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# EzUHF JR Module Manual Supplement

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January 2014



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## Introduction

Congratulations on your purchase of an ImmersionRC EzUHF 'JR' module transmitter.

This manual is a supplement to the general **EzUHF Control System, Overview & Operating Instructions** manual, which may be downloaded from the ImmersionRC Website, and gives more general information on the EzUHF system.

This module-based transmitter has a similar feature set to the standard 500mW EzUHF Transmitter, but with a more convenient form-factor, and much simpler cabling.

## Specifications

- Output Power 500mW (high), 200mW (low)
- DC Power Input 6v – 13v
- Current Consumption 250mA @ 12V in high power mode, 85mA @ 12V in low power
- Head-tracker Power Same as input voltage
- Channel Count Currently 12 Max. (16 planned)
- Antenna Connector Standard-Polarity SMA
- Frequency Range 430MHz -> 440MHz, with a UK (459MHz option)
- Frequency Bands 431-433, 433-435, 435-437, 436-438, 430-430 EH<sup>1</sup>
- Spread Spectrum FHSS, 20 slots from a possible 40, PRBS sequence

<sup>1</sup> EH = Extreme Hopping, more robust operation due to a 20MHz hopping range, instead of 2MHz.

## Compatibility

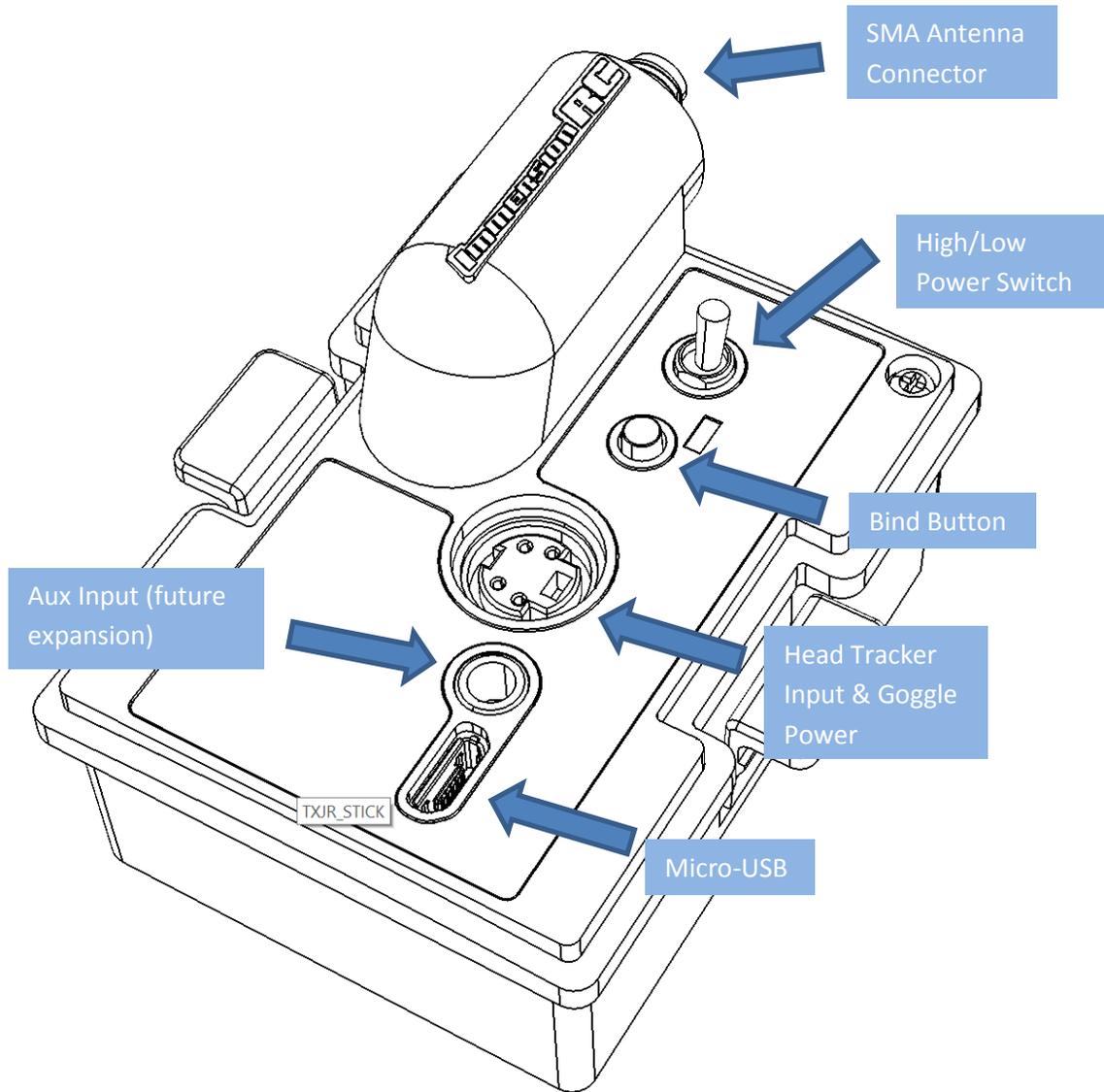
The EzUHF JR module is 'plug and play' compatible with the following radios:

Manufacturer	Model/Notes	Photo
FrSky	Taranis	
Turnigy	9xR	

The following radios can be made compatible after a simple modification procedure

Turnigy	<p>9X</p> <p>Plastic part in the module bay needs removing in order to support the EzUHF JR module</p>	
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## Connectors & Controls



Details of the Head Tracker connector pin-out may be found in the main EzUHF manual, mentioned earlier in this document.

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## Firmware Upgrade

As with all EzUHF equipment, it is important that compatible firmware is installed on both the transmitter, and the receiver.

The EzUHF JR module requires, at minimum, firmware version v1.48b. Receivers should be upgraded to v1.48, freely downloaded from the ImmersionRC.com website.

*Note: A small batch of transmitter modules shipped with v1.48a, these should be upgraded to v1.48b before use.*

To upgrade the firmware on the JR module, follow the below procedure:

1. Install the latest revision of ImmersionRC Tools on your Windows based PC
2. Remove the module from the radio
3. Switch the High/Low Power Switch to LO power mode
4. Hold down the failsafe/bind button, and connect the radio to a PC
5. Select the 'EzUHF: Tx, 500mW, 2W, JR' module from the list on the left
6. the 'Program' tab, and select 'Upgrade Firmware'
7. Select the upgrade file 'EzUHFFirmware\_TxJRModule.fw', and follow the prompts.

## Settings

There are several settings which may be set while the EzUHF JR Transmitter is connected to the PC.

These include:

### Frequency Band

The EzUHF system hops over many frequencies within a pre-set band. Each set of stick positions sent to the model are sent on a different frequency, following a pseudo-random sequence.

The default band is 433-435MHz as the units are shipped.

It is important that the band matches between the Transmitter and Receiver.

Band selections available are:

431-433MHz

433-435MHz

435-437MHz

436-438MHz

430-450MHz Extreme Hopping

The UK version of the firmware doesn't have the frequency band selection, and will default to the hopping range legal within the UK, around 459MHz.

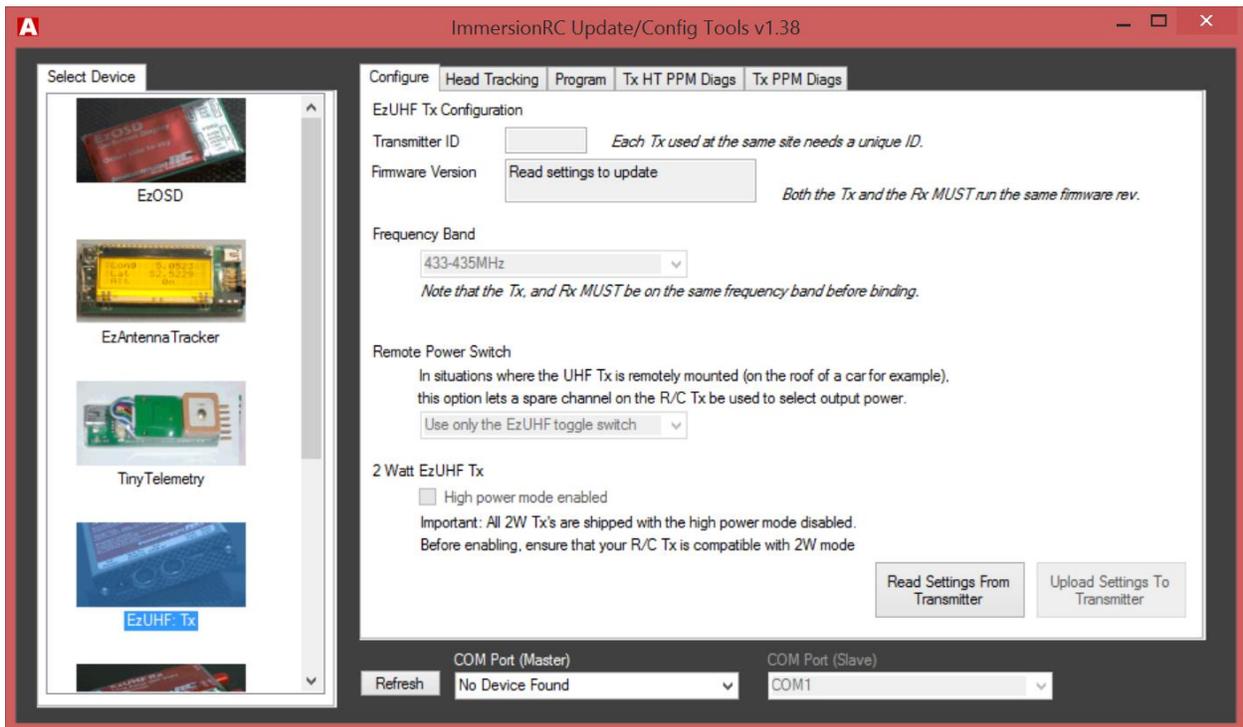
Typically, the band does not need to be changed from its default setting. Examples of when it should be changed are:

- When flying with other LRS users, to avoid the frequency band used by them
- When flying in RF-polluted areas, with strong interfering transmitters

## Remote Power Switch

The Remote Power Switch allows a channel from the R/C transmitter to be used to change the output power level of the EzUHF transmitter.

Not commonly used, it is best left at its default setting, which uses the power switch on the back of the module to change between the two power levels.



## Head Tracking

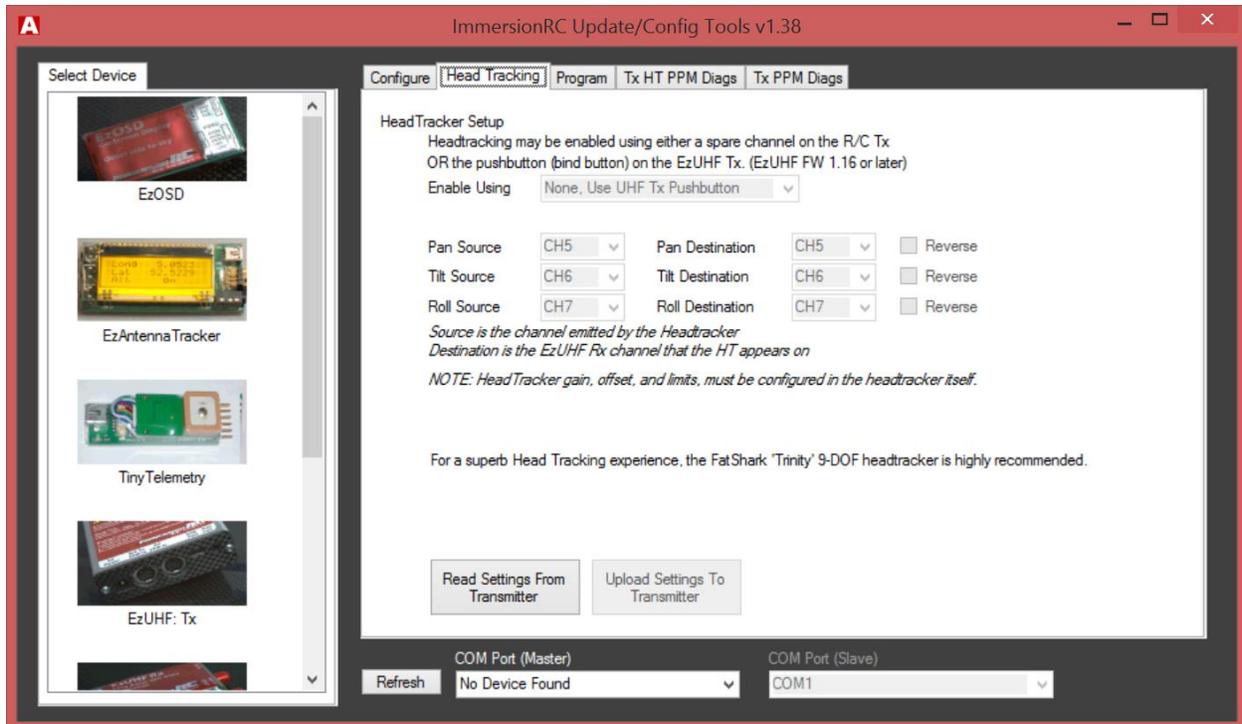
There are various settings which define the behavior of the head tracking support.

These allow mapping of source channels (channels on which the headtracker emits the pan/tilt/roll controls), and the destination channels (channels which are sent to the EzUHF Rx).

A switch also allows the headtracker to be optionally enabled/disabled with the bind button on the module.

The head-tracker port may also be used to power a set of FatShark goggles, eliminating the need for a separate battery.

Note that the FatShark 'Trinity' head tracker is highly recommended for use with the EzUHF system. This is really a best-in-class headtracker which uses sensors with 9 degrees of freedom, and absolutely zero drift.



## Binding

Once the firmware revisions of the Tx and Rx have been verified, and upgrades performed, the transmitter may be bound to an EzUHF receiver.

To start the binding process, switch the power switch on the EzUHF JR module to Low power, while the radio is turned off.

Hold down the binding button, and turn on the radio. Keep the button held down until the radio starts beeping periodically. This indicates that the Tx is in bind mode.

Power up the receiver, and press the bind button on the receiver. The LED on the receiver will go out while binding is in progress, but then, assuming binding is successful, the LED will start 'breathing' indicating a successful bind.

A failed binding is indicated by 6 flashes of the LED on the Rx. If this occurs, ensure that the firmware versions match between Tx and Rx, and also ensure that the frequency band matches.

Once bound successfully, cycle power to both the transmitter, and receiver, and ensure that the LED on the Rx is still 'breathing'.

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Tip: We often get asked why the LED ‘breathes’ like this. Basically, an LED which fades on and off by varying the duty cycle is a better indicator of reception quality than a simple on/off LED. While range testing for example, signal quality can be estimated by looking at ‘stuttering’ in the LED’s fading.

## Error/Beep Codes

When the EzUHF JR module detects a problem, it will beep in a sequence of long, and short beeps, which will indicate what is wrong.

_ .	Transmitter internal error, return for service (Xtal)
_ . .	Transmitter internal error, return for service (TxOvfl)
_ . . .	Detected PCM as opposed to PPM, change R/C Tx Mode to PPM
_ . . . .	PPM not detected at power-up (Tx connected to HT input?)
. . .	PPM Timeout, connection problem between R/C Tx and EzUHF

Common problems are \_ . . . which indicates that the R/C Tx is in PCM mode, instead of PPM. The EzUHF (and all other equivalent systems) require PPM as input, and not PCM.

Another common problem is \_ . . . . which indicates that a PPM signal was not sensed, generally indicating that the R/C Tx is not configured to emit PPM to the module bay connector.

This error may also occur if the R/C transmitter is turned on, and stuck at the ‘switch error’ prompt for an extended period of time. During this time, the transmitter doesn’t start emitting PPM.