EzOSD Manual

'Pro Features' Guide

Preliminary. July 2009

Contents

Overview

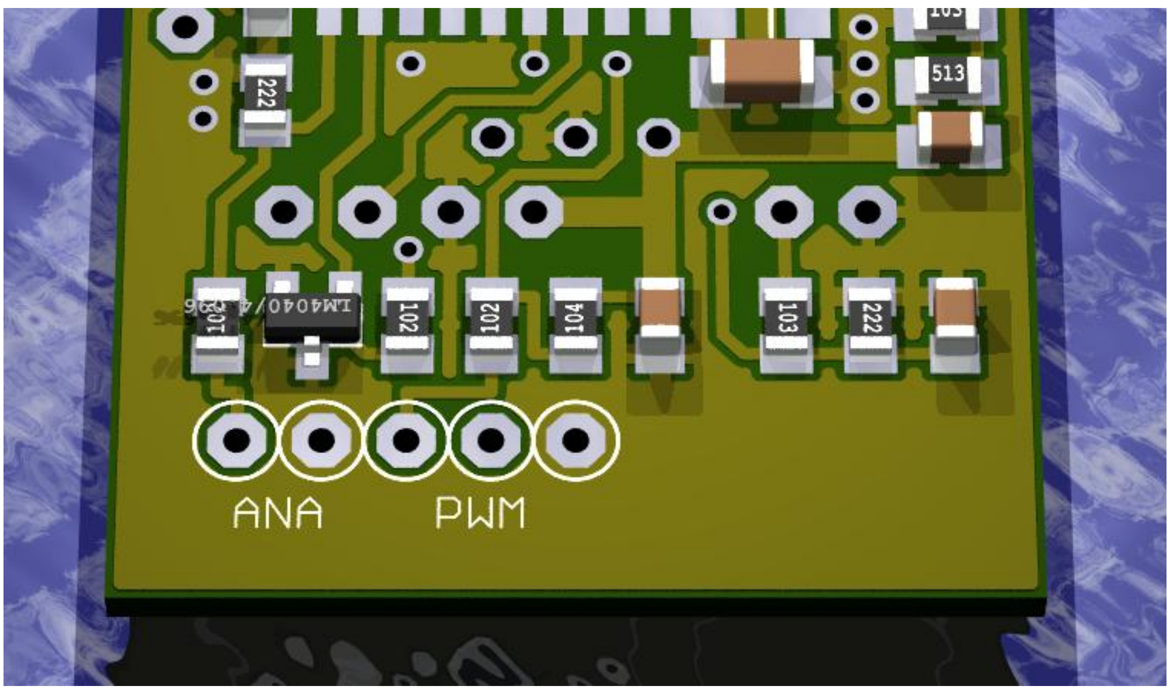
This document contains details on some of the more advanced features of the EzOSD. These are features which are not required by any means to fly FPV with the EzOSD, but are certainly 'nice to have'.

The two features currently documented here are receiver signal strength display, and enabling/disabling the OSD display using a spare receiver channel.

Sensor Board PCB

The EzOSD current sensor contains a small microcontroller. This microcontroller communicates the battery voltage and current to the OSD itself, and also keeps track of mAh consumed during a flight.

It has a couple of sets of PCB pads which are not normally populated with connectors or cables, these are shown in the diagram below, and are labeled 'ANA' and 'PWM'.



These pads may be accessed by carefully trimming away the heat-shrink and label from the bottom of the sensor board, in the area marked 'EzBUS'. The pads are quite close to the edge of the board, so a few millimeters of label/shrink may be removed without the need to remove it all.

Blanking the OSD display

The pads marked 'PWM' may be used to blank the OSD display during flight. Two connection possibilities exist:

1) Take a 3-pin 0.1" header, trim the pins a little, and solder them into the three holes.
2) Take a standard 3-wire servo cable, and solder the three wires to the three PWM pads.

In both cases, the left-most PWM pin is the PWM signal (orange, white, or yellow in the servo cable), and the right-most is ground (black or brown in the servo cable).

Note that when the OSD display is blanked, any alarm will cause the display to return. A good example of this is a low-voltage alarm, this will un-blank the display, and warn the pilot to land quickly.

Rx RSSI Display

The pins marked 'ANA' are an analog input, which may be used to show the receiver signal strength.

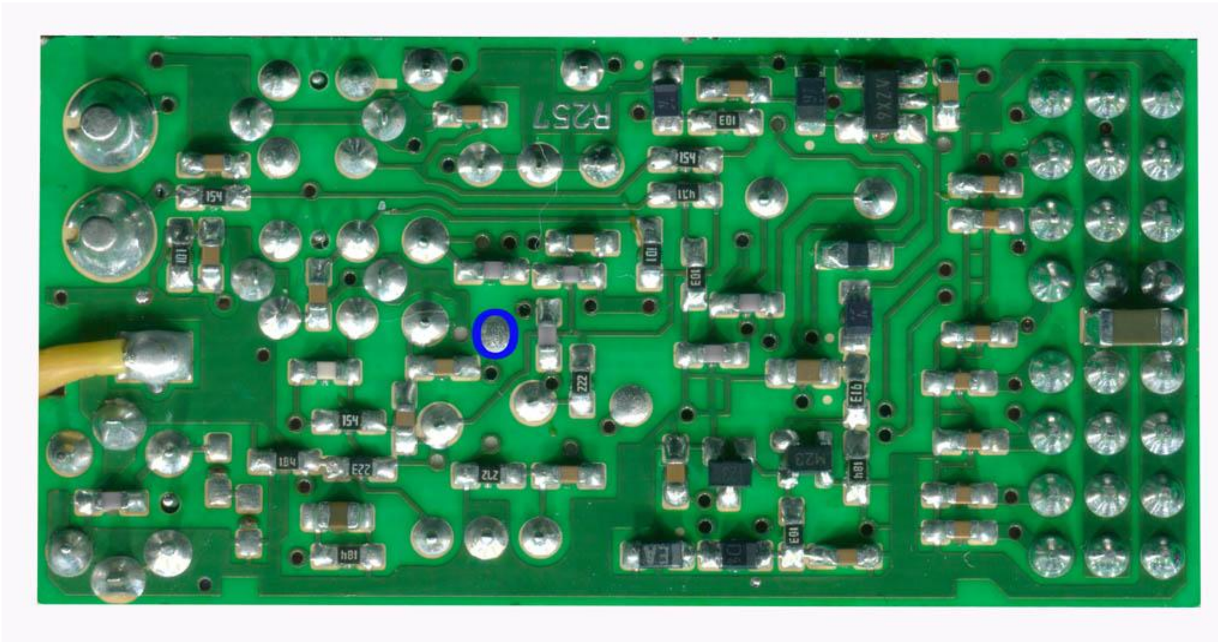
Note that EzOSD Firmware rev. 0.99 or later is required to take advantage of this feature.

In order to use the RSSI feature you'll first need to find the RSSI voltage output pin inside your RC receiver, which means opening up your RC receiver. Take notion that doing so will void its warranty, so don't attempt this unless you're confident you will be able to successfully put it back together again.

Most modern receivers use surface mount technology which gets smaller with each revision. This makes soldering onto the RSSI pin very difficult, and is really not recommended unless you are quite skilled in the art of soldering.

Most receivers use the same chipset for the RF frontend and hence use a similar RSSI implementation. A popular IC used in the RF frontend of RC receivers is the Toshiba TA31136, this is commonly used by RC receivers from Futaba for example.

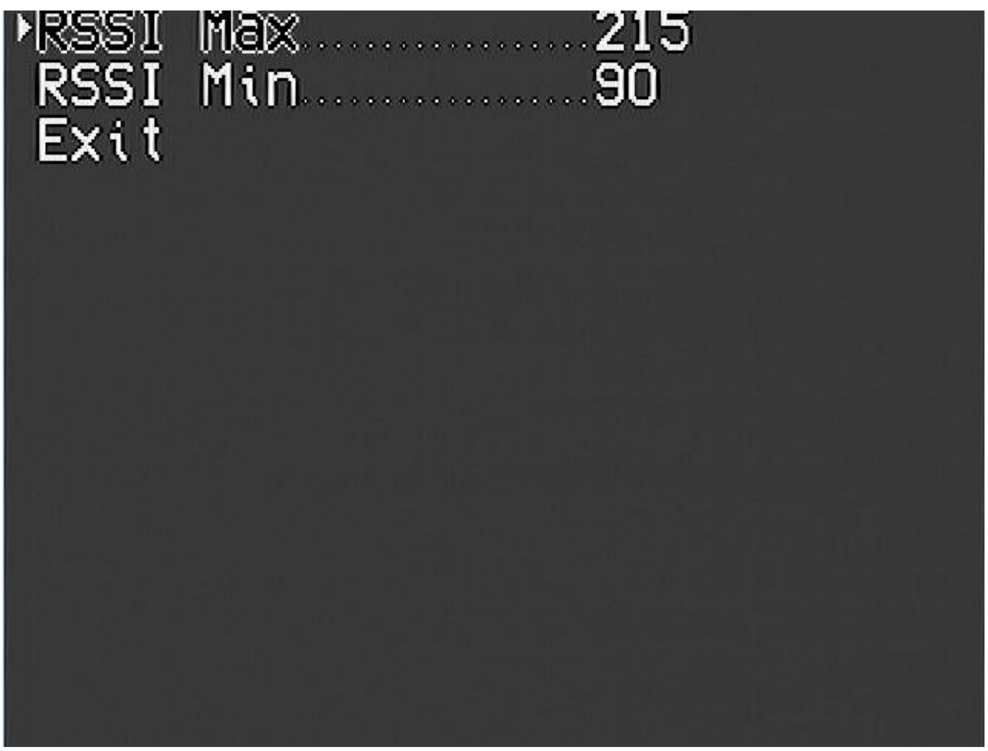
Pictured below is the Futaba R168DP PCM receiver with circled in blue the RSSI output pin. Simply soldering a piece of wire to this pin and a nearby ground connection (for example the ground of the strip of servo output pins) and routing these wires to the sensorboard of the OSD will be sufficient. However care should be taken that this wire is kept as short as possible and routed clear of 'noisy' wires, such as those connected to the battery, ESC and motor.



Calibration

A new feature was added in firmware version 0.99 which allows the RSSI levels to be calibrated.

A second page is present in the menu, accessed by moving the cursor down the page, and past the **Exit** entry.



To calibrate the system, highlight the **RSSI Max** entry, and, with your R/C transmitter ON, press the menu button. The value to the right should change, but always remain at around a value of ~200.

Next, reduce the length of your Tx antenna by sliding it down into the Tx and move the RC plane with the receiver away from it, gradually increasing the distance between the two. You'll reach a point where the servos start glitching or the Rx enters its failsafe mode, this is the point where the Rx loses signal. Now highlight the **RSSI Min** entry, and press the menu button. The value here should be around 90 for most receivers.

WARNING: If this procedure is being performed while the equipment is installed in a model, and if power is applied to the motor, take extreme care during this test. Many PPM receivers will glitch the servos, and can cause the motor to start unexpectedly, on a PCM receiver the motor could be set to a specific throttle setting, also causing for the motor to start running.

Note that an alternative technique for setting the RSSI Min threshold is to switch Tx off completely. This however will mean there's a grey area where the behaviour of the Rx cannot be predicted. The 0% setting will now correspond to the Tx being off, which means you can't be sure what safety margin is left when you're close to 0%, as normally you wouldn't be turning your Tx off in flight.

Also, take notice that RSSI is a relative indicator of signal strength, hence if your RSSI has dropped to 50% that doesn't mean you can fly twice as far before losing control, most RSSI signal curves are not linear. Another thing to watch out for is the fact that if someone is using the same Tx frequency near you and you're flying towards this Tx the RSSI cannot distinquish between the signal received from your Tx and the other Tx, hence it'll indicate the received signal strength, but you can still lose control due to the fact that the model is closer to the other Tx than yours.

In summary the RSSI indicator is just that, an indicator. If you think you're flying to far out you probably are. The signal received by the Rx is influenced by a large number of factors, antenna orientation (both on the Rx and Tx) is one very important one, we'd recommend always keeping enough margin left for the return flight and use caution and common sense when flying further out by using the RSSI as a means of determining how much further you can fly.