Additional information for bare bones Drone 3 users
FLIGHT CONTROLLER

Any Multirotor Flight Controller should be able to control and stabilize your Hoverbike Drone. We use the Pixhawk flight controller from 3D Robotics. To get your Hoverbike Drone flying as soon as possible we suggest using a Pixhawk Flight Controller, as you can upload our flight tested parameters (see list below).

We have also tested the DJI Naza on the Hoverbike Drone and did get it flying fine but we felt it wasn’t possible to get it flying as well as the Pixhawk due to the lack of configurable parameters (see settings we have flown with below).

The ArduPilotMega 2.5 or 2.6 (APM2.X) is the predecessor to the Pixhawk. Although the APM doesn’t have the processing power of the Pixhawk it is still a very advanced flight controller and still supported in new releases of the ArduCopter firmware. Also the APM is directly compatible with our parameter file so you shouldn’t have to tune the APM to your Hoverbike Drone and the APM will be directly compatible with the power module supplied with your bare bones Hoverbike.

Flight controller settings
Pixhawk and APM

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<tr>
<th></th>
<th>Pitch</th>
<th>Roll</th>
<th>Yaw</th>
<th>Rate Loiter</th>
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<td>0.115</td>
<td>0.2</td>
<td>1</td>
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<tr>
<td>Rate I</td>
<td>0.095</td>
<td>0.105</td>
<td>0.02</td>
<td>0.5</td>
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<tr>
<td>Rate D</td>
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<td>0.0035</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Rate IMAX</td>
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<td>500</td>
<td>8</td>
<td>4</td>
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<tr>
<td>Stabilize</td>
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<td>4.5</td>
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<tr>
<th></th>
<th>Throttle Accel</th>
<th>Throttle Rate</th>
<th>Altitude Hold</th>
<th>Loiter PID</th>
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<td>6</td>
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<tr>
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<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>IMAX</td>
<td>5</td>
<td>N/A</td>
<td>N/A</td>
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Screenshots from Mission Planner
### DJI NAZA

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<th>Vertical</th>
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<td>75%</td>
<td>110%</td>
<td>135%</td>
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<tr>
<td><strong>Attitude Gain</strong></td>
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<td>145%</td>
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<td></td>
</tr>
</tbody>
</table>

Screenshot from Naza Assistant

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**Powering your flight controller**

The wire loom contains a power module. The power module provides power to Pixhawk or APM flight controllers through a 6-pos DF13 plug as well as a signal for measuring current and voltage. This power module is rated for 6S batteries (25V). At 90A the power and signal outputs are:

1. Vcc (5V)
2. Vcc (5V)
3. I (Battery current measurement analog voltage input)
4. V (Battery voltage measurement analog voltage input)
5. Ground
6. Ground
If you are reading in the analog voltage or current signal into a microcontroller and need to know the scaling factors - below are values derived from using a common Arduino Uno microcontroller (0-5V, 0-1023 = 4.9mV per unit) and measured with a Fluke multi-meter and oscilloscope, then averaged and graphed to produce a corresponding trend line.

Voltage: \( \frac{Vin}{1986} \times 100 \)
Current: \( \left( \frac{Ain \times 874}{10} \right) + 240 \)

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**TRANSMITTER - RECEIVER**

The Hoverbike Drone will require at least a 4 channel transmitter, if you want to be able to change flight modes a 5th channel is required. As quadcopters require a flight controller, a programmable transmitter is not necessarily required, adding an exponential curve or control stick sensitivity can be adjusted on the Flight Controller. If you do want to have more than 2 flight modes available to you a 6 channel (minimum) programmable transmitter will be required such as the Spektrum DX6i.

The receiver supplied with your transmitter should work with most Flight Controllers. The Pixhawk does not support PWM. Unless you have a S.Bus receiver or a Spektrum Satellite receiver, a PPM encoder will also be required to get your receiver to communicate with the Pixhawk. The APM2.X and the KK2.X Flight Controller do support PWM input so a PPM encoder will not be required for these Flight Controllers.

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**MOTOR CONTROLLERS**

Four brushless motor controllers or Electronic Speed Controllers (ESCs) will be required to control your four brushless motors. The ESCs should be rated to a minimum of 30A continuous current. The motors supplied with the Hoverbike Drone come with standard 3mm male bullet connectors. It is important to check the motors are spinning in the correct direction before flight. If they are spinning in the wrong direction simply swap two of the 3 control wires to change the direction.
WIRING LOOM

The Drone 3 wiring loom distributes power from the batteries to the flight controller, motor speed controllers (ESC) and MAcro Micro board / Accessories.

The wire loom contains a power module. The power module provides power to Pixhawk or APM flight controllers through a 6-pos DF13 plug as well as a signal for measuring current and voltage.

The wiring loom also has a power plug (standard 2.54mm) for use with the MAcro Micro or other external devices.
This voltage is direct from the batteries, so if you are running 6S then it will be ~22.2V. The wire is rated to 3A.

The power to the ESC’s are supplied via a male XT60 connector.

Note: The Motor controllers (if- included, or as shipped with the standard Drone3) do not contain a BEC (Battery Eliminating Circuit). If your flight controller does not support the 3DR Power Module, an alternative power supply will be required for your flight controller.

BATTERIES AND BATTERY CHARGER

We use two 6 cell LiPo 3000mAh in parallel to provide 6000mAh of capacity. The wire loom provided with the Bare Bones Hoverbike Drone comes with HXT connectors for two 6 cell batteries in parallel. You can fly your Drone3 off a single larger capacity battery as the cable is rated to handle the higher current draw on a single line.

A LiPo battery charger that can charge 6 cell packs will be required to charge your batteries.
Blades
The Hoverbike Drone uses carbon fibre propeller blades which are incredibly strong. Even when they spin at low speeds they are fast and sharp enough to remove a finger.

Where to fly
Always fly outside and in an open area, and in line of sight with your drone.

Flying over or near people and animals
Where possible, do not to fly over or close to people or property. Although the Hoverbike Drone is comparatively light to other drones of similar lift and size, it still weighs over 3kg when fully equipped for flight and can weigh up to 6kg! This can be a very dangerous object when either falling controlled or uncontrolled from the air. Although Malloy Aeronautics has tried to engineer a highly reliable system, there is always the chance that something could go wrong. Children and animals have a fascination for drones of all types so keep landing and takeoff areas well clear. Ensure at all time you have somewhere safe to land in an emergency. Please check your local aviation regulations related to drones and/or RC helicopters.

Please: Always fly your Hoverbike Drone with the thought in the back of your mind that something may happen, and buffer you and your surroundings accordingly.

Environmental
Wind speed and gusting is always a problem for drones and this Hoverbike Drone is no exception. If you are unsure about the conditions it is best not to fly. Work gradually up in experience with different wind speeds and gusting so that you are confident in all conditions.

GPS satellites are not always in line of sight or atmospheric conditions maybe such that your drone cannot lock onto sufficient GPS satellites before or during flight. Be ready to assume manual control if your drone loses GPS lock (by default it is set to land if GPS lock is lost while in a flight mode that uses it, and will start to descend down onto whatever objects or surface is below).

REMEMBER - SAFETY FIRST
Support + inquiries
For customer support and inquiries, please do not hesitate to contact us at:

info@hover-bike.com
+44 (0) 1628822477
+44 (0) 7741035576
Monday to Friday 9:00 - 17:00 (timezone = UK, +0 UTC/GMT, summertime + 1hr)