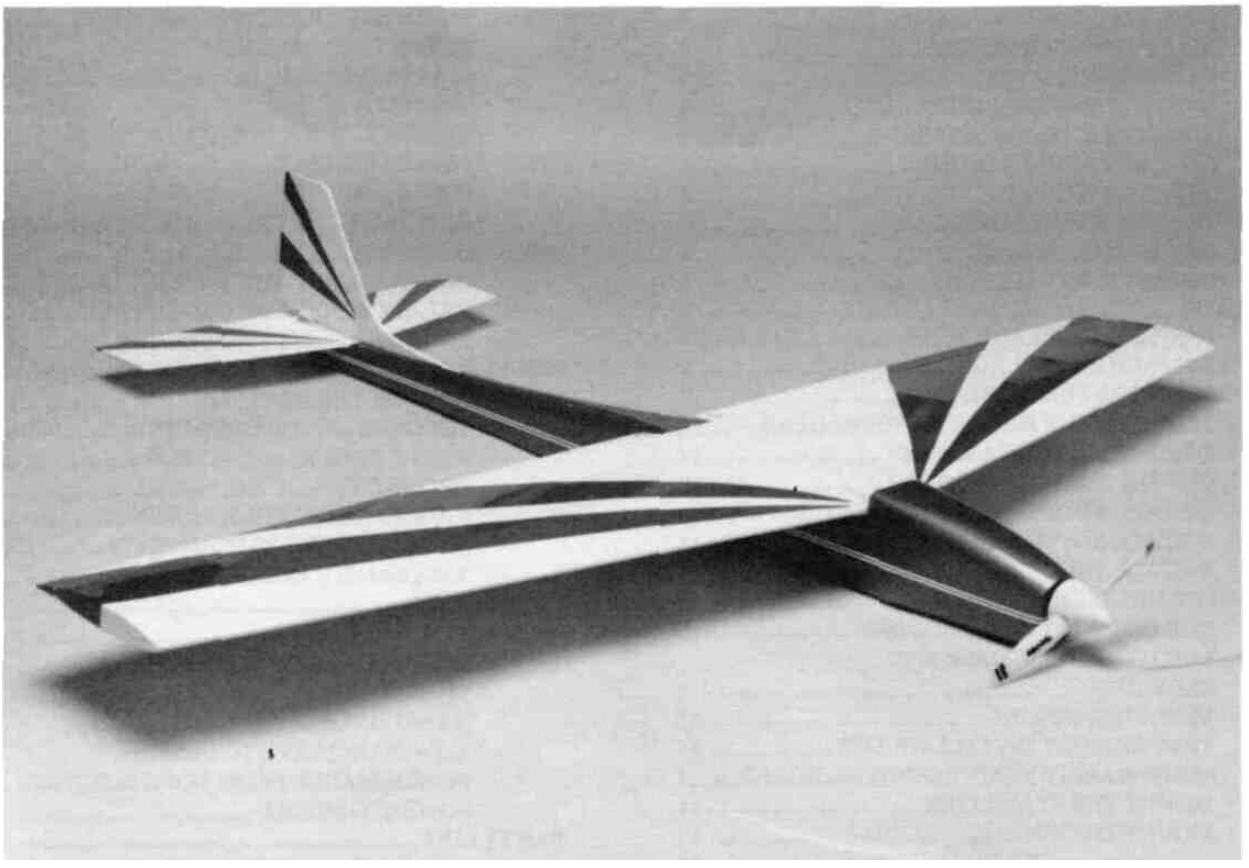
Electro Streak

INSTRUCTIONBOOK



PLEASE READ THROUGH THIS INSTRUCTION BOOKLET IN ITS ENTIRETY BEFORE BEGINNING ASSEMBLY. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

WARNING! THIS IS NOT A TOY!

This R/C kit and the model you will build is not a toy! It is capable of serious bodily harm and property damage. IT IS YOUR RESPONSIBILITY AND YOURS ALONE-to build this kit correctly, properly install all R/C components and flying gear (motor, batteries, pushrods, etc.) and to test the model and fly it only with experienced, competent help in accordance with all safety standards and common sense as set down in the Academy of Model Aeronautics Safety Code. It is suggested that you join the AMA and become properly insured before you attempt to fly this model. IF YOU ARE JUST STARTING R/C MODELING, CONSULT YOUR LOCAL HOBBY SHOP OR WRITE TO THE ACADEMY OF MODEL AERONAUTICS TO FIND AN EXPERIENCED INSTRUCTOR IN YOUR AREA.

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INTRODUCTION

Congratulations! Thank you for purchasing the Great Planes ElectroStreak! Tom Stryker's original design for this airplane was first featured in the November, 1987 issue of Model Aviation magazine. We built this airplane "just for the fun of it", and we were so impressed with its performance on our standard "Thrustmaster" motor, we knew it would be a success as a kit! During the testing process, the new Goldfire motor was developed, and we found this motor to be ideally suited for the ElectroStreak, due to its tremendous power.

This is one of the very few easy to build electric-powered airplanes in kit form that really does provide exciting and satisfying acrobatic performance without the need for expensive cobalt motors or exotic building materials. It is a very smooth and stable flier, yet it will perform all basic pattern maneuvers, such as rolls, inside and outside loops, snap rolls, spins, inverted flight, Immelmans, hammerheads, Cuban 8's, and many others.

While not a beginner's plane, the ElectroStreak is great for the intermediate or advanced flyer who wants real performance, with the quiet convenience of electric power.

Please Inspect all parts carefully before starting **to** build! If any parts are missing, broken or defective, or if you have any questions about building or flying this airplane, please call us at (217) 367-2069 and we'll be glad to help. If you are calling for replacement parts, please look up the part numbers and the kit identification number (stamped on the end of the carton) and have them ready when calling.

PRECAUTIONS

1. You must build the plane according to the plans and Instructions**.** Do not alter or modify the model as represented by the plans, as doing so may result in an unsafe or unflyable modeL

2. You must take time to build straight, true and strong.

3. You must use a proper R/C radio that is in first class condition, the correct size motor and correct components (wheels, etc) throughout your building process.

4 You must properly install all R/C and other components **so** that the model operates properly on the ground.

5 You must test the operation of the model before the first and each successive flight to insure that all equipment is operating and you must make certain that the model has remained structurally sound.

6. You must fly the model only with competent help from a well experienced R/C pilot if you are not already an experienced and knowledgeable R/C pilot at this time.

Note: We, as the kit manufacturer, can provide you with a top quality kit and great instructions, but ultimately the quality and flyability of your finished model depends on how you build it, therefore, we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model

Remember: Take your time and follow directions to end up with a well-built model that is straight and true.

KEEP IT LIGHT!

Because the electric motor and motor battery are relatively heavy, and because electric motors do not produce as much thrust as glow engines (when compared to their weight), it is essential that the basic structure of the airplane be kept as light as possible In doing so, you will help insure that the finished airplane will not be too heavy to fly well.

One way to prevent excess weight build-up is to use only as much glue as needed for good glue joints Do not apply extra "fillets" of glue thinking that it will make your plane stronger' All that extra glue adds ounces to the weight of your plane, and will detract from the performance.

In order to help you build a light airplane, many parts in this kit are made from soft balsa Because the wood is soft, it does not die cut cleanly and it dents easily Therefore, you will have to do a little more sanding on the edges of the die cut parts before using them, and you may have to fill a few more dents and "dings". The soft balsa is also more fragile, so use a little extra care to avoid damaging the parts.

We will give you tips throughout this book on how to keep the structure light, and we urge you to follow them.

RADIO SELECTION

Because the ElectroStreak is optimized for light weight, you must use a radio system with "micro" servos and a 225 mAh flight pack battery Our prototype uses a Futaba radio with three S33 servos and a Robart HQ500 electronic speed control The radio equipment you choose must be small and lightweight.

SPEED CONTROL SELECTION

You must equip your ElectroStreak with some type of motor control to enable you to turn the motor on and off with the transmitter The best way to accomplish this is by installing an electronic speed control, which provides fully proportional control of the motor speed You should choose a speed control that is capable of handling at least 25 Amps of continuous current.

It is not necessary to have fully proportional speed control in this airplane Instead, you may prefer the simplicity (and cost savings) of a simple on-off switch, activated by a 4th micro servo To accomplish this you may purchase a micro switch or toggle switch (from an electronics supply store, such as Radio Shack) and mount it to the "throttle" servo using double-stick tape.

NOTE: Many electronic speed controls have a built-in safety feature which acts like a circuit breaker in case of an overload due to a short circuit or a stalled propeller, however, if you are using a simple switch system, you should install a 20 or 25 amp fuse in your switch harness to protect the electrical components and to prevent fire or explosion in the event of an overload

BATTERY SELECTION

In order to give the ElectroStreak sufficient power to perform large acrobatic maneuvers, we strongly recommend that you use a good quality 7 cell nicad battery pack for motor power. The individual cells in the battery pack should be "low impedance", which means that they are capable of delivering high current to the motor (Sanyo SCR cells, for example)

If you choose a 7-cell 1200 mAh battery pack, it should be a "flat" pack, such as the "Kyosho Turbo Racing Battery"

You can cut several ounces from the flying weight of your ElectroStreak, thereby improving performance, by using a 7 cell 800 mAh battery pack The major disadvantage is that flight times will be reduced to only 2 or 2-1/2 minutes (continuous motor run).

BATTERY CHARGER SELECTION

You may use any of the commercially available battery chargers that are designed for charging 7 cell nicad battery packs. Some chargers have a "peak detector" which sense when the battery is fully charged and automatically shut off at the right time Some chargers operate from 110 volt house current, 12 volt DC (automobile battery), 01 both For convenience, we recommend a "fast charger" that will charge a 7-cell 1200 mAh battery pack m approximately 20 minutes.

PROPELLER SELECTION

We tested several different propellers on the ElectroStreak, and found the G rish Tornado 7x6 nylon prop to be a very good all around choice An 8x4 prop provides a little more thrust on takeoff, but the 7x6 gives more speed and better overall performance Wood props break very often when this airplane is "belly landed", so they are not recommended unless you are using the landing gear.

OPTIONAL LANDING GEAR

Parts are included in the ElectroStreak kit for a wire landing gear and tail skid The landing gear adds a little weight and drag, thereby reducing overall performance slightly, therefore, if you want maximum performance, do not install the landing gear.

If you will be landing your plane on a hard surface, such as blacktop, concrete or gravel, you should install the landing gear or nylon skids on the belly to prevent damage to the fuselage.

If your flying site has a smooth grass surface, belly landings are no problem, and (usually) result in no damage to the fuselage or nylon propeller.

SELECTION OF WHEELS

If you plan to install a landing gear, we strongly recommend that you choose wheels that are both lightweight and aerodynamically clean We have used Williams Bros #127 wheels with good success. If you use lightweight foam rubber wheels, you should round the edges of the wheels with sandpaper to reduce drag

GLUES (ADHESIVES)

You may build this entire airplane using CA (Cyanoacrylate) adhesive Thin CA runs right into a good fitting joint, so you can assemble the parts first, then apply thin CA Thick CA is more like syrup and it will not harden until you press the two parts together squeezing the glue out to a thin layer A related and very handy product is CA Accelerator spray (Zip Kicker or Hot Shot), and is used to instantly harden CA glue When using CA glues "trial fit" the parts to make sure they fit well before gluing because they don't give you a second chance The most common mistake made by new modelers is using loo much CA glue Rather than squeezing the bottle, it is usually sufficient to touch the tip of the applicator spout to the joint being glued and allow a few drops of CA to flow into the joint.

There may be a couple of instances during construction of this model in which a small amount of Aliphatic Resin or Epoxy adhesive will make construction easier. The amounts required will be very small, however.

In any case, a "glob" of glue is not a substitute for a good-fitting joint' Take the time to sand the parts until they fit well, then a small amount of glue will do the job.

OTHER ITEMS REQUIRED

Radio, Speed control or Switch, Batteries (See above comments on these items)
2- 1-1/2" Diameter Main Wheels
4- 1/8" Wheel Collars
Iron-on Covering Matenal (Super Monokote, Black Baron Film or equivalent)
Roll of 1/16" x 1/4" self adhesive foam wing seating tape (Sonictronics #230)

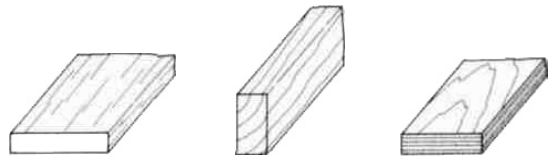
SUPPLIES & TOOLS NEEDED

2 oz - Thin CA Adhesive
1/2 oz - Thick CA Adhesive
Instant Glue Accelerator (optional)
2.5 oz - 30 Minute Epoxy
2 oz Aliphatic Resin (Titebond. etc.)
Hand or Electnc Drill
Drill Bits (1/16', 5/64", 3/32", 5/32", 11/64", 13/64")
Sealing Iron (for covering)
Heat Gun (optional, for shrinking covering)
Soldering Iron
Hobby Saw (X Acto Razor Saw)
X-Acto Knife, #11 Blades
Pliers
Screw Drivers
Flat File
T-Pins (small)
Straightedge or Ruler
Masking Tape
Sandpaper (80, 100, 220 and 400 grit)
T-Bar Sanding Block, or similar
Waxed Paper
Lightweight **Balsa Filler**

COMMON ABBREVIATIONS USED IN THIS BOOK AND ON THE PLANS:

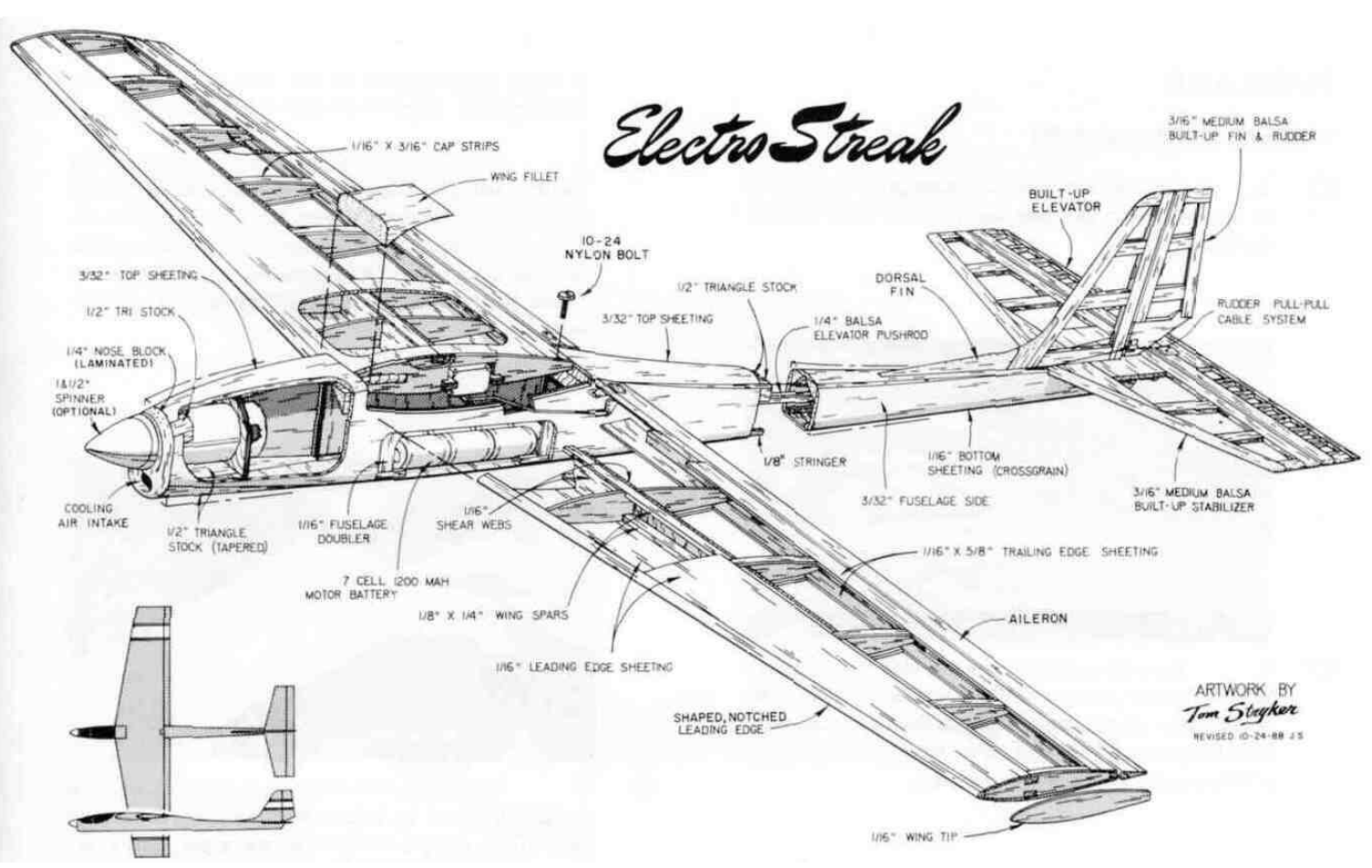
Elev = Elevator
Fuse = Fuselage
LE = Leading Edge (front)
LG = Landing Gear
Lt = Left
Ply = Plywood
Rt = Right
Stab = Stabilizer
TE = Trailing Edge (rear)
" =Inches

TYPES OF WOOD



BALSA

Study the perspective drawing on page 5 to become familiar with the parts of the ElectroStreak



GET READY TO BUILD

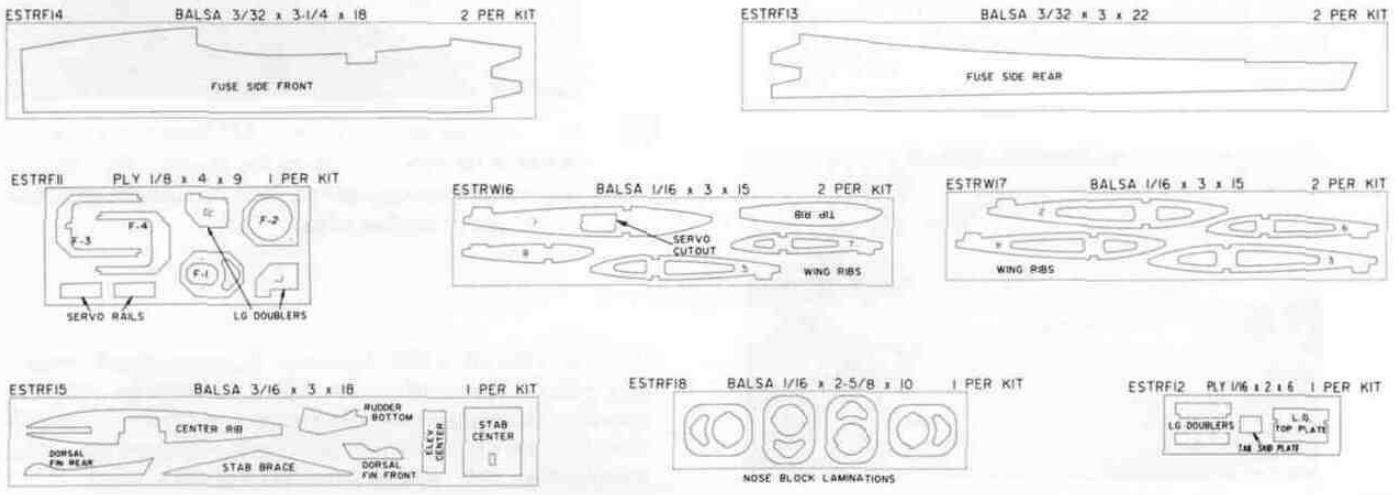
D 1. Unroll the plan sheet. Re-roll it inside out to make it lie flat. NOTE: If you have a small work area, you may cut the plan into two sections, "wing" and "fuselage".

D 2. Remove all parts from the box. As you do, figure out the name of each part by comparing it with the plans and the parts list. Using a felt tip pen, write the part name or size on each piece to avoid confusion later. Use the die-cut patterns shown below to identify the die-cut parts and mark them before punching out. Save all scraps. If any of the die-cutparts are difficult to punch out, do not force them! Instead, first cut around the parts with an Xacto knife.

NOTE: After punching out the die-cut parts, use your T-Bar **or** sanding block to lightly sand the edges to remove any die-cutting irregularities.

D 3. As you identify and mark the parts, separate them into groups, such as fuse (fuselage), wing, fin & stab (stabilizer), and hardware.

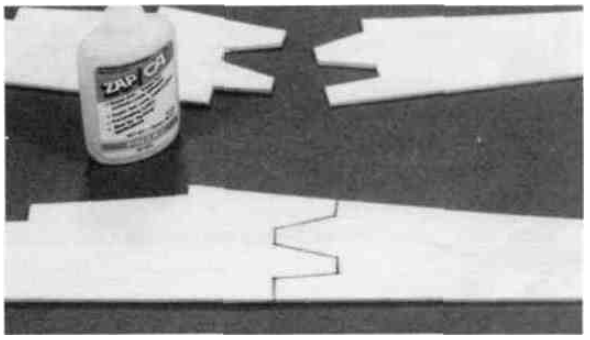
DIE PATTERNS



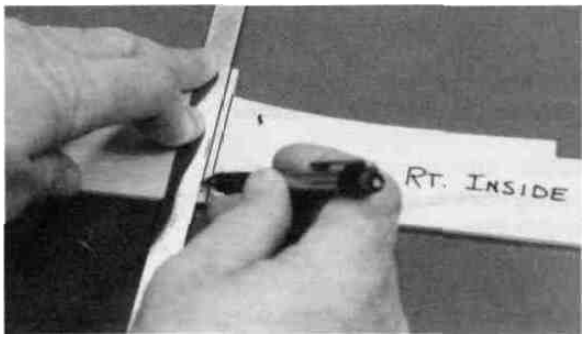
FUSELAGE

PREPARE FUSELAGE SIDES

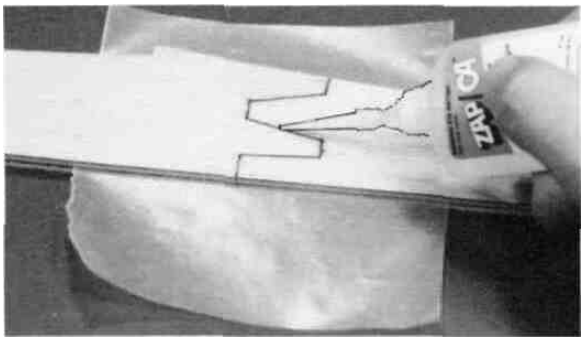
D 1. Lay a 6" x 6" piece of waxed paper on the plan in the area where the front and rear fuse sides join, to protect the plan.



D 2. Lay a die-cut 3/32" balsa fuse side front and fuse side rear on the plan and carefully line them up along the bottom edge. Apply thin CA glue to the joint, then apply thick CA glue to fill any gaps. Sand the joint smooth using a T-bar sander with 100-grit sandpaper.

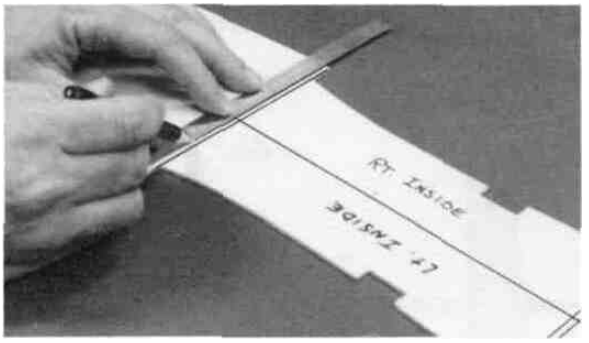


D 3. While the fuse side is still in place on the plan, use a straightedge and a pen to mark the locations of formers F-3 and F-4 only. Note that we have extended the former lines above and below the fuse for your convenience. Mark this fuse side "Rt. Inside".

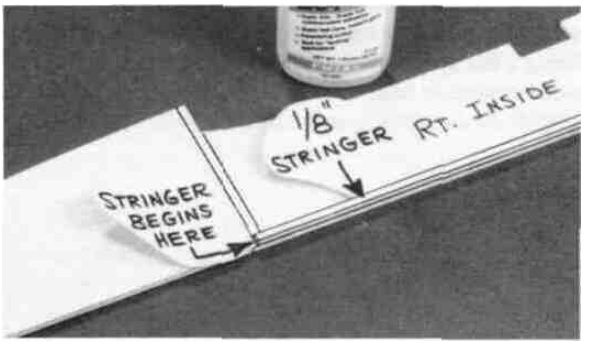


D 4. Glue the left fuse side halves together by carefully positioning them on the right fuse side. Use a piece of waxed paper between the fuse sides to prevent gluing them together. Sand the Lt. fuse side joint smooth.

D 5. Remove the waxed paper, put the two fuse sides together and line them up at the front and the bottom edges. Then check to make sure they are exactly the same all the way around. Sand the edges as necessary until the two fuse sides match. It is especially important that the overall length be the same. so sand the tail end as necessary.



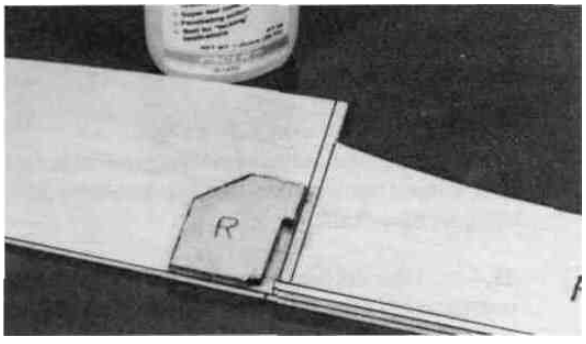
D 6. Lay the two fuse sides flat on the table, with the straight portion of the bottom edges touching at the front half. Then, using a straightedge and a pen, extend the former location lines onto the fuse side that does not have them. Also, mark the 2nd. fuse side, "Lt. inside".



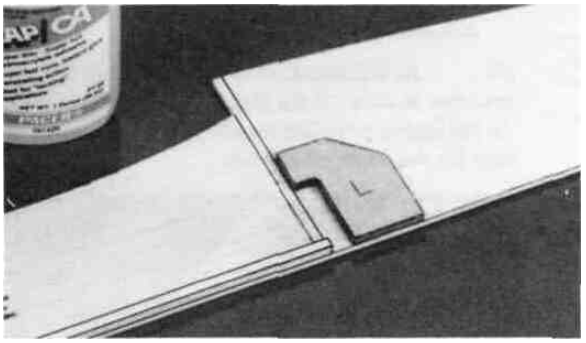
D 7. Glue the 1/8" x 1/8" x 30" balsa stringers to the inside of the fuse sides, along the bottom. The stringers begin at the front edge of F-3. Trim the stringers even with the aft end of the fuse sides.

LANDING GEAR NOTE: If you have decided to install a landing gear, you will now install the Lt. & Rt. LG Doublers. However. even if you do not plan to use a landing gear, you may wish to install these doublers anyway, in case you change your mind later. (The extra fuselage parts required for the LG will add 1/4 oz.).

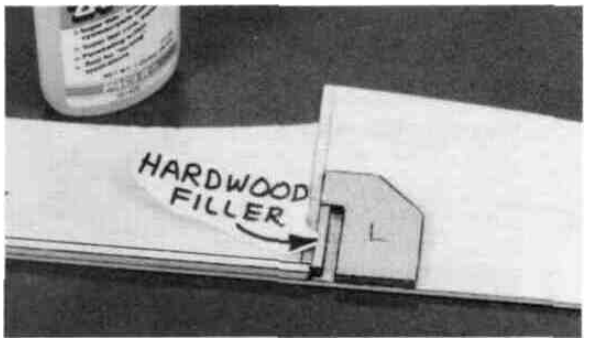
D 8. Strengthen the inside surface of the fuse sides in the area of the LG wires by applying thick CA and spreading it smooth with waxed paper.



D 9. Glue the die-cut 1/8" ply Rt. LG doubler to the Rt. fuse side. The bottom edge of the doubler is even with the bottom of the fuse side, and there must be a 1/8" gap in front of F-3.

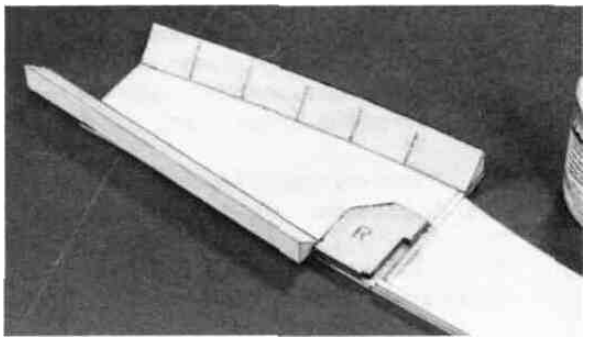


D 10. Glue the die-cut 1/8" ply Lt. LG doubler to the Lt. fuse side. The bottom edge of the doubler is even with the bottom of the fuse side, and there must be a 1/4" gap in front of F-3.

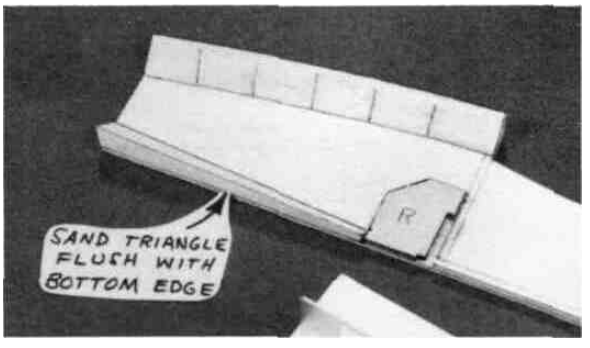


D 11. Glue the 1/8" x 1/8" x 7/8" hardwood filler to the Lt. fuse side, along the front edge of F-3. NOTE: The bottom end of this filler must be 1/16" above the bottom edge of the fuse side, and there must be a 1/8" gap between the filler and the LG doubler for the LG wire.

D 12. Using a razor saw, cut one of the 1/2" x 24" balsa triangles into two 6-1/8" lengths and two 5-7/8" lengths.



D 13. Glue the 5-7/8" long triangles to the inside of the fuse sides along the bottom, from the front of F-3 forward to the front of the fuse sides. Note that the triangle is angled in relation to the bottom edge of the fuse side (see the fuse plan side view). NOTE: If you have installed the 1/8" ply LG doublers, run the triangles from the front of the doublers forward.

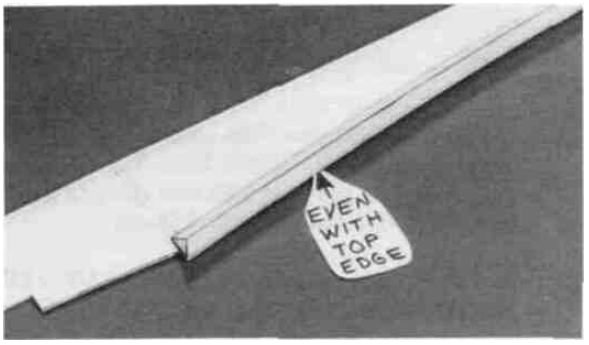


D 14. Using your razor saw, cut slots in the 6-1/8" lengths of 1/2" triangle, to permit bending. Then glue these triangles to the fuse sides along the top edge, beginning at the rear edge of F-3 and extending forward to the front of the fuse sides.

(See **Steps** 15 and 16 at the top of page 8.)

D 15. Trim and sand the balsa triangles even with the front of the fuse sides.

D 16. Sand off the bottom triangles even with the bottom edge of the fuse sides.

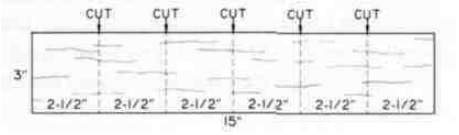


D 17. Glue the remaining two 1/2" x 24" balsa triangles to the fuse sides along the top edge, beginning at the front edge of F-4, and extending to the aft end of the fuselage. NOTE: Sand the front end of the balsa triangles to an angle so they line up with the front edge of F-4. NOTE: The triangles extend into the stabilizer saddle area and will later be sanded even with the stab saddle.

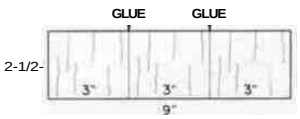
D 18. Trim and sand the balsa triangles even with the aft end of the fuse sides.

D 19. Find the two 1/16" x 3" x 15" balsa sheets. Select the sheet that has the softest balsa, and use it in the next steps.

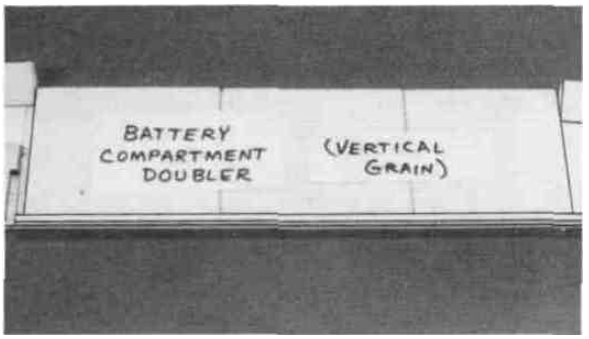
D 20. Using an Xacto knife and a straightedge, cut the 1/16" x 3" x 15" balsa sheet into 6 pieces, each having a length of 2-l/2".



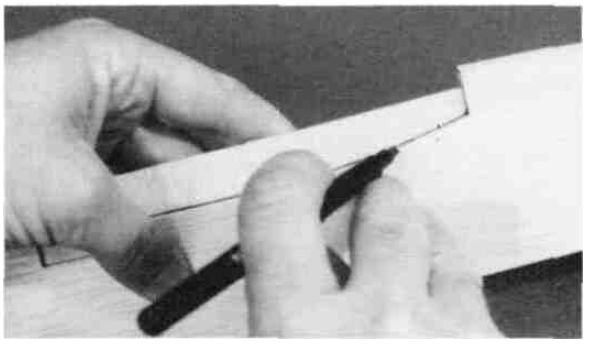
D 21. Edge glue three of these pieces together to make the **battery compartment doubler.**



D 22. Sand smooth, and sand one long edge straight, using your T-bar.



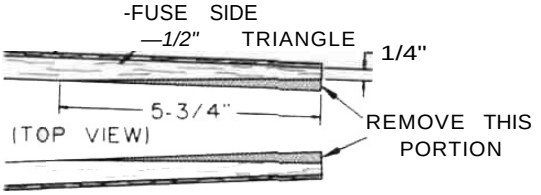
D 23. Trim the ends of the battery compartment doubler to fit between the rear of F-3 and the front of F-4.



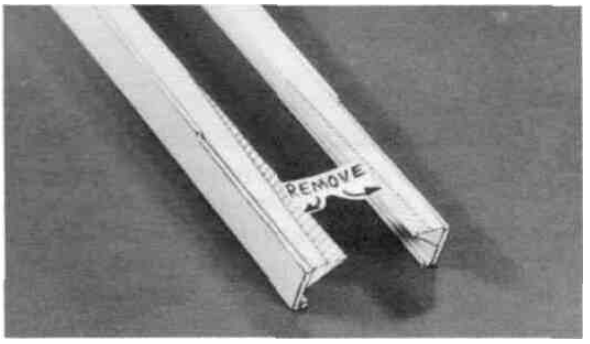
D 24. Mark the outline of the wing saddle on the battery compartment doubler, then trim the doubler to this outline using an Xacto knife.

D 25. Glue the doubler to the fuse side in the following manner: apply thick CA to the doubler, press the doubler in place, then apply thin CA around the edges.

D 26. Repeat steps 21-25 to make and install the other battery compartment doubler.

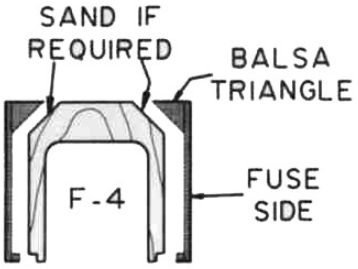


D 27. At the aft ends of the fuse sides, sand the triangles to a taper as shown in the sketch and photo. This will enable the tail end to be pulled together and will provide a strong base for the stabilizer and fin.

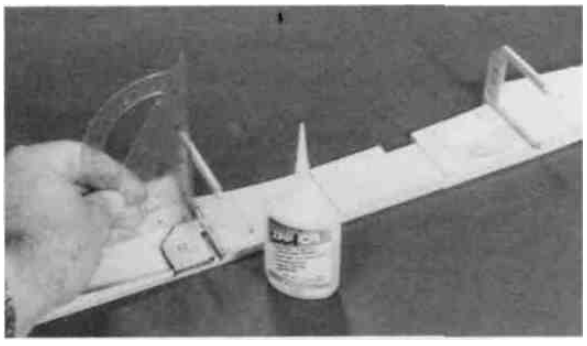


D 28. Spread a couple drops of thick CA on the battery compartment doublers in the area of the servo rails and wing hold-down plate. Use a piece of waxed paper to spread it **smooth.**

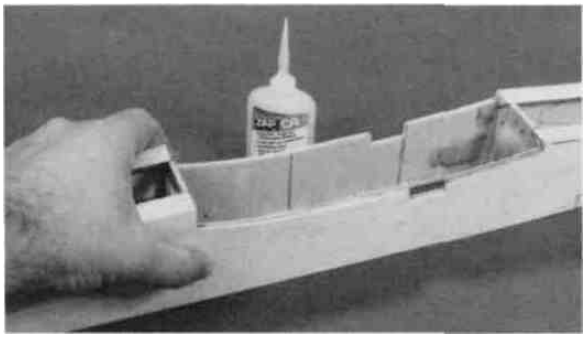
ASSEMBLE FUSELAGE



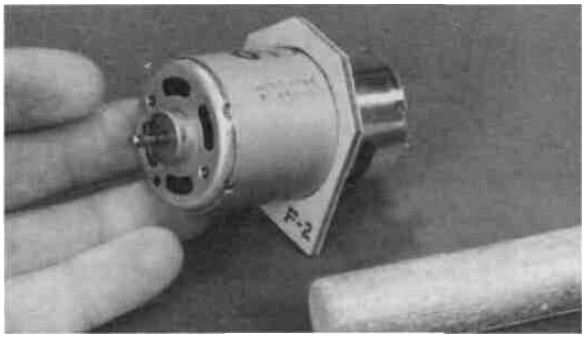
D 1. Trial fit the die-cut 1/8" ply formers **F-3** and F-4. You may have to sand the top comers slightly to make the formers fit perfectly. (Remove only a very small amount at a time).



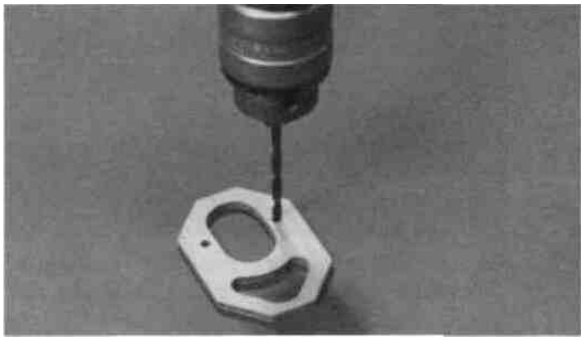
D 2. Glue F-3 and F-4 to the Rt. fuse side. Use a square to make sure these formers are installed at right angles (perpendicular) to the fuse side.



D 3. Place the fuselage upright on the fuselage top view, working on a flat surface and glue the Lt. fuse side to F-3 and F-4. **NOTE:** The bottom edges of the fuse sides must be down on the flat surface during this step.



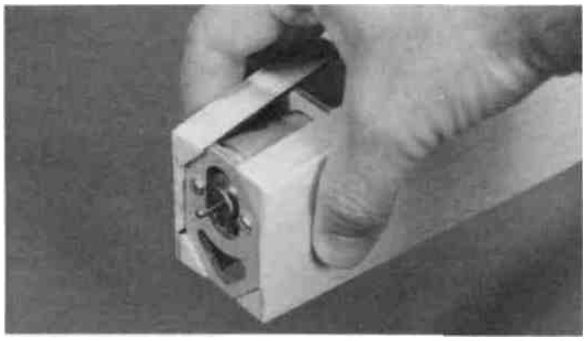
D 4. Trial fity our electric motor through the hole in F-2. Sand the hole as necessary for a snug fit (Use a piece of sandpaper wrapped around a dowel). **NOTE:** If the motor label gives you problems when fitting, you may want to peel off the label.



D 5. Note that we have punched the locations of the two screw holes in F-l. Drill 1/8" holes at these two locations. Be sure to use a wood backing when drilling to prevent damaging the part you are drilling.

D 6. Mount F-1 onto the front of the motor with the two M3 x 6 metric screws.

M3x6 SCREW

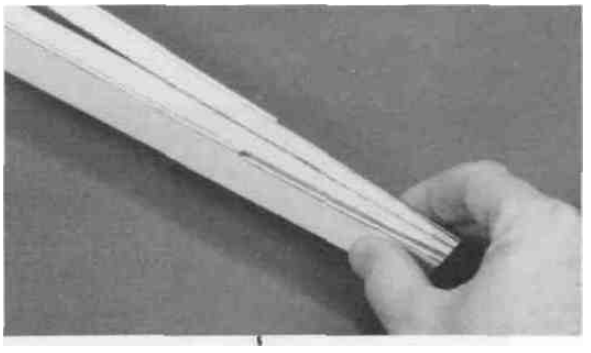


D 7. With F-1 mounted to the motor and F-2 positioned

on the motor as shown in the fuse plan side view, trial fit this assembly into the front of the fuse. Pull the fuse sides together over the formers and note the fit. If it is necessary to sand the comers of F-1 for a perfect fit, you must also sand the top comers of F-2 an equal amount, to maintain the correct down-thrust angle. NOTE: Remove the formers from the motor while sanding, to avoid getting pieces of wood inside the motor. NOTE: When trial fitting, notice that the right fuse side protrudes in front of F-1. This is normal, due to the built-in right thrust. You will later sand everything off even with the front of F-l.

D 8. Holding the motor, F-l and F-2 in place, glue F-l and F-2 to the fuse sides with thin CA. (Do not glue the motor to the formers!) Then remove the motor and reinforce the glue joints by adding thick CA.

D 9. Align the front half of the fuse on the plan (top view) and hold it down with weights.



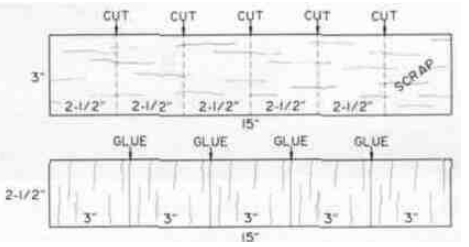
D 10. Pull the aft ends of the fuse sides together, align with the plans, and glue the triangles together. **NOTE:** If, when pulling the fuse sides together, you notice that one side seems stiff er than the other, you may make a few vertical cuts in the triangle on the stiff side to "soften" it up and allow it to bend to the same curvature as the other side.

D 11. Using a T-bar or sanding block, sand the top edges of formers F-l, F-2, F-3 and F-4 even with the top of the balsa triangle stringers. Also sand the top of the triangle stringers even with the top edge of the fuse sides, and to remove any rough glue joints.

D 12. Glue the 3/32" balsa top rear sheeting in place.

NOTE: This sheeting begins at the front of F-4 and ends at the front of the stab saddle area (trim as necessary).

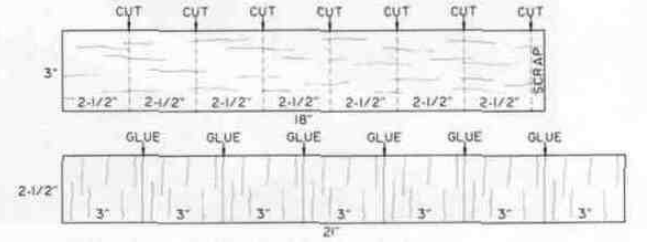
D 13. From the 1/16" x 3" x l5" hard balsa sheet, cut five 2-1/2" lengths. Edge glue these pieces together as shown.



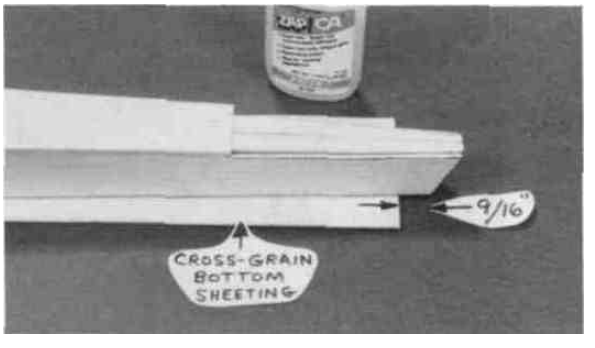
Then sand smooth on both sides with your T-bar and 100-grit sandpaper.

D 14. Glue this sheeting to the bottom **of** the fuse, beginning at the front of F-l.

D 15. From one of the 1/16" x 3" x 18" soft balsa sheets (the other two are used in the wing), cut **seven** 2-1/2" lengths. Edge glue these pieces together as shown.



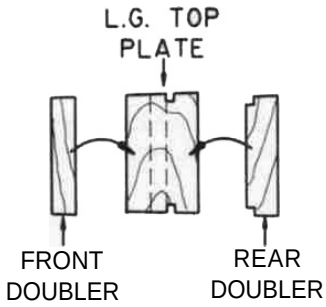
Then sand smooth on both sides with your T-bar and 100-grit sandpaper.



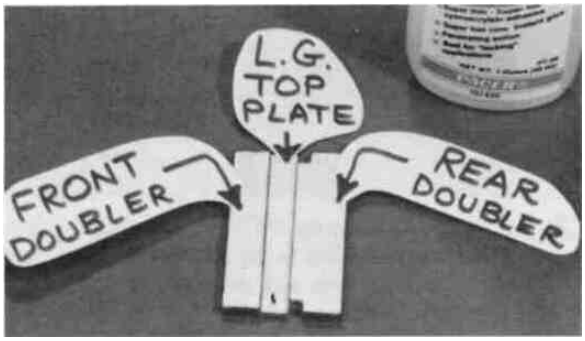
D 16. Glue this sheeting to the bottom of the fuse from

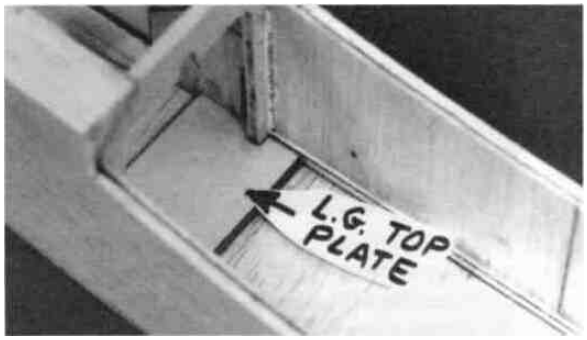
F-4 to the aft end. **NOTE:** If you are planning to install the landing gear,do not sheet the aft 9/16" of the fuse bottom.

D 17. Trim and sand the cross-grain bottom sheeting even with the fuse sides.

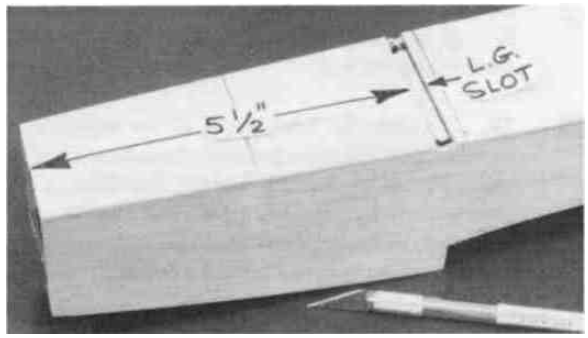


D 18. If you are installing a landing gear, glue the die-cut 1/16" ply front and rear LG doublers to the 1/16" ply LG top plate.

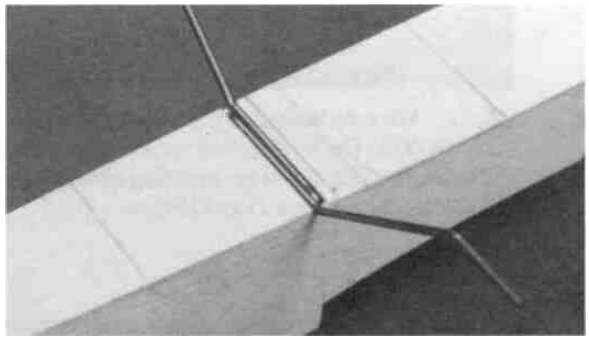




D 19. Trial fit the LG plate/doubler assembly in place in the fuselage, sanding and filing as necessary for a good fit, then glue in place. **NOTE:** The slot between the front and rear LG doublers must be down.

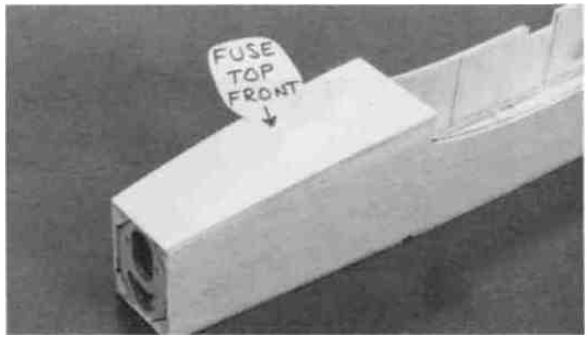


D 20. Cut a 1/4" wide slot in the bottom sheeting for the landing gear. NOTE: This slot is approximately 5-1/2 to 5-3/4" back from the front of F-1. You may push a pin through the bottom sheeting in a few places to "find" the correct slot location before cutting.



D 21. Trial fit the 1/8" wire landing gear wires into the LG slot. File the slot as necessary for a good fit.

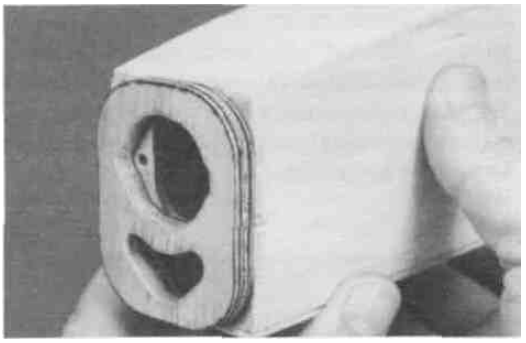
D 22. At this time, before you close up the front of the fuse, make a final check of the motor fit through F-2. You should be able to readily slide the motor into place from the rear, but it should fit rather snugly. If the motor is loose in F-2 it will result in a noisy vibration when the motor is running. You can tighten it up by coating the inside hole in F-2 with a thin layer of thick CA glue. If it is too tight, use sandpaper wrapped around a dowel to enlarge the hole slightly.



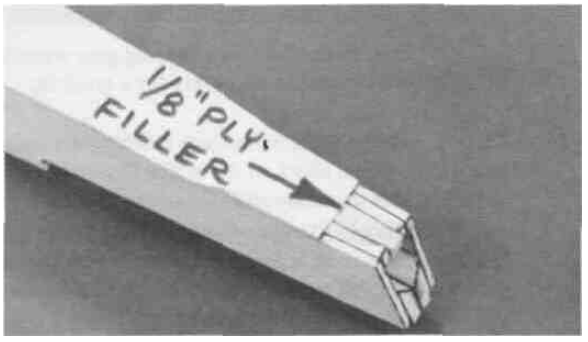
D 23. Glue the 3/32" balsa top front sheeting in place. NOTE: This piece has been cut slightly oversize to allow extra for trimming.

D 24. Sand all balsa parts flat and even with the front of F-l. Also sand the rear edge of the fuse top front even with the rear edge of F-3.

D 25. Glue the four layers of the balsa nose block together, alternating the grain direction at each layer (you are making balsa "plywood"). NOTE: Use thin CA to achieve good penetration, making a hard and durable nose block. After the glue has hardened, sand the inside of the openings with sandpaper wrapped around a dowel.



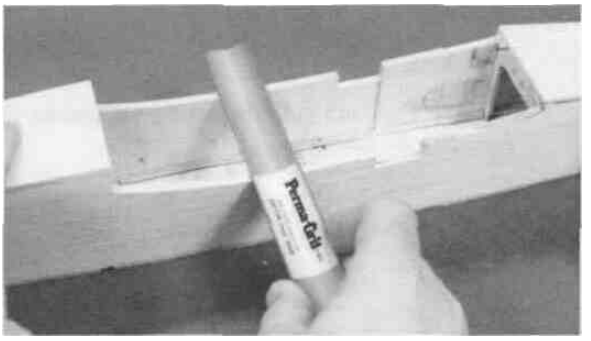
D 26. Glue the laminated nose block to the front of the fuse. **NOTE:** The layer having vertical grain should be in the front. **NOTE:** If you are installing a landing gear (and tail skid), perform steps 27 and 28 now.



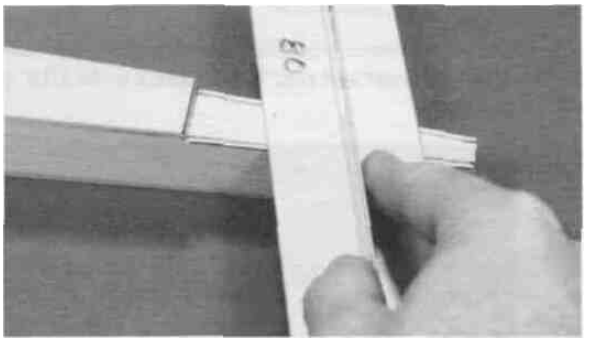
D 27. Cut a scrap of 1/8 " ply (from die-cutting scrap) to fit snugly between the 1/8" x 1/8" balsa stringers at the aft end of the fuse. Glue in place.

D 28. Glue the die-cut 1/16" ply **tail skid plate** to the bottom of the fuse at the aft end. Then sand the tail skid parts **even** with the fuse sides and fuse tail end.

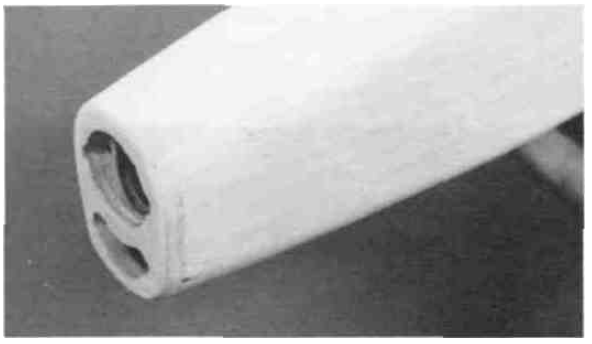
SAND THE FUSELAGE



D 1. Carefully sand the vertical grain balsa battery compartment doublers even with the fuse sides in the wing saddle area.



D 2. Note that the 1/2" balsa triangle stringers protrude above the fuse sides in the stab saddle area. Sand these triangles down even with the fuse sides in the stab saddle **area.**



D 3. Study the cross-section drawings of the formers and cross-sections "E-E" and "F-F" to get a "feel" for how much sanding will have to be done on the fuselage to produce the correct shapes. Now use a sanding block with coarse (#50 or #80 grit) sandpaper to sand the fuselage to its approximately final shape.

D 4. Change to progressively finer grades of sandpaper to achieve the final shape and smoothness. If you cut a long, narrow strip (1" x 10") of 400-grit sandpaper and use it like a "shoe-shine cloth" on the top of the fuse, you will be surprised at the uniformity and smoothness that can be achieved.

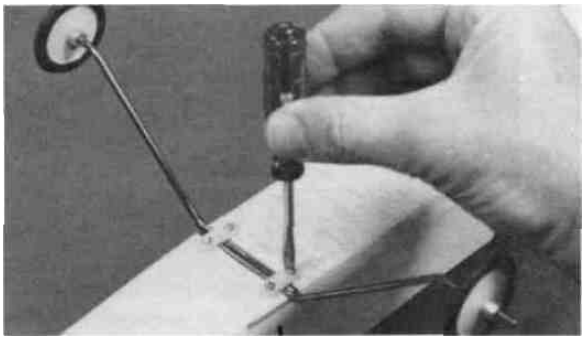
D 5. At this time, you should check the basic fuselage weight. It should weight approximately 2-1/2 oz. with the ply LG plates installed. If the fuse weighs closer to 3 oz., go over the entire fuse with sandpaper another time or two to reduce weight, especially on the top and front.

TEMPORARILY MOUNT LANDING GEAR

D 1. Place the 1/8" wire main landing gear in position.

NYLON L.G. STRAP

D 2. While holding two of the nylon landing gear straps in place, mark the locations of the holes to be drilled. Drill 1/16" pilot holes at these locations. NOTE: Use only two of the landing gear straps (the others are extras).

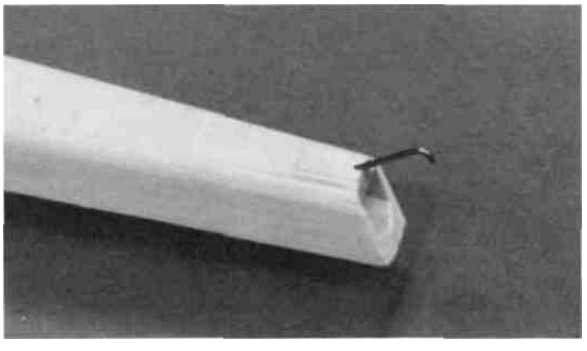


D 3. Secure the nylon straps with #2 x 3/8" screws.

#2x3/8" SCREW

DRILL HOLE FOR TAIL SKID

D 1. Drill a 1/16" hole in the plywood tail skid plate, drilling at an angle, as shown on the plan.

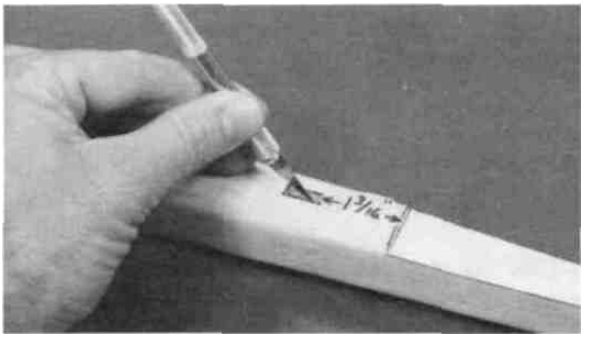


D 2. Trial fit the 1/16" wire tail skid.

D 3. Now remove the main gear and tail skid (they will be permanently attached after covering).

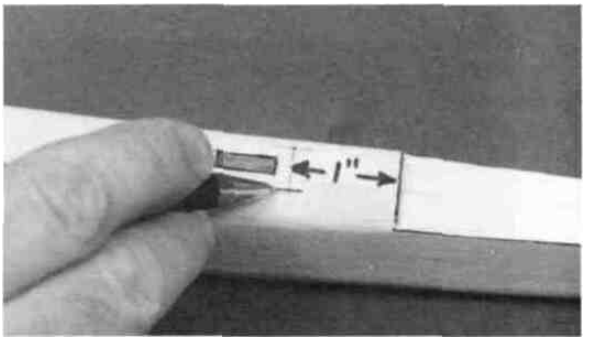
CUT FIN SLOT IN FUSE TOP

D 1. From the front of the stab saddle area, measure forward and make marks on the fuse top at 1 -3/16" and 1-11/16".

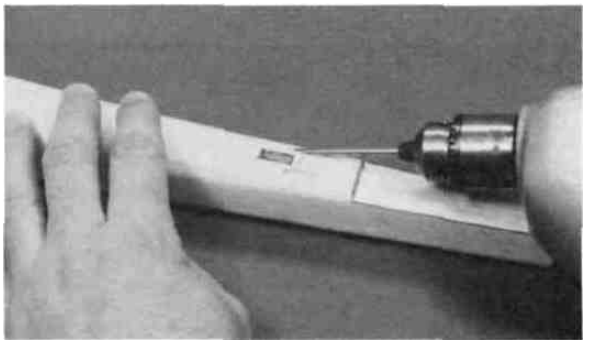


D 2. Between the above marks, cut a 3/16" wide slot in the exact center of the fuselage top, using an Xacto knife.

INSTALL RUDDER CABLE GUIDES



D 1. Measure 1" forward from the front edge of the stab saddle, and make a mark on the fuse top. Then make marks 1/4" Rt. and Lt. from the fuse centerline.



D 2. Drill 1/8" holes* at the above two marks for the rudder cable guides. NOTE: You must hold the drill at a very "flat" angle, as shown on the plans. *NOTE: For cleaner holes, you may drill these holes with a 1/8" diameter brass tube that has been sharpened by running an Xacto knife around the inside of one end.

D 3. Insert the 1/8" diameter plastic rudder cable guide tube into one of the holes you just drilled. Looking through the opening in the aft end of the fuse, insert the tube until it

just protrudes into the inside of the fuse. Then mark the tube on the outside (allowing 1/4" extra) and cut it off. Repeat for the other side.

D 4. With the cable guide tubes in place, apply thin CA where they enter the fuse.

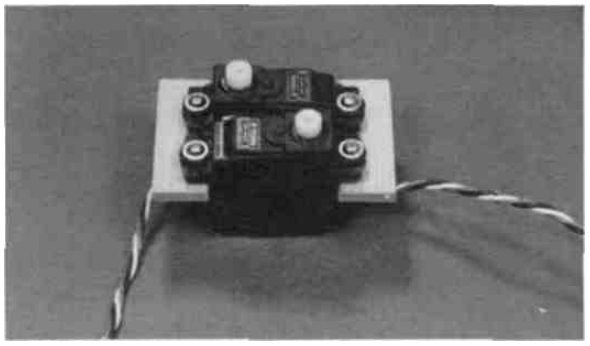
D 5. Cut and sand the tubes off even with the surface of the fuse top.

INSTALL SERVO RAILS

NOTE: The plans and photos show installation of Futaba S-33 servos. If you are using a different type servo you may have to modify the servo rails and installation procedure.

D 1. While you can still easily reach through F-4, place a few drops of thick CA on the fuse bottom in the receiver area and smooth it out with a piece of waxed paper. This Strengthens the balsa in the area where the receiver will be fastened with Velcro.

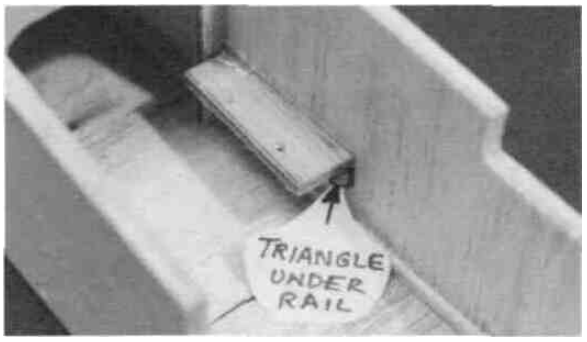
D 2. Stick two servos together with the square of double-stick tape. NOTE: Make sure the servos are positioned as shown on the plan.



D 3. Install the servo grommets and eyelets, and mount the servos to the die-cut 1/8" ply servo rails using the screws provided with your radio.

D 4. Sand the servo rails a little at a time until the servo/rail assembly fits snugly between the fuse sides at the front of F-4.

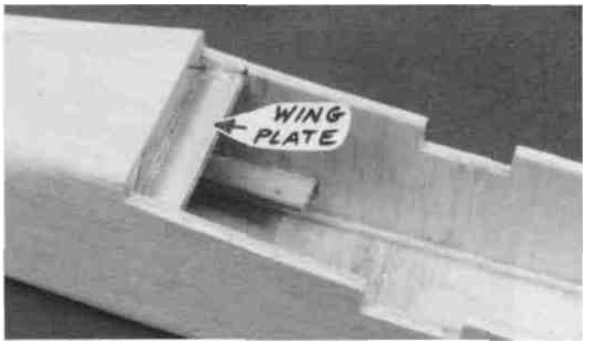
D 5. Cut a heavy paper shim and lay it on the fuse bottom, under the servos (to prevent the servos from touching the bottom). With the servos and rails in place, glue the rails to the fuse sides and F-4 with thin CA. Remove the servos after the glue has hardened.



D 6. Cut 1/4" balsa triangles to fit under the servo rails. Glue in place. Add thick CA as necessary for secure glue joints.

INSTALL WING PLATE

D 1. Find the 1/8" x 1/2" x 2-1/16" birch ply wing plate and sand it as necessary to fit snugly between the fuse sides.



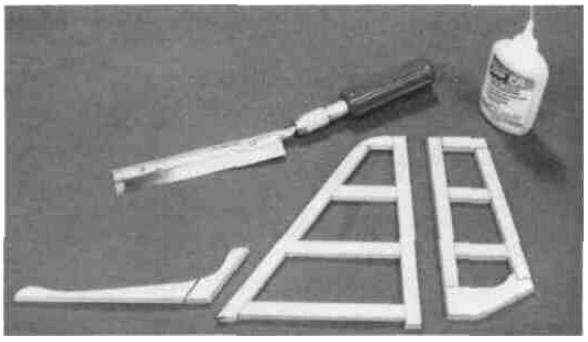
D 2. Position the wing plate exactly as shown on the plan and glue it in place.

D 3. Build up fillets of thick CA or epoxy all around the wing plate, on top and bottom, to securely lock it in place. NOTE: This installation must be very strong!

FIN AND STABILIZER

BUILD THE FIN AND RUDDER

D 1. Find the following parts: Six 3/16" x 3/8" x 18" balsa sticks, and the die-cut 3/16" balsa rudder bottom and dorsal fin pieces. Lightly sand the edges of the die-cut pieces with a sanding block to straighten out any die-cutting irregularities. Select the two straightest 3/16" x 3/8" x 24" balsa sticks and set them aside for later use as the stab trailing edge and the elevator leading edge.



D 2. Working over the separate FIN drawing on the plan, mark and cut the balsa sticks for the outer framework of the fin and rudder. Hold or pin the parts over the plan and glue the outer framework together with thin CA, working on waxed paper to prevent gluing to the plan.

D 3. Cut the 3/16" x 3/8" balsa ribs to fit between the leading and trailing edges of the fin and rudder, and glue them in place.

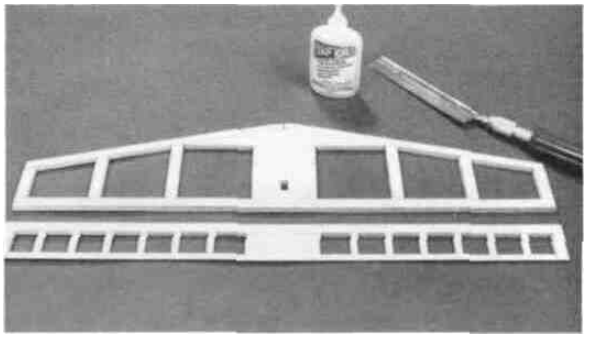
D 4. Glue the die-cut 3/16" balsa dorsal fin parts together over the plan, to make the dorsal fin.

D 5. Sand both sides of the fin, rudder and dorsal fin smooth using your T-bar and 100-grit sandpaper. Draw a centerline on the fin trailing edge and the rudder leading edge. Sand the leading edge of the fin to a rounded shape (except in the area where the dorsal fin will attach). Sand the leading edge of the rudder to a "V-shape (as shown on the plan).

D 6. Using your sanding block, sand the rudder to a taper, as shown in the detail drawing on the plan.

BUILD THE STABILIZER AND ELEVATOR

D 1. Get the following parts together: Die-cut 3/16" balsa stab and elevator center pieces, two 3/16" x 3/16" x 17" balsa sticks, and the remaining 3/16" x 3/8" balsa sticks.



D 2. Tape a piece of waxed paper over the separate STABILIZER drawing on the plan, then lay the die-cut 3/16" balsa stab center pieces on the plan and pin in place. NOTE: These die-cut pieces may have irregular edges, so you should sand the edges with your T-bar first, until they fit the plan exactly. Edge glue these stab centerpieces together with thin CA.

D 3. From 3/16" x 3/8" balsa sticks, cut the outer framework pieces and glue them together. Note: The straightest 3/16" x 3/8" balsa stick should be used for the trailing edge.

D 4. Cut the stabilizer ribs from the 3/16" x 3/8" balsa sticks and glue them in place.

D 5. Sand both sides of the elevator smooth with your T-bar, then sand the stabilizer leading edge and ends to a rounded shape as shown on the plan.

D 6. In the same manner, working over the plan, build the **elevator.**

D 7. Draw a centerline on the stab TE and elevator LE.

D 8. Sand the elevator leading edge to a V-shape as shown on the plan.

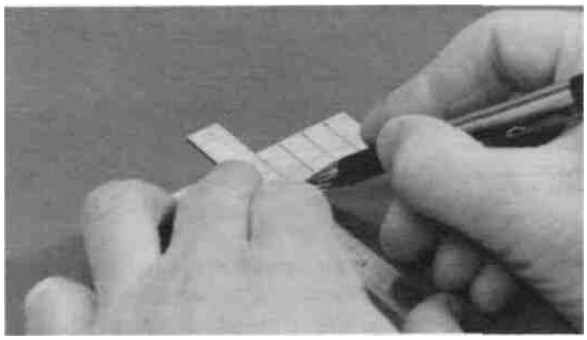
D 9. Sand the elevator to a taper, as shown on the plan.

MAKE THE HINGES

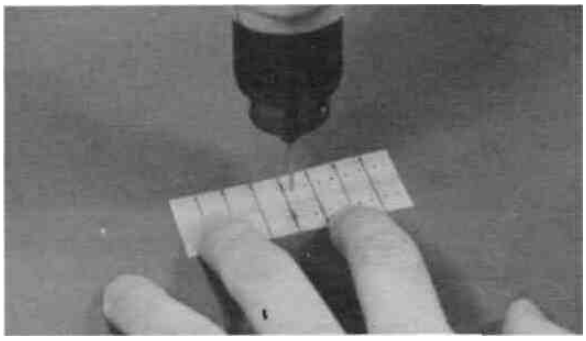
D 1. You'll need the following: The 7" length of hinge strip material, a piece of 220 grit sandpaper, a ruler, scissors and a 1/16" drill.

D 2. Take the strip of hinge material and roughen both sides with 220 grit sandpaper. This is best done with a small

piece of sandpaper held with your fingers, rather than a sanding block. **Do not sand the centerline of the hinge material.**

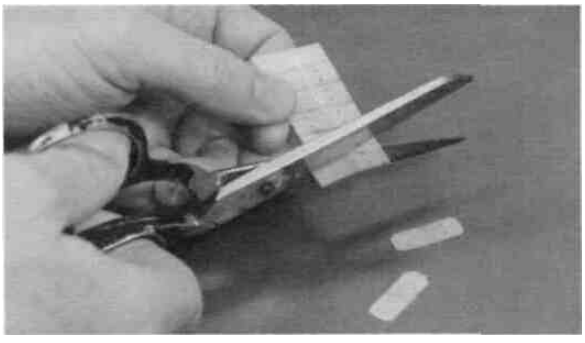


D 3. Using a ruler and a ball point pen, draw lines dividing the hinge material into sixteen 3/8"-wide segments.



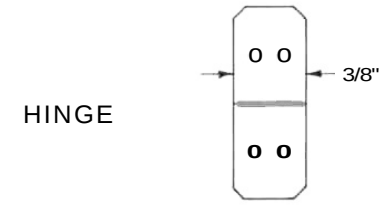
D 4. Drill four 1/16" holes in each of the hinge segments as shown on the plan. Use a wood block as a backing when drilling these holes. After drilling, lightly sand the hinges again to remove any rough edges caused by drilling.

D 5. Fold the hinge material back and forth a few times to "condition" the hinges.



D 6. Cut the hinges apart with a scissors on the lines you previously drew. Also snip off a small piece of each corner.

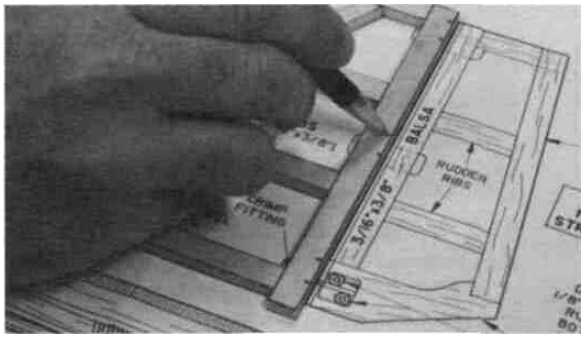
(See sketch at top of next column.)



TEMPORARILY INSTALL HINGES (Do not glue the hinges at this time).

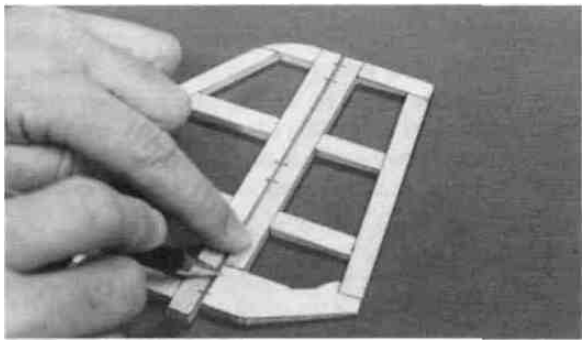
D 1. You'll need eight of the hinges you just made, plus an Xacto knife with a No. 11 blade.

D 2. If you have not already done so, draw an accurate **centerline** on the trailing edge of the fin and stabilizer.



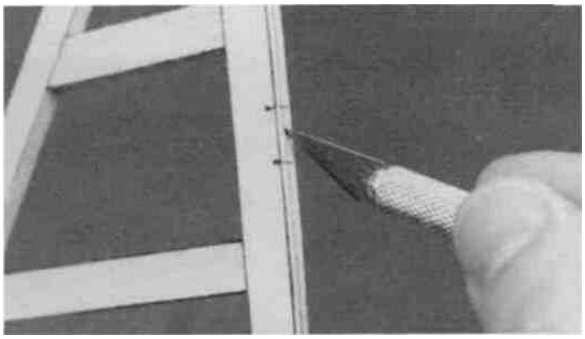
D 3. Lay the fin and stabilizer on the plan and mark the **hinge locations** on the trailing edges.

D 4. Now, while holding the elevators in place against the stabilizer trailing edge, transfer the hinge locations over to the elevator leading edge. **Repeat this process to mark the hinge locations on the rudder.**



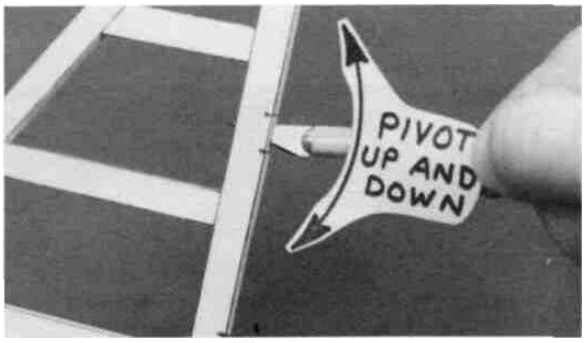
NOTE: The hinges supplied with this kit are thin enough that they can be inserted into a slot made with an Xacto knife. Most other hinges require you to use a hinge slotting tool. The following steps describe how to easily cut the hinge slots with an Xacto knife.

CAUTION!!!: You must use extreme care when cutting hinge slots with an Xacto knife, to avoid cutting yourself! If the balsa part breaks while you are pushing on the knife, the blade could go into your hand before you know it! A good precaution is to wear leather gloves while performing the following steps.



D 5. Begin by carefully cutting a very shallow silt in the fin trailing edge at the hinge location. This first cut is to establish your cut in the right place, so concentrate on staying on the centerline and don't cut too deep!

D 6. Make three or four more cuts in the same line, going slightly deeper each time. As you make these additional cuts. work on going straight into the wood.



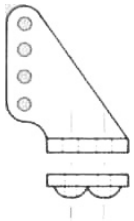
D 7. After you have cut about halfway into the wood, you can push the blade all the way through, while "wiggling" the knife handle back and forth. Continue to pivot the knife while moving the blade to both ends of the hinge location.

D 8. Trial fit the hinge into the slot. If the hinge is difficult to push in, re-insert the knife and move it back and forth in the slot a few times to enlarge the slot.

D 9. Repeat the above process to cut slots at all the hinge locations in the fin, rudder, stabilizer and elevators.

D 10. Assemble the rudder to the fin and the elevators to the stabilizer **(DO NOT GLUE),** and check the operation of the hinges.

TEMPORARILY MOUNT CONTROL HORNS

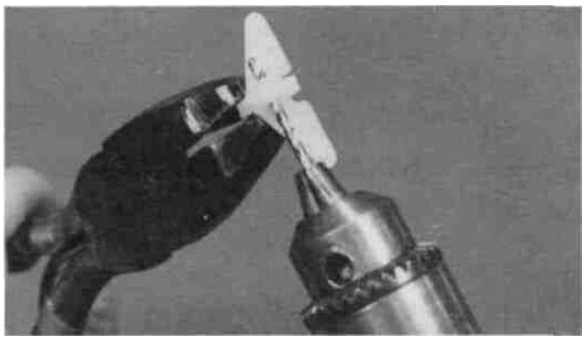


NYLON HORN AND NUT PLATE

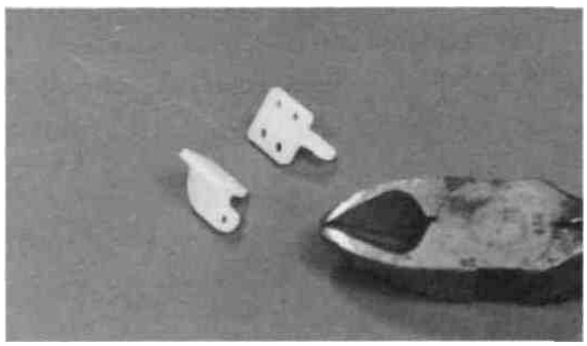
2-56x5/8" SCREW

2-56 x 3/8" SCREW

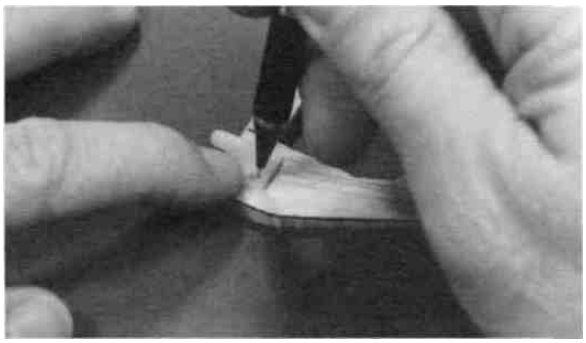
D 1. You'll need three nylon control horns, two 2-56 x 3/8" screws, two 2-56 x 5/8" screws, two 2-56 hex nuts, a 3/32" drill, a small screwdriver and a pliers.



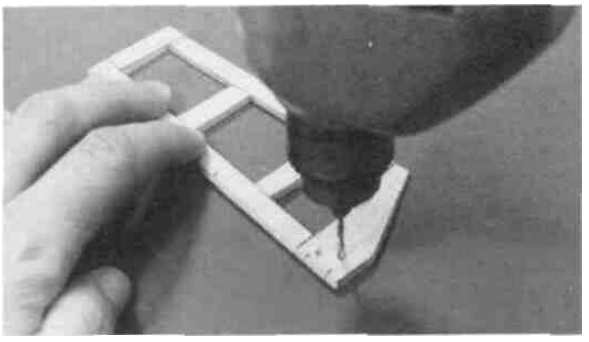
D 2. While holding two nylon horns together at their bases, drill 3/32" holes through the holes in one horn, making two new holes in the other horn. The purpose of this is to enable the horns to be bolted together on both sides of the rudder.



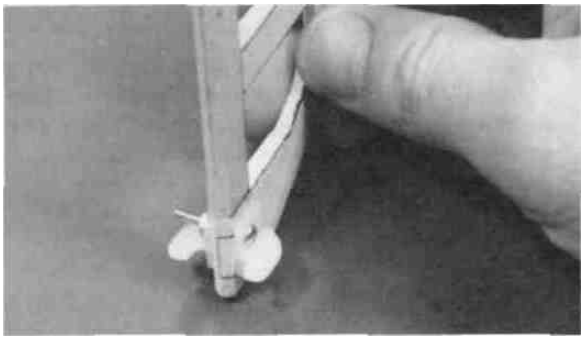
D 3. Cut and sand the two nylon rudder control horns to the shape as shown in the "Rudder Detail" drawing on the plan.



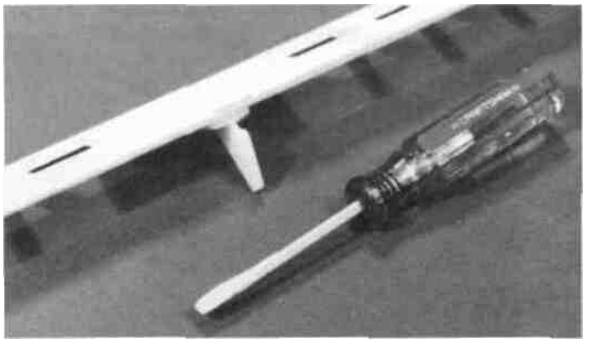
D 4. Lay the rudder on the fuselage plan side view and determine where the nylon control horn should be located. Holding the nylon horn with only two holes on the left side of the rudder, use a pencil to mark through both holes in the horn.



D 5. Start pilot holes with a pin at the marked locations, then drill the holes with a 3/32" drill.

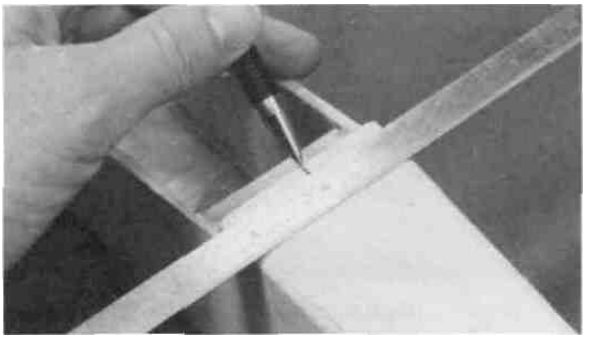


D 6. Trial mount the rudderhorns with two2-56 x 5/8" screws and hex nuts.



D 7. In a similar manner, temporarily mount the elevator control horn on the elevator. NOTE: When marking the locations for drilling, you must hold the nylon horn on the BOTTOM of the elevator! Use the 2-56 x 3/8" screws and nylon nutplate to mount the elevator horn. **IMPORTANT;** Make sure the nutplate and screws of the elevator horn do not touch the rudder when the elevator is deflected up 1/2" Sand the bottom of the rudder if necessary to eliminate this possibility.

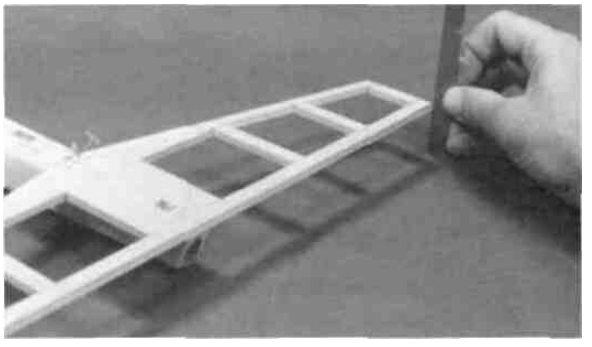
MOUNT THE STABILIZER



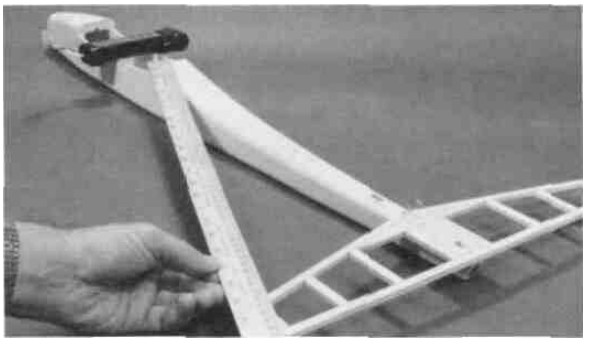
D 1. Accurately measure and mark the exact center of the fuselage top at F-4. Also measure the width of the stabilizer and mark the exact center at the trailing edge.

D 2. Place the fuselage on a flat surface, and hold it down firmly with a book or other heavy object.

D 3. Position the stab on the stab saddle, centered side-to-side, and pin it in place.



D 4. While holding the stab firmly in place onto the saddle, measure down to the flat work surface from both ends of the slab. If one side is higher than the other, sand the high side of the stab saddle with your T-bar sander and 100 grit sandpaper (Sand only a little at a time!). Replace the stab in the saddle and re-check the measurements. Continue this process until the stab is level within 1/16".

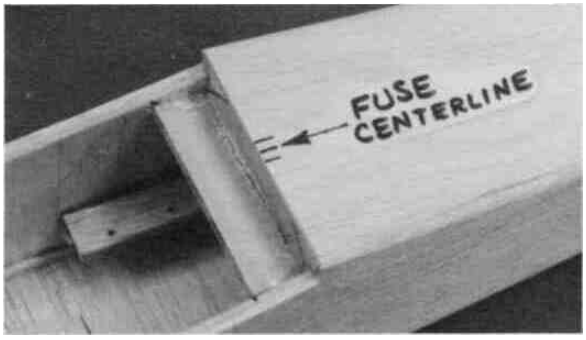


D 5. Again, pin the stab to the stab saddle, and measure from the rear corners of the stab to the center mark at F-4. Adjust the position of the stab until these measurements are equal.

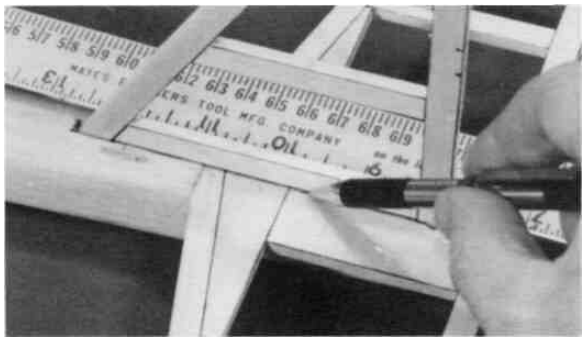
D 6. Glue the stab to the stab saddle by applying thin **CA** generously along both sides of the fuse. Also apply thin **CA** in the fin notch and at the front and back of the stab **to** insure that the glue fully penetrates into the joint. Finally, add a **small** fillet of thick CA along both sides of the fuse/ stab joint to fill any gaps.

MOUNT THE FIN

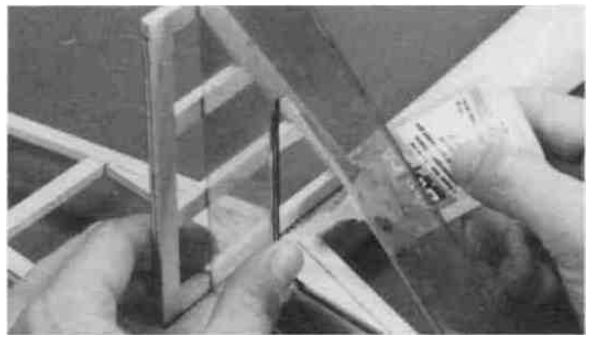
IMPORTANT NOTE: Improper fin alignment is one of the most common causes of poor flying airplanes. **The fin absolutely must line up with the centerline of the airplane!** Therefore, use care in the following steps to mount the fin properly.



D 1. Remember the fuselage centerline mark you made at F-4? Now measure 3/32" left and right of that mark and make two more **reference marks.** Now lay a straightedge along the left side of the fin, with one end of the straightedge on the left mark at F-4. Adjust the position of the fin until it matches the straightedge.

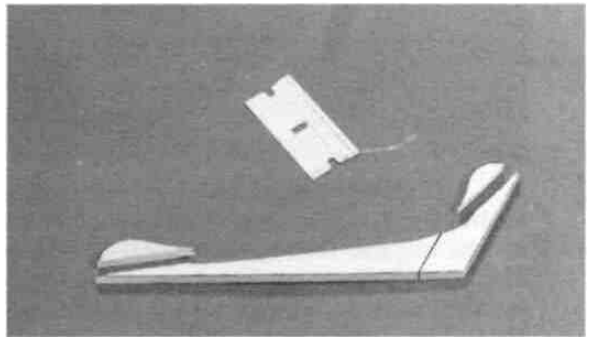


D 2. Holding the fin in this position, draw lines on the stab center on both sides of the fin for future reference. Double check this by laying the straightedge along the right side of the fin and holding it on the **right** mark on F-4.



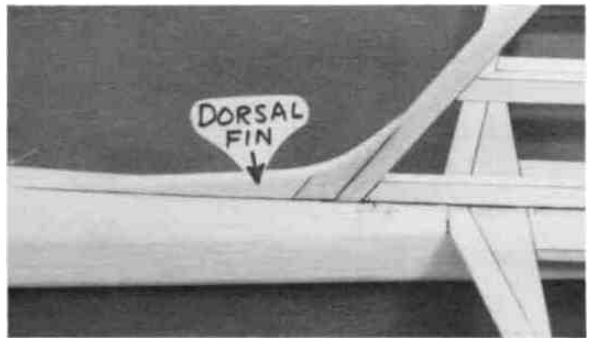
D 3. Hold the fin in place on the stabilizer and line it up with the marks you just made. Check to make sure the fin is perpendicular to the stab, using a draftsman's triangle **or** a carpenter's square. Apply a **couple drops** of thin CA **to** tack glue the fin in place.

D 4. Double check the fin alignment (It must line up with the fuselage centerline), then apply thin CA all along the base of the fin. Use thick CA to fill any gaps.



D 5. Cut the **die-cut "bumps"** off the dorsal fin parts.

D 6. Sand the top edge of the dorsal fin to a rounded shape.



D 7. Align the dorsal fin on the fuselage centerline in the same manner as used for aligning the fin. and glue **it to** the fuse top and fin.

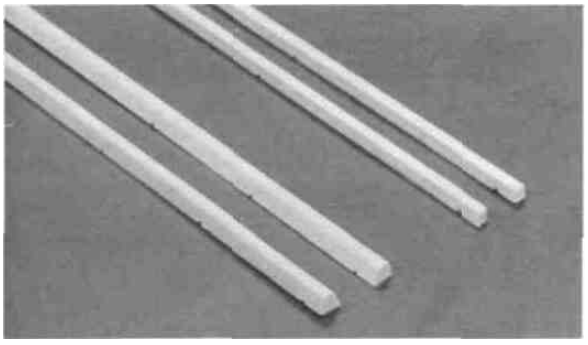
THIS COMPLETES THE BASIC FUSELAGE ASSEMBLY

WING

BUILD THE WING PANELS

NOTE: It will be helpful to build the wing on a piece of "Celotex" or other semi-soft (and flat) surface, into which you may easily stick pins to firmly hold down the wing parts while building, to avoid warps.

D 1. Turn the plan around so the wing drawing is facing you. Tape the plan to your flat work surface, and cover the wing drawing with waxed paper (so you won't glue the wing to the plan!). **NOTE;** If your work space is limited, you may cut the left and right wing half drawings apart.



D 2. The shaped and notched wing leading edges (L.E.) and trailing edges (T.E.) are fastened together by thin layers of balsa. Separate them by folding until the balsa breaks. Sand away the excess balsa that remains along the edges after breaking them apart, using a T-bar with 100-grit sandpaper.

D 3. Before using the L.E. and T.E. pieces, you must determine which pieces are to be used for the wing panel you are building. Here's how;

A. Compare the leading and trailing edges with the following drawings to determine the top and bottom of each piece.

B. Notice that there are three notches near one end of each piece that are 1-7/8" apart. This is the end that goes toward the center (root) of the wing.

C. Take one of the LE pieces and lay it on the right wing panel plan with the top up. If the three closely-spaced notches are toward the center of the wing, you have the correct LE for the right panel.

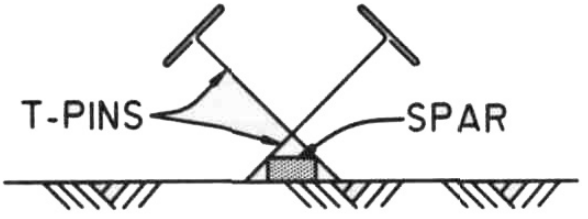
D. Do the same thing to determine which TE piece to use.

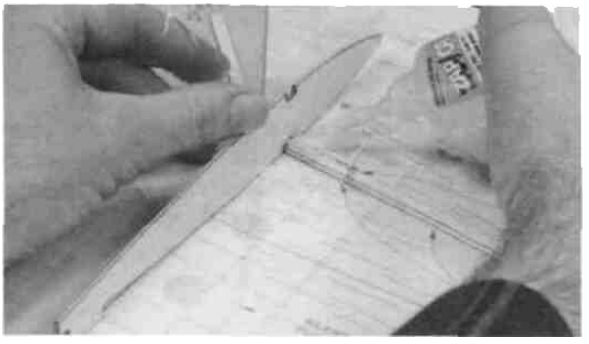
D 4. Before using the 1/8" x 1/4" x 23" hard balsa spars, examine them carefully for possible imperfections. Look for knots, soft spots, diagonal grain and any other imperfections. If possible, position each spar so the imperfections (if any) are on the outer half of the wing panel (toward the tip), where they will be least affected by high stress. If the spars are warped slightly, try to "balance them out" by installing the warped spars in opposite directions (see sketch).

If you find that the spars in your kit are not satisfactory (due to gross imperfections, damage, or extreme warp), just give us a call or write a note requesting replacements (see the "INTRODUCTION" on the first pages of this book).

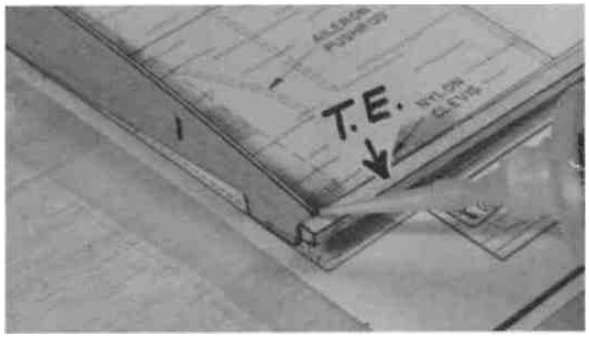
D 5. Carefully punch out all the die-cut 1/16" balsa **wing** ribs. Sand the edges slightly to remove any die-cutting irregularities.

D D 6. Pin one of the 1/8" x 1/4" x 23" spars to the plan. **NOTE:** The spars are slightly longer than necessary, and will be trimmed later.



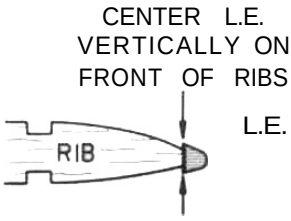


D D 7. Set rib W-l in place on the plan, holding it perpendicular to the surface, and glue it to the spar.

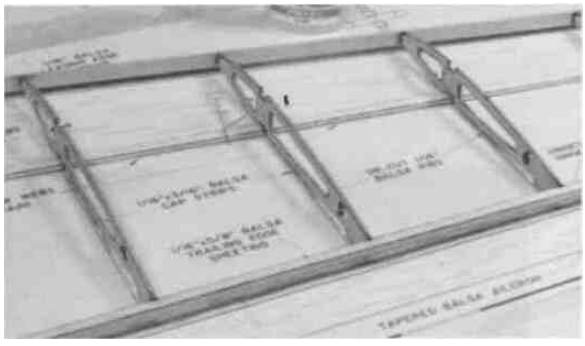


D D 8. Set rib W-8 in place, but do not glue to the spar. Now glue the notched balsa TE to the aft ends of ribs W-1 and W-8.

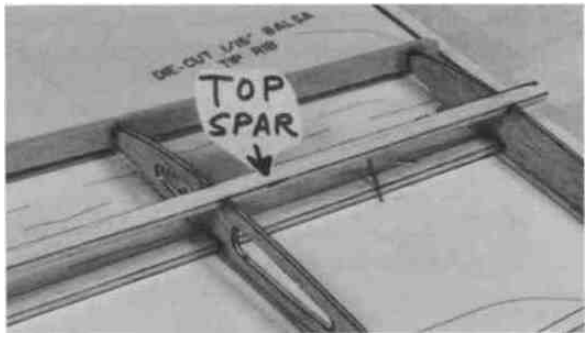
D D 9. Glue the shaped, notched balsa LE to the front of ribs W-l and W-8. **NOTE:** Position the leading edge as shown here:



D D 10. Glue W-8 to the spar.



D D 11. Set ribs W-2 through W-7 in place, inserting the ribs into the notches. Center each rib vertically in the LE notches. With the nbs fully down on the plan and all ribs inserted into the LE and TE notches, apply thin CA to all joints.



D D 12. Glue the top spar in place.

D D 13. From the 1/16" x 1-1/16" x 15" balsa sheet, cut pieces to fit between ribs W-l and W-2, W-2 and W-3. and W-3 and W-4. Glue these horizontal grain shear webs to the front of the spars. (Cut each piece slightly oversize, then sand to fit). Trim the webs even with the top of the top spar. NOTE: Because the horizontal grain webs act as spar doublers, it is important that they fit snugly between the ribs, and that they are also glued to the nbs.

D D 14. From the 1/16" x 3-5/8" x 1-1/16" balsa pieces, cut vertical grain shear webs to fit between the ribs. as shown on the plan. **NOTE:** The vertical grain webs extend out to rib W-6, and are glued to the rear of the spars. Sand the webs even with the top of the spar.

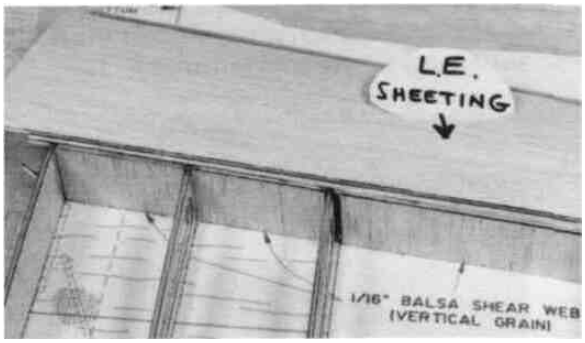
D D 15. Sand the tops of the ribs slightly, to match the trailing edge.

D D 16. Glue one of the 1/16" x 5/8" x 23" balsa trailing edge sheets to the lop of the wing at the trailing edge.

NOTE: If this piece is warped slightly, just leave a little extra sheeting hang over the TE, and trim it off later.

D D 17. Take one of the 1/16" x 3" x 24" balsa leading edge sheets and cut it as shown (measurements are approximate) to fit between the LE and the approximate spar centerline.

D D 18. Trial fit the top LE sheet, sanding as necessary for a good fit at the LE.



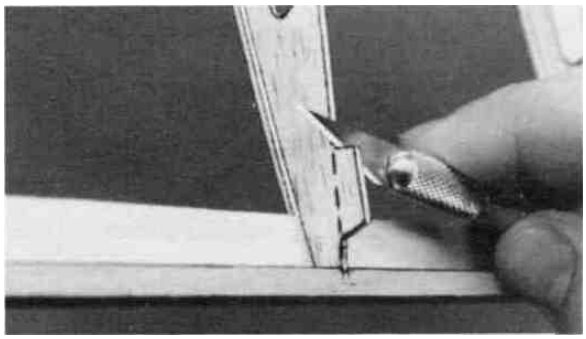
D D 19. Glue the top LE sheet in place. Here is a suggested method: Apply aliphatic resin glue (i.e. Titebond) or very slow-setting CA glue to the tops of the ribs between the LE and spars; lay the LE sheet in place and glue it to the LE with thin CA; bend the sheeting down over the ribs and glue the sheeting to the spars with thin CA.

D D 20. From one of the 1/16" x 3" x 18" balsa sheets, cut pieces to make the top center section sheeting (from W-l to W-3). Glue the top center section sheeting to the ribs and to the LE and TE sheeting.

D D 21. Mark the rib locations on the LE sheeting and TE sheeting to aid in placement of the cap strips.

D D 22. From the 1/16" x 3/16" x 18" balsa sheets, cut cap strips to fit on each remaining rib, from the LE sheeting to the TE sheeting.

D D 23. Remove the wing panel from the plan and turn it upside down.



D D 24. Using an Xacto knife, cut the "alignment feet" off the ribs. Then use a T-bar or sanding block to carefully sand the bottom of the ribs smooth, to blend with the TE.

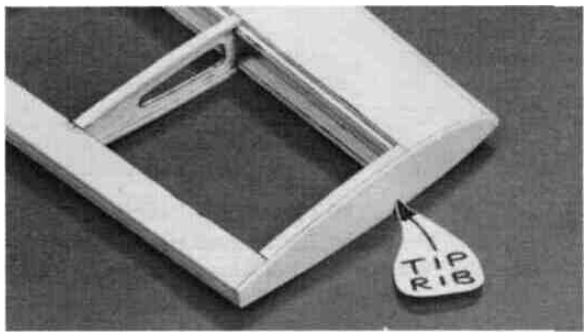
D D 25. Examine all glue joints and re-glue if necessary.

D D 26. Using a razor saw, trim the spars, LE, TE and sheeting even with ribs W-l and W-8.

D D 27. Lightly sand the bottom of the ribs and shear webs, using your T-bar and 100-grit sandpaper.

D D 28. Glue the TE sheeting, LE sheeting, center section sheeting and cap strips to the bottom of the wing panel, in the same manner as the lop (See Steps 16-22).

D D 29. Trim the bottom sheeting even with ribs W-l and W-8, then sand the ends smooth and straight with your T-bar. Also sand the TE sheeting even with the TE.

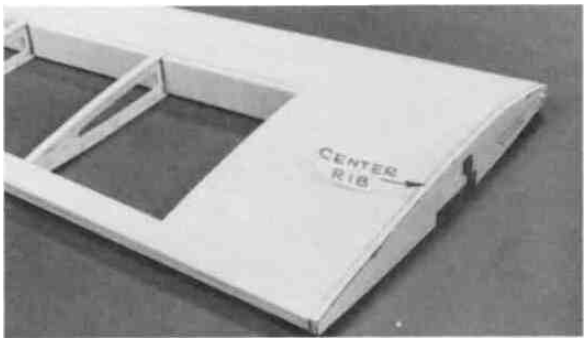


D D 30. Glue the die-cut 1/16" balsa **tip rib** in place, and sand to blend with the top and bottom of the wing.

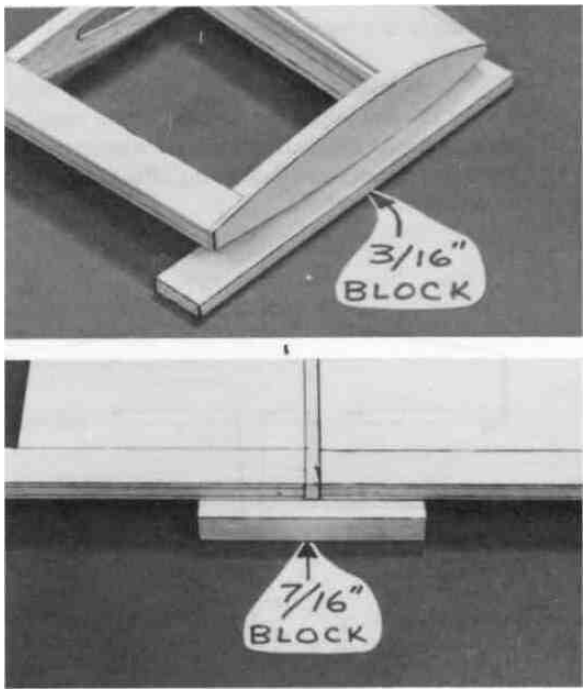
D D 31. Fill any dings and cracks with lightweight balsa filler, then sand the entire wing panel smooth, using your T-bar and 150-grit sandpaper. Observe how the leading edge sheeting blends with the shaped leading edge. Sand the leading edge as necessary to blend it in smoothly with the top and bottom LE sheeting.

D 32. Repeat steps 6 through 31 to build the left wing panel in the same manner.

JOIN THE WING HALVES



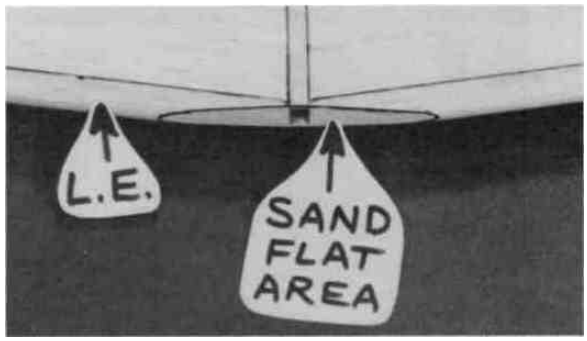
D 1. Glue* the die-cut 3/16" balsa center rib to rib W-1 **of** the left wing panel. (This center rib is slightly oversize to allow for positioning). Then sand the center rib even with the left wing panel.
*A thin layer of 5-minute epoxy or aliphatic resin glue is recommended, to allow time for positioning.



D 2. Trial fit the two wing halves together by blocking up both tips 3/16" (use the 3/16" x 3/16" x 4" blocks provided) and the center at the trailing edge 7/16" (use the "7/16" x 7/16" x 4" block provided).Use your T-bar to sand the center rib to a slight angle, so the wing halves mate properly at the center.

D 3. Place waxed paper under the center joint, then mix up a batch of epoxy (or aliphatic resin may be used), and apply a thin layer to the center rib. Push the two wing panels together with both lips blocked up 3/16" and the trailing edge up 7/16". Pin the wing halves together, carefully double-check alignment of the two halves, and allow the glue to fully harden.

D 4. Sand the center joint smooth.

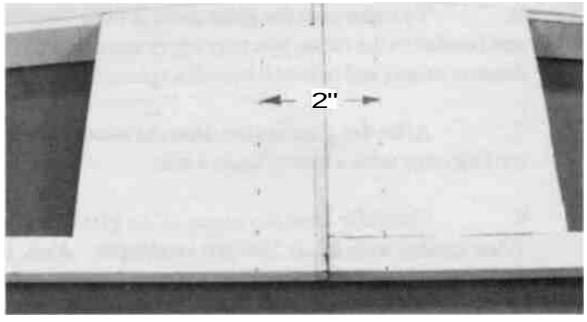


D 5. Sand the flat area on the LE at the center, as shown on the plan. As you are sanding, trial fit the wing in the wing saddle. There should be approximately 1/32" to 1/16" "slop" in the fit of the wing to the saddle, to allow for fiberglass and covering.

FIBERGLASS CENTER JOINT

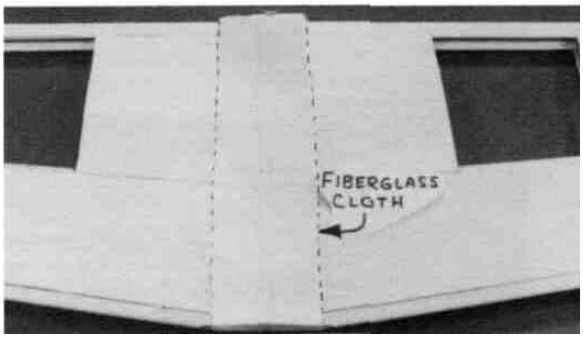
IMPORTANT: This wing does not use plywood dihedral braces. Therefore, it is absolutely necessary to reinforce the center of the wing by applying 2" -wide fiberglass cloth, top and bottom.

NOTE: If you have previous experience with applying fiberglass, feel free to use your favorite method, providing that it results in a strong bond between the glass cloth and the wood. If this is your first time, we offer the following suggested method, which is the fastest and easiest we have seen.



D 1. Make location marks for the fiberglass reinforcement cloth, 1-inch each way from the wing centerline.

D 2. Spray a very light mist of 3M "77" Spray Adhesive on the center section in the area to be glassed. Hold the spray can at least 12" away from the surface when doing this to avoid a heavy buildup. The purpose of this is only to give the wood a little "tackiness". If you apply loo much spray it could result in a poor glue bond.



D 3. Beginning at the trailing edge, lay the glass tape in place on the wing. Gently press the cloth in place, working out all the wrinkles. The "77" spray adhesive should hold the cloth down to the surface, but will permit you to lift and reposition the cloth if you make a mistake. Keep working forward along the top of the wing, around the leading edge, and along the bottom of the wing, ending at the trailing edge. It is not necessary to wrap the glass cloth around the trailing **edge.**

D 4. Working outdoors or in a very well-ventilated area apply thin CA glue to the glass cloth. Begin by running a bead of glue down the center of the glass cloth strip, then continue applying the glue in lines until all the cloth has been secured. Run the thin CA out 1/4" beyond the edges of the glass cloth to help protect the balsa sheeting when sanding later. **WARNING: This operation produces a larger than normal quantity of CA fumes, so adequate ventilation is a must!**

D 5. Inspect the surface of the glass cloth. If any areas are not glued down, apply a couple more drops of CA glue and press down with a piece of waxed paper until the glue **sets.**

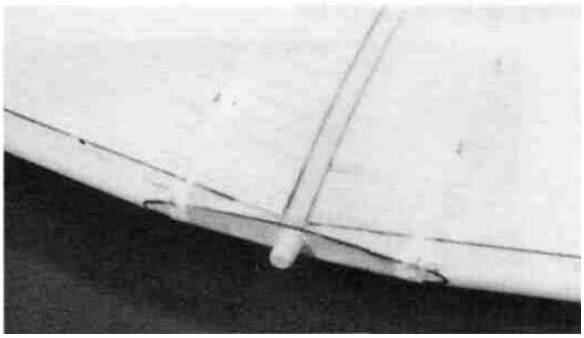
D 6. To make sure the glass cloth is fully "wetted out" and bonded to the balsa, you may apply more thin CA, a few drops at a time, and spread it out with a piece of waxed paper.

D 7. After the glue has set, trim the excess cloth at the trailing edge with a sharp Xacto knife.

D 8. Carefully sand the edges of the glass cloth with a T-bar sander with 80 or 100-grit sandpaper. Also, lightly sand the surface of the glass cloth to remove any rough spots.

MOUNT WING TO FUSELAGE

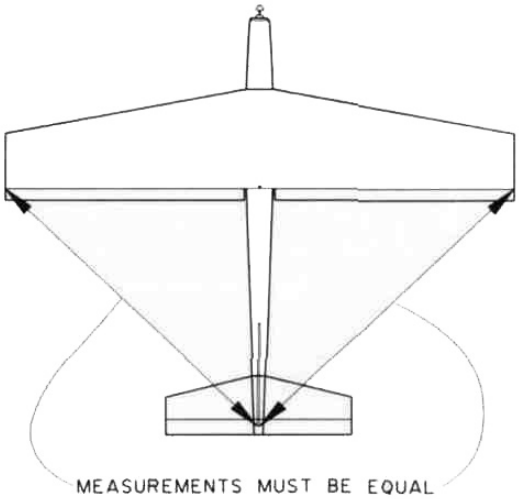
D 1. Using an Xacto knife, cut away the fiberglass from the wing dowel hole.



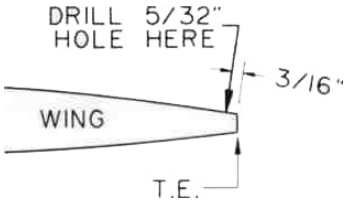
D 2. Find the 3/16" diameter x 2-3/8" hardwood dowel. Chamfer the ends slightly with sandpaper. Trial fit the dowel in the hole, sanding slightly if necessary for a good fit. Do not glue the dowel In place until after the wing has been covered.

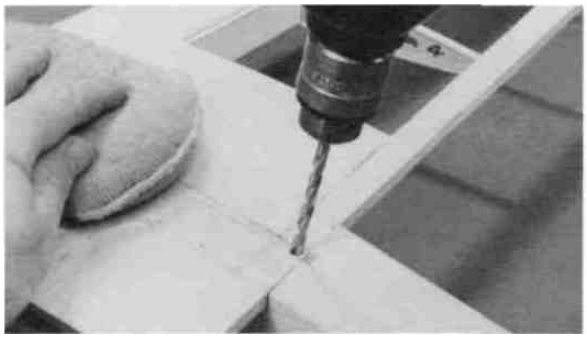
D 3. Lay some heavy paper in the wing saddle (to simulate the foam wing seating tape which will be installed later. Then trial fit the wing in the saddle. Sand the saddle if necessary until the wing is level. You can check this by standing behind the airplane and observing the position of the wing in relation to the stabilizer.

D 4. Measure from the rear comers of both wing tips to the fin TE, and adjust the position of the wing until the measurements are equal. Holding the wing in this position, make a reference mark on the wing TE in line with your fuse centerline mark at F-4.



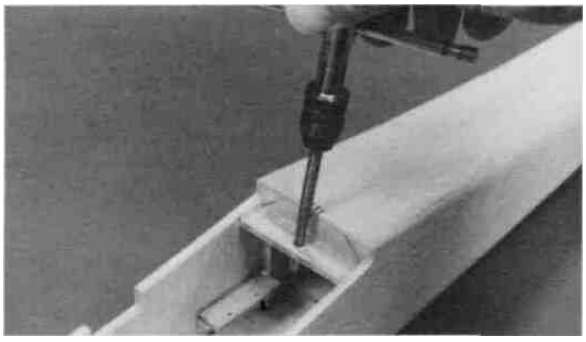
D 5. On the top of the wing, mark the location of the hold-down bolt hole, 3/16" forward of the TE.





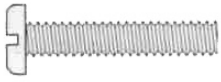
D 6. Holding the wing firmly in its correct position, drill a 5/32" hole down through the wing and plywood wing plate. Try to hold the drill perpendicular to the top surface of the wing, as shown on the plan.

D 7. Remove the wing from the fuselage and re-drill the hole in the wing only, using a 13/64 (or 7/32") drill. Apply thin CA to the inside of this hole (to harden the balsa), the re-drill the hole after the glue has fully hardened.



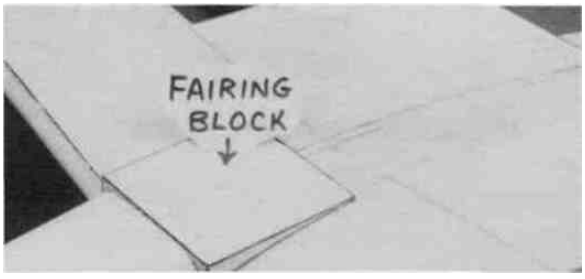
D 8. Use a 10-24 tap to cut threads in the hole in the plywood wing plate. Apply thin CA to the threads to harden them, then re-tap the threads after the glue has fully hardened.

INSTALL WING FAIRING

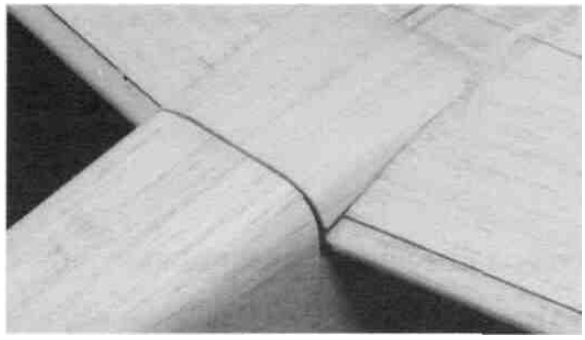


10-24 NYLON BOLT

D 1. Place the wing in the saddle and install the 10-24 nylon bolt. (The heavy paper shim should be in place on the saddle to simulate the foam wing seating tape).



D 2. Carve and sand the 3/8" x 2-3/8" x 2-3/8" balsa block to fit the top of the wing.



D 3. Round the comers of the block to match the fuselage.

D 4. Tack glue the fairing block in place with a couple drops of CA. NOTE: Do not glue the wing to the saddle!

D 5. Remove the wing from the fuse, and securely glue the fairing block to the wing. You may then use some lightweight balsa filler compound to fill any gaps and irregularities.

INSTALL AILERONS

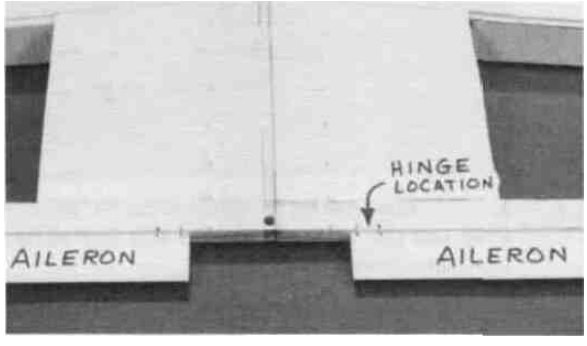
NOTE; The ailerons are sawn (but not sanded), so you'll have to sand off the saw marks using a T-bar with 80 or 100-grit sandpaper, for a nice smooth finish.

D 1. Trim the ailerons to the length shown on the plan.

D 2. Draw a centerline on the leading edge of the ailerons and the trailing edge of the wing.

D 3. Sand the leading edge of the ailerons to a "V"-shape, as shown on the "WING CROSS-SECTION ATW-1". Sand the trailing edge of the ailerons to a rounded shape.

D 4. Lay the wing on the plan and mark the hinge locations on the wing TE.



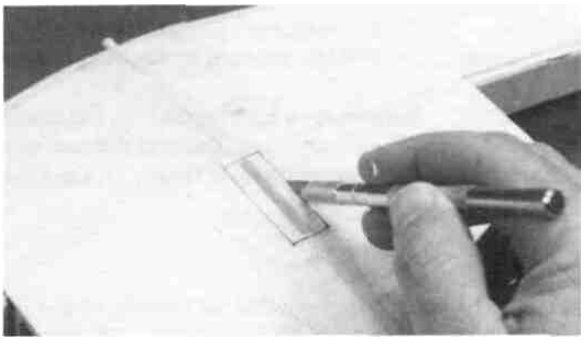
D 5. Hold the ailerons against the TE, and transfer the hinge marks over to the ailerons.

D 6. Using an Xacto knife, cut the hinge slots in the wing and ailerons.

D 7. Temporarily attach the ailerons to the wing with the hinges, but do not glue until after the wing has been covered!

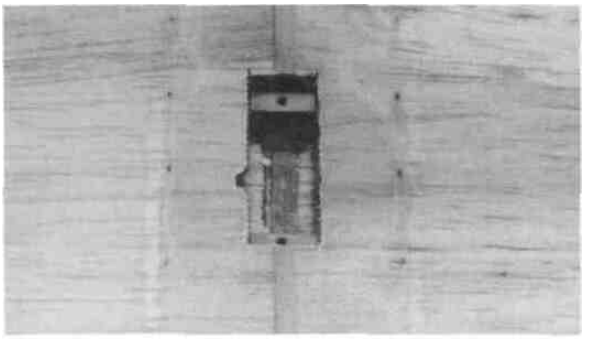
INSTALL AILERON SERVO AND HORNS

NOTE: Install the aileron servo in the bottom of the wing!

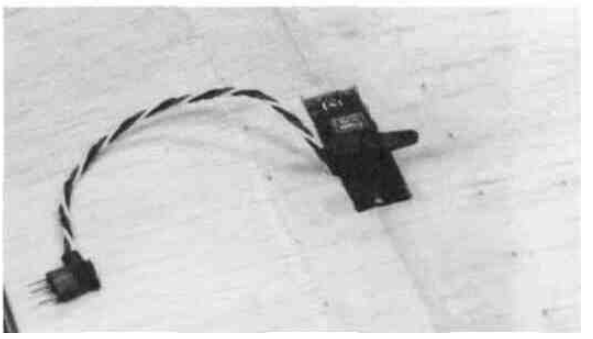


D 1. Cut an opening in the fiberglass and bottom sheeting for your servo. **CAUTION: Do not cut into the wing spar or shear webs!**

D 2. Remove a sufficient portion of the center rib and the W-1 ribs to fit your servo. NOTE: The die-cut openings will have to be enlarged and deepened. (A Dremel Moto tool with a 1/8" router bit is excellent for this, but it may also be done with an Xacto knife and a long-nose pliers). The servo must be installed as deep into the wing as possible.



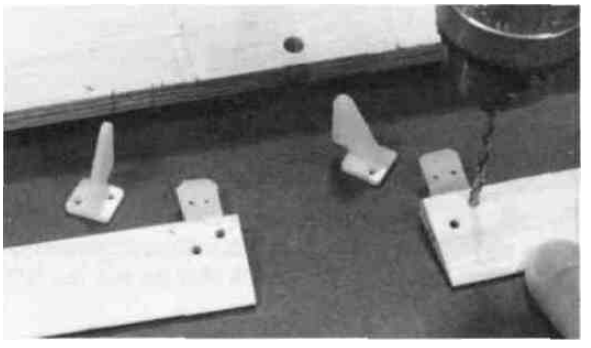
D 3. Make two servo rails from the 1/8" ply die-cutting scrap, and glue in place. (See the side view of the aileron servo installation on the plan).



D 4. Mount the servo using the screws provided with your radio.

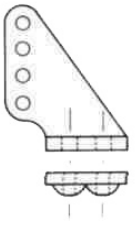
NOTE: Because the nylon horn mounting screws pass through the inboard aileron hinges, we glued only these two hinges into the ailerons (permanently), mounted the horns (temporarily), and worked around these hinges when covering the ailerons. If you do not want these hinges in the way when covering, we suggest that you wait until the airplane is covered and the hinges glued in before installing the nylon horns.

D 5. Hold the nylon horns on the bottom of the ailerons in the locations shown on the plan, and mark the locations of the mounting screws.



D 6. Drill 5/32" holes through the ailerons (and hinges). Put a drop of thin CA into each hole (to harden the balsa), wait until the glue hardens, then re-drill the holes.

D 7. Temporarily mount the nylon homs with the 2-56 x 5/8" screws and nylon nutplates. You may cut off the portion of the screws that protrude through the nutplates.



2-56x 5/8" SCREW

NYLON HORN AND NUT PLATE

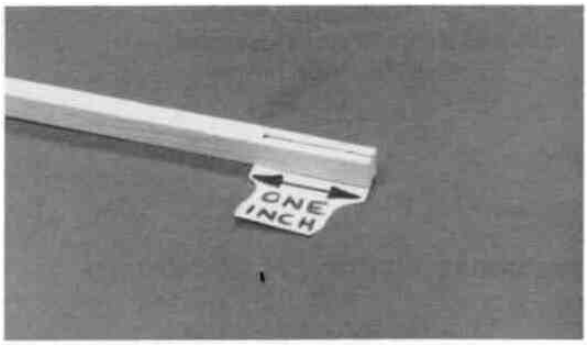
COMPLETION

MAKE THE ELEVATOR PUSHROD

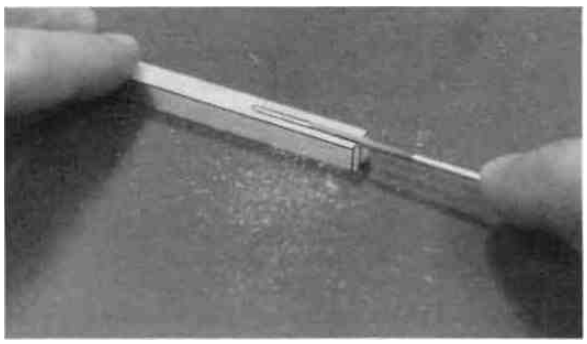
D 1. You'll need the following: 1/4" x 1/4" x 17-1/4" balsa stick, 12" pushrod wire (threaded one end), nylon clevis, and strong thread (not included).

NYLON CLEVIS

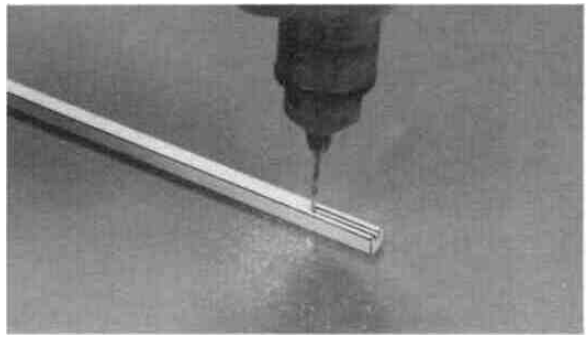
D 2. Clean the pushrod wire with alcohol or solvent to remove all oils from the surface.



D 3. Draw a line 1-inch long on both ends of the 1/4" x 1/4" x 17-1/4" balsa stick to mark the locations of the pushrod wire grooves.

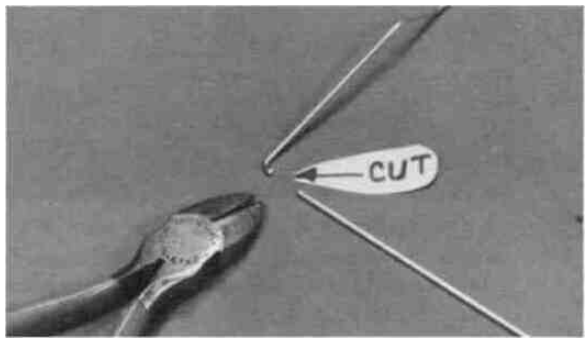


D 4. Use the threaded end of one of the wire pushrods to "file" **grooves** in the balsa stick where you drew the lines. The depth of the grooves should be about 1/2 the thickness of the wire.

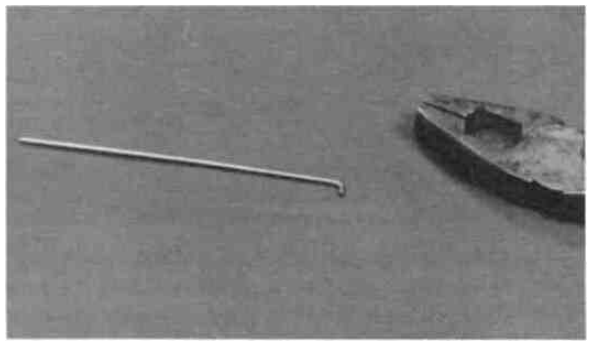


D 5. Drill 5/64" holes through the stick at the end of the grooves you made in the above step.

D 6. Screw a nylon clevis on the threaded end of the steel pushrod wire. Screw it all the way on, until the wire is visible inside the clevis (about 17 full turns). Note: The wire will be easier to hold if you grasp it with a pliers.



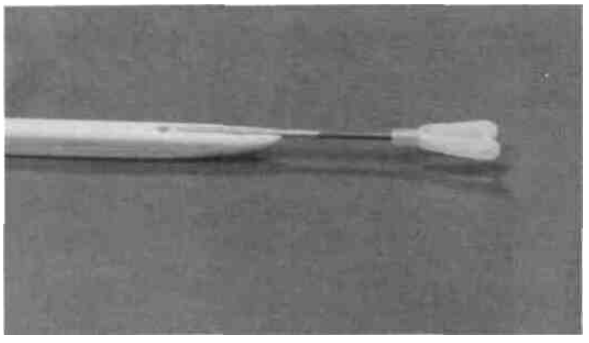
D 7. Lay the wire on the fuse plan (side view), and notice where the wire makes a 90-degree bend and goes into the stick and mark that location on the wire. Make this bend now and cut off the excess wire.



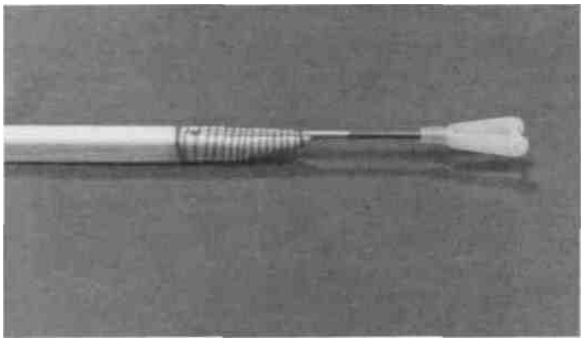
D 8. Take the straight wire that you cut off and make a short 90-degree bend in the end. Also notice the slight bend near the midpoint of the wire (see plan).

D 9. Use sandpaper to roughen the ends of the wires that will be glued into the balsa slicks.

D 10. Insert the wires into the holes and slots in the 1/4" x 1/4" balsa stick and glue them in place with thin CA.



D 11. Use your T-bar to sand the ends of the balsa pushrod to a rounded and somewhat pointed shape, as shown on the plans and in the photos. This will reduce the chance of the pushrod binding against something inside the fuselage.



D 12. Wrap the ends of the pushrod with strong thread, as shown on the plan, apply thick CA to the threads and smooth it out with a piece of waxed paper. Allow to harden.

MAKE THE AILERON PUSHRODS

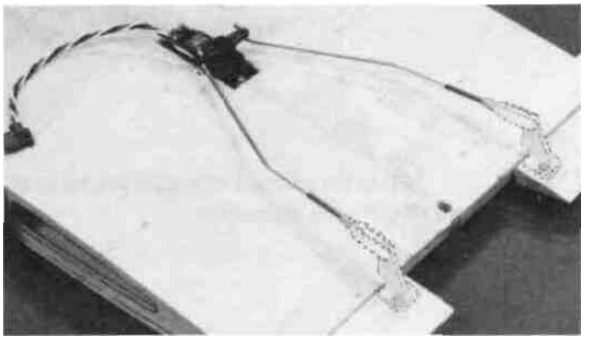
D 1. Screw the nylon clevises onto both of the remaining pushrod wires that are threaded on one end. Screw them on all the way until the threads are protruding inside the clevis.

D 2. Make the single bend in each pushrod as shown on the wing plan.

D 3. Attach the nylon clevises to the nylon aileron horns.

D 4. With the ailerons and the servo in the neutral position, mark the pushrod wires where they cross the holes in the servo arm.

D 5. Using a pliers, make a "Z"-bend in each of the pushrod wires at the marks you just made, and cut off the excess wire.



D 6. Work the pushrod wires into the holes in the servo arm. **NOTE:** You may haveto drill the servo arm holes with a 5/64" drill bit. to fit the wires.

PREDICT THE FINISHED FLYING WEIGHT

At this time you should try to accurately predict what the final weight of your ElectroStreak will be. You are shooting for a target weight of 40.5 ounces without landing gear, or 42 ounces with landing gear, and using a 7-cell 1200 mAh motor battery. If it looks like your airplane will be only 1 ounce overweight, don't worry about it, as the flight performance will still be satisfactory. If, however, you predict a final weight that will be 2 or 3 ounces overweight, you should consider one or more of the following:

1. Give the entire airframe another good sanding. Round the fuselage comers more, etc. Drill some 1/4" lightening holes in the landing gear plate and landing gear doubler areas. You may be able to cut 1/2 oz. off the weight by doing this.

2. Consider operating the plane without the landing gear... a weight savings of 1-1/4 **oz.**

3. Consider covering the airplane with a very lightweight covering film, such as "Black Baron Film" or "Micafilm", and stay with a very simple trim scheme to avoid excess weight.

4. Consider using a 7-cell 800 mAh motor battery, which will provide good power and a weight savings of approximately 5 ounces; but will result in shorter flight times.

Here is a sample weight computation:

FUSELAGE (fuse, fin, stab, rudder, elevator).....3.5oz.

WING (with ailerons and dowel).....4.5 oz.

GOLDFIRE MOTOR (prop. adaptor).....8.5 oz.

ELECTRONIC SPEED CONTROL (or servo and switch).....2.1oz.

RADIO (receiver, switch, 3 micro servos, 225 mAh receiver battery).....5.3 oz.

PUSHRODS AND ALL HARDWARE..... 1.2 oz.

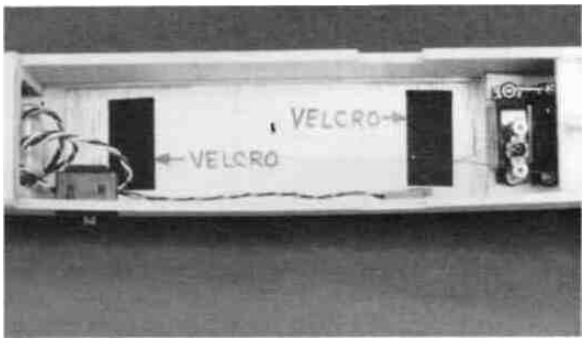
7-CELL 1200 mAh MOTOR BATTERY.....13.2 oz.

COVERING (film type).....2.5 oz.

(Optional) WIRE LANDING GEAR. WHEELS, COLLARS & HARDWARE.....1.5 oz.

TOTAL.....423oz.

INSTALL V E L C R O



The receiver, receiver battery, motor battery and speed control may all be attached to the fuselage using the self-adhesive Velcro fastener strips supplied. Here are some tips:

D 1. Before attaching Velcro to balsa wood, spread a few drops of thick CA on the balsa with a piece of waxed paper to strengthen the balsa and to provide a good bonding surface for the Velcro.

D 2. When applying Velcro to your electronic speed control, do not apply it to the side that has the heat-dissipating metal. Apply it to the plastic case on the side that does not get hot during operation.

D 3. Do not attempt to cushion the radio or batteries by using foam rubber. You must keep the fuselage interior open to permit a free flow of cooling air for the motor and battery.

D 4. For additional security, you may run Velcro all along the full length of the motor battery (instead of only two strips at the front and rear). There is not enough Velcro supplied in the kit to do this, but you may purchase more at a sewing supply store or K-Mart. **NOTE:** We have found the method shown on the plan to be satisfactory, but the battery has come loose occasionally in hard landings and violent "negative G" maneuvers.

BALANCE THE AIRPLANE LATERALLY

NOTE: Do not confuse this procedure with "checking the C.G." or "balancing the airplane fore and aft". That very important step will be covered later in the manual.

Now that you have the basic airframe nearly completed, this is a good time to balance the airplane laterally (side-to-side). Here is how to do it:

D *1* Temporarily attach the wing and motor to the fuselage.

D 2. With the wing level, lift the model by the propeller shaft and the bottom of the rudder. Do this several times.

D 3. If one wing tip always drops when you lift, it means that side is heavy. Try to balance by sanding the heavy wing panel and by drilling holes in the heavy wing tip. If you are unable to balance it by removing material from the heavy side, then you will have to add weight to the other wing tip until it balances. Place several drops of thick CA on the inside surface of Rib W-8 until it balances.

FINAL SANDING

D 1. Check the structure over carefully to make sure all joints have been glued.

D 2. Fill all unwanted holes, dents and "dings" with lightweight balsa filler (not the spackling compound found in hardware stores).

D 3. Sand the entire structure smooth with 400 grit sandpaper.

COVERING

D 1. Preparation: Before covering, make a final thorough check to make sure the entire model has been sanded smooth. The covering material probably will not hide imperfections in your structure, so now is the time to fix them. Then vacuum the model dust free, using a brush attachment on your vacuum cleaner. Finally vacuum your entire work area dust-free. Remove the rudder, elevator, hinges, radio, batteries, servos, pushrods, motor, switch harness and landing gear from your model.

2. Using any lightweight, good quality covering film and following the manufacturer's instructions, cover your model in the following sequence:

D 1. Rudder left side
D 2. Rudder right side
D 3. Elevator bottom
D 4. Elevator top
D 5. Cut 1/2" strips of covering, and apply to the joints between the stab and fuse, the stab and fin, and the dorsal fin and fuse.
D 6. Stab bottom
D 7. Stab top
D 8. Fin left side
D 9. Fin right side
D 10. Fuse bottom
D 11. Fuse sides
D 12. Fuse top
D 13. Wing tips (overlap slightly onto wing surface)
D 14. Bottom of wing (maybe done in one or two pieces)
D 15. Wing fairing
D 16. Top of wing (may be done in one or two pieces)
D 17. Bottom of ailerons
D 18. Top of ailerons
D 19. Now cut out the openings in the covering for the rudder cable exits, radio switch, landing gear, aileron servo and wing bolt.

NOTE: If you are not using a landing gear, you may install a strip of protective plastic or a small nylon skid on the fuse bottom. Although this is not usually necessary for belly landing on smooth grass, it may help to avoid scuffing or tearing the covering material.

ADD TRIM

Add trim using covering film or self-adhesive trim material or decals. NOTE: We recommend that you keep your trim scheme as simple as possible for ease of application and to avoid weight build-up. We also recommend that you trim with a contrasting color (light over dark, or dark over light) for maximum visibility.

FINAL ASSEMBLY

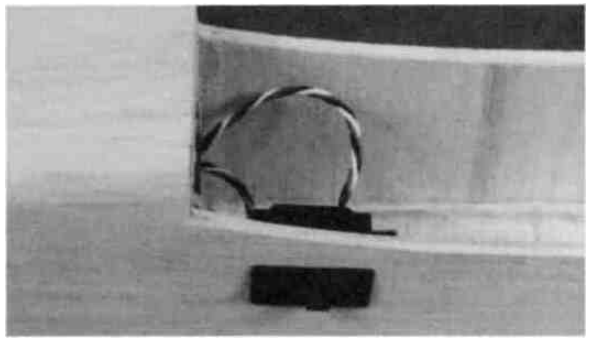
INSTALL ALL COMPONENTS

D 1. Lay the rudder, elevators and ailerons on the plans and mark on the leading edge of each part the locations of the hinges. Now use a sharp Xacto knife to cut slits in the covering at the hinge locations. Trial fit the hinges to make sure you have "found" the slots which you previously cut. In the same manner, slit the covering at the hinge locations in the wing, stab and fin TE.

D 2. Glue the hinges in place. **NOTE;** We recommend gluing the hinges with 30-minute epoxy (force glue into the hinge slots with a plastic soda straw); however, we have also had good success using thin CA glue. If you use thin CA, assemble the parts first, then carefully apply the glue to the hinge, making sure it flows into the hinge slots. Be prepared to wipe off any excess glue with a tissue. **IMPORTANT:** When installing the hinges, make sure there is little or no hinge gap. A large (1/32" or more) hinge gap will reduce control surface effectiveness, and may promote flutter!

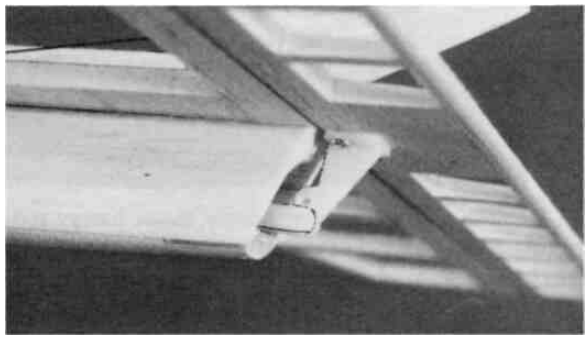
D 3. Re-install the nylon control horns. Cut off any excess 2-56 screws that protrude through the nutplates.

IMPORTANT: Make sure the nutplate and screws of the elevator horn do not touch the rudder when the elevator is deflected fully up!



Note: Photo shows uncovered structure.

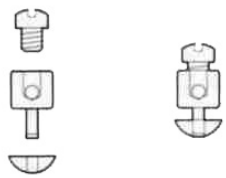
D 4. Re-install the motor, wiring and all radio equipment, including the radio on-off switch. **NOTE:** Depending on the radio you are using, it may be necessary to use extra "aileron extension cords" from the receiver to the speed control and from the switch to the receiver, due to the aft location of the receiver.



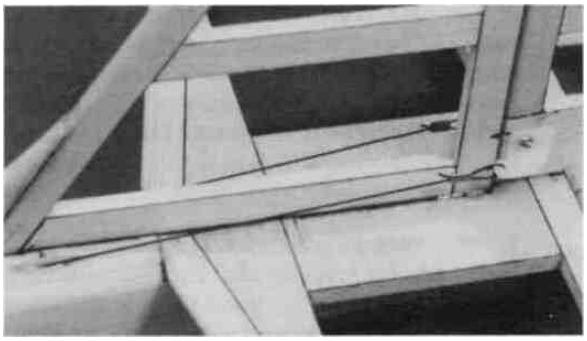
Note: Photo shows uncovered structure.

D 5. Re-install the elevator and aileron pushrods.

D 6. Install the EZ Connector onto the elevator servo arm as shown on the plan, and pass the elevator pushrod wire through the EZ Connector. Install the slotted screw to secure the elevator pushrod.



E-Z CONNECTOR



Note: Photo shows uncovered structure.

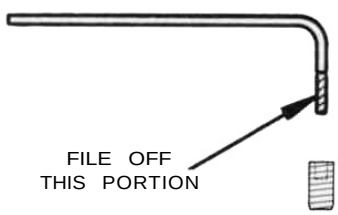
D 7. Install the rudder cables. Pass the cables through the crimp fittings as shown on the plan, and squeeze the fittings securely with a pliers. NOTE: When attempting to run the cables from the rudder horns to the servos, it will help to glue the end of the cable to a long piece of small diameter music wire, then pull the cable through with the wire. Install the EZ Connectors onto the rudder servo arms, and pass the rudder cables through the EZ Connectors. Pull the cables snug*, and secure them inside the EZ Connectors with 4-40 set screws, tightened down onto the cables. Pull on the cables to check for slippage.

•It is not necessary (or desireable) to pull the cables extremely tight, as this will cause excess friction and servo wear. Just make sure all the slack has been taken up. Verify this by grasping the rudder and moving it from side-to-side. There must be no free-play in the rudder.

D 8. Apply 1/16" x 1/4" foam wing seating tape on both sides of the wing saddle area to protect the wing.

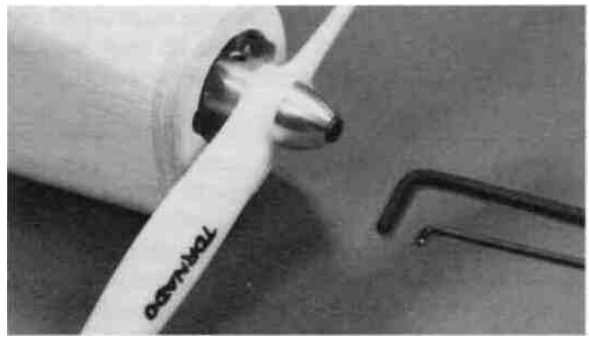
D 9. Run the receiver antenna along the bottom inside of the fuselage, and **let the excess antenna length trail behind.**

D 10. Install the 6-32 x 1/4" set screw in the aluminum prop hub, then attach the prop hub to the motor shaft. Tighten the set screw firmly down onto the "flat" on the motor shaft using the hex key supplied. NOTE: When installing the prop hub, it may be helpful to file the hex key shorter, making it easier to use without touching the nose block.



6-32 SET SCREW

(See photo at the top of the next column.)



D 11. Slide the propeller onto the prop hub, and secure it with the aluminum spinner nut and the 6-32 socket head cap screw. Tighten the cap screw with the hex key supplied, but do not overtighten! ("Finger-Tight" not "Wrench-Tight" is a good rule of thumb).

6-32 SOCKET HEAD
CAP SCREW

NOTE: Although not included in this kit, you may use a 1-1/4" plastic spinner for a sleeker appearance. If you use a spinner, you may have to use a different length 6-32 socket head cap screw, because of the thickness of the spinner backplate. CAUTION: If you use a Goldberg Snap-On spinner, you must modify the snap lugs so they insert more easily without damaging the motor.

D 12. **(Optional)** Install the main landing gear, using the nylon straps and #2 x 3/8" screws provided. Drill the wheel hubs if necessary to fit the main gear. Secure the wheels with 1/8"wheel collars. **NOTE:** A small drop of oil **on** each axle will help the wheels turn freely.

D 13. **(Optional)** Roughen the 1/16" wire tail skid with sandpaper, and clean it with alcohol. Glue the tail skid into the hole you previously drilled, using CA glue or epoxy.

BALANCE YOUR MODEL

NOTE: This section If very important and must not be omitted!

D 1. With the wing attached to the fuselage, all parts of the model installed. Including the 7-cell motor battery, gently turn the model upside down.

D 2. Carefully measure 3.3/4" Inches (3.75**")** back from the LE of the wing along both sides of the fuselage and mark the location of the recommended balance point. Now turn the model right side up.

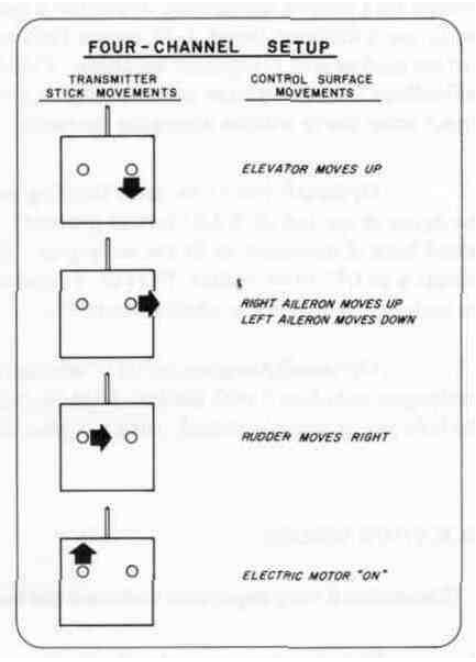
D 3. Lift the model with your index fingers at the marks you made at the recommended balance point (or for more precision you may lift with the eraser end of two pencils). If the tail drops when you lift, the model is "tail heavy" and you must add weight to the nose to balance. If the nose drops. it is "nose heavy" and you must add weight to the tail to balance.

NOTE: The forward limit of the balance range is 3/8" forward of the recommended balance point The aft limit of the balance range is 1/4" aft of the recommended balance point

NOTE: You should make your first flights with the model balanced at the recommended balance point Later you may want to experiment by shifting the balance toward the forward or aft limit of the recommended range Moving the balance forward results in a model that is more resistant to stalls and spins but also may act sluggish and require more speed for takcoff and landing Moving **the** balance aft makes the model more agile with a lighter and snappier "feel" If your model flies unpredictably and is highly sensitive to elevator control, it is probably tail-heavy If your model seems to fly like an arrow, but you are unable to raise the nose when making a normal landing, it is probably nose-heavy In any case, **do not balance your model outside the recommended range**

FINAL HOOKUPS AND CHECKS

D 1. Make sure the control surfaces move in the proper direction as illustrated in the following sketch :



D 2. Adjust your pushrod hookups as necessary to provide the following control surface movements*:

Elevator = 3/8" up, 7/16" down

Rudder = 1-1/4" Lt., 1-1/4" Rt

Ailerons = 3/16" up, 3/16" down

***NOTE:** These control surface "throws" are approximate and provide a good starting point for the first flights with your ElectroStreak You may wish to adjust the throws slightly to provide the smoothness or quickness that you prefer

D 3 Place a drop of oil on the front and rear bearings of your Goldfire motor, then "Break-in" your electric motor by running it **without the propeller** for at least 1/2 hour For best results, use a lower voltage or mostly discharged battery pack during this break-in process This will insure that the motor will provide full power for your first flight, and will extend the overall life of the motor

D 4. With the prop hub adaptor attached to the motor shaft, slide the propeller onto the shaft of the prop hub adaptor NOTE: Do not install the prop backwards' The rounded side of the prop blades must be facing forward Insert the 6-32 socket head cap screw through the aluminum spinner, and tighten the cap screw securely with the hex key, but do not overtighten!

D 5. Check for wing twist as follows:

NOTE: Even if you have built your wing on a perfectly flat surface and used utmost care, it is possible that your wing may have a twist due to uneven shrinking of the covering material **You must check for this condition and correct it before the first flight!**

If you do not own a wing Incidence meter**,** we recommend that you purchase or borrow one from another modeler With the wing mounted to the fuselage, use the incidence meter to check the angle of your wing at the tips and at the root (alongside the fuselage) If the incidence meter reveals a wing twist of more than 1/4 degree, you must grasp the wing at the tip and twist it slightly, while reheating the covering material Keep checking, twisting and reheating until the wmg twist is removed.

PRE-FLIGHT

CHARGE THE BATTERIES

Follow the radio battery charging procedures in your radio instruction manual You should always charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer Read the battery charging procedure in the Appendix at the end of this book to familiarize yourself with the procedure for charging the motor battery.

TEST THE MOTOR OPERATION

D 1. Make sure the motor switch (if you have installed a switch) is in the "off position.

D 2. Make sure no one in the area is operating a radio on your frequency, then turn on the transmitter and receiver (in that order), and pull the throttle stick back Check to make sure that the micro switch (if you have installed a micro switch) is in the "off position. Turn off the receiver and transmitter (in that order)

D 3. Remove the wing, insert the charged 7 cell motor battery, and plug the battery connectors together Replace the wing

D 4 Position yourself **behind** the wmg, and grasp the airplane firmly

D 5. Turn on the transmitter and receiver (in that order).

D 6. Make sure that all bystanders are behind the airplane.

D 7. Make sure the transmitter throttle stick is pulled back to the "off position.

D 8. Advance the throttle stick forward to the "on" (or full throttle) position. This should cause the motor to start, spinning the propeller at a high RPM. The wind generated by the rotating propeller should be blowing toward the rear, and the airplane should be pulling forward.

D 9. If you have installed an electronic speed control, you will have to adjust the neutral and full throttle settings. according to the manufacturer's recommendations.

D 10. Continue running the motor and notice how the power continues to be nearly constant for about 3-1/2 to 4 minutes*, after which there is a definite noticeable drop in power. The power then drops rapidly until it reaches a point where there is very little thrust pulling the airplane forward. **At** this point the battery is almost fully discharged. *NOTE: The actual in-flight running time will be longer, because when the airplane is moving forward the motor does not draw as much current

D 11. Pull the transmitter stick to the "off position, and turn off the toggle switch.

D 12. Turn off the receiver and the transmitter (in that order).

D 13. Remove the battery from the airplane and allow it to cool before recharging. Also leave the wing removed for several minutes to allow the interior of the airplane to cool.

FIND A SAFE PLACE TO FLY

The best place to fly your R/C model is an AMA (Academy of Model Aeronautics) chartered club field. Ask your hobby shop dealer if there is such a club in your area and join. Club fields are set up for R/C flying which usually makes your outing safer and more enjoyable. The AMA can also tell you the name of a club in your area. We recommend that you join AMA and a local club so you can have a safe place to fly and also have insurance to cover you in case of a flying accident.

If a club and its flying site are not available, you need to find a large area at least 6 miles away from any other R/C airplane operation and also away from houses, buildings and streets. A schoolyard may look inviting but it is too close to people, power lines and possible radio interference.

GROUND CHECK THE MODEL

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to check to see that you have the radio installed correctly and that all the control surfaces do what they are supposed to. **Read the APPENDIX in the back of this book,** and become familiar with the proper operation of the electric motor and electrical system in your model. Check to make sure all screws remain tight, that the hinges are secure and that the prop is on tight.

RANGE CHECK YOUR RADIO

Wherever you do fly, you need to check the operation of the radio every time you fly. This means with the antenna down, and the receiver and transmitter on, you should be able to walk 100 feet away from the model and still have control. Have someone help you. Have them stand by your model and while you work the controls, tell you what the various control surfaces are doing. If this test is successful, then repeat the test with the electric motor running. If the control surfaces are not acting correctly, do not fly. Correct the problem first. NOTE: It is possible that the electric motor will cause interference to your radio (some radios are more easily interfered with than others). If this happens, you may try installing a 2nd. .01 uF capacitor between the motor leads, or solder additional capacitors between the motor tabs and the outside of the motor case. Repeat the range check with the motor running.

MOTOR SAFETY PRECAUTIONS

Note: Failure to follow these safety precautions will result in severe injury to yourself and others.

Get help from an experienced pilot when learning to operate motors.

Use safety glasses when starting or running motors.

Do not run the motor in an area of loose gravel or sand; the propeller may throw such material in your face or eyes.

Keep your face and body as well as all spectators away from the path of the propeller as you start and run the motor.

Keep items such as these away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects (pencils, screw drivers) that may fall out of shirt or jacket pockets into the prop.

The electric motor and motor battery used in your ElectroStreak is very powerful, and the spinning propeller has a lot of momentum; therefore, if you touch the propeller while it is spinning it may inflict severe bruises, cuts or abrasions. Keep this in mind, respect the motor and propeller for the damage it is capable of, and take whatever precautions are necessary to avoid injury. Always disconnect and remove the motor battery until you are ready to fly again, and always make sure any switches are turned off and the model is being held firmly when connecting the motor battery.

AMA SAFETY CODE

Read and abide by the following Academy of Model Aeronautics Official Safety Code.

General:

1. I will not fly my model aircraft in competition or in the presence of spectators until it has been proven to be airworthy by having been previously successfully flight tested

2. I will not fly my model aircraft higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator I will give right of way to, and avoid flying in the proximity of full scale aircraft Where necessary an observer shall be utilized to supervise flying to avoid having models fly m the proximity of full scale aircraft

3. Where established, I will abide by the safety rules for the flying site I use, and I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

Radio Control:

1. I will have completed a successful radio equipment ground check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flyer, unless assisted by an experienced helper

3. I will perform my initial turn after takeoff away from the pit, spectator and parking areas, and I will not thereafter perform maneuvers, flights of any sort or landing approaches over a pit, spectator or parking area

FLYING

The ElectroStreak is a great flying sport airplane that flies smoothly and predictably, yet is highly maneuverable It does not have the self-recovery characteristics of a primary trainer, therefore you must either have mastered the basics of R/C flying or seek the assistance of a competent R/C pilot to help you with your first flights.

The ElectroStreak will take off effortlessly from a hard-surface runway (with landing gear installed), or with a short run and a hand launch Always take off directly into the wind Immediately after takeoff, fly level for a few seconds to allow the plane to get up to speed, then climb gradually to maneuvering altitude.

We recommend that you take it easy with your ElectroStreak for the first several flights and gradually "get acquainted" with this fantastic ship Add and practice one maneuver at a time, learning how it behaves in each one We particularly appreciate the low-drag feature of the ElectroStreak, which allows it to "save" momentum efficiently from the previous maneuver and use it in the next maneuver Snap rolls are unbelievably quick and spins are also performed with ease. Adjust the control surface throws according to your preference.

When it's time to land, make your approach low and shallow, as this ship wants to just keep on flying If you find that it lands a little fast, you might try dialing in a few clicks of up elevator when you cut the throttle on the downwind leg of the landing approach This will automatically help to bleed off some of the speed Do not try to slow down too much, however, as doing so may result in a stall If you are not using the landing gear, try to slow the plane down as much as possible before touching down, and (more importantly) concentrate on keeping the wings level to avoid dragging a wmg tip.

Have a ball! But always stay m control and fly in a safe manner.

APPENDIX

PROPER CARE OF YOUR GOLDFIRE MOTOR

Break-in: To properly break in, place a drop of oil on the motor bearings and run the motor with no load (prop and prop hub removed) for at least 1/2 hour when the motor is new, before using it in your airplane

Power source: A 7-cell, 8.4 volt. 1200 mAh battery pack (with "Kyosho"-type connector) is recommended as the ideal power source for good power and long motor life However, for weight savings and better vertical performance, you may use a 7 cell, 8 4 volt, 800 mAh battery pack.

Oiling: The bronze bearings are self lubricating, but you may extend their life and improve motor performance by applying a very small amount of light machine oil to the points where the center shaft touches the bearings, after each hour of running time, or if the bearings sound noisy Note A "drop" of oil is far too much, so you should apply the oil with a toothpick Never oil the inside of the motor!

Brushes: The Goldfire brushes (which transfer electricity to the commutator inside the motor) are maintenance-free and will last a long time under normal use You may inspect the brush wear by looking through the vent holes on the sides of the motor When the brushes wear out it is time to replace the motor If you notice that your motor has lost power, but the brushes are still good, it will provide a power boost if you spray some commutator cleaner (such as "Reedy in a Can") on the brushes

Heat: Using multiple battery packs to run the Goldfire successive flights may cause the motor to become excessively hot Therefore, we recommend a 10 minute "cool-down" period between flights (especially on hot days).

OVERLOADS

If the propeller is stalled, such as by running into long grass or by "nosing over", and you do not shut off the power immediately, the motor will draw a very large electrical current, causing the fuse to "blow" or the overload protector in the electronic speed control to trip.

If you blow a fuse, or trip the overload protector, immediately pull back the throttle stick and turn off any switches, disconnect the battery, check the condition of the wire, switches and other components, and replace if any are damaged Then replace the fuse and check the operation of the system

WARNINGS: Do not use a fuse rated higher than 25 amps, and never operate the system without a safety fuse or other type of overload protection, because doing so could easily result in a fire, causing property damage and personal injury!

HOW TO ACHIEVE THE BEST PERFORMANCE FROM YOUR ELECTRIC-POWERED MODEL

Whether you are Just starting to build your electnc-powered airplane, or have already completed it, you will benefit from the information that follows.

Your objective should be to build your airplane in such a way that it will fly as it was designed GREAT! To insure that it does, please read the following comments and suggestions very carefully, and follow as many of them as you can

WEIGHT:

NOTE- In order to get a handle on this subject of weight, you'll have to be able to accurately weigh your airplane at various stages of construction A bathroom scale is definitely not suitable for this. If you do not have access to a suitable scale, we suggest that you take the airplane to your local post office and ask them to weigh it for you.

We know from experience that this airplane, equipped with a stock Goldfire motor, will R 0 G (takeoff from a hard-surfaced runway) and fly satisfactonly with a fully charged 7 cell battery pack **IF** the total weight is under 43 ounces Heavier airplanes do not fly as well At 45 ounces it may not R 0 G , and the climb rate will be disappointing An ElectroStreak that weighs 42 ounces or less will probably fly very well unless other factors are introduced that reduce performance (see "Motor Performance" and "Other Factors")

Keep the airplane as light as possible for best performance!

If you really got carried away with the glue bottle and your airplane is "hopelessly overweight", consider using an 800 mAh motor battery, rather than a 1200 mAh pack Although the flight time will be reduced by a couple of minutes, the weight savings will result in better performance

THRUST:

There are several factors that contribute to the way an airplane flies, but the most important things you have control of are WEIGHT and THRUST. Here are some ways you can insure maximum thrust

Battery: In order to give the ElectroStreak sufficient power to perform large acrobatic maneuvers, we strongly recommend that you use a good quality 7-cell nicad battery pack for motor power. The individual cells in the battery pack should be "low impedance", which means that they are capable of delivering high current to the motor (Sanyo SCR cells, for example)

Propellers: The Goldfire electric motor was designed especially for powering airplanes by direct-drive It is well suited for this application because it turns a relatively large (7x6 or 8x4) propeller at an RPM that provides sufficient thrust for this airplane Because it has a relatively low no load RPM (compared with some car motors), you will not benefit by using a smaller diameter prop We have tested many props and have found the Gnsh Tornado 7x6 (nylon) to be about the best for this airplane. You may want to experiment with other props

Motor Break-in: Be sure to run your motor with no load (prop removed) for at least 1/2 hour before using it in your airplane. Because of the special design of the brushes, your Goldfire's performance will continue to improve during the first several hours of operation.

Peak Battery Charging: A fully charged battery pack will provide an initial "surge" of power during the first 15 to 30 seconds of the motor run, then the power curve stays fairly level for the next several minutes If you do not charge your battery fully it will not deliver that surge necessary for a good takeoff and climb out There are three easy ways to "peak charge" your battery pack

1. Use a "peak-detecting" battery charger This type charger will automatically charge your battery until it is fully charged Unfortunately, this type charger is not yet available for use with AC current, but it works very well when connected to a 12 volt car battery.

2. You can monitor the voltage of your charging battery with a voltmeter Your charger may have sockets into which you may plug a voltmeter If not, you may insert the probes from the voltmeter into the rear of the battery plug, making contact with the metal portions As your battery charges, the voltage will gradually increase When the battery is fully charged, the voltmeter will level off or show a slight drop in the battery voltage At this point your battery is fully charged **NOTE:** If, during the charging process, your battery starts to get noticeably warm, disconnect the charger immediately, as this means the pack is fully charged.

3. The third method of "peaking" your battery is by checking its temperature As the battery charges it will remain cool until it is almost fully charged When it reaches the fully charged state it will rapidly build up heat You can feel this heat with your hand As soon as the pack starts to noticeably warm up, disconnect it from the charger Do not continue charging until the pack is hot! Over-charging will damage your battery pack and can result in an explosion.

Exercise Your Batteries: A new battery pack should be "cycled" for best results You should peak charge the battery, then discharge it almost completely by actually running your motor with the propeller attached Do this 2 or 3 times on the ground before using the new battery for flying Be sure you remove the battery from the airplane between each cycle and allow it to cool before recharging

Wiring Harness: Standard "Kyosho" or "Tamiya"-type battery connectors supplied with most batteries are normally adequate for most installations However, if you are looking for maximum performance, you may want to consider installing high-perform-

once battery connectors, such as "Sermos R/C Snap Connectors". Using low-resistance wire, such as Jomar 12 gauge (665 strand) wire will also provide an increase in performance.

OTHER FACTORS:

In addition to keeping the airplane light and increasing thrust, there are several other things that can improve performance considerably. Check for the following conditions and correct as necessary.

1. Examine your propeller for irregularities caused by the injection molding process. Carefully remove these imperfections with fine sandpaper.

2. Most nylon propellers balance quite well as they come from the factory, but we have found several that require balancing. You can improve the performance of your Goldfire by balancing the prop, using an inexpensive prop balancer available at your local hobby shop.

3. To takeoff from a hard-surfaced runway the wheels of your airplane must spin freely, with very little friction Check the wheels for possible binding when moved from side to side, and put a drop of oil on each axle.

4. If you store your airplane resting on the wheels, the wheels will develop "flat spots", which prevent them from rolling smoothly While this may happen with any wheels, it is especially a problem with the lightweight foam wheels To avoid this problem, support the airplane in storage with a Robart "Super Stand" **or** similar.

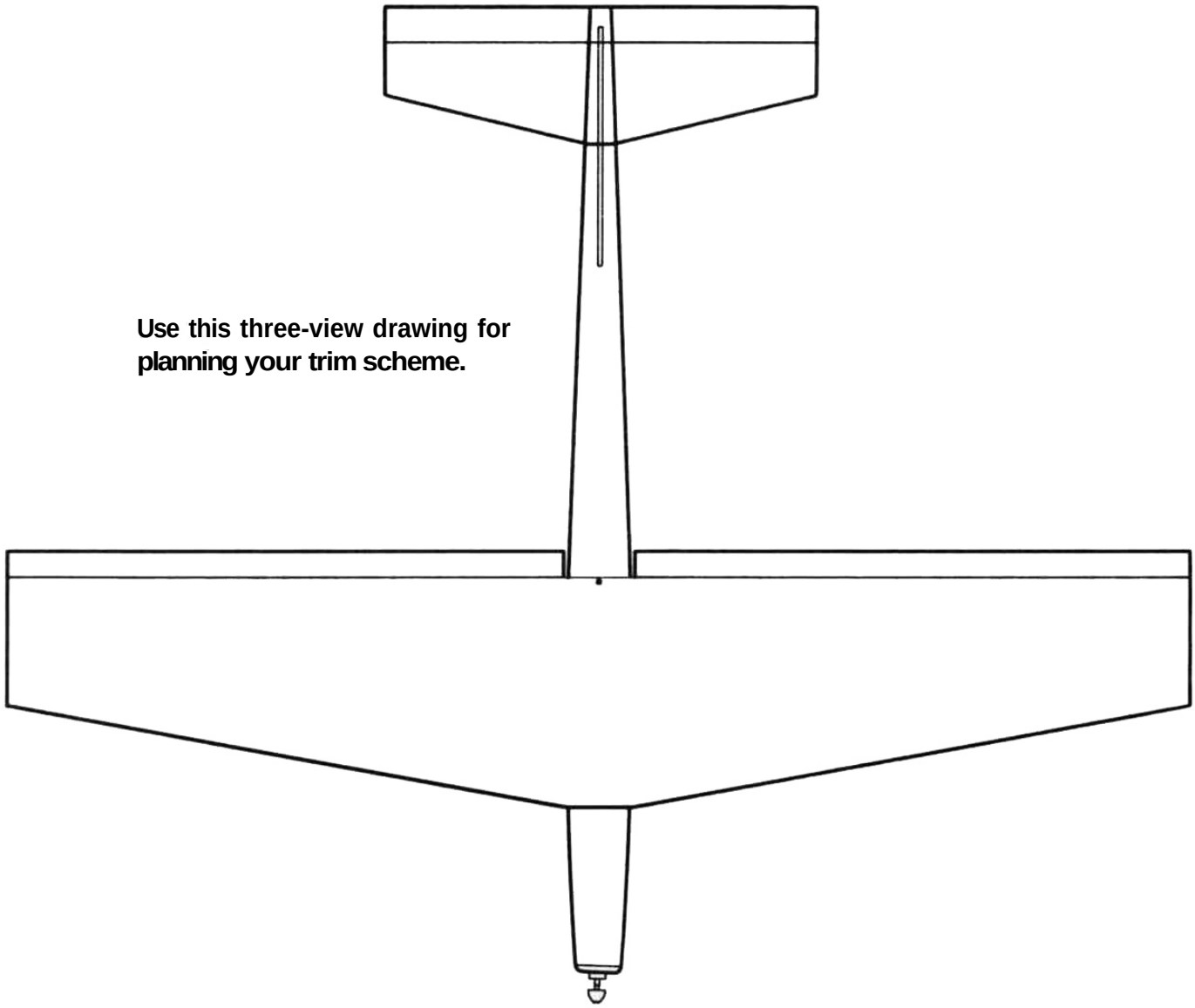
GOOD LUCK AND GREAT FLYING!

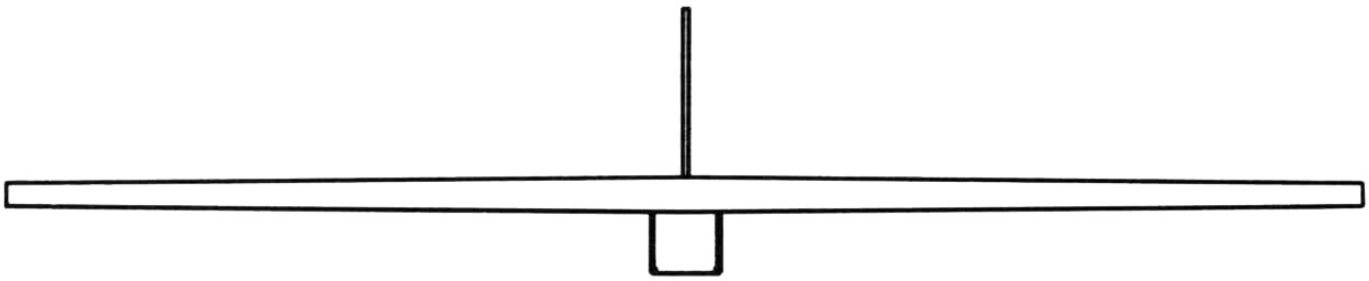
SEE THE FULL LINE OF GREAT PLANES AIRPLANES AT YOUR HOBBY DEALER

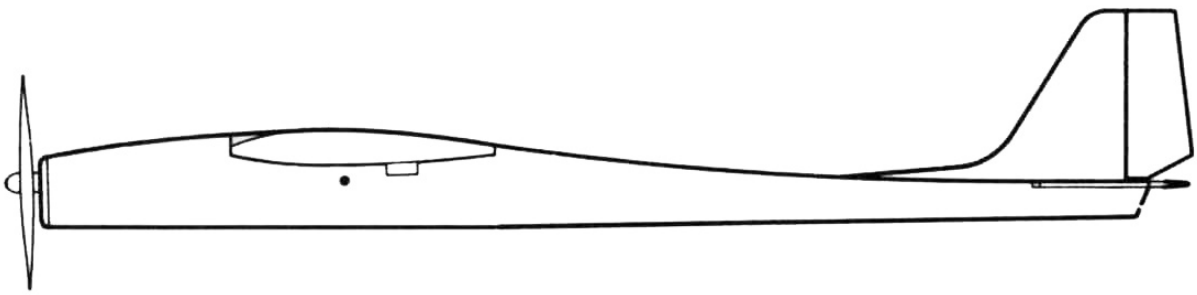
WE HOPE YOU WILL SELECT ANOTHER "GREAT PLANE" AS YOUR NEXT PROJECT THANK YOU!

NOTES

Use this three-view drawing for planning your trim scheme.







ELECTROSTREAK PARTS LIST

		LOOSE IN BOX
ESTRP01R	1	Rolled Plans
ESTRP02	1	Instructions
NYLON25	1	7" Nylon Strip Hinge
WIRES16	3	12" Pushrod Wire (Threaded One End)
W1RES27	1	48" Coated Steel Cable
	1	**GOLDFIRE MOTOR ASSEMBLY**
CAPACIT1	1	Capacitor
MOTOR002	1	S-600 Motor
		SMALL WOOD PARTS
ESTRA05	1	1/16" x 3-5/8" x 1-1/16" Balsa Shear Web Set
ESTRF09	1	1/8" x 1/8" x 7/8" Hardwood Landing Gear Filler
ESTRF10	1	1/8" x 1/2" x 2-1/16" Ply Wing Hold Down Plate
ESTRF16	1	1/4" x 3" Balsa Triangle Servo Rail Reinforcement
ESTRW11	1	3/8" x 2-3/8" x 2-3/8" Balsa Wing Fairing Block
ESTRW12	1	3/16" x 2-3/8" Hardwood Wing Dowel
ESTRW14	2	3/16" x 3/16" x 4" Balsa Dihedral Block
ESTRW15	1	7/16" x 7/16" x 4" Balsa Dihedral Block
		FUSELAGE PARTS
ESTRF02	1	3/32" Balsa Shaped Fuselage Top, Rear
ESTRF04	2	1/16" x 3" x 15" Balsa Batt Compartment Doubler, Bottom Front Sheeting
ESTRF05	1	1/16" x 3" x 18" Balsa Bottom Rear Sheeting
ESTRF11	1	1/8" DC PLY F1, F2, F3, F4, LG Doublers, Servo Rails
ESTRW10	1	1/16" x 1-1/16" x 15" Balsa Shear Web Horizontal Grain
		STRINGERS
ESTRF06	1	1/4" x 1/4" x 17-1/4" Balsa Elevator Pushrod
ESTRF07	2	1/8" x 1/8" x 30" Balsa Fuse Bottom Stringers
ESTRF08	3	1/2" x 24" Balsa Triangle Fuse Stringers
		TAIL PARTS
ESTRS01	6	3/16" x 3/8" x 18" Balsa Stab & Fin Stock
ESTRS02	2	3/16" x 3/16" x 17" Balsa Stab & Elevator Ribs
		WING PARTS
ESTRW02	4	1/8" x 1/4" x 23" Balsa Spars
ESTRW03	2	19/64" x 1" x 21" Balsa Aileron
ESTRW04	4	1/16" x 5/8" x 23" Balsa Trailing Edge Sheeting
ESTRW07	4	1/16" x 3/16" x 18" Balsa Cap Strips
ESTRW08	1	3/8" Balsa Shaped Notched LE
ESTRW09	1	3/8" Balsa Shaped Notched TE

		DIE-CUT FUSE PARTS
ESTRF01	1	3/32" Balsa Shaped Fuse Top Front
ESTRF12	1	1/16" x 2" x 6" DC Ply LG Plate & Doublers
ESTRF13	2	3/32" DC Balsa Fuse Side Rear
ESTRF14	2	3/32" DC Balsa Fuse Side Front
ESTRF15	1	3/16" DC Balsa Center Rib, Elevator Center, Dorsal Fin, Rudder Bottom, Stab Center
ESTRF18	1	1/16" DC Balsa Nose Block Parts
		DIE-CUT WING PARTS
ESTRW16	2	1/16" Balsa Ribs 1, 5, 7, 8, Tip
ESTRW17	2	1/16" Balsa Ribs 2, 3, 4, 6
		SHEETING
ESTRW05	4	1/16" x 3" x 24" Balsa LE Sheeting
ESTRW06	2	1/16" x 3" x 18" Balsa Wing Center Sheeting
		HARDWARE
ADAPQH01	1	Prop Adapter Hub
ADAPQS01	1	Prop Adapter Spinner
FTAP001	1	1/32" x 1" x 1" Foam Tape
GLTP010	1	2" x 18" Fiberglass Tape
METAL016	2	Crimp Fittings For Rudder Cable
METAL056	3	Brass Body For Quick Connector
NUTS005	2	2-56 Hex Nuts
NYLON03	5	Small Nylon Control Horn
NYLON17	3	Nylon Clevis
NYLON23	1	10-24x1" Nylon Wing Bolt
NYLON36	1	Nylon Flat LG Straps (Tree of 4)
NYLON85C	1	Nylon Retainer for Quick Connector
PLTB004	1	6-1/2" Inner Pushrod Tube
PROP002	1	7 x 6 Nylon Propeller
SCRW001	2	2-56 x 3/8" Screws
SCRW002	6	2-56 x 5/8" Screws
SCRW015	2	4-40 x 1/8" Set Screws
SCRW024	4	#2 x 3/8" Sheet Metal Screw
SCRW038	1	6-32 x 1/4" Hex Head Set Screw
SCRW040	2	3MM x 6MM Motor Mount Screws
SCRW057	1	6-32 x 3/4" Socket Head Cap Screw
SCRW100	1	4-40 x 1/8" Socket Head Cap Screw
VLCRSH03	3	3/4" x 3-1/2" Hook & Loop Material
WBNT136	2	1/8" Main Landing Gear Wire
WBNT137	1	1/16" x 1-1/2" Tail Skid Wire
WRENCH01	1	1/16" Short Arm Hex Key
WRENCH02	1	7/64" Short Arm Hex Key
WRENCH03	1	.050" Short Arm Hex Key