ETana Specifications

**Wingspan:** 44in.
**Length:** 45in.
**Wing Area:** ~418 in. sq.
**Weight (without battery):** ~24oz.
**Wing Loading (depending on battery):** ~10 oz. / ft sq.
Thank you for purchasing the ETana. This plane is an aileron/elevator/rudder (full house) setup, designed for the intermediate to advanced pilot who wants a plane with outstanding performance.

Sincerely,
Doug Binder
sales@mountainmodels.com

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Before You Begin

Before you begin building your ETana make sure you read and understand all of the instructions thoroughly.

Additionally, you will need to have the following items. Check to make sure that all of your parts are there and in good shape, and review a couple quick building tips to make this whole process go quicker and easier.

What You Will Need

- Smooth and flat work surface
- Wax paper to protect the work surface
- Thin and thick Cyanoacrylate (CA) glue
- Hobby knife with #11 blades
- Needle nose pliers
- Wire cutters
- Sanding block with 200 grit sandpaper
- Covering material
- Sealing iron for applying the covering
- 4 channel radio minimum
- 4 channel receiver minimum
- Brushless Motor – 150 Watts minimum
- 2 aileron servos (we recommend either the Hitec HS55s or the GWS Naros)
- 2 tail servos (we recommend the Hitec HS81s)
- 2 servo extender cables
- Electronic Speed Control (ESC) capable of handling at least 20 amps
- 3 cell 2100 mAH LiPoly pack (minimum)

Parts List

<table>
<thead>
<tr>
<th>Number in Kit</th>
<th>Description of Part</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Loose Wood and Carbon</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1/4” x 1/4” x 18” Balsa triangle stock</td>
</tr>
<tr>
<td>1</td>
<td>18” x 3/16” hardwood dowel for elevator joiner and pushrods</td>
</tr>
<tr>
<td>1</td>
<td>24” carbon spar tube</td>
</tr>
<tr>
<td><strong>Metal</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.039” x 18” thin music wire for the tail wheel and pushrods</td>
</tr>
<tr>
<td>1</td>
<td>Aluminum Landing Gear</td>
</tr>
<tr>
<td><strong>Plastic</strong></td>
<td></td>
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<tr>
<td>1</td>
<td>Plastic canopy</td>
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<tr>
<td>1</td>
<td>Plastic Nose Cowl</td>
</tr>
<tr>
<td><strong>Bagged Parts</strong></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>E-Z Hinges – will be cut in half to make 14 hinges</td>
</tr>
<tr>
<td>7</td>
<td>6-32 Blind Nuts</td>
</tr>
<tr>
<td>Number in Kit</td>
<td>Description of Part</td>
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<tr>
<td>--------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>7</td>
<td>6-32 x 3/8” Allen Head Bolts</td>
</tr>
<tr>
<td>7</td>
<td>#6 Washers</td>
</tr>
<tr>
<td>2</td>
<td>2” wheels</td>
</tr>
<tr>
<td>1</td>
<td>1” tail wheel</td>
</tr>
<tr>
<td>2</td>
<td>4-40 x 1” bolts for wheel axles</td>
</tr>
<tr>
<td>4</td>
<td>4-40 Lock Nuts</td>
</tr>
<tr>
<td>1</td>
<td>#2 x 3/8” wood screw for motor retainer</td>
</tr>
<tr>
<td>1</td>
<td>6” Velcro strip for mounting the battery and receiver</td>
</tr>
<tr>
<td>1</td>
<td>6” double-sided Velcro strip for battery strap</td>
</tr>
<tr>
<td>2</td>
<td>Neodymium canopy hold down magnet</td>
</tr>
<tr>
<td>1</td>
<td>1/16” x 6” heat shrink tubing</td>
</tr>
<tr>
<td>1</td>
<td>1/4” x 11” heat shrink tubing</td>
</tr>
<tr>
<td>1</td>
<td>1/8” yellow tube to retain tail wheel</td>
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</tbody>
</table>

**General Building Tips**

- Balsa is a lightweight and fragile wood, so you do need to be careful with it; however, you will also need to use a little bit of force to make everything fit properly, so don’t be too timid.
- Join all of your pieces using thin CA (Cyanoacrylate) glue, unless we tell you otherwise. In general, only a small amount of CA is necessary to glue parts together.
- Don’t remove any pieces from the balsa sheets until they’re ready to be used. That way, parts won’t get mixed up or disappear.
- After you remove pieces from the balsa sheets, carefully remove any of the extra material from where the piece was attached.
- Don’t over force your pieces together. If they aren’t going together properly, make sure you have the right pieces and that they are oriented correctly.
- If you want to remove the charred edges caused by the laser cutting process, dampen a cloth with bleach and gently rub the affected areas. Removing the char will not increase the strength but will make it look better.

**Assembly Instructions**

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**NOTE** Experienced builders may notice that this building order goes against the normal building conventions. We have found that fewer pieces get mangled this way, since you are building the stronger pieces first. For example, the tail feathers are at the end of the build process instead of the beginning, so that they are less likely to get underfoot or under cat (which seems to be a recurring problem) and are being built right before they are attached to the fuselage and each other.

**Step 1: Assembly of the Fuselage**

The first thing you are going to assemble is the fuselage of your airplane. This involves assembling the fuselage sides and bottom, attaching the bulkheads, assembling and attaching the motor mount, and finally, attaching the sheeting.
1. Glue the fuselage side and bottom halves together with thin CA. Ensure that they are seated properly with no gaps.

To remove the pieces, gently flex the balsa sheets until the pieces fall out. You may find that you need to carefully trim the extra pieces of wood that originally held the piece to the sheet.

2. Press the blind nuts into the front former and the landing gear mount. You will need to hammer the blind nuts fully in. The landing gear mount is different than that in the photo.

3. Place the formers into the fuselage bottom. **Don’t glue anything until instructed later. You will dry fit the fuselage first.**

   Note: the landing gear mount has been moved to between the second and third formers and must be installed now. The photo below is not correct in this regard.

This photo shows the correct landing gear mount location. Because of the stresses of landing, it is advisable to epoxy the landing gear mount and the two formers shown in place now, ensuring the formers are perpendicular to the bottom and that there is a good
glue bond between the landing gear mount and the formers. Sanding the laser burns will give you a better glue joint. Use epoxy as it is better for high stress loads.

4. Press the sides on to the formers.

5. Place the small former behind the tall slanted former. This small former is only notched into the fuselage sides, not the bottom

6. Place the second to the rearmost former into place.

7. Place the plywood crutch on the front formers.
8. Install the canopy magnet holder in front of the slanted former.

9. Ensure that all the parts are snug and that the fuselage is straight. Apply thin CA to all the joints. Watch that there are no gaps between joints being glued.

   **TIP**
   Be careful to keep your fingers as far away from the glue as possible; otherwise, you might become a part of the model permanently. If you do get stuck, remove yourself as carefully as possible, trying to avoid taking any of the wood with you. Once separated, remove the CA glue from your fingers using nail polish remover, or acetone, making sure you wash your hands thoroughly when done.

10. Install the wing spar supports. Ensure the holes line up perfectly and glue with thin CA.

11. Install the front fuselage former. Due to the motor loads, it is best to glue it with epoxy. Notice the orientation of the blind nuts.
12. Install the rear former and the 1/8” plywood tail wheel support.

13. Glue the 1/16” plywood tail wheel guide to the 1/8” plywood tail wheel support.

14. Install the two 1/16” balsa turtledeck supports. Note that the vertical balsa can set too low so you will need to push it up to the horizontal support while gluing the two into place.

15. Install the two 1/16” balsa stringers to the five rear formers. The stringers are positioned flush with the inside of the fuselage sides, forming a 1/32” gap between the
stringer and the outside wall of the fuselage sides. The 1/32” turtledeck sheeting will fit in this gap.

16. Glue one 1/32” balsa turtledeck sheeting to the stringer you just installed. Only glue the bottom now.

17. You may need to dampen the upper half of the sheeting to get it to bend around the upper half of the formers. Glue the sheeting to the formers and to the upper turtledeck support. The sheeting will extend past the support. You will sand it flush later. Glue the second sheet to the other side of the fuselage. Sand the sheeting down to the turtledeck support.

18. Glue the 3/32” turtledeck top sheet to the turtledeck support.

19. Sand the turtledeck top sheet to form a rounded top.
20. Glue the three ¼” balsa rear turtledeck blocks as shown.

21. Sand the blocks to shape.

22. Sand the fuselage smooth. You may wish to round the corners of the bottom sides and the bottom sheets.

**Step 3: Assembling the Wings**

1. Note that there is a slight dihedral to this wing. There is a top spar and bottom spar and the ribs have a top and bottom. Failure to pay attention to this detail can easily ruin the wing. You will make a left and right wing, one at a time.

2. Set a bottom spar on the table and position the second through sixth rib in the spar, ensuring that the top of the ribs are up. Press the top spar into place. Press the leading edge reinforcement into place. **Don’t glue anything yet.**
3. Position the trailing edge on the ribs. Check that everything is straight and tack the parts together with thin CA.

4. Position the innermost rib, vertical reinforcement piece, and angled trailing edge. Glue with thin CA.

5. Glue the outer rib.

6. Carefully slide the innermost 1/16” ply rib reinforcement into place. Ensure the holes are aligned and glue in place.
7. Insert a blind nut onto the ply reinforcement plate in the top hole.

8. Slide the remaining ply reinforcement plates into place and glue. They are numbered and marked as to which side is up ("TOP"). If the hole is not well lined up, it will be hard to insert the carbon spar later.

9. Install the two leading edge strips and glue in place. The wider strip goes on first.

10. Sand the leading edge to a nice round shape.
11. Install the three parts that make up the aileron servo box.

12. To prevent the inner rib from bowing when you shrink the covering, there are two reinforcement strips that run from behind the spar to close to the trailing edge. Only one is shown in the photo. Install both strips and glue.

13. The first wing is done being assembled. Lay it on the table and build a second wing that is a mirror image of the first. This is to make sure you build a left and right wing.

14. It is a very good idea to run a string from the servo box to the wing root to fish the servo wire out the wing after the wing is covered. Tape the string in place.

Step 4: Assembling the Ailerons

1. Glue the two aileron leading edge strips together. They are positioned at right angles to each other.
2. Position the ribs in the leading edge, slide the trailing edge into the ribs and glue everything together.

3. Position and glue the two parts that make up the control horn pocket. Note: prior to this step, the ailerons weren’t left or right. The pocket faces down so be careful to make a left and right.

Step 5: Assembling the Stabilizers, Rudder, and Elevator

4. Position the horizontal stabilizer pieces as shown below and then glue the joints together.
5. If you will want greater than 45 degrees of elevator throw, you will need to sand a bevel in the trailing edge of the horizontal stabilizer. The side view of the bevel will be something like this:

<table>
<thead>
<tr>
<th><img src="image1.png" alt="Image" /></th>
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<tbody>
<tr>
<td><img src="image2.png" alt="Image" /></td>
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<tr>
<td><img src="image3.png" alt="Image" /></td>
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</tbody>
</table>

6. Position the elevator pieces as shown below and then glue the joints together.
7. The extended leading edge will be rounded with sandpaper. This is the 1/8” balsa in the upper left of the photo below.

8. Install the 1/16” balsa outer rib reinforcement piece.
9. Use the horizontal stabilizer as a width guide, glue the two elevator halves to the connecting dowel. Be careful to keep them level to each other. Glue the control horn pocket as shown. The opening faces down.

10. Glue the vertical stabilizer parts together as shown. The leading edge balsa will be sanded round. The bottom rib is 1/8” balsa

11. Start the rudder by gluing the two leading edge parts together, 90 degrees to each other.
12. The rudder control horn pocket is made up of three pieces of 1/16” balsa. This is built up to 3/16” to give the tail wheel wire something to attach to.
Shaping the Tail Wheel Wire and Attaching it to the Rudder

You need to shape the tail wheel wire and attach it to the rudder before you attach the rudder to the fuselage.

- **Shaping the tail wheel wire**
  
  Bend the 1/32” x 18” wire following these steps:

<table>
<thead>
<tr>
<th>TIP</th>
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</thead>
<tbody>
<tr>
<td>Needle nose pliers work pretty well to shape the wire.</td>
</tr>
</tbody>
</table>

1. Put a 90° bend into the wire 1/2” in from the end.

2. From that bend, go in 1/2” and create a slight 45° bend.

3. From that bend, you want to straighten out the wire so that it runs parallel to the section of wire on the other side of the 45° bend.

4. The photo above is the view from the rear. The bend going up is where you attach the wheel. The side view of the completed wire is something like this:

   ![Diagram](image)

   *This is pushed up into the rudder*

   *This is inserted into the fuselage 1/16ply guide.*

Note that you do not attach the wheel until the rudder is installed to the fuselage. This happens after the rudder is covered. You will cover the rudder, glue the tail wheel wire to the rudder, insert the CA hinges, snake the tail wheel wire through the
fuselage guide, insert the CA hinges into the fuselage, then add the tailwheel. This happens later in the build.

**Step 6: Assembling the Wheel Pants and Landing Gear**

1. You will need to glue the wheel pants pieces together. Below is a photo of all the pieces in the order that they are assembled. One side is assembled right to left, the other side is assembled left to right. The 1/16” ply is inserted inside the second 1/16” balsa sheet.

2. The parts can be glued with thick CA or wood glue. Try to get them reasonably well aligned.

3. Sand the wheel pants to a nice rounded shape.

4. Paint the wheel pants with a few coats of primer, sanded between coats, then a final color coat.

5. Insert a 4-40 x 1” bolt into a wheel. Screw on one lock nut and tighten to the point just before the wheel binds. Slide the wheel into one of the wheel pants with the screw extending out the side of the wheel pants with the slot. Insert this arrangement onto the aluminum landing gear. Fasten with another lock nut.
Step 7: Assembling the Canopy

You are going to assemble and attach the canopy base, which once in place will be used to hold the plastic canopy in place.

1. Position the three 1/8 ply front formers to the canopy base.

2. Make sure that all of the pieces are perpendicular, and then glue the joints.

3. Glue the 3/32” x 6.3” x .5” balsa strip to the notches in the three formers.

4. Draw a centerline down the balsa strip you just glued.

5. Align a 1/32 sheet with the centerline. Glue with thin CA to the balsa strip.

6. Dampen the 1/32 sheet so that it will bend around the formers and glue it to the formers.

7. Glue the other 1/32” sheet to the other side of the canopy base.

8. Trim the 1/32” sheet flush with the bottom of the ply base.

9. Place the canopy base in position on the fuselage. With a sheet of wax paper between the canopy base and the fuselage, position the rear canopy base 1/8” ply in position at the rear of the base. Match the angle of the fuselage former that it rests against.

10. With the wax paper protecting the fuselage from the glue, glue the rear former to the base.

11. Position the plastic canopy over the canopy base.

12. Using a fine point marker, mark the front, sides, and rear of the plastic canopy where it meets the canopy mount. Basically, trace an outline of the canopy mount onto the plastic canopy.

13. Cut out the plastic canopy, using the marks you created above. It is best to make one cut ¼” wide, then cut second time on the line.

14. Wash the canopy in dishwashing liquid. This removes the mold release and allows better adhesion for the glue.

If you plan on painting the canopy, you're going to have to do it before it's all
glued in place. Once the canopy is washed, use a Scotch Brite pad to scuff the plastic so that the paint adheres better. You should use the paint recommended for R/C car bodies (polycarbonate / lexan). This is also the time for you to paint the canopy frame.

15. Cover or paint the canopy base. You can not easily do this once the canopy is in place.

16. Glue the canopy into place using 5 minute epoxy. Do not use CA, it will crack the plastic. Another option is to tape the canopy to the base.

Step 8: Sanding and Covering

The next step is to sand the pieces that need to be sanded and cover everything.

**NOTE** We aren’t going to go into how to cover the pieces themselves, you’re going to have to refer to your covering’s instructions for this information. Additionally, we aren’t going to cover our kit for instructional purposes, since the covering hides too much.

**Sanding the ETana**

What we recommend:

- 200 grit sandpaper for sanding

**What to Sand**

This is a fairly small chore for the ETana; apparently the air prefers sharp edges to rounded ones, so we aren’t going to round any of the pieces. Mind you, by sharp edges we don’t mean pokey bits, you ARE going to have to sand those, we just mean non-rounded bits.

**HINT**

- While sanding, try to go over the entire edge in a sweeping motion, avoiding any part of the assembly that is to remain non-beveled. This will make sure that your bevel angle is even across the entire way.
- Make sure that you sand lengthwise with the grain and not across it, as this will cause less strain on the wood and less chance of breaking the pieces.
- Using a tack cloth, carefully remove the balsa dust once you are done sanding.

**Adding hinge reinforcement**

To give the CA hinges more to adhere to, you will add ¼” triangle balsa to the places where you will insert the hinges. The balsa will be glued behind the angled leading edges you created. These places are:

The outer two and center bay of the ailerons.

The top two and bottom bay of the rudder.
The outer two bays of each elevator.

**Covering the ETana**

Determine what material you’ll use to cover, we recommend using Solite covering material since it is extremely lightweight and won’t crush the balsa when shrinking.

Following your covering material instructions, cover the pieces in this order:

<table>
<thead>
<tr>
<th>TIP</th>
<th>Do not shrink the covering until both sides of each part are covered. This reduces your chances of twisting the surfaces.</th>
</tr>
</thead>
</table>

- **Wings**
- **Fuselage**
- **Ailerons**
- **Tail Feathers**
  - Do not cover the bottom of the vertical stabilizer. This is where it will connect to the sheeting.

**Cutting the Slits for the CA Hinges**

You need to cut slits into the tail feathers to allow for the CA hinges to be attached.

- **Cutting the slits**
  - Cut a 1” wide and 1/4” deep slits into the ailerons, wings, stabilizers, elevator, and rudder, as defined by where you placed the ¼ square balsa reinforcements. The slits should be exactly centered into the depth of the wood.

**Step 9: Installing the Tail Feathers**

For this step, you are going to install the horizontal stabilizer, elevator, the vertical stabilizer and the rudder to the fuselage using packing tape and CA hinges. Also within this section we are going to install the elevator and rudder servos, and route the push-pull system.

Once you’re done with this entire step, you will have a finished tail feather section!

**Installing the Horizontal Stabilizer and Elevator**

First, you are going to install the horizontal stabilizer and elevator. You’re one step closer to completed tail feathers...

**Removing the Covering from the Horizontal Stabilizer**

You need to remove some of the covering on the horizontal stabilizer so that you can securely attach it to the fuselage.

- **Removing the covering**
  1. Position the horizontal stabilizer into the larger rear slot in the side of the fuselage. Make sure that it’s centered by measuring the distance from the outermost point of
the horizontal stabilizer trailing edge to the rear of the fuselage on both sides; the numbers should match. Double check with a quick eyeballing, does it look right?

2. Mark a line on the horizontal stabilizer to show where it touches the fuselage on both the top and bottom.

3. GENTLY cut and remove the covering from between the marks. Be EXTREMELY careful that you are only cutting the covering and not the wood when you're doing this, since scored wood is weak wood. Use a NEW exacto blade. DO NOT GLUE YET

**Attaching the Elevator and the Horizontal Stabilizer**

1. Insert the elevator through the SAME slot at the back of the fuselage, making sure that the control horn is on the right side when looking at the plane from the rear. You have to attach the elevator before the horizontal stabilizer or you will NEVER be able to fit it into position.

   There is a bit of a trick to getting the elevator through the slot. You will need to flip the elevator upside down so that the trailing edge is facing forward, and then holding the piece perpendicular to the fuselage insert one side into the slot. Once in place, rotate the elevator so that it’s right side up.

2. Slide the horizontal stabilizer into place using the same slot as the elevator, making sure that it is forward of the elevator, and that it is perfectly centered and square to the centerline of the fuselage.

**Attaching the hinges**

1. Cut the hinge material in half, lengthwise.

2. Position all the hinges into their slots on elevator, and then maneuver the elevator so that one by one, the hinges can be lined up and slid into the slots in the horizontal stabilizer.

3. Glue the hinges into place.
This is a bit tricky since there is only so much room to move the elevator in order to get the CA hinges into the slots. A bit of patience will go a LONG way.

4. Center the horizontal stabilizer using the hint above, and then glue it into place in the fuselage, being extremely careful to avoid the elevator.

**Installing the Vertical Stabilizer and Rudder**

Next, you are going to install the vertical stabilizer and rudder.

**Attaching the Vertical Stabilizer**

- Run a bead of thick CA along the top of the fuselage sides where the vertical stabilizer will rest, and position the vertical stabilizer, making sure that the rear of the stabilizer lines up with the rear of the fuselage and that it’s perpendicular to the elevator. Hold in place until the CA sets.

> **Attaching the hinges**

5. Position the three hinges into their slots on the rudder, and then maneuver the rudder so that one by one, the hinges can be lined up and slid into the slots in the vertical stabilizer.

6. Glue the hinges into place with thin CA.

**Step 10: Attaching the Ailerons**

Attach the ailerons to the wing using the same method you used to attach the tail feathers. You will use 3 half CA hinges per aileron.

> **Note**

Make sure that you pay attention to which is the left and right aileron when you are attaching them to the wings. The aileron control pockets need to face down.

**Step 11: Installing the Elevator and Rudder Servos**

> **Installing the servos**

1. The tail feather servo holes are sized for HS55 size servos. If you are using HS 81s, you will need to open the hole by cutting out the back of the opening to the bulkhead towards the rear of the opening.

2. Flow some thin CA into where the servo screws go into the servo openings so as to strengthen the wood. Try not to clog the screw pilot holes, and make sure you allow the glue to dry completely.

3. You will need servo extender cables to have the servos reach the receiver. I recommend taping the extender cable to the servo cable to ensure they don’t disconnect in flight.

4. Position the servos into the servo tray so that they are straight, and then screw them into place using the screws that came with your servos.
Step 12: Attaching the Control Horns

Next, you are going to attach all of the control horns, you will need:

- 1 Elevator control horn
- 1 Rudder control horn
- 2 Aileron control horns

**Attaching the control horns**

Insert the control horns into their appropriate pocket. After checking to make sure that they’re aligned properly, glue them into place with plenty of thin CA.

Step 13: Finish installing the Servos

Next, you are going to install the aileron servo.

You will need:

- 1 - .039” x 18” thin music wire for the pushrods (*Wire*)
- Heat shrink tubing (*Bagged Parts*)

**Installing the aileron servos**

1. Flow some thin CA where the servos will be mounted. Make sure you allow the glue to dry completely.
2. Center the servos, and then screw them down.

**Installing the pushrods**

1. For each wing, cut two pieces of .039” wire 2.5” long. Make a small Z bend in one end of each wire. One wire goes in the servo control horn, the other goes in the aileron control horn.
2. Lightly sand each wire to ensure a good glue joint later.
3. Insure that the servo is centered and then attach the two wires to each other with 1/16” heat shrink tubing cut slightly shorter than the pushrods.
4. Center the control surface and shrink the tubing.
5. Once everything is adjusted, flow some thin CA into the heat shrink tubing to bond everything securely.
6. Use the same procedure to make the tail pushrods except that, due to the length of the pushrods, you will also use a piece of 3/16” dowel to stiffen the pushrod. You will cut the dowel ½” shorter than the distance between the control horns and you will use the ¼” heatshrink.
Correct Control Horn Hole Selection
Hole closer to the control surface = more throw
Hole further from the control surface = less throw

Correct Servo Horn Hole Selection
Hole closer to the servo = less throw
Hole further from the servo = more throw

Note: to get enough travel for good 3D performance, you may find it necessary to lengthen your servo control horn to allow even further travel. I glue a cut off horn to the existing horn then wrap both horns with Kevlar thread.

Step 14: Installing the Motor
We recommend a brushless motor rated for around 150 to 250 watts (more if you’re crazy like us).

Installing the Motor
1. Chose if you want a front firewall mount or a stick mount. Because the motor mount unbolts, you can change mounts later.
2. You will want to glue the mounts together with epoxy, rather than CA. Epoxy can handle the vibration of a slightly out of balance propeller better than CA can.
3. Assemble the motor mount as shown in the photos. Make sure the parts are seated properly to ensure the thrust angles are correct.
4. The firewall mount front piece is 1/16” ply. It is hard to get a good glue joint to this piece. It is recommended to glue some additional triangular wood along the front sides to increase the glue bond area.
5. If you use the stick mount, retain the motor with the 2-56 wood screw.

Step 15: Attaching the Receiver and Speed Controller
We are not going to cover the receiver and speed controller (ESC) specific information, please refer to your manufacturer’s instructions for more information, if necessary.
- **Attaching the Receiver**
  - The receiver is attached within the fuselage, behind the batteries. Use adhesive Velcro and attach it to the ply crutch near the rear. Connect the servos and ESC to the receiver, following the guides on the receiver itself.

- **Attaching the ESC**
  - The speed controller is attached within the fuselage, forward of the batteries. I just let my ESC hang loose. Connect the battery and the motor to the ESC, following the guides on the controller itself.

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**Step 16: Finishing the Kit**
Well, you’re almost there...the end is in sight; just a few more steps and you can go flying, assuming the weather is cooperating.

**Attaching the Tail Wheel**
This is one of those highly overlooked, but extremely important pieces if you want your backend to remain in one piece. For the ETana we are using a tail wheel.

- **Attaching the tail wheel**
  1. Slide the tail wheel over the tail wheel wire.
  2. Place a drop of thick CA onto the yellow 1/8th inch plastic tubing and push the plastic tubing onto the tail wheel wire. Take care to not let the glue touch the wheel until it sets.

**Attaching the Battery**

- **Attaching the battery**
  1. The battery mount is the center section of the plywood crutch.
  2. Determine approximately where the battery will need to be placed to establish your CG. Cut the rough side of the Velcro strip down to 4 1/2” in length, and attach it to the top of the battery mount so that it’s centered on the battery’s position.
  3. Attach the soft side of the Velcro strip to the bottom of your battery pack.
  4. After you attach the battery pack onto the mount, run the 6” double-sided Velcro strip underneath the battery mount, around the top of the battery pack, and then secure it to itself snugly. This acts as a seatbelt, holding the battery pack securely in place.

Typically, losing your battery in mid-flight is a bad thing...a very bad thing...

**Attaching the Landing Gear**
The landing gear is pressed onto the blind nuts and screwed in place. Use washers over the hex head screws and don’t over tighten the screws or you will crush the balsa fuselage bottom.

**Attaching the Canopy**
You will need:
- Canopy assembly (assembled earlier) and 2 Neodymium magnets
Attaching the canopy

1. Glue one magnet to the bottom rear of the ply canopy base, centered on the base. Use thick CA. You may want to lightly sand the magnet where you apply the glue to ensure a good bond.

2. Allow the second magnet to stick to the first magnet to assure the polarity is correct.

3. Apply a drop of thick CA to the end of the second magnet and press the canopy into position in the fuselage, allowing the second magnet to bond the magnet holder in the fuselage. Allow at least five minutes to ensure a proper bond.

Attaching the Nose Cowl

1. Cut out the two nose cowl halves. Test fit them over the fuselage.

2. Glue the two halves together with model plastic glue.

3. Cut out the holes for the propeller shaft and the air inlets.

4. Attach the cowl to the fuselage with clear tape.

Attaching the Wing

5. Mark the middle of the carbon fiber spar. A sharpie works well for this. **DO NOT NICK THE SPAR.**

6. Slide the spar into the fuselage then slide the wings on to the spar, ensuring that the rear wing alignment tabs slide into the slots in the fuselage sides. Check that the spar is still centered in the fuselage.

7. Retain the wing with a hex head screw and washer from inside of the fuselage to the blind nut you inserted in the root spar.

Setting the Throws

You need to adjust your radio trim so that the elevator, rudder, and ailerons are all level. The throws are listed as total travel, and are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Low Rates</th>
<th>High Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ailerons</td>
<td>1”</td>
<td>Whatever you can get out of them.</td>
</tr>
<tr>
<td>Elevator</td>
<td>2”</td>
<td>Whatever you can get out of them.</td>
</tr>
<tr>
<td>Rudder</td>
<td>3”</td>
<td>Whatever you can get out of them.</td>
</tr>
</tbody>
</table>

Setting the Center of Gravity

The Center of Gravity (CG) will affect how the airplane recovers from a nose up or nose down condition (pitch stability). With the CG too far forward, the plane will be quite stable, but require a lot of up elevator to fly level. This will result in an increased low end speed. On the other hand, too far back and the plane will be hard to control, requiring constant input to keep the plane flying straight and level. For the ETana, start with the CG about 4” back from the leading edge at the fuselage. Use this as a starting point, you can slowly move it back as you get more comfortable with the plane.