

# VECTOR

## User Manual

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v1.3

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# Features

## Motion Control

Vector is introducing motion control to the world of First Person View. As you press on the arm button, Vector precisely tracks the attitude of your hand in space. Each of the three control axis - yaw, pitch and roll – can be controlled. The result is an intuitive and immersive piloting experience while zipping through the air.

## Long Range Carbon Protocol

Flying a drone requires a radio link that works in every situation. For Vector, we started from a blank sheet. We are using state-of-the-art technology for the Carbon protocol. The result is a strong and reliable link up to 1km.

## Portable

We have been able to shrink the size of the Vector controller by using motion control and our own embedded communication module. The result is a compact and sturdy remote control that you can toss in your back pack and carry everywhere with you.

## Sturdy Design

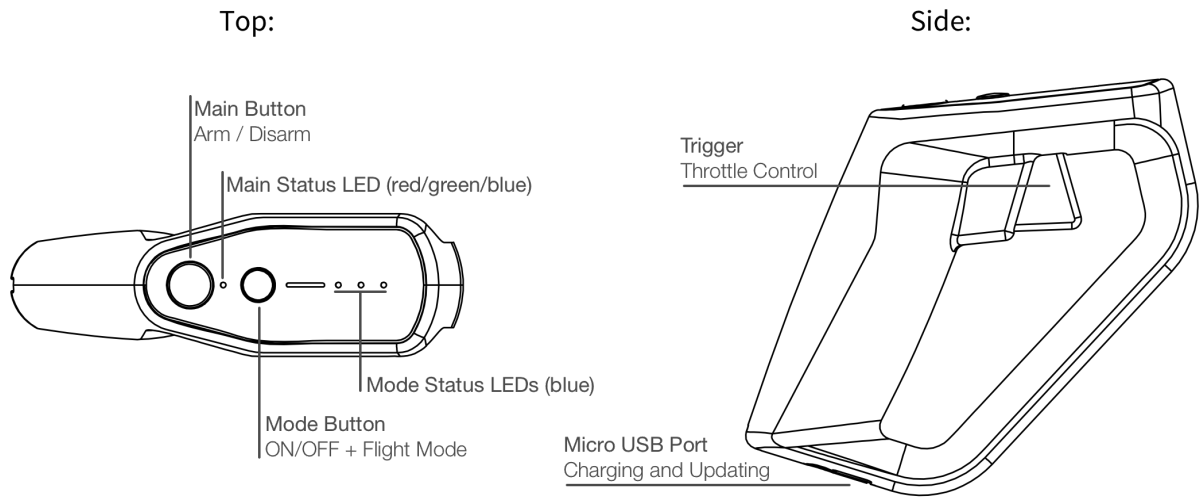
With our compact design and few moving pieces, Vector is extremely sturdy. We have tested the controller in extreme conditions with great results. Vector can easily be carried in your backpack without having to be afraid of damaging it.

## Refined User Interface

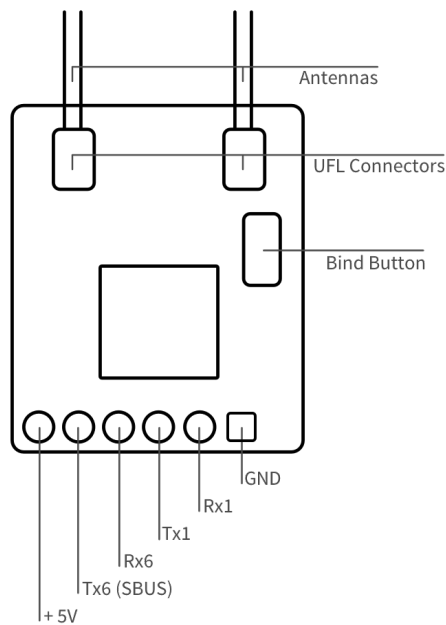
For vector, we have designed the user interface specifically for FPV aircraft. The controller fits nicely in your hand. Both buttons for changing flight mode and arming the drone are easily accessible.

# Overview

## Vector Overview



## Receiver Overview



# Setup

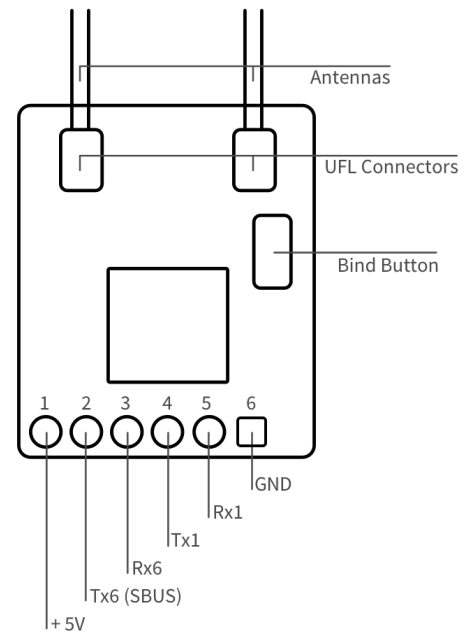
## Installing your Receiver

### Connecting the Receiver to your Flight Controller

The pads on your receiver need to be connected to your flight controller. The receiver comes with the required wires soldered to the receiver board. You can use those cables to connect the receiver to your flight controller or you can solder your own cables if you wish to do so.

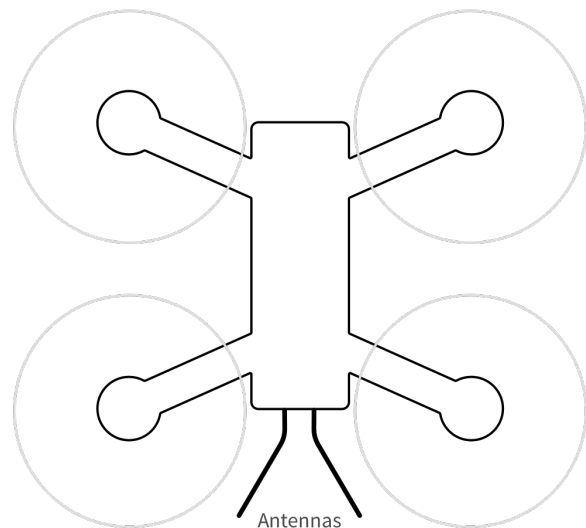
The following table shows how the cables should be connected to your flight controller.

Pad	Receiver	Cable Color	Flight Controller
1	+ Vin	Red	5V Power
2	Tx6	Yellow	SBUS
3	Rx6	Not Used	-
4	Tx1	Not Used	-
5	Rx1	Not Used	-
6	GND	Black	Ground



### Securing the Receiver to your Aircraft

The receiver should be attached to your aircraft away from any sources of electromagnetic noise. The antennas should be sticking outside the frame of your aircraft without touching any electrically conductive material such as carbon fiber or metal. Make sure the tip of the antennas are straight. There should be an angle of 90 degrees between each antenna for the best receiving performances.



## Binding Vector to a new Receiver

The purpose of the binding procedure is to tell your controller with which receiver it should communicate. This is important when multiple aircrafts are flying at the same time or if you have multiple aircraft that you wish to control with the same Vector controller.

When you receive your product, the Vector controller and receiver are already bound together. Thus, you don't need to follow this process.

To bind your controller to a new receiver, you should follow those steps:

### Step 1: Put your controller in bind mode

To do so, start by making sure that Vector is turned off. Then, turn it on by pressing the ON/OFF button and keeping the button pressed until the controller enters the bind procedure. Once this happens, you can release the button. The controller will indicate that it is in bind state when the mode LEDs are moving up and down (see Controller Status Indicator Description). Leave your controller and continue to step 2.

### Step 2: Put your receiver in bind mode

Turn your receiver on and then press the bind button for 2 seconds until the LED starts flashing. After doing this, Vector should come out of the bind procedure. This should only take a couple of seconds. If this procedure did not work, turn everything off and start again.

### Step 3: Check communication between controller and receiver

Check if the LED on your receiver is flashing rapidly. If this is the case, it means that the controller and receiver are communicating together and that they can be used.

## Communication between your receiver and your Flight Controller

Now that your receiver is installed on your aircraft, you can setup the communication between your receiver and your flight controller.

Before doing this, please remove propellers on your quad to avoid severe injuries.

First, check that the LED on your receiver is turning on and flashing when you turn on your aircraft and your controller.

### Setting Up the SBUS Communication Protocol

The receiver uses the standard SBUS protocol. On your flight controller configurator, make sure the communication serial port is enabled and that you have selected the SBUS protocol. If this is the case, you should see the AUX1 channel change from 1500 to 1800 when you press the mode button on your Vector controller. If this is not working, check that your controller and receiver are bound together and that you have correctly soldered the receiver on the aircraft.

SBUS Channel	Purpose	Value	Controlled by
Channel 1	Controller Roll Value	1000 to 2000	Tilting Controller
Channel 2	Controller Pitch Value	1000 to 2000	Tilting Controller
Channel 3	Controller Throttle Value	1000 to 2000	Trigger
Channel 4	Controller Yaw Value	1000 to 2000	Tilting Controller
Channel 5	AUX1: Arming	1500 or 1800	Main Arming Button
Channel 6	AUX2: Flight Mode	1500 or 1800	Mode Button
Channel 7	AUX3: Flight Mode	1500 or 1800	Mode Button
Channel 8	AUX4: Not Used	1500	-
Channel 9	AUX5: Link Quality	1000 to 2000	Link Quality (% of packets received)
Channel 10	AUX6: Failsafe	1500 or 1800	Indicates failsafe event

## Setting Up the Arming Procedure and Flight Modes

The arm button is setup to change the AUX1 channel. You can setup the arm button to arm the aircraft when the button is pressed.

The mode button changes the value of AUX2 and AUX3, you can use those channels to configure your different flight modes like angle, acro, horizon, ...

## Setting Up Link Quality

Link Quality is the ratio between the number of communication packets received on the drone and the packets sent from your controller. It gives you some understanding on how well the two are communicating together. The receiver is setup to output this information on the AUX5 channel. If your flight controller supports it, you can configure Link Quality on the AUX5 channel.

When flying, if the Link Quality drops lower than 50%, you should head back to where you are standing to have better reception.




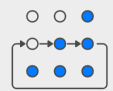
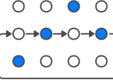
# Operation

## Turning the Controller On/Off

To turn your controller on and off, simply press the mode button for two seconds. The LEDs will turn on or off. If the controller is not turning on, try charging it.







## Controller Status Indicator Description

### Mode Status Indicator Description

Mode LED Pattern		Signification
	One LED on	Controller is on and flight mode 1 is selected
	Two LEDs on	Controller is on and flight mode 2 is selected
	Three LEDs on	Controller is on and flight mode 3 is selected
	Increasing LEDs Pattern	Controller is charging
	Alternating LEDs Pattern	Controller is in bind mode



## Main Status Indicator Description

Main LED Pattern	Signification
 Solid blue LED	Aircraft is armed
 Solid green LED	Controller is fully charged
 Single red Flash LED	Your battery is running low. Charge your controller.
 Double red Flash LED	Your battery is critically low. Land immediately and charge your remote.
 Fast Flashing yellow LED	Leave Vector on a stable surface to perform calibration. If you want to skip this step, you can shake your controller. However, the control performance might not be as good.
 Slow Flashing yellow LED	Compass has been disabled because of a magnetic disturbance. You can continue to fly when this happens.

## Calibration of the Controller

Before flying, you should calibrate your Vector controller. The yellow LED is flashing indicating that the calibration should be performed.

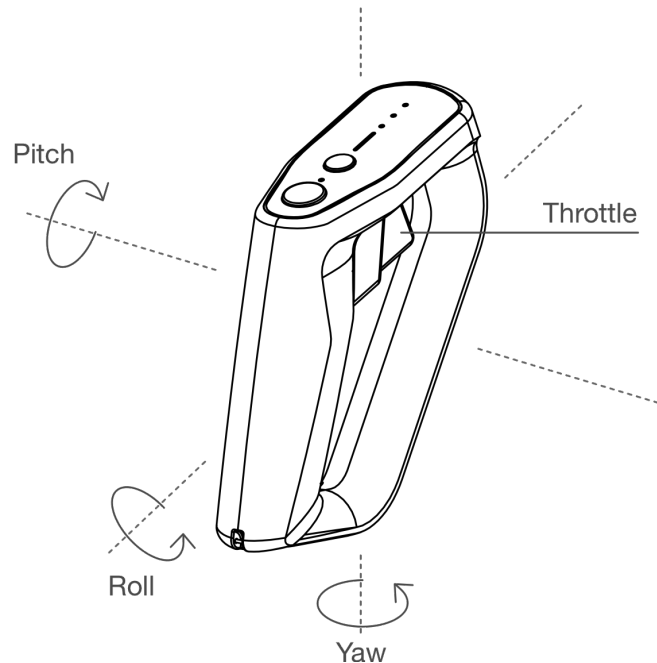
To calibrate, place your controller on a stable surface after turning it on. The controller will detect that it is placed on a stable surface and start the calibration procedure. Once the calibration is performed, the yellow LED will stop flashing indicating that you can start flying.

## Arming the Aircraft and Setting the Control Position

To control the aircraft, the controller needs a neutral position around which you will be able to move your controller. This position is set once you press on the main arming button. This means that you can control your aircraft in any position you would like. However, we recommend keeping your forearm parallel to the ground to have the best antenna radiation performances.

## Controlling your Aircraft

After pressing the arming button, you are able to control your aircraft. Each control axis is controlled according to the following figure.



# Advanced Operation

## Connecting Vector to multiple aircrafts

Vector has the ability to be bound to up to five receivers. If you bind Vector to multiple receivers, when started Vector will automatically search for one of the receiver that you bound. When found, it will only communicate with this receiver until the controller is turned off.

# Troubleshooting

## Resetting your Controller

If your controller is stuck and you can not turn it off, you can perform a hard reset by pressing on the two buttons at the same time for about four seconds. The controller will turn off and on again and should work properly again.

If the controller is not turning on, it is likely that the battery is discharged. Simply plug the controller through USB and it should turn on again.

## Contacting Customer Support

To get some help from us, you can contact us directly at the email address: [support@motionpilot.ch](mailto:support@motionpilot.ch)