

ZIPP MANUFACTURING



JAE12G4

Hybrid

A Zippkits R/C Boat

Building Instructions

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www.zippkits.com

Toll Free (866) 922-ZIPP

The JAE series was designed and developed as a result of a joint venture between IMPBA Hall of Fame member Rod Geraghty, David Hall, Ron Zaker Jr. & Martin Truex Jr.

The main difference between this hull and all the others is the use of sharp edges on the bottom of the sponsons and tub, as opposed to curved surfaces. This helps break any surface tension of the water and makes for a faster boat.

This design approach has been built, developed and tested a great deal.

The 12G4 Hybrid kit is a light version of our popular JAE 12G2 kit. About 25% lighter... This reduction in weight is substantially faster, and is still robust enough for everyday heat racing. The JAE 12G holds several world speed records.

The Hybrid refers to a mix of all of the JAE 12G versions. Light, but not too light. Strong, but not too heavy. Easier to build too.

In addition to a marine engine, you can use any air cooled 12, 15, 18, 20 (small block) car or truggy engine, with excellent results.

The kit is not hard to assemble, as all of the hard stuff has been done for you.

That is no excuse to do a poor job with assembly. The better you build this boat, the better it will run. Often the difference between an excellent building job and a poor one is a simple sanding block.

A note about overhangs:

This boat is designed to shear water and prevent any capillary action of water. To do this the tub, ski and sponsons have sharp edges and rear overhangs. These shear the water off and must be left in place and not rounded in any way.

Take the time to read this entire manual, so that you are familiar with all the buildings steps and their proper order. Take your time; make sure you understand everything before you do it and you will be rewarded with an impressive running hull...

Note that the pictures in this manual may be of a different boat to better illustrate a point. This boat is built exactly like the 12G2, so we used some of the same pictures.

This kit is not a toy. Although R/C boating is a fun and rewarding hobby, it can be dangerous if not done with common sense and safety in mind. Just about anyone should be able to build this kit, but it should not be operated by children without close adult supervision.

The manufacturer assumes no liability for damages or other loss in the use of this product, as we have no control over the construction or end use of this product.

Tools and supplies needed to build

- Sanding blocks with 80 and 150 grit paper
- Drill with bits (1/16, 3/32, 5/32, 1/4 inch)
- Square
- Flat file
- FLAT Workbench
- 1/2 ounce Medium CA glue and accelerator
- Good quality 5 or 30 minute epoxy
- Epoxy finishing resin
- Spring clamps, paper clamps, c clamps, etc.
- Razor blade or X-Acto knife
- Masking tape
- Waxed paper
- Wood filler
- Primer
- Paint

Additional items needed to complete

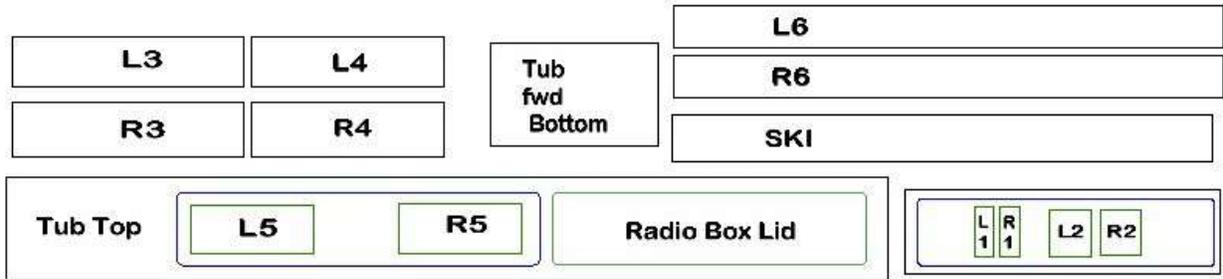
- .10-.20 air or water cooled Nitro engine
- .150 Collet and flywheel for engine (Zipp 3541 for 5mm)
- Starting belt if needed (Zipp 3548)
- .150x16 inch cable w/welded 3/16 stub shaft (Zipp 3475)
- Header to fit engine
- Tuned pipe
- 2 channel surface radio with 2 servos (Hitec HS-225MG and Zipp 5001 recommended)
- Throttle and rudder pushrods (.055 Size) (Included in Zipp 3606 Set)
- 2 pushrod seals (Zipp 3404)
- 4 ounce Fuel Tank (Sullivan SS-4) (Zipp 3473)
- Z21 Strut (Zipp 3494)
- .187 drive dog (Zipp 3485)
- 440 prop (Zipp 4007)
- 10-32 Prop nuts (Zipp 3489)
- Engine Mounts (Zipp 3554)
- Cable grease
- Rudder (Zipp 3477)
- 12 inch length of 1/4 brass tubing (Zipp 3474)

Note that all items need to complete your 12G4 are available as a complete set.

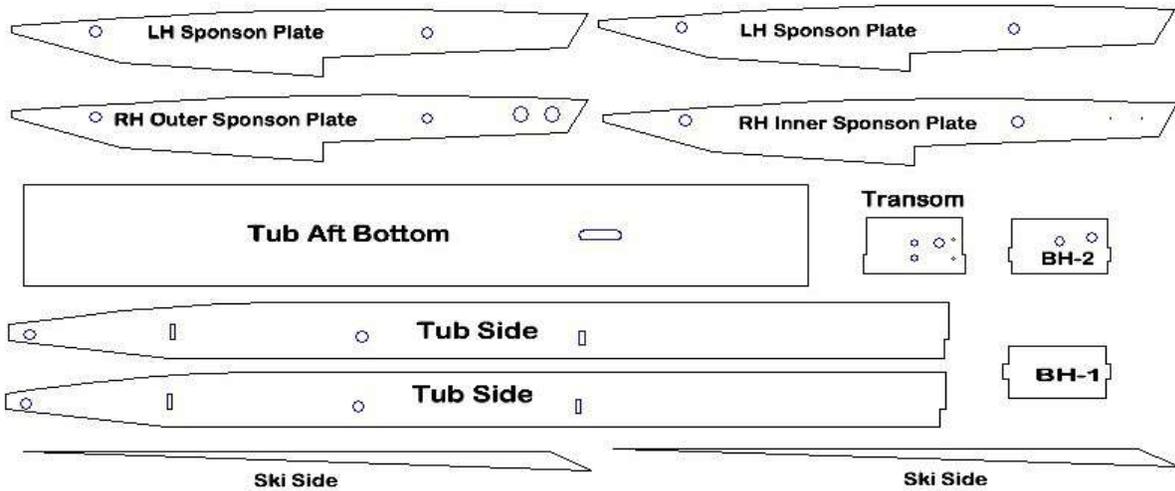
Order part number 3606 Ultimate Hardware Set

Let's identify the parts so that we can easily find them when needed. Mark the parts that are inside other parts.

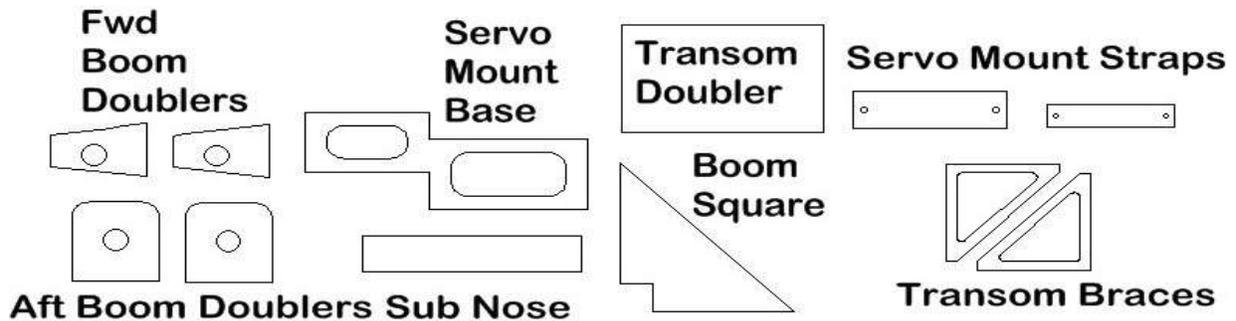
1/32 plywood parts:



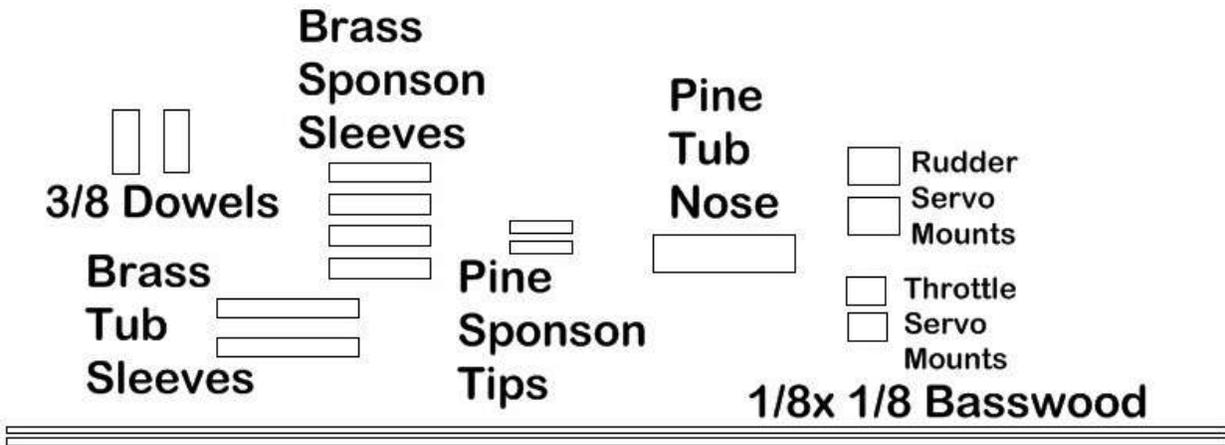
1/16 plywood parts



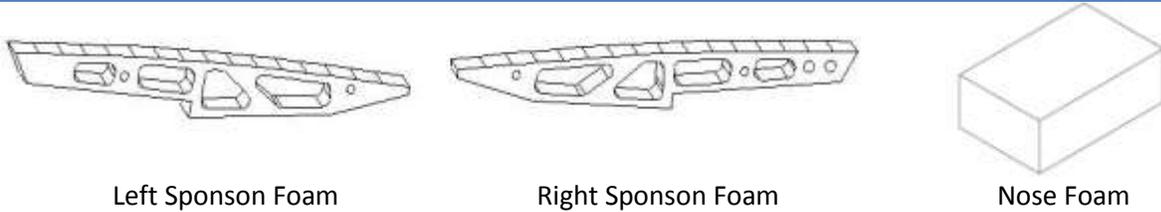
1/8 plywood parts



Miscellaneous parts



Foam parts



Do an inventory of all the parts, to be sure that everything is there. If anything is missing or damaged, contact us as soon as possible, so that we can get replacements to you quickly.

Tub Jig

We recommend that you make a jig for the tub.

This can be as simple as two straight pieces of $\frac{1}{2}$ to $\frac{3}{4}$ inch thick wood.

It can be as elaborate as $\frac{1}{16}$ by 1-1/2 inch aluminum angle with adjustment slots for different tub widths.

We mounted some aluminum angle to a piece of $\frac{3}{4}$ inch MDF.

Either way, you need something to clamp the tub sides to.
Every critical component on this hull depends on a straight, square tub.
Do whatever it takes to get it done correctly.



Tub Jig



Tub sides marked before assembly.



Bulkheads in place. Note position of holes.



Ready for the bottom.

Tub

Let's build the tub.

First, mark the insides of the tub right and left. The sponson boom hole is toward the bottom of the tub side.

Lay these out in a mirror fashion.

Make these marks in the front portion of the sides, where it won't be seen later.

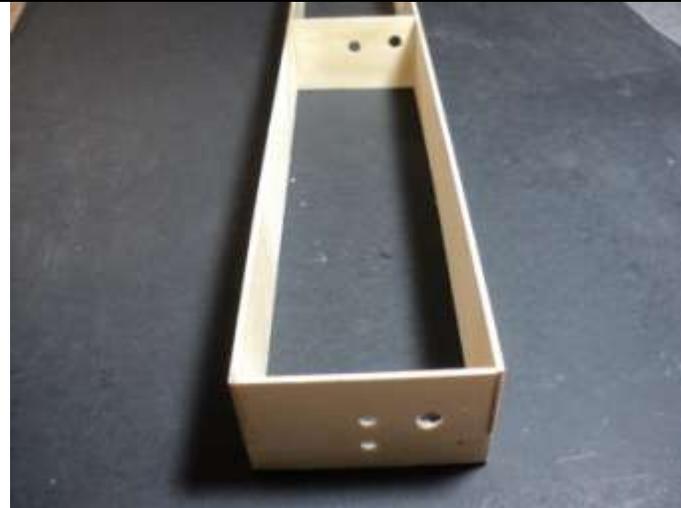
Check the fit of the bulkheads in the right tub side.

Once you are happy with the fit of the bulkheads in the tub side, glue them in with CA. Use the square provided in the kit to ensure each bulkhead is perfectly square.

Glue BH-2 so that the pushrod hole is to the right.

Glue the transom in place so that the 2 small holes are on the right.

Assemble the tub sides on a flat surface. Check the fit of the bulkheads in the left tub side. If all is well, glue the bulkheads in place one at a time, using the square from the kit.



Holes in bulkheads must be as shown...



Tub in jig.



Transom doubler clamped in place.

Flip the tub over and lightly sand the bottom.

Now is the time to use your tub jig. If you don't have the ability to make an aluminum jig, use a pair of thick wooden sticks. Make sure they are straight. Leave these clamped to the sides while gluing the aft bottom in place.

Glue the 1/8 transom doubler in place. Make sure it is flush with the top of the tub.

Put a layer of waxed paper over the jig. Put the tub aft bottom in the jig and set the tub onto it.

The bottom sheet should be flush with the front of bulkhead 1.

Make sure that the aft bottom has about a 1/16 inch overhang at the rear.



Transom braces in place against the transom doubler.



1/8x1/8 square basswood strips in place.



Tub sub nose being glued in place. Tub extends just past jig.

Set the 1/8 ply transom braces in place against the transom.

Measure and cut the 1/8x1/8 basswood to fit between the bulkheads.

These get glued with the bottom and reinforce the side to bottom joint.

You should end up with 4 pieces.

If all is well, glue the aft bottom in place with epoxy.

Also glue the transom braces and 1/8 basswood in place.

Fully clamp the jig sides to the jig.

Glue the tub sub nose to the very front of the tub. This supports the nose for sheeting, and provides a solid base for the tub nose block.

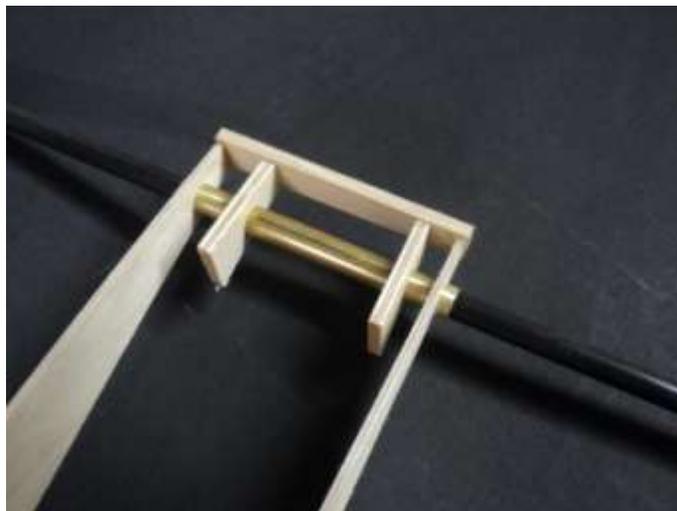
When the tub bottom has cured, let's move on to boom tube alignment.

This is probably the most critical step in the assembly, so take all the time needed to get this right.

Remove the tub from the jig.



Tub sleeves sanded, ready to glue in.



Tub sleeves, doublers and booms in place.



Measuring boom tube distance above flat bench.

Grab the two brass boom tube sleeves, and use 80 grit paper to rough the last $\frac{1}{4}$ inch or so of each end.

Put the rear tube doublers in place and slip a boom tube sleeve and carbon boom tube through the tub and doublers.

Measure the carbon tube on each side of the tub, and center it. Make some pencil marks on the tube, on the outsides of the tub so that you can quickly center the tube later.

Do the same for the forward boom tube and doublers.

The forward boom tube doublers line up with the forward boom tube holes. They only align correctly one way, so be sure that the orientation is correct before you mix any glue.

Weight the tub so that it is flat on the bench.

Clamp the doublers in place **without glue** and measure the ends of the tubes. Both sides of the tubes should be the same distance from the bench.

If not, loosen the clamps and adjust the doublers until they are.

If the doublers or holes now have to be sanded to fit, you must sand them and repeat the measuring process.

This is a critical step in the assembly, and if done incorrectly, your hull will never handle properly.

When you are happy with the height of the tubes above the bench, check to see that the tubes are square front to back with the boom square provided in the kit.

When you have checked and double checked that the boom tubes are straight and square to the world, remove the clamps, but leave everything in place.



Tub sleeves sanded flush with tub side.



Lid frame in place on deck bottom. Skinny end forward.



Lid frame showing "lip" for radio box lid.

Mix up some 30 minute epoxy, and coat the doublers where they will be in contact with the tub sides and bottom.

Align the tubes and clamp in place. Quickly check your measurements and square several times, and make any tiny adjustments before the epoxy starts to cure. Use any excess epoxy to build a small fillet around the brass sleeves and doublers. Clamp in place.

Set aside for at least 3 hours. Be sure everything is perfect before you walk away...

Once everything has cured, sand the brass tub sleeves flush with the tub sides.

Prepare the tub top by installing the radio box "lip". This 1/32 ply lid frame goes inside of the radio box opening to provide a lip all the way around for the radio box lid.

The frame goes with the skinny end forward.

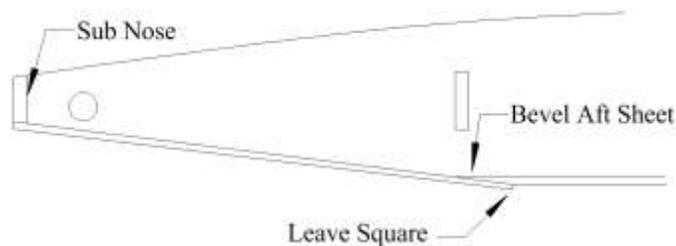
Use a teeny glue bead so that you don't get glue blobs in the lip area. Flip the top over so that you can be certain that the lip is centered, all the way around, on the tub top.

Be sure that the skinny end goes forward. If you don't, the top won't fit the tub.

Glue this in place with CA.



Foam nose block being test fit.



This is what makes a JAE a JAE... Sponsons are similar.



Forward bottom sheet in place. Leave back end square.

Check the fit of the foam nose block. If all is well, glue the foam nose block in place with epoxy or poly glue. Allow to cure.

Sand the foam flush with the tub sides. Be careful not to sand the tub sides too much.

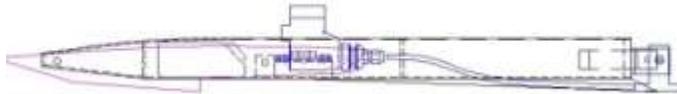


Foam sanded to match tub sides. Note angle sanded on aft sheeting.

This foam is needed for floatation, in case you shear off both sponsons...

Glue the forward bottom in place with epoxy. Be sure to sand the angle into the aft sheet so that it matches the tub sides. The forward bottom sheet should cover the bevel on the aft sheeting and be left square. Do not sand the rear of this sheet; it needs to have a sharp edge for the water to shear off.

See drawing.



Shaft tube with "S" bends. Available pre-bent.



Take your time with the shaft tub. Leave a lot at the rear.



Looking good...

Install your engine mounts, then screw the engine in place on the mounts. We recommend Zipp Super Mounts.

With the engine in place, we can move on to the shaft tube.

This is another area that will need to be done perfectly for a good running hull. Bending the shaft tube is a piece of cake, if you know the secret.

The ¼ inch brass tubing needs to be annealed.

This will make it easy to bend by hand, without kinks.

To anneal the tube, simply heat it with any propane torch, until it changes color. You will see the brass color change to a sort of blue. It only takes a couple of seconds, so watch for it.

When you see the tubing change color, move the flame slowly down the tube until the whole thing is done. Put a screwdriver in one end of the tubing to hold it while you heat it. Try not to anneal the last inch on each end.

When the tubing has cooled off we will be bending it into an "S" shape. Why an "S" shape?

Tests have proven that a tube with two bends has less drag than a tube with one. The reason is that two bends support the flex cable better, reducing cable whip, and drag.

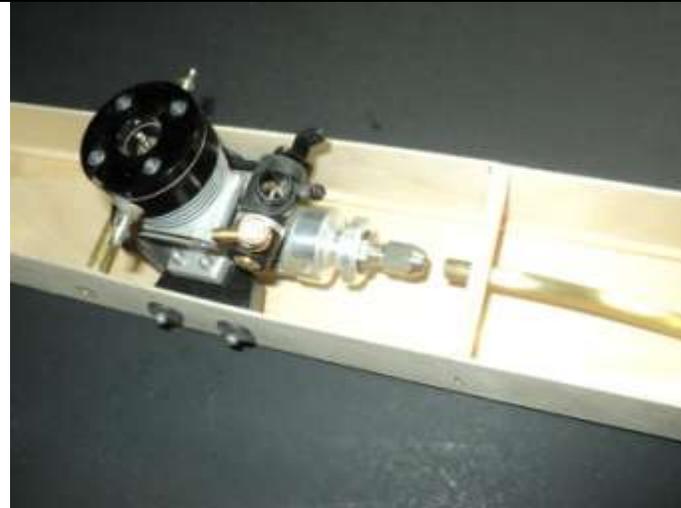
Remove the engine.

Put the shaft tube through the hole in the rear bulkhead, and the hole in the tub bottom.

Let the tube stick through bulkhead by about an inch.

Mark the shaft tube here for reference.

Now study the side view of the shaft tube, and carefully and slowly bend the "S" shape into the tube.



Shaft tube should line up with engine collet.



Ski parts ready for assembly.



Ski sides glued to bottom about 1/8 inch from rear.

Try to make sure that the tube sticks through the bulkhead the proper amount, and the rear of the tube is about 1/4 inch from the tub bottom.

Take your time, and go a little at a time. If you try to rush it, and kink the tube, you will have to start over with a new tube.

When you finish, you should have a nice "S" tube that starts about 3/8 inch behind the engine collet, and continues past the rear of the boat (we will trim it later).

If all else fails, contact us for a pre-bent shaft tube...

Don't glue the shaft tube in place until we check it with the ski in place.

Ski

Assemble the 3 parts of the ski using epoxy or CA.

Glue the ski bottom onto the sides. The rear should be about 1/8 inch longer, and let the front overhang. Clamp or tape this assembly until cured.



Ski sanded to bevel in rear.



Note long bevel sanded in front of ski.



Servo mount parts.

Sand a sharp bevel on the front and rear of the ski bottom sheet, so that it blends into the tub bottom. Do not glue the ski to the tub yet.

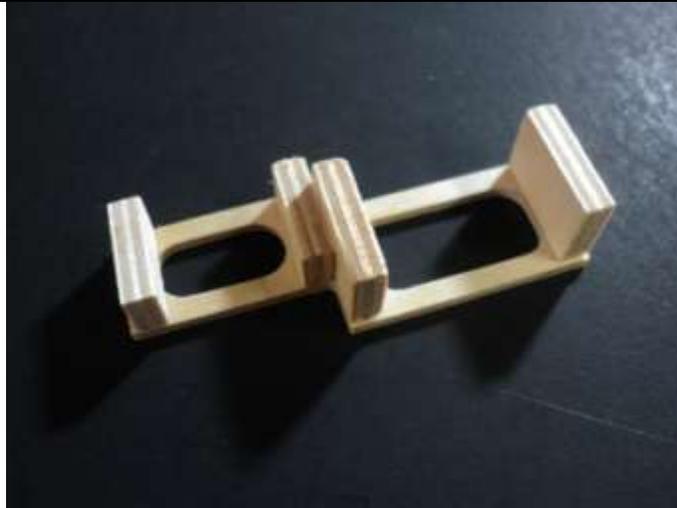
You can seal the inside of the ski at this point. Use epoxy finishing resin.

Servos

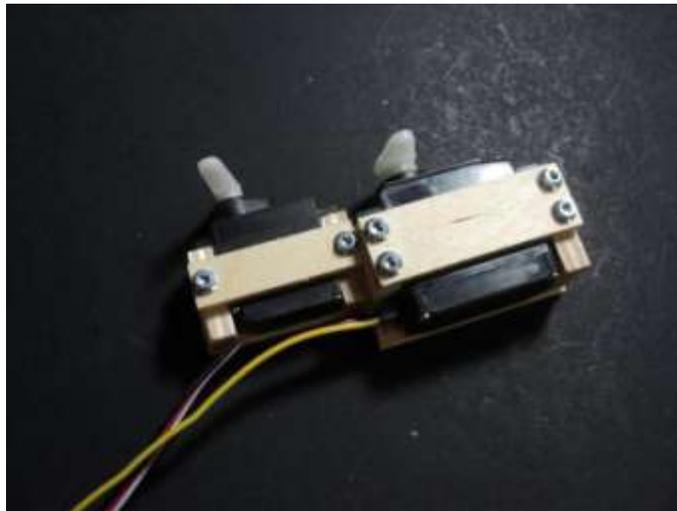
Assemble the servo tray. This is made from the servo mount base, straps and the four plywood blocks.

This tray will fit the Hitec HS-225MG rudder servo and the Zipp 5001 throttle servo.

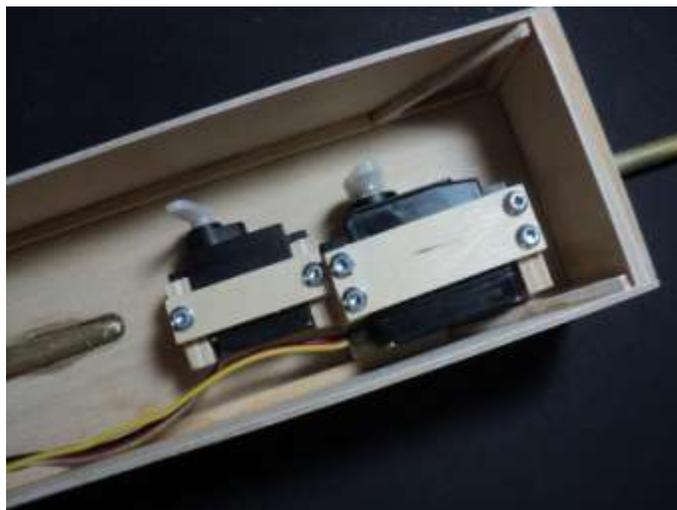
Use epoxy or medium CA to build the tray.



Dual servo mount assembled.



Use servo screws to retain. Don't over tighten...



Mount starts 3/8 inch from transom. Touches side.

Check the fit of the servo in the tray. You will have to cut a recess for the servo wire in one block.

Make sure that the servo is a tiny bit taller than the mount, otherwise, the strap won't tighten the servo.

Use servo screws (not supplied) to attach the straps.

Be sure to drill 1/16 pilot holes so that the mount doesn't split.

Measure 3/8 inch forward of the transom and make a mark.

The servo tray should go to this line, and contact the 1/8 bass on the left side.

Glue the servo tray to the tub floor. Don't get any glue on the servo or wire. Allow to cure.

Use a 1/4 inch bit and drill the pushrod hole in the transom. This hole is already drilled in the transom, you just need to finish drilling thru the doubler.

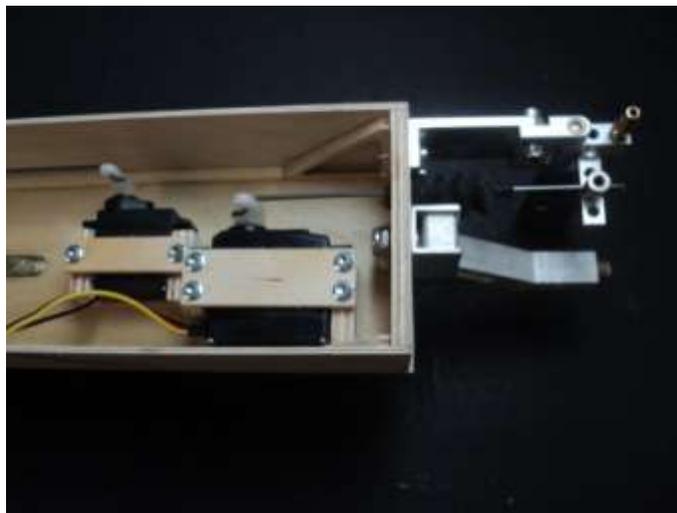
You can hold a block of wood tight against the inside of the tub to prevent the drill from splintering the wood on the inside.

Be careful and don't drill into your fingers.

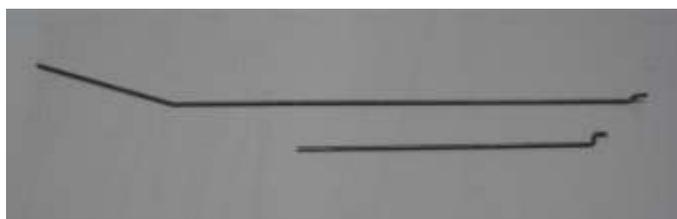
You might as well drill the other holes now. The small holes for the rudder are 1/16 and the holes for the strut are 5/32.



Rudder and strut bracket mounted to transom.



Rudder pushrod in place. Use inner hole at servo.



Pushrods. Note single bend in throttle pushrod.

Go ahead and mount the rudder and strut bracket to the transom.

The pushrods are next.

We like to use .055 music wire for pushrods with a "Z" bend at the servo.

The rudder pushrod is 4-1/4 inches long and the throttle is 9-1/4.

Make a "Z" bend in one end of each pushrod. This will be the servo end.

Put the rudder pushrod in the servo arm as close to the center as possible (all the way in).

This gives reduced throw needed for the rudder.

The rudder pushrod simply goes straight to the rudder arm. You will need to move the rudder pushrod connector in one hole.

Put the throttle pushrod about 5/8 inch from servo center, or almost all the way out.

The throttle pushrod needs one bend near the carb. Make sure the bend is forward of the bulkhead by an inch or so.

Adjust the bend until it meets the carb arm. Install an EZ connector in the carb arm and secure with the metal washer. Open up the hole in the carb arm very slightly so that the EZ connector can spin freely, but not wobble.

Secure the pushrod with a set screw instead of the screw in the set.

We will do final adjustments to the throttle and rudder later.

Remove the servos and pushrods.



Throttle pushrod in place.



Getting tub ready to seal interior.



First coat of sealer done. One more to go.

Remove everything from the boat in preparation for sealing.

Use epoxy finishing resin (or West Systems epoxy) to seal the inside of the tub. Be sure to seal around the boom tube sleeves, pushrod holes and all around the servo mounts.

Use any excess epoxy to seal the underside of the deck, ski and one side of the radio box top. Set these on waxed paper while they cure.

Repeat with a second coat and allow to cure.

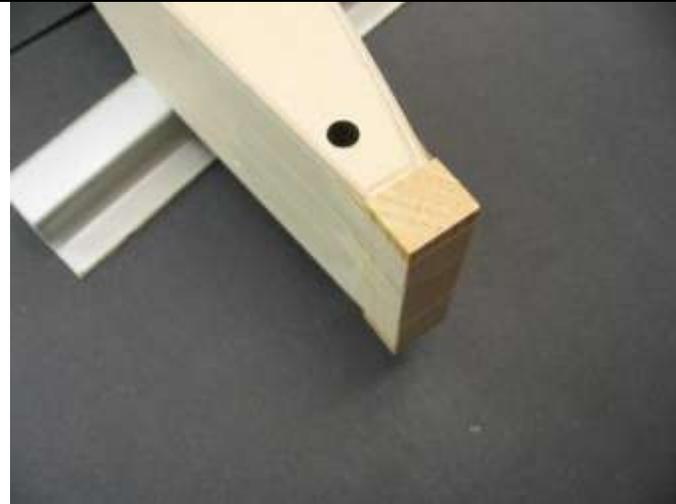
Every part needs 2 coats of epoxy sealer before we can finish up.

Allow to cure overnight.

Sand the top of the tub, so that the sheeting has a flat surface for gluing.

Check the fit of the tub top. If you installed the radio box lid frame correctly, it should fit without issue.

If all is well, glue the tub top sheeting in place with 30 minute epoxy. Make sure that the sheeting is flush with the transom and is centered. Tape and weight until cured.



Pine tub nose block in place.



Sand to match tub.



Pretty sweet nose rounding...

Once the top sheeting has cured, sand the front of the tub flat and square. Glue the pine tub nose block to the front of the tub.

Shape the block to match the tub.

Finish the nose block with a round, blunt nose.



Nice and blunt.

Sponsons

The sponsons are assembled in a specific order for a reason. It is not the fastest way, but it's the only way it can be done right.



Right sponson does all the work...



Dowels should protrude from the outside of RH sponson.



Inside has small turn fin holes.

Gather all of the parts for the right sponson.

The right sponson holds the turn fin, so it has dowels in it,
Grab the right foam sponson.

Test fit the 3/8 inch wood dowels in the 2 rear holes. Also test fit the 2 brass tubes. They should be a nice fit, without slop. Prepare the sponson inside and outside plates by lightly sanding the edges.

We will not be gluing the brass tubes in yet. This will be done during setup.

Mix up some 30 minute epoxy, and coat the inside of the sponson plates.

Do the same for the 2 wood dowels. Put the inside plate in place, being sure that the tubes and dowels protrude on the other side. They should all stick up above the side plates.

Work quickly.

Put the other sponson plate in place, aligning the brass sleeves and dowels. Make sure that the sleeves and dowels go through the sponson plate.

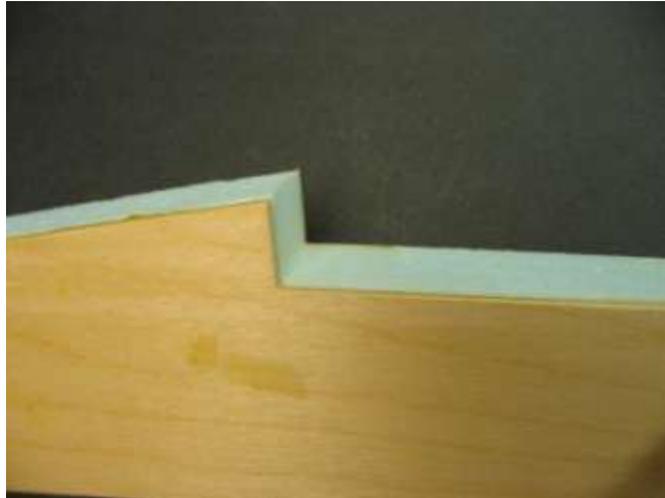
The tubes and dowels should protrude through, and be above the outside plate

Use tape and small weights to hold the sponson and allow to cure on waxed paper.

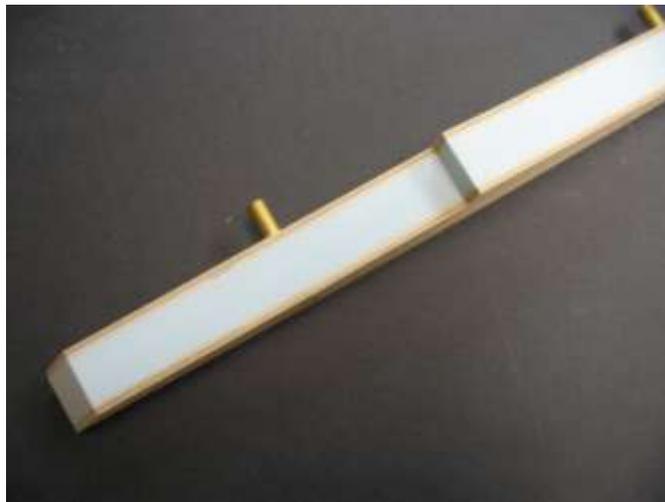
You can also use small pins to pin the plates to the foam.

Carefully remove the tubes and clean of any epoxy before it cures.

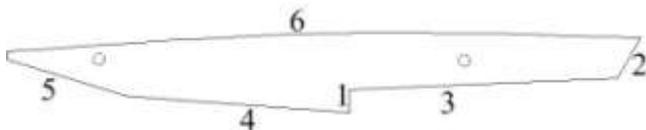
While the right sponson is curing, you can glue the left sponson. Everything is the same, except the left sponson does not have dowels.



Sharp inside corner.



Foam sanded flush with sponson plates. 12G2 shown. Tubes should not be in place yet.



Sponson sheeting order. Needed for correct overhangs.

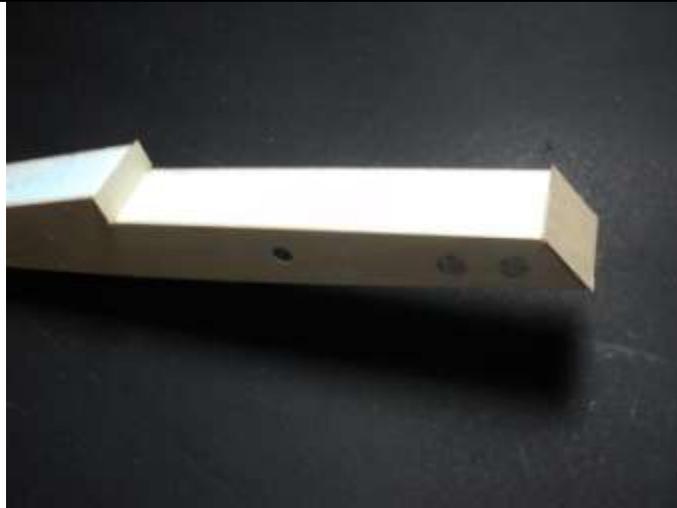
When the sponson sides are cured, let's do the sheeting. This is where the strange order comes in. The sheeting is done in this order because it has to overlap in a specific way.

Follow along and you won't have any trouble. If something doesn't seem to fit, stop and find out why. Epoxy is impossible to remove from foam...

Grab all the sheeting pieces, including the ones you marked earlier.

Use a file to sharpen the inside corner of the sponson step as shown.

Use your sanding block with 80 grit paper to sand the foam flush with both sponson plates.



1 and 2 glued in place.



3 and 4 in place. Both should overhang slight at the rear.



Small overhang helps shed water and increase speed...

Using epoxy, glue R-1 in place on the sponson step. Use masking tape to hold it in place while it cures.
It's okay to repeat the steps on the other sponson.

Glue R-2 to the sponson rear.
Once these have cured, sand the bottom and sides of R-2 and R-1 flush.

Glue R-3 in place, leaving an overhang on the rear.

Glue R-4 with a 1/16 overhang in the rear.

Note that the bottom overhangs don't get sanded off.



Note sharp bevel for 5. Just like tub.



Sponson sheeted.



Nose block.

Once R-4 is cured, sand the front of R-4 flush with the forward bottom. This is exactly like the forward tub bottom. Do not round any corners.

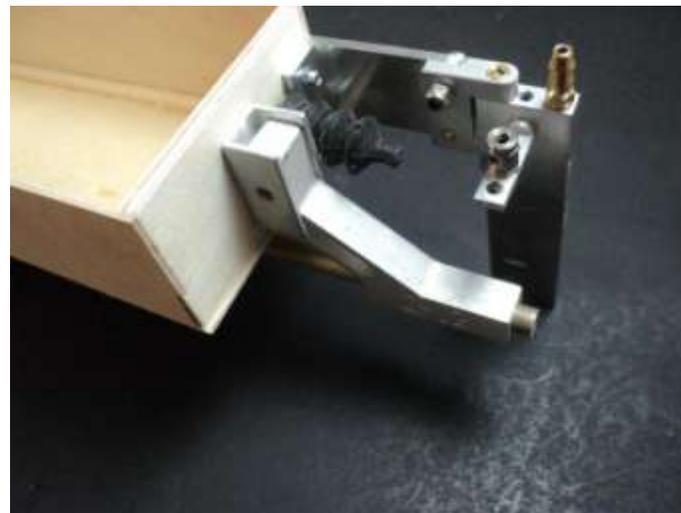
Glue R-5 in place. Match the rear to just cover the bevel you sanded in R-4. Leave the rear of this square, just like the tub bottom.

Sand the top of R-2, and glue the sponson top on (R-6).

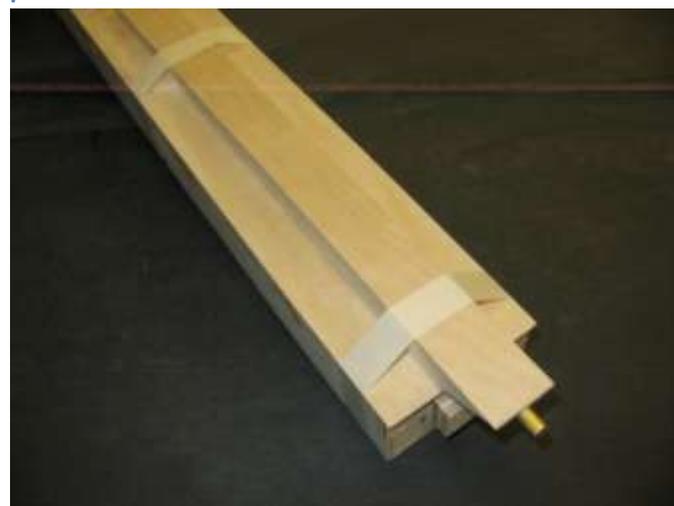
When cured, sand the sponson so that the dowels and sheeting are flush and sand the front until it is flat and square. Glue the pine sponson tip in place with epoxy.



Sponson nose block rounded.



Strut in place



Ski being test fit.

When cured, sand the nose block to a nice blunt tip.

Do not sand off the overhang on the sponson bottom or rear. They should protrude about 1/32 to 1/16 inch beyond the sponson to shear water.

Don't round off any edges...

If you have not done so, repeat on the other sponson.

Strut

Mount your strut bracket to the transom with the 6-32 cap screws, nuts and washers. Attach the strut using the 6/32 button head screw and locknut. Make it so that when the strut is in the middle of its travel, the bottom of the strut is about 1/2 inch below the tub bottom.

You may have to adjust the shaft tube.

Note that the strut slips onto the 1/4 inch brass tube.

Test fit the ski to the tub.

The rear of the ski should line up with the rear of the transom, and the front should blend into the tub bottom. Sand the front of the ski sheeting so that it blends to nothing.

Be sure the shaft tube is just touching the ski sheeting, and level with the tub bottom.

Measure from both sides and make small alignment marks for the ski.

The strut needs to be at the very bottom of the ski for the proper propeller depth.

The strut should touch the ski and be level with the tub bottom (straight).

Adjust the shaft tube so that the ski fits on without having to push it down.



Strut sitting on ski.



Be sure to make a RIGHT and LEFT



Boom tube clamps in place.

When you are satisfied with the shaft tube, glue it in place with epoxy.

When the epoxy cures, cut the shaft tube so that it is flush with the rear of the strut.

Using 30 minute epoxy, seal the bottom of the tub in the area of the ski, and epoxy the ski in place. Be sure that the inside of the ski is sealed with epoxy.

Tape and weight the ski, check alignment, and allow to cure.

Sponson setup

Once the ski cures, prepare the boat for final sponson alignment.

Set the tub on a flat surface and slide the fiberglass booms into the tub.

Rough up the brass sponson tubes and slip them into the sponsons until they are flush on the outsides.

Make sure that the left sponson is a mirror image of the right

With the right sponson on it's right (outside) side, and the left sponson on it's left (outside) side, both sets of brass sleeves should be sticking out.

Be sure of this, as this is one of those critical points.

Slide the sponsons onto the booms and admire your awesome boat! This is the first time that everything is in place so that it looks like something...

The boat should be sitting on the ski at the rear and the sponsons in the front.

We need to measure the angle of attack on both sponsons and correct it if they are different.



Wow! This really looks like a boat now!



Drill bit being used to check AOA.



Measure to rear of ride pad.

To do this, we will use a drill bit or piece of music wire or anything round and about 3/32 inch diameter.

With the boat resting on your FLAT surface, roll the drill bit under the left sponson until it touches.

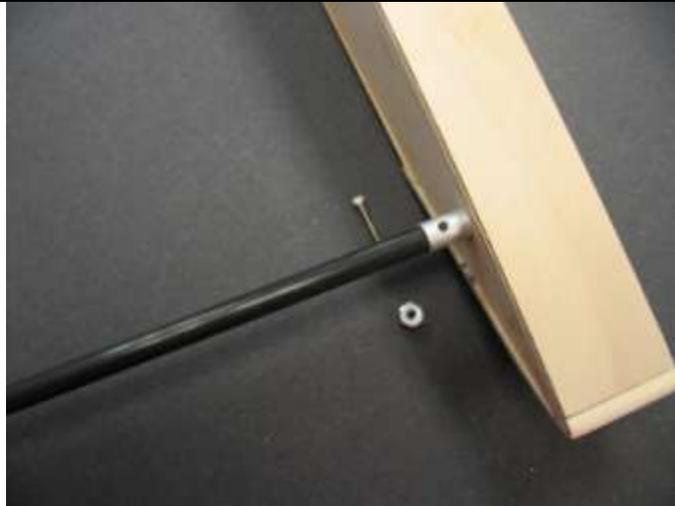
Do this several times and measure from the back of the sponson pad to the drill bit.

Write this down.

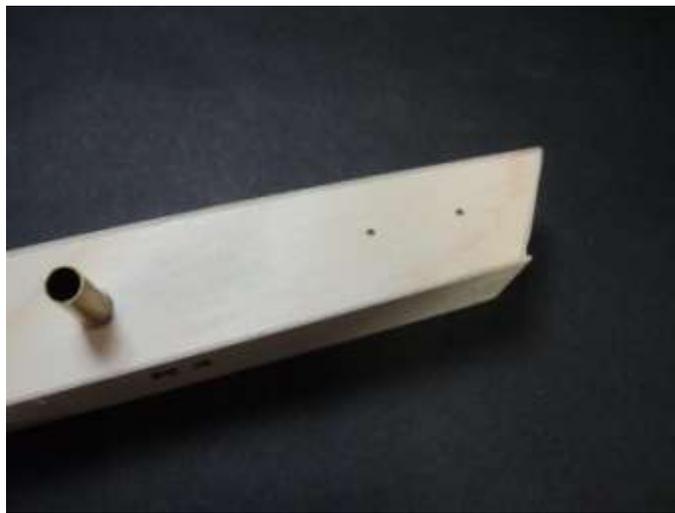
Now do the same for the right side. The actual measurement is not too critical, they just need to be the same, or pretty close to each other.

If you need to make any changes, open up the rear hole in the sponson and use tooth picks to "shim" the brass tube to the correct place. Measure again and once you are satisfied, use 30 minute epoxy to glue the brass tubes in place.

Be sure to wipe up any excess glue and allow to cure untouched.



Brass drilled 3/32 for sponson screws and nuts.



Turn fin holes need to be drilled 3/32 as well.



Turn fin in place. Do not over tighten screws.

Once cured, drill 3/32 holes through the brass and fiberglass booms. Drill these about 3/8 inch from the sponson. Secure the sponsons with 2-56 screws and lock nuts.

Turn Fin

Sharpen the outside of the turn fin.

Mark the center of the turn fin dowels. Drill 3/32 pilot holes on your marks.

Attach the turn fin with the supplied sheet metal screws and washers.

Note that you can later fine tune the fin with the oversized holes.

Remove everything from the boat in preparation for finishing.

Make reference marks or notes with tape on the boom tubes so that you can put them back the same way. Like "right front top" and "left rear top".



Leave about half of threads showing past rear of prop.



Flat spot filed into stub shaft.

Finishing

Sand the tub and sponsons, but be sure to leave the rear overhangs.

Fill any holes or imperfections with wood filler.

Sand everything with 150.

Seal the tub and sponsons with epoxy finishing resin or West Systems epoxy.

Be sure that all wood is sealed.

Scrape off as much epoxy as you can. It will make sanding easier.

Also seal the other side of the radio box top.

When cured, sand with 150 and recoat with epoxy. This coat will use far less resin than the first.

When this cures, wet sand the bottoms of the sponsons and ski with 220.

If you are painting sand the entire boat with 220. Now is the time for primer. Wet sand the primer with 400, and use spot putty to fill any imperfections. Wet sand with 400 and lay on a heavy coat of primer. Wet sand with 600-800 and paint.

Use fuel proof paint or fuel proof clear.

Final Assembly

Assemble the boom tubes with the tub and sponsons.

Slide on the boom tube collars.

Bolt the sponsons to the booms using your references.

Center the sponsons in the tub.



Drive dog, prop and prop nut assembled.



Note that deck is relieved near throttle and starter.



Battery pack in position.

Use boom tube clamps against the tub to keep the tubes in place.

Install your engine mounts

Mount your engine back into the engine mounts.

Be sure that you have $\frac{3}{8}$ to $\frac{1}{2}$ inch from the end of the collet to the shaft tube.

Bolt the strut to the transom.

The strut needs to be at the very bottom of the ski for the proper propeller depth.

Slide your drive dog onto your flex shaft, then your prop. Leave about half of the threads showing past the prop. Tighten the drive dog set screw.

Remove the prop and measure the exact location of the set screw from the end of the shaft. Remove the drive dog and file or grind a flat spot on the shaft about $\frac{1}{8}$ inch wide.

Put the drive dog back on the shaft, aligning the set screw in the flat you made.

Push the flex shaft into the shaft tube, and into the collet. Make sure that the shaft goes all the way into the collet. Measure the distance from the back of the strut to the front of the drive dog. Subtract $\frac{3}{16}$ inch.

Cut this amount off of the flex shaft. This allows you to put the shaft all the way into the collet, and still have a $\frac{3}{16}$ gap between the strut and drive dog.

This is needed because the flex shaft will twist slightly at high speeds, and actually get shorter.

Setup



Strut bushing fits into ¼ inch brass shaft tube, already in strut.



Bushing inside the shaft tube. Flare keeps bushing from traveling.



Water line is taped to tub side when radio box lid is taped in place.

Set the strut so that it is level with the tub bottom, and touching the ski bottom sheeting.

Turn on the radio.

Make sure that the steering trim is in the center. Move the steering servo arm so that it is straight up. Put the servo arm screw in.

Mount the throttle servo arm so that it is at about 2 o'clock with the trigger at neutral. Put the servo arm screw in.

Install the servos and pushrods again, only this time, glue pushrod seals in place with Goop.

Mount your receiver and battery pack with double sided tape or Velcro.

We like to mount the receiver to the under side of the radio box lid with two sided tape.

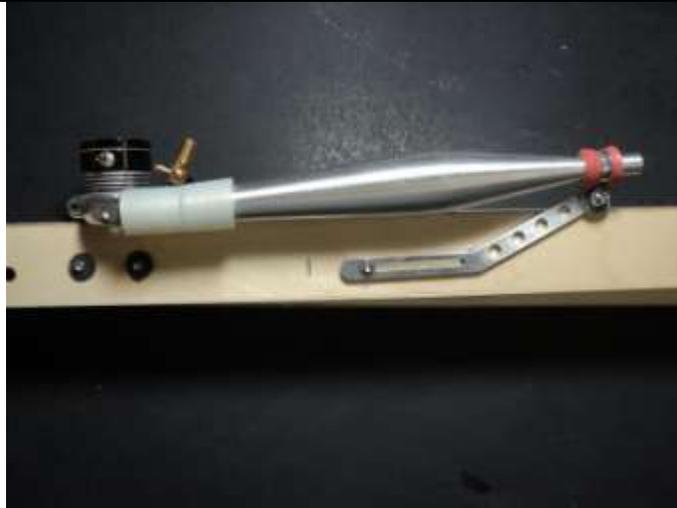
Assemble the fuel tank and mount with Velcro as well.

Mount the rudder and attach the pushrod. Check for correct rudder movement.

Set the carb so that it is slightly open with the trigger at neutral.

Open the throttle and check to see if you get full open. If not, move the Z bend out farther on the servo arm, farther in on the carb arm, or adjust your throttle end point in your radio until it does.

Also push the trigger (brake) to make sure that the throttle closes fully. You may have to back out the tiny throttle stop screw on the carb.



Pipe mounted to tub. Zipp 3542 mount shown.



Take the time to get this right. If you don't, your boat won't shut off and will be embarrassing and dangerous.

Set your rudder throw to about 3/16 inch either way using your transmitter.

Mount your switch through the lid with a waterproof switch assembly.

Make sure your prop is sharpened and balanced.

Support the rear of the tuned pipe with a pipe mount, like the Zipp 3542.

Grease the flex shaft with cable grease or high quality marine grease.

Put your starting belt in place, and then install the flex cable.

Hook up your fuel and pressure lines. Run a water cooling line along the side of the tub. When you are ready to run, simply tape this line to the tub when you tape down the radio box lid.

Note that you will probably want to restrict water flow to the engine, as these small engines need to run pretty hot to be happy.

If the water is cool, you can probably run without any cooling water.

Check and double check all screws and lines.

Center Of Gravity

This hull has a wide range as far as the CG is concerned. If you are using an unusual setup and suspect that your CG will be substantially different than designed, try for anywhere on the turn fin.



The designers strongly recommend that you run you boat first, and don't be too concerned with the CG unless the boat handles funny. Even then, 99% of the time an ill handling boat is either built crooked or has a turn fin issue.

Running

It's better to start with a rich needle setting, and "sneak up" on the best setting. If too lean, it will simply quit. No fun with a boat. Start rich.

The main thing is to get the boat running smoothly and turning well. After that, try different props, pipe lengths and needle settings.

For a bunch of help tuning and running, go to some of the R/C boating web sites. One of the most popular is International Waters (www.intlwaters.com).

Good luck and happy boating!



Additional information

International Waters Website

www.intlwaters.com

Excellent forum for information on nitro powered boats

NovaRossi US

www.novarossi.us

Source for the extremely fast NovaRossi 12 and 21
If you have a need for speed, this is the engine you need...

JAE
12G
12 Nitro Outrigger