outputs.

Note: this input is read at power up only.

Watchdog Input (pin 13)

When activated the ZULU RX module will automatically expect to receive a watchdog signal from the ZULU TX on a regular basis (10seconds) If it has failed to receive this within a 30second period it will assert drop all outputs and flash the RF fault output.

RF fault

Direct drive to LED. Flashes when watchdog fails.

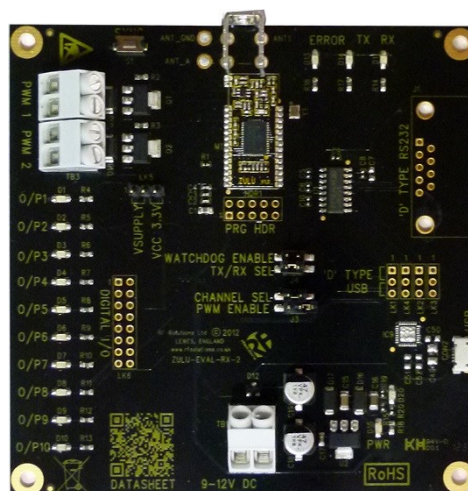
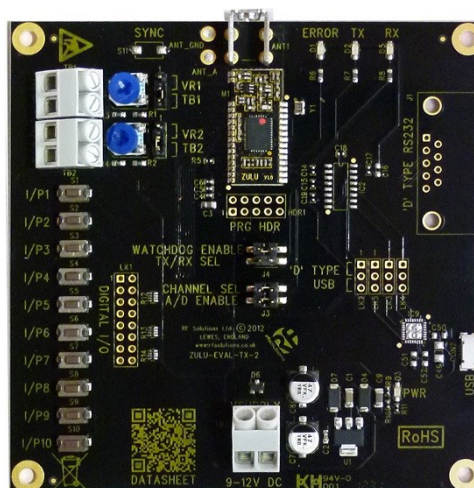
RF fault status	Description
OFF	ZULU RX has received watchdog correctly
Flashing at 2Hz	No watchdog received
OFF	Watchdog is inactive

ZULUT Evaluation Board

The ZULU EVAL Boards provide a ready to go platform which can be used for evaluation or complete projects. These boards demonstrate the capabilities of ZULU Modules.

Features

- Provides a Radio Link with;
 - 10 Digital Channels
 - 2 Analogue Channels (PWM)
- Watchdog Feature
- Direct Antenna Connection
- 9-12Vdc Power in Terminal
- LED Indication of
 - Power
 - Transmit / Receiver
 - RF Error



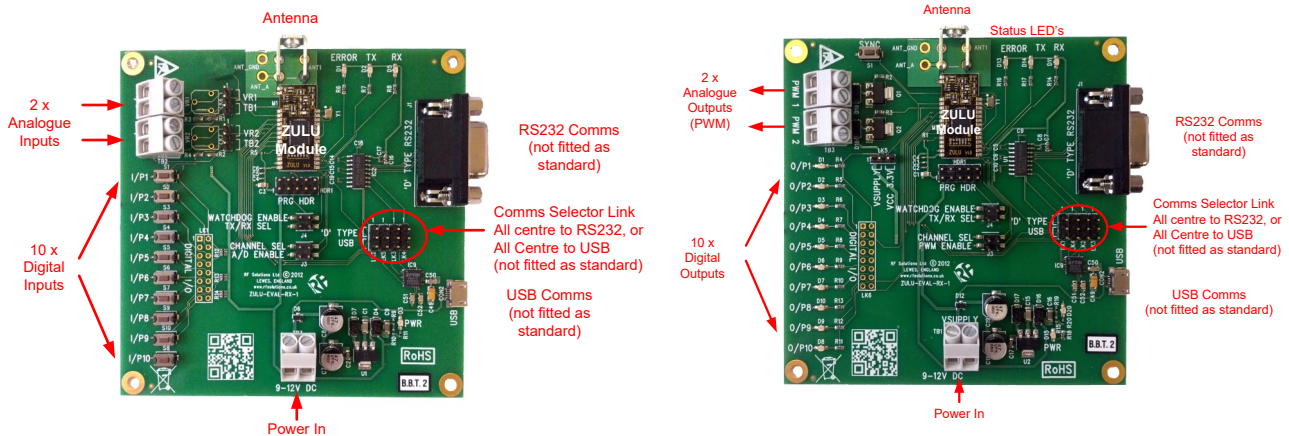
The Evaluation boards are sold as a TX and RX PCB pair, ready for component use.

Ordering Information

Part No	Description
ZULU-EVALT	Tx and RX PCB Pair
PSU-12V1A-UK	Power Supply 12V 100mA

ZULU Telemetry

ZuluT Evaluation Board Configuration



Overview

When paired together the outputs of the receiver will follow the inputs at the transmitter. The serial outputs also provide data from the receiver.

To get up an running complete the following;

1. Set the jumper links as below
2. Screw in Antenna
3. Apply power
4. Pair together the receiver and transmitter board

Reference	Name	When Fitted	When Open
J3	A/D	I/O 1 & 2 are analogue operation	I/O 1 & 2 are set to Digital operation
J3	PWM Enable	Enables PWM Output	Output's 1& 2 set to Digital
J3	Channel Select	ZULU operates on Channel A	ZULU operates on Channel B
J4	TX/ RX Select	ZULU set as Receiver	ZULU set as Transmitter
J4	Watchdog Enable	Watchdog enabled	Watchdog Disabled
LK1-LK4	Comms Select	All links from Centre to USB All links from Centre to RS232	N/A
LK5 (Receiver)	PWM Supply	Vcc: PWM is powered from Vcc VSUPPLY: PWM is powered from incoming V supply at TB1	

Pairing Process

In order to pair together a Transmitter and receiver,

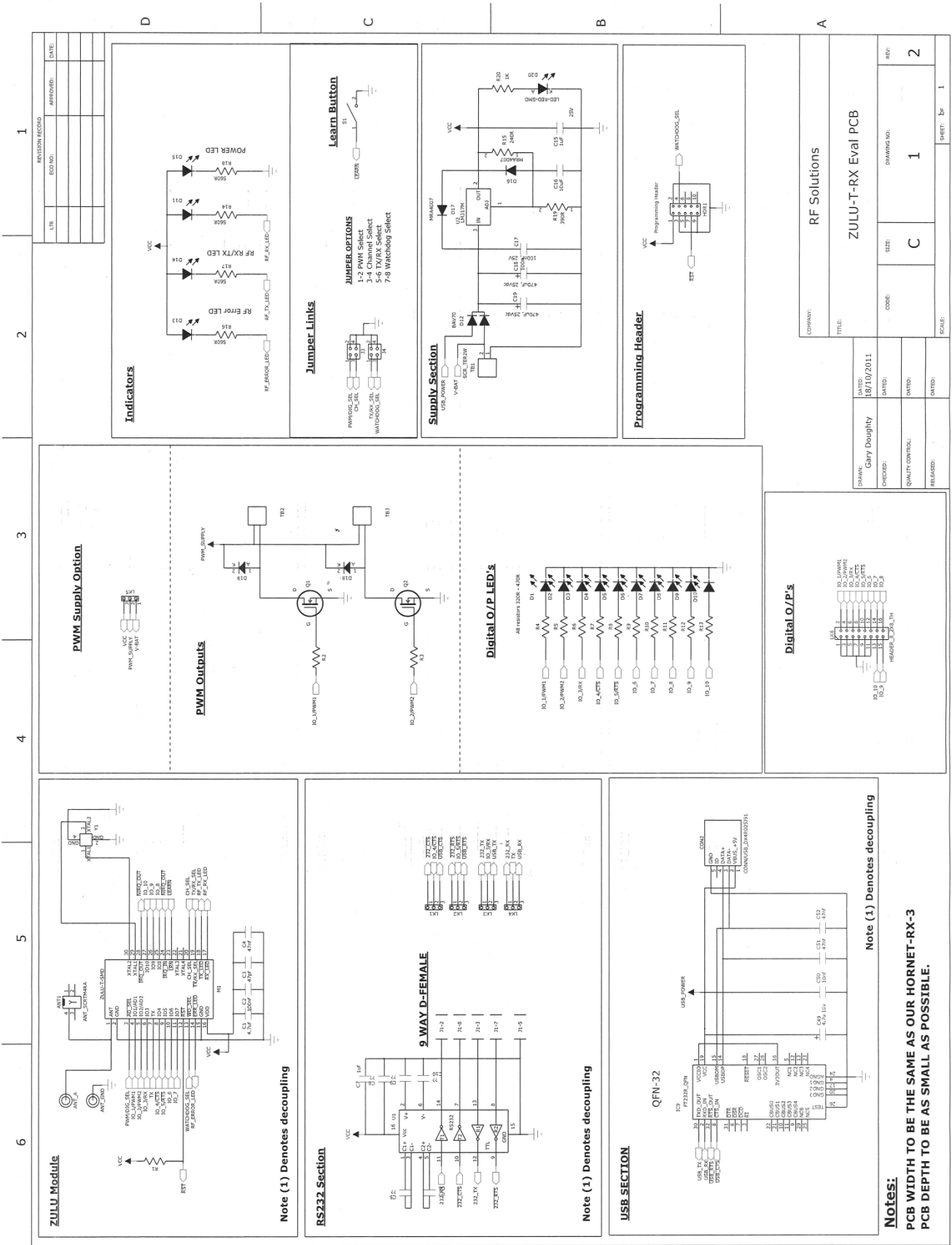
1. On the Receiver Briefly press the Receiver 'Sync Button'
2. Briefly operate any of the transmitter buttons

For all other operation please refer to the ZULU Module operation.

Analogue in / PWM Out

When using the analogue RF link, by turning the potentiometer VR1 or VR2, outputs 1 and 2 at the receiver will vary between 0 and 100% PWM, the EVAL-T board has these outputs connected to LED's 1 and 2 which will 'dim' their brightness with the adjustment of the transmitter VR1 and 2.

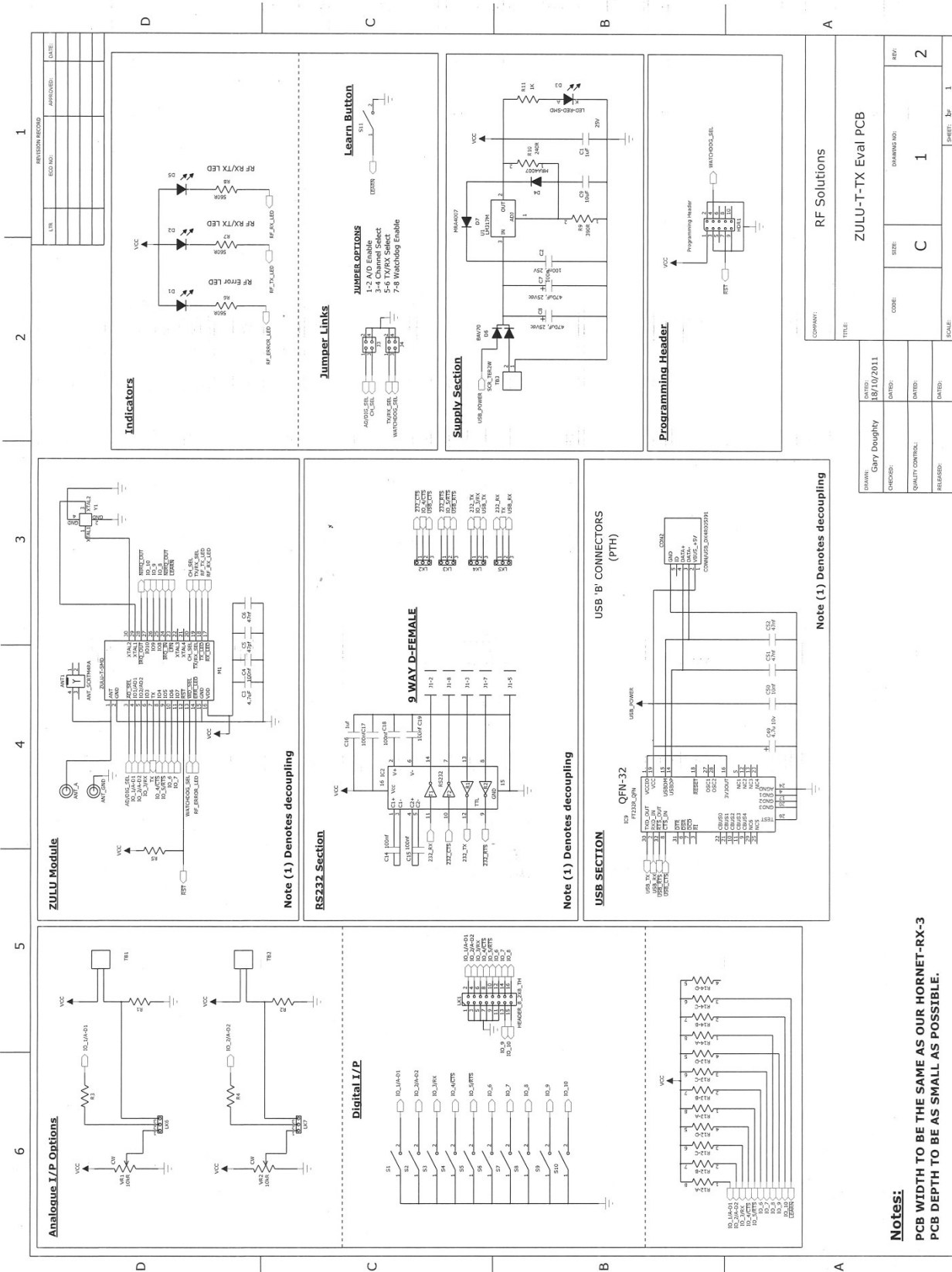
Zulu evaluation board receiver schematic



REVISION RECORD		DATE
LIB	ECO/NO	APPROVED
1		
2		
3		
4		
5		
6		

COMPANY:	RF Solutions
TITLE:	ZULU-T-RX Eval PCB
DRAWN:	Gary Doughty
CHECKED:	
DATE:	18/10/2011
QUALITY CONTROL:	
RELEASED:	
CODE:	
SIZE:	C
DRAWING NO:	1
REF:	2
SCALE:	
SHEET:	1

Zulu evaluation board transmitter PCB layout



COMPANY:	RF Solutions
TITLE:	ZULU-TX Eval PCB
DATE:	18/10/2011
DRAWING NO.:	1
REV.:	2
CODE:	C
SIZE:	1
SCALE:	1
SHEET:	1

DRAWN:	Gary Doughty
CHECKED:	
QUALITY CONTROL:	
RELEASED:	

Notes:
PCB WIDTH TO BE THE SAME AS OUR HORNET-RX-3
PCB DEPTH TO BE AS SMALL AS POSSIBLE.

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DO NOT

Discard with normal waste, please recycle.

ROHS Directive 2011/65/EU and amendment 2015/863/EU

Specifies certain limits for hazardous substances.

WEEE Directive 2012/19/EU

Waste electrical & electronic equipment. This product must be disposed of through a

licensed WEEE collection point. RF Solutions Ltd., fulfills its WEEE obligations by membership of an approved compliance scheme.

Environment Agency producer registration number: **WEE/JB0104WV**.



Waste Batteries and Accumulators

Directive 2006/66/EC

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