MultiRotor UAV Kit

Helpful instructional videos available at: mindsirobotics.com
When safety precautions are followed, your MINDS-i® system will provide years of enjoyment. Use care and good sense at all times when operating this product. Failure to use your system in a safe, sensible manner can result in injury or damage to property. You and you alone must insure that the instructions are carefully followed and all safety precautions are obeyed.

- Water can cause the electronics to short out and can cause permanent damage.
- Always turn on the transmitter before turning on the receiver.
- Fully extend the transmitter antenna before operating your vehicle.
- Before turning on your radio system, check to make sure that no one else is running on the same frequency.

- CHOKING HAZARD: Do not allow children under age 3 or any individuals who have a tendency to place objects in their mouths to play with any part of the MINDS-i system, including, but not limited to: connectors, pieces, electronics, radio transmitters, wheels, tires. The system contains small parts which could accidentally be swallowed and cause suffocation.
- When the system is powered and/or in motion, keep fingers, face, tools, loose clothing, hair, and all other body parts away from gears, wheels, etc. Do no wear gloves while operating machinery. Even plastic parts can pinch, cut, or crush.
- The transmitter's antenna could also cause injury if played with violently or pointed towards someone's face.
- Never operate your MINDS-i® system on streets or in any areas where full-size vehicles are.
- Do not pick up your MINDS-i® system when it is in motion.
- Never charge, run or store your MINDS-i® system in a location subject to high temperatures, low temperatures or high humidity. Do not store in direct sunlight.
- To avoid electronic malfunction, do not allow the vehicle to become wet. Short circuits will produce a very strong electrical current. Should your MINDS-i® system become wet, stop using it immediately.

- WARNING! Electrocution Hazard. Do not use the materials provided for other than its intended purpose.
- Do not put it into fire.
- Always use recommended batteries. If improper batteries are used, they may become hot, leak and may rupture.
- Do not attempt to recharge non-rechargeable batteries.
- Only batteries of the same equivalent type as recommended are to be used. Do not mix old and new batteries.
- Exhausted batteries are to be removed from the system and replaced with new ones. Recycle all used batteries.
- Do not lick batteries. If battery appears to be leaking or has a crystalline deposit on the outside, dispose of it immediately (wear gloves when handling, preferably nitrile or other non-reactive material).
- Do not run a wire between battery terminals, as wire will get very hot, can be irreparably damaged or explode.
- Make sure the batteries are installed with the correct polarity as shown. Do not disassemble your batteries. Never allow them to become hot or to burn. To avoid short-circuits, avoid getting them wet. Do not short circuit batteries.
- If liquid from inside the batteries contacts your skin or clothes, wash them with water. If leaked battery fluid gets into your eyes, flush them immediately with cool water and seek medical attention. Do not rub eyes.
- Always wear safety glasses to protect your eyes. Note that normal glasses, while usually made of impact-resistant plastic, will not afford sufficient protection from shrapnel or flying debris.
- Always wear close-toed shoes to protect your feet from heavy or sharp objects, which might be dropped.
- If you have long hair, keep it tied back or under a hat to avoid it becoming caught in moving parts.
- The MINDS-i® system contains small parts. Do not ingest. Do not insert into any orifice (e.g. nostrils, ears, etc).
- The system contains metal parts. Cutting or bending can cause parts to break; resulting in sharp edges which can cut skin.
- Battery disposal. Do not throw batteries into the trash, especially rechargeable batteries. Contact your local waste disposal office for information on battery disposal. Batteries should be stored as directed by your local hazardous materials disposal office until pickup (usually in a hard sided waterproof, non-conductive container, e.g. a plastic bucket).

WARNING! IMPORTANT! RESPONSIBLE ADULT SUPERVISION IS REQUIRED FOR CHILDREN UNDER THE AGE OF 14. THIS PRODUCT IS NOT DESIGNED FOR UNSUPERVISED USE BY CHILDREN YOUNGER THAN 14 YEARS OLD.

All pictures descriptions and specifications found in this instruction manual are subject to change without notice.

MINDS-i® MultiRotor SAFETY INFORMATION

When safety precautions are followed, your MINDS-i® system will provide years of enjoyment. Use care and good sense at all times when operating this product. Failure to use your system in a safe, sensible manner can result in injury or damage to property. You and you alone must insure that the instructions are carefully followed and all safety precautions are obeyed.

- This is NOT a toy, serious harm may occur if not properly assembled and operated.
- Never operate without safety glasses.
- Never remove, modify or operate without the safety shrouds.
- Water can cause the electronics to short out and can cause permanent damage.
- Always turn on the transmitter before turning on the MultiRotor.
- MINDS-i MultiRotors have powerful motors and high-speed propellers. Never place your hands near propellers while it is armed or the safety button displays solid red.
- Always disarm the MultiRotor before handling.
- Always fly in an open area away from people and buildings; do not attempt to fly indoors or in a confined space. Do not fly over people, near airports, or in any situation that could pose a hazard to those around you. Always fly within your line of sight and in compliance with local regulations.
- MINDS-i MultiRotor will not avoid obstacles on its own. As the operator, it is your job to recognize and avoid obstructions while flying. Always follow the preflight and post-flight steps in the order described in this manual, and remain attentive at all times while flying.
- Environmental factors, such as wind and GPS irregularities, can cause instability in flight. The MultiRotor will attempt to compensate for these factors by triggering a failsafe if it detects an unsafe flying condition due to loss of controller signal, loss of GPS signal, or low battery (see below for details). To avoid potential hazards due to environmental factors, identify the boundaries of your flying area before takeoff, and recover manually by switching into standard (STD) if it moves outside your designated flying area. If you observe any inconsistent behavior, land, and consult the troubleshooting guide.
- If you are new to UAVs / drones, it is very important that you follow these guidelines carefully.
- MINDS-i takes the approach that no irreversible modifications should be needed in order to assemble the product and we do our best to ensure parts can easily connect to one another.
- Note that MINDS-i MultiRotor assembly requires patience and close attention to detail. Unlike “plug and play” UAVs where you only need to plug in the battery, MINDS-i MultiRotor UAVs can be reprogrammed, work with a variety of products (different flight controllers, motors, ESCs, batteries etc) and tend to be more powerful.

***WARNING***

1. UAVs are essentially flying lawn mowers and can do significant harm if a fast spinning blade contacts an object.
2. Only touch the electronics when the battery has been unplugged. Although the batteries used are low voltage, they are discharging at a very high current and as such, if you touch both the red and black lead while in use, you will receive a significant (40 amps or higher) shock.
3. It is best to assume that if the battery is plugged in, that the motors can start rotating at any time.

Failsafes

Loss of RC signal
- Always use the controller as a primary or backup control system when flying.
- Ensure that the controller is turned on any time the MultiRotor is powered.
- If contact with the controller is lost during flight, it will land and display a blinking yellow LED.

Loss of GPS signal
- MINDS-i MultiRotor requires an active GPS signal before takeoff. If it loses GPS signal in flight it will trigger a GPS failsafe, indicated by a blinking blue and yellow LED and automatically switch to manual control (standard - altitude hold mode). Always be prepared to regain manual control at any time while flying and choose an unobstructed flying area to improve GPS signal strength. When flying a mission, we recommend changing the GPS failsafe behavior to land.

Low battery
- When the battery reaches 25% of its remaining charge, it will land and display a blinking yellow LED.

WARNING! IMPORTANT! RESPONSIBLE ADULT SUPERVISION IS REQUIRED FOR CHILDREN UNDER THE AGE OF 18 TO OPERATE THE MULTIROTOR. THIS PRODUCT IS NOT DESIGNED FOR UNSUPERVISED USE BY CHILDREN YOUNGER THAN 18 YEARS OLD.

All pictures descriptions and specifications found in this instruction manual are subject to change without notice.

MINDS-i® is a high-performance Construction/RC/Robotics System, which is NOT intended for use on the public roads or congested areas where its operation may conflict with or disrupt pedestrian or vehicular traffic. Read all enclosed information before operating. Fully illustrated, step-by-step instructions describe adjustment, operation, and required maintenance procedures. MINDS-i® should not be operated in a crowd, or without adequate space. In an effort to continually upgrade our products, MINDS-i® reserves the right to make improvements and modifications to this system, which may not be reflected in the photographs and specifications printed on this box.

PROPOSITION 65 WARNING: This product contains chemicals known to the State of California to cause cancer and/or birth defects or other reproductive harm.

Terms & Conditions: All orders placed with MINDS-i, Inc (phone, fax, mail, internet/web & email) constitute the acknowledgment and acceptance of all conditions listed below. All purchases remain the property of MINDS-i®, Inc until paid for in full. All orders shipped to a Washington State address must pay sales tax as required by the Washington State Department of Revenue. In the event that an order placed on our web-site does not calculate sales tax and the order is being shipped to a Washington State address, MINDS-i® will calculate the sales tax when the order is processed and call or email the customer with the new amount. All prices, materials, design, color, contents included with a product and product specifications are subject to change without notice. Some product images may be shown with optional items that are sold separately. Depending on the products ordered and the destination of the order, certain shipping services may not be available. MINDS-i® will not be responsible for pricing errors and may cancel the order. Orders will not be shipped until all Credit Card information is verified and matched. All other orders (check or money order) will not be shipped until payment has been received in full. All unpaid orders will be canceled after 30 calendar days. All weights shown for products are used for shipping calculation only and may not reflect actual weight of the product.

Product Warranty: MINDS-i® warrants to the original buyer that our products are free from defects in materials and workmanship for a period of 120 days from the original date of purchase (original purchase receipt required). This warranty does not cover abuse, misuse, incorrect wiring, modifications, alterations, connector damage, wear and tear or robot competition damage. If the Product is determined to be defective within the warranty period, MINDS-i® or its authorized service provider will, at our sole option, repair or replace any defective parts free of charge, or refund the purchase price. What you must do: Return the Product in its original packaging or packaging affording equal protection, freight prepaid, with proof of purchase, to an authorized MINDS-i® service provider. You are responsible for all shipping charges. For more information, contact MINDS-i® at (509) 252-5767 or info@mymindsi.com.

Shipping Errors and Defective Products: Claims for shipping shortages, errors, or defective materials must be in writing and received by Innovation First within ten (10) days after receipt of shipment by buyer. Failure to make such claim within the stated period shall constitute an irrevocable acceptance of the goods and an admission that the goods fully comply with all the terms and conditions of the buyer's order.
CONNECTOR ASSEMBLY AND USAGE
HELPFUL INSTRUCTIONAL VIDEOS AVAILABLE AT: www.mymindsi.com

1.5-LOCK  2-LOCK  3-LOCK

PANEL LOCK  2-ROTATE  3-ROTATE

01
1100kV MOTOR MOUNT

1100kV BRUSHLESS MOTOR

M3 x6 mm SCREW

DUAL TRANSITION

TRANSITION

CLEARANCE THREAD ADAPTER
STANDARD LANDING GEAR

- 1x CARBON ARM END
- 2x LOCK
- 1x 1/4" SILICONE CAP

OPTIONAL
- 1x SINGLE-END CARBON ARM
- 1x 3/8" SILICONE CAP

OPTIONAL LONGER LANDING GEAR
FOR USE WITH CAMERA OR GIMBAL

- 2x DOUBLE-ENDED CARBON ARM
- 2x #4-40 x 1 3/8" SCREW
- 2x #4-40 x 1" SCREW
- 4x # WASHER
- 4x CLEARANCE THREAD ADAPTER
- 4x INTERFERENCE THREAD ADAPTER

X4 REPEAT STEPS 1-4
x2 QUAD UPPER PLATE

x12 SHROUD STUD

x12 #40 x 3/8" SCREW

x12 # WASHER

x2 DOUBLE-ENDED CARBON ARM

x2 1/8" BEAM

x16 PANEL-LOCK
ATTACH THE PROVIDED VELCRO (LOOP SIDE) TO THE PLACES SHOWN IN GREEN. THEY WILL BE USED TO SECURE THE ELECTRONICS.

VELCRO LOOP

x1 CHANNEL RECEIVER
x1 APM BOARD
x1 NOT INCLUDED IN STARTER KIT
TELEMETRY RADIO
x1 NOT INCLUDED IN STARTER KIT
GPS

REFER TO THIS IMAGE AND THE WIRING DIAGRAM ON THE NEXT PAGE TO PROPERLY ATTACH AND CONNECT THE ELECTRONICS.
Using the wire ties and velcro provided, place the electronic components on the frame as shown in step 14 so that they are secure and out of the way of moving parts.

**Warning:** Properly plug the ESC wires into the battery harness. Red - Red, Black - Black.

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**Electronics Layout**

- **Battery**
- **Power Module**
- **GPS/Compass Module**
- **Telemetry Radio**
- **Telemetry Radio (not included in starter kit)**
- **Radio Receiver (not included in starter kit)**

**Interface Pins**

- **ESC 1 - Output Pin 1**
- **ESC 2 - Output Pin 2**
- **ESC 3 - Output Pin 3**
- **ESC 4 - Output Pin 4**

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**Input Connections**

- **Throttle (THRO)**
- **Aileron (AILE)**
- **Elevator (ELEV)**
- **Rudder (RUDD)**
- **Gear (GEAR)**
- **Aux 1 (AUX 1)**
Warning!

Before continuing further, please ensure that you have **NOT** mounted the propellers on the MultiRotor.
Flight Systems Setup Checklist

☐ #1 Mission Planner Instillation

☐ #2 Loading Firmware

☐ #3 Hardware Configuration
  ☐ A. Compass Calibration
  ☐ B. Accelerometer Calibration
  ☐ C. Radio Calibration

☐ #4 PID Test Rack

☐ #5 PID Tuning

☐ #6 ESC Calibration

☐ #7 Motor Setup

☐ #8 MultiRotor Flight Modes

☐ #9 MultiRotor LED Indicators

☐ #10 Failsafe Settings
  ☐ A. Radio Failsafe
  ☐ B. Battery Failsafe
Step #1 Loading & Firmware

1. Once you’ve downloaded the Mission Planner onto your computer, connect PM to your computer using the micro US connector and PM’s micro US port. Use a direct US port on your computer, not a US hub.
2. Windows will automatically detect PM and install the correct driver software. If you get a message stating “driver not found,” go to this website to manually install the driver software. http://ardupilot.com/downloads/did219
3. Edit, open the mission planner software and we are going to let the Mission Planner know which port we were using to connect to PM.
4. In Mission Planner, use the drop-down menus in the upper-right corner of the screen near the Connect button to connect to PM. Select Arduino Mega 2560 and set the baud rate to 115200 as shown. Don’t hit Connect just yet.
5. Select Initial Setup / Install Firmware.
6. Now select which Firmware to download to PM—this depends on the configuration of your craft. Select the Hardware screen from the icons at the top of the display. Choose your copter’s frame by clicking the corresponding icon—Yune, Heda, z6, plane, rover, or other.

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Step #1 Mission Planner Installation:

1. Go to http://ardupilot.com/downloads/?category=4&sortby=hits to download the most recent mission planner software.
2. Open the Microsoft installer file (.msi) and select Run to run the installation utility.
3. If you receive the warning pictured here, select install this device software anyway to continue.
4. Once installation is complete, open Mission Planner by clicking on the Icon. Mission Planner automatically notifies you about available updates. Always run the most current version of Mission Planner.
Step #2 Loading Firmware:

1. Once you’ve downloaded the Mission Planner onto your computer, connect APM to your computer using the micro USB connector and APM’s micro USB port. Use a direct USB port on your computer, not a USB hub.

2. Windows will automatically detect APM and install the correct driver software. If you get a message stating “driver not found”, go to this website to manually install the driver software. http://ardupilot.com/downloads/?did=19

3. Next, open the mission planner software and we are going to let the Mission Planner know which port we’re using to connect to APM.

4. In Mission Planner, use the drop-down menus in the upper-right corner of the screen (near the Connect button) to connect to APM. Select Arduino Mega 2560 and set the Baud rate to 115200 as shown. Don’t hit Connect just yet.

5. Select Initial Setup > Install Firmware.

6. Now select which firmware to download to APM; this depends on the configuration of your craft. Select the Hardware screen from the icons at the top of the display. Choose your copter’s frame by clicking the corresponding icon: Quad, Hexa, Y6, plane, rover, or other.

Note: The firmware screen will not appear if you have already selected Connect, so ensure that Mission Planner shows a disconnected icon in the upper-right corner to access the firmware.
7. Once you select your frame, Mission Planner will automatically detect the latest firmware version for your craft and prompt you to confirm the download. Select Yes to download the firmware onto APM. When the download status reads Done, your firmware download is complete.

Step #3 Hardware Configuration:
1. On the Mission Planner’s Initial Setup screen select Mandatory Hardware > Frame Type. Select the frame for your copter. The default configuration is X.
   Note: make sure the Connect is active on the top right of the Mission planner screen.

A. Compass Calibration:
   Full Drones LAB (with GPS & External Compass)
   1. Under Initial Setup > Mandatory Hardware select Compass. Select APM with External Compass.
   2. Ensure the Enable and AutoDec check boxes are checked.
   3. Click the Live Calibration button and follow the on screen instructions.

4. Move the craft in all directions making sure not to pull the data cable loose.
5. Continue to move craft until mission planner completes setup.
1. Un-Check the box next to Enable

Under Initial Setup, select Accel Calibration from the left-side menu.

2. Place the drone in front of you with the arrow on the flight controller pointing away.
3. Click calibrate and follow the on screen instructions.
C. Radio Calibration:

NOTE: Before Attempting radio calibration you will need to make sure that the “MOTOR/THRO” switch on the top right of the remote remains in the arm position.

1. In Mission Planner, click on the green “Calibrate Radio” button in the lower right of the window. Mission Planner will call a dialog window to ensure radio control equipment is on, battery is not connected, and propellers are not attached. Select OK.

Note: Red lines will appear across the calibration bars to indicate maximum and minimum values. Move the Ch 5 and 6 toggle switches through their range of positions.

2. Move the control sticks and toggle switches on your transmitter to their limits of travel and observe the results on the radio.

3. When the red bars for roll, pitch, throttle, yaw, and radio 5 (and optionally radio 6, 7 and 8) are set at the minimum and maximum positions, select Click when Done.

4. Mission Planner will show a summary of the calibration data. Normal values are around 1100 for minimums and 1900 for maximums.

Note: If the bars go in the opposite direction of the direction you’re moving the sticks, that means that the channel is reversed on your RC transmitter side. Use your RC transmitter’s channel-reverse function to reverse it at the transmitter side. (see your RC gear’s manual for that, if you’re not familiar with the process)
Step #4 PID Test Rack:

1. Set up your PID Test Rack as shown below.

2. Mount the MultiRotor to the rack using the provided parachute cord.

3. Loop the cord through the open hole in the transitions on the antenna mount and the GPS stand.
4. While one student holds the MultiRotor centered feed one side of the cord through the hole in stand and loop it through a MINDS-i Beam as shown. Tie the chord off and repeat on the other side. Make sure to pull the chord tight, a slight bowing of the test stand is desirable.

5. With the MultiRotor strung up loop the third cord through the two open holes in either the front or rear of the upper frame plates.

6. Hold the MultiRotor at a 90° angle and loop the cord through the hole in the stand and tie it off.

7. Once the MultiRotor is securely mounted to the stand you can now begin the process of calibrating your ESC’s and verifying your PID tuning values.
Step #5 PID Tuning:

1. With the MultiRotor mounted in the Test Rack, open the Mission Planner Software.
2. Click on the Config/Tuning, Extended Tuning. The screen should look like the one below.
3. You will need to adjust all of the Tuning values to match the image below and then click the Write Parameters button.

Note: If a value won't go as high as the above image shows adjust it to the maximum it will allow.
Step #6 ESC Calibration:

1. **Warning!** Before calibrating ESC’s, please ensure that your copter has NO PROPS on it and that the flight controller is NOT CONNECTED to your computer via USB and the Lipo battery is disconnected.

![NO PROPS NO USB](image)

2. Turn on your transmitter and put the throttle stick at maximum.

3. Connect the Lipo battery. The autopilot’s red, blue and yellow LEDs will light up in a cyclical pattern. This means the it’s ready to go into ESC calibration mode the next time you plug it in.

![Connect battery to power module.](image)

   Note: red and blue LED’s tend to diffuse light from the yellow led and could be hard to see.

4. With the transmitter throttle stick still high, disconnect and reconnect the battery.

   ![Disconnect battery. Connect battery to power module.](image)

5. Wait for your ESC’s to emit the musical tone. As soon as it makes a tone pull the transmitter’s throttle stick down to its minimum position.
6. The ESC’s should then emit a long tone indicating that the minimum throttle has been captured and the calibration is complete.

7. If the long tone indicating successful calibration was heard, the ESC’s are “live” now and if you raise the throttle a bit they should spin. Test that the motors spin by raising the throttle a bit and then lowering it again.

8. Set the throttle to minimum and disconnect the battery to exit ESC calibration mode.

Note: Helpful video, https://www.youtube.com/watch?v=gYoknRObfOg

**Step #7 Motor Setup:**

1. Make sure there are no propellers on your copter.
2. Turn transmitter on.
3. Connect battery to quad copter.
4. Arm copter by holding the throttle down and rudder right for 15 seconds.

   NOTE: If holding down and right does not arm the copter try down and left. If that arms it then you will need to reverse the “Rudder/Yaw” channel on your transmitter.

5. Apply a small amount of throttle, and observe and note spin direction of each motor.

   Note: if unsure of motor direction apply a small piece of tape on motor shaft.

6. Now that your motors are spinning, we’ll set the correct direction for each motor. The direction the motors spin (clockwise or counterclockwise) is determined by the connection to the ESC’s. As you apply a small amount of throttle to the motors, check and see what direction they are spinning in. Motors should spin as indicated by the diagram below.

![Diagram of motor connections and directions](image1.png)

7. Most likely some of your motor directions will need to be switched. Take note of which motors needs to be reversed and disconnect the battery from your copter.

8. To reverse the spin direction of a motor, switch two of the three cables connecting the motor to the ESC by disconnecting two of the bullet connectors, switching the wires, and reconnecting as shown below.

![Diagram of motor connections](image2.png)
Step #8 MultiRotor Flight Modes:

1. Turn on your RC transmitter.
2. Connect the APM to the Mission Planner.
3. Go to the Initial Setup > Mandatory Hardware > Flight Modes screen.

4. **Flight Mode 1:**
   Use the drop-down on line 1 to select the Stabilize flight mode for that switch position.

5. **Flight Mode 6:**
   Use the drop-down on line 6 to select either AltHold or Loiter (loiter requires GPS, not included in MultiRotor Starter kit) flight mode for that switch position.
   
   Note: Quad-copter comes pre-configured to fly in Stabilize mode at all switch positions.

6. When finished press the “Save Modes” button.
Step #9 MultiRotor LED Indicators:

**Power Indicator**
- Power LED is located just above GPS port.
- Solid light = on.
- No light = off.

**Arming Indicator**
- Arming Indicator is located above PM port.
- Solid red = Motors armed.
- Blinking red = Motors disarmed.
- Fast Blinking red = Motors disarmed and flight failure (check mission planner for more information)

**GPS Indicator**
- GPS Indicator is located above the PM port.
- Solid blue = GPS locked.
- Blinking blue = GPS working, GPS lock not acquired (DO NOT FLY – modes that require GPS lock will not work and could cause flight failures).
- No blue LED = GPS not attached/ not working (DO NOT FLY – modes that require GPS lock will not work and could cause flight failures).
Step #10 Failsafe Settings:

A. Radio Failsafe:
1. Make sure receiver is powered off.
2. Plug bind plug into “Batt/Bind” slot in the receiver.
3. Turn on receiver making sure receiver shows a rapid blinking light.
4. With the transmitter on make sure all trims are centered.
5. Press the throttle trim down 20 times, each press will be followed by a short beep.
6. Turn the transmitter off.
7. Hold the “trainer switch” up while turning the transmitter back on, it will beep indicating it’s trying to bind.
8. Continue to hold the trainer switch up until the receiver light stays solid.
9. Remove bind plug and unplug receiver power.
10. Now press the throttle trim up 20 times, each press will be followed by a short beep.
11. Plug USB interface into APM board and computer.
12. Hit connect in mission planner software.
13. With the transmitter powered off navigate to INITIAL SETUP>MANDATORY HARDWARE> FAIL SAFE.
14. Under the radio tab select ENABLED ALWAYS LAND.
15. Under FS PWM set that to the value that shows under RADIO 3.
16. Now turn transmitter on and wait until controls respond.
17. Ensure the RADIO 3 PWM increases from FS PWM value set earlier.

**B. Battery Failsafe**

1. Set the low voltage value for the number of cells your battery has. 12.5 for 4 cell, 9.6 for 3 cell.
2. Set the reserve mAh between 1/4 and 1/3 of the batteries total mAh (1000 for a 4000 mAh battery).
3. Set the failsafe setting to Land.

**WARNING:** Every time the MultiRotor is powered on it is assuming you have put a freshly charged battery in. Never operate with a partially charged battery, the reserve mAh setting will not work and could result in a loss of power while in flight.
Servo Reversing (DXe)

1. To enable servo reversing, hold the left and right gimbal sticks in the upper-inside position as shown while powering on the transmitter.

2. After the transmitter is powered on, release the sticks and return to center. Use the right gimbal to select the channel or reverse the selected channel.

3. The LED will flash corresponding to the channel being adjusted (see chart to right).

4. The LED will Flash **Orange** for a channel that is set to Normal direction.

5. The LED will Flash **Red** for a channel that is set to Reverse direction.

6. To select a channel to adjust, move the right gimbal to the left or right. Move the gimbal to the right to select the next channel. Move the gimbal to the left to select the previous channel. The number of flashes will change to indicate the new channel selected.

7. To reverse the channel currently selected, move the right gimbal up or down. The LED will change color, from **Orange** To **Red** or **Red** to **Orange**, to indicate the new servo direction.

8. When all channel reversing is completed as desired, power off the transmitter.

9. When the transmitter is powered on again normally (sticks not in the position above) the transmitter will operate normally with the new reversing selections.

Transmitter and Receiver Binding

1. Lower the throttle to the lowest position and make sure the transmitter is powered off.
2. Insert the bind plug into the BIND/DATA port.
3. Make sure the receiver is connected to the micro controller.
4. Connect the micro controller to the computer with the USB cable. The receiver’s LED will flash rapidly when the receiver is ready to bind.
5. While pressing the Bind button, power on the transmitter.
6. Release the Bind button after the receiver’s LED stays illuminated. This indicates the receiver is bound to the transmitter.
7. Remove the bind plug from the receiver before powering anything off.
ATTACH THE PROVIDED VELCRO (LOOP SIDE) TO THE PLACES SHOWN IN GREEN. THEY WILL BE USED TO SECURE THE BATTERY.

USE THE RUBBER BAND TO SECURE THE ANTENNA.

LOOP THE VELCRO STRAP AROUND THE TWO CENTER CARBON TUBES TO SECURE THE BATTERY AND POWER MODULE.
BE SURE THAT THE PROPELLERS ARE PROPERLY PLACED AND SECURELY TIGHTENED USING THE SUPPLIED ALLEN WRENCH. NOTE THE DIFFERENCE BETWEEN THE SFP AND SF PROPELLERS AND BE SURE THEY ARE IN THE CORRECT LOCATIONS BEFORE OPERATION.
On Rack Pre-Flight Check

- With MultiRotor in test rack, point the front facing away from you.
- Turn the transmitter on.
- Plug in LiPo battery.
- Wait for the MultiRotor to steady itself.
- Stand back a safe distance from quad.
- Arm the quad by moving the throttle to zero and full right rudder. Hold for 6 seconds.
- Power to 25% throttle, do not exceed 50% throttle while attached to the rack.
- Check stick movements by moving the right stick in small amounts, the quad should lean and tilt in the same direction as the stick movements.

- If a stick is reversed you will need to reverse the channel in the controller setup menu (pg 36).
Preflight
1. Always wear safety glasses.
2. NEVER operate without the safety ducts.
3. Left stick fully down
4. Set flight mode
5. Power on transmitter
6. Connect charged battery
7. Place at Launch point
8. Check for solid blue LED GPS Lock, step back to safe distance
9. Hold left stick down and to the right until motors spin

Flight
Raise left stick to take off and gain altitude
Set left stick to center to hover
Move left stick left and right to rotate
Use right stick to fly forwards, backwards, left and right
Lower left stick to descend
Set left stick fully down to land when near the ground

Postflight
1. Hold left stick down and to the left until motors stop
2. Disconnect the battery
3. Power off transmitter
Carbon Fiber Arm Repair

PRESS OUT RETAINING PIN
PRESS PIN BACK INTO ARM, BE SURE TO ALIGN THE HOLES IN THE TUBE WITH THE HOLE IN THE CARBON ARM END.
For technical questions or to place an order:

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