

Vac-U-Tug, Jr.™

Model Tugboat

Hull Kit

For Radio Control

Manufactured by Vac-U-Boat™

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Conyers, GA 30012

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Length: 22.5 in. Beam: 7 in. Draft: 2-3/8 in.

Thank you for purchasing this Vac-U-Boat hull kit. I think you will be pleased with all of it's features. It is easy for the novice to build in just a few hours. The drive system is very durable and should provide years of service with very little maintenance. The H.I.P.S. "High Impact Poly Styrene" hull is lightweight and strong. It is trimmed by a rubber rub rail that will greatly reduce the chance of damage to other boats during a collision. At full throttle, it runs at a normal walking pace making it easily controlled by young children without the risk to the the "adult toy boats" in the area.

There is plenty of room inside for your radio gear and batteries. The motor is pre-installed in the removable motor tray. It draws only .45 Amp cruising at full throttle. With a two channel radio, electronic speed control & average servo use, the total draw can average .76 Amp. With a new, fully charged 1,500mA 7.2 volt rechargeable battery, Vac-U-Tug Jr. will run for 1.5 to 2.0 hours! With this setup, about 27 ounces of ballast weight is necessary. This means that you can substitute heavier batteries or add electronic gear without overloading the hull. Oilite® bearings support the stainless steel prop shaft in a custom-drawn brass stern tube. A tube of non-toxic, plastic-friendly Synco Superlube® synthetic grease is included for filling the stern tube. The brass motor-prop shaft coupling uses an acetal plastic dogbone that has self-lubricating properties to minimize wear. The resin rudder is cast over a solid brass shaft and supported at the rudder arm with another Oilite® bearing. The motor tray & skeg screws are stainless steel. A DU-BRO™ E/Z Connector is provided to attach the stainless steel pushrod to the servo .

The boat can be painted with plastic-compatible hobby spray paints. Plastic-safe paints like Hobby Enamels, Krylon *Fusion* or Plasticote paints are the best. Acrylics work well too. If you are building the boat for a young child, I recommend that you spray the boat in their favorite color (even if they want it sprayed pink) then apply the vinyl decals and let them add their own customizing decorations.

Please read the following information, warnings, tips and tricks before building this model. Use caution with glue, the plastic bags, and small parts if children are around. Read the labels of all adhesives, paints, and electronics purchased for this hull. Use extreme care with hobby knives when cutting plastic.

Remember to turn on the transmitter first, then the boat's receiver. Mount the boat switch on the cabin wall so it will be easy to locate. Teach your child to turn off the boat before lifting it out of the water. Even a plastic prop can be hazardous to their little fingers.

Enjoy your Vac-U-Tug, Jr.. If you have any questions, you can contact me at philpace@vac-u-boat.com.

Phil Pace



WARNING:



CHOKING HAZARD - Small parts. Not for children under 3 years.

WARNING - To avoid danger of suffocation, keep plastic bags away from babies and children. Do not use in cribs, beds, carriages or play pens. **THESE PLASTIC BAGS ARE NOT TOYS.**

WARNING: Brass parts in this kit contain lead, a chemical known to the State of California to cause cancer and birth defects and other reproductive harm. Bronze and brass alloys can contain .03% to 3.7% lead.

WARRANTY AND RETURN POLICY: All Vac-U-Boat Hull Kits are sold direct from Vac-U-Boat. If you purchased this from a dealer, contact that dealer on any matter of return. If you open and inspect this kit and for any reason you do not wish to keep it, return all of the parts to their bags and repack the kit into it's box along with a copy of the receipt. (Keep an original for your records.) Mail to me via the United States Post Office, Parcel Post with "Delivery Confirmation". Please do not use any Express Mail carrier or send COD. I cannot be responsible for such higher-than-necessary shipping costs. Upon receipt of the complete kit, I will reimburse you the original cost plus the cost of the return postage shown on the package and mail those funds to the name and address on the receipt copy. I will replace any defective part found during the assembly or operation of the boat for a period of three months after the purchase date. This warranty does not cover damage caused by abuse, misuse, improper spray paints, alteration or accident. It does not cover consequential damages. You may have other rights, which vary from state to state. **Caution: Never leave the boat in a hot car. It will melt!**

CUTTING PLASTIC: Adults only! A sharp pair of sewing scissors is best to trim around the parts. Cut through sharp corners in the plastic with a hobby knife. While H.I.P.S. is tough, it will tear. When cutting out holes, as in the top of the Cabin and through the rear hatch, score the opening with the tip of the hobby knife. (Just a deep scratch.) Then trace the score 2 or 3 more times and you will cut through the plastic. As you cut through the plastic, hold the knife at a side-angle to keep the blade from binding in the cut. Don't hurry. Draw the blade slowly along the plastic to prevent overcutting. Think about where the blade would go if it slipped. (Like, into your leg or arm!)

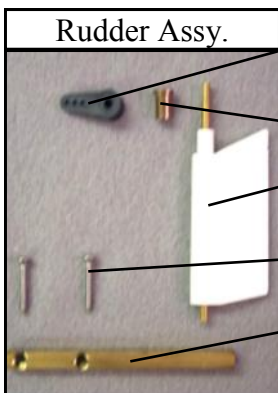
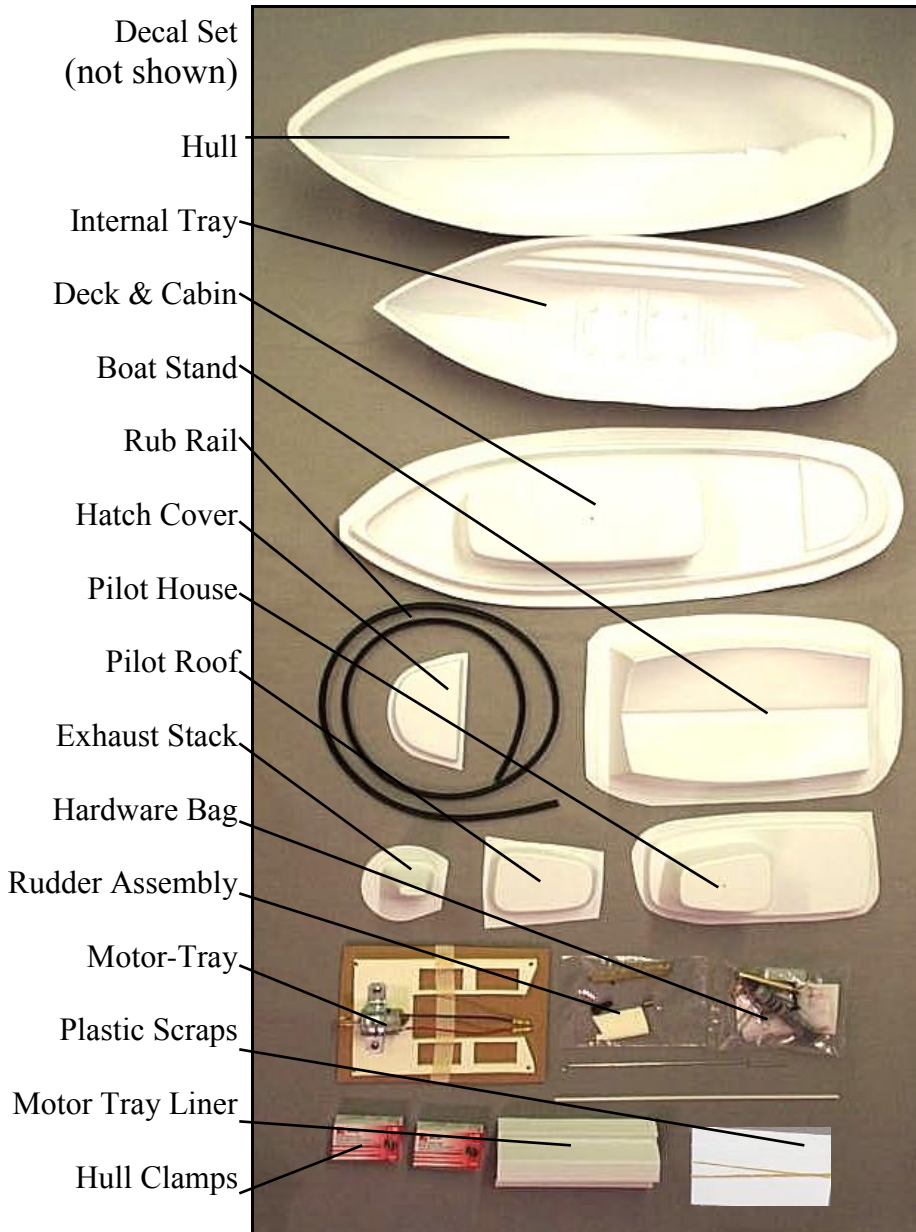
GLUE: You will need about two ounces of 30-Minute or "2-Ton" epoxy. While 15-Minute epoxy will work fine and will build the model faster, 30-Minute Epoxy has superior water resistance to the 15-minute kind and gives you more working-time for this model. Epoxy is used for the rudder shaft, skeg screws, tray screws, rudder bearing & ballast weights. Where specified, a filler should be added to make the epoxy less brittle, increase the volume, and to thicken it. Dry plaster, talcum powder, or micro-spheres all work well. Mix the two parts of the epoxy together first. Then, add the same volume of filler material and fold them together until blended. Medium CA (super glue found at hobby stores) is best for gluing the H.I.P.S. together when attaching the Internal Tray to the Hull, Deck & Cabin to the Hull, and Pilot House Roof to the Pilot House. If you are inexperienced with CA Glue, those small metal tubes of Model Cement found where plastic model cars are sold, either the regular kind or the "non toxic" type will work. Model cars are made of the same type of plastic as this boat. However, because the sheet plastic is so thin, it will melt more easily if you use too much glue. CA provides the strongest seam with less chance of weakening or melting the plastic but must be used in a well ventilated area. Both CA and Model Cement are permanent. If you think you will ever want to separate the upper and lower hulls, then glue them with epoxy. You will have to scuff the surfaces of plastic to help the epoxy bond to the plastic. Gentle prying will separate the parts. Experiment with the glues using the scrap of plastic you cut from the top of the deck. This scrap can be used for testing glues or paints. Glue them together and then try to tear them apart. The rubber bands in the box are used when assembling the kit.

PAINT: Use spray paints that are safe for plastics. The short cans of "Hobby Enamel" found at your hobby store, or spray paints safe for plastics like Krylon Fusion or Plasticote brands work best. When buying them, if the lid isn't sealed, remove the cap to see if someone "test sprayed" the can. If it has any paint residue on the spray nozzle, don't buy it. It is likely clogged because it was not properly cleared by inverting the can and spraying the paint out of the nozzle. (See the can's directions.) No sanding is necessary. Hobby Enamels, Fusion, and Plasticote will bond with the H.I.P.S. well as long as the plastic is clean. Don't get grease or oil on the plastic as it can repel the paint. If in doubt, wash your hands with liquid detergent before handling the plastic. Buy a can of Clear Hobby Enamel or Clear Krylon Fusion when you are getting the colors. It makes a great top coat on dull metallic or dark colors that don't gloss on their own. Test the colors on the scrap to see if a coat of clear is necessary. NEVER USE LACQUER OR AUTOMOTIVE PAINTS ON H.I.P.S. PLASTIC. It will soften the plastic and greatly shorten its life span and may completely melt the plastic. Avoid all tall spray cans like Krylon[®] or other "household enamels". They will damage the thinner areas of the sheet plastic. Don't be fooled by test spraying auto paint onto the scrap. They are thicker than the model parts and will be less affected. Krylon[®] "Short Cuts" Hobby/Craft Enamel Paints work fine. Avoid the short cans of lacquer you will find at hobby stores. Ask for hobby enamel. I have listed additional painting tips at the end of the manual.

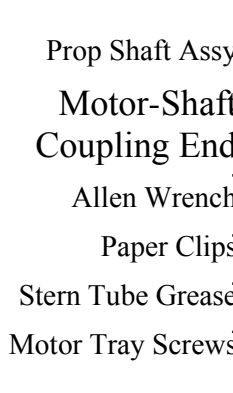
Hull Kit Contents:

Nine-piece high-impact polystyrene hull assembly (marked for trimming), "380" size Johnson electric motor prewired with leads and capacitors, Motor-Tray, Motor-Shaft Coupling Assembly, Prop, custom drawn brass Stern Tube assembly with stainless shaft and Oilite® bearings, shaft alignment tool, synthetic Stern Tube Grease, brass Skeg, Rudder assembly with solid brass Shaft & Oilite upper Bearing, Antenna Tube, stainless steel Pushrod with Du-Bro® E-Z Connector, stainless steel Screws, rubber Rub Rail, Velcro for mounting the Hatch & Cabin Roof, 24 gluing clamps for assembly, sandpaper, a vinyl decal set, and instructions.

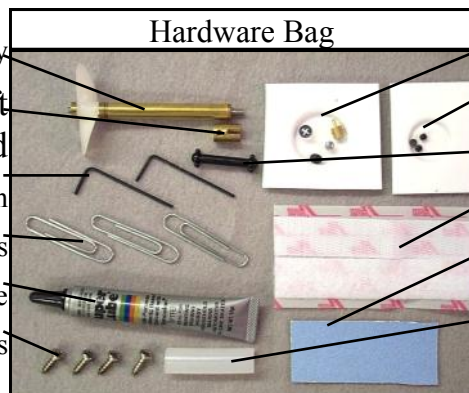
To complete this hull kit, you will need: ADULT SUPERVISION, 6 or 15-minute epoxy, medium CA glue, (Regular or non-toxic model cement will work fine but CA "super glue" is needed for the end joint of the rubber rub rail) electric drill with bit assortment, screwdrivers including a tiny Phillips screwdriver for servo screws, scissors, hobby knife or Xacto® knife, ballast weights (a carton of 5,000 BB's or lead shot work well), pencil, masking tape, light sewing-machine oil, two short cans of model spray paint or non-toxic type brush paints compatible with plastic.



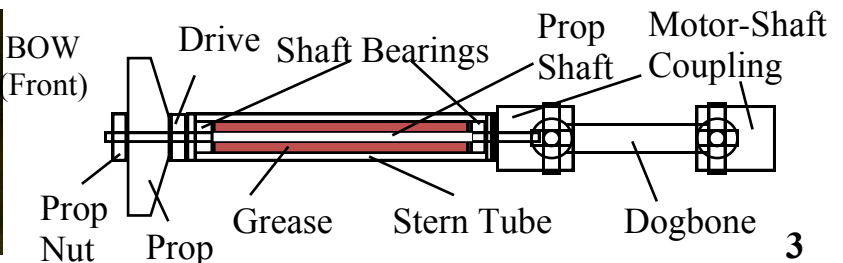
- Rudder Arm
- Rudder Bearing
- Rudder
- Skeg Screws
- Skeg



- Prop Shaft Assy
- Motor-Shaft Coupling End
- Allen Wrench
- Paper Clips
- Stern Tube Grease
- Motor Tray Screws



- E-Z Connector
- Set Screws
- Dogbone
- Velcro
- Sandpaper
- Shaft Alignment Tool
- Tool



To complete the radio-controlled boat, you will also need:

A two-channel AM, FM or 2.4 Ghz. radio, (rudder & throttle), with one servo,



You can use a two-stick model or a pistol-type radio like R/C cars use,



An Electronic Speed Control (ESC) with forward and reverse,



A 7.2 volt rechargeable battery (six cells),



A Battery Charger. Inexpensive wall chargers will work



but “Peak Detection” chargers are best for your batteries



Each type of battery has different rules regarding their charge-state when not in use. Consult the manufacturer or the internet for recommendations for your type of battery.

CONSTRUCTION: Follow the photographs and directions. Read the text below each photo before performing the step.



Squeeze the Super Lube into the Stern Tube until it comes out the other end.



Push the Prop Shaft into the stern tube. This will push out the excess grease. Wipe off the excess with a paper towel. Be careful to keep any grease off of the brass Stern Tube. Clean it with a cloth dampened with glass cleaner.



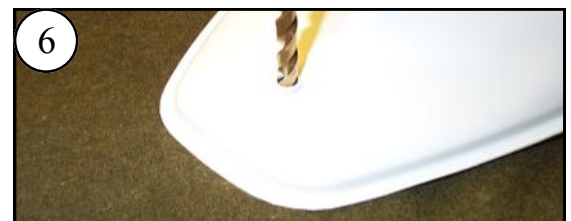
Wash your hands to remove any grease. Scuff this part of the Stern Tube by twisting it against medium grit sandpaper.



Put a mark on the Stern Tube about 3/8^{ths} of an inch from the end of it.



Trim the Hull along the marked line on it's underside. The plastic is thick for a stronger hull. Use sharp scissors!



With a 1/4" drill bit, drill through the Rudder Bearing hole. Use gentle pressure. Let the drill slowly drill through the plastic to avoid it splitting or tearing the hole. You can “Step drill” with smaller drill bits, increasing to 1/4 inch.



7 With a rocking motion, slice through the Stern Tube hole as shown. Cut down 2/3rds then cut up to complete.



8 Round out the hole as necessary.



9 **Install The Skag**
Center the Skag and mark the bottom of the end hole for drilling the hull.



10 With a 1/16th bit, drill through the mark to make one hole.



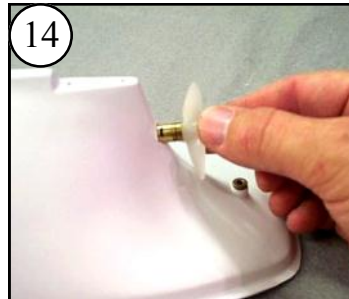
11 Install one screw in the hole. Align the Skag to the Keel. If the Skag is off center, remove the screw and use the drill to slightly oval the hole to center it. Mark the second hole & drill it. Install the second screw & check for alignment. Remove the Skag.



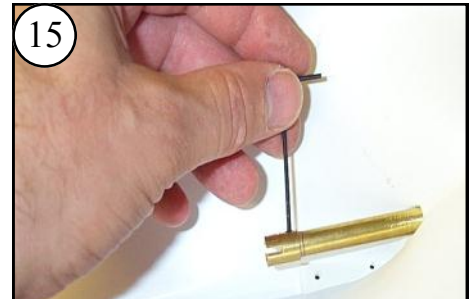
12 Scuff the area inside the Hull around the Stern Tube hole with sandpaper to help the epoxy bond to the Hull.



13 **Insert Then Adjust The Prop Shaft**
This picture shows how to properly space the Motor-Shaft Coupling End. (Don't do this yet.) Put two layers of notebook paper between the Coupling End and the Stern Tube. Tighten the Coupling End Set Screws. Slide out the paper. This gives a little front to rear play in the prop shaft.



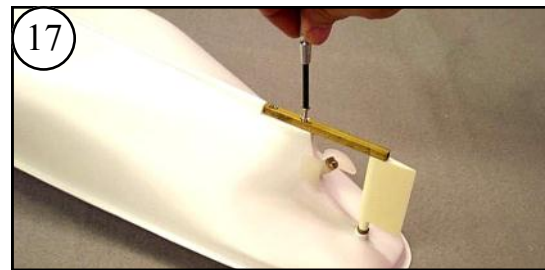
14 Put the Prop Shaft Assembly into the Hull. Don't glue it yet. Just let it flop around for now.



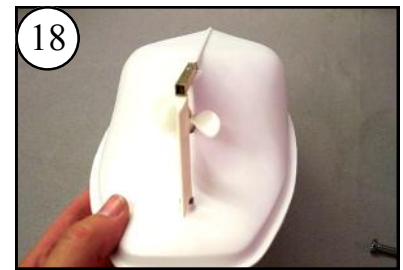
15 Slip on the Coupling End. Space it properly. You will see a "flat" on the prop shaft. Make sure the first set screw is tightened against that flat, then tighten the other screw.



16 **Install The Rudder Assy.**
Insert the Rudder into the Rudder Mount Bearing then push the bearing into the hull as shown. The new rudder is larger than this one.



17 Install the Skag & gently tighten the screws. The rudder should turn with a slight resistance. If it is binding, you can shorten the rudder by carefully trimming it's resin collar near the rudder bearing.

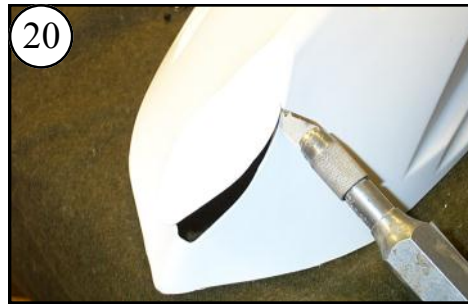


18 Make a final check for the proper alignment of the Skag to the Keel. Ensure that the Rudder Bearing is fully seated into the Hull.

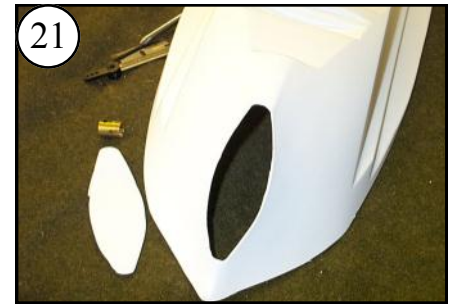


19 Trim The Internal Tray

Trim around the Internal Tray with scissors along the pencil mark.



20 Cut away the flat oval area at the stern end of the Hull Floor.



21 It should look like this after trimming.

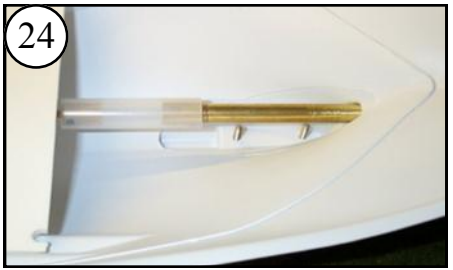


22 Install Prop Shaft Assy.

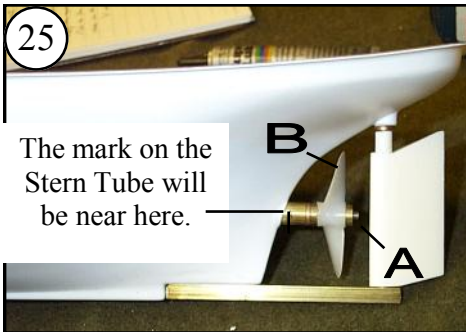
Set the Internal Tray into the Hull. Align it until it "fits" the Hull. Mark this position with a reference line.



23 Slip the Shaft Alignment Tool over the entire Coupling End. Set the Motor Tray into the Internal Tray, Motor-down.



24 Sliding the Tray toward the Stern Tube, insert the Motor's Coupling fully into the Shaft Alignment Tube.



The mark on the Stern Tube will be near here.

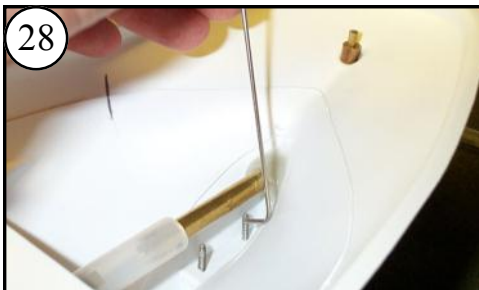
Slide the Stern Tube & Motor Assembly together to center the Prop between the Rudder "A" and the Hull at the Prop tip "B".



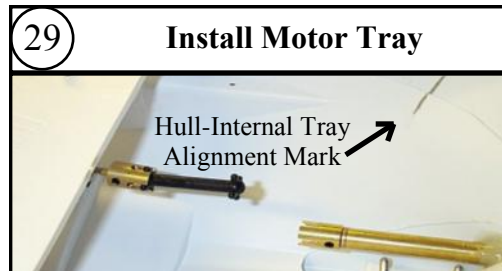
26 Using a toothpick or wire, place a droplet of light oil on the tip of each Skeg Screw. When it runs down about 3/4 of the screw, touch a piece of paper towel to it to stop the oil. Use a scrap of towel to keep oil off of the plastic hull. Oil keeps the epoxy from bonding to the screws, so they can be removed.



27 Mix a quarter-sized puddle of epoxy. Add filler. Put the filled epoxy around the Stern Tube at the Hull. **Important:** Don't get any epoxy on the Internal Tray.



28 Use a bent wire to help push the epoxy completely around the Stern Tube to seal it to the Hull. OK if the epoxy runs onto the screws.

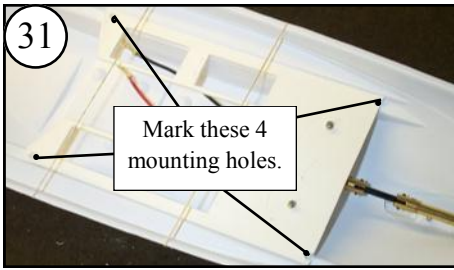


29 Install Motor Tray

After the epoxy has fully set (It gets hot as it hardens, then it cools and is rigid.) replace the Alignment Tube with the Dogbone.



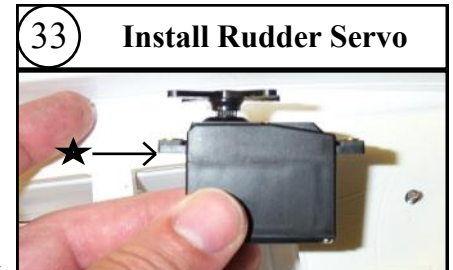
30 Adjust the Motor Tray until there is about 1/16 - 1/8 inch of front-to-rear play in the Dogbone. Check the Tray-Hull alignment mark.



Wrap two or three rubber bands around the Hull middle. This will snug the Motor Tray in the Internal Tray. Mark the 4 mounting screw holes.



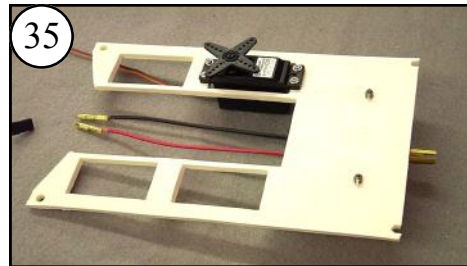
Remove the Internal Tray. Drill the Tray Mount Holes with a 3/32th inch drill bit. Drill 7 or 8 vent holes in the floor with a 1/8th inch bit. This will help to dry any water trapped under the floor.



When mounting the Servo, leave off the rubber isolator on the underside ★ of it's mounting flange. This gives the pushrod extra clearance to the Deck.



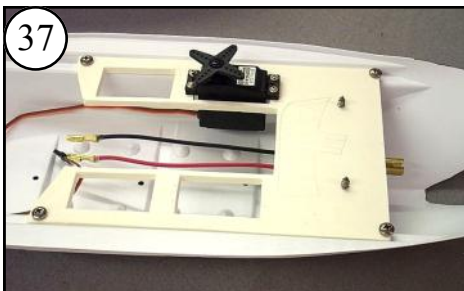
With light pressure, supporting the Motor Tray with your hand, drill four 1/16th inch holes for the servo. The tray is dimpled for a Standard Servo.



Install the Rudder Servo exactly as shown, with the Servo Arm to the left and the Servo's label on the right.



Turn over the Internal Tray. On it's underside, scuff around the Motor Tray mounting holes with the sandpaper.



Attach the Motor Tray to the Floor with the four #8 screws. Tighten the two Bow-End screws. Just **lightly snug** the Stern-End screws.



Turn over the Internal Tray with the attached Motor Tray. Put a droplet of light oil only on the two screws closest to the Bow. This will make them removable. Pinch with a paper towel to remove excess oil. Keep oil off of the Internal Tray.



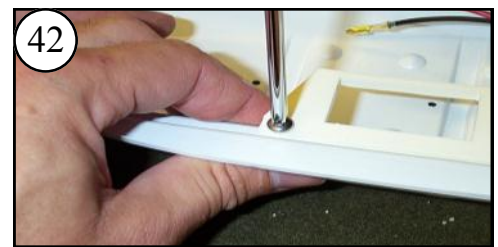
Put a piece of tape next to the four Motor Tray mounting screws. This will hold the filled epoxy you will pour around them.



Mix a teaspoon of epoxy and add filler. Place filled epoxy on the four screws. Use the tape to keep the filled epoxy from running away.

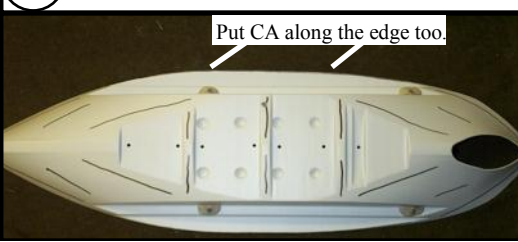


The Motor Tray screws will look like this with the tape removed. The filled epoxy forms a "nut" for the screws.



With the epoxy **fully cured**, grasp the epoxy and "crack" loose, then retighten the two Bow-End Mounting Screws. They are now removable for future maintenance.

43 Glue Internal Tray To The Hull



These lines mark where you should put CA glue on the Internal Tray before inserting it into the Hull. Practice step 49 WITHOUT GLUE first!



If you want to use filled epoxy to secure the Internal Tray, this is how you do it: (Otherwise, skip ahead to step 49) Scuff the Hull and Internal Tray where the glue will go. Use 15 or 30-minute epoxy. 6-minute epoxy sets too fast.



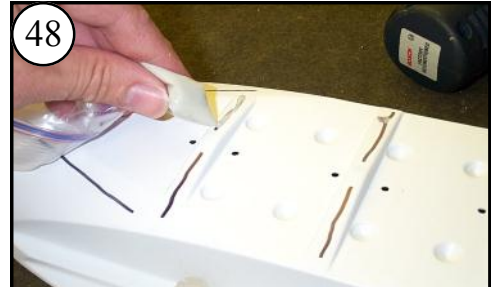
Mix a teaspoon of epoxy and add filler. Put the filled epoxy into a plastic snack bag. Plain or Ziplock®, it doesn't matter.



Use a straight-edge to push the filled epoxy into a corner of the bag. Work fast. Watch the clock to prevent it setting before you are ready.



Snip the tip off of the bag. Just a tiny opening is necessary.

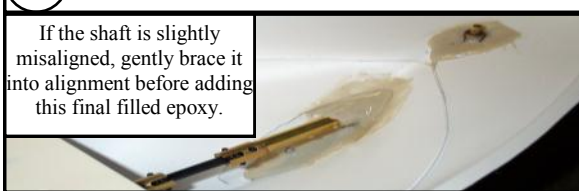


Twist the bag behind the epoxy and you can squeeze out the stuff like a cake decorator.

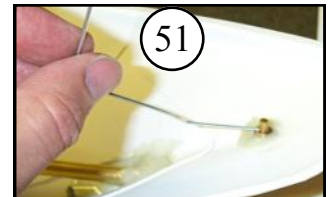


Critical Moment. Don't get flustered. Set the Internal Tray into the Hull engaging the Dogbone and aligning the reference mark between the Tray & Hull. Press the Tray into place. Use the rubber bands to hold the Hull sides tight against the Tray. Hold for one minute until the CA cures. Whew!

50 Reinforce The Prop Shaft Area



Mix 2 drops of epoxy and put it around the Rudder Bearing. The plain epoxy will fill the narrow spaces around it. Use a pin to help it flow around the bearing. Then, mix about a teaspoon of epoxy. Add filler. Put the filled epoxy all around the Stern Tube at the Hull. Let it flow over the Skeg Screws. Put some around the Rudder Bearing to further reinforce it. Tilt the Bow to control the epoxy flow.



The Oilite® Rudder Bearing was washed of it's oil. Place a drop of oil at the Rudder Shaft. Rotate the Rudder to distribute the oil. Wait 5 minutes to let it soak in then blot off the excess.

52 Install Rudder Linkage



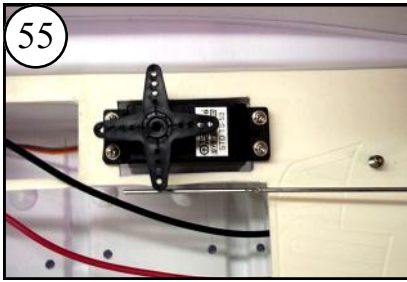
Push the Z-bend end of the Push Rod into the Steering Arm outer hole as shown. (Push from bottom of the Arm.) It will seem tight but it will push in if you rock the wire. Once in, it will rotate smoothly.



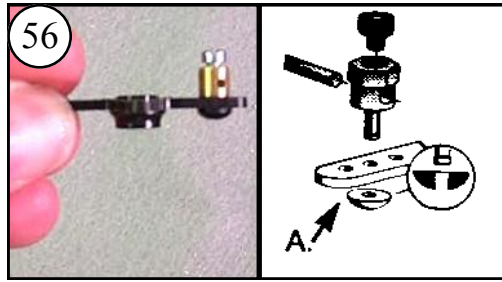
Orient the Rudder "straight ahead". You will see a "flat" on the front of the Rudder Shaft. Push the Steering Arm over the Rudder Shaft. Install one 6-32 Set Screw and tighten carefully against the flat on the Rudder Shaft.



Temporarily connect the Servo, ESC, Radio, and Battery. Turn on the transmitter then the receiver. "Center" the servo. Be sure to center the radio's trim adjustments.



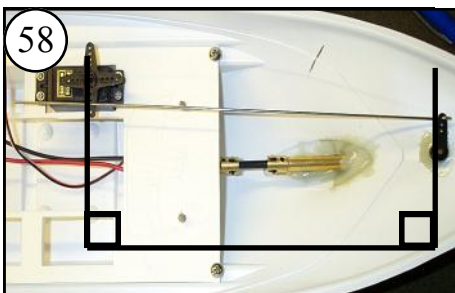
55 Remove the Servo Arm Screw and Servo Arm. Re-position the Arm on the Servo Shaft to match the photo where it is best aligned with the Servo Body.



56 Install the E-Z Connector into the arm closest to the pushrod, 3rd hole from the center. Use the nylon washer "A" to attach the brass connector to the servo arm. Don't use the metal washer. It is an optional part of the E-Z Connector but is not removable.



57 Slide the E-Z Connector onto the pushrod. Set the Servo Arm onto the Servo in the same position as you removed it. Align the Rudder "strait ahead" then tighten the E-Z Connector screw firmly while holding the Pushrod.



58 Properly aligned, the Servo Arm is parallel to the Rudder Arm.



59 **Cut & Install Tray Liners**

Cut two pieces of the Tray Liner each a little under 1-3/4 inches long.



60 Trim the Tray Liner on both sides as shown in the photo.



Set the Tray Liners in the tray openings for your Receiver, Speed Control or any device that has no mounting screw holes.



62 **Final Operation Check**

Attach the battery to the center floor with a 3-inch piece of Velcro®. The Hull is complete. Turn on the Transmitter, then the Receiver. Make a "final operational check" of all components.

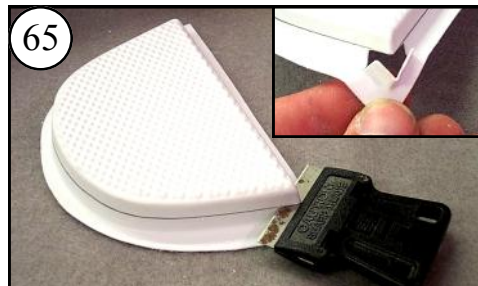


63 **Trim Deck, Hatch & Pilot**

Trim the Deck & Cabin along the marked line on top of the flange. Trace the Deck onto paper for painting. See "Painting Tips".

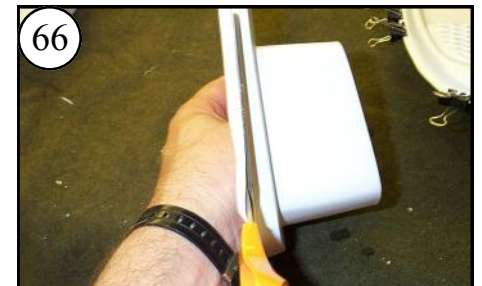


64 The cutouts for the rear hatch access and the cabin access are marked for trimming. Score along the inside of the recess with a hobby knife several times until you can remove the pieces.



65

Start cutting out the Hatch Cover by razoring the corners, breaking them off, then trimming with scissors along the marked line.



66

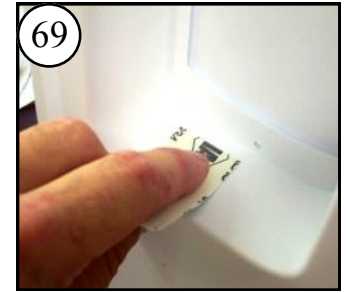
Trim the Pilot House along the marked line. Make short snips around the corners to prevent tearing the plastic.



67 Cut six 1/4 inch strips of Velcro[®]. Fold each together so the hooks & loops are attached. Peel off the adhesive backing and stick them, loop side down, 1/4 inch from the Hatch opening and on the four Cabin corners. Put the Pilot House & Hatch Cover in place pressing gently. Remove the Pilot House & Hatch Cover, separating the Velcro[®]. Peel the protective blue plastic from the rear hatch window and tape in place to prevent water entering the hull.



68 **Install Mast**
Use a drill bit the same diameter as the Antenna Mast to drill a hole through the Cabin Roof and Cabin at the rear center.



69 Scuff the area inside the Cabin under the Antenna hole with medium sandpaper. This helps the epoxy bond to the plastic.

Omit these steps if your receiver has no antenna. (2.4 Ghz radios, for example)



70 Mix a penny size puddle of epoxy. Add filler. Insert the Antenna Mast through the hole. Put epoxy onto the mast & Cabin wall. Rotate the Mast to coat it evenly.



71 Use pieces of masking tape to hold the epoxy & antenna mast in place until it cures. Keep the filled epoxy away from the end of the Antenna Mast.



72 Before the epoxy sets, check the alignment of the antenna. Remove the tape after it sets.



Front & rear waterline.

73 **Install Ballast Weights**
With the battery & radio gear installed, temporarily clamp the Deck to the Hull and put the boat into a tub of water. The water line runs from 1/8" below the top of the Rudder to the center of the curve of the Bow.



74 Put dry ballast weight into plastic bags in the bow and on the stern. Adjust the ballast to obtain the waterline depth. With the battery and radio gear shown earlier, this model will need about 14oz. of weight in the stern and 13oz. of weight in the bow.

MEASURE EQUIVALENTS	Daisy BB's	#9 lead bird shot
# per ounce	22	-
Level Tablespoon	2.2oz.	3.0oz.
Black Kodak 35mm film canister level	5.3oz.	7.6oz.
1/4 cup level	9.2oz.	13.3oz.
1/3 cup level	11.6oz.	16.3oz.

Lead is poisonous. Do not use measuring spoons or cups you prepare food with!

The recommended Total Weight for the completed model is 63 - 66 oz.



75 Add about a teaspoon of plain epoxy to the front ballast bag. Just enough to coat the ballast.



76 Stir or knead the ballast & epoxy until the shot (or BBs) are thoroughly coated.



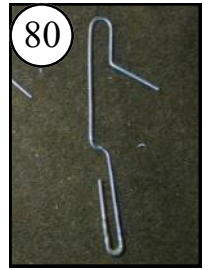
77 Press the bag into the Bow of the boat just in front of the last flat floor section. Once cured, trim away the loose plastic and attach to the Hull with tape or a drop of epoxy.



78 Mix the rear ballast in a shallow cup. Pour it into the rear area under the Stern Tube. Arrange with a wire. Keep epoxy off of the Coupling and Motor. Leave off a couple of ounces if you wish. It is easy to add and hard to remove if you put in too much.



79 **Attach The Deck & Cabin To The Hull**
Place the Hull on the table with the Bow pointing away from you. Unfold the 24 clamps and arrange them around the hull starting with one at the Bow. Notice the BB's used as ballast cover most of the Stern Tube.

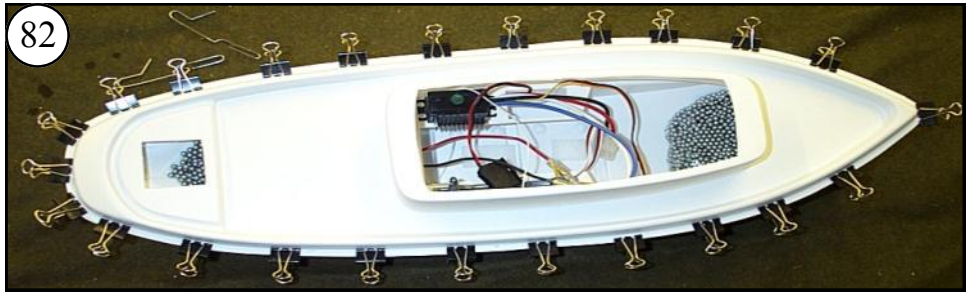


80 Unfold the three large Paper Clips and bend the large end as shown.



Have a paper towel ready to wipe up any drips of CA in or out of the Hull.

81 During the next step, after applying the CA, hook the three Paper Clips over the rear of the boat. They act as spacers. They will keep the CA from bonding the rear of the Deck and Hull before you are ready.



82 **Practice this without glue at least once!** Put CA on the Hull Flange. (or scuff both flanges and use epoxy) A thin 1/8th inch bead is enough. Leave no gaps in the line of glue or it may leak water later. Set the Deck on the Hull, Bow first. Align the Bow tips and put on the Bow clamp first. Work from Bow to Stern down both sides of the boat clamping the flanges together, making sure the flange edges of the Deck and Hull are even. When you get to the rear of the Cabin, remove two of the paper clips, leaving the rear-most one. Remove the last clip when you get to the Rear Hatch. Continue to the last clamp at the Stern center. Now, take a breath, check and reposition any clamps as necessary for a good bond. With CA, the seam will set rapidly and you can move clamps to the spaces in between if they don't look tightly bonded.



83 **Attach Rub Rail**
Find the center of the Rub Rail and place it at the Stern of the boat.



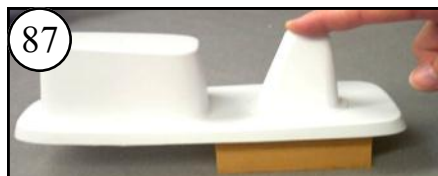
84 Work the Rub Rail over the flange along both sides of the boat.



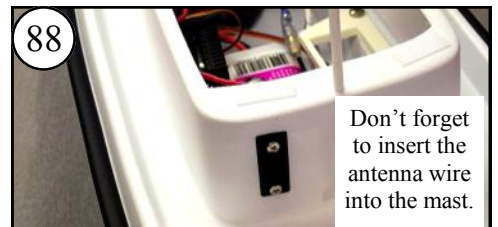
85 At the Bow, gently pull one end of the Rub Rail around the Bow and start the cut in-line with the Bow center. Complete the cut after pulling the Rub Rail away from the boat. Repeat for the other end.



86 Put a thin coat of CA on one end. Press the two ends together aligning them on the Bow flange. Hold for 30 seconds. The Rub Rail can now be removed like a rubber band for painting. Reinstall from Bow end.



87 Trim and install the Exhaust Stack and Pilot House Roof. Center the Stack on the Cabin Roof. Lightly mark the location with a pencil. CA the Stack in place. Use a block to support the roof when gluing.

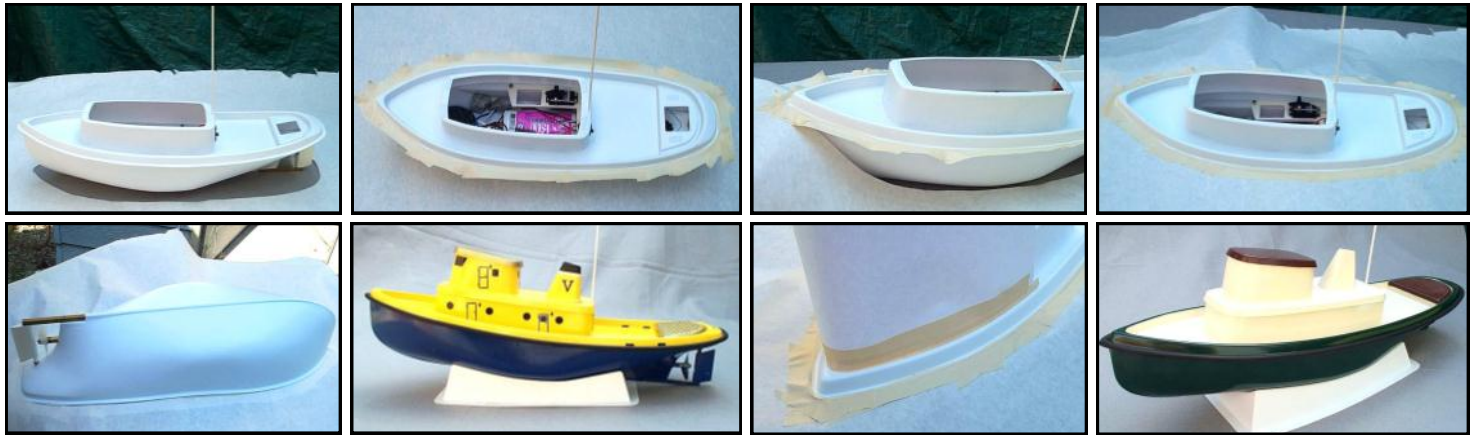


88 Don't forget to insert the antenna wire into the mast.

Mount the receiver switch, trim the Boat Stand and you are ready to paint!

PAINTING TIPS: It will take 2 to 3 coats of most hobby paints to give a good even color. Never try to get full coverage with the first coat. It will run every time! You should be able to see through the first coat. **The best tip about any kind of spray paint is to let the paint “flash” between coats.** A coat of paint has “flashed” when it is dry to the touch. Don’t touch the boat. Touch the masking paper or somewhere where a fingerprint won’t show in case you touched it too soon. Hobby enamel will take 5 to 15 minutes to flash depending on the temperature. Different colors can take different times to flash. A coat that has flashed properly will support the next coat and prevent it from dripping. The second coat will take longer to flash than the first. Be patient! Practice on a scrap stood on it’s end. Your goal is to get coverage without runs. Avoid spraying enamel on very humid days. Humidity can cause the paint to “blush” leaving a cloudy appearance to dark colors. After the spray paint has dried **three days**, you can apply the decals. “Non-toxic” model paints are safest to brush on, for the painter and the boat. **Click the Painting Tips link on the Vac-U-Boat home-page for more tips.**

PAINTING THE HULL: Remember step 63 where I said to trace the Deck & Cabin onto paper for painting? If you are painting the Deck one color and the Hull another, you can mask between them on the flange that the Rub Rail slips onto. Cut out the traced line. Set the boat onto the cutout. Remove the rub rail. Put masking tape around the flange. Lift the paper to the masking tape and make sure it is sealed tightly to the tape and flange. Otherwise, spray paint may leak through.



If you want your bulwark (that raised railing around the deck) to be the same color as the Hull, you can mask at the inside of the bulwark. After painting the Deck & Cabin let the paint dry 3 days. (Read the can. The tape will stick without damaging the paint in about a day but painting over uncured Hobby Enamel will cause the paint to wrinkle.) Put a length of masking tape along the inside of the bulwark as shown above. Put masking tape along the edge of pieces of paper to make “masking paper”. Attach the masking paper to the tape. Holding the boat in one hand, or on a cleverly constructed support, you can spray the Hull and Upper Bulwark at the same time. Stand the Hull upside down on it’s cabin to dry. The hull is Stern heavy. You may have to secure the battery in the Hull or put in a temporary weight to keep the inverted Hull from falling over. The antenna can hang over the edge of the table. Mask the Drive Dog & Shaft Bearing near the Prop to keep paint from gumming them up. If you paint the Boat Stand, let it cure 3 days before using it. Otherwise, it may stick to the boat. A couple of strips of felt along the top of the Boat Stand will prevent sticking and scratching the hull.

DECALS: Apply only after the paint has fully cured. Place the boat on it’s stand. The stand holds the boat at a bow-up angle just like it sits in the water. Make sure that doors or square openings are vertical to this position. Otherwise, if you placed the door decals parallel to the floor, they would be angled toward the stern when the boat is in the water. Cut out the desired decal from the assortment. Separate the paper backing from the front tissue. The decal will adhere to the front tissue. Place the decal on the hull and smooth it with your fingernail. Peel off the front tissue paper. The decal set includes several types of Doors, Portholes, Scuppers (deck drains), exterior weatherproof Lights (small ovals), Ladders, Ladder Rungs, retracted Anchors, and two V’s for “Vac-U-Boat” to put on the Stack. The hinge-side of the doors point toward the bow of the boat. You will find left and right doors in the set. See our website for examples.

WATERPROOFING - FLOTATION: Be sure to tape the clear plastic hatch window in place to prevent leaks. There is plenty of room in the Bow for flotation. An inflated Ziplock[®] bag with the opening pressed and taped closed, makes a nice form-fitting float.

REPAIR: In swimming pools, long hair can wind up on the prop shaft between the Drive Dog and the Stern Tube Bearing. If this happens, the shaft will bind and slow or stop turning. To repair, insert needle-nosed pliers through the rear hatch opening and lightly grasp the Motor-Shaft Coupling End to block the shaft rotation. Use a 1/4 inch wrench to loosen the Prop Nut several turns. Unscrew the Prop & Drive Dog 3-4 turns by turning the Prop. Remove the hair and re-tighten the Prop with Drive Dog & install the Prop Nut. Don’t store the boat in direct sunlight. This will shorten the life of the plastic.

MAINTENANCE: Before running, place a droplet of light oil between the Drive Dog and the Stern Tube Bearing. Rotate the prop to distribute the oil & wipe off the excess. **After running,** tilt the boat toward the Bow and blot out any water that was hiding under the floor. Leave the Pilot House off for a while to allow any moisture to dry. Discharge the boat battery to 6 volts. Storing the battery discharged helps to prevent it from developing a “memory”. **Once every 2 years** you can refill the Stern Tube with the Super Lube. To access and relube the Stern Tube, remove in this order: Rudder Arm, Skeg, Rudder, Motor Tray, Dogbone, Motor-Shaft Coupling on the Prop Shaft. Slide out the Prop Shaft. Squirt new Stern Tube Grease into the Stern Tube from the outside. Catch the overflow with a napkin on the inside. Push the Prop Shaft into the Stern Tube catching the additional grease that will be pushed into the boat. Reassemble all parts. You will have to find the flat on the Prop Shaft by “feel” when you reinstall and properly space the Prop Shaft’s Coupling.

Now go find some water and have fun!

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