

GAME OF DRONES



HIRO DIY KIT
BUILD INSTRUCTIONS

Congratulations on your purchase of the Game of Drones® Hiro Build-It-Yourself kit. When you're done, you'll have your very own Hiro drone ready to bind to a transmitter. We designed this kit to be easy to use, fun, and educational. When you've completed the Game of Drones® Hiro Build-It-Yourself kit, you will not only have a drone to fly, you'll also know more about how drones work. This may be your first drone you build, but don't let it be your last. There's a lot of building out there, and you've just taken your first step.

Content list

Your Game of Drones® Hiro Build-It-Yourself kit should include the following:

One Game of Drones® Hiro airframe;
Five lengths of plastic trim (four longer, one shorter);
Cable ties;
Four wood motor mounts;
One KK 2.1 HC Multi-Rotor Control Board with Programmer;
Two clockwise (CW) RCMC 2212 1000Kv V2 motors;

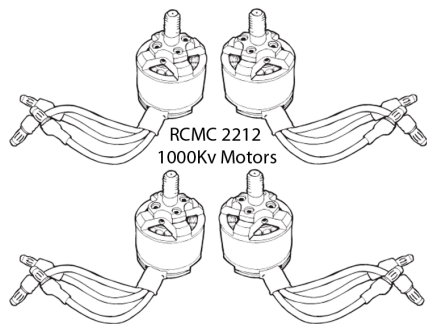
Tools you'll need:

Phillips screwdriver
Allen wrenches size 2 mm, 2.5 mm
Small-nose pliers
Wire cutters
Scotch or masking tape
Pliers or a ½-inch mini ratchet
Pen

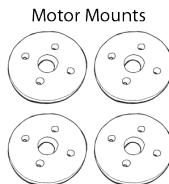
Two counterclockwise (CCW) RCMC 2212 1000Kv V2 motors;
16 small black screws;
5 servo wires;
1 grey ribbon cable;
Four RCMC 30Amp SimonK Firmware Electronic Speed Controllers (ESCs);
One power distribution board;
Four tabs of mounting tape;
Four propellers;
Four sets of propeller adapters;
One frame cap

Other parts you'll need:

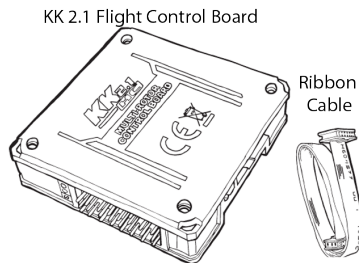
RC transmitter
Receiver compatible with your transmitter
A 2200mAh 3S 30C LiPo battery with an XT60 plug



RCMC 2212
1000Kv Motors

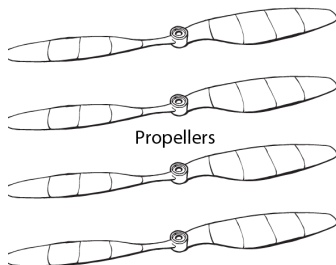


Motor Mounts



KK 2.1 Flight Control Board

Ribbon
Cable



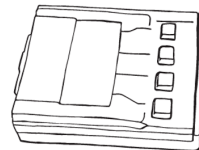
Propellers



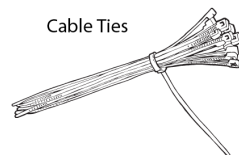
Prop Adapters



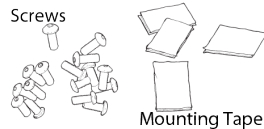
Game of Drones Hiro Airframe



KK 2.1 Control Board Programmer



Cable Ties

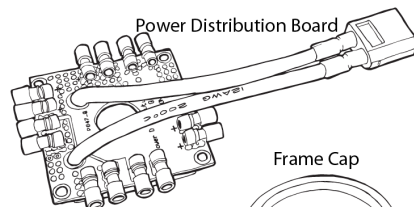
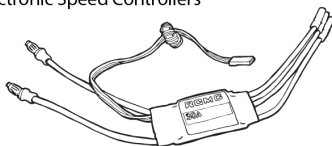


Screws

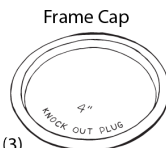
Mounting Tape



RCMC 30 Amp Electronic Speed Controllers



Power Distribution Board



Frame Cap

**Not Pictured: Servo Cables (3)

Laying out your components

Estimated time to complete: 5 minutes

Remove the airframe from the box and separate the two sides. Lay them out and become familiar with them.

The side with the hole in the center is the “top shell.” The “front” of your drone is adorned with the “Game of Drones” sticker. Keep that in mind when you’re building.

The side without the hole is the “bottom shell.” The bottom shell is symmetrical, so you don’t need to worry about a front or back.

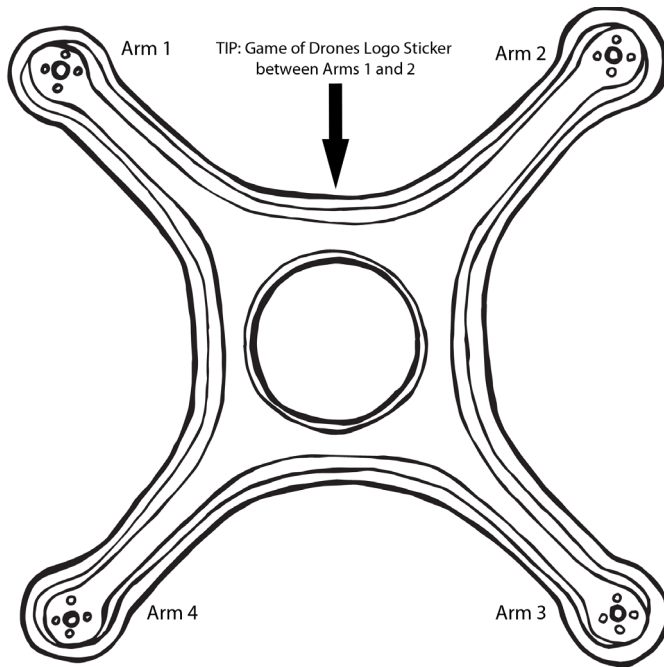
Now, take your components out of the box and verify you have all the parts and pieces. If you find something missing, contact us immediately.

Ready to build a drone?

Attaching motors to your frame

Estimated time to complete: 25 minutes

Start your drone-building odyssey by attaching the motors to your frame. You have four motors and four arms. One motor is attached to each arm.



First take a moment to become familiar with your arms. Not the ones on your body; the ones on your frame. Arm 1 is a friend, and you and it will spend a lot of time together. After you've identified Arm 1 through 4, use a small piece of tape and a pen to number your arms so you can easily find them later.

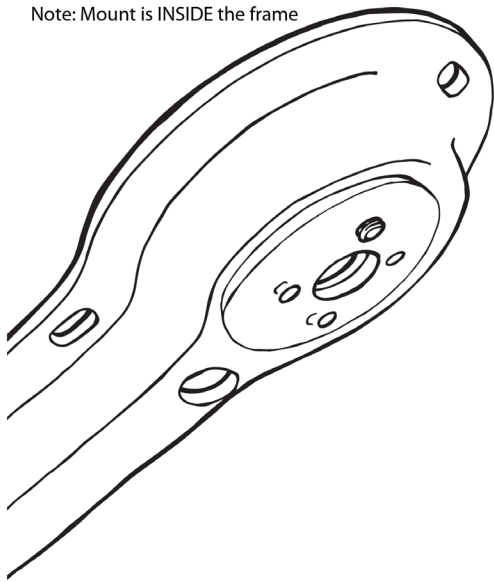
Pull out the box of two motors with black cap screws, the box of two motors with green cap screws, the four wood motor mount disks, and the baggie of small black screws.

Using your allen wrench, attach the two counterclockwise (green-capped) motors to Arm 1 and Arm 3, and the two clockwise (black capped) motors to Arm 2 and Arm 4.

Starting with your old friend, Arm 1, place one of the wood motor mount disks inside the frame and make sure all the holes on the disk align with the holes on the frame. The holes are not in a perfect square, so if they don't align, turn the mount 90 degrees and look again. Eventually, you will get the mount so the holes all line up. Then use one of the small black screws to secure the mount to the frame, screwing in until just the tip of the screw can be seen coming through the top of the frame.

This step is a bit fiddly and can be challenging the first time you do it, but once you get the hang, the other three will go on fairly quickly.

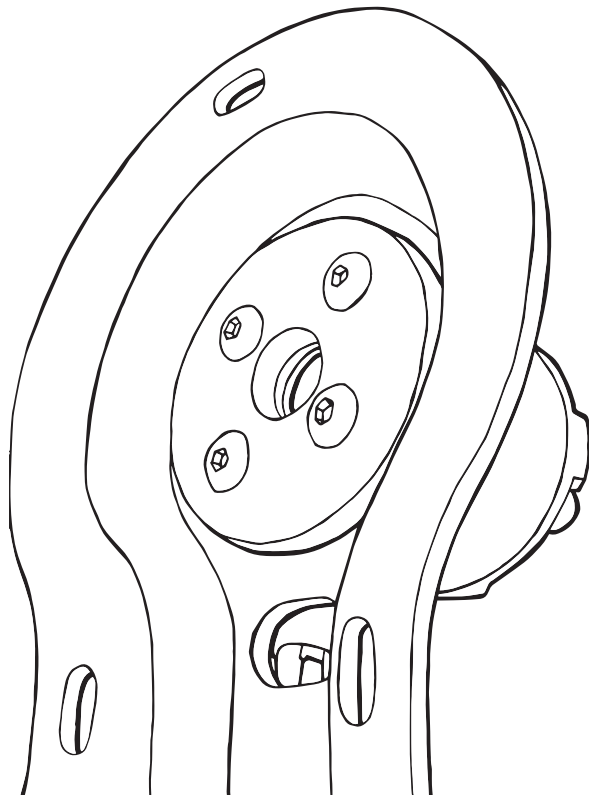
Note: Mount is INSIDE the frame



NOTE: DO NOT USE LOCTITE OR ANY SCREW ADHESIVE ON YOUR SCREWS. We promise the Screw Gods will not smite you and send your motor flinging off your frame if you don't. The motor mount was specially designed to grip your screws and help prevent the need for Loctite. If you do use Loctite, however, the Frame Gods, who are division of the Plastics and Chemistry Gods, will reign down cracks on your frame. (That's our way of saying the chemicals in Loctite interact badly with the plastics in the frame. So don't do it.)

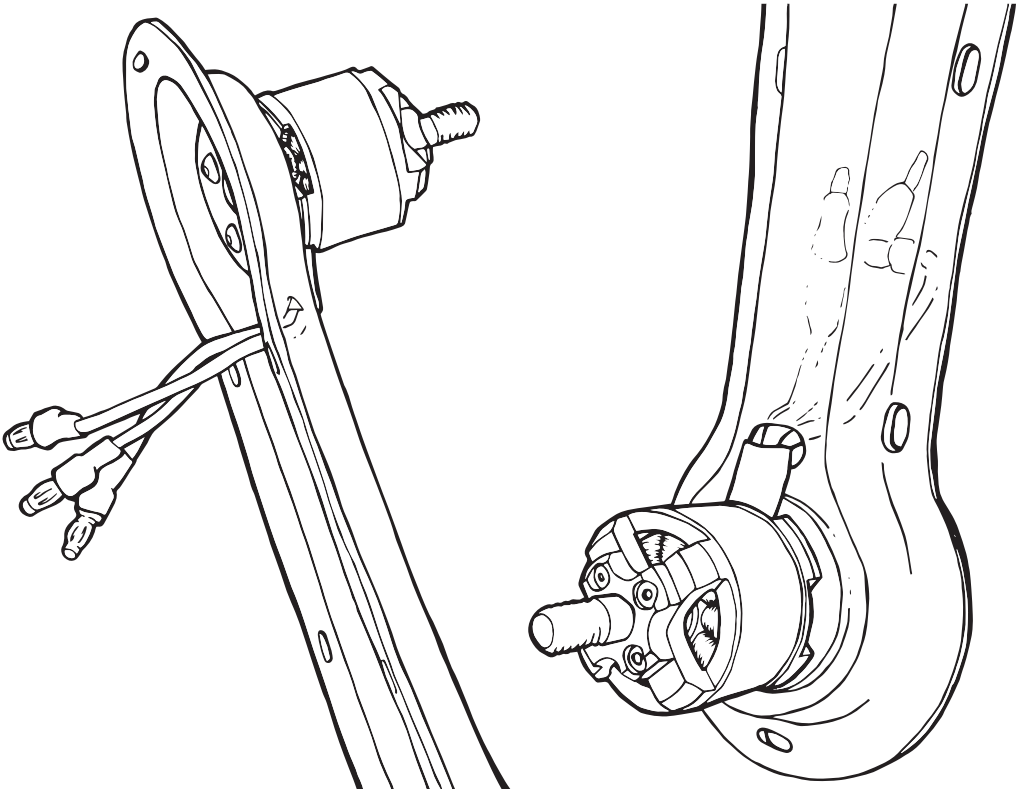
Then get a CCW motor (double check you've got the right one!) and align it so its wires are pointed toward the center of the frame. Then line up the screw hole in the bottom of the motor with the tip of the screw sticking out of your frame. Screw in the motor until it is firm, but not so firm you can't swivel the motor a bit to get the other three holes to line up. Then screw in the other three screws.

Once you've got all four screws in place, go back and tighten all four screws firmly but not too tightly. The head of the screw should be flush with the wood mount. **DO NOT OVERTIGHTEN.** If you screw in as hard as possible, you'll drive the screw into the motor's internal parts and permanently damage it. If you're sinking the screw into the wood, you've gone too far. Just a firm fit is good.



Do this for all four motors, making sure your CCW motors go on Arm 1 and Arm 3 and your CW motors go on Arm 2 and Arm 4.

Now string all the wires coming out of the motors through the little slot in the frame next to the motor. It's easiest to string these through one at a time rather than all three at once.



Mounting your Control Board to your Power Distribution Board

Estimated time to complete: 10 minutes

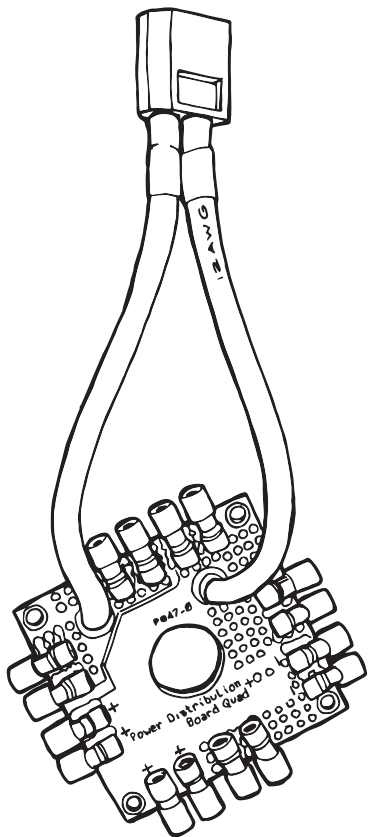
Set your frame aside and get out your KK 2.1 Control Board (The one that has a “Multi-Rotor Control Board” sticker) and your Power Distribution Board. Inside the Control Board box you’ll find four long black bolts with little silver nuts. Now take a moment to get familiar with

your Control Board. On the bottom of its case you’ll see a small arrow and the word “forward.” On the top is a label that reads “Multi-Rotor Control Board.”

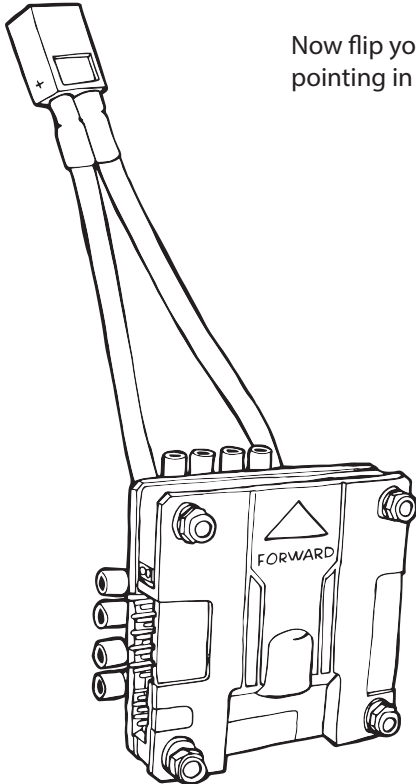
Place your Control Board on the table with the label-side up and the forward arrow pointing away from you. You’ll know you’re in the right position if the words on the label are right-side up. If they’re upside down, spin it around. If you are seeing the arrow, flip it over.

Grab your Power Distribution Board and you’ll see a thick red and black wire with a yellow tip coming off of it. This is your power cable, which will connect to your battery. You’ll need to make your Power Distribution Board as flat as possible, so split the red and black wires apart and orient the wires so the black wire is to the left of the plugs closest to where it attaches to the board and the red wire is to the left of the plugs closest to where that wire is attached.

NOTE: If you squint, it looks like a little heart.



Now flip your Power Distribution Board over so the black squishy side is up, and lay it over your KK 2.1 Control Board, sandwiching the power cables between the two boards. The power cables and the yellow tip should be pointing away from you (pointing in the same direction as the “forward” arrow on your Control Board). Insert the long bolts into the four corner holes of the Power Distribution Board and through the four corner holes of the Control Board. Secure the bolts with the silver nuts, making sure they are firm. A few turns with your small-nose pliers should do the trick. Don’t get too enthusiastic about it, though, or you may crack the Control or Power Distribution boards.



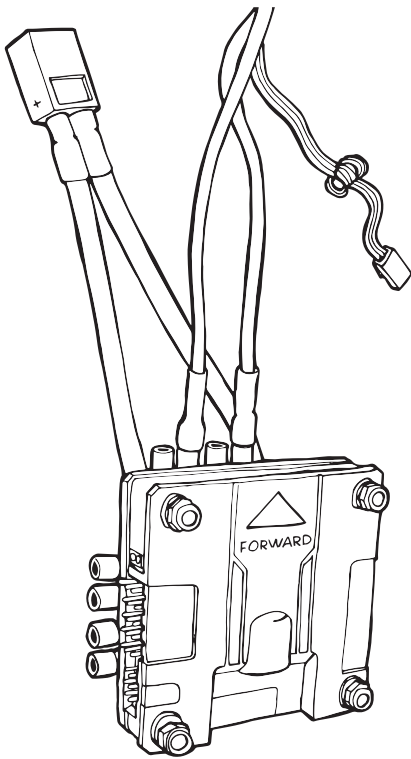
Now flip your boards over and make sure the “forward” arrow is pointing in between your power cables.

Attaching your ESCs

Estimated time to complete: 20 minutes

Now you’re ready to plug in and test your Electronic Speed Controllers (ESCs). Pull your four RCMC 30Amp SimonK Firmware ESCs out of their silver pouches. One end has three wires (red, blue and black). These wires will plug into your motors. The other end has two wires (red and black) and a thin cable called a “servo wire.” This end will plug into your Control Board and your Power Distribution Board.

NOTE: Don’t mess these next steps up or you will burn up your ESC.



Plug the red wire from the end with the servo wire into your Power Distribution Board. You can use any of the plugs on your Power Distribution Board EXCEPT the ones on the back (opposite of the forward arrow on your Control Board).

Make sure the red wire goes into a red-colored plug on your Power Distribution Board, and plug the black wire into a black-colored plug. If you reverse this, you will burn up your ESC, so be careful and double-check your work.

NOTE: Any spare plugs you don't use can be used at a later time if you ever want to customize your Hiro with lights, FPV cameras, camera gimbals, or other components.

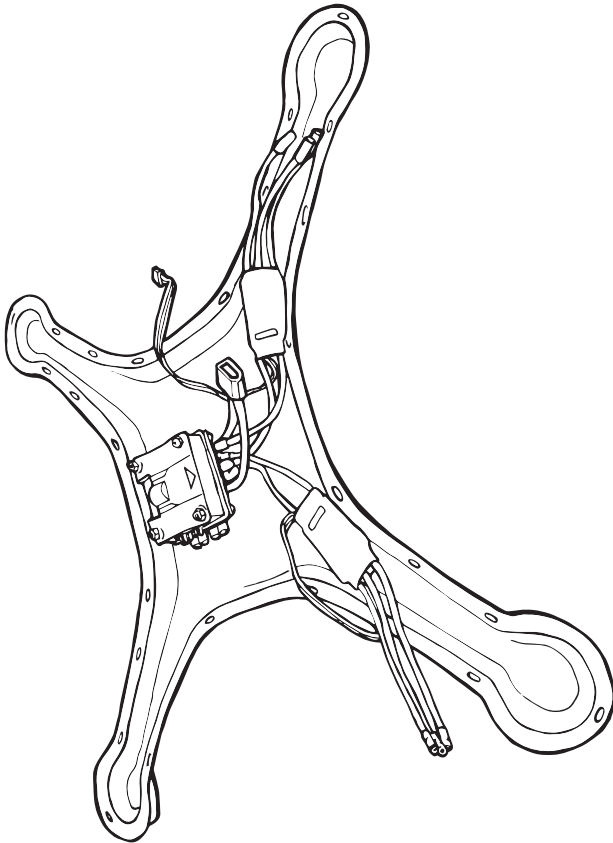
Do this for all four ESCs. It doesn't matter which set of black and red plugs you use, but you'll want to space them out a bit. We recommend plugging one ESC into the right side of the Power Distribution Board, one into the left side, and two into the front. Remember: don't plug anything into the back plugs.

Now grab your bottom shell and lay out your four ESCs in the arms and the Power Distribution Board/Control Board into the center to test your layout.

Position the Distribution Board/Control Board in the center part of the frame, with the black, squishy side down and the forward arrow up. The forward arrow and the battery cable should be pointing between Arm 1 and Arm 2. Slide the board to the back of the frame so the arrow mark sits right on top of the middle of your frame.

Why is this important? Because the computer chip important to navigation is located right below where the arrow is on the case. Putting that chip in the center of the drone makes a big difference in how it flies.

Now take a good look at what you've got and you'll see why you can't use the back plugs on your board. They should be right up against the back of the frame and fairly unusable.



With the boards in place, the ESCs should arrange easily about $\frac{1}{4}$ of the way up each of the arms, more or less. It's okay to have a little extra wire, but if you're finding any wires on an ESC are too short or too long, you might want to move the wires to another plug on your Power Distribution Board to give you more or less slack.

Now look at your KK 2.1 Control Board. On the back side, you'll see a plug called "Programming Port." Grab the flat, grey ribbon cable from the KK 2.1 Control Board box and plug one of the ends (doesn't matter which) into the Programming Port. Give it a good push to make sure it's firmly seated. Leave the other end free for the moment, as this will be the cable you'll use to connect your Programmer to the board when you're tuning it. Just plug in the cable and leave it there for convenience.

Now grab your double-sided tape tabs and attach them to the four corners of the squishy side of the Distribution Board/Control Board, then stick it to your frame in the position you just tested out.

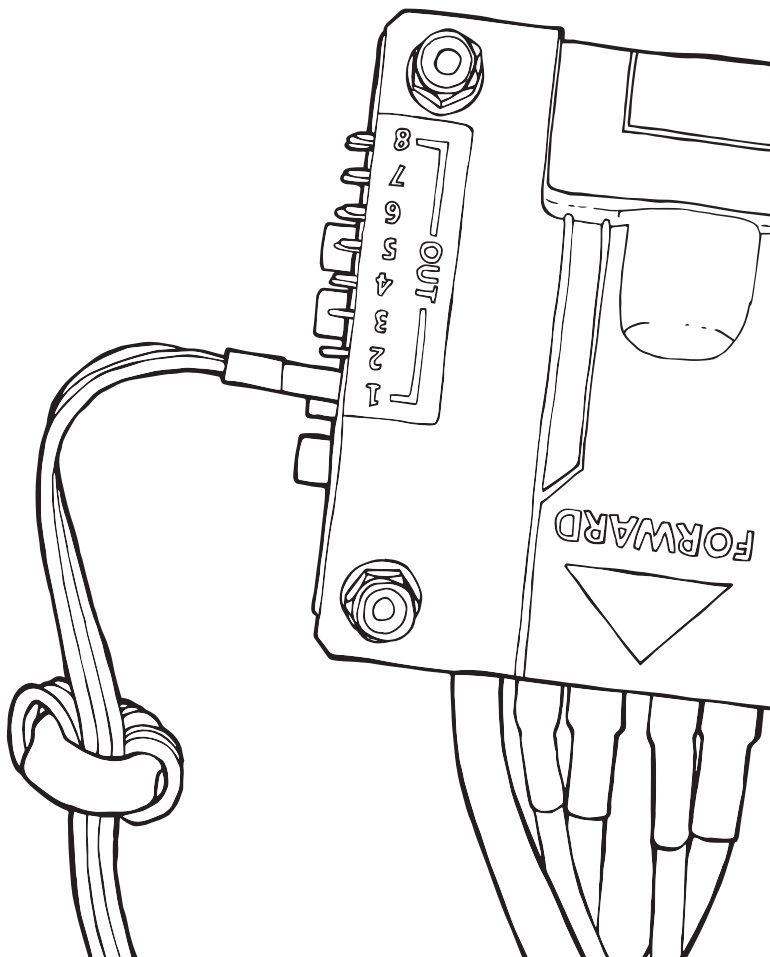
Attaching the Servos

Estimated time to complete: 5 minutes

Now you're ready to attach all those servo wires coming out of your ESCs. Take a look at your Control Board. On the right side, you'll see a bunch of "Out" pins numbered 1 through 8.

Start with the ESC you plan to put in your new best friend, Arm 1. Holding the connector on the servo wire with the white wire up, plug the servo wire into the pins on the right side of your Control Board in position 1. Do yourself a favor and put a small piece of tape on this ESC so you can later identify it as ESC 1. You will need to know this later.

Now that ESC 1 is all plugged in, place it back in Arm 1.



Now do the same with ESC 2 (the one that will go in Arm 2), plugging it into to position 2 on your Control Board. Follow up with ESC 3 and ESC 4 into positions 3 and 4.

Attaching Your Receiver

Estimated time to complete: 15 minutes

Now is the time you'll plug in your receiver. This is part of a matched set with your transmitter (the thing in your hands you use to steer your drone). Because there's a lot of transmitters out there with varying degrees of complexity and prices, we've left this decision up to you. You'll connect your receiver to your KK 2.1 Control Board using servo cables we've included with your kit. We've given you three cables, but you may only need one.

Refer to the manual for your transmitter/receiver package on how to hook it up to your Control Board.

A Little About Receivers

There's a lot of technical talk, here, but we'll try to make it as understandable as possible.

This is just a bit of background and shouldn't be used as your instructions. You definitely want to use the instructions that came with your transmitter/receiver set to do the actual installation properly.

There are, for the most part, two kinds of receivers: "PWM-based" and "PPM-based," which is sometimes called "CPPM." These are the two languages your transmitter and receiver use. You need to know which type your transmitter/receiver set uses before you plug in.

If you use a PWM-based receiver, it's pretty straightforward. Look at the wires coming from the receiver and match them with the plugs on the left side of your Control Board. "AIL" will go to the "AIL" plug, "ELE" will go to the "ELE" plug, "THR" to "THR," and "RUDD" to "RUDD." (Side note: Those stand for "aileron," "elevator," "throttle," and "rudder.")

With a PWM-based receiver, for those four channels you'll plug the AIL servo into the AIL channel, the RUDD to the RUDD channel, the ELE to ELE, and the THR to THR.

On your receiver, there will be a fifth channel that's used for the self-leveling mode. This could be called "AUX," "Gear," "Channel 5," or some other name, depending on your receiver's manufacturer. You need to refer to your receiver's manual to know what it's named. This allows you to switch between manual-leveling mode and self-leveling mode using a switch on your transmitter. There are other methods of doing this switching, but we highly recommend you do your switching through your transmitter by plugging in your "AUX" to the AUX channel.

If you use a PPM-based receiver, all information for AIL, ELE, THR, RUDD, and AUX come through one servo cable. Plug the PPM output wire from the receiver into the "AIL" plug. Keep in mind, though, if you use a PPM receiver you will have to make a final adjustment in the end of the programming of your Control Board, as the KK 2.1 is set for PWM-based receivers by default.

As we said, this section is NOT to be used as your instructions for connecting your receiver. Don't rely upon it. Instead, make sure to use the instructions for your receiver for connecting it properly.

If you can't find installation instructions for your receiver, you can find links to the most popular receivers on our website at www.GameofDrones.com/diymanuals.

Plugging In Your Motors

Estimated time to complete: 5 minutes

Grab the top shell with your motors attached. You'll notice the wires from the motors are colored red, black, and yellow and the wires from your ESC are colored red, black, and blue.

For all your motors, connect them to your ESCs by plugging them together. Don't worry about being in a particular order. That will come later.

Congratulations! You're almost there!

Getting Ready to Test Your Motors

Estimated time to complete: 5 minutes

Before you close up the hood, you want to make sure you haven't made any mistakes and everything is spinning properly.

First go through all your connections and make sure you've done them correctly, especially the power cables between your ESCs and your Power Distribution Board. If you've mixed up your wiring, you may fry some electronics, so double check it well.

Now, if you've jumped ahead and attached your propellers, back it up, cowboy. Remove those props. You are about to check your motor rotation, and having the props on now can be very dangerous. Never test a motor with propellers attached unless you like the sight of your own blood and don't really care about losing things like fingers, noses, or lips. Props are the last thing you'll put on once you know your drone is working properly. Don't be a statistic.

If You Are Using a PPM-Based Transmitter/Receiver

This section is only for those who are using a PPM-based receiver. If you are using a PWM-based receiver, skip this section. The KK 2.1 is set by default to use PWM, so no extra steps are needed.

First, check and double check your connections before applying power, especially your connections of your ESCs. Make absolutely sure you have everything plugged in correctly.

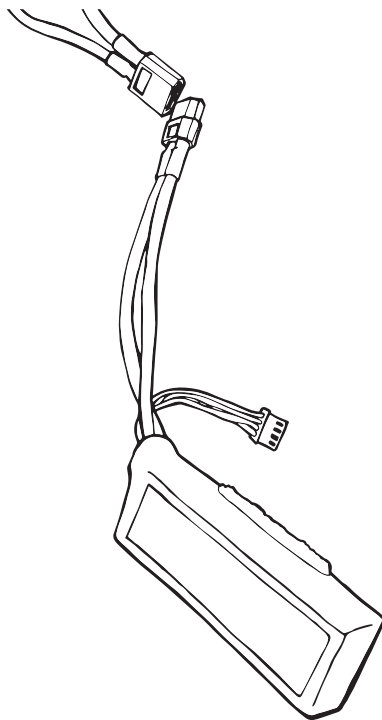
Get out your KK 2.1 Programmer and plug it into the flat grey ribbon cable you attached to the Programming Port. The cable can only be attached in one direction, so you won't be able to attach it the wrong way. Push it in well, as it needs to be well seated.

Turn on your transmitter and plug in a charged battery to the yellow battery plug coming out of your Power Distribution Board.

Press the rightmost key (the "Menu" button) on your Programmer. Now use the "Down" key to scroll to "Mode Settings." Then hit the rightmost button again (which is now labeled "Enter").

Press the "Next" button and scroll to "CPPM Enabled," and press the rightmost key again (now, it's the "Change" key) until you see on the screen that the CPPM Enabled setting is "Yes."

Now press the leftmost "Back" button once, which will take you back to the main menu.



Final Test Prep

Now you'll bind your transmitter to your receiver. Check your transmitter's manual on how to do this.

For more information about manuals for the most popular transmitters and receivers, visit www.GameofDrones.com/DIYmanuals

Setting Your Motor Layout

Estimated time to complete: 5 minutes

Now you will tell the flight board how your motors are laid out so it will fly the right way.

Connect your Programmer to the ribbon cable and plug in the battery to the power cable. The screen on your programmer will display that you are in "safe" mode. Press the rightmost "menu" button, and using the "Down" button, scroll down to "Load Motor Layout" and press the enter button.

Using the "Down" button, scroll down to "Quadcopter X mode" and press "Enter." Be careful to not choose the "Quadcopter + mode," as this is a different layout. When it asks "Are you sure?" choose "Yes." You will then see a display of your motor layout, with Motors 1, 2, 3, 4 in their proper places.

Press the "Back" key until you are back on the "Safe" screen.

Testing Your Signal

Estimated time to complete: 5 minutes

Turn on your transmitter and plug in your battery. You'll hear a few beeps, and the Control Board and your receiver will power up.

Now, let's make sure your Control Board is getting signal from your transmitter.

Plug in your programmer if it isn't already plugged in and press the rightmost key on your Programmer to enter the "Menu." Use the "Down" button to scroll to "Receiver Test," and hit the rightmost "Enter" key. You'll see values from the inputs of your receiver. Move the sticks on your transmitter and you should see those values change.

Moving your right stick up and down should change the value for "Elevator," while moving it left and right should change "Aileron." Moving the left stick up and down should change "Throttle," and left and right should change "Rudder."

If you aren't getting these responses, or the responses are reversed (it says "left" when you move the sticks "right," "forward" when you move the sticks "back," or the values between left and right are disproportionate to each other) check your transmitter's manual to troubleshoot your channels or invert your signals on your transmitter. The instruction manual for your transmitter should tell you how to do that.

When all signals are correct, press the "Back" button to return main menu, and unplug your battery.

Calibrating Your Accelerometer

Estimated time to complete: 5 minutes

From the “Safe” screen on your KK 2.1 Control Board, hit the rightmost key to get to your menu. Use the down key to scroll to “ACC Calibration” and press “Enter.”

You will see instructions on the screen. They tell you to place the drone on a flat, level surface that has no vibration and press “Continue.” Make absolutely sure that your surface really is level. Do it on a flat table or a floor. Once you hit continue, the accelerometer will calibrate itself. Just make sure that, once you’ve started the calibration you do not move the drone until it is finished calibrating or it will mess up your calibration and you won’t be able to fly.

Eventually, the screen will change to show you a series of X, Y, and Z-axis values. Hit continue again, and don’t touch the quad until it lets you know calibration was successful.

Press continue again, and you will return to your main menu and unplug your battery.

Calibrating Your ESCs

Estimated time to complete: 10 minutes

This is your last calibration, and it's necessary to ensure your ESCs all have the same values for start and stop. If you aren't lucky enough to have a third arm, it might be good to have a friend help with this.

If the battery is still plugged in, unplug it and turn on your transmitter, and if your Programmer isn't already plugged in, plug it into the ribbon cable.

Plug in your battery and wait for your receiver and transmitter to bind. Then unplug the battery. Do NOT turn off your transmitter. With your transmitter on, move the left stick (your throttle) all the way to full power. Then simultaneously hold down the rightmost and leftmost keys on your Programmer.

While you hold the keys down, have your friend attach the battery. Keep holding them down. The screen on your Programmer will read "Throttle Pass-Through," and you will hear a series of beeps. Keep holding those keys down.

When the beeps end, without releasing the keys have your friend now move the left stick (your throttle) all the way to the bottom. Keep holding the keys down until you hear another few beeps. When the beeping stops, that says all ESCs are calibrated for stop at the same time. You can now release the keys and unplug the battery.

Unplug your programmer from the ribbon cable. Tuck the ribbon cable inside your drone, and store the Programmer in a Very Safe Place. If you ever need to redo any of your calibration tests or change any settings, you can plug the programmer back in to do so. If you lose the Programmer, you can buy a replacement, but that's a drag. Best to not lose it.

Checking Your Rotation

Estimated time to complete: 20 minutes

The direction your motors' spin determines if it will take off or just flop around on the ground.

Place your top shell on your bottom shell, making sure all your wires are inside the frame and nothing's sticking out. Secure the frame with a few zip ties (not too many, because you will need to remove them after you test).

Remove the cap screws on your motors (and keep track that the greens go on Motors 1 and 3 and blacks go on Motors 2 and 4), and carefully wrap a small piece of your tape around your motor shafts so you have a little flag hanging off one side of each shaft. This will help you see what direction your motors are turning. Make sure you only put the tape on the shafts and aren't touching the motors so it impedes their spin.

Plug in your battery, and tuck it inside your drone. Place it on a flat floor or a table with nothing around it that could get caught in the motors. Then arm your drone (refer to your transmitter's manual on how to do this).

Slowly increase the throttle on your transmitter and watch the motors turn. Motors 1 and 3 should spin **CLOCKWISE** and Motors 2 and 4 should spin **COUNTERCLOCKWISE**.

NOTE: This might mess you up because the direction of the spin for each motor is opposite of what was written on the boxes they came it.

Take note which motors are turning in the wrong direction, if any. Then unplug your battery, clip the zipties holding the shells together, open up your frame, and unplug any **TWO** wires between the motor and the ESC on the wonky motor and swap them. This will reverse the direction of the motor. Then close it back up and test again until you have all the motors spinning correctly.

Make sure you swap only the wires between the ESCs and the motors, NOT the ones between your ESCs and your Control Board because, again, fried electronics.

Now unplug your battery.

The Hover Test

Estimated time to complete: 10 minutes

Once you have all the motors turning in the right direction and all calibrations complete, it's time to test whether your Hiro can get off the ground. Unplug your battery and put on your propellers.

Now, before you go throwing any old propeller on any old motor, keep in mind you have left-hand and right-hand propellers. If you've got the wrong propellers on, you will just power up but your drone won't take off.

Look at your propellers. Two have "10x4.5" marked on them. The other two have "10x4.5R" written on them. The 10x4.5R props go on Motors 1 and 3. The 10x4.5 props go on Motors 2 and 4.

To attach your prop, you'll first need a prop adapter. Grab one of the flats of adapters and remove the cap screw on Motor 1. Try to fit one of the adapters on the flat over the shaft of the motor. By trial and error, find the adapter that fits snugly over the shaft but not so tight you have to force it. Keep trying larger and smaller adapters until you find the right fit. Once you've found the right adapter, swivel the flat back and forth until the adapter comes off (it may need help by clipping with a small wire cutter or scissors). The adapter will fit like a little washer inside the lip of the propeller where it attaches to the shaft. If it doesn't fit, you may have to clip off any bits of plastic left over from when you removed it from the flat. Now toss that flat. Or save it. Or repurpose it for something else. Unfortunately, there's only one adapter of each size per flat, so the others won't fit these motors and your used flat can't be

used again. You'll need one flat per motor. Repeat until all four motors are wearing adapters.

Then get out a 10x4.5R prop and, with the numbers on the propeller facing up, slide it down the shaft of Motor 1, fitting it over the adapter and firmly onto the motor. Secure it with the cap screw and tighten it with pliers or a small ½-inch ratchet. Make sure it's tight, but don't overtighten or you may break the shaft.

Repeat this process with a 10x4.5R prop on Motor 3.

Then get out your 10x4.5 props and attach them to Motors 2 and 4.

Having trouble putting your cap screws on Motors 2 and 4? That's okay. Motors 1 and 3 are normal thread and adhere to the old "righty-tighty, lefty-loosey" rule. The threads are REVERSED on Motors 2 and 4, so they're "lefty-tighty, righty-loosey." This keeps your cap screws from coming off when your motors spin! Tighten up your cap nuts with a pair of pliers (or a small ratchet, if you have one), but don't overtighten or you may snap your shaft. A firm tightening is all it needs.

Take your Hiro outside in a clear, flat area where there are no pets or people who may be hit by it. Place it on the flat ground, turn on your transmitter first, and then plug in the battery and tuck it inside your drone. Arm the drone and VERY SLOWLY increase the throttle until it lifts off the ground and hovers.

If it does, you're ready to close it up for good.

If it doesn't, check your propeller rotations and make sure you have the right propellers on the right motors. Fix those issues and repeat the hover test until it lifts off the ground and hovers.

Land, disarm, disconnect your battery, and take it back inside for the final finishing touches.

Finishing Up Your Hiro

Estimated time to complete: 20 minutes

You're so close you can almost taste it, huh? Well then, let's get this finished up!

Remove the zipties you used to temporarily close your drone. Then pull out the clear plastic gaskets and slide the four long gaskets over the flange all the way around the Hiro. Ensure that the gaskets completely enclose the flange on both top and bottom shells. Do not skip the gaskets! Without them, your Hiro will not be damage resistant and the frame may split in crashes.

Then slide the remaining zipties, one by one, into the slots in the flanges, and secure them around the gasket. Make sure to have a ziptie in every hole all the way around your Hiro. Tuck the heads of all the zipties securely against the gaskets and clip off all the ziptie tails.

Now either pop the frame cap into the top hole or leave your Hiro open and just slide the short piece of gasket around the edge of the hole.

You've done it. You've built a drone.

A Few Notes About Batteries and Flying Etiquette

There's a few things every drone owner should know, especially since owning a Hiro is a long-term commitment.

First, a short primer on batteries. Many people don't recognize that LiPo batteries aren't like your standard battery you have in your household items. While usually very safe, LiPo batteries must be respected and treated with care. If left unattended on a charger, stored improperly, or damaged, a LiPo can spontaneously combust. And these aren't little friendly burns. These are big, ugly, burn-down-your-house burns. Yes, this is exceedingly

rare, but yes, it does happen. NEVER, EVER leave a LiPo battery on a charger unattended. Many suggest never charging them indoors, and while that's not always possible, if you must charge them in your house or garage, be sure that you are always in the same room as the charging LiPo and never put it near anything flammable, like drapes, bedding, rugs, furniture, household chemicals, or containers that have been used for flammables like gasoline, propane, or kerosene. Inside or outside, NEVER leave batteries charging overnight.

When you're not using your LiPo, keep it in a battery-safe bag in a fire-safe battery box. Never leave them out loose and NEVER EVER put a bunch of them together in a non-LiPo-safe container.

Do not run your LiPo batteries completely out of charge when you're using them. This damages the batteries and increases the danger.

Regularly inspect your LiPo batteries. If you ever find one of your LiPos is damaged, or if one is puffed up like a little balloon, DO NOT USE IT. Fully discharge it and dispose of it properly.

Do some research on the care and feeding of LiPo batteries so you know what to do and what not to do. We don't want to lose one of our Hiro family due to a battery.

Second, flying etiquette. It's important. You now are a part of the flying community, and you now have a great responsibility to know how to fly safely and properly. There's a lot of scrutiny of drones and their owners. So before you head out on your first flight, you should know and abide by the suggested guidelines of the Federal Aviation Administration and the Academy of Model Aeronautics.

To learn about these guidelines, which will keep you and others safe, visit <http://knowbeforeyoufly.org> and <http://www.modelaircraft.org/files/540-c.pdf>.

Now That You're a Drone Pilot

There's nothing better than being a safe drone pilot. Getting educated and involved in the community is key.

We highly recommend you learn how to fly your drone from experienced trainers. The Academy of Model Aeronautics endorses a number of schools that can get you flying right. You can find a list of RC instruction programs at www.modelaircraft.org under "Education."

We also recommend you start doing fun things with your drone, like racing, combat, and group flying. Check [Meetup.com](https://www.meetup.com) for local drone-flying clubs, or visit GameofDrones.com and check out our community.

Thank you for choosing the Game of Drones® Hiro Build-It-Yourself kit, and more important, thank you for building it. We hope you enjoy flying it, and we're always looking for your feedback. Visit www.GameofDrones.com for more information and to sign up for our newsletter.

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