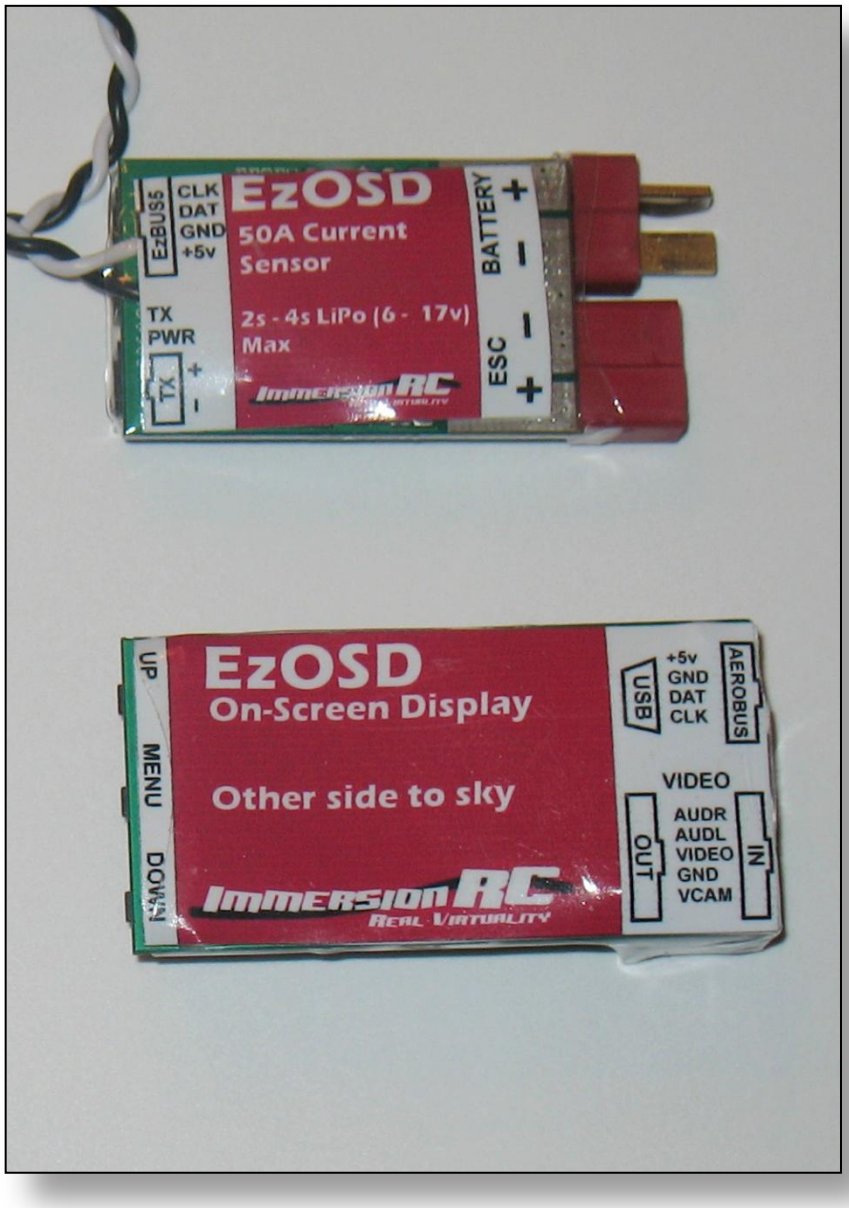
EzOSD Manual

Overview & Operating Instructions
Preliminary. April 2009



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Overview

Congratulations on your purchase of an ImmersionRC 'EzOSD', the no-nonsense On-Screen Display for FPV flight.

Features

- Crisp text, shadowed to ensure visibility against a summer sky, or a winter evening.
- No need for a PhD to install and configure.
- Robust design, reverse polarity protection, overvoltage protection
- Firmware upgrades without a PIC programmer, standard USB port (mini-USB B) on-board
- Simple, uncluttered display, just the essentials. 'Which way is home', and 'how long can I stay up here'. Enjoy the view, not the skills of the HUD author.
- Warnings for low battery voltage, pack capacity reached, too high, too far, etc.
- Periodic Amateur radio callsign broadcast, to comply with FCC regulations.
- OSD control from a spare servo channel (optional)
- Intuitive menu system, with onboard menu buttons.
- After-flight debriefing, shows a summary of the flight: Max. altitude, max. distance, max. speed, average speed, distance flown, etc.
- 5Hz GPS update rate
- PAL/NTSC auto-detect
- Uncluttered display, enjoy the view, not the OSD clutter!
- No connection to an R/C receiver required to configure, nor fly
- Robust telemetry downlink, for live Google Earth™ Tracking, or ImmersionRC's unique Antenna Tracking system.

Installation

The easiest way to install the EzOSD is when using ImmersionRC cameras and video transmitters. In this case, standard connectors are used, which are all compatible with those present on the EzOSD. All of them are keyed, can't be inserted backwards, or 'on the wrong pins' (as is the case with many other OSDs currently on the market).

Several things to remember when installing the OSD:

1) In the 'Ez' Concept, it is the video transmitter which supplies power to the camera, as it generally does when the OSD is not present. Note that the OSD does NOT supply power to the camera, it simply passes the Gnd/VCam lines from the transmitter to the camera. This allows the user of 5v or 12v cameras.

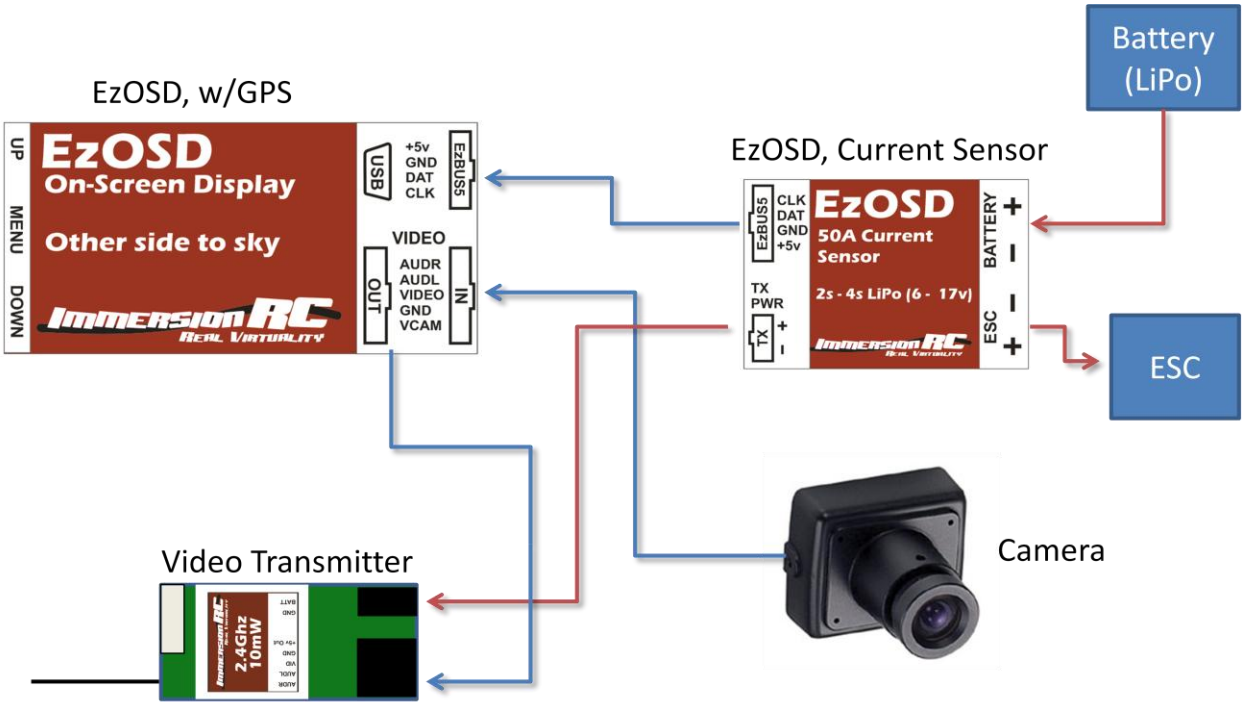
2) The current sensor contains a quiet, cool, switching regulator, which powers the OSD. In applications where current/voltage sensing is not required, such as a Gas/Glow model, or even a glider, it is possible

to power the OSD directly from a spare connector on the R/C Receiver, without using the sensor board at all. A wiring diagram for this configuration is shown below.

3) The telemetry downlink from the EzOSD uses the AUDR (Right channel of a stereo audio pair) signal. In the case of using ImmersionRC A/V transmitters, which transmit high-bandwidth stereo audio, the standard cabling will connect this signal correctly.
In the case that 3rd-Party video transmitters are used, possibly with mono-audio, ensure that the AUDR signal from the OSD is correctly routed to the transmitter's audio input pin.

1. Installation using an ImmersionRC camera and transmitter

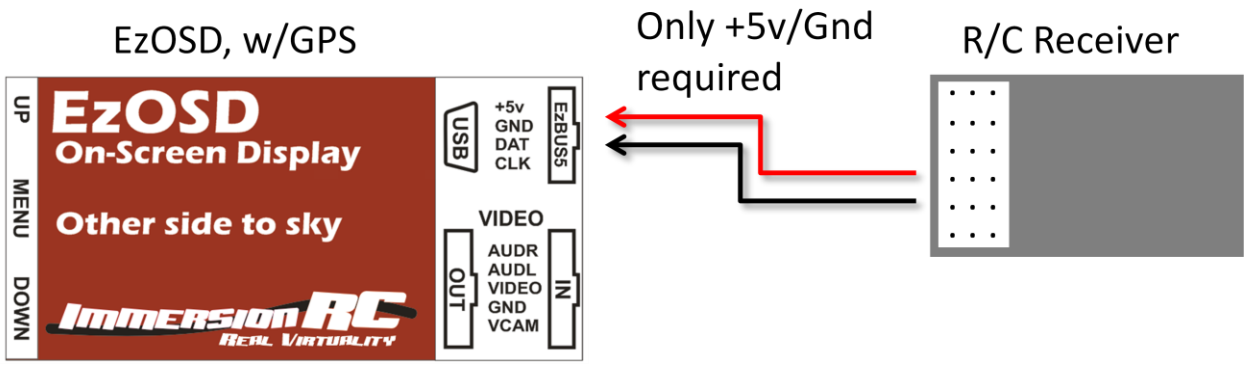
1. Connect the current sensor between the LiPo and the ESC
2. Hook the 4-pin cable between the current sensor and the OSD (it is keyed, can't be inserted backwards, and only fits into the correct connectors)
3. Remove the the 5-pin camera connector from the video transmitter, insert it into the Video-In connector of the OSD
4. Connect the 5-pin cable, supplied with the OSD, and hook it between the OSD and the video transmitter.
5. (optional) If this is a new installation, and the video transmitter has not yet been cabled for power, take the 2-pin cable supplied with the OSD and hook it between the current sensor and the video transmitter (this will just pass the battery voltage to the Video Transmitter).



2. Installation without using the sensor board.

When the sensor board is not required, the OSD may be powered directly from an unused connector on the R/C receiver. Cables to make this connection should be available from your local ImmersionRC distributor.

If the cable is not available, those handy with a soldering-iron could take two standard servo cables, remove the signal line (white/red/orange), connect the red wires together, black wires together, and on the OSD end of the cable, swap the red/black pins so that the red wire is on the +5v pin of the EzBUS, and the black wire is on the Gnd pin of the EzBUS.



Video Standard

When provided with a standard composite video input, in either the PAL, or the NTSC format, the EzOSD will automatically switch to match the input format.

When powered up (usually for the first time), without a video input signal connected, the EzOSD will default to PAL mode.

To change this, power up the OSD with either the UP, or DOWN buttons pressed. The DOWN button will switch to PAL mode, the UP button will switch to NTSC.

Switch Functions

The EzOSD is configured using three simple push-buttons. No need for a complex switch setup in your R/C transmitter, and no need for any external hardware.

Preferences Menu

The center switch, marked MENU, will enter the simple preferences menu, shown below. All settings are accessible via a single menu.

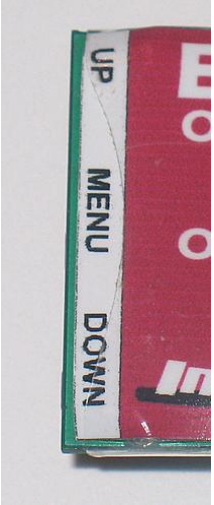


Figure 1: Simple UI

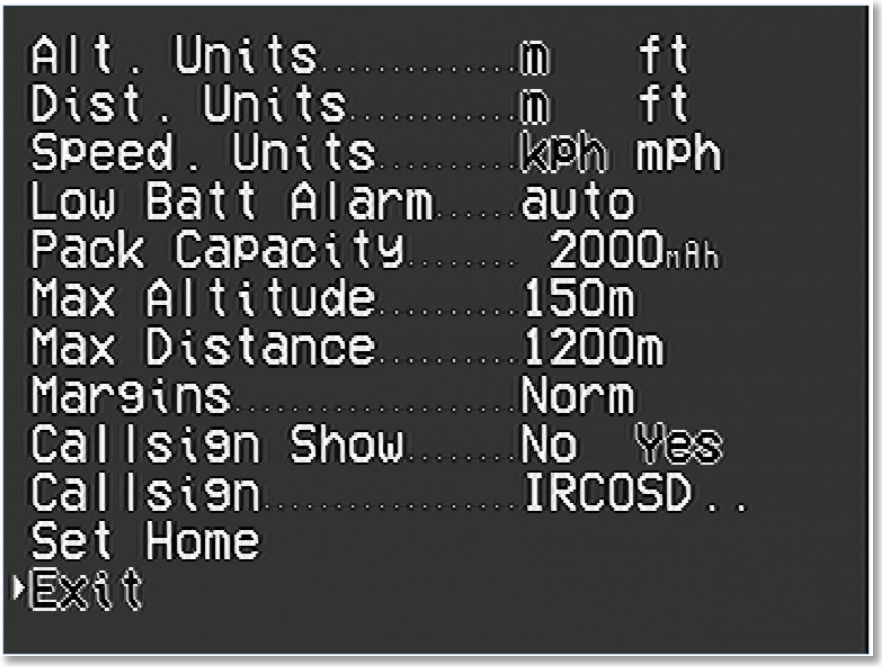


Figure 2: The setup menu

Once in the menu, the UP/DOWN button may be used to navigate between preferences, and the MENU button will modify the selected preference.

Show Flight Debriefing

Pressing the UP button, will show a summary of the last flight.

Usually this is shown automatically after each flight, but if accidentally closed, the UP button will show it again.

Note: the conditions for the debrief to appear after a flight are speed < 5km/h, and distance from launch < 100m.

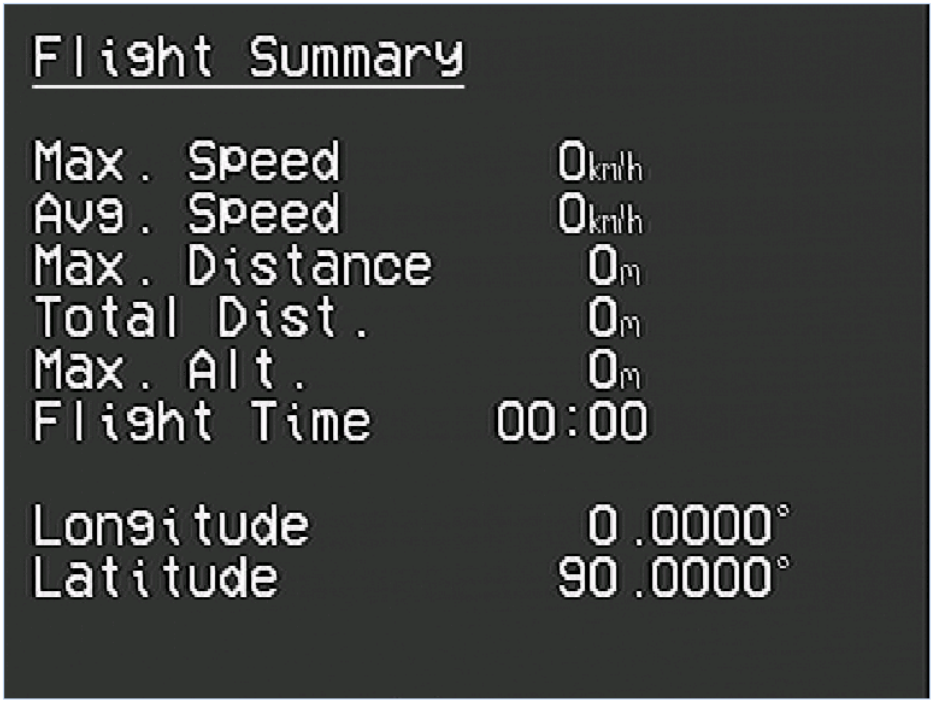
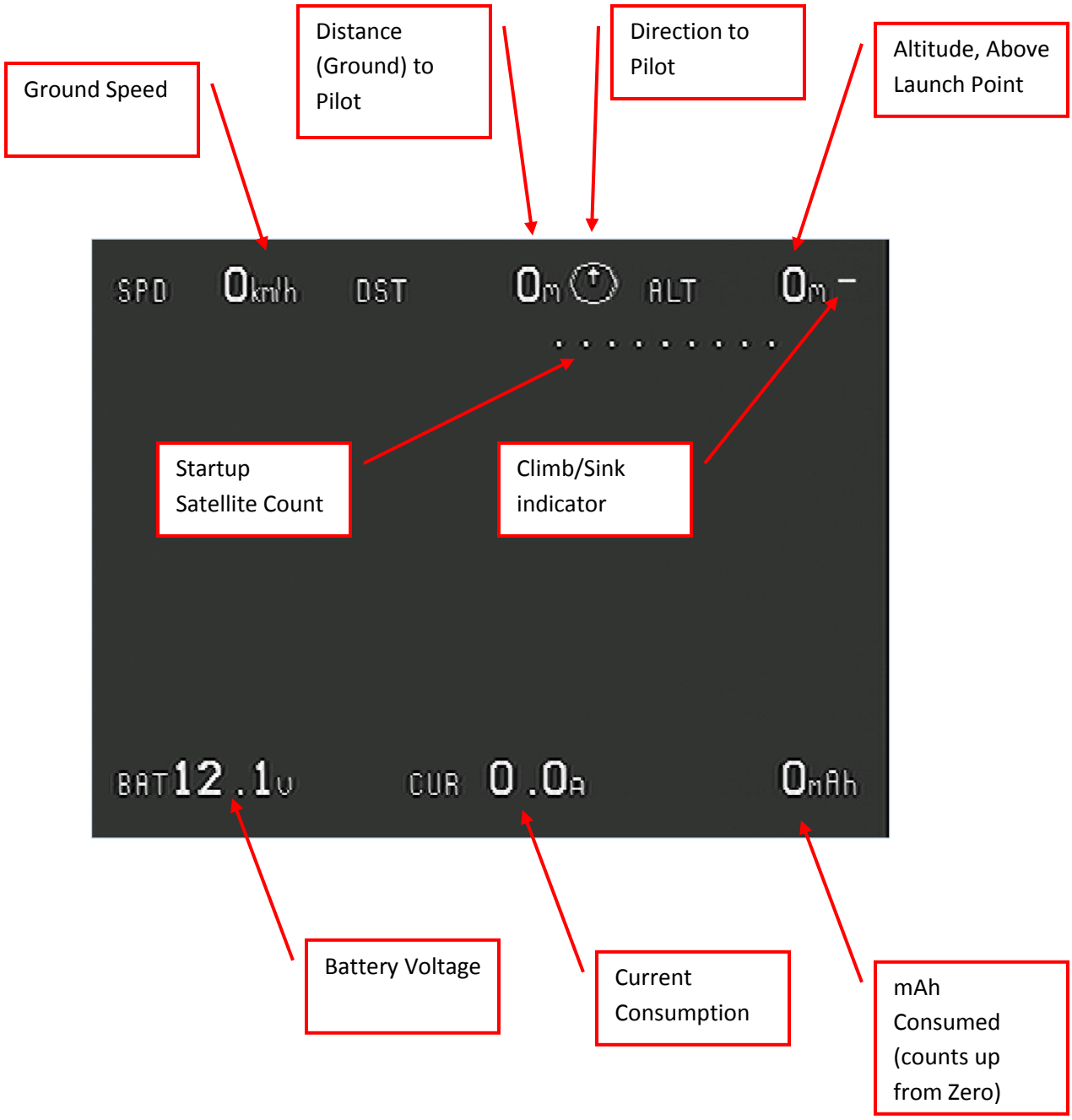


Figure 3: Debriefing Display

OSD Display Layout



Alarms

The EzOSD is equipped with 4 settings which define alarms. When an alarm triggers, the relevant on-screen readout will flash, to draw the pilot's attention.

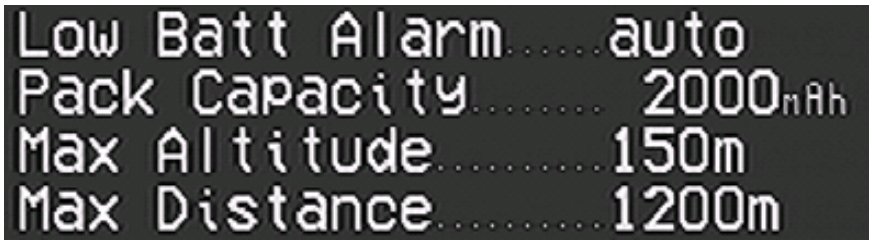


Figure 4: Alarms

The 4 alarms supported by the EzOSD are:

1. Low Battery

Defaults to 'Auto' mode, which assumes a LiPo flight pack. In this mode the number of cells is automatically detected.

The alarm will sound when the battery voltage drops down below 3.2v/cell.

2. Pack Capacity

While flying, the number of mAh (milliamp-hours) consumed from the battery is recorded. Once it reaches the trigger point set in the Pack Capacity alarm, the readout will flash, and it's a good time to head home.

3. Max Altitude

While flying FPV it is easy to exceed local regulations regarding maximum permitted altitude for model flight. Set the Max. Altitude value to reflect these local regulations, and the altitude readout will flash when this altitude is exceeded.
Remember: Altitude is always measured relative to the launch point in the EzOSD (AGL, vs. ASL).

4. Max. Distance

Set this alarm to warn when the plane is more than a pre-set distance from you.

Several of the worldwide modeling federations are starting to define rules for FPV flight on club fields.

These generally include the mention of a requirement to fly within visual range, or at least the visual range of the spotter pilot which should be monitoring your flight.

Set the Max. Distance alarm to warn you before your spotter starts panicing.

Also useful to warn before your R/C uplink looses control!

Units

In order to accommodate our fellow pilots from lands where ‘those old fashioned’ units are used, the EzOSD supports selectable units.

Units for Altitude, Distance, and Speed are all independently definable.



Flight

The section of this manual which covers the use of the EzOSD is intentionally very short.

1. Bring Equipment to the field

2. Power up FPV equipment, and wait for 'Acquiring Satellites' to disappear (6 satellites required to fly)

3. Fly…

Telemetry, and Tracking Antenna

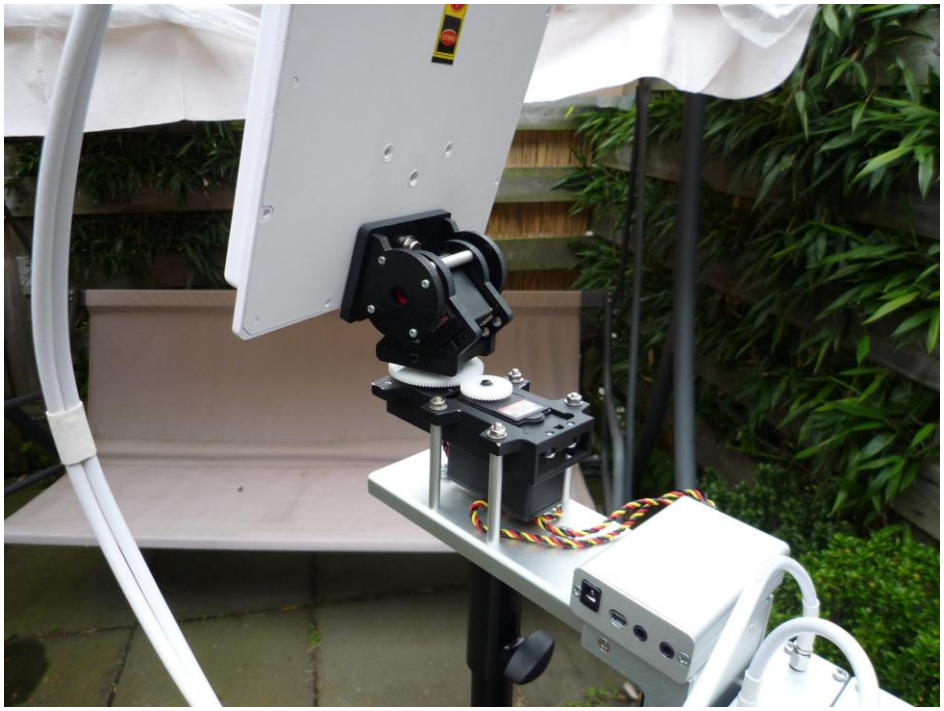
The EzOSD transmits the position of the plane (Latitude/Longitude/Altitude) in a coded form, down the Right Audio channel.

This telemetry data may be used in several ways:

1) Replay a flight using the Immersion Player on a PC, and show the plane's position, and track, in real time, in Google Earth™

2) Connect the audio output of the A/V receiver to one of ImmersionRC's Antenna Tracking accessories. These will drive servos in a pan/tilt (or pan-only) antenna mount, to track the model as it moves around the sky.

The tracking antenna allows higher-gain, directional antennas to be used, and can be a great help where video transmitter power is limited.



For further information on the ImmersionRC Antenna Tracker, see the documentation available on the ImmersionRC website.

Upgrading Firmware

The EzOSD is equipped with a built-in USB port, with a standard connector, commonly found on most portable USB equipment (technical name is a mini-B).

Upgrading firmware requires no additional hardware, programmers, or returns to the factory. All that is required is a standard USB cable, and a utility which may be freely downloaded from the ImmersionRC website.

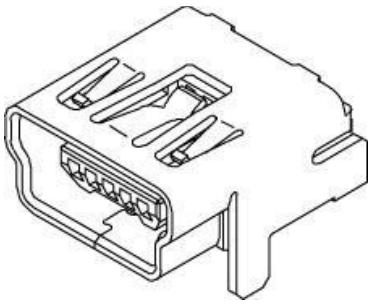


Figure 5: Standard Mini-B connector

Diagnostics, Q/A

Q. The OSD is taking along time to acquire satellites, or is not very precise when flying

A. This is a common problem in our hobby. The GPS receiver is extremely sensitive, and is generally placed in close proximity to a powerful video transmitter. To solve this, keep the GPS as far from the video transmitter as possible.

2. Speed/Altitude not accurate when flying 3D

The GPS antenna is directional, and is similar to the patch antennas that we use commonly for video.

When throwing a plane around the sky, diving rapidly, flying inverted, etc. this directional antenna may well not be facing towards the satellites which provide its position. During these times, it is normal for the GPS readout, especially speed, and altitude, to be in-precise. When level flight is returned, the readings will correct themselves.

Thank You…

Thank you for purchasing this ImmersionRC product.

We take great pride in the design of our products, and hope that they give you as much pleasure as they have given us.

Please don't hesitate to feed back any comments/suggestions/complaints to us, we do listen, and any feedback will help in perfecting our products in the future.

Now, what are you waiting for, Go Fly!

