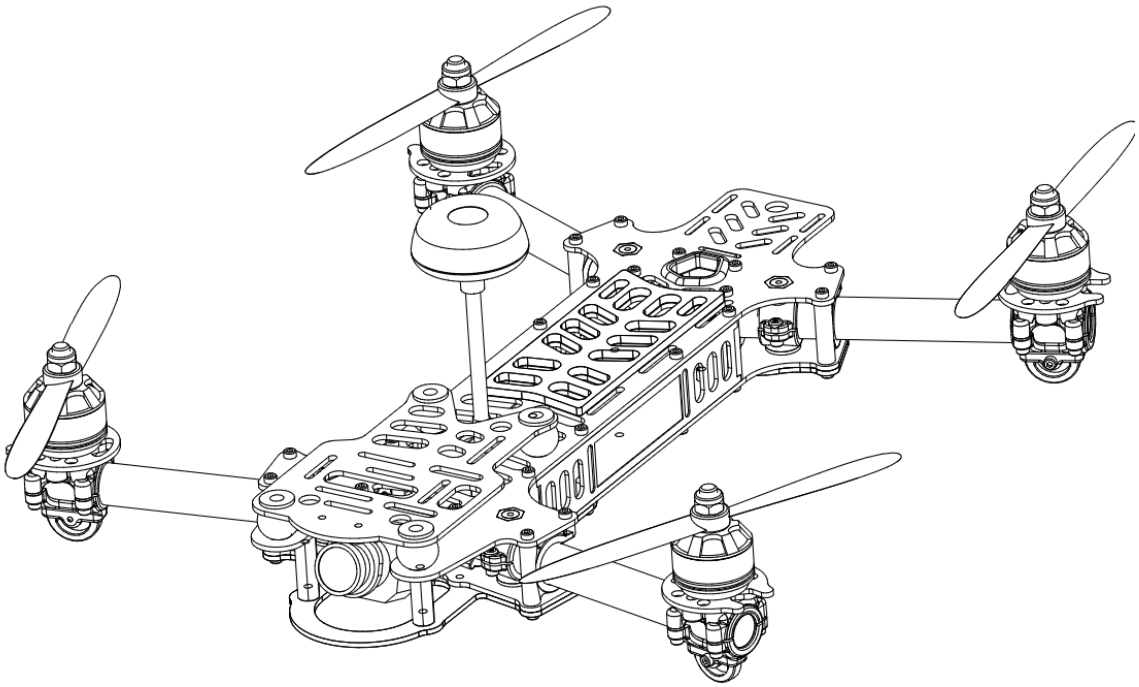
# Getting Started Guide

*International edition*

*Rev 1.0 - May 2015*



| *Every Vortex is flight tested before leaving the factory.* |
| --- |
| Flight Tested By: |

## WARNING

To use dogs as a good analogy, if the DJI Phantom™ is a white fluffy **Poodle**, the Vortex is a fight-bred **Pitt Bull**, and ready to bite you at any minute :-)

This is a race quad. It does not come with GPS hold (in fact, it has no GPS at all), and it does require a fair amount of skill to pilot it, this isn't a quad built for strolling around the local park at walking pace.

With that being said, the Vortex is a lot of fun, remember to start slow, get to know your quad before slamming it into a wall at race-speeds.

Please carefully read the recommendations in this getting started guide, as far as equipment/battery selection, and how to run the Vortex Wizard.

*Disclaimer: We love Pitt Bulls (and fluffy Poodles)*

## REMOVE PROPS

Mini-quad props can do some serious damage when coming in contact with human skin, risk of deep cuts and lacerations should be avoided at all cost.

So when you are working on a quad with the battery connected, it is highly recommended to **REMOVE ALL PROPS**, unless you are just about ready to fly.

Keep in mind that when setting up mini-quads, there is always a remote chance that a configuration change can spin up motors unexpectedly.

*ImmersionRC accepts no responsibility, or liability, for any injury, or damage, to persons or property, caused by the use of the Vortex.*

## INSTALL ANTENNA

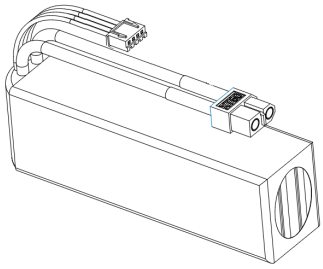
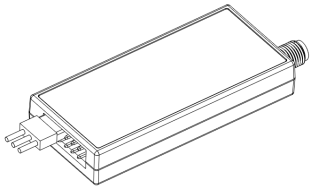
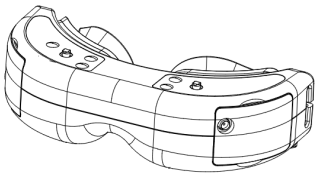
The Video Transmitter included in the Vortex may be damaged permanently if run without the supplied SpiroNET Antenna.

Please take care to install this antenna before every flight, and when powering up the Vortex for even a short time period.

*ImmersionRC accepts no responsibility for damage caused to the Vortex by operating without a suitable Tx antenna installed.*

# 4 Steps: Unboxing to Racing

To get your ARF Vortex ready to race, follow the simple 4-step process below.

| | |
|---|---|
| **1) Install suitable battery** |  |
| **2) Install Compatible R/C Receiver** |  |
| **3) Setup the video link** |  |
| **4) Run the wizard** |  |

## 1) Install a Suitable Battery

The Vortex has a flexible battery mounting system, and uses an industry-standard XT-60 connector. This allows it to use a wide range of different batteries.

To help select a suitable battery for your flying-style, read this section carefully:

### Voltage

First things first, voltage. For starting out with the Vortex, a **3s** (11.1V) pack is recommended.

A Vortex running **4s** (14.8V) is an extremely fast race-quad, which can easily get a pilot into trouble.

A **3s** pack calms things down a bit, and is a good way to ease into the hobby, hence novice pilots should certainly start out on **3s**.

### Capacity

For capacity, there are a few things to remember. Firstly, keeping weight down on a mini-quad is the best way to increase crash survivability as well as improve acceleration, climb speed and general agility of the quad.

Also remember that most races are just a few laps, so a huge capacity battery is just dead weight, and will never be drained in the typical race.

**1300mAh** packs, or similar, are ImmersionRC's choice for racing. 3s for beginners, 4s for pros.

### 'C' Rating

For 'C' rating, the Vortex in stock setup, with 5040 props, can pull over 64 Amps during fast pull-outs. A 1300mAh pack, with a 25C rating, is good for about 32A, and will have it's usable life reduced when pulling much more than that.

These packs have been tested for the 3s configuration

- Turnigy nano-tech 1300mAh 3S 45~90C Lipo Pack
- Lumenier 1300mAh 3s 60c Lipo Battery (XT60)

And these for the 4s

- Turnigy nano-tech 1300mAh 4S 45~90C Lipo Pack
- Lumenier 1300mAh 4s 60c Lipo Battery (XT60)

When installing the selected battery, pay attention to the Center of Gravity mark on the bottom

of the Vortex. The COG is not that critical on a quad of this class, but it doesn't hurt to respect it if possible.

The addition of a heavy GoPro, or Mobius camera, on the nose of the quad may need a heavier battery to re-balance the quad.

Note that the largest battery that can be installed safely on the Vortex is approx. 86mm long, by 50mm wide. These larger packs are not generally recommended, due to the damage that the extra mass can do in a crash.

**NOTE: Ensure that the battery is securely mounted on the anti-slip pad, with at least two battery straps installed. The battery should not be able to move around in flight.**

## 2) Install Compatible R/C Receiver

The Vortex is compatible with CPPM (all PPM channels down one single cable) receivers out of the box, and can support S-Bus, or Spektrum receivers with an optional cable.

It is not compatible with standard R/C receivers with multiple channels of PWM out (standard servo hookups).

The receiver should be mounted on the rear of the quad, on the shelf provided. A velcro strap, or a piece of double-sided tape is the best way to mount the a receiver.

### EzUHF

Any EzUHF Rx will work, although the cased 4 channel model is recommended for race quads due to its robustness, and small size.

*For the EzUHF, upgrade firmware to v1.52, and setup using the Multicopter button in the IRC tools. This will enable the UPSTAT channel, which places all uplink status (RSSI, etc.) on-screen.*

Connect CH1 of the EzUHF to the supplied Vortex Rx connector.

### DSM/DSM2/DSMX

Unfortunately none of the standard Spektrum™ receivers, including their satellite receivers, support CPPM output.

One option to fly the Vortex with the Spektrum™ equipment is to use the optional Spektrum->CPPM cable. Due for release mid-May 2015.

Another option is to use one of the 3rd party receivers, such as the OrangeRx R615X, available from retailers such as Hobby King, or the Lemon LM0007, from http://www.lemon-rx.com/

### Futaba

Futaba S-Bus compatible receivers require the optional S-Bus->CPPM adapter cable, due for release mid-May 2015.

### FRSKY

For the popular Taranis, and other FrSky transmitters, the DR4-II ACCST receiver is a good match.

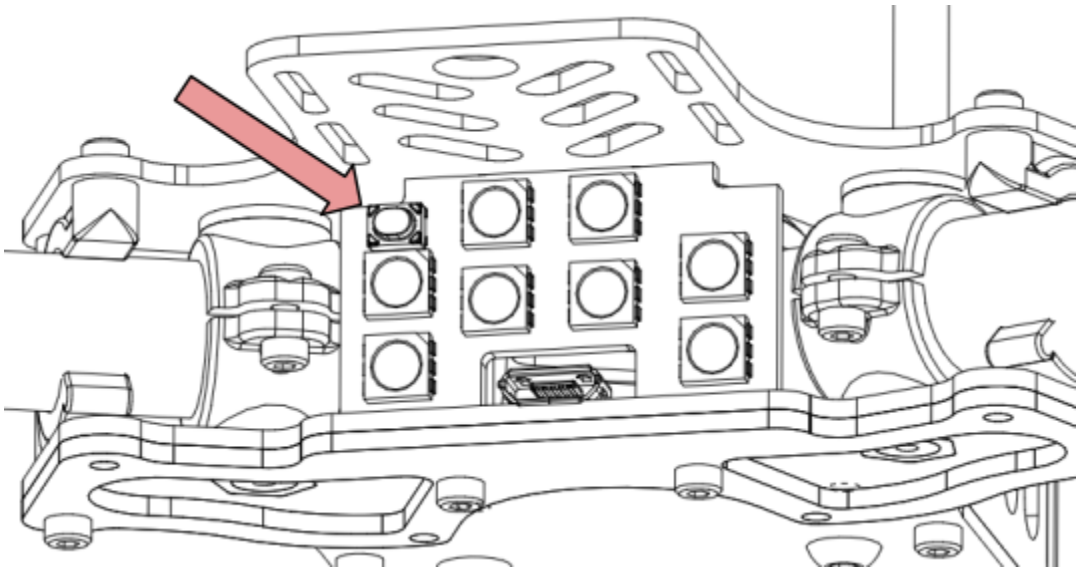
## 3) Setup the Video Link

To avoid the traditional 'dip-switch chaos' at race events, the Vortex does not use a DIP switch to define Video Tx channels. Instead, the OSD is responsible for setting the channel, and band.

The Vortex ships with a default Tx frequency of **5740MHz**, which corresponds to ImmersionRC/FatShark frequencies, Channel 1.

If you are running ImmersionRC receivers, or a FatShark headset using the standard 5.8GHz module, just select Channel 1, and the wizard image should be shown.

If you are running non-ImmersionRC/FatShark gear which cannot tune to 5740MHz, it may be necessary to switch bands on the Vortex before the wizard image is displayed. To do this, set your receiver to Channel 1, and use the button on the LED board (rear of the quad).



To switch bands, press the button on the LED board, hold for 2 seconds, and release.

The Vortex will beep a number of times, representing the band number. Each time the button is pressed, the band number will be incremented.

The band/beep order is as follows:
Band 1: IRC/FS (5740MHz)
Band 2: RaceBand (5658MHz)
Band 3: Band E (5705MHz)
Band 4: Band B (5733MHz)
Band 5: Band A (5865MHz)

For a full list of channel frequencies for each band, please refer to the full Instruction Manual.

## 4) Run the Wizard

In the world of R/C, there is little standardization between equipment manufacturers as far as control stick to channel mapping. There is also little agreement between users as to which of the 4 control modes should be used.

Since in the Vortex, both the OSD, and the Flight Controller need to know the channel mappings, a 'Tx Setup Wizard' is included to greatly simplify the process.

This wizard also configures various flight controller parameters which would normally require a personal computer, with a USB connection to the quad copter.

**NOTE: The wizard should allow a brand-new, unconfigured Vortex, to be removed from its shipping box at a race event, and prepared for flight in less than a minute, with no tools, or USB hookups required.**

*For the techies, there is a full description of the configuration steps performed near the end of the full user's manual, under 'Appendix A: The Wizard - Details'.*

The first time the Vortex is powered up, the **Tx Setup Wizard** is presented, as shown after the mode 1/mode 2 control descriptions below.

Following the instructions on-screen, 5 simple steps, will configure the 4 flight channels, and one auxiliary control (CH5) which will control the flight mode.

## Mode 2 Controls

Mode 2, arguably the most common stick mode, is common in the USA, and is a natural fit to helis, and multirotors.

A Mode 2 transmitter is easily identified with the un-sprung (i.e. doesn't return to center) throttle control on the left stick.

For this mode, the multi-rotor controls are typically as follows:




## Mode 1 Controls

Mode 1 is common in Europe.

A Mode 1 transmitter is easily identified with the un-sprung (i.e. doesn't return to center) throttle control on the right stick.

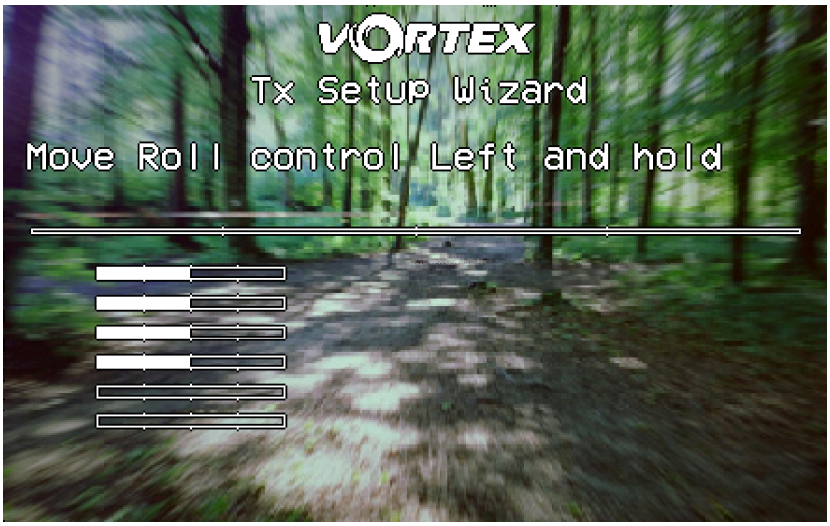
For this mode, the multi-rotor controls are typically as follows:




*Note: Modes 3 and 4 are intentionally left out of this abbreviated Getting Started guide. It is assumed that pilots flying these more 'uncommon' modes, are already very familiar with their remote, and their control mapping.*

## Following the Wizard

The wizard is used primarily to let the Vortex learn the flight channel order, and R/C Tx mode (1, 2, 3, 4). ‘Left’ refers to moving the stick left, and ‘Back’ refers to moving the stick back towards you.




Follow the prompts, ensuring that the correct stick is moved each time. As each control is recognized, it’s name will appear to the left of the servo bar.

**Take your time with this step, if the wrong stick movements are fed to the wizard, it will be difficult to navigate the OSD to complete the setup.**




Once the four primary flight controls have been learned, place the quad on a flat and level surface and move the right stick back. This will calibrate the accelerometer.

It is important that the quad is level when this step is performed, or the auto-level flight modes will not function correctly.




*NOTE : To restart the wizard at any time, power up the quad, and press, and hold, the button on the LED board for approx. 8 seconds.*

Once the wizard is finished, various Cleanflight settings will be configured, including enabling oneshot, motor_stop, and failsafe.

Another setting which is automatically made is the assignment of CH5 to the flight mode, Acro, Horiz, and Angle. To complete the setup, configure your R/C Tx to link CH5 to a 3-position switch.

Ensure that the switch correctly switches between the three flight modes, reflected in the top-right corner of the OSD main landscape .

Note that It is highly recommended to attempt the maiden flight in either **Angle**, or **Horiz** mode. **Acro** takes a little getting used to.

**NOTE: Even though the flight controller failsafe has been set by the wizard, it is important to also set the R/C Rx failsafe.**

**see https://github.com/cleanflight/cleanflight/blob/master/docs/Failsafe.md for cleanflight specific failsafe test procedure.**

**On the EzUHF this is as easy as setting the controls in a 'safe' position (very low throttle for example) and holding down the bind button on the EzUHF Tx until a beep is heard.**

**Flyaways with mini-quads are almost always caused by incorrect failsafe settings!**

**NOTE: Currently there is no 'servo reverse' feature in Cleanflight. This means that if one of the R/C transmitter channels is reversed, the wizard will not complete correctly.**

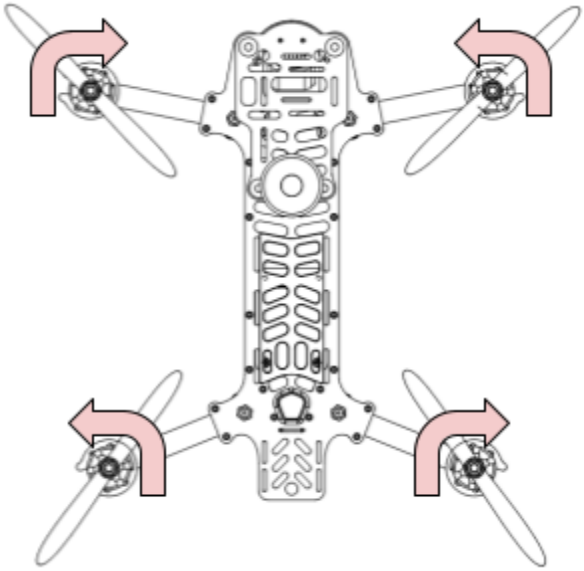
**It is highly recommended to start the wizard with a 'new' profile in the R/C radio, without any channel reversing, and also without any expo. Expo is all handled within the Pro-Tuning profiles.**

# All Done, Time To Fly

At this point in the Getting Started manual, the Vortex should be ready for its maiden flight.

The Wizard has setup the flight controller with our default Pro-Tune, generated by one of our expert team pilots. PIDs and gains are unlikely to require major changes to achieve precise flight.

If the props were removed during setup (as we highly recommend), please re-install taking care of the prop directions below:



Take it easy for the first few LiPos, and get used to your new Vortex.

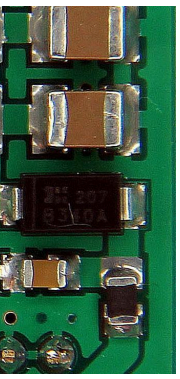
**P.S. To arm the flight controller after running the wizard, for mode 2, move the throttle stick down and to the right. See 'Flight Controller Stick Commands' in the main manual.**

The ImmersionRC Team wishes you many hours of enjoyment with your new Race Quad, and welcome any feedback that you may have at: feedback@immersionrc.com

The Getting Started Manual should have got you airborne. It is a good idea to read the full Instruction Manual also, which contains many more details than this abbreviated manual.

**Note: The default 'pro-Tune' loaded is a 'dumbed down' version of UmmaGawd's excellent tune. For experienced racers, who require more 'crisp' flight characteristics, it is recommended to load the UmmaGawd tune.**

# Specifications



| | |
|---|---|
| **Flight Controller** | |
| IMU | Invensense 6050, 3 axis Gyro, 3 axis Accelerometer |
| Altimeter | Bosch BMP180 |
| CPU | STM32F103 32-bit ARM processor |
| Firmware | Cleanflight compatible *(with API version matching that of the OSD)* |
| | |
| **OSD** | |
| CPU | STM32F373 32-bit ARM processor |
| Resolution | 440H x 280V |
| Style | White, with black surround around all pixels |
| Output | Programmable Black/White levels |
| | |
| **Video Tx Features** | |
| Transmitter Module | Socketed, Custom NexWaveRF 5.8GHz module |
| Channels | 40 Initially, programmed via OSD |
| Bands | 5, including the ImmersionRC/FatShark bands, and RaceBand |
| Frequency, IRC/FS | 5740, 5760, 5780, 5800, 5820, 5840, 5860, 5880 MHz |
| Frequency, RaceBand, CH1..8 | 5658, 5695, 5732, 5769, 5806, 5843, 5880, 5917 MHz |
| Frequency, 'A' Band, CH1..8 | 5865, 5845, 5825, 5805, 5785, 5765, 5745, 5725 MHz |
| Frequency, 'B' Band, CH1..8 | 5733, 5752, 5771, 5790, 5809, 5828, 5847, 5866 MHz |
| Frequency, 'E' Band, CH1..8 | 5705, 5685, 5665, 5645, 5885, 5905, 5925, 5945 MHz |
| Power Output | 350mW +/- 1dB (25mW module available after launch) |
| Audio | Stereo, Right channel used for Telemetry, Left channel unused |
| Recommended Antenna | Supplied SpiroNET Omni, Skew Planar, 4 leaf |
| | |

| | |
|---|---|
| **Power Train** | |
| Standard Prop | Gemfan 5030 |
| Upgrade Prop | HQ 5040 |
| Maximum Prop Size | 6” |
| Race Motors | OEM T-Motor 1806-2300kV |
| Recommended Battery | 1300mAh 3S 45~90C, or 1300mAh 4S 45~90C |
| | |
| **ESC** | |
| Type | ImmersionRC EzESC |
| Rating | 12A continuous, 17A peak |
| Features | OneShot125, and Motor Braking |
| Processor | 32-bit ARM running custom ImmersionRC ESC Firmware |
| | |
| **R/C Receiver** | |
| Channels Required | Absolute minimum four. Five recommended to support mode switch. |
| Interface Standard | 3.3v-5v PPM Sum (all channels in one PPM stream) |
| Receiver Power | +5v @ 200mA max. (3.3v supplied using the optional Spektrum Rx cable) |
| | |
| **Flight Characteristics** | |
| Flight Time | Depends upon battery, and flight style |
| Maximum Range | Highly dependent on battery, and flying style |
| Maximum Speed | TBD (Fast!) |
| | |
| **Camera Support** | |
| Onboard GoPro Supply | +5v at 1A |
| Video Standard | Composite, PAL or NTSC, switchable using a camera-mounted jumper |
| | |
| **Weight and Size** | |
| Weight, as Shipped, ARF | ~350g |
| Weight, Typical RTF | ~528g w/1300mAh 45C 4s pack, and EzUHF 4 CH receiver |
| Size | 283mm between diagonal motors, 210mm and 195mm front/rear |
| Folded Size | 100(w)x300(L)x40(h)mm, without battery/GoPro/Mobius |

# Support

First line of support is handled by the reseller. If you encounter any problems with your ImmersionRC product please 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 your 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.

Even a lightweight mini-quad, when travelling at high speed, can do some serious damage to property, or persons, please always consider what could possibly go wrong and plan your flight and selection of location responsibly.

## 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.

## Social Networks

### 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