

Duo 5800 V4 Diversity Receiver

Instruction manual - International edition

Rev 1.0 - 10 Oct 2014



IMMERSION RC
REAL VIRTUALITY

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Feature overview

- Dual receivers with dual antenna connection.
- Automatic antenna switching.
- Calibrated receivers for seamless switching between antennas
- Visual indication of selected antenna
- Standard 5.8GHz band 7 channel frequencies
- Additional 5.8GHz band 25 channel frequencies
- Dual, buffered AV outputs
- Automatic of user configurable low battery alarm
- High bandwidth stereo-audio.
- >-90dB typical sensitivity
- Single-cable ImmersionRC ground station link

Overview

Conventional receivers have one big drawback, they only allow for a single antenna to be connected. If for some reason the reception fails there's no backup and you lose the signal. Not so with the Duo 5800 diversity receiver. With its twin receivers it allows you to hook up two antennas and the microcontroller inside will automatically switch to the receiver with the strongest signal, without any switching noise or a change in the image received.

The Duo5800 now also comes with selectable 7/32 Channel support. The standard 'ImmersionRC/FatShark/Airwave' 7 channels are supported, and may be scrolled through with the Channel button. In its 'unlocked' mode, it adds an additional 25 channels.

The Duo 5800 is also one of the first in a line of 'smart' receivers, designed for single-cable, plug and play, integration with the ImmersionRC Ground Station system. Power, Audio, Video, and a bidirectional data link, are all passed through a single Mini-Din connector, connected to the Ground Station.

With > -90dB sensitivity per receiver the Duo 5800 is sensitive, very sensitive. Paired with an appropriate antennas, it will give you many miles/km of range. Add an antenna tracker, and a higher gain directional antenna, and this range increases significantly.

Equipped with two buffered AV outputs it allows you to connect your goggles, as well as your recording device, without the need for Y-cables or a signal splitter.

Package Content



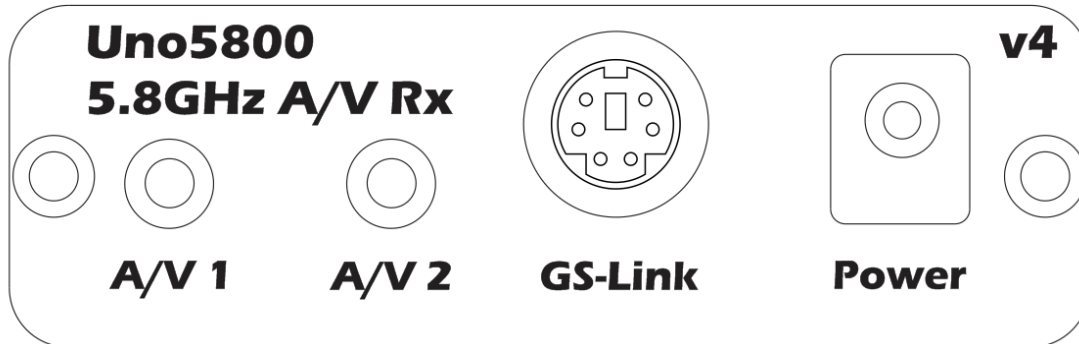
- Duo500 v4 Receiver
- 2x linear polarized antennas with SMA connector (rubber ducky style)
- 1x power connection lead
- 2x 3.5mm Male to 3x Phono cable
- 2x ImmersionRC logo stickers

Technical Specifications

- FM Audio/Video Modulation
- -90dB typical sensitivity
- 50 ohm antenna impedance
- 1Vpp Video output level
- 3V pp Audio output Level
- Twin female SMA antenna connectors
- Can be powered from 6-13V (< 9v, or 2s recommended)
- Small, light weight, durable, anodized aluminum casing

- Weight: 169-grams
- Size : 103 x 90 x 23mm

Connectors and Pin-Outs



A/V connection

The A/V connections are where you can connect your displays goggles or iTelemetry Dongle. Input is a 3.5mm 4 pin plug.

Provided are 2x 3.5mm Male to 3x Phono cable to help you connect your devices. Please use the ones provided since cables from other manufacturers might be wired differently.

To connect iTelemetry dongle you will need a 3.5mm 4 pin plug to 3.5mm 4 pin plug (not provided)

Power

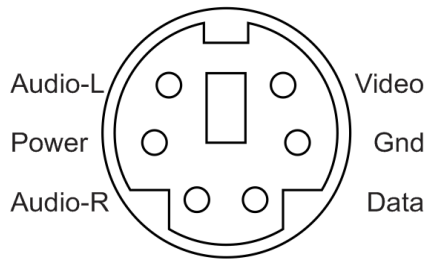
The diversity receiver works best with either a 2S or 3S LiPo battery. A cable to connect the battery is provided. You will have to connect your preferred type of battery connector to the cable.

Also see the programming section on how to set low voltage warnings.

Groundstation Link Connection

The Ground Station link is a standard 6-pin mini-din, as used for many years by PS/2 mice and keyboards.

This connector may be used to power the receiver, and also interface to the Video, and Audio output lines.



List **all** connectors with their location and pin outs.
 Edit photos to mark the specific connectors or components.
 Emphasize power **Input** or **Output**, especially if it is critical.
 Make sure text on the pictures/equipment is readable is needed.

Instructions on use

Operating the Duo 5800 Diversity Receiver

The Duo 5800 A/V receiver can be configured to store user selected configuration settings. The selected channel will always be stored so at power up it defaults to the last selected channel. Other settings that can be configured are:

- Low voltage alarm threshold
- Low Batt 100mV
- Rx Ticks

Programming these settings is accomplished by using the CHAN push button, with feedback from the internal beeper, in a manner similar to that used by most ESCs (Electronic Speed Controllers).

To enter the programming menu, hold down the CHAN push button for 5 seconds or longer. Once the programming menu has been activated, the receiver will start cycling through the menu options, in the order listed.

To change one of the items, wait for it to be 'played', and immediately after, press the button.

The receiver will then 'play' the current value, as a number of beeps, and will then start from the first option, and play each option until the last. Selecting an option is simply done by waiting for it to be played and pressing the button briefly.
 See beep codes in the table below.

Beep Codes

Beep Code	Menu	Menu Choices
- . (beep - Dot)	Low Batt Volts	1 – Auto (for 2S or 3S LiPo)* 2 – 6v 3 – 7v 4 – 8v 5 – 9v 6 – 10v 7 – 11v 8 – 12v Default: 6V for 2S, 9V for 3S
- . . (beep - Dot Dot)	Low Batt 100mV	1 – 0.0v 10 – 0.9v Default: 0.5v (for threshold of 9.5v) (Ignored in Auto mode)
- . . . (beep - Dot Dot Dot)	Rx Switch Tick	1 – Tick Off 2 – Tick On *

Note that * indicates the default value .

For example to change the Low Battery 100mV setting:

Button pressed for > 5 seconds

Dash Dot Dot	- second menu item	<u>press button briefly to enter setting</u>
Dot	-	<u>current setting (auto)</u>
Dot	- first available option	0.0v <u>press button briefly</u>
Dot Dot	- second available option	100mV <u>press button briefly</u>

At this point the Low Battery 100mV setting has been changed to '100mV'. The module will now continue with the next item in the menu, and continue to the end of the list. Once the end of the list is reached, the receiver will automatically exit the programming mode signaled by two short beeps.

Low Battery Volts and Low Battery 100mV

These two options can be combined to set the threshold at which the low-voltage alarm sounds.

In Auto mode (the default), the receiver will sense the attached battery voltage, and will set the alarm voltage accordingly (6V for 2S and 9V for 3S LiPo). This mode is designed only for use with LiPo batteries. For use with NiCD, NiMh, or other batteries, set the alarm voltage manually, for example:

9.2v	set LowBattVolts to 5 (9v), and LowBatt100mV to 3 (0.2v)
10.0v	set LowBattVolts to 6 (10v), and LowBatt100mV to 1 (0.0v)

When powering the receiver from LiPo batteries, it is important to note that the discharge curve is fairly flat, and drops off quickly near the end. Setting a threshold of around 3.0/cell is relatively safe. It is however highly recommended to perform a 'dry-run' after setting the voltage warning threshold to make sure the low battery warning is set up correctly.

If upon connection of a battery pack the receiver beeps continuously then the low battery warning is set higher than the voltage from the battery pack, so reset accordingly or charge the battery pack.

Note that regardless of the low battery alarm settings, a fixed alarm will occur when an input voltage smaller than 5V or larger than 13V is detected. This safeguards the receiver from being used with input voltages with which the correct operation cannot be guaranteed.

Safety Note: Even though this alarm will provide some protection against loss of video signal during an FPV flight, it is highly recommended to fully charge all battery packs used before each and every flight.

Rx-change Ticks

When the diversity receiver's microcontroller switches receivers, it issues an audible 'tick'. A useful confidence-building feature when using the receiver, but if you feel the ticking becomes annoying you have the option of turning it off.

Optimal Antenna Connection

The Duo5800 was designed to be connected directly to the antenna's RF connector with as short a cable as possible, or ideally no cable at all.

Months of testing has shown that with this configuration, the best reception will be obtained. You can even connect the Patch antenna directly to the Duo5800

Antenna Selection & Placement

The diversity receiver may be used with standard 5.8GHz antennas, equipped with a male SMA connector. The spacing between the two antennas is fairly important, so as to avoid simultaneous nulls received by both receivers simultaneously. 1 ½ wavelengths of separation, or approx. 18.4 cm (7.2 inch) is suitable, but multitudes of that can be used also (36.8 cm, etc.).

Frequencies

The Duo5800v4 Alpha has a dual-personality. In stock form, it behaves as it's predecessors, the v1, and v2. The standard 'ImmersionRC/FatShark/Airwave' 7 channels are supported, and may be scrolled through with the Channel button.

	CH1	CH2	CH3	CH4	CH5	CH6	CH7
Band 1	5740	5760	5780	5800	5820	5840	5860

In its 'unlocked' mode, it adds an additional 25 channels as shown in the table below:

	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Band 1	5740	5760	5780	5800	5820	5840	5860	5880
Band 2	5705	5685	5665	5645	5885	5905	5925	5945
Band 3	5733	5752	5771	5790	5809	5828	5847	5866
Band 4	5865	5845	5825	5805	5785	5765	5745	5725

Unlocking Additional Channels

The Duo5800v4 has the ability to support additional channels within the 5.8GHz band which are supported by other manufacturers.

To lock or unlock the Duo, apply power with both the Band, and Channel switches pressed. The Duo will beep a number of times indicating that the unlock succeeded.

10 quick beeps means the Duo was unlocked (placed in 32 channel mode)

5 quick beeps means the Duo was locked (returned to standard ImmersionRC/FatShark mode)

Products from Other Manufacturers

TS832, 32 Channel Transmitter Channels

	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
FR1	5865	5845	5825	5805	5785	5765	5745	5725
FR2	5733	5752	5771	5790	5809	5828	5847	5866
FR3	5705	5685	5665	5645	5885	5905	5925	5945
FR4	5740	5760	5780	5800	5820	5840	5860	5880

Note that Band FR4 is the standard ImmersionRC/FatShark band.

Mapping to Multistandard Duo bands:

FR1 = IRC Band 4, FR2 = IRC Band 3, FR3 = IRC Band 2, FR4 = IRC Band 1

Black Pearl LCD

The Black Pearl labels bands A, B, E, F, as follows:

	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Band A	5865	5845	5825	5805	5785	5765	5745	5725
Band B	5733	5752	5771	5790	5809	5828	5847	5866
Band E	5705	5685	5665	5645	5885	5905	5925	5945
Band F	5740	5760	5780	5800	5820	5840	5860	5880

Note that Band F is the standard ImmersionRC/FatShark band.

TBS Dominator Rx (5G8)

The TBS Dominator has the following bands:

	TBS Description	Duo5800 Band Number
1 flash	BOSCAM Band A	4
2 flashe s	BOSCAM Band B	3
3 flashe s	BOSCAM Band E	2
4 flashe s	Airwave	1

Channel numbering within these bands matches those of the Duo5800.

TBS Greenhorn, Boss, and Rookie Transmitters

The TBS transmitters operate on the Boscam 'A' band, with channel frequencies shown below. These match the Duo5800v4's **Band 4**.

	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Band A	5865	5845	5825	5805	5785	5765	5745	5725

Support

First line of support is done by the reseller. If you encounter any problems with your ImmersionRC product contact them first.

For support on issues involving equipment from other brands and also general support for ImmersionRC products, the best place to go is the ImmersionRC section of FPVlab.com.

We actively monitor this forum and provide support here.



Regulatory notice

The use of this product may be prohibited in your country/region/state, please verify that the RF output power and frequencies used by this transmitter comply with local rules and regulations, this product may require a license to operate.



Directions on safety

ImmersionRC advocates the safe use of their products, always make sure you equipment is in proper working order, is checked prior to every flight and that you are familiar with and respect the equipment's capabilities and limitations. Do NOT fly recklessly, do NOT fly near airports, freeways, towns, people, etc, basically anywhere where a equipment failure or pilot error can result in injury or damage to people and/or property.

Warranty

For warranty claims or repair requests please consult the retailer that you purchased this product from, they will be able to help you with your warranty claim or repair request.

Like Us 

We would like thank you for purchasing this ImmersionRC product.

Like ImmersionRC's Facebook page and be kept up-to-date with news, product releases, firmware updates, tips and tricks, and other information relevant to the FPV hobbyist.

<http://www.facebook.com/ImmersionRC>



You can also follow us on Google Plus

google.com/+immersionrc



We have even been known to Tweet on occasion

<https://twitter.com/@immersionrc>

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