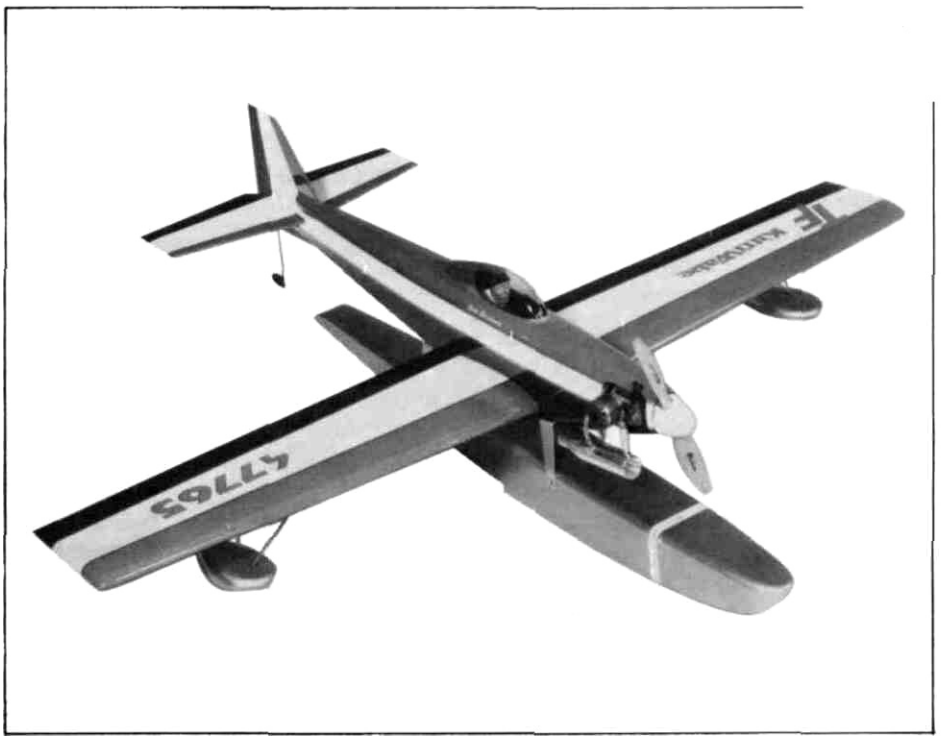
AEROBATIC R/C SEAPLANE

KittiWake

RC-36 KITTIWAKE INSTRUCTION MANUAL

INTRODUCTION

The KittiWake, proof-positive that there can be more to R/C seaplane flying than just take-offs and landings! Top Flite Models is sure that your KittiWake will provide you with hours of flying fun *and* performance.



Realistic, finished flying weights of 3 to 3-1/2 pounds can be expected when the model is built to the following instructions. Our prototypes were all covered and flown with Monokote® coverings. The covering instructions will give you the details of how we accomplished the few extra precautions that should be exercised when covering a seaplane.

Engine selection for your KittiWake is important. Our prototypes have been powered with a variety of engines, ranging from .19's through .28's. The KittiWake that is shown in the ads and on the label of your kit has a O.S. .25 FSR installed with a Mac's muffler. This has been an excellent combination, providing lots of power at the top end while offering an excellent and reliable idle. A reliable idle is an absolute must! Face it,yourKittiWake will have to spend a portion of each flight taxiing on the water and without a reliable idling engine, you better have access to a boat to go out and get it when the engine "flames out." Take extra time to work on the idle of the engine you choose—it will pay off later.

While on the subject of engines, it is worthwhile to point out that the physical mounting of your engine does not necessarily have to be a side-mount, as shown. Your engine can be mounted up-right, at a 45 degree angle, even inverted (although we do not necessarily like an inverted engine in a seaplane due to potential flooding problems). Generally speaking, the use of a muffler on your engine is highly recommended as it greatly enhances the idle characteristics as well as serving to keep you on good terms with people who may also be at your flying site! Therefore, mounting your engine in the nose of your KittiWake should take into consideration the positioning of the muffler. Mounting the engine up-right or at a 45 degree angle allows the use of most engine's stock muffler set-ups. Side mounting the engine, as we did, most usually requires a replacement muffler (one with a longer header) or a header extension. Our prototypes all used fiber-filled motor mounts, sized for whatever engine chosen for the airplane. Your local retailer should be able to supply you with the correct mount for your engine.

IMPORTANT NOTE:

TOP FLITE MODELS, INC. does not recommend the KittiWake as a first R/C powered aircraft. However, if you are a beginner to the sport of R/C flying, we would *urge* you to seek and use experienced assistance in constructing and flying this airplane. Again, if you are new to this hobby, consider this:

Flying this or any other radio-controlled model aircraft is a PRIVILEGE and not a RIGHT and this privilege begins with the utmost safety considerations to others and yourself as well. An R/C model airplane in inexperienced

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hands has the potential of doing serious personal or property damage. These safety considerations start at the building board by following instructions, seeking competent help when you are confused and avoiding shortcuts. These considerations have to be carried over to the flying field where safety must come first and limitations cannot be exceeded. We urge you to:

1. Send for and obtain your AMA (Academy of Model Aeronautics) membership which will provide insurance for your R/C activities — DO NOT RELY ON HOMEOWNERS INSURANCE.
2. Join an AMA sanctioned R/C flying club in your area where you can obtain competent, professional instruction in trimming and learning how to fly this model.

Check with your favorite local hobby shop for the required AMA forms or the address where they can be obtained.

WARNING!!!

A radio controlled model is not a "toy." Care and caution must be taken in properly building the model, as well as in the installation and use of the radio control device. It is important to follow all directions as to the construction of this kit as well as installation and use of the engine and radio gear. The advice and assistance of a well experienced builder and pilot is highly recommended. Don't take chances! Improper building, operation, or flying of this model could result in serious bodily injury to others, yourself, or property damage.

PRE-CONSTRUCTION NOTES

The KittiWake, like other Top Flite kits employs the use of die-cut wood to ease the task of construction, parts fit and identification. The dies used for this kit have been rigorously checked for absolute accuracy and should provide you with excellent fit. Die-cut parts should be carefully removed from their sheets by first lightly sanding the *back* of each sheet of parts and then carefully removing each part. Use a light garnet paper for the sanding and keep a sharp hobby knife with an X-acto #11 blade, or equivalent, handy for assistance in removing any parts that might not have completely cut-through by the dies. Parts which oppose one another and must be precisely uniform—such as ribs, etc.—should be carefully "matched" after their removal from the part sheets. Matching is the process of holding the opposing pieces together with either pins, tape or spot gluing and lightly sanding the edges of the parts until they are identical. A sanding block with light garnet paper is most useful for this and other phases of construction.

Your building surface should be at least large enough to accommodate the wing. This surface should be as absolutely flat as possible and yet be able to accept pins easily. We have found that a product such as Celotex fiber board works quite well for this purpose. Another good surface can be found in most well-stocked hardware stores—a *2'* x 4' fiber board ceiling tile. These are quite inexpensive and can be used for several airplanes before needing replacement.

As with most R/C kits that are constructed from wood, a selection of tools—most of which can be found in the average workshop—are a must to do the job correctly:

- Hobby knife and sharp #11 blades
- Single-edge razor blades
- T-pins
- Sanding blocks in assorted sizes
- Sandpaper in various grits
- Hand-held hobby saw, such as an X-acto
- Dremel tool or power drill and assorted drill bits
- Straight-edge, preferably metal, at least 36" long
- 90" triangle
- Soldering iron, flux (silver) and solder
- Carbide cut-off wheel for wire cutting
- Small power jig-saw, such as a Moto-Saw
- Razor plane
- Tapes, such as masking and cellophane

Our KtttiWakes were constructed using a variety of common hobby adhesives including 5-minute epoxy, cyano-acrylates, and 1-hour epoxy. Since all of us have our own construction techniques and favorite adhesives, stick with the ones you are familiar with and prefer. However, in certain areas there will be callouts for certain types of adhesives, and we urge you to try not to substitute since doing so could possibly cause problems structurally.

The last thing we should touch on before we begin actual construction is the sequence in which the KittiWake is assembled. The sequence given to you in this booklet has proven to be the most straight-forward and provides the finished components in the order in which you will need them to progress to the next assembly phase. Try to stick with the building order presented here to avoid mistakes.

Spread the plans out on your work surface, cover them with a clear plastic material, such as the backing from a roll of MonoKote® or plastic wrap and commence construction.

WING CONSTRUCTION

It is important that you study the plans and illustrations to understand how this wing is constructed. It is also at this point that you make up your mind about the possible addition of the optional landing gear set-up that we've shown on the plans. The grooved trunnion block material is a stock item by Sig Mfg. Co. (their #SH-655) and the V dia. landing gear wire is bent from the pattern provided on the plan. This set-up has worked well in actual practice. The rib reinforcements for the trunnion blocks, RR-1 through RR-3, have been accurately depicted for you on the plans. The addition of the optional landing gear will permit you to use the model either on the land or in the water. Additionally, Halico

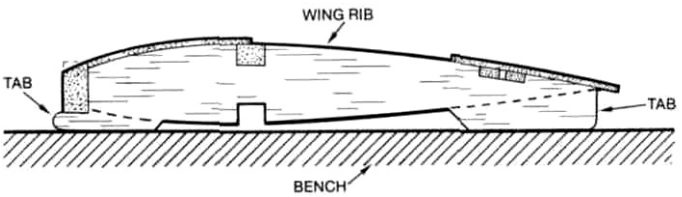
sells a pre-bent, tempered aluminum landing gear that mounts directly to the fuselage, at the forward float leg location. Ken Willard has used this variation quite successfully (see RCM Magizine, November, 1986). The following instructions assume the float plane version only.

☐ 1. From their die-cut sheets, carefully remove all wing ribs, W-1 (A and B) through W-8. Where necessary, use a #11 blade to free the parts, making very sure that bottom tabs remain attached. (These have been partially cut through for later removal, should one break off, reattach it with a spot or two of glue). If needed, lightly sand the edges of the ribs to remove any burring. Locate and remove die-cut (ply) parts W-9 and W-10. Additionally, locate and have ready the four 1/4"x 3/8"x 24"wing spars, the two 3/8 x 3/4" x 24" leading edges and the two 1/8" x 1/4" x 36" sub spars—all balsa. Of course, as we proceed with these instructions, you will need wing sheeting (1/16"balsa) from the stock provided in your kit. Protect your plans with clear food wrap or MonoKote® backing. We will build the center section first, followed by the outer panels.

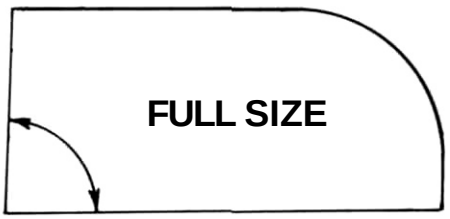
☐ 2. Cut two 2 11/16" lengths of 1/4" x 3/8" spar stock (Important: cut one of these lengths from one piece of spar stock and the other piece from a different length of spar stock). From one of the leading edge pieces, cut a 2-11/16" piece. Accurately pin one of the spar pieces directly over the plans. Now securely pin the two rear W-1 B's in place against the spar, making sure that they are perfectly vertical to your work surface (use a triangle or block to be sure). Now set the W-9 dihedral brace in place on the work surface, against the bottom spar and the two W-1 B's. Like the W-1 B's, accurately position and securely pin the forward W-1A's in place against the W-9 brace. With the above securely in place, glue the *2-11/16"* piece of leading edge stock to the front of each W-1A (do not glue to the break-away tabs). Now carefully glue the top length of spar stock in place to the W-1 B's. Starting from the leading edge, cut, fit and glue all of the center-section's 1/16" balsa sheeting in place; allow to dry.

☐ 3. Carefully remove this assembly from your work surface. Unpin the short length of spar stock from your work surface. Turn the assembly over and epoxy W-10 in place against the rear face of the leading edge and up against the top sheeting. Carefully glue W-9 in place against the W-1A's and B's, the top spar and sheeting. Take care here to wipe-off any excess adhesive on the outer surfaces of the ribs and W-9. Glue the remaining length of spar stock in place against W-9 and to the W-1 B's. Carefully remove the bottom rib tabs from each rib section and use a sanding block to smooth the bottom of this structure as well as bevel the bottom rear edge of the top sheeting. From the kit, locate the shaped basswood wing bolt insert. As shown, this part fits in place between the W-1 B's, about 3/8" ahead of the trailing edge. Sand the insert as needed to fit and when satisfied, epoxy in place. The bottom of this structure is now sheeted with 1/16" balsa from the leading edge back to the trailing edge. Do this accurately and neatly. Use a small sanding block to now smooth the rib/sheeting joints, keeping the outer surfaces of W-1A and B flat.

(Note: The following outer wing panel construction steps assume that both the left and right panels are built simultaneously. Also, this is the point at which your decision about installing the landing gear option, shown on the plans, should be made. The patterns provided on the plans for rib reinforcement parts RR-1 through RR-3 should be used to make the 1/16" Ply parts and these should now be epoxied in place to the concerned ribs.)



4. Use the full cross section of the wing, the view directly beneath the wing plan, to now accurately cut and bevel the top and bottom *1/4"* x 3/8" spars and the 3/8"x*3/4"* leading edges. You'll note that the inboard W-1 ribs are angled to provide the needed 7/8" dihedral for each wing panel. In order to provide this angle uniformly to each W-1 rib section, we've provided you with a dihedral guage, shown here. Use this as a pattern to now make this guage from either scrap ply or balsa. As you did for the center section, now pin the bottom spars accurately in place over the plans. Take care here to ensure that they are in place *straight.* These bottom spars are only in place for accurate rib alignment at this time.



DIHEDRAL GAUGE FORW1-A&W1-B

☐ 5. Starting with tip rib W-8 and working inboard to W-2, securely pin each rib in place overthe bottom spar, making sure each is perpendicular to your bench at 90°. Using the dihedral guage that you made in Step 4, now accurately and securely pin both W-1A and B rib sections in place. Note that W-1A is spaced 1/16" ahead of the spar to compensate for the thickness of W-9 (ply dihedral brace). Now trial-fit the pre-cut and beveled 3/8"x3/4" leading edges in place against each rib face and on each rib's bottom tab. Use a soft pencil to now mark each ribs location on the leading edge and remove. Apply glue to the marks made and glue the leading edge in place, securing with pins. Glue the top spar in place, W-8 through W-1B (remember that you need a 1/16" gap for W-9, use a scrap spacer).

☐ 6. As shown on the plans, each wing panel has a sub-spar system which allows for the cutting and hinging of the inset ailerons. These sub-spars are made from 1/8" x 1/4" balsa and the effected ribs (W-8 through W-3) are slotted for their installation. Cut, fit and glue the forward sub-spar in place from W-8 to W-3. Now cut and trial-fit the rear sub-spar in place at the rear of the slots provided in ribs W-8through W-5. Note that the inboard end of this sub-spar extends to and contacts W-4 and that when in place correctly, there is an approximate 1/8" gap between the front and rear sub-spars (this allows for 1/16" cap sheeting after the ailerons are removed from the wing). Glue the rear sub-spar in place.

☐ 7. From your kit, locate the 1/16" x 3" balsa sheet stock. (Note that whenever you are applying balsa sheet stock to a structure, it is almost always necessary to "true- up" edges by the use of a sharp X-acto blade and a long metal straight edge. These instructions assume that you will be doing this as you progress.) Cut and fit the *2"* wide lengths of sheet required for the top, rear trailing edge. Apply a *moderate* amount of glue to each rib and glue this sheet in place; weight and/or pin as needed to secure. Move forward to the top front sheeting. Cut, fit and glue this piece in place (note that the rear edge of this sheeting is cut to fit halfway across the width of the spar). Now cut, fit and glue the 1/16"x1/4" cap strips in place to the top of each rib; W-8 through W-4.

☐ 8. Remove the wing panels from the work bench and lay them back down, upside down. Glue the bottom spar in place. Now carefully remove all of the tabs from the wing ribs. Use a long sanding block to lightly smooth the bottom wing rib contours and to bevel the trailing edge sheeting. Again, with the panel's upside down on your bench, locate and remove the two W-4A inboard aileron "riblets". These are now glued in place, 1/16" outboard of W-4 (use scrap of balsa as a spacer), to the sub-spar and top sheeting. Use a pencil to now draw the aileron "cut-out" lines directly onto the top sheeting. With this out of the way, cut, fit and glue in place the bottom trailing edge sheeting; pin and/or weight and allow to dry.

☐ 9. From your kit, locate the 10" length of slotted hardwood tip float trunnion stock; 1/4" x 1/2". As shown on the plans, you need to cut two 3-1/2" lengths and six at 7/16"; do this now. Next, drill a 3/32" dia. hole through the 3-1/2" pieces, just outboard of the W-5 rib. This hole allows passage of the 3/32" dia. formed main tip float wire. Trial-fit these wires in place now. Some chamfering of the slot and hole may be needed to allow the wire to nest in the slot. Once satisfied, epoxy the two *3-1/2"* trunnion blocks in place to the front of the bottom spar and ribs W-6 and W-5, carefully lining up the hole just drilled with the outboard face of W-5. Tape the formed tip float wires in place to their trunnion blocks. Now carefully glue the *7/16"* lengths of trunnion blocks in place, over the wire stub end, to W-5 and the top of the already-installed *3-1/2"* trunnion block. The resultant positioning of the formed wire, as shown on the plans, should be vertical to the bottom surface of the wing. Note that the remaining 7/16" lengths of trunnion stock should first be trimmed to conform to the bottom curvature of W-5 and epoxied in place per the spacing shown in section C-C.

☐ 10. The bottom leading edge sheeting is now cut, fitted and glued in place, making sure that the glue is kept out of the tip float trunnion slots and holes; weight and/or pin as needed and allow to dry.Cut, fit and glue the bottom 1/16" sheeting that fits over W-5 and W-6, between the leading and trailing edge sheets—bottom of wing *only.* The bottom center section sheeting can now be cut, fitted and glued in place. All of the bottom 1/16" x 1/4" rib cap strips are now cut and glued in place. The last thing to do in this step is to locate and clear-out the tip float trunnion slots and holes.

☐ 11. In this step you will be joining the outer panels to the center section. If you've been careful to this point, all that is needed is to lightly sand the inboard faces of the wing panels to render them truly flat and at the correct angle to achieve the required 7/8" dihedral. Now carefully trial-fit the center section to each wing panel (one at a time) to check fit. Some trimming of W-9 may be needed. Once you've achieved a good fit, prop up each panel's wing tip 7/8" and check for the proper angle in each panel, when in placetothecenter section; sand and trim as needed to achieve this fit. For joining the wing panels, we suggest an adhesive like 30-minute epoxy as it gives you plenty of time to work. Apply a moderate amount of glue to each side of the center section and the rear face of W-9, where it contacts the spars. Slide one of the wing panels in place to the center section and gently move it up and down a little to disperse the glue evenly. Slip on the other panel and do the same thing. Place the wing on your bench with the tips supported at 7/8" each. Weight the center section to hold it flat. Use tape and/or pins to maintain the

wing panel's alignment. Before leaving this structure to cure, carefully remove any oozing adhesive from the tops of the wing panel's still exposed W-1B ribs.

☐ 12. Remove the now-assembled wing from your bench and inspect your work. Use a sanding block to clean-up the joints. The leading edge of the wing is now first razor-planed to rough shape followed by the sanding block to achieve final shape. Take your time here and bring these shapes down to those shown on the plans.

☐ 13. The top of the fully sheeted center section, behind the spar, is now opened up to accept your aileron servo. As shown on the plans, the aileron servo is to be installed on it's side. The opening that you need to make should correspond with the dimensions of your system's servo. Under no circumstances should the width of this opening exceed the inside dimensions of the fuselage interior (2-1/8" between the F-2 doublers). Most radio system manufacturers provide what is called an Aileron Servo Tray for their servos. This is what we've used on our prototypes and recommend to you. The servo is mounted to the tray and the tray can then be mounted into the opening in the center section and to the floor. The tray can be held in place with servo mounting tape or you can do as we did and install a couple of scrap spruce rails (1/4" thick) and screw the tray to the rails. You should now make-up the aileron servo mounting system that you're going to use. As shown, the aileron servo's output arm is fitted with the DuBro EZ Connector (supplied) which is used to drive the aileron drive cable. Install this connector to the output arm that you plan to use. *(IMPORTANT* You will *not* need a great deal of "throw" from your servo to the output arm and we suggest that this connector be mounted on the output arm's innermost hole.) Place the servo, in place to the servo tray and with the EZ connector attached, into the opening. Now observe where the cable housing tube (one in each panel) needs to enter the compartment, through the W-1B ribs and carefully mark these locations on the ribs. Remove the servo and use a 1/8" drill bit (handheld) to drill these first two holes. Use the plans to now drill the remaining 1/8" holes through ribs W-2 through W-5. Angle drill the tube exit holes, as shown on the plans, just inboard of W-6 (also see Section C-C)

☐ 14. From your kit, locate the 36" length of aileron drive cable and drive cable tubing. Lightly sand the surface of the tubing and cut it into two 18" lengths. Now install the tubing into the holes you've drilled, as shown on the plans—don't glue yet, just get it into place with the excess protruding out of the aileron end. Working from one side, slide the cable into the tube, working it as needed to negotiate the corners—be patient, it'll go. Run the cable all the way through and out the other side, centering it in the servo compartment. Try moving the cable back and forth a few times, it should be fairly smooth and free. Adjust the as-yet unglued tubing to achieve free movement of the cable (a little heat from your heat gun at the curves, really helps). Once satisfied, use slow-setting CA glue to permanently secure the tubes at each rib station and the angled exit points—do this with the cable still in place. When dry, remove the cable and trim the outboard angled ends of the tubing flush with the sheeting.

☐ 15. Cut, fit and glue the top center section sheeting to each wing panel followed by the last cap strip pieces over the two W-3 ribs. Lightly sand the outer faces of the W-8 ribs smooth and flat. You can now glue the 1" x 1-1/4" x 6-1/8" balsa wingtip blocks in place to the W-8 ribs but *NOT* to the outer ends of the ailerons. These blocks can now be shaped and final-sanded, as shown on the plans. The entire wing should be sanded and smoothed to final shape.

☐ 16. Using the marks made earlier, the ailerons can now be cut from the wing. Use a sharp #11 knife and a straight edge. Once the ailerons are free; sand the aileron bays smooth and straight. Cut, fit and glue 1/16" balsa sheet over the open rib ends and against the top and bottom sheeting, thus closing up the aileron bay. As shown on the plans, the ailerons now need to be beveled, to facilitate free movement. Do this now with your sanding block. Also sand the face of W-4A flat and smooth. Before capping the face of the ailerons, you'll need to install the two die-cut W-11 aileron horn mounting plates (1/16" ply) in place as shown. Glue these in now. Take one of the nylon control horns from your kit, hold it in place on the bottom of the aileron and use a pencil to mark the hole locations for later mounting. The front face of the now-prepared aileron can now be sheeted with 1/16" balsa. Lightly sand the ailerons, top, bottom and ends, with your sanding block. Use the sanding block to slightly bevel the top, front edges of each aileron, down to the hinge line (see Sections A-A and C-C).

☐ 17. Using the plans, mark the hinge locations for each aileron on both the wing and aileron. Use a #11 blade to carefully cut the hinge slots. Temporarily install the ailerons to the wing with the nylon hinges. Check for fit and movement and trim as needed for a perfect fit.

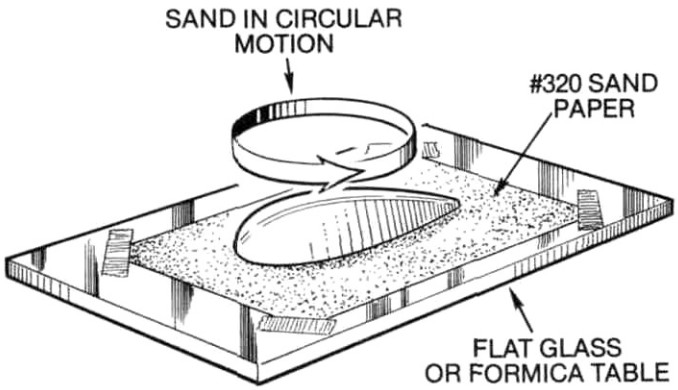
Your wing is now complete with the exception of installing the 1/4"dia. dowel in the forward center section. This will take place during fuselage construction.

TIP FLOAT ASSEMBLY

From your kit, locate the four ABS plastic tip float halves. You should have two right and two left halves. As you can see from the diagram and the views on the plans, these molded tip floats are mounted over a central light-ply "core" (TF-1). These cores are slotted at the top to accept three 3/32" I.D. x *3/8"* brass tubes. These

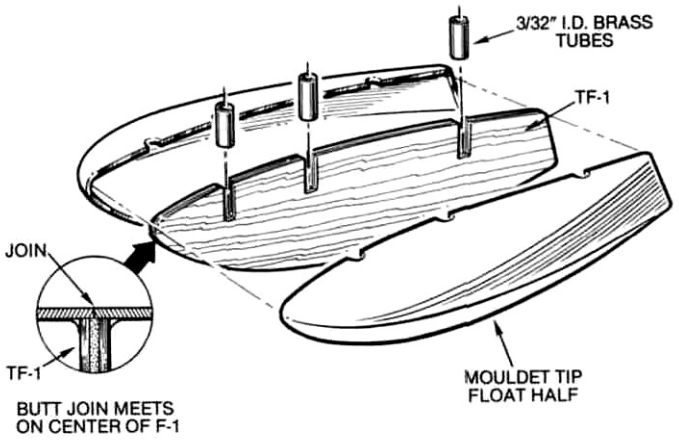
tubes provide mounting capability to the wing. The secret to success here is the accurate cutting of the tip float halves from their bases, thus providing a nice, straight edge at the center.

☐ 1. As shown in the cross-section diagram, the tip float has to be cut from it's base. The easiest way to do this with absolute accuracy is to make a simple cutting tool. We use a 4"-5" length of 1/8" x 3/8" spruce or hard balsa to which we glue a #11 X-acto blade, flat, to one end of this stick with about one half of the blade's length protruding past the end of the stick. When this tool is laid flat on the bench, it can provide a consistently accurate cut 1/8" above the work surface. Use a flat formica table top for this operation. Select one of the tip float halves and place flat on the table and hold it firmly to the table with one hand. With your other hand, slide the X-acto tool all around the tip float, scoring it lightly as you go. Repeat this operation several times until you have a definite score line all around the piece. You should now be able to flex the plastic at the score line until it breaks free. Repeat this procedure with the remaining float halves.



☐ 2. As shown, the edges of each tip float should now be sanded *lightly* to absolute flatness. A piece of #320 sand paper taped to a piece of glass or a formica table top will work great for this purpose. Simply hold the tip float half on the sandpaper and move it lightly in a circular motion. Just a few passes will be needed.

☐ 3. Locate and remove the two required TF-1 light-ply cores from their die-cut sheet. These cores now need to be final sanded to fit exactly into the center of the tip float halves. They only need to fit halfway into the center—take your time to achieve a good fit. Once satisfied, locate the six required lengths of brass tubing from the parts bag in your kit. Lay the TF-1's flat on a protected work surface and epoxy one of the tubes into each of the slots provided. Be sure the tubes are laying flat and that glue does not get into them and allow to cure completely. When dry, lightly sand the tops of these tubes flush with the top edges of the TF-1 cores.



☐ 4. In this step you are going to glue the TF-1 cores halfway into one of the tip float halves. We suggest using a slow-setting CA adhesive for this operation. Use your finger to apply a liberal amount of glue around the inside center edge of the tip float half. Now carefully insert the TF-1 core halfway into the float half and lay the assembly down on your protected work surface (core side down) and allow to cure. Once the glue has set, pick up the assembly and inspect it for any glue runs, etc. These can be quickly removed with a single edge razor blade. Once satisfied, trial fit the other float half in place—it should fit accurately, even if a little pressure is required to do so. Remove the remaining unglued half.

☐ 5. Use a 3/32" dia. drill bit to carefully open up the ends of each of the brass tubes. The remaining tip float half can now be glued in place. Again apply glue all around the inside center edge of the part and press it in place. Tape or hold the assembly until cured.

☐ 6. Once again use the 3/32" drill bit to clear-out the holes in the brass tubes. The now-assembled tip floats should be lightly sanded along the center joint with #320 paper to true them. Some filling may be required along this joint and for this we would suggest something like lacquer putty (probably the best choice), available at most automotive paint supply outlets. On our prototypes, we used both PIC's "Pie N' Patch" filler and Model Magic Filler with great results. Finally, we suggest wet-sanding the floats with #600 paper prior to painting. These floats can be

painted with a variety of available paints, preferably sprayed. Our choice is K&B epoxy.

MAIN FLOAT CONSTRUCTION

☐ 1. Locate and remove the two FL-1 main float sides from their die-cut sheets. Tape or pin these accurately together and use a sanding block to lightly sand their edges smooth. Now lay one of the FL-1 parts directly over the side view of the main float on the plans. Use a soft pencil to accurately mark the position of each float former—top and bottom. Use a straight edge to draw the former locations directly onto the FL-1 part. Do the same thing to the remaining FL-1 part.

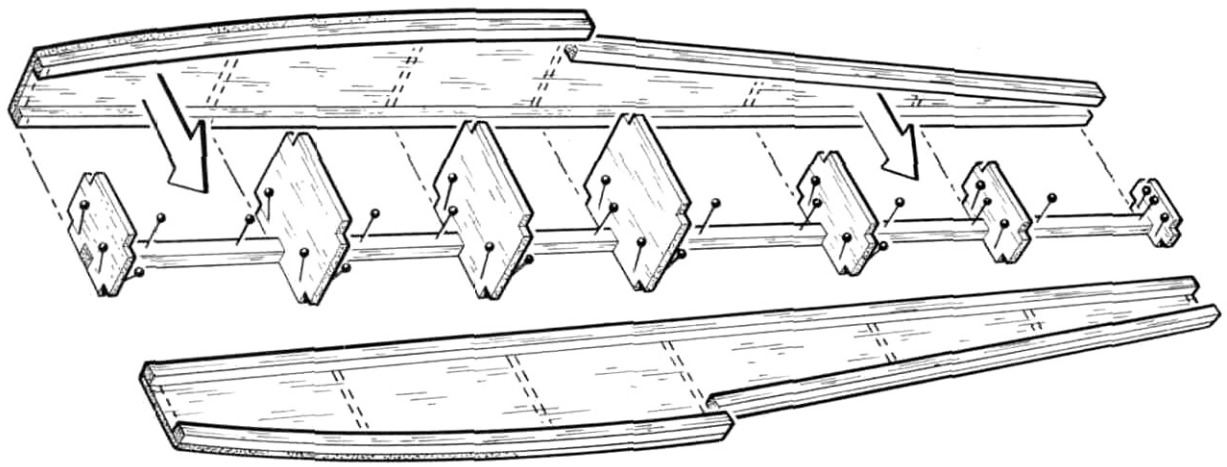
☐ 2. Using the 1/4" sq. balsa stock provided in your kit, glue the top and bottom longerons in place to each FL-1 float side—REMEMBER, you want a LEFT and a RIGHT float side!

☐ 3. Locate and carefully remove the seven required float formers (FL-2 through FL-8) from their die-cut sheets. Now trial-fit each former in place against each of the FL-1 float sides. Use a single edge razor blade to make any adjustments required to achieve a good fit to the float sides and the 1/4" sq. longerons.

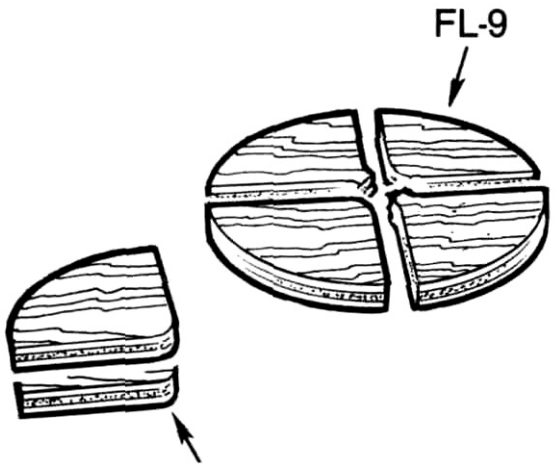
☐ 4. As shown, the main float is built upside down, directly over the plans. Start by accurately positioning and pinning in place the 1/4 " sq. balsa "former locator" directly over the centerline on the top view of the main float. We'd suggest using along straight edge to be certain that this piece is straight. Starting with the forward FL-2 former, accurately glue each former in place to the 1/4" sq. former locator making sure that each former is 90° upright from your work surface; a triangle is helpful here. Securely pin each former in place.

☐ 5. In this step you are going to glue the float sides in place to the formers (still pinned and positioned overthe plans). You will need to use a slow-drying adhesive to allow you time to work. We suggest the slowest setting CA-type adhesive you can find or something like 15-30 minute epoxy. Before glueing, trial-fit the sides to the former assembly to be sure that everything fits as it should. While doing this, experiment with bending the float sides to fit the formers at both ends to get some idea of the amount of pressure required. If there seems to be too much pressure needed to do this, a little common household ammonia, wiped or sprayed on the float sides, helps the wood to bend. Assuming that you are satisfied with the fit, you can start to glue the FL-1 sides in place. We suggest starting by applying glue to the inside of each FL-1 (using the pencil marks made earlier)at the FL-5 through FL-8 former locations. Working quickly, position each FL-1 side in place to each former; securely pin and/or weight as needed. Now apply glue to the FL-4 through FL-2 former locations drawn on the FL-1 sides and bend the sides around these three forward formers. Again, securely pin and/or weight as needed. Allow this assembly to dry completely.

☐ 6. Carefully unpin and remove the float assembly from your work surface. Use a sanding block to now smooth the top and bottom. You can also make a few passes with the sanding block on each of the sides. Now carefully sand the front of former FL-2 to render it flush with the sides. Do the same thing to the rear FL-8 former. Once satisfied, the front and rear balsa blocks can be glued in place. These two blocks are now shaped to conform to the top and side views, shown on the plans, with the exception of the tops of each block, leave these flush with the float sides for now.



☐ 7. Cut, fit and glue the 1/4" balsa cross piece that fits against the rear face of former FL-5, between the bottom longerons of the float sides (see plans). Locate and remove the two FL-9 "discs" from their die-cut sheet. As diagramed, these discs break down to four pieces each. Glue these quarter-round pieces to each other to make four 1/4" thick parts. Sand to 90° at the corners. As shown on the plans, these four parts are glued in place to form the "hard points" for attaching the aluminum float legs. Do this now.



☐ 8. From your kit, locate the 1/16" x 3-1/2" x36" piece of plywood. This is the bottom sheeting for the main float. Start by laying one end of this piece on the bottom, rear of the main float, from FL-5 back to the tail block. Use a pencil to draw the outline of the float on the ply. Use a jigsaw to now carefully cut-out this rear sheeting. Use the remaining plywood for the forward, bottom float sheeting. Use the same process to mark and cut-out this piece of sheeting. Once again, lay the float assembly upside down on your flat work surface. Glue the rear ply sheet accurately in place and use weights to hold it firmly to the float until dry. The forward ply piece is glued in place next. This piece requires bending to match the bottom curve of the float, so use all necessary weight to hold this piece in place until dry.

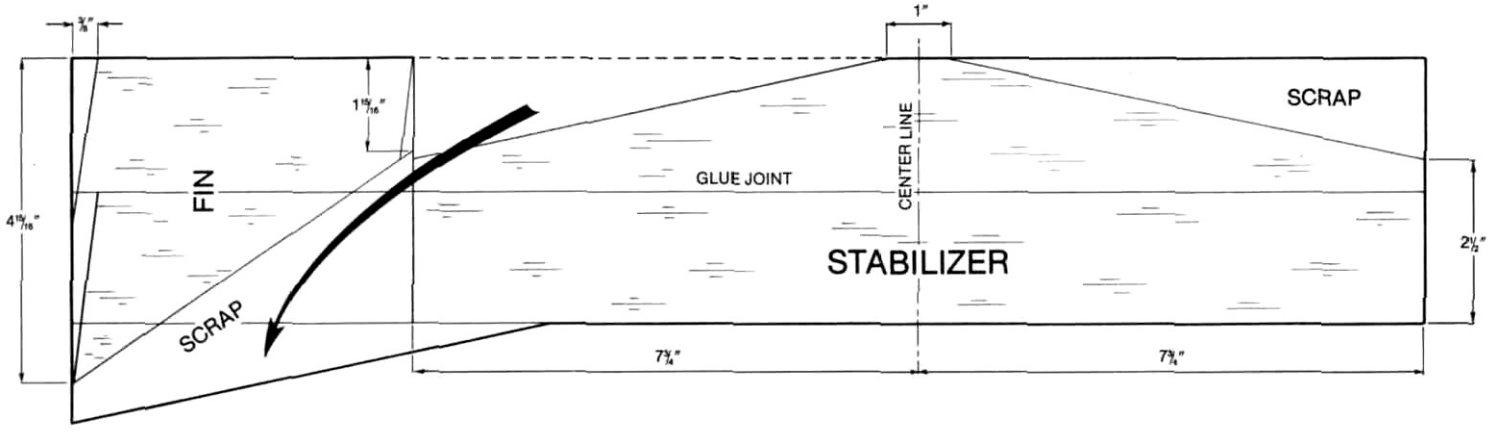
☐ 9. Remove the float from your bench and take the time to inspect your work. We've made it a habit to go back at this time and re-glue all of the joints. Once satisfied, use your sanding block to now sand the ply bottom flush with the float sides and front and rear blocks.

The main float assembly is now as complete **as** it needs to be. Top sheeting and final sanding will be done in the Final Assembly phase of these instructions.

STABILIZER AND FIN

☐ 1. Both the fin and stabilizer are cut from the two 3/16" x 2" x 21" balsa sheets provided in your kit. These two pieces of wood should now be edge-glued together on your flat work surface to obtain a single 4" wide piece.

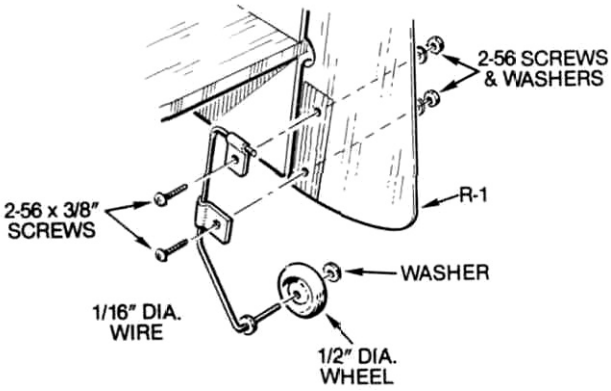
☐ 2. Using the dimensional diagram provided, measure, mark and cut-out the stabilizer and fin.



☐ 3. Use a sanding block to smooth each side of these surfaces. Remove the two elevator halves and rudder from their die-cut sheets. Lay the stabilizer on your flat work surface and pin or weight in place. Use a strip of clear protective material (food wrap) to line the trailing edge of the stab. Position the two elevator halves firmly against the trailing edge of the stab and pin or weight in place. From your parts bag, locate the *2-1/2"* length of 3/16" dia. dowel, this is the elevator joiner. Epoxy this dowel in place in the slot provided in each elevator half and allow to cure.

☐ 4. Remove the now joined elevators from your bench. Lightly sand the leading edge of the elevators smooth and flat. Now use masking tape to accurately attach the elevators to the stab, on one side only. Turn this assembly over and use a sanding block to sand the leading edges, tips and trailing edges to about halfway to the cross-sections shown on the plans. Now tape the elevators to the stab on the sanded side, turn the assembly over, remove the tape and repeat the sanding procedure just described. The fin and rudder are match-sanded in the same manner.

☐ 5. Locate and remove the two R-2 parts from their die-cut sheet. As shown on the plans, these are meant to provide a hard-point at the bottom, leading edge of the rudder for mounting the water rudder or tail wheel. Lightly sand the edges of these parts smooth. Lay one of the R-2 parts in place on the rudder and trace it's outline on the rudder with a pencil. Use a single-edge razor blade to now cut out a 1/16" deep inset location for the R-2 part. Repeat this operation on the other side of the rudder. Once satisfied with the fit, epoxy the two R-2 parts in place. Weight or clamp this assembly and allow to cure.



☐ 6. As shown on the plans, the leading edges of the elevators and rudder are beveled to facilitate movement. Use a sanding block to now bevel these two parts. Now use the plans to locate and mark the hinge locations on the elevators, stab, fin and rudder. Carefully cut the hinge slots in each of these surfaces and trial fit them together—do not glue hinges in place yet. Once satisfied with the fit of these parts to each other, use a sanding block to match them to each other while hinged in place.

FUSELAGE CONSTRUCTION

A review of the plans and cross-sections reveals that the fuselage construction is basically the typical box-type which, when completed, lends itself to rounding. Before starting, you should have available to you the radio system that you plan to use and the engine, tank and motor-mount.

☐ 1. From your kit, locate and remove from their die-cut sheets, the following parts; F-1 (fuselage sides, 2), F-3 (nose doublers,2), F-2 (fuselage doublers, 2) and the light-ply fuselage formers, F-5 and F-6. Tape or hold the two fuselage sides together and use your sanding block to match edges. Lay one of the fuselage sides directly over the side view on the plans and carefuly mark the locations (top and bottom) of the firewall, F-5, F-6 and the 1/4" sq. balsa bracing (@D-D). Use a straight edge to now draw these locations directly on the fuselage side. Repeat this operation on the other fuselage side (remember, you need a RIGHT and LEFT side).

☐ 2. With the fuselage sides laying flat on your bench, glue the F-3 nose doublers in place. Now lay the F-2 fuselage doublers in place, being careful to match the wing saddle area. Observe the fit in relationship to the lines you drew earlier. If necessary, trim the doublers to fit precisely. Once satisfied, glue the F-2 part in place, weight or pin and allow to dry. From your kit, locate the four required lengths of 1/4" triangle balsa stock. Cut, fit and glue the triangular fuselage longerons in place, top and bottom. Cut, fit and glue the four required lengths of triangular stock to the top and bottom of the F-3 doublers and finally, glue triangular stock in place, directly beneath the stabilizer slots. With the fuselage sides still down flat on the bench, cut, fit, and glue the 1/4 " sq. balsa uprights in place (see D-D).

☐ 3. At this point, you may wish to start planning your radio installation by placing one of the servos on the fuselage side, marking its location on the wood for later placement of servo rails or servo rail braces. You may also wish to plot out the eventual location of the throttle pushrod. Next, make sure that you can pass the fuel tank you're planning to use through the opening in former F-5—route out as needed to accomplish this. The last thing to do before joining the fuselage sides is to bevel each side, at the tailpost, to provide a nice fit when the sides are pulled together (see top view of plans).

☐ 4. Trial-fit F-5 and F-6 in place on each of the fuselage sides; dress them with the sanding block if needed to achieve a nice fit. Lay the right fuselage side down flat on the bench and glue F-5 in place using a triangle to make sure that it is perpendicular. Repeat this process with F-6. Apply glue to the other side of these two formers and position the left fuselage side to them. Turn the structure upside down on your bench and pin or weight in place—allow to dry.

☐ 5. Pull the fuselage sides together at the rear to make sure that the two sides bend equally. Once satisfied, apply glue to the inside rear of the fuselage sides and glue them together. Use clamps to hold the sides together until dry. Cut, fit and glue the top and bottom 1/4" sq. balsa cross braces in place at D-D.

☐ 6. From your kit contents, locate the 1/4" x 1" x 7-1/4 " plywood piece which will be used for the main float and wing mounting blocks. Measure, cut and fit the rear main float mounting block which fits directly behind F-6 and between the fuselage sides at the bottom. It will be necessary to bevel each end of this block to fit snuggly between the 1/4" triangle longerons and flush with the fuselage sides. Epoxy this block in place. The wing bolt mounting block is now cut to fit between the F-2 doublers and against the forward, bottom face of F-6, flush with the wing saddle. Save the remaining length of 1/4″ x 1" ply, you'll need it shortly.

☐ 7. Remove one of the two die-cut F-7 parts from its die-cut sheet. This part is epoxied directly over the rear main float block just installed. Measure, cut and glue in place the bottom rear 1/16" balsa sheet, applied cross-grain, from the rear edge of F-7 back to the tailpost. Use a sanding block to sand the edges flush with the fuselage sides.

☐ 8. In this step you are going to make the necessary provisions for mounting the completed wing to the fuselage. Cut a 3" length of *1/4"* dowel from the stock provided. Locate the two #8-32 x 1-1/2" nylon bolts from your kit contents. Placethewing into the fuselage wing saddle, making sure it is square and that the fit is good. Now is the time to make any adjustments needed. Once satisfied, place the fuselage/wing structure upside down on your bench. Use weights to hold the wing firmly to the fuselage. The first step is to drill the required 1/4" dia. hole through F-5 (at the mark provided), the wing's leading edge, W-10 and W-9. Remove the wing, fit the 3" length of 1/4 "dowel into the hole you've just drilled (DON'T glue yet) and re-install the wing to the fuselage, using the end of the dowel protruding from the wing's leading edge (about *1/4")* to key into the hole in F-5. Again, use weights to hold the wing firmly to the fuselage. Using the plans for reference, you now must drill the two required guide holes for the rear wing bolts. Use a 1/8"dia. bit, at right angles to the bottom wing surface, to drill these two holes through the wing and wing bolt ply plate in the fuselage. Remove the wing. Change drill bits to 3/16" dia. and redrill the two holes in the wing, thus allowing bolt clearance. The two holes in the wing bolt plate must now be tapped for #8-32 threads. This can either be done with a #8-32 tap or by using a #8-32 metal bolt. Be sure the cut threads are clean and that the nylon bolts fit smoothly. Once satisfied, apply a couple of drops of instant CA glue to these threads to harden them. You can now epoxy the 1/4" dia. dowel permanently into the wing's center section. Test fit the wing to the fuselage and bolt in place. Once satisfied, remove the wing from the fuselage.

☐ 9. In this step you must decide on what position you want your engine; upright, side-mount, etc. Using the plans, mark the center lines directly on the forward face of the 1/4″ ply firewall. Take care to be accurate here. Assuming that you now know which position you want your engine, carefully mark the four holes required to install your mount to the firewall. We suggest that you use #4-40 x 3/4" socket head bolts and blind nuts to attach your mount. Drill the required holes, epoxy the blind nuts in place and removethemountfromthe firewall. The firewall can now be epoxied in place between the two fuselage sides, Clamp in place until cured.

☐ 10. From the remaining length of 1/4" x 1" plywood, measure, cut and fit the forward main float mounting block in place to the forward face of F-5, flush with the bottom fuselage sides. Note that this block must be slightly routed out at the center to allow clearance for the wing's mounting dowel; dothisnow. Epoxy this block in place and allow to cure. Epoxy the remaining F-7 plywood part directly over the main float mounting block just installed.

☐ 11. Remove spinner ring former F-4 from its die-cut sheet. As shown, this part fits directly to the front of the two fuselage sides. Trial-fit F-4 in place by bending the fuselage sides together, at the nose, until the outer diameter of F-4 matches the outer edges of the fuselage sides. This necessary bending can be made easier by wiping some ammonia on the fuselage sides in the area of the bending stress. F-4 must be accurately located. Epoxy F-4 in place and clamp securely until cured.

☐ 12. Sheet the bottom of the forward fuselage, from the leading edge of the firewall back to the forward edge of the F-7 part, use your sanding block to smooth the sheeting to the fuselage sides. From your kit, locate the two 3/8"x3"x3-1/2" balsa nose blocks. As shown on the plans, these are now trimmed and fitted into place from the rear of F-4 back to the front face of the firewall, top and bottom. Usethe sanding blockto sand them flush with the fuselage sides after gluing in place.

☐ 13. While we still have access to the inside of the fuselage through the top, there are a couple of things we can take care of at this time. First, locate four (4) #4-40 blind mounting nuts from your hardware package along with one #4-40 bolt. Using the plans as a guide, you now need to mark the positions of the four required holes to mount the aluminum float legs to the fuselage. As shown, these holes are positioned 7/8" on each side of the fuselage/float leg centerline (see cross-section). From your kit box, locate the two

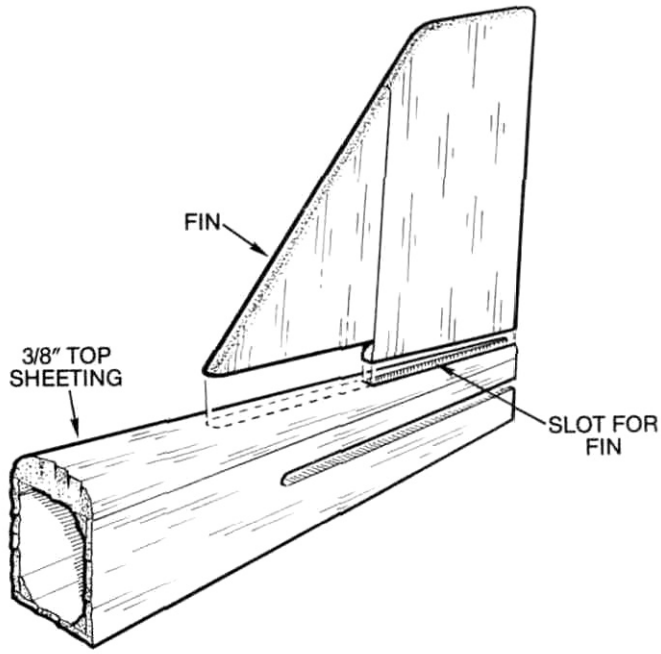
aluminum float legs. Use a ruler, triangle and a sharpened nail (or scribe) to accurately mark the vertical centerline on both float legs. Now use a soft pencil and a ruler to mark the fuselage's centerline of both of the F-7 ply plates, on the bottom of the fuselage. Use a small amount of CA glue to now tack glue the as-yet unbent float legs accurately in place on the bottom of the fuselage, carefully lining up the centerlines. Now mark the hole locations directly on the float legs and with a 7/64" dia. drill bit, drill these holes through the aluminum, F-7 and 1/4 ″ ply mounting blocks. One at a time, apply epoxy to the edges of the blind mounting nuts and, using a screwdriver and the #4-40 bolt, cinch the glued nut down into the hole, from the inside. Once all four nuts have been installed in this manner, carefully remove the tack glued float legs from the fuselage.

The next thing to do at this time is to make all the necessary provisions for mounting the rudder, elevator and throttle servos. As shown, we have mounted the servos as far back in the radio compartment as possible and close to the bottom of the top sheeting. We used the radio manufacturer's stock servo mount (plastic), which allowed for all three servos to be mounted side-by-side. However, there's plenty of room for the throttle servo to sit ahead of the other two, as shown on the plans. Doing this now makes servo installation later a simple matter of a few screws.

☐ 14. From your kit, locate the 3/8″ x 3″ x 30" balsa sheet used for the top fuselage sheeting. Sand the front edge to match the rear edge of the noseblock, already in place. Cut and sand the rear edge to match the tailpost angle. As shown, a 3/16"x *2″* slot should now be cut in the rearto provide for mounting the fin. Hold the sheet accurately in place to the fuselage and use a soft pencil to mark the fuselage outline on it. Use a jigsaw to remove the excess material. Glue the top sheet in place to the top of the fuselage and rear of the top noseblock. Lay the assembly upside down on the bench and weight in place until dry. Once dry, use a sanding block to smooth the edges flush with the fuselage sides.

☐ 15. The fuselage can now be shaped and sanded to final configuration, using the plans and cross sections for reference. We'd suggest first using a sharp razor plane to rough shape the fuselage, followed by progressively lighter grades of sandpaper to achieve final shape and surface smoothness. Take your time here to get those sexy lines that you admired so much in both the ads and the box art!

☐ 16. With the wing bolted in placetothe fuselage,trial-fit the stabilizer in place in the slot provided. Set the assembly flat on atable and step back to sight down the front of the model—everything should look straight. If it isn't, some sanding and adjustment of one of the slot sides may be needed. If so, do this now. Next, be sure that the stabilizer, when viewed from the top, is squarely in position relative to the wing. Use a piece of string or a ruler to be sure that the distance from one wingtip to the tip of the stabilizer is the same measurement on each side. Glue the stabilizer in place and allow to dry. Next, the fin is glued in place. Again make sure that the fin is absolutely vertical to the stabilizer and wing. Tape and/or pin in place and allow to dry.



☐ 17. Locate and remove die-cut sub-fin R-3. This part has a "lobe" on it's forward end which should now be sanded-off to match the plans. Tape the rudder in place to the fin. Trial-fit R-3 in place to the bottom rear of the fuselage. It's rear edge should match the rudder's angle and depth at this point. Once satisfied, glue R-3 in place (leave the rudder taped to the fin). Once the glue has dried, use a sanding block to match the R-3 sub fin to the rudder shape. Use sandpaper to round R-3 to shape (see E-E).

☐ 18. The engine compartment opening is now made. We suggest starting with a small hole over what would be the top of the engine's head and working outward from there. The idea here is that you want the opening to be large enough to fit the engine in place (at this point; without the muffler mounted yet) by hand, but *not* overly large. Once you can fit the engine in and out of the opening, try the motor mount. With access through the spinner ring (F-4), bolt the motor mount firmly in place to the firewall. Now fit the engine in place to the motor mount. Slide the engine forward and attach the spinner (we use the stub of an old 9 x 6 prop for a spacer). Now slide the engine back until the back of the spinner contacts the F-4 spinner ring. With a few scraps of 1/32″ material (balsa or ply), space

the back of the spinner *1/32"* from the front of F-4. This is the position that your engine should be for drilling the holes in the motor mount. Mark these engine lug holes now, on the motor mount with a pencil or scribe. Remove the engine, spinner and motor mount. Accurately drill the four required holes in your motor mount (Note: For .25-sized engines, we suggest using #4-40 socket head bolts and tapping the motor mount for #4-40 threads.). Reassemble the mount, engine and spinner to check for accuracy of fit. With everything still in place, positioning of the two fuel line holes (fuel feed and muffler pressure/overflow venting) and the throttle linkage should be noted on the firewall for drilling. The last thing to make provision for is the fitting of your engine's muffler with sufficient clearance. Do this now.

Remove all of the above components from the front of your fuselage. Using a longer drill bit of the correct (never oversize) diameter to the fuel tubing and throttle linkage housing, drill the holes marked earlier through the firewall. It is at this point that we suggest a coat of polyester resin be given to the inside of the engine compartment and firewall (don't get any in the holes for the motor mount). We also like to use resin inside of the tank compartment and on the rear face of F-5.

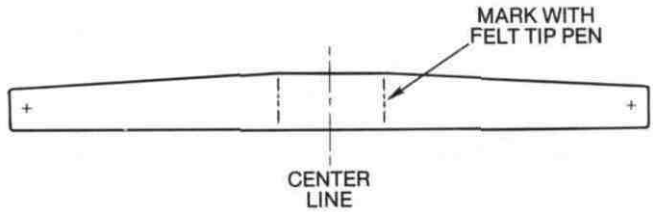
☐ 19. Use the same method described in the TIP FLOAT ASSEMBLY section to accurately cut the molding base off of the canopy. Next, securely tape a sheet of #220 sandpaper over the area that the canopy is to be mounted on the fuselage. Carefully sand the base of the canopy to conform to the top of the fuselage (it won't take much since the fuselage, at this point, is only slightly rounded). Once the canopy fits, hold it in place exactly where you want it to be, and use a soft pencil to draw its outline on the fuselage. If you wish, as we did, to add cockpit detail, now is the time. We used a Wm. Brothers pilot head, suitably cut-down to fit, scraps of black construction paper and a few instrument decals we had laying around to make a reasonable-looking cockpit. Once satisfied, the canopy can be glued in place to the fuselage with a slow-setting CA glue—tape **or** hold and allow to set.

☐ 20. There are some good fillet materials currently on the market which we have used and recommend; Penn's "Pie N' Patch" and Model Magic Filler. Use the one that you're most comfortable with to now apply a small fillet around the canopy (tape it off with electrical tape) and around the fin/fuselage, stabilizer/fuselage and sub-fin/fuselage joints. You should also look over your fuselage carefully for any nicks, dings or voids and fill these at this time. Once the filler has set, use a light grade of sandpaper to smooth these out. You should now cut the last required hinge slot in the rear edge of R-3 for rudder attachment.

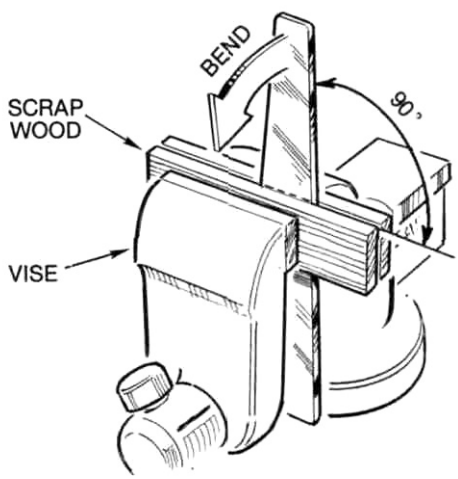
FINAL ASSEMBLY

I. MAIN FLOAT ASSEMBLY

Back in the construction of the fuselage (Step 13), you drilled the two required mounting holes in each of the two unbent aluminum float legs. The float legs must now be accurately bent to provide fit and attachment to the main float and the plywood "hardpoints" built into it. Take a look at the cross section shown on the plans of this fuselage/float leg/main float relationship. You can see that the float legs must be bent *equally* on each side and that, at the bottom, they are bent slightly once again to pick-up the vertical float sides. In all of this, the fuselage/float relationship must provide for a.) proper propeller clearance (9" dia. max prop size) *and* b.) the correct angle of attack for the wing/fuselage/engine combination.



☐ 1. Hold the float leg, straight edge down, vertically in place on your flat bench. With a triangle and scribe (sharpened nail will do) mark two vertical lines on the float leg, each 1-1/4" on either side of the centerline that you marked earlier. This provides you with an accurate 2-1/2" inside bending location. Place the float leg into a vice with a piece of hardwood on each side of it (see diagram) and make the first bend directly along the line just marked on the part. This bend is made by "eyeballing" the drawing provided. Turn the part over and make the second bend. Remove the part, lay it over the drawing to check for how close you came. Continue this process until the part matches the drawing. Repeat this procedure for the other float leg.



☐ 2. The method we suggest for locating the fuselage to the main float is to make a pair of front and rear scrap balsa stand-offs. These stand-offs are then tack glued to the top of the main float and provide a place for the fuselage, with the float legs attached, to accurately rest. The dimensions we used are those directly behind the front float leg location, beneath F-5 (2-1/16") and directly ahead of the rear float leg, beneath F-6 (2-1/4"). These two dimensions take into consideration that the top of the float has not yet been sheeted.

☐ 3. With the fuselage, float legs attached, now sitting accurately over the main float, you can view the assembly from the side and use a pencil to mark the float leg ends for the second bend needed **to** fit the vertical main float sides. These bends can easily be done with a pair of pliers. Take a little time to "tweek" these bends to achieve a good fit.

☐ 4. The bolt hole marks on each float leg end should now be made. Remove the fuselage from the main float and the stand-off fixtures (leave the stand-offs in place) and remove the legs from the fuselage. Drill the bolt holes accurately through each leg end with a 7/64"dia. drill bit. Re-assemble the legs to the fuselage and place the fuselage back on the main float. Use the same drill bit to now drill holes through the main float sides and the plywood hard points. Install the four #4-40 blind nuts into the ply hard points with epoxy and allow to cure.

☐ 5. Remove the fuselage from the main float and remove the stand-off jigs from the main float top. The top of the float can now be sheeted with the 1/16" balsa provided and shaped and sanded to final form (see plans and cross sections). PLEASE note that the bottom edges of the float are NOT rounded, they are sanded to sharp, precise corners.

II. TIP FLOAT WIRE BRACES

☐ 1. Locate the 18" length of 3/32"dia. wire from your kit. This wire is purposely untempered to allow easy bending with common pliers. A carbide cut-off wheel in your Dremel Tool should be used to cut this wire as needed. Accurate bending patterns for these braces (2 per float, front and rear) are shown on the right side cross section view of the wing. Use the patterns to now bend and cut the braces.

☐ 2. Now trial-fit the tip float and the supporting wire braces in place to the wing. Use your pliers to adjust as needed for an accurate fit. Section C-C on the plans demonstrates the correct relationship of the tip floats to the wing. Once satisfied, set these parts aside for later assembly after covering.

III. WATER RUDDER

☐ 1. Locate the two solder clips, the 1/16" dia. x 5-1/4" wire arm and the 3/4 "x 1-1/4" piece of tin from your kit parts. These are used to make the water rudder system shown on the plans. We suggest using Harris "Stay-Clean" solder flux for the required soldering operations. Once the water rudder assembly is made, carefully clean it off and round the tin rudder as shown. On our prototypes, we sprayed this part flat black with K&B epoxy. This is not necessary but it looks very "finished".

IV. GENERAL

☐ 1. Bolt the wing to the fuselage. How does the wing saddle fit look? It should be an excellent fit because if it isn't water will find its way inside. Now is the time to correct any gaps and achieve a good fit. We suggest mixing up a thick mixture of 30-minute epoxy and white micro-balloons and spreading this mixture directly onto the fuselage wing saddle area. Cover the center section of the wing with clear MonoKote backing to protect it and then mount and bolt the wing in place. Allow the micro-balloon filler to cure, remove the wing and sand the fuselage sides smooth. The result will be a perfect wing/fuselage fit that will not require any additional sealing.

☐ 2. On our prototype KittiWakes we used no fiberglass for strengthening parts. However, you may wish to do so. We suggest using only 3/4 oz. fiberglass and only using this material in certain, small areas such as the bottom, leading edge of the rudder, a square inch or so over each of the four bolt holes in the main float, etc. Fiberglassing the entire float is *not* needed and doing so could cause a major weight gain.

COVERING

As mentioned right from the beginning, our prototypes have all been covered and flown with MonoKote® covering. The airplane depicted on the label of your kit is totally covered with MonoKote, including the aluminum pinstriping and the tip floats (which were initially hand-carved, shaped and hollowed from light balsa)! This airplane has been flown a great deal as well as displayed at the various trade-shows and still, to this day, looks fabulous. This demonstrates the viability of MonoKote® as a covering for seaplanes and we highly recommend it's use.

The tip floats, being plastic, lend themselves best to paint. We have used and highly recommend sprayed 2-part epoxies, such as K&B or HobbyPoxy. These paints were also used on our prototypes for areas such as the water rudder assembly, inside the engine compartment (flat black), the control horns (dark blue), the top of the canopy (red) and the aluminum float legs (aluminum).

We suggest that all of the various components that are going to be covered with MonoKote should first be wiped with a tack rag or blown off with high pressure air to remove any dust particles. Each component should

be covered separately (elevators, rudder, ailerons, wing, fuselage, etc.). After covering, locate and open up all required access points; hinge slots, bolt holes, etc. For seaplane operations there really isn't much difference in covering methodology other than being careful of each required opening in the airframe. A structure such as the main float, for instance, has requirements for four holes (the float leg attach points). Common sense dictates that when the float legs are bolted in place to the main float, the bolt threads should first be lightly coated with a silicone sealer (best) or at least a coat of Vaseline. While still on the subject of the main float, this particular structure should be very carefully covered with the overlapped seams measuring about *3/16" - 1/4".* Additionally, these seams should be carefully worked over with your MonoKote iron to be very sure they're in place for good. It's taking the time to do these kinds of things that has made MonoKote work so well for us on our prototypes.

After covering, the elevators, rudder and ailerons can be hinged in place. We've made it a practice to drill a few *3/32"* dia. holes on each side of the hinges, before installation, to allow the epoxy to flow and act as "pins" when cured. As you proceed, keep a small amount of acetone handy to wipe-off any excess epoxy.

The tip floats and tip float braces can now be installed on the bottom of each wing panel. The method that we've used to do this is simple and fast. First, install the formed main tip float wire into it's hole and slot and secure with the wood screws and washers. The front and rear tip float brace wire-forms have already been bent and pre-fitted earlier. Apply a slow-setting CA adhesive to the ends of the braces and main tip float wire that fit into the tip float itself and insert the front and rear wire ends into the tip float, in approximately the correct positions. Now apply just a little CA adhesive to the opposite ends of the wire braces and press this assembly into place in the holes. If you need to remove the tip floats from the wing, all you need to do is to remove the screws and washers, flex the brace wires a couple times and the assembly will come out.

The nylon control horns can now be permanently mounted to the rudder, elevators and ailerons. Again, we'd suggest silicone adhesive on the threads.

As mentioned earlier, we suggest a coat or two (brushed is fine) of epoxy paint (K&B or Hobby Poxy) for the engine compartment. Flat or satin black is our favorite because it's neutral and easy to see when brushing. Once this is done, the motor-mount, engine, muffler, fuel tank and all necessary plumbing can be installed. The water rudder won't be attached until after the radio is installed and the airplane is assembled.

RADIO INSTALLATION

If you have followed these instructions to this point, the physical mounting of the four required servos should only be a matter of a few screws. This should be done now.

As mentioned earlier in the Wing Construction steps, the aileron drive mechanism consists of the single length of braided steel cable, driven at the center by the aileron servo. Solder one of the threaded brass couplers on one end of this cable and insert the other end into one of the openings at the aileron location on the bottom of the wing. Feed the cable through and into the servo compartment, through the EZ connector on the servo's output arm and then into the tubing opening for the other wing panel. Continue feeding the cable through this panel until it exits on the other side. Attach one of the nylon clevises to the threaded coupler and attach the clevis to the aileron control horn. Use scraps of tape to hold the ailerons in neutral. Now measure how much cable needs to be cut-off in order to solder the remaining coupler in place with a clevis attached. Mark and cut-off this length of cable with a carbide cut-off wheel, lightly tin the cable end, and solder the coupler to it. Attach the clevis to the coupler and make the connection to the aileron control horn. The clevises can now be adjusted to center the ailerons and once satisfied, the set screw in the EZ connector can be tightened. Test the action of this mechanism with your radio system and make any adjustments required.

1/4" dowel stock has been provided for the rudder and elevator pushrods, make and install these now. We suggest you use 3/32" dia. wire at the servo end of these pushrods with either DuBro EZ connectors or "Z"-bends. Don't use threaded clevises.

Assuming the throttle linkage of your choice has been installed and works, make that connection to the throttle servo. The switch on our prototype was mounted internally (almost a "must" with seaplanes), against the bottom of the fuselage top sheeting, just ahead of the servo tray. A short length of wire through the fuselage (use a close-fitting grommet of some sort; plastic tubing, etc.) is then installed to activate the switch externally. If you look closely at the KittiWake on the box label, you can see this on/off wire, just below the name on the fuselage.

You should now make an exit for your receiver's antenna. We suggest that, like the switch, this exit be as high up on the fuselage side as possible and that this exit also be grommeted. Attach the other end of it to the top of the fin with a wire hook and rubber band.

The only real water-proofing measure that we took, other than building the airplane tight to begin with, was wrapping the battery pack in clear plastic. The receiver and battery pack should now be installed, remembering that their positions may have to be changed for Center of Gravity needs.

Assemble your model completely and turn on the switch. First make very sure that the ailerons, rudder and elevators move in the correct directions by transmitter command. Now you need to set-up your surface movements for initial test flights. The following is what we suggest for first flights:

ELEVATORS..... .5/16" from neutral 5/8" total
RUDDER.....All available movement
AILERONS..... 1/4" from neutral 1/2" total

The above movements provide crisp control of the model. If you have dual rate capability on your transmitter, you may wish to decrease these movements slightly.

The last thing to do is balance the model. The C.G. shown on the plans is exactly where we have been flying our prototypes. We've gone as far as *1/2"* fore and aft of this location and still had a managable airplane but not necessarily a "happy" airplane. Therefore, do whatever is needed to achieve the C.G. location shown and recommended.

After fully charging your radio system, you can head to the pond!

FLYING

Assuming that you have followed the instructions and made sure that the engine is performing well, let's head for the lake! The flying site that you choose is very important. It should offer you clear, unobstructed take-off and landing room and it should also have access to the water; a bank, stretch of sand, low pier, etc. *Never,* at any time, should you operate your KittiWake when the water is being used by swimmers or boaters. The last precaution we'll throw in here is that it is extremely unwise to operate your KittiWake out of salt water. Salt water can and will attack almost all metals, including battery packs, receiver P.C. boards and servos. And it does so in a matter of seconds. Fresh water on the other hand really does not hurt the electronics of a radio system, as long as the system is given the opportunity to dry out between "dunkings". Our prototypes have not shown a tendency to take on water and the fact that the radio system is "suspended" in the upper part of the fuselage does a great deal in protecting the system from sitting in any pooled water that may get in.

It does pay to create the best possible fit between the wing and fuselage to minimize leakage.

Fill your tank and start the engine. From the work you've done at home, the radio system should have already been checked for any problems with vibration. After making sure that all of the controls are moving in the correct directions, launch the airplane onto the water.

First try the action of the water rudder. This rudder system works best at low speeds. You will find that the faster the aircraft is moving, the less effective the water rudder is. Do you have enough movement? In other words, can you steerthe model comfortably in any direction? Remember that wind will effect the steering of the model and that some additional time turning into the wind may be required. What we are trying to find out in these taxi tests is if we have enough steerage to easily handle the model but not so much as to render it "touchy".

If you find you need more steerage, return the model to shore and induce more movement into the flying rudder by moving the clevis in, to the next hole. Try taxiing again.

Once you're comfortable with the water handling characteristics, turn the airplane into the wind and advance the throttle smoothly to about 1/3 rd. You'll find, as you do this, it may be necessary to hold a small amount of right rudder to compensate for intitial torque. The idea is to hold the aircraft in as straight a line as possible while proceeding upwind. Watch your airplane carefully. At 1/3 rd throttle you should be able to notice that it wants to come up on the step and, depending on your engine, it may already be on the step. This is the point that a seaplane must reach in order to take-off. It is possible that your model is now planing on the step. Try this a couple of times to get used to this transition phase of your model. You should now be ready to try a take-off. Again head the KittiWake into the wind, advance the throttle smoothly and look for the transition of the model onto the step. After a few yards on the step to build-up speed, the model will essentially by flying. A little back pressure on the elevator stick should lift the model off the water. Do *Not* lift the model off before reasonable flying speed has been reached.

Once airborne, grab some altitude and start the process of checking out the effectiveness of the flight controls—remember that, if you have dual rate capability with your radio system, you can increase or decrease flight surface throws. Once you have the model settled down and trimmed for straight and level flight, take the time to idle back the engine and find out what a stall is like while still at altitude. Our prototypes, balanced as shown, stall rather cleanly with recovery almost instantaneous. The further back your C.G. is, the more the tendancy will be to tip stall. Once you've seen some of the low-speed characteristics of your KittiWake, you should be a bit more comfortable with the landing.

Landing a seaplane is not too different from landing any other type of model with the exception that it is important to keep the wings level. You want to land your airplane on the main float, not the tip floats. A couple of feet off the water, start a gentle flare, to allow the main float to just skim across the water—don't pancake the float onto the water, you'll just ricochete back into the air again. With the float skimming across the surface of the water, chop the throttle and allow the model to settle into the taxiing speed and return to shore.

Now is the time to relax a bit and think back about what trim changes, if any, are needed. Make these now. Get airborne again and start finding out the performance capabilities of your KittiWake. We think you'll be truly impressed.

We sincerely hope that you have enjoyed this project and that your KittiWake will be the source of many happy hours spent at the lake!

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