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## Quadcopter Build for Noobs

All -

I have been following various threads on here for the last month or so and have been inspired to attempt my first RC build, a quadcopter.

I will attempt to catalog the build as I go so that other inexperienced builders will have something to reference.

Before I get started, many thanks to *Old Man Mike (OMM)*, *S11D336B*, *Signguy*, *Reverendrichie*, *Jesolins*, and others for their informative threads and builds.

### QUADCOPTER DEFINED:

*A quadrotor, also called a quadrotor helicopter, is an aircraft that is lifted and propelled by four rotors. Quadrotors are classified as rotorcraft, as opposed to fixed-wing aircraft, because their lift is derived from four rotors. They can also be classified as helicopters, though unlike standard helicopters, quadrotors are able to use fixed-pitch blades, whose angle of attack does not vary as the blades rotate. Control of vehicle motion can be achieved by varying the relative speed of each rotor to change the thrust and torque produced by each.*

<http://en.wikipedia.org/wiki/Quadrotor>

Many resources are available to prospective quadcopter builders. RCgroups member Jesolins has compiled an invaluable list of designs, material suppliers, builder threads, and more in a Mega Link Index linked below. As a novice builder, before you begin your build, I suggest reading about each build design and follow build threads on this forum from the first post to the last.. and then re-reading them all again.

**It is my understanding that the QuadPowered guys will soon be releasing detailed build instructions in the Docs section of the QuadPowered website. I will update the build thread with this information as soon as it becomes available.**

<http://www.quadpowered.com/index.php...d=52&Itemid=68> (Current Docs Section / QuadPowered)

### Quadcopter and Tricopter Info Mega Link Index

<http://www.rcgroups.com/forums/showthread.php?t=1097355>

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### My Build:

After reading through many designs, I have decided to build a quadcopter using the QuadPowered circuit board as I wanted as basic a build as possible with as many options as

available. The QuadPowered board claims to be "Plug 'n Play" requiring very little tweaking. We'll see if it is "noob" friendly!

The following is a list that I have compiled of parts that I intend to use for the build. In the event I vary from this list, I will post a revision. I will address each part in detail with reasons in future posts:

**Frame:** MikroKopter 500mm frame

- \$72.95 [http://www.nghobbies.com/cart/index....roducts\\_id=249](http://www.nghobbies.com/cart/index....roducts_id=249)

**Transmitter (Tx):** Spektrum DX6i (Full Range w/o servos - Mode 2)

- \$168.00 [http://www.toddsmodels.com/SPM6600\\_S...\\_p/spm6600.htm](http://www.toddsmodels.com/SPM6600_S..._p/spm6600.htm)

**Receiver (Rx):** AR6200 - *Included w/above Tx*

**Motors:** Turnigy 2217 20turn 860kv 22A Outrunner x 4 - \$56.16 @ \$14.04 a piece <http://www.hobbyking.com/hobbycity/s...idProduct=5691>

**ESCs:** Turnigy Plush 25amp Speed Controller x 4 - \$49.92 @ \$12.48 a piece <http://www.hobbyking.com/hobbycity/s...idProduct=2163>

**Props:** APC 10x4.7 propellers set - \$8.50 a

set [http://www.quadrifo.com/product\\_inf...fe3e6cd8e13471](http://www.quadrifo.com/product_inf...fe3e6cd8e13471)

**Battery:** Zippy FlightMax 3s 4000mAH 20c / Zippy FlightMax 3s 5000mAH 25c

- \$19.99/\$36.29 <http://www.hobbyking.com/>

**Battery Charger:** Turnigy Accucel-6 50W 5A Balancer/Charger

- \$33.99 <http://www.hobbyking.com/hobbycity/s...idProduct=7028>

**Circuit Board:** QuadPowered

- \$229.00 <http://www.quadpowered.com/index.php...mart&Itemid=72>

**Lippo Alarm:** Cheap E-Bay Lippo Alarm - \$3.00 <http://www.ebay.com>

**Landing Gear:** Foam Pool Noodles - \$4.49 <http://www.supremehardware.com/servl...-Noodle/Detail>

**QP Board Mounting Plate:**

I plan to fabricate a mounting plate out of aluminum from the local hobby shop (LHS) for the QP board. Right now, I plan to mount the aluminum plate above the MikroKopter frame's center plate and under mount the QP board on the aluminum plate.

**Part Choices:**

### **Frame**

There are many frames available for your build, from pre-fab to do-it-yourself. I personally decided on a pre-fab frame as I lack the skills, tools, and time to design a custom frame. I chose

the MikroKopter 500mm frame primarily due to price. At \$73 it is the most affordable complete pre-fab frame available. (To date) Another recommended frame, Rusty's Frame, is a carbon fiber center frame relying on Trex 450 tail booms as arms. This design is often preferred as the arms are very cheap to replace in the event of a crash. See the Multi Index for info on both frames.

There are some new quad projects going on that promise to provide cheaper solutions to quad frames. One such project is *OpenPilot*. The OpenPilot store advertises a 50cm frame very similar to the MK 50cm frame for around \$25. The frame varies by using aircraft grade metal for the arms rather than aluminum. This reportedly provides for a more ridged/durable frame with a small addition in weight. Compared to the \$75 MK price, this may be a good alternative! (Note - As of this update, the OpenPilot store was out of stock)

<http://store.openpilot.org/index.php...e-set-169.html>

In addition to the above option, George over at *QuadPowered* has stated he will begin designing a cheap frame solution in the near future. Stay tuned!

[www.quadpowered.com](http://www.quadpowered.com)

**Side note** - Some have conducted studies to test vibrations in square arms (similar to the MK/OpenPilot frames) versus U shaped aluminum arms (Used in some home builds). It has been concluded that square arms allow for significantly less vibrations to the control board. Bear this in mind when choosing material.

Full study available on [www.diydrones.com](http://www.diydrones.com)

## **Transmitter**

A good Transmitter (Tx) or Radio is a crucial to successful flying. I chose the Spektrum DX6i as it is a highly recommended 2.4GHz system among fliers. This is a 6ch radio with 10 mode memory for a reasonable starting price. One highly recommended competitor is the Futaba 6EX for a little more money.

## **Receiver**

I will be using the AR6200 Receiver by Spektrum. The AR6200 DSM2 6-channel receiver is a great solution for all model aircraft requiring full range up to six channels. This DualLink receiver simultaneously gathers information from two receivers that is processed by patent-pending Spektrum software that combines it to form the most vivid picture of an RF signal. This dual path redundancy, plus the fact each of the two receivers is located in a slightly different location exposes each to a different RF environment and creates a bulletproof RF link in all conditions.

## **Motors**

There are many motors available for your quad. Much research has been conducted to determine the best motor/esc/prop configuration. Credit goes to Old Man Mike and Rusty for their comparison chart. (Attached) The quad community recommends staying with a brushless motor with a KV under 1000 as anything above can cause excessive vibrations. I decided on the

Turnigy 2217 / 20turn brushless motors as they performed well in OMMs bench test and have been used by numerous quad fliers on this forum. One other motor that comes highly recommended is the DT750. Bear in mind, many of these motors are designed in China utilizing cheap guts (wire). Many quad owners spin their own high grade wire on these motors to ensure effective performance. Ask around for personal preferences when choosing a motor.

<http://www.af9y.com/ColorSummary8.jpg>

### **ESCs**

ESCs or Electronic Speed Controllers provide a pulsating signal to the motors to allow for a vary in speed thus resulting quad movement. A good ESC is paramount to stable flying. The ESC must be the proper amp as one too small will burn up and result in engine failure. Make sure your ESCs can support the draw of your motors. Many suggest mounting the ESCs at the end of the quad's arms underneath the props to allow for prop wash cooling. I am using the Turnigy 25A ESCs as they will provide sufficient flow of power to the Turnigy 2217 motors.

### **Propellers**

Many props have been tested by quad owners on this forum. I chose the APC 10 x 4.7s as they are highly recommended for use with the 2217 motors. Prop sizing is important as it directly affects power consumption and lift. Too small a prop will provide insufficient lift and too large a prop will result in excessive motor usage/battery drain. The APC props are reported to be much harder material than the EPP props some fliers choose. It is recommended to use APC props for quads with higher payloads. When purchasing the APC props, make sure to buy them by the set. They are sold with one CW and one CCW prop in a package and are balanced to work with each other.

Bench Test for APC 10 x 4.7 props with Turnigy 2217 20turn Motors and 25A ESCs:

Turnigy 2217/20  
Prop\Watts\RPM\Amps\Thrust  
APC slo 11x4.7\210\6600\19.5\37oz

When mounting props on your motors, there are a few different ways to do it. You can directly mount the prop using a prop adapter (silver adapter pictured in prop parts attachment), or you can use a prop saver (blue pieces and rubber-o-rings pictured in prop parts attachment). The prop adapter will screw directly to the barrel of your motor allowing for the most secure fit of your prop. A prop saver is good for prop shafts that will not accommodate a prop adapter. The prop saver goes on the prop shaft and is then held in place with screws that fasten tight against the shaft, the prop is then mounted with the prop saver washer and then held fast with rubber-o-rings across the top of the prop/shaft from one prop saver screw/bolt to the other. Prop savers can allow for additional vibrations but will work with the QP Board in the event you are unable to use a direct prop mount.

Some prop mounts will require you to reverse the prop shaft on the motor as some motors are sold with the prop shaft exiting the bottom of the motor. (This is often required with a prop saver setup) To reverse the shaft, do the following:

1) You need to remove the motor shaft and reverse it to allow you to mount the motor and prop

correctly. You will have to remove the grub screw and circlip, usually one grub for the can and one circlip for the bearing, or thereabouts. You will then need a method to remove the shaft i.e. a press. If unavailable then wood blocks and a vice will work quite nicely.

2) Of course you might be thwarted if the other end of the shaft does not have a detent or channel cut for the circlip but you won't know this until you remove the shaft and inspect the hidden end.

Concerning props, and this could totally negate the above description, does your prop have a direct mount prop adapter? If so then that just screws to the can and you're done. If possible, best go with this type rather than the rubber prop saver type which will require reversal of the shaft.

For a good walk through on prop shaft reversal, see the below link:

<http://www.machinegrid.com/2009/11/r...-motor-20-22/>

*Many thanks to Tom "Tommygun" for help on this one.*

As a reminder, make sure you have your props spinning in the proper direction! Many thanks to "Sid3ways" for sharing this bit of wisdom with the rest of us.

*Quote:*

*S11D336B (George)*

*For yaw control issues. Double check that your pitch propellers spin CW and your roll propellers spin CCW. Also, load trouble mode and check your yaw gyro. It should read 0 with some deviation. Rotate the board left and right. You should see 500 -1000 without too much effort. If the rudder stick feels really really sensitive it could mean your yaw gyro has gone bad. Check trouble mode first. Make sure your rudder, aileron, elevator values read 0 in trouble mode. Also make sure you are running the latest version of the firmware.*

*Quote:*

*Sid3ways*

*After running through trouble mode and checking all the values, I was stumped. Then I went over the most noob of all things and checked rotation even AFTER I checked it last time when it crashed about 4 days ago. The left prop was spinning CW and not CCW.*

*Now I have to wait for new props to get here. Such a noob...*

## **Batteries**

Batteries are all about weight and power. The lithium polymer batteries are the most powerful batteries available to RC enthusiasts. I have decided to go with a 3s 4000mAh 20c and a 3s 5000mAh 25c battery for my quad. Typically, the greater the mAh and the greater the C, the more powerful the battery. Keep in mind there is a direct correlation between battery power and weight, it's all about weight! (Note: Lithium Polymer batteries are extremely flammable! Keep them isolated in a safe place. Also, swelling in lipo batteries is a sign they are toast.)

## **Battery Charger**

Use a battery charger capable of charging and discharging the voltage of battery you are using. Most battery chargers also come with built in cell balancers to provide for even charging of your battery's cells. Also, some battery chargers are sold separate from the charger's power supply, make sure you have both! I chose the Turnigy Accucel-6 as it came highly recommended on these forums.

### **Circuit Board / Computer**

This is the brain of the operation. If you chose to build a quad absent of Tx mixing you will need to weigh which options you would like available in your quad. Refer to the Multi Link Index for available systems. Some features include: Height Hold, GPS, On Screen Display (OSD), Accelerometer, Compass, Gyro Stabilization. When you chose to use a circuit board, all of the listed features are built in to the board in addition to servos. You will still need a receiver. For my build, I chose the QuadPowered board as it is advertised as a "Plug 'n Play" board, meaning, very little tweaking or electrical knowledge is required to connect to the rest of your quad components.

<http://www.quadpowered.com/index.php...hk=1&Itemid=72>

### **Lippo Alarm**

A lippo alarm is an audible and visual alarm that plugs in to your battery to provide a voltage warning when in flight. This is necessary to know when to land your craft prior to engine failure due to low batteries. Many on this forum recommend a cheap alarm on [www.ebay.com](http://www.ebay.com).

### **Landing Gear**

Landing gear is unique to each quad. Your options are only limited by your own creativity. Keep in mind your landing gear will contribute to the overall weight of your quad, keep it light. Many fliers recommend using pool noodles strapped to the bottom of your quads arms below the motors. This is a very cheap light foam material. Research the various pictures and threads on this forum for ideas.

### **AERIAL PHOTOGRAPHY (AP)**

Most quad builders have intentions of mounting a camera to their quad for point and shoot (P&S) or video photography. Your options in this category depend on the maximum payload capabilities of your quad. Look at the Mega Link Index for good suggestions on camera options and techniques. OMM and some others use the Panasonic Lumix FX35 to shoot video and have posted some pretty incredible (stable) videos on their threads. As a novice flier, I plan on purchasing a Type 3 808 30fps keychain camera for mounting on my quad. I've included a link below. (This camera is very very light weight and is available on Ebay for \$20 - \$25!!) Check out the Type 3 thread for sample videos.

<http://www.ecrater.com/product.php?pid=5006787> (Camera Specs)

<http://www.rcgroups.com/forums/showt...15052&page=113> (RC Camera Thread)

A quick approximation on what your quad will be capable of lifting:

Max Thrust/2 - Empty Weight = Useful Load (Camera)

## **FRAME CONSTRUCTION**

500 mm MikroKopter Frame / See attached pictures and link for assembly instruction

<http://www.ng hobbies.com/cart/index....d=14&chapter=1>

Plastic CD Blank screwed on MikroKopter riser screws - *Possible QP Board Platform* (See attached pictures)

## **WIRING**

Wiring is something I'm clueless about so I'll attempt to post as many pictures and links to example wiring hookups as possible.

<http://www.rcgroups.com/forums/showp...postcount=4698> (Very detailed wiring setup, thanks to Greg)

Wire Connection Options - When connecting wires from your Motors to ESCs or ESCs to Battery Harness, you can use a variety of connectors. Some use a 3mm bullet connection or a Dean's plug. The Dean's plug claims to have the lowest level of resistance compared to other connections (BK 5.5mm, Astro Zero, MPI 3mm, Generic 3mm). I've attached pictures of the Dean's connector being used and a link to where you can find them. *Attached Pictures Thanks to Ken*

You will also need to tie all of your ESC to Battery wires together, you can use a Barrier Strip to do this, available from the below website. *Attached Pictures Thanks to Ken*

<http://www.allelectronics.com/>

**Adapting a battery to power the QP board** - Solder the red and black wires of a servo lead to the red and black wires of the battery. This lead goes to the power plug of the board. Make sure you plug black into the left side and the red/positive to the center. The White wire does not get used. (See Photo in Attachments)

## **SOLDERING**

Solder is an alloy (mixture) of tin and lead, typically 60% tin and 40% lead. It melts at a temperature of about 200°C. Coating a surface with solder is called 'tinning' because of the tin content of solder. Lead is poisonous and you should always wash your hands after using solder.

Solder for electronics use contains tiny cores of flux, like the wires inside a mains flex. The flux is corrosive, like an acid, and it cleans the metal surfaces as the solder melts. This is why you must melt the solder actually on the joint, not on the iron tip. Without flux most joints would fail because metals quickly oxidize and the solder itself will not flow properly onto a dirty, oxidized, metal surface.

The best size of solder for electronics is 22swg (swg = standard wire gauge).

When soldering connectors, make sure your soldering iron is hot then tin your connectors and

wires prior to soldering to ensure a good connection. Also remember to put heat shrink on your wires before you solder the connection. For more information on soldering, reference the Mega Link Index.

## **QUADPOWERED BUILD PRE-FLIGHT CHECKS**

Once everything is together you need to program the ESCs AND Calibrate them. These are two different things. They are programmed and calibrated individually. Read the directions for each model or ASK others. A programming card was very helpful. I thought I had my ESCs programmed via the radio, then tested the programming with the card and realized they were not properly programmed. So, add a programmer to the list of tools.

Also, if you are using Futaba, be sure to reverse all channels except for gain and leave them there. The reverse is not just for programming!

Be sure to use this updated diagram if you are setting up the quad for version 1.999 or later. <http://www.quadpowered.com/attachmen...%20Changes.pdf> The wiring is different then what is in the manual.

Next, update the Quadpowered board with the update client. There are clear directions in the manual for the board.

Get the client here <http://www.quadpowered.com/index.php...d=54&Itemid=75>

After updating to the latest version you can go into trouble mode.

<http://www.quadpowered.com/attachmen...ble%20Mode.pdf>

One thing you need to do that is not stated in the directions is to have the radio on and in the menu for sub trim. Also, to get into trouble mode you remove one of the channels from the receiver. be sure to put the lead back into the receiver so that trouble mode can detect that channel.

Once you're ready to go, step back, take a look at the quad from a distance. Then step back in and look at every nut, bolt, screw, connection, etc.... I missed a tiny screw on one motor shaft and on the first attempt, the motor flew up without the quad

*Many thanks to Kenny (Tahoe) for this post..*

While setting things up, there were a few questions or things I had to continually reference. I've included them below in the event you need them. I'll add more as I think of them.

## **QP Quad Troubleshooting & Reminders**

1. The Parallax Programmer faces the power 3 pin plug on the QP Board
2. The APC props are mounted with the Pusher Props (CW) on the Pitch (Front/Rear) and the Regular Props (CCW) on the Roll (Left/Right) motors. All APC props should be mounted with the writing facing up. The left and right motor spin counter clockwise (CCW) and the front and rear motors spin clockwise (CW).
3. MAKE SURE YOU UNPOWER THE QUAD BEFORE TURNING THE Tx OFF!

4. Bind your Tx to your Rx first, then your Tx to your ESCs, then program each ESC's throttle range so they are all in sync. Do this before worrying about trouble mode.
5. Remember to plug back in whichever servo cable you unplugged on the Rx side of the QP board when you send the board in to trouble mode, so that you can see all the values on the Parallax Terminal while in trouble mode.
6. The onboard gain knob (pot) 12 o'clock position faces the board and the 6 o'clock faces the outside edge of the board. Use this when referencing how far to turn the pot.

## Training Tools

Free flight simulators:

<http://jnaudin.free.fr/uav/qro/qrov21sim.htm> (Quad Model = QRO)

<http://www.flying-model-simulator.com/>

You will need the proper cable to plug your Tx in to your computer, they can be usually be found on eBay for cheap.

## TERMINOLOGY & DEFINITIONS

**Gain** - Gain is the level of correction you want the gyros to use. You want a middle ground because too little makes it hard to fly and too much will make it very twitchy and rock back and forth trying to over correct itself. You plug one end into the spot that is designated for gyro gain and then whatever channel on your RX you want that has either a 3 position switch or dial. It is best to use a dial because you can fine tune the gain with high resolution vs. having only 2/3 settings on a switch.

**CW** - Clockwise *Abbreviation used in prop descriptions*

**CCW** - Counter Clock Wise / Counter Rotating *Abbreviation used in prop descriptions*

## LINKS

<http://www.quadpowered.com/attachmen...er%20Guide.pdf> (QuadPowered Board Instructions)

<http://www.rcheliwiki.com/> (RC Helicopter Wikipedia)

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This thread and quad are a work in progress, please feel free to provide advice, insight, explanations, or suggestions. If you have a better description of anything above, please post it and I will revise the initial thread and incorporate what I can to make this the most descriptive

basic build available. Thanks to all!

Various pictures of quads. Video to soon follow.  
Attached Thumbnails



- [41.1 KB · Views: 1111](#)



- [29.2 KB · Views: 744](#)



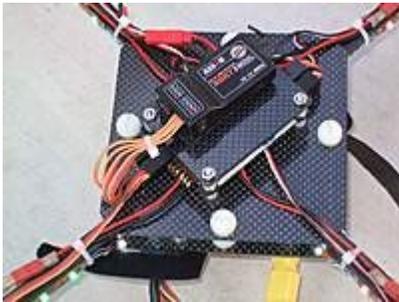
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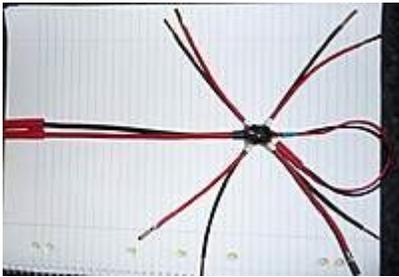
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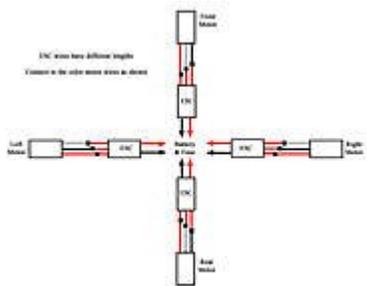
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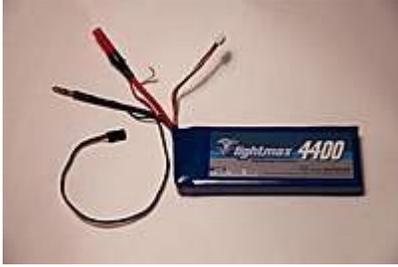
- [101.1 KB · Views: 945](#)



- [Sample ESC / Battery wiring harness56.1 KB · Views: 1084](#)



- [Motor/ESC Wiring Diagram77.1 KB · Views: 1197](#)



- Servo soldered to battery wiring for QP power hookup.44.8 KB · Views: 608



- 500 mm MikroKopter Frame Kit72.2 KB · Views: 545



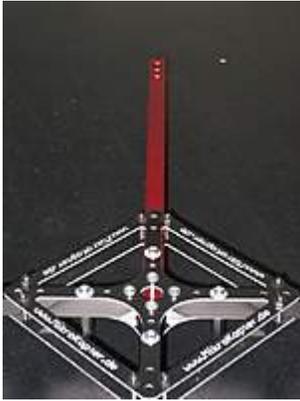
- 500 mm MikroKopter Frame Center Top114.3 KB · Views: 699



- Frame Center Top / Spacer Screws Shown104.6 KB · Views: 459



- [Frame Center Bottom](#) 93.7 KB · Views: 453



- [Frame Center Bottom](#) 66.4 KB · Views: 398



- [Frame Arm Top / Extra Frame Parts](#) 98.8 KB · Views: 402



- [Plastic CD Blank Platform Image](#) 181.0 KB · Views: 490



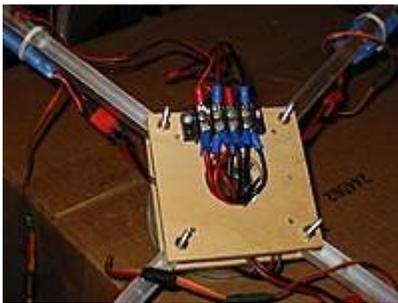
- [Plastic CD Blank Platform Image 289.0 KB · Views: 601](#)



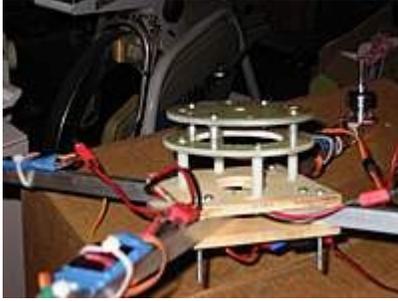
- [Plastic CD Blank Platform Image 369.7 KB · Views: 428](#)



- [Sample Wired Arm with Deans Plug95.8 KB · Views: 670](#)



- [Sample Wired Barrier Strip85.7 KB · Views: 687](#)



- [Wired Center Console](#)73.4 KB · Views: 522



- [Wired Motors/ESCs to Battery](#)85.0 KB · Views: 863



- [Wired Motors/ESCs to Battery](#)66.7 KB · Views: 519



- [Spare Turnigy 2217/20 Motor Parts](#)77.9 KB · Views: 468



- [Turnigy 2217/20 Motor \(Shaft on bottom of motor\)](#)51.2 KB · Views: 465



- [Bottom of Turnigy 2217/20 Motor \(Mounting holes shown\)](#)68.3 KB · Views: 412



- [Top of Turnigy 2217/20 Motor](#)67.9 KB · Views: 417



- [QP Center Mount \(Plastic Recessed Lighting Cover \\$2.00 at Hardware Store\)](#)64.2 KB · Views: 429



- [Center Mount on Frame \(Sits on Plastic Stand-off Screws for Barrier Strip Under Mount\)](#)49.7 KB · Views: 396



- [Center Mount Picture](#)43.4 KB · Views: 358



- [Under View of Center Mount \(Mounted on MK Stand-off Screws with 1.5" Aluminum Stand-off Screws for Top Plate\)](#)57.9 KB · Views: 378



- [QP Plastic Mounting Plate and Matching Cover Plate \(Will Mount Receiver on Top of Cover Plate\)](#)47.5 KB · Views: 372



- Barrier Strip Positioning Under QP Mounting Plate (Sits Approximately 3/4" above MK Frame)51.5 KB · Views: 452



- 1.5" Aluminum Stand-offs (Available from local electric shop)56.9 KB · Views: 321



- Barrier Strip Wired With (2) Jumpers72.0 KB · Views: 700



- Barrier Strip80.0 KB · Views: 677



- [Barrier Strip Under Mounted With Velcro](#) 71.5 KB · Views: 504



- [Under Mount](#) 102.4 KB · Views: 513



- [Under Wiring of Quad](#) 100.3 KB · Views: 489



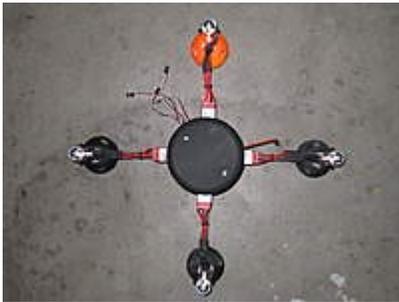
- [QP Platform and Cover](#) 68.2 KB · Views: 415



- [Quad](#)71.2 KB · Views: 492



- [Quad With Wiffle Ball Landing Gear](#)60.2 KB · Views: 566



- [Over Shot of Quad](#)57.4 KB · Views: 378



- [Wiffle Ball Landing Gear / Quad Clearance](#)58.0 KB · Views: 622



- 507

Zippy Batteries Re-wired with Deans (Heat shrunk)76.4 KB · Views:



- Under Mount)54.1 KB · Views: 429

800 Key Chain Camera Possible Mount (Will Mostly Likely Create



- Views: 431

Battery and Keychain Camera Mounted (Velcro/Pipe Foam)66.8 KB ·



- 

Battery Velcro / Under Quad92.8 KB · Views: 413



- [Quad](#)58.3 KB · Views: 331 Battery Wrapped in Foam / Velcro in Center to Prevent Slip Under



- [Quad Arm](#)68.5 KB · Views: 340 Keychain Camera Foam Case / For Vibration Absorption (Velcro to



- [Keychain Insertion / Tight fit \(Will tie safety string to the back of the keychain camera - quad for failsafe\)](#)69.6 KB · Views: 343



- [QP Base Board mounted on first platform](#).91.1 KB · Views: 641



- Mounted on plastic spacers.49.0 KB · Views: 411



- Dual receivers mounted on second platform covering base board on first platform.91.3 KB · Views: 520



- Top view, dual receivers.85.5 KB · Views: 490



- 56.3 KB · Views: 641



63.8 KB · Views: 664

- Attached Images



- Sample ESC / Battery wiring harness installed

*Last edited by Agjake01; May 06, 2010 at 01:46 PM.*

[Quote](#)



Jan 12, 2010, 07:47 PM

• #2

[Agjake01](#)

Registered User



United States, DC, Washington

Quadcopter pictures

**QUADCOPTER PICTURES - Member Quads**

Attached Thumbnails

Joined Dec 2009  
499 Posts



- 434

Agjake01's Quad56.3 KB · Views:



- Views: 466

Mactadpole's Quad134.4 KB ·



- 

Tom's Quad137.0 KB · Views: 536



- Views: 506

UniversalRC's Quad127.6 KB ·



- 492

Pug398's Quad119.5 KB · Views:



- Views: 475

Dalswede's Quad136.9 KB ·



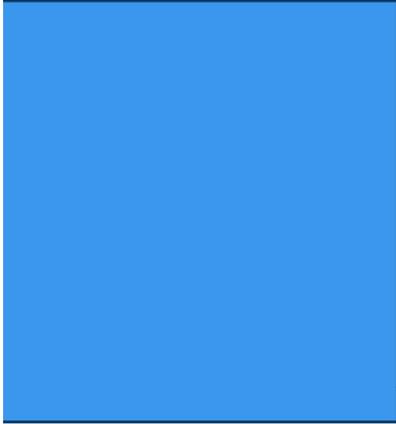
- Views: 425

Nicaimless' Quad136.1 KB ·



- 531

KM28104's Quad70.7 KB · Views:



- 730

FourPlay's Quad45.1 KB · Views:

