

BIG STIK

Instruction Book



(These instructions cover the building of the
20, 40 and 60 size BIG STIKS.)

**READ THROUGH THIS INSTRUCTION
BOOKLET FIRST. IT CONTAINS IMPORTANT
INSTRUCTIONS AND WARNINGS CONCERN-
ING THE BUILDING AND USE OF THIS
MODEL.**

WARNING!

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 (engine, tank, 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.**

Academy of Model Aeronautics
5151 East Memorial Dr.
Muncie, IN 47302-9252
(800) 435-9262



P. O. BOX 788 URBANA, ILLINOIS 61801

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INTRODUCTION

Congratulations! We're pleased you have chosen a BIG STIK, and we sincerely hope your project will be enjoyable and successful.

Please be aware that the BIG STIK is radically different from most of the other "similar looking" kits available today. The "stik" concept was born in the early 1960's with Phil Kraft's "UGLY STIK." This design achieved almost overnight popularity because it was simple, easy to construct and maintain, and easy to fly. In addition, it had the versatility to be used as an aileron trainer, pattern trainer, fun fly competitor or just a darned good sport flyer. Although named "UGLY", its big iron crosses and scalloped trailing edges were reminiscent of WWI fighters, considered anything but ugly by many.

Since those early days, many changes have taken place in R/C. 2-cycle engines have become much more powerful, 4-cycle engines are now commonplace and very popular, and radios have become much smaller and lighter. Unfortunately, many modelers have installed hot 2-cycle or big 4-cycle engines into airframes which just were not designed to handle them,

resulting in overpowered or overweight "bombs" that had to be "aimed" rather than flown! Perhaps even more important is the fact that most people who enter the R/C hobby today do so with little or no previous building experience. These people find it very frustrating when the kits they purchase contain only one or two pages of "instructions."

From the ground up, the BIG STIKS have been designed for today's engines and radios, and today's modelers. We think you'll like the difference! You'll see that the BIG STIK gives you several choices, so you can build it the way you like it... as a taildragger or trike, with a 2-cycle or 4-cycle engine, and with wing hold-down bolts or rubber bands. For best results, we recommend that you cover your BIG STIK with Super Monokote or other pre-finished covering that does not require painting. We caution you against painting because the model's weight can easily become excessive, which will reduce its performance.

In this book, we'll take you, one easy step at a time, through construction of the fuselage and wing, give you specific pointers on installing your radio, engine and accessories, and end up with tips on finishing, balancing and flying your BIG STIK. Be-

fore starting to build, we encourage you to examine the large plan sheet and the perspective drawing on page 5. Also flip through this book and examine the kit parts to become familiar with the kit and the construction sequence.

While the BIG STIK is very easy to build and flies great, we must discourage you from selecting this kit as your first R/C airplane unless you have an instructor who will be able to give you a lot of assistance (preferably using the "buddy cord" method), and who will keep working with you until you are able to remain in full control of the airplane on your own. The BIG STIK is not a beginner's airplane because it is relatively fast, highly maneuverable, and lacks the self-recovery characteristics of a good basic trainer, such as the Great Planes PT-20 or PT-40. On the other hand, if you have already learned the basics of R/C flying and you are able to safely handle a basic trainer airplane, the BIG STIK is an excellent choice!

We think you will agree that the Great Planes BIG STIKS are the highest quality, best building and best flying airplanes of their type on the market today!

If you have any questions or problems about building or flying your BIG STIK, please call us at (217) 398-8970 and we'll be glad to help.

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 sized **engine** and correct **components** (fuel tank, 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.

ENGINE REQUIRED:

BIG STIK 20	.19-.28 2 Cycle
	.25-.40 4 Cycle
BIG STIK 40	.35-.46 2 Cycle
	.46-.60 4 Cycle
BIG STIK 60	.50-.61 2 Cycle
	.80-1.20 4 Cycle

A NOTE ABOUT ENGINE SELECTION: If you are a near-beginner, just past the "basic trainer" stage, and the BIG STIK is your first aileron-equipped airplane, we recommend that you choose an engine in the middle or lower end of the specified range...or a non-Schneurle, relatively "tame" engine near the upper end of the range. With a lower powered, lighter engine your BIG STIK will not have unlimited vertical performance, but it will be more docile and fly slower, making it easier to handle. On the other hand, if you are an experienced modeler who wants unlimited aerobatic and vertical performance, don't hesitate to select a "hot" engine at or near the top end of the recommended range.

OTHER ITEMS REQUIRED:

(See plan for sizes)

1 or more-Propellers to fit your engine

1- "Acorn" type prop nut

2- Main Wheels

1- Nose Wheel or Tail Wheel

2- 5/32" Wheel Collars for nose wheel

(or 3/32" collars for tail wheel)

1- Fuel Tank

Iron-on covering material

Fuel Tubing

Wing Seating Tape

Foam Rubber

SUPPLIES AND TOOLS NEEDED:

2-3 oz. - Thin CA Adhesive

1 oz. - Thick CA Adhesive

2.5 oz.- 5 Minute Epoxy

2.5 oz.- 30 Minute Epoxy

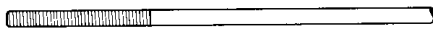
Hand or Electric Drill

Drill Bits (1/16", 3/32", 7/64", 1/8", 5/32", 11/64", 13/64", 1/4")

Sealing Iron
 Heat Gun
 Hobby Saw (X-Acto Razor Saw)
 X-Acto Knife, #11 Blades
 Pliers
 Screw Driver
 T-Pins
 Straightedge

Masking Tape
 Sandpaper, Coarse (100 grit) and fine (220 grit)
 T-Bar sanding block, or similar
 Waxed Paper
 Balsa Filler
 1/4-20 Tap
 Tap Wrench

HARDWARE



STEEL PUSHROD WIRE



8-32 HEX NUT



BLIND NUT



AILERON CLEVIS



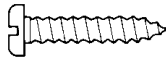
AILERON CLEVIS CONNECTOR



#2 SCREW



#4 SCREW



#6 SCREW



5/32" COLLAR



2-56 SCREW



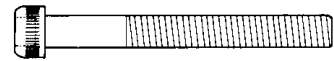
4-40 BOLT



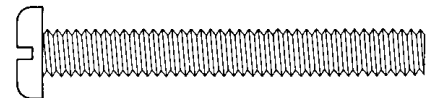
6-32 x 3/16" SCREW



6-32 BOLT

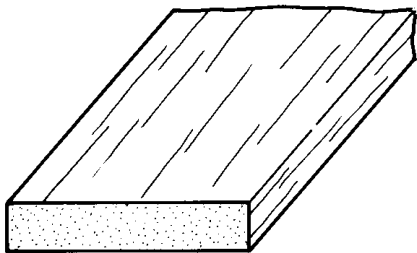


8-32 SOCKET HEAD CAP SCREW

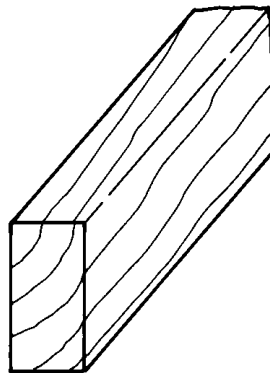


1/4-20 NYLON BOLT

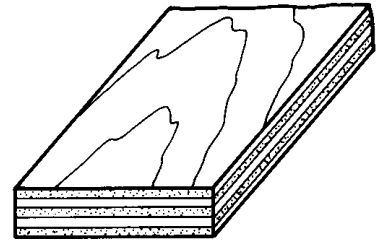
TYPES OF WOOD



BALSA



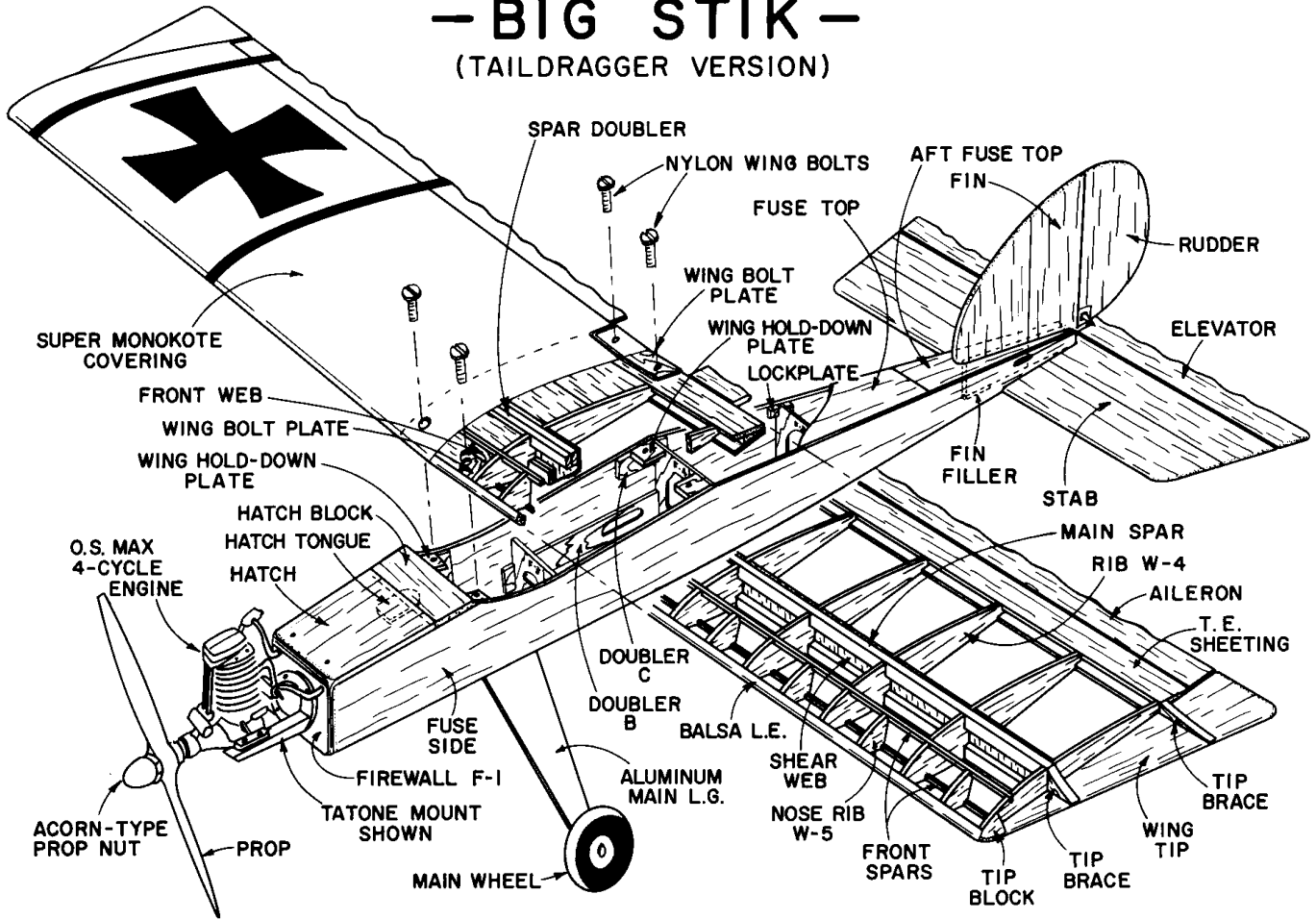
BASSWOOD



PLYWOOD

- BIG STIK -

(TAILDRAGGER VERSION)



COMMON ABBREVIATIONS USED IN THIS BOOK AND ON THE PLANS:

Stab = Stabilizer

Elev = Elevator

LE = Leading Edge (front)

TE = Trailing Edge (rear)

Lt = Left

Rt = Right

" = Inches

Fuse = Fuselage

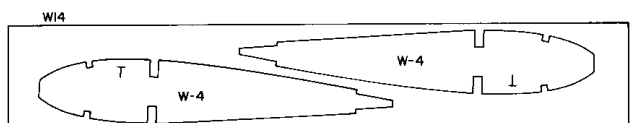
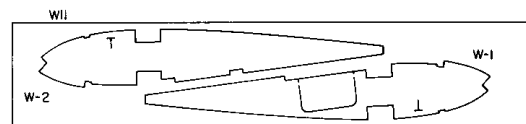
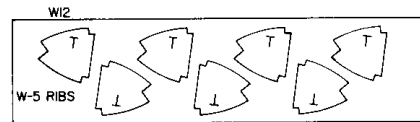
LG = Landing Gear

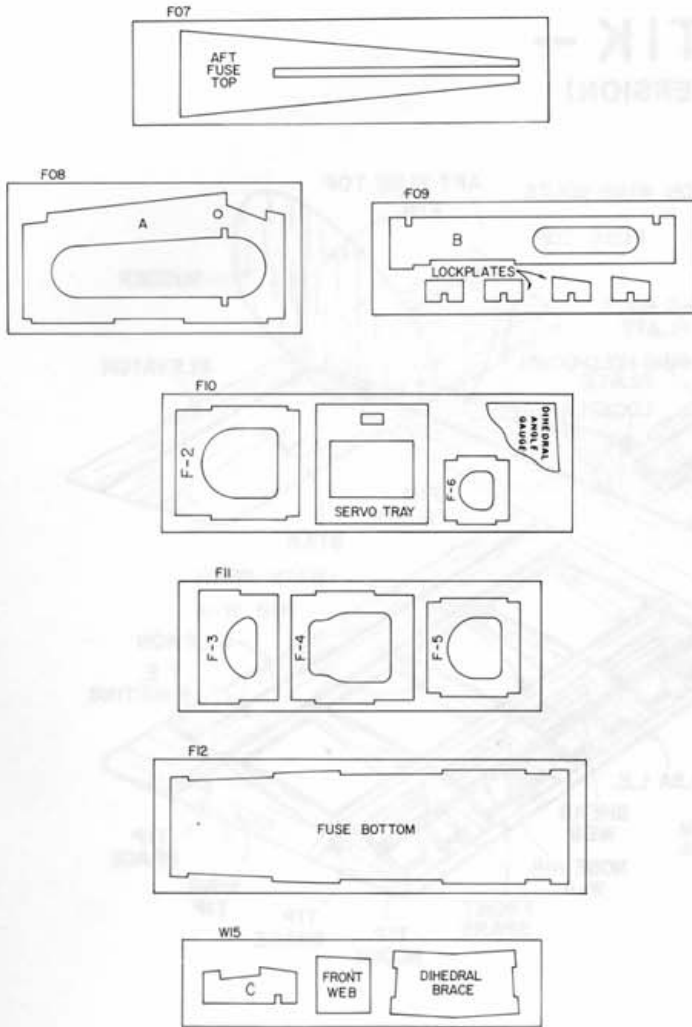
Ply = Plywood

GET READY TO BUILD

□ 1. Unroll the plan sheet. Re-roll it inside out to make it lie flat. Note: The fuselage plan is printed on Side 1 and the wing plan is printed on Side 2.

□ 2. Remove all parts from the box. Figure out the name of each part by comparing it with the plans. Using a felt tip pen, write the part name on each piece to avoid confusion later. Use the die cut patterns shown below to identify the die cut parts and mark before punching them out. Save all scraps.





SPECIAL NOTES

1. This instruction book gives the construction procedure for the BIG STIK 20, 40 and 60. The photos in this book are of the BIG STIK 40, but the structures of all three airplanes are very similar. Refer to the plans for sizes of specific parts.

2. You may construct your BIG STIK with a "Tricycle" or "taildragger" landing gear configuration, depending on your preference. The differences are minor. We'll tell you how to build both configurations in this book. Parts are included for both.

3. You may attach the wing to the fuselage with nylon bolts or rubber bands, depending on your preference. Parts are included for both methods and the instructions tell you how to build both ways.

4. Cyanoacrylate (CA) adhesives may be used for most glue joints in this airplane, except where other adhesives are specifically called for in the instructions.

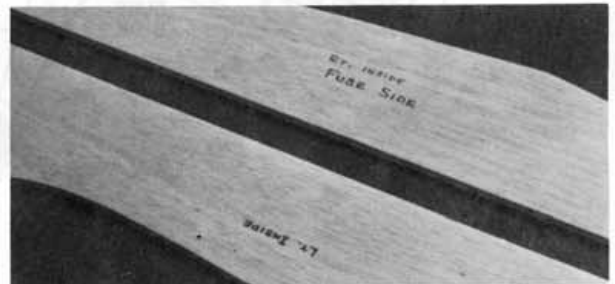
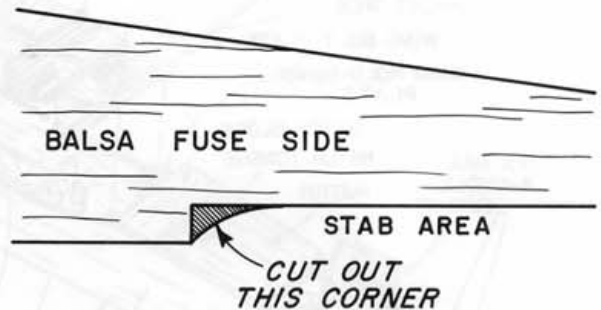
5. Several steps in this instruction book require you to build on and measure from a "flat building surface". Ideally, it should be at least 24" x 60", flat and free of warp and twist.

FUSELAGE

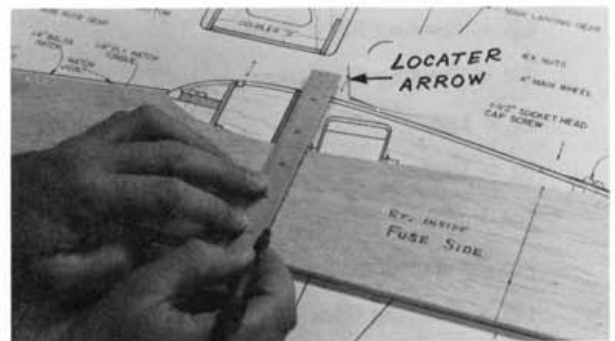
PREPARE FUSE SIDES

□ 1. Place the two balsa **fuse sides** together and line them up along the bottom and front edges. Examine carefully to make sure both sides are identical; if not, use a sanding block to carefully match up the edges.

□ 2. Notice that the front corner of the area where the stab will be attached has a rounded shape. Use a knife or razor saw to cut this corner **square** as shown here:



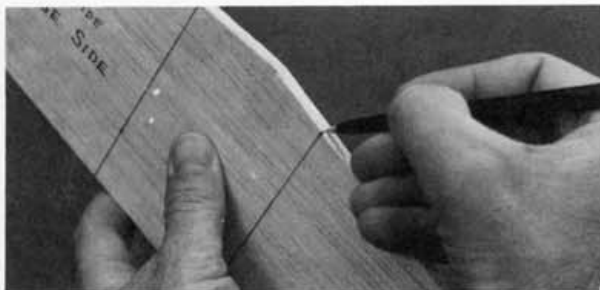
□ 3. Separate the two fuse sides and designate one Rt. and one Lt. side. Mark the **inside surface** of each side to avoid confusion later.



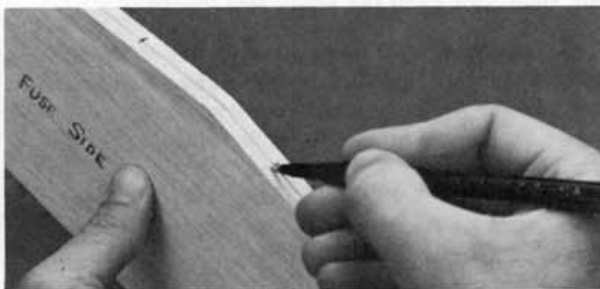
□ 4. Tape the **fuselage plan** (side 1) to your flat building surface.

□ 5. Lay the **Rt. fuse side** on the plan, position it carefully so that the bottom edge and front edge line up with the plan. Tape or pin the fuse side in this position to prevent it from moving during the next step.

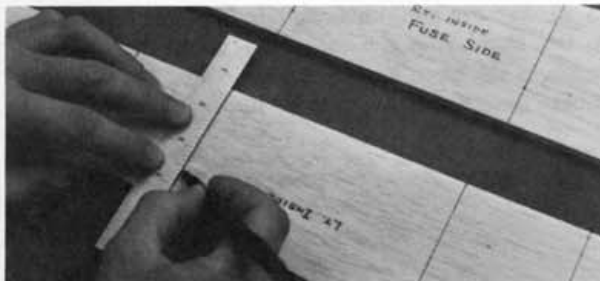
□ 6. Draw vertical lines on the Rt. fuse side to mark the location of the front and rear of the plywood doublers and lockplates. To do this, you must lay a straightedge across the fuse side and carefully line it up with the "locator arrows" on the plan. When lining up the straightedge with the arrows you must be looking **straight down** on the plan to insure that the straightedge is correctly positioned. **It is essential that this step is done accurately or you will have difficulty fitting the parts later.** When completed, there should be 9 lines drawn.



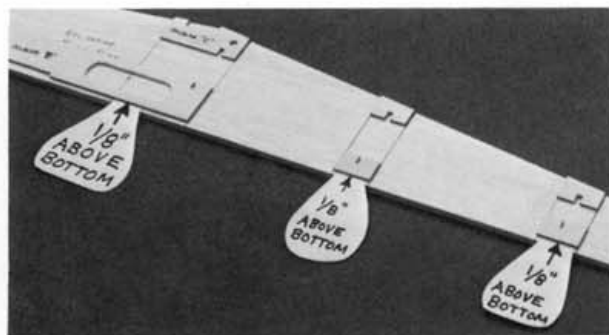
□ 7. Remove the Rt. fuse side from the plan and make small marks on the top and bottom edges where the lines end.



□ 8. Put the two fuse sides together (inside to inside), and line them up carefully. While holding them together, transfer the edge marks over to the Lt. fuse side edges.



□ 9. Now draw lines on the left inside fuse side, using the edge marks and a straight edge.



NOTE: Read and understand **all** of step 10 before proceeding.

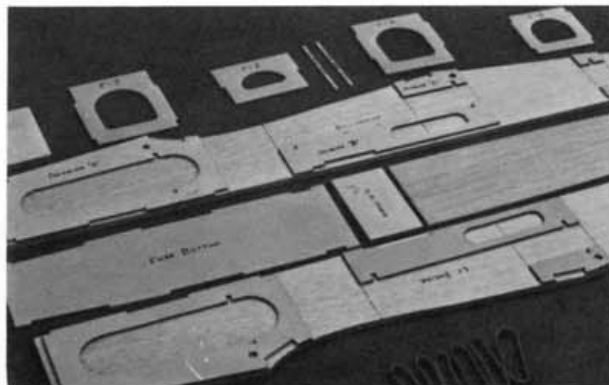
□ 10. Lay plywood doublers A, B and C and the upper and lower lockplates in position on the Rt. fuse side using the lines previously drawn as a guide. **Important: The bottom rear portion of Doubler B and the lower lockplates must be positioned 1/8" above the bottom of the fuse side, using a scrap piece of 1/8" balsa as a spacer.** Holding each of the above parts in its proper position, apply thin CA glue around the edges of the part, holding until the glue sets.

□ 11. Repeat step 10 for the inside of the Lt. fuse side. **Don't forget to space the bottom rear of Doubler B and the lower lockplates 1/8" above the bottom of the fuse side!**

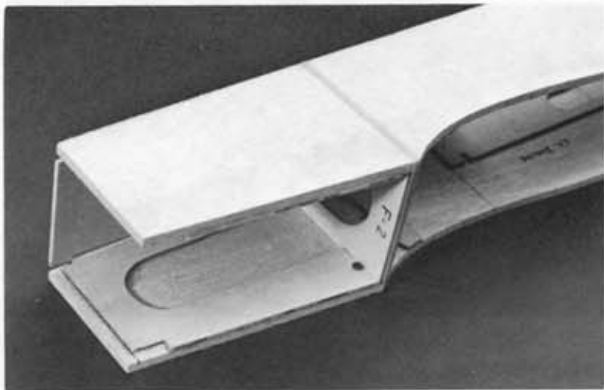
□ 12. If you want to use the rubber band method for attaching the wing, drill the holes in the fuse sides for the wing **hold-down dowels**. Use the holes in Doublers A and C as a guide. For a cleaner cut when drilling, place a piece of scrap wood under the fuse side.

ASSEMBLE THE FUSELAGE

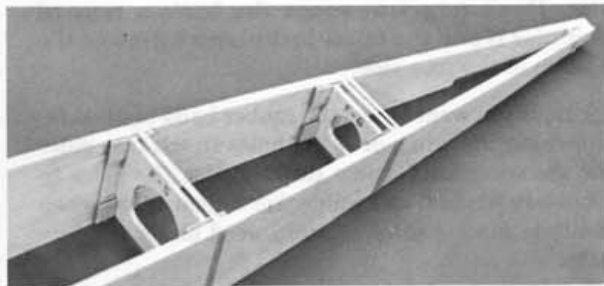
NOTE: In the next steps you will assemble the fuselage **without glue!** The interlocking parts enable you to do this so you can get everything together, make sure the parts fit properly, check for straightness and make adjustments if necessary. **Then** you will glue everything together by applying CA glue and epoxy.



□ 1. Before assembling the fuse, make sure that the following parts are set out within easy reach: both fuse sides with doublers and lockplates glued on, formers F-1 through F-6, ply fuse bottom, ply LG plate, balsa fuse bottom, the two 1/8" x 1/8" basswood LG plate braces and the #63 rubber bands provided.



□ 2. Lay the **Rt. fuse side** flat on the work surface. Insert formers F-2 and F-4 into their respective slots in the Rt. fuse side doublers. While holding F-2 and F-4 upright, lay the **left fuse side** in place on these formers. Now put the **1/8" ply fuse bottom** in place in the slots provided. Holding these five parts together with one hand, slide two #63 rubber bands over the nose, leaving one around F-2 and one around F-4. **NOTE:** Don't try to pull the fuse sides together at the nose yet.

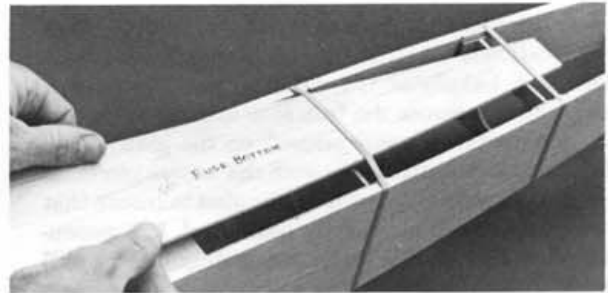


□ 3. With the fuselage in an upright position, insert F-3, then slide another rubber band around the fuse sides at the F-3 location. Now slide additional rubber bands over the rear fuse and place F-5 and F-6 into the lockplate notches. Use a small rubber band to pull the fuse sides together at the tail (this is **temporary**...the fuse sides will **not** be glued together at the tail).



□ 4. Slide a few more bands over the fuse front, pulling the front of the fuse sides together and install F-1.

□ 5. Turn the fuse upside down and place the **ply LG plate** into the slots in Doubler B (use masking tape to hold in place).



□ 6. Now take the **balsa fuse bottom** and slide it into place, narrow end first, under the rubber bands, starting at F-4.

□ 7. Check and double check your assembly of the fuselage, **making sure that all former tabs are in their respective notches and all parts are in place.** Set the fuselage assembly on the plan top view. Your fuse assembly should line up with the plan within 1/16". If not, something is wrong and you should try to straighten it out. If the alignment is far off and you can't find the problem, consult with an experienced model builder to correct the problem before proceeding.

□ 8. Temporarily remove F-1 from the fuse. Apply 5-minute epoxy to the bottom and sides of F-1 and to the fuse sides in F-1 slot area, then put F-1 back in place, wipe away all excess epoxy that squeezes out, then wait until the epoxy sets firmly.

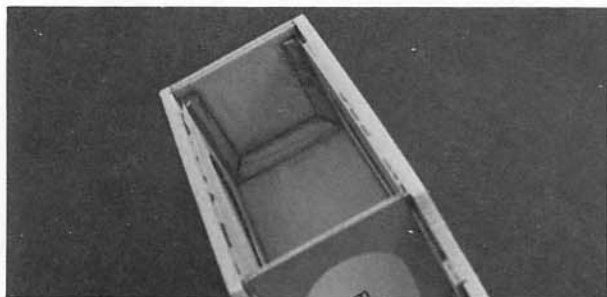
□ 9. Lay down a 50" long piece of waxed paper to protect your building surface. Set the fuselage assembly upright (in its normal position) on the waxed paper. With everything in its proper place, apply **thin** CA glue to all the joints, around the formers and along the bottom*. **Keep checking the parts fit and alignment as you glue.** Wait a minute for the glue to set, then apply **thick** CA to the joints to make sure a good bond exists, especially in the joints that do not fit perfectly. **Note:** The use of "Zip Kicker" or other CA glue accelerator will be helpful when using thick CA to fill any large gaps.

***NOTE:** Do not glue the fuse sides together at the tail.

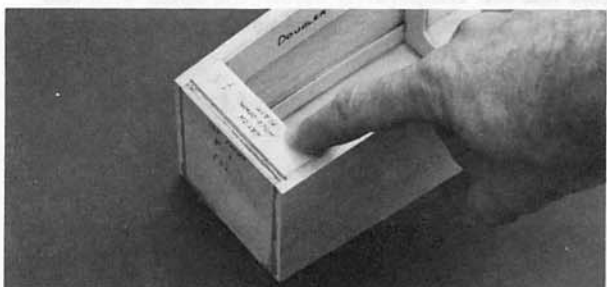
□ 10. Remove the rubber bands from the fuselage. In the above step you may have glued the rubber bands to the wood in some places. If so, just cut the rubber away from the wood with an X-Acto knife.



□ 11. Sand the fuse bottom flat with your sanding block before proceeding.

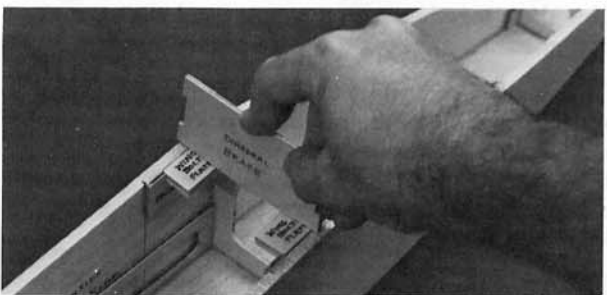


- 12. Cut three pieces of balsa **triangle stock** to fit in the inside corners at the bottom and sides of F-1 and glue in place. Note: When installing the side triangle pieces, cut them short enough to allow the hatch hold-down plate to rest fully down into the notches provided in doubler A.

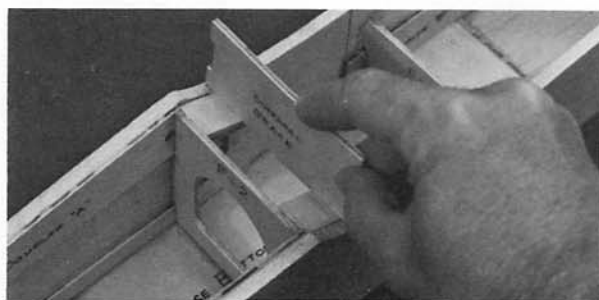


- 13. Sand the ply **hatch hold-down plate** as necessary to fit into the notches in Doubler A, then glue in place with 5 minute epoxy.

NOTE: Skip steps 14 and 15 if you will be using the rubber band method of wing attachment.



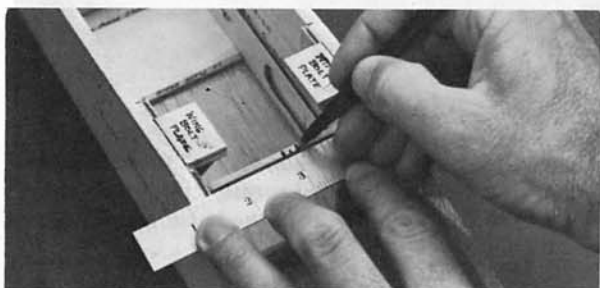
- 14. Find the two plywood rear **wing hold-down plates** and trial fit them in the slots in Doubler C. Also find the ply wing **dihedral brace** and have it handy. Now apply 5-minute epoxy to the slots in Doubler C and place the ply plates into the slots. While holding the plates in place, set the wing dihedral brace on top of the plates as shown to set the plates at the proper dihedral angle. Hold in place until the epoxy sets. Add epoxy or thick CA into the small gaps between the bolt plates and the fuse sides.



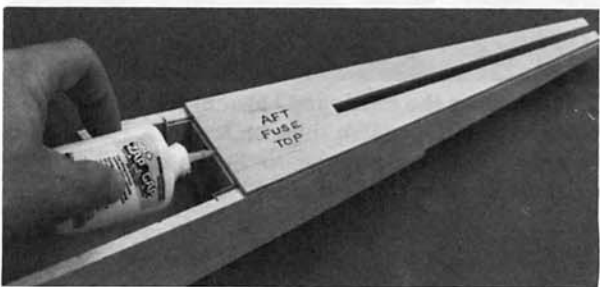
- 15. Repeat the above procedure to install the front **wing hold-down plates**, sanding the plates as necessary for a good fit in the Doubler A notches and against the back of F-2. Epoxy in place, setting the dihedral angle as in step 14. Now add a piece of balsa triangle stock under each of the four bolt plates for added strength. **NOTE:** These bolt plates will be subjected to a lot of stress, so make sure they are **securely** glued in place.

- 16. If you are building your BIG STIK as a tail-dragger, install the ply **L.G. screw backplate** on the inside fuse bottom in the location shown on the plan.

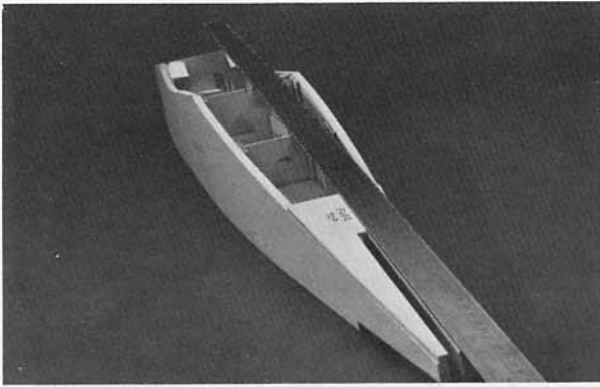
- 17. Using a T-bar sanding block, carefully sand the tops of F-4, F-5 and F-6 flat with the top of the fuse sides.



- 18. Measure and mark the exact center of the top of F-4. Then measure left and right from this center mark, 1/2 the thickness of the **fin**. For example, the BIG STIK 40 fin is 1/4" thick, so marks were made on the top of F-4 1/8" Rt. and Lt. of center.

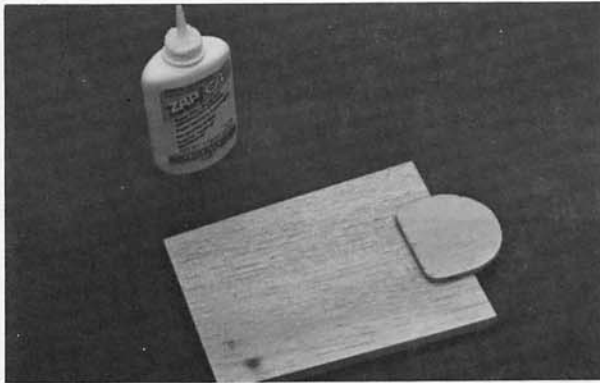


- 19. Find the balsa **aft fuse top** and position it so that the front of this piece is in the **center** of F-6 and centered side-to-side. **Tack glue** the aft fuse top in place with one drop of thick CA applied at the center of F-6.

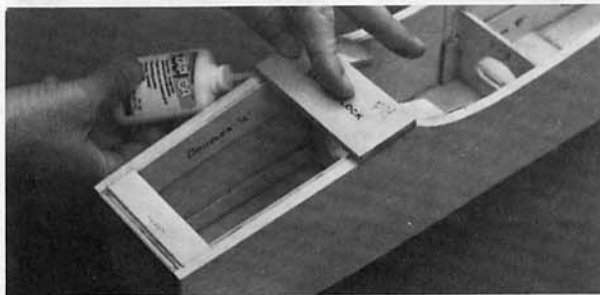


□ 20. Lay a long straightedge across the aft fuse top and F-4. Adjust the position of the aft fuse top so the sides of the fin opening line up with the two marks on F-4. When correctly aligned, glue the aft fuse top to the fuse sides.

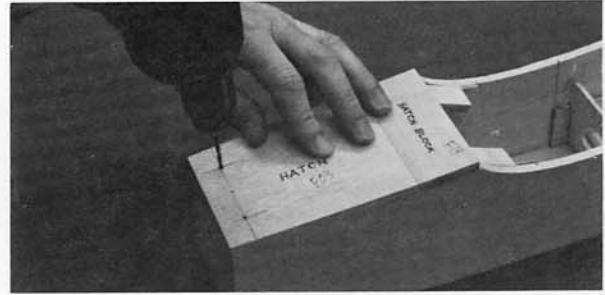
□ 21. Sand the top of the fuse sides, F-1 and hatch hold-down plate flat in the hatch area.



□ 22. Glue the ply **hatch tongue** (the punch-out from F-5) to the bottom rear of the balsa **hatch**.



□ 23. Holding the hatch and balsa **hatch block** together as a unit, position them on the fuse. Holding the hatch block in place, remove the hatch and glue the hatch block to the fuse sides.



□ 24. Put the hatch back in place and drill two $3/32$ " pilot holes for the hatch hold-down screws where shown on the plan, drilling down through the hatch and the ply plate. Remove the hatch and enlarge the holes in the hatch only to $1/8$ ". **NOTE:** To strengthen the balsa hatch in the area of the screw holes, apply thin CA into the $1/8$ " holes, then re-drill after the glue has set. Temporarily mount the hatch with two #4 x $1/2$ " screws, then sand the hatch and hatch block even with the fuse sides.

ASSEMBLE AND INSTALL STAB AND ELEVATOR



□ 1. Lay waxed paper over the stab drawing on the plan. Position the **stab front** and **stab rear**, and edge glue them together with thin CA. Sand the top and bottom surfaces smooth with a T-bar sanding block.

□ 2. Mark a centerline along the full length of the stab TE and the elevator LE. If you have a hinge slotting kit that includes a device for marking centerlines, use it. Mark the hinge locations on the stab and elevator and cut the hinge slots with an X-Acto knife or a hinge slotting tool.

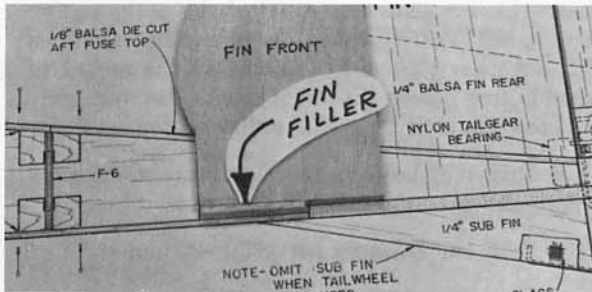
□ 3. Sand the elevator LE to a "V" shape as shown on the plan. Temporarily assemble the elevator to the stab with hinges, then sand the corners of the stab and elevator to the radius shown. Now sand the edges of the stab and elevator to a rounded shape.

NOTE: The scalloped elevator TE is best sanded with a piece of sandpaper wrapped around a dowel.

NOTE: At this time you may final sand the stab and elevator to the point where they are ready for covering, as it is much easier to do it now than it will be after the stab has been glued to the fuse.

□ 4. Carefully position the stab on the plan, then lay the fuse in place over the stab. With both the fuse and stab properly positioned and resting flat on the surface, glue the stab to the fuse. You may use thin CA for this step, applying the glue from both the outside and inside of the fuse. Follow up with thick CA or a **small** fillet of epoxy to fill any gaps and to provide a strong glue joint.

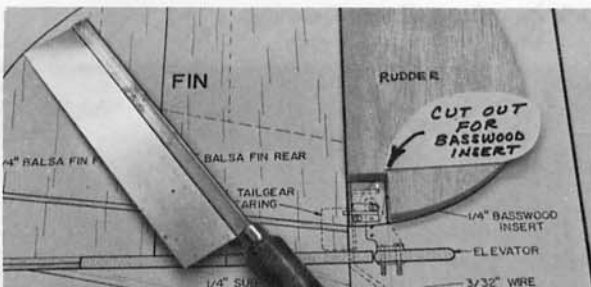
ASSEMBLE AND INSTALL FIN AND RUDDER



□ 1. Find the small balsa **fin filler** piece and glue it to the bottom of the **fin front** in the location shown on the plan.



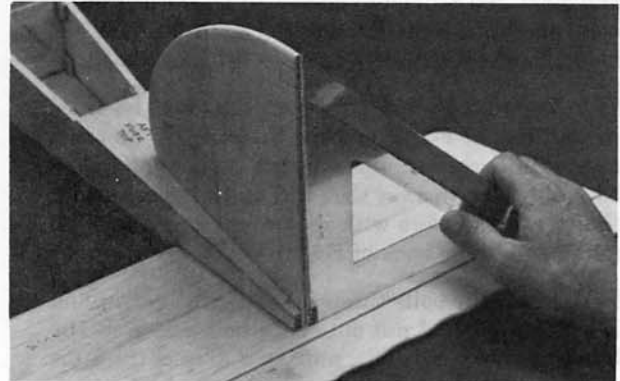
□ 2. Lay waxed paper over the fin drawing on the plan. Position the **fin front** and **fin rear** so that the bottom edges line up, and edge glue them together. Sand both sides smooth with a T-bar sanding block.



□ 3. Cut out the lower front corner of the balsa **rudder** as shown on the plan, and glue in the **basswood insert**. Sand to blend in with the rudder.

□ 4. Mark a centerline on the fin TE and the rudder LE. Mark the hinge locations on the fin and rudder and cut the hinge slots.

□ 5. Sand the rudder LE to a "V" shape as shown on the plan. Temporarily assemble the rudder to the fin with hinges, sand the sides of the fin and rudder, then sand the edges of the fin and rudder to a rounded shape. **NOTE: Do not round any part of the fin that will be inside the fuse.**



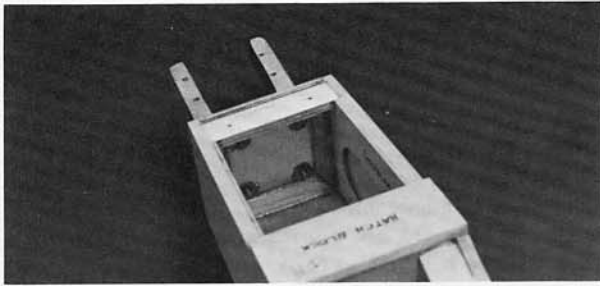
□ 6. Trial fit the fin in the fin slot. You can see the bottom front of the fin through the hole in F-6. Make sure it is down onto the fuse bottom. Also, the fin TE should be even with the aft end of the fuse sides. Sand or adjust as necessary. Now mix up a batch of 30 minute epoxy and apply a good bead of it to the bottom of the fin. Put the fin in place in the slot and align it vertically using a carpenter's square or a draftman's triangle at the fin TE. When you have it positioned correctly, lock it in place by applying thin CA to the joint where the fin enters the fuse top.

ENGINE INSTALLATION

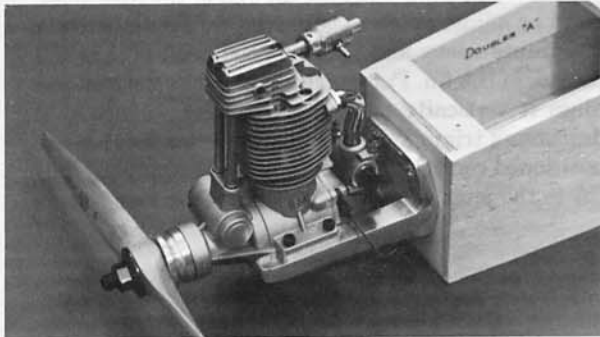
NOTE: The engine mount supplied in this kit will fit most 2-cycle engines in the recommended size range, and it also doubles as a nose gear mounting bracket. Obviously, we cannot supply a mount that will work with all engines; therefore, if you plan to install a 4-cycle engine you will probably have to purchase a special engine mount from your hobby shop.

If you are planning a tricycle gear setup and the engine mount you purchase does not serve as a nose gear mounting bracket, then you will also have to purchase two nylon nose gear mounting blocks and install them along with the engine mount.

NOTE: The plans show the installation of an OS.45 FSR (2-cycle) engine with a nose gear and are self explanatory. The following photographs show the installation of an OS 61 FS (4-cycle) engine without a nose gear, for a taildragger arrangement.



- 1. Position the **engine mount** on the front of F-1 and mark and drill four holes in F-1 for the mounting bolts and blind nuts. For the BIG STIK 20, drill 1/8" holes. For the BIG STIK 40 and 60, drill 5/32" holes.
- 2. Insert the blind nuts part way into the holes in the back of F-1. If you see that any of the blind nuts will touch the balsa triangle reinforcing on the back of F-1, carve away that part of the triangle stock that would interfere with the proper fit of the blind nuts against the back of F-1.
- 3. Insert the bolts through the engine mount and F-1. Screw a blind nut onto each bolt and draw the blind nut down securely, putting a drop of thick CA under the blind nut flange just before the nut bottoms out against the back of F-1.



- 4. Place the engine pointing straight ahead on the mount and mark the mounting hole locations on the mount.

Drill pilot holes in the mount as follows:

BIG STIK 20 & 40: 3/32" hole

BIG STIK 60: 7/64" hole

- 5. Now you may use one of the following methods to attach your engine to the mount:

Method 1: Screw the sheet metal screws provided in your kit (BIG STIK 20 = #4 x 1/2", BIG STIK 40 = #4 x 5/8", BIG STIK 60 = #6 x 3/4") through the engine mounting flange and into the mount. When first installing these screws, put a drop of oil into each screw hole.

Method 2: Cut threads in the holes you just drilled using a tap and tap wrench (use a 4-40 tap for .40 size and smaller engines. Use a 6-32 tap for engines larger than .40). If you use this method you'll have to supply your own bolts for attaching the engine to the mount.

(Photo shows OS 61 FS 4-cycle on a Tatone mount, which comes pre-drilled and tapped for the engine you specify.)

LANDING GEAR INSTALLATION

TRICYCLE GEAR SETUP

- 1. Assemble the nose gear **steering arm** which consists of a nylon arm, a 5/32" wheel collar, and a 6-32 x 3/16" screw.
- 2. Referring to the nose gear diagram on the plans, slide the steering arm onto the **nose gear wire**, then insert the nose gear wire into the holes in the engine mount. **NOTE:** If the hub of the steering arm touches F-1, cut away part of F-1 just below the mount to provide free movement. Then secure the nose gear into the mount with a 5/32" collar on top.
- 3. Drill four holes in the aluminum **main gear** where shown on the fuse plan top view

Drill 1/8" holes for BIG STIK 20 and 40.

Drill 5/32" holes for BIG STIK 60.

- 4. Position the main gear on the ply **LG mounting plate** and mark the hole locations. Drill holes in the LG plate.

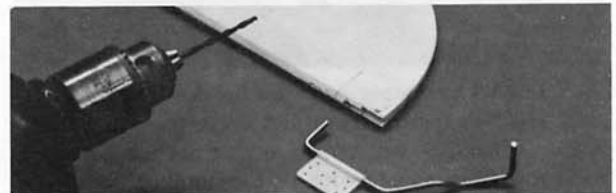
Drill 3/32" holes for BIG STIK 20 & 40.

Drill 7/64" holes for BIG STIK 60.

- 5. Attach the LG to the plate with four screws as shown on the plan.

NOTE: Later you will add the balsa **sub fin**, 1/16" wire skid and glass cloth reinforcement as shown on the plan.

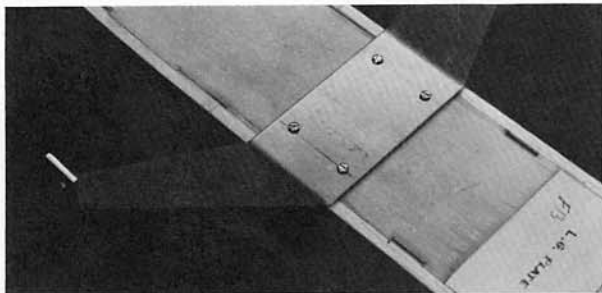
TAILDRAGGER SETUP



- 1. Drill a hole in the basswood insert in the rudder, and groove the rudder LE to accept the **tailgear wire** and the nylon **tailgear bearing**.



- 2. Drill a hole in the stab rear for the tailgear to pass through.
- 3. Cut a hinge slot in the fin TE for the tailgear bearing, then trial fit the tailgear.



4. Drill four holes in the aluminum **main LG** where shown on the fuse plan top view.

Drill 1/8" holes for the BIG STIK 20 & 40.

Drill 5/32" holes for the BIG STIK 60.

5. You previously glued the **LG Screw Backplate** into the fuse. Now you must figure out where this backplate is located on the **outside** of the fuselage bottom. To do this you may push a pin or drill a tiny hole through the fuselage bottom in two places along the rear edge of the screw backplate, then draw a straight line through these two holes on the outside of the fuselage bottom.

6. Position the aluminum main LG so that the rear edge of the LG is on the line you drew in the above step. Mark the four hole locations on the fuselage bottom. Remove the LG and drill pilot holes for the screws.

Drill 3/32" holes for the BIG STIK 20 & 40.

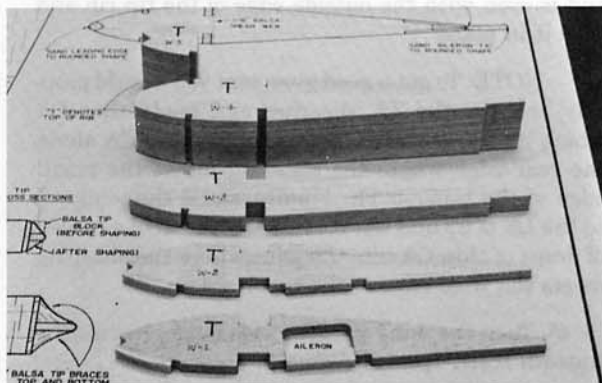
Drill 7/64" holes for the BIG STIK 60.

7. Attach the LG with four screws as shown on the plan.

NOTE: If you are using the taildragger setup, **do not** install the **sub fin**.

WING

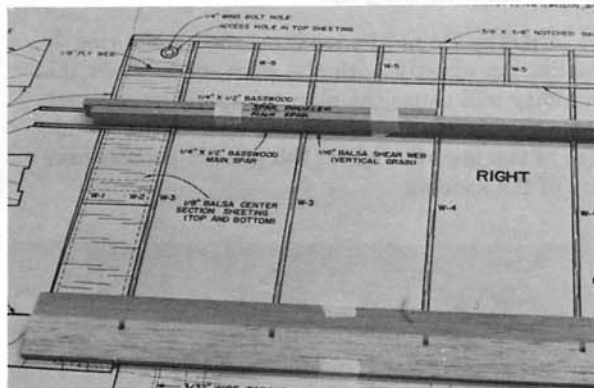
BUILD THE WING PANELS



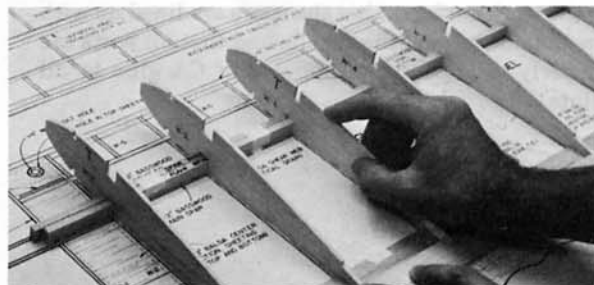
1. Punch out all the **wing ribs** from the die-cut sheets. Compare the ribs with the **wing rib patterns** on the wing plan and arrange them into stacks of the same kind of ribs.

NOTE: You will build the right wing panel first (steps 2 through 24). Then read and follow step 25. Then follow steps 3 through 21 and steps 23 and 24 again to build the left wing panel. You can check off one box in front of each step for the right panel and then check off the other box as you build the left panel.

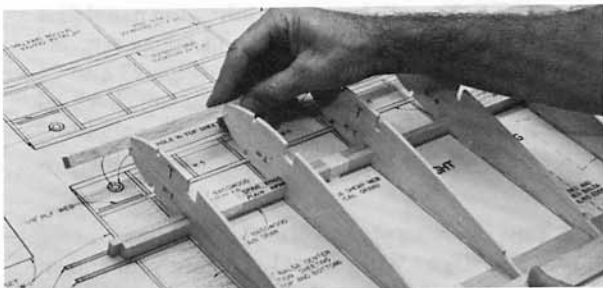
2. Tape the wing plan to your flat building surface so that the **Right Wing Panel** is facing you. Tape a sheet of waxed paper over the right wing panel drawing.



3. Lay one of the balsa **TE Sheets** on the wing plan. Now place one of the **tapered notched balsa TE** on the TE sheet (the end with the notch must be at the wing tip). Line up the narrow edge of the tapered TE with the rear edge of the TE sheet, and line up these two pieces at the tip end. While holding in the above position, glue these two pieces together with thin CA.
4. Now pin the above assembly onto the Rt. wing plan, lining it up with the outside edge of the tip rib (any excess balsa will extend beyond the wing centerline).
5. Place a basswood **main spar** on the plan, lining up the right end with the outside edge of the tip rib. Do not pin this spar down to the plan, but use a piece of masking tape on the rear edge to prevent it from moving left or right.
6. Position a basswood **spar doubler** in place and temporarily tape it to the main spar with a couple of pieces of masking tape (apply the tape **between** the ribs).



7. Place the **W-3** and **W-4 ribs** onto the main spar and into the notches in the TE. Note that the ribs are stamped with a "T" which always denotes the **top** of the rib.

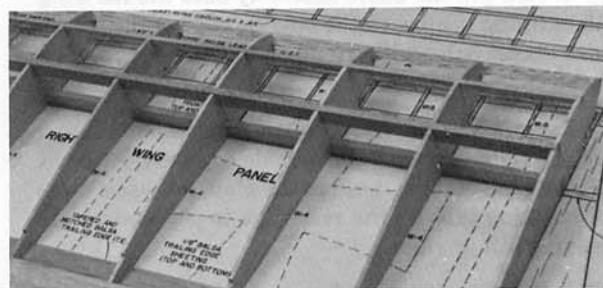


- □ 8. Now work the **notched balsa LE** onto the front of the ribs. **Remember** that the notched end of the LE is toward the wing tip.

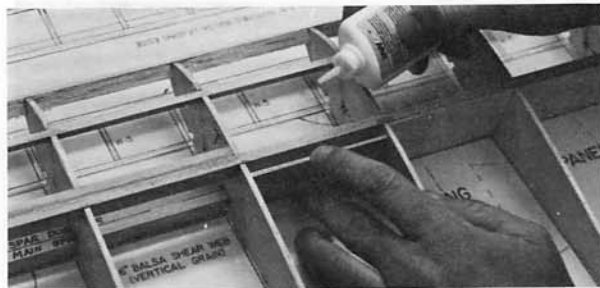
NOTE: Do not be too concerned if the ribs do not line up exactly with the plan. Sometimes the humidity will cause the plan to expand or contract. Just remember to line everything up with the outside edge of the last rib and let the pre-cut notches take care of the spacing.



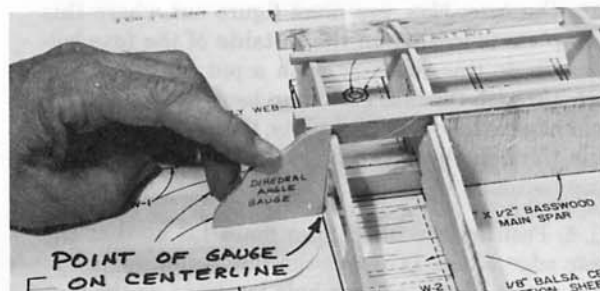
- □ 9. Put rib **W-2** in place and pin it to W-3. Note that the spar notches are cut extra wide to allow for the dihedral braces.



- □ 10. Insert the upper main spar, upper spar doubler and upper front spar into the notches in the top of the ribs.
- □ 11. Make sure the tip rib is vertical (90 degrees to the work surface), that the spars are lined up with the outside edge of the tip rib, and that all parts are properly aligned. Then apply thin CA glue to all joints.



- □ 12. Glue the pre-cut balsa **shear webs** to the spars as shown on the plans. It is not necessary for the webs to be glued to the ribs. Don't forget the single web that goes onto the **front** of the spars in the 4th rib bay.



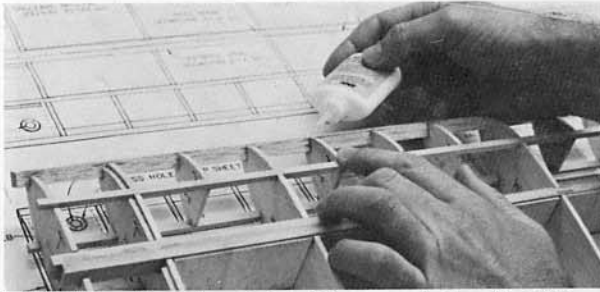
- □ 13. Position rib **W-1** as follows: Slide the rib into place from the end of the wing panel, then tilt the rib to the proper dihedral angle using the dihedral angle gauge as a guide. Check the alignment of the rib at several places **with the point of the dihedral angle gauge right on the wing centerline** as shown here. Glue W-1 in place.



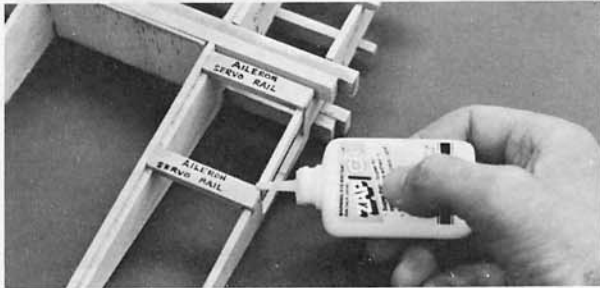
- □ 14. Position the balsa **top TE sheeting** so the Rt. end is even with the outside edge of the tip rib and glue it in place.

NOTE: To get a good glue joint you should properly position the TE sheeting and apply thin CA where it joins each rib. Second, apply thin CA along the rear edge where the sheeting meets the small edge of the tapered TE. Finally, stand the wing up so the LE is up and the TE is down and drip a couple of drops of thin CA into the joint where the sheeting meets the wide edge of the tapered TE.

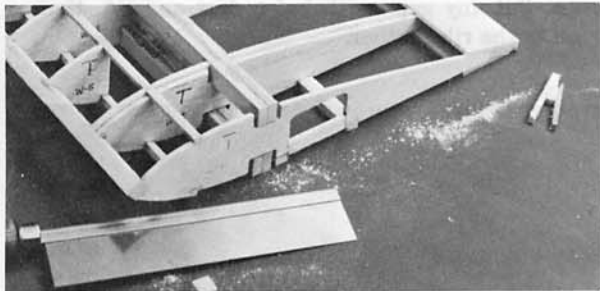
- □ 15. Turn the wing panel upside down, install the **bottom front spar** and glue in place.
- □ 16. Now go over the entire wing panel making sure **all joints** are securely glued. Add thin and/or thick CA glue where necessary.



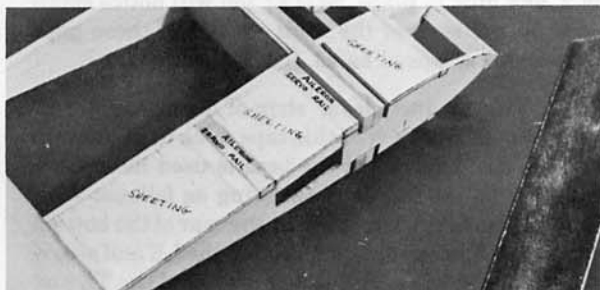
- 17. Turn the wing right side up and glue the W-5 ribs in place using the plan as a guide for positioning the ribs.



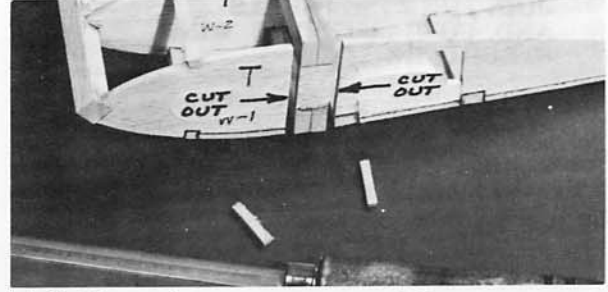
- 18. Turn the wing upside down and glue the basswood aileron servo rails into the slots in W-1 and W-2 leaving a 1/8" opening behind the main spar.



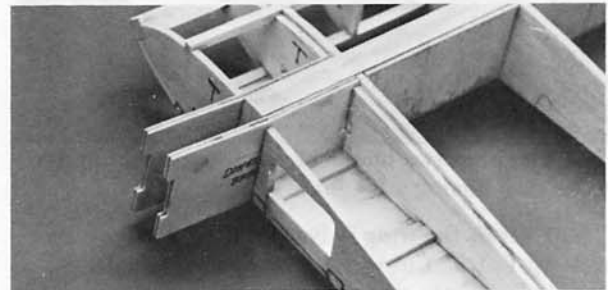
- 19. Using a razor saw, carefully cut off all excess sheeting, spars, LE and TE even with W-1. Now sand the ends of the parts you just trimmed until they are smooth and flush with the face of W-1.



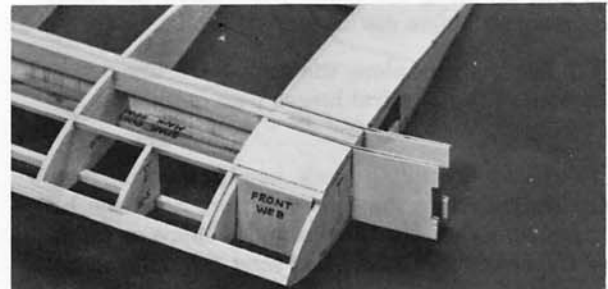
- 20. From the balsa sheet provided, cut pieces of bottom center section sheeting to fit across ribs W-1 and W-2. Sheet only the bottom between the TE sheeting and the rear aileron servo rail, the area between the servo rails, and the area between the spar doubler and the front spar. Leave 1/8" openings behind the main spar and in front of the spar doubler. Sand the sheeting flush with the face of W-1.



- 21. Now, using a razor saw, carefully cut two 1/8" segments out of rib W-1 in front of the spar doubler and behind the main spar, providing openings for the plywood dihedral braces.



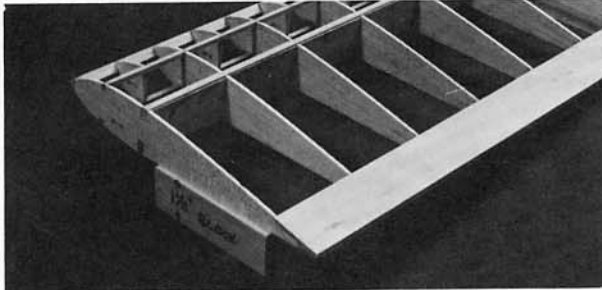
- 22. With the wing right side up, trial fit the dihedral braces to make sure they fit properly. Now glue them securely to the spars using 30 minute epoxy. Position the dihedral braces carefully and wipe away any excess epoxy.



- 23. Cut and glue the top center section sheeting in place across ribs W-1 and W-2 between the TE sheet and the upper front spar, leaving the area open between the upper front spar and the LE. Sand the sheeting flush with the face of W-1. Note: When doing this step for the Lt. wing panel, leave 1/8" openings in front and back of the spars.
- 24. Glue the die cut ply front webs to the front of the front spars.
- 25. Turn the wing plan around so the Left Wing Panel is facing you, cover with waxed paper and build the left wing panel in the same manner as the right panel, following steps 3-21 and 23-24.

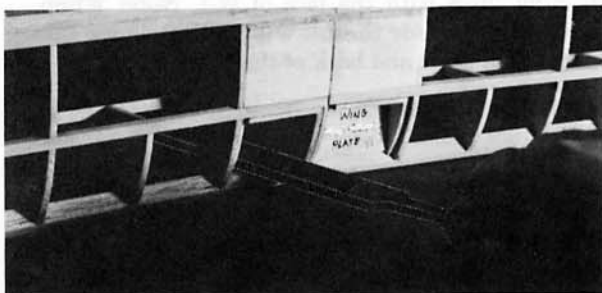
JOIN THE WING PANELS AND COMPLETE THE WING STRUCTURE

- 1. Sand the bottom of both wing panels near the center, to remove any " globs" of glue on the spars or sheeting that may prevent the wing from resting flat on the surface.

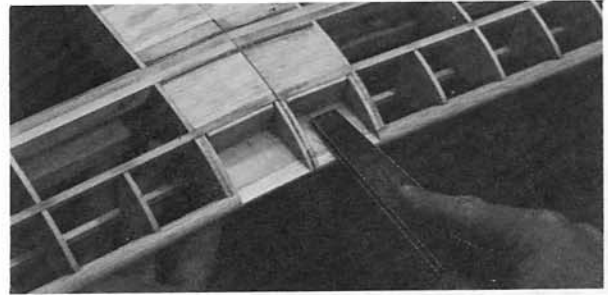


- 2. Make up two blocks of wood or two stacks of books each having a height of 1-1/2".
- 3. Trial fit the wing halves together, blocking up each tip 1- 1/2". Cut or sand as necessary until the wing halves mate properly.
- 4. Lay down a piece of waxed paper, then mix up a batch of **30 minute epoxy**. Apply it liberally to the dihedral braces and to the spars, then slide the wing halves together. Make sure the two halves are properly aligned, then "lock" them together by applying CA glue all along the center joint. Allow the epoxy to firmly set before disturbing.
- 5. Fill any gaps along the wing centerline and in the area of the dihedral braces with balsa dust and CA glue.
- 6. Using a sanding block, sand the entire wing smooth, including the center section. Sand the LE to approximately the same rounded shape as shown on **Cross-section A-A**. Also sand the TE straight and flat as shown.

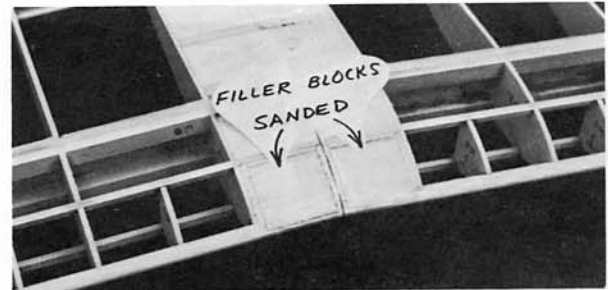
NOTE: If you have chosen to attach your wing with rubber bands, you may omit step 7.



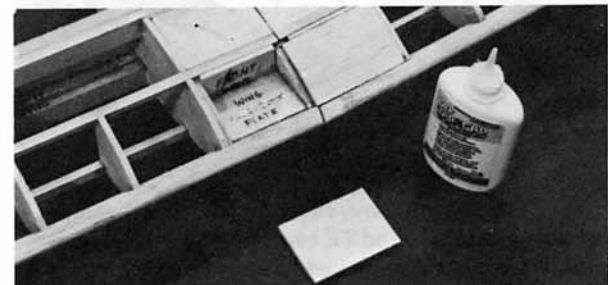
- 7. File or sand the rear edge of the LE between ribs W-1 and W-2 to accommodate the ply wing bolt plates. See the fuse side view plan which shows this clearly. Then glue the two plywood wing bolt plates to the LE and the front webs.



- 8. Sand or file the **bottom** of the LE between W-1 and W-2 even with the bottom of the wing bolt plate.



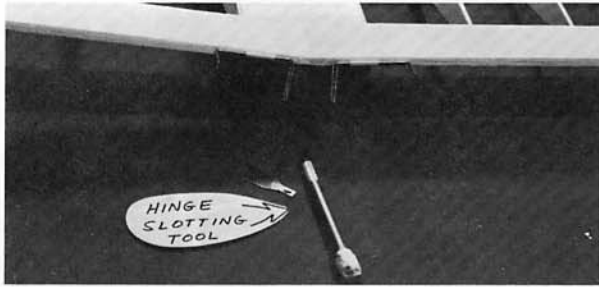
- 9. Glue the balsa filler blocks to the bottom of the wing bolt plates, then carve and sand the filler blocks to the shape of the wing ribs. **NOTE:** if you are using rubber bands for wing hold-down, merely glue the filler blocks to the bottom of the LE and to the front webs. Fill any gaps with balsa dust and CA, then sand to the rib contour.



- 10. Turn the wing right side up, then cut balsa sheeting to fit onto the front portion of ribs W-1 and W-2, and glue in place. **NOTE:** You will notice small gaps on the ends of the front webs. Fill these gaps with small scraps of balsa. Sand smooth.
- 11. Your kit includes a strip of fiberglass tape. Cut off one inch of this tape to be used later on the sub fin. The rest of the tape is used here. Glue this tape to the center of the wing as follows: With the wing upside down, begin at the rear of the bottom wing spar. Proceed forward, around the LE and across the top of the wing. Pull the tape around the TE and end near the rear servo rail. The aileron servo area is left unglased.

TIPS: If you spray a **very light mist** of 3M "77" spray adhesive on the center section, you will be able to press the glass cloth fully in place before applying the thin CA glue. You may also use a piece of waxed paper to press the glass cloth firmly down to the wood immediately after applying the glue.

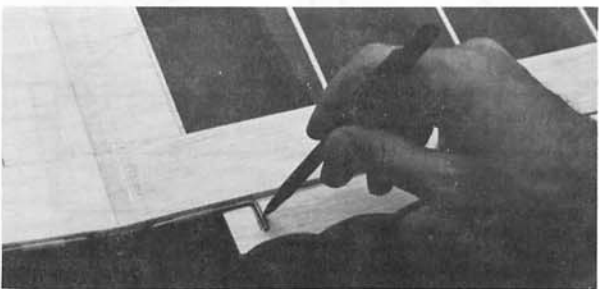
- 12. Use a sanding block to **carefully** “feather” the edges of the glass cloth to blend with the sheeting. Lightly sand the surface of the glass cloth to remove the roughness, but **do not sand through the weave!**



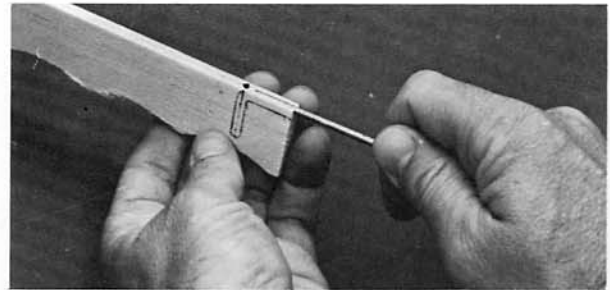
- 13. Cut slots in the TE where shown on the wing plan for the nylon **torque rod bearings**. Temporarily mount the **torque rods** to the wing as shown on the wing plan.



- 14. Cut small slots in the bottom of the TE to allow the torque rod arms to swing forward.
- 15. Carefully mark a centerline on the LE of the **ailerons**.



- 16. While holding the ailerons in place against the TE (with the ends of the ailerons lined up with the tip rib), mark the locations where the torque rods will enter the ailerons.

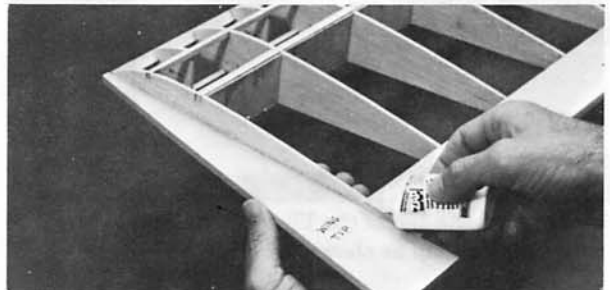


- 17. Drill a $3/32$ " hole in each aileron to accept the torque rod. Also cut a slot in the aileron LE for the torque rod (this is easily done with a sharpened piece of brass tubing).

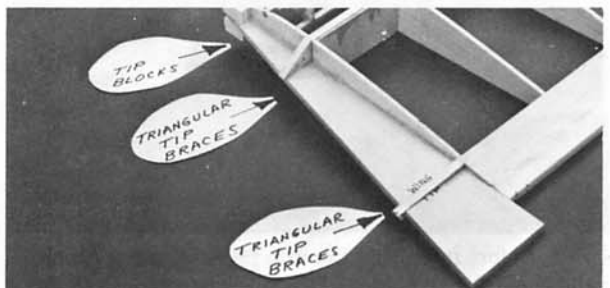
- 18. Using the plans as a guide, mark the **hinge locations** on the ailerons and the wing TE. Cut the hinge slots.

- 19. Sand the LE of the ailerons to a “V” shape and the TE of the ailerons to a **rounded** shape, as shown on **Cross section A-A**.

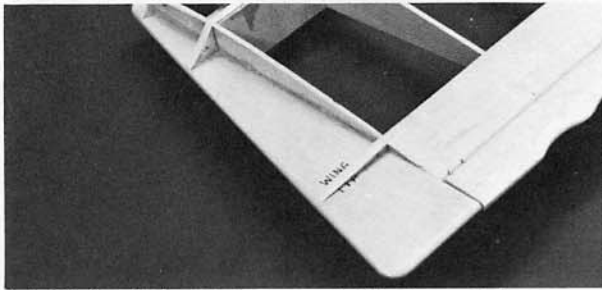
NOTE: Sanding the scalloped TE to a rounded shape is best accomplished with a piece of sandpaper wrapped around a 1" diameter dowel.



- 20. Glue the balsa **wing tips** to the tip ribs.



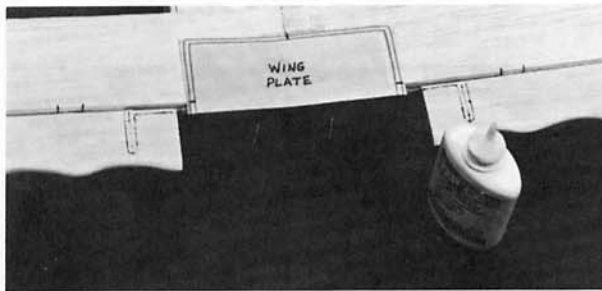
- 21. From the balsa stock provided, cut **triangular tip braces** and glue in place as shown on the plan. Also, find the balsa block from which the **tip blocks** will be cut. Cut it into four equal lengths, and glue them in place at the front of the wing tips, top and bottom.



- 22. Sand the tip braces, tip blocks and tips to a rounded and pleasing shape (see the **Tip Cross Sections** on the plan). Also sand the front and rear corners of the tips to a radius as shown on the plan.
- 23. Temporarily install the ailerons using hinges (no glue). Sand a little off the outer ends of the ailerons, as necessary, to provide 1/16" clearance between the ailerons and the tips.
- 24. Sand the tip TE to a rounded shape to match the aileron TE.



- 25. Sand the end of the TE sheet slightly to blend with the wing tip as shown here.

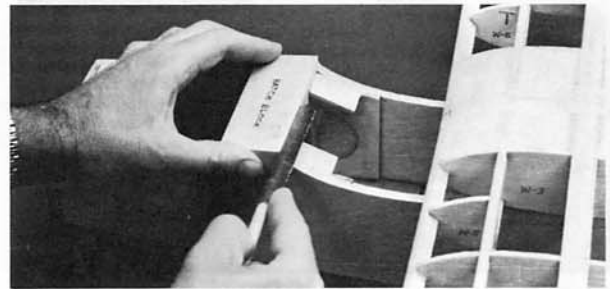


- 26. Before installing the thin plywood **wing plate**, sand the front and sides of the plate to a taper, which will make it easier to cover later. After sanding, glue the wing plate to the top of the wing center section, so that the plate extends 1/4" behind the wing TE, as shown on the plan. Finally, slightly round the TE of the wing plate to remove the sharp edge.

MOUNT THE WING TO THE FUSELAGE

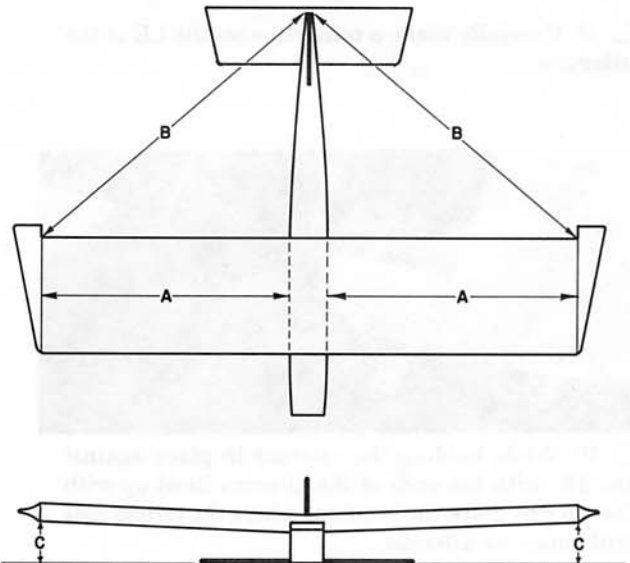
NOTE: As we have said throughout this book, you may mount the wing with bolts or rubber bands. If you have chosen the rubber band method, simply follow steps 1 and 2 below and skip steps 3-6. Then

after you have covered your model, glue in the hold-down dowels and secure the wing with good quality #64 rubber bands (BIG STIK 20: 10 bands minimum; BIG STIK 40: 12 bands minimum; BIG STIK 60: 14 bands minimum).



- 1. Trial fit the wing in the wing saddle on the fuse. Using sandpaper wrapped around a dowel, sand the rear edge of the hatch block to the shape of the wing LE. Sand the saddle lightly so that the wing contacts the saddle evenly on both sides.
- 2. With the wing centered (side to side) in the saddle and the fuse with the landing gear removed resting on a flat surface, measure down from the bottom of both tip ribs to the flat surface. If the measurements are not equal (within 1/16"), sand the saddle slightly until the wing sits level in the saddle. Also measure from the rear corner of each wing tip to the rudder or stab TE. These measurements must also agree within 1/16". If not, shift the wing slightly until they do.

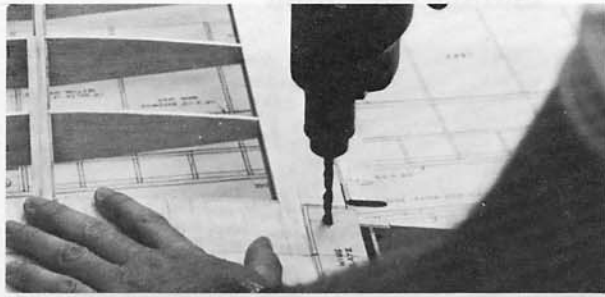
WING ALIGNMENT



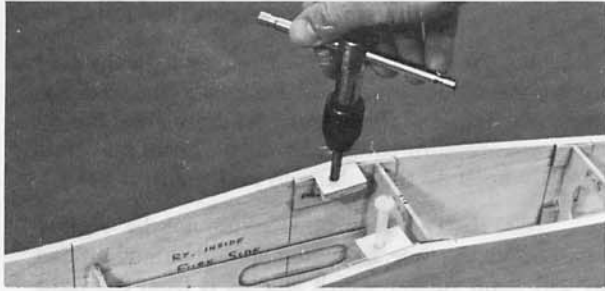
- 3. From the wing plan determine where to drill the holes for the wing bolts. Transfer the measurements from the plan to the wing, accurately marking the hole locations on the wing.

FINISHING

INSTALL THE RADIO

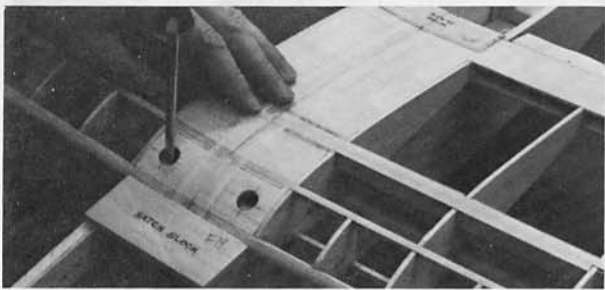


□ 4. While holding the wing firmly in its proper position on the fuse, drill four 13/64" holes down through the wing and the ply hold-down plates. Remove the wing and enlarge the holes in the wing



only to 1/4". Use a 1/4-20 tap and a tap wrench to cut threads in the ply hold-down blocks in the fuse.

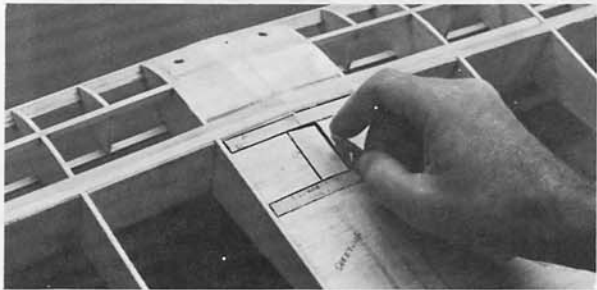
TIP: When cutting threads in plywood, keep the tap threads clear by frequently backing the tap out or by reversing direction every 1/2 turn.



□ 5. Enlarge the holes in the upper front wing sheeting only to 1/2" to permit the heads of the nylon bolts to pass through. This is best accomplished with a Dremel Moto Tool and a cylindrical cutter bit, but may also be done with a round file or a piece of sandpaper wrapped around a small dowel.

□ 6. Trial fit the wing to the fuse using the four 1/4-20 nylon bolts provided. You may cut the bolts off to their proper length, so that they protrude about 1/4" below the hold-down plates in the fuselage.

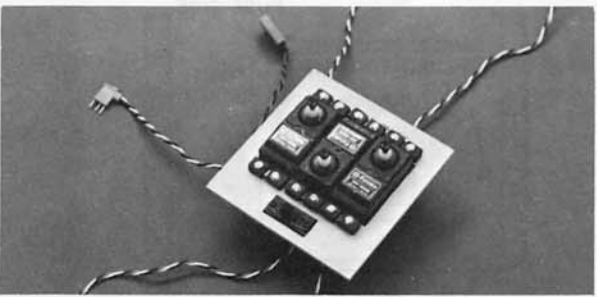
NOTE: When attaching the wing with the nylon bolts, you should tighten the bolts securely, but do not use excessive force as doing so may damage the wing. "Finger-tight, not wrench-tight" is a good saying to keep in mind.



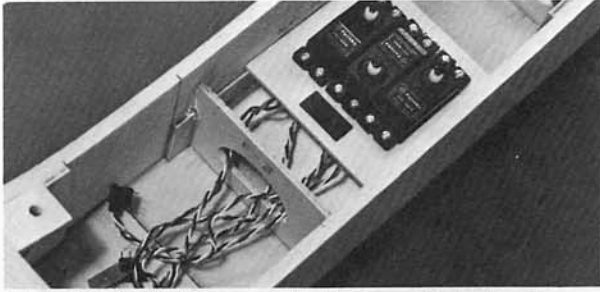
□ 1. With the wing inverted, place the aileron servo on the bottom of the wing between the basswood servo rails, and mark the width of the servo on the bottom sheeting. Cut out the opening for the servo. Break out the tabs on the bottom of ribs W-1, exposing the pre-cut servo opening.



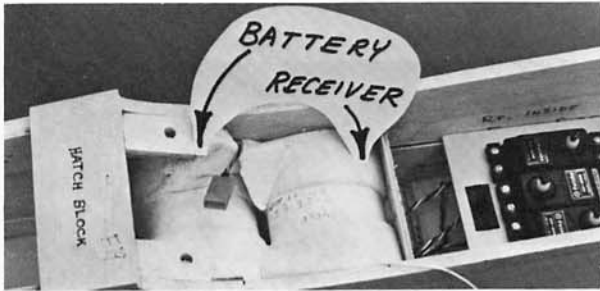
□ 2. Place the aileron servo into the opening and mark the locations of the servo hold-down screw holes. Drill 1/16" holes at these locations and mount the servo.



□ 3. Place the other three servos into the opening in the die-cut ply servo tray, mark the screw hole locations, drill 1/16" pilot holes and mount the servos. Also mount the on-off switch to the servo tray. **NOTE:** You may use the standard servo mounting tray which is provided with your radio instead of the above method.

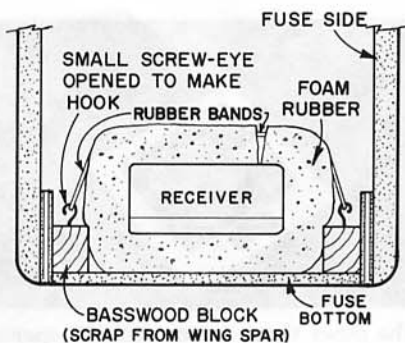


□ 4. Trial fit the servos/switch/tray into the fuse. The tray should rest on the top edge of the "B" doublers. Notice that the tray slides fore and aft. We recommend that you do not permanently mount the servo tray to the fuselage until it is time to balance the model. The ability to move the servos may eliminate the need to add balancing weights.



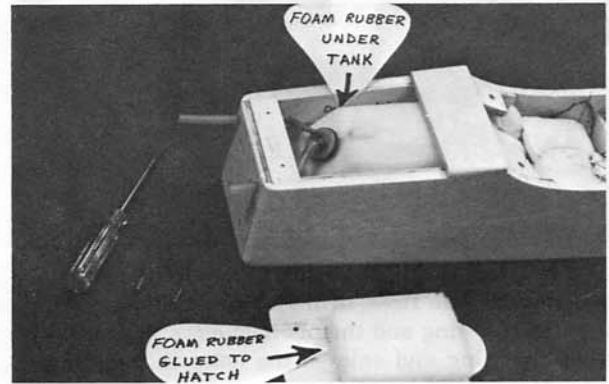
□ 5. Wrap your **battery** and **receiver** separately in foam rubber, then work out a mounting method similar to the example shown below.

RECEIVER (AND BATTERY) MOUNTING



NOTE: If your battery pack is the "flat" type, it is possible to place the battery under the fuel tank between F-1 and F-2. If your battery pack is the "square" type, it will have to be located aft of F-2. The receiver should be positioned between F-2 and F-3 behind the battery pack. Again we recommend that you postpone the final mounting of these components until it is time to balance the model.

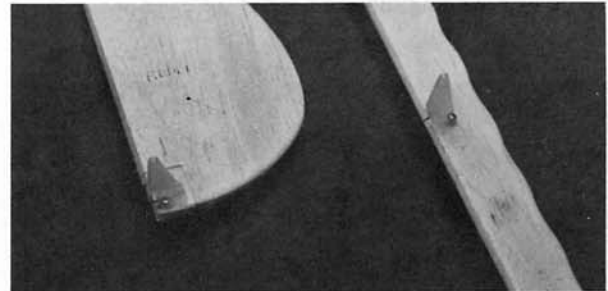
INSTALL FUEL TANK



- 1. Temporarily mount your engine to F-1.
- 2. Assemble your **fuel tank**, place it in the fuel tank compartment (between F-1 and F-2) and determine where to drill the holes in F-1 for the fuel tubing and vent/pressure tubing. Drill the holes and temporarily hook up the tubing to make sure it fits.

NOTE: The fuel tank must not be rigidly mounted to the fuse. Instead it should be surrounded by soft foam rubber which shields it from the hard vibrations which can cause fuel foaming, making the engine run erratically.

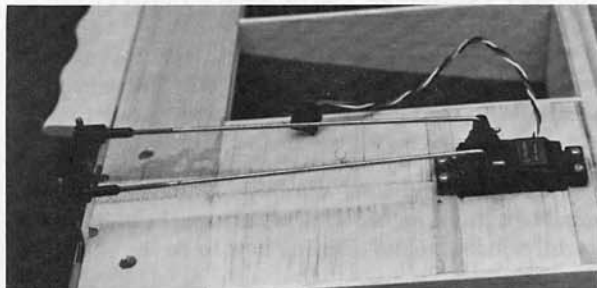
INSTALL NYLON CONTROL HORNS



- 1. Lay the rudder on the fuselage plan side view and determine where the nylon **control horn** should be located. Holding one of the nylon horns in place on the left side of the rudder, use a pencil to mark through the holes in the horn.
- 2. Drill 3/32" holes through the rudder at the marks you just drew.
- 3. Repeat steps 1 and 2, locating and drilling holes in the **elevator**. Harden the balsa in the area of the elevator horn by applying a drop of thin CA into each of the holes, then re-drill if necessary.
- 4. Temporarily mount the control horns on the rudder and elevator. (Note that the elevator horn is mounted on the top, and the rudder horn is mounted on the left side.) To do this, insert two 2-56 screws through the holes in the horn and through the holes you drilled. Then screw them into the nylon "nutplate" which originally came attached to the horn.

- 5. Re-install the rudder and elevator onto the fin and stab, but do not glue in the hinges.

PUSHRODS



- 1. To make the **aileron pushrods**, screw the two nylon clevises onto the 12" steel rods that are threaded on one end. Screw the small nylon screw-on connectors onto the aileron torque rods, then attach the clevises to the connectors.



AILERON CLEVIS



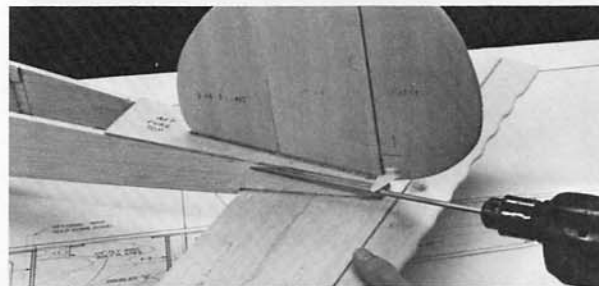
AILERON CLEVIS
CONNECTOR

- 2. With the ailerons in the neutral position, mark the steel rods where they will enter the servo arm and make a "Z-bend" in the rods at that point.

NOTE: You can make a "Z-Bend" with a regular pliers (practice on a scrap first), or you may use a special "Z"-bend pliers (available through your hobby shop). There are a couple of alternatives to making Z-bends which you may want to consider: 1. Use a **solder-on clevis** on the servo end of the pushrod or 2. Use a Dubro No. 121 **E-Z Connector** to attach the pushrod to the servo arm.

IMPORTANT NOTE: The pushrods supplied in your BIG STIK for the elevator, rudder, throttle and steering are the "rod-in-a-tube" type. We at Great Planes have been using this type of pushrod in our prototype models for many years in everything from .10 size to Quarter Scale. Properly installed, we have found this to be the easiest to install, most reliable and most trouble-free type of pushrod. Study the "TYPICAL PUSHROD HOOKUP" drawing on the fuse plan to become familiar with this method.

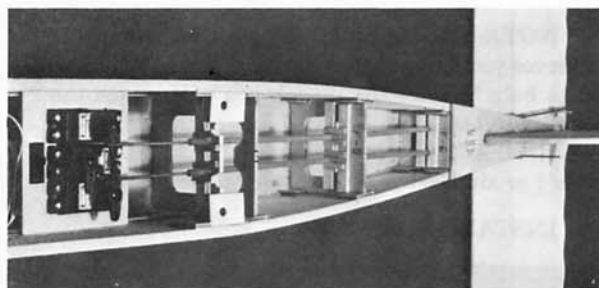
- 3. **Plan** your pushrod and servo arrangement before proceeding! The fuse plan shows Futaba S-28 servos with a tricycle landing gear and an OS Max .45 FSR engine. The photos in this book show a tail-dragger landing gear (which does not require nose wheel steering) and an OS Max .61 4-cycle engine. These two setups are quite different and require different pushrod routing. Whatever combination you are using be sure to plan ahead.



- 4. Drill holes in the rear fuse sides at the locations where the outer tubing will exit. The best way to do this is to purchase a 12" length of brass tubing having an outside diameter the same as the plastic tubing used as the pushrod guides. Sharpen one end of the brass tubing by inserting an X-Acto knife and cutting the inside of the brass tube to a taper while twisting the tube. Place the brass tube in a drill and cut the holes as shown here.

NOTE: Be sure to push the "plug" of balsa out of the brass tube with a stiff wire after each cut.

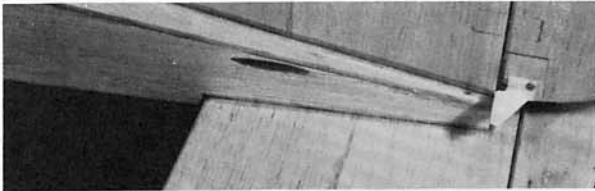
- 5. Roughen the surface of the plastic tubes with sandpaper then insert them into the holes you just drilled and through the openings in F-6, F-5 and F-4. With the tubes protruding about 1 inch in front of F-4, cut off the excess tubing sticking out at the rear, leaving about 1/2 inch extra at the rear for now.



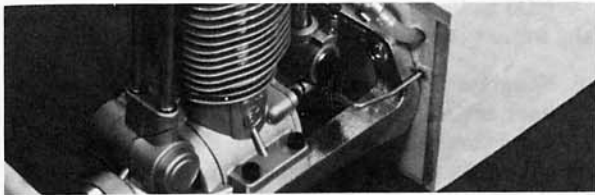
- 6. Insert the steel pushrods into the tubes and route them to the servos as you have planned (step 3). While holding the pushrods in their proper locations, glue the tubes to the fuse sides with thin CA where they exit, then secure the tubes to F-4, F-5 and F-6 with scraps of 1/8" balsa running both horizontally and vertically. Glue the balsa braces to the formers and the plastic tubes to the balsa braces.

- 7. Temporarily put the wing in place on the fuse, turn on your radio and operate the aileron servo to check if the aileron torque rods will touch the balsa braces on F-4 (you can observe this action from the rear of F-4). If there is any possibility of binding here, carve or sand away part of the balsa brace to provide plenty of clearance for the aileron torque rods.

- 8. Remove the steel rods from the fuse and screw a nylon clevis onto one end of each rod.



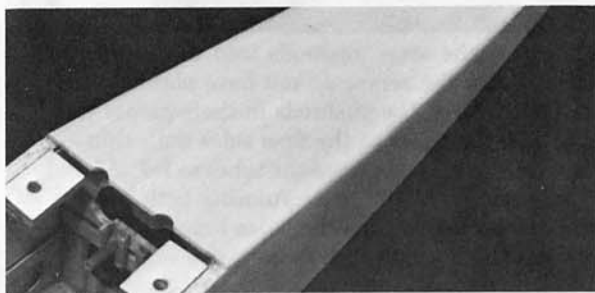
- 9. Cut and sand off that part of the plastic tubing which protrudes outside the fuse sides.
- 10. In a similar manner, install the outer plastic tubing for the **throttle pushrod** and the **nose gear steering pushrod** (trike gear only), routing them along the sides of the fuel tank. You'll have to drill the holes in F-1, F-2 and F-3 with a regular drill bit, however, as the brass tube drill does not work on plywood. Refer to the plans for guidance here but remember that **your installation may be different** depending on the components you are using.



Close-up photo of simple but effective throttle pushrod hookup to OS .61 4-cycle engine. In this case, the nylon clevis is installed at the servo end of the pushrod.

NOTE: Do not finalize the pushrod hookups at the servos yet. **Later**, after you have moved the servo tray to help balance the model, you will attach the pushrods to the servo arms by one of the following methods: 1. A "Z-Bend", 2. A Dubro No. 121 E-Z Connector (or similar) or 3. A solder-on metal clevis.

INSTALL FUSE TOP



- 1. With the wing in place, trial fit the **fuse top**. It should fit right up against the rear edge of the aileron torque rod bearings. If the fuse top is too long, cut or sand it off a bit until it fits.
- 2. Looking under the thin plywood wing plate, notice where the aileron torque rods will touch the fuse top when they tilt backwards. Cut or sand two small slots in the front of the fuse top at these locations, so the aileron torque rods may move freely.

- 3. Remove the wing, then glue the fuse top to the tops of F- 4, F-5, F-6 and the top edge of the fuse sides as follows: Apply **thick CA** glue to the tops of F-4 and F-5; quickly lay the fuse top in position, then apply thin CA around the edges.

BALANCE THE AIRPLANE Laterally

SPECIAL 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.

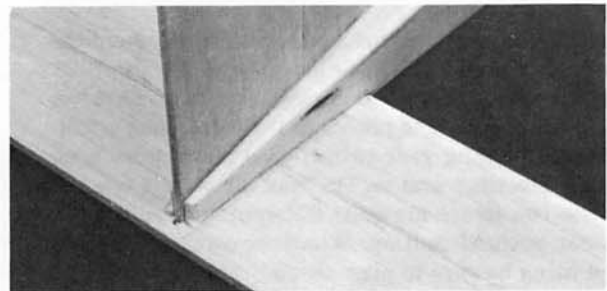
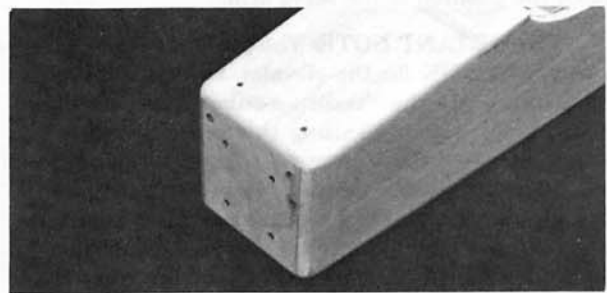
Now that you have the basic airframe nearly completed, this is a good time to balance the airplane laterally (side-to-side). Here is how to do it:

- 1. Temporarily attach the wing and engine to the fuselage.
- 2. With the wing level, lift the model by the engine propeller shaft and the bottom of the rudder (this may require two people). Do this several times.
- 3. If one wing always drops when you lift, it means that side is heavy. Balance the airplane by gluing weight to the other wing tip.

SAND THE FUSELAGE

NOTE: At this time you should remove the engine, engine mount, fuel tank, steel wire pushrods and all radio equipment from the airplane.

- 1. Fill all unwanted holes, dents and "dings" with spackling compound or balsa filler.
- 2. With the hatch in place, use a sanding block with 100 grit sandpaper to sand the entire fuselage smooth, and to round the upper, lower and front edges, **except the wing saddle area**. Look at the drawings of the formers (F-1, F-2 etc.) on the plan to get an idea of how much to round the corners and edges. Here are some photos which show what the fuse should look like after sanding.



- 3. Now change to a sanding block with 220 grit sandpaper and go over the entire fuselage **again**, final sanding so it is very smooth.

FUELPROOFING

NOTE: Certain parts of your BIG STIK need extra protection against exposure to glow fuel and oily residue. The substance you use for fuelproofing should be one of the following: 1. 30 minute epoxy, thinned to a brushing consistency with alcohol or epoxy thinner, 2. polyester finishing resin or 3. fuelproof paint such as Hobbypoxy, K&B Superpoxy, clear dope or "Balsarite".

- 1. Fuelproof the entire fuel tank compartment, including the back and top of F-1, the bottom of the hatch and the top of the fuse sides in the hatch area.
- 2. Fuelproof the front of F-1 and the holes through which the fuel tubing will pass.
- 3. Fuelproof the wing saddle, the rear edge of the hatch block and the front edge of the fuse top.

COVERING

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 hatch, rudder, elevator, ailerons, hinges, torque rods and control horns from your model.

2. Using Super Monokote or any other good quality covering material and following the manufacturer's instructions, cover your model in the following sequence:

- 1. Rudder left side
- 2. Rudder right side
- 3. Elevator bottom
- 4. Elevator top
- 5. Bottom of ailerons
- 6. Top of ailerons
- 7. Hatch
- 8. Stab bottom
- 9. Stab top
- 10. Fuse bottom
- 11. Fuse sides
- 12. Fuse top
- 13. Fin left side
- 14. Fin right side
- 15. Front of F-1

- 16. Bottom of left wing panel
- 17. Bottom of right wing panel (overlap covering 1/2" at wing centerline)
- 18. Top left wing panel (overlap covering 1/4" at wing LE)
- 19. Top of right wing panel(overlap covering 1/2" at the center and 1/4" at the LE)

FINAL ASSEMBLY

1. Lay the rudder, elevator and ailerons on the plans and mark on the leading edge of each part the locations of the hinges, torque rods (and tailgear if you have built a taildragger). Now use a sharp X-Acto 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. Also cut the covering away from the torque rod and tailgear slots.

2. Slide the nylon aileron torque rod bearings to their proper position on the torque rods, then apply a small amount of Vaseline to the torque rods, where they enter the bearings (to prevent glue from getting inside and "locking up" the bearings). Do the same thing for the tailgear if you have built a taildragger.

3. Epoxy the nylon aileron torque rod bearings (and tailgear bearing) into the slots previously cut.*

***NOTE:** When gluing in the nylon bearings and the hinges, do not just smear glue on the hinge and push it into the slot, as most of the glue will be wiped off as it is being pushed in. You must also work some glue into the slot. A good way of doing this is to scoop up some epoxy with a plastic soda straw, then pinch the end of the straw, insert it into the hinge slot, and squeeze the straw to force glue into the slot. Then insert the hinge into the slot. After pushing in the hinge, wipe away all excess glue with a tissue. We recommend 30 minute epoxy for this process.

4. Glue the hinges into the slots in the wing, stab and fin TE using the above process and **allow the glue to harden before proceeding.**

5. Put epoxy into the slots in the elevator, push the elevator onto the hinges and wipe away **all** excess epoxy with a tissue (for best results dampen the tissue with rubbing alcohol).

6. Using coarse sandpaper, roughen the part of the aileron torque rods that will be glued into the ailerons, then clean off the sanded portion of the rods with a degreasing solvent. Roughen the tailgear wire in the same manner.

7. Put glue into the rudder hinge slots (and the tailgear hole), push the rudder into place and wipe off **all** excess epoxy.

8. Put glue into the aileron hinge slots and the torque rod holes, push the ailerons into place and wipe off **all** excess epoxy.

□ 9. If you are using the rubber band wing hold-down method, glue the wing hold-down dowels in place in the fuse at this time. Paint the exposed portions with fuelproof paint.

□ 10. Re-install the fuel tank (empty), fuel tubing, engine, propeller, battery, receiver, servos, control horns, pushrods, main LG, nose gear and wheels.* Attach the wing to the fuselage.

***NOTE ON WHEELS:** The main wheels are attached to the aluminum main L.G. with 8-32 socket head cap screws and nuts as shown on the fuse plan. If the socket head cap screws do not readily fit through the wheel hubs, drill out the hubs using an 11/64" drill bit. We recommend the use of "Loctite" or similar thread locking compound to prevent the nuts from loosening. The nose wheel is secured to the nose gear with two 5/32" wheel collars (not supplied). In case of a taildragger, the tailwheel is secured with two 3/32" wheel collars (not supplied).



5/32" COLLAR

□ 11. Run a small "switch pushrod" out the side of the model so you can switch the receiver on and off without removing the wing.

□ 12. Route the receiver antenna out through a small hole in the side of the fuselage and anchor it to the bottom of the stab with a pin and rubber band. (Tie the rubber band around the antenna, then hook it over the pin.)

BALANCE YOUR MODEL

NOTE: This step is very important and must not be omitted.

□ 1. With the wing attached to the fuselage, all parts of the model installed and with the fuel tank **empty**, gently turn the model upside down.

□ 2. By feel, determine the location of the center of the double wing spar in the vicinity of ribs W-2 and W-3 (where the bottom center section sheeting ends). Make a mark at the center of the double spar on the left and right sides.

□ 3. From the marks at the center of the double spar, measure back (toward the tail) and make two marks which represent the **CG limits** or **Balance Range**. The measurements are as follows:

BIG STIK 20: 1/4" and 7/8"

BIG STIK 40: 1/4" and 1"

BIG STIK 60: 5/16" and 1-1/8"

□ 4. Turn the model right side up, place your index fingers under the wing and lift the model in the **center** of the balance range. 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. Before actually adding weight, try moving the servo tray forward or backward. Also try mounting the battery pack under the fuel tank or behind F-2. If this does not provide enough weight shift to balance properly, you must then add weight to the nose or tail.

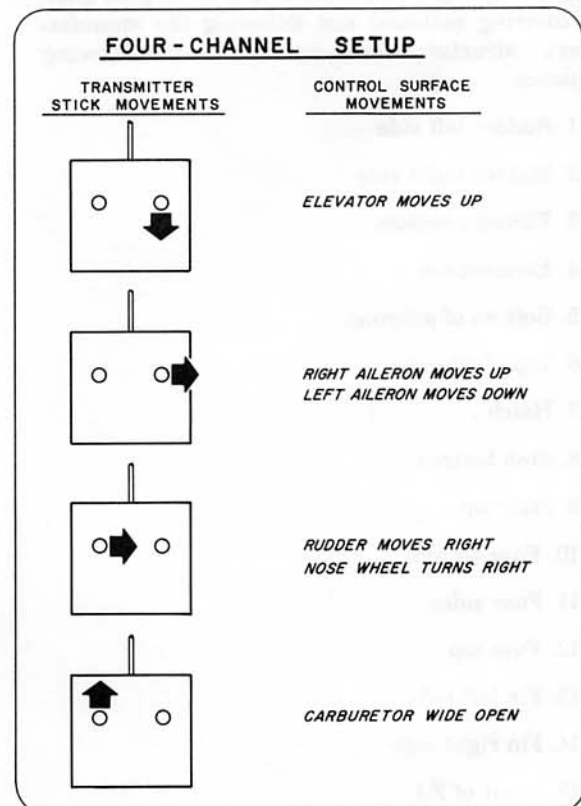
NOTE: As described above, you should make your first flights with the model balanced in the **center** of the Balance Range. Later you may want to experiment by shifting the balance toward the forward or aft limit of the recommended range. Moving the balance forward results in a model that is more resistant to stalls and spins but also may act sluggish and require more speed for takeoff and landing. Moving the balance aft makes the model more agile with a lighter and snappier "feel". In any case, **do not balance your model outside the recommended range.**

FINAL HOOKUPS AND CHECKS

□ 1. Securely glue the servo tray to the top of the "B" doublers in the position that you determined when you balanced the model. Lock the tray in place by gluing small wood scraps to the top of the tray where it joins to the fuse sides.

□ 2. Connect the pushrods to the servo arms using "Z"-bends, solder-on clevises or E-Z connectors as previously described.

□ 3. Make sure the control surfaces move in the proper **direction** as illustrated in the following sketches:



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

BIG STIK 20

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

Rudder = 1-1/8" Lt. , 1-1/8" Rt.

Ailerons = 1/4" up, 1/4" down

BIG STIK 40

Elevator = 1/2" up, 1/2" down

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

Ailerons = 5/16" up, 5/16" down

BIG STIK 60

Elevator = 9/16" up, 9/16" down

Rudder = 1-1/2" Lt., 1-1/2" Rt.

Ailerons = 3/8" up, 3/8" down

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

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 wing twist is removed.

PRE-FLIGHT

CHARGE THE BATTERIES

Follow the 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.

FIND A SAFE PLACE TO FLY

1. 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 and join. Club fields are set up for R/C flying which usually makes your outing 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, grassy area at least 6 miles away from any other forms of radio operation like R/C boats and R/C cars 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. The engine operation must also be checked and the engine "broken in" on the ground by running the engine for at least two tanks of fuel. 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 before every time you fly. This means with the transmitter 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.

Repeat this test **with the engine running** at various speeds with an assistant holding the model. If the control surfaces are not acting correctly at all times, **do not fly!** Find and correct the problem first.

ENGINE SAFETY PRECAUTIONS

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

Keep all engine fuel in a safe place, away from high heat, sparks or flames as fuel is very flammable. Do not smoke near the engine or fuel; remember that the engine exhaust gives off a great deal of deadly carbon monoxide. Therefore do not run the engine in a closed room or garage.

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

Use safety glasses when starting or running engines.

Do not run the engine 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 engine.

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.

Use a "chicken stick" device or electric starter; follow instructions supplied with the starter or stick. Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch it during or after operation. Make sure fuel lines are in good condition so fuel is not leaked onto a hot engine causing a fire.

To stop engine, cut off the fuel supply by closing off the fuel line or follow the engine manufacturer's recommendations. Do not use hands, fingers or any body part to try to stop the engine. Do not throw anything into the prop of a running engine.

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 in 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 BIG STIK 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.

We recommend that you take it easy with your BIG STIK for the first several flights and gradually "get acquainted" with this fantastic ship. Add and practice one maneuver at a time, learning how she behaves in each one. We particularly enjoy the ease with which the BIG STIK flies inverted, with very little down elevator required! Spins and inverted spins are also performed with ease. Knife edge and point rolls are possible, but they require some aileron correction to counteract the rudder-induced bank.

When it's time to land and you cut the throttle, you'll notice a very slight climbing tendency at first, which bleeds off some speed; then it assumes the normal glide angle, slightly nose down.

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

GOOD LUCK AND GREAT FLYING!

BIG STIK PARTS LIST

PART NUMBER			QTY	DESCRIPTION
20 SIZE	40 SIZE	60 SIZE		
BS20F01	BS40F01	BS60F01	2	Balsa Shaped Fuselage Side
BS20F03	BS40F03	BS60F03	1	Balsa Shaped Hatch
BS20F04	BS40F04	BS60F04	1	Balsa Shaped Fuse Top
BS20F05	BS40F05	BS60F05	1	Balsa Shaped Fuse Bottom
BS40F06	BS40F06	BS60F06	1	Balsa Triangle Brace Stock
BS20P01	BS40P01	BS60P01	1	Plan
BS20W08	BS40W08	BS60W08	2	Balsa Wing Tips
BS20W22	BS40W22	BS60W22	1	Balsa Center Sheeting
BS246P02	BS246P02	BS246P02	1	Instruction Book
L-3U	L-4U	L-5U	1	Dural Landing Gear
MM19D	MM40D	MM60LD	1	Nylon Motor Mount
PLTB002	PLTB002	PLTB002	3	Plastic Pushrod Tube
WIRES10	WIRES10	WIRES10	1	Pushrod Wire 36" (60 Size has 4)
WIRES17	WIRES17	(none)	2	Pushrod Wire 34"
BS20A01	BS40A01	BS60A01	1	HARDWOOD PARTS
BS20F02S	BS40F02S	BS60F02S	1	Plywood Shaped F-1, Firewall
BS20F13	BS40F13	BS60F13	1	Plywood Landing Gear Plate
BS20F14	BS40F14	BS60F14	1	Plywood Landing Gear Back Plate
BS20F15	BS40F15	BS60F15	1	Plywood Shaped Hatch Hold Down
BS20F16	BS40F16	BS40F16	2	Plywood Shaped Front Hold Down Plate
BS20F17	BS40F17	BS40F17	2	Plywood Rear Hold Down Plate
BS20F18	BS40F18	BS60F18	2	Hardwood Landing Gear Plate Filler
BS20R05	HRDWD003	BS60F21	1	Hardwood Rudder Insert
BS20W17	BS40W17	BS60W17	1	Plywood Wing Bolt Plate
BS20W18	BS40W18	BS60W18	2	Plywood Wing Hold Down
BS20W19	BS40W19	BS60W19	4	Hardwood Aileron Servo Rail
DOWEL020	TR60F09	DOWEL023	2	Hardwood Wing Hold Down Dowel
BS20A02	BS40A02	BS60A02	1	BALSA PARTS
BS20F19	BS40F19	BS60F19	1	Balsa Hatch Block
BS20F20	BS40F20	BS60F20	1	Balsa Shaped Sub Fin
BS20R04	BS40R04	BS60R04	1	Balsa Fin Filler
BS40W16	BS40W16	BS40W16	1	Balsa Wing Tip Brace
BS20W20	BS40W20	BS60W20	2	Balsa Filler Block
BS40W21	BS40W21	BS60W21	1	Balsa Wing Tip Block
(none)	(none)	BS60R05	1	Balsa Fin Nose
BS20A03	BS40A03	BS60A03	1	DIE CUT PLY PARTS
BS20F08	BS40F08	BS60F08	2	Plywood Doubler A
BS20F09	BS40F09	BS60F09	2	Plywood Doubler B, Lockplates
BS20F10	BS40F10	BS60F10	1	Plywood F-2, F-6, Servo Tray, Dih. Gauge
BS20F11	BS40F11	BS60F11	1	Plywood F-3, F-4, F-5
BS20F12	BS40F12	BS60F12	1	Plywood Fuselage Bottom
BS20W15	BS40W15	BS60W15	2	Plywood Doubler C, Front Web, Dih. Brace
BS20A04	BS40A04	BS60A04	1	DIE CUT BALSA PARTS
BS20F07	(in A05)	(in A05)	1	Balsa Rear Fuselage Top
BS20W11	(in A05)	(in A05)	2	Balsa W-1, W-2 Wing Ribs
BS20W12	(in A05)	(in A05)	2	Balsa W-5 Riblets
BS20W13	BS40W13	BS60W13	2	Balsa W-3 Wing Ribs
BS20W14	BS40W14	BS60W14	6	Balsa W-4 Wing Ribs
BS20A05	BS40A05	BS60A05	1	DIE CUT BALSA PARTS
(in A04)	BS40F07	BS60F07	1	Balsa Rear Fuselage Top
(in A04)	BS40W11	BS60W11	2	Balsa W-1, W-2 Wing Ribs
(in A04)	BS40W12	BS60W12	2	Balsa W-5 Riblets
BS20A06	BS40A06	BS60A06	1	BALSA STAB/ELEVATOR PARTS
BS20S01	BS40S01	BS60S01	1	Balsa Shaped Elevator
BS20S02	BS40S02	BS60S02	1	Balsa Shaped Stab Rear
BS20S03	BS40S03	BS60S03	1	Balsa Shaped Stab Front

PART NUMBER			QTY	DESCRIPTION
20 SIZE	40 SIZE	60 SIZE		
BS20A07	BS40A07	BS60A07	1	BALSA FIN\RUDDER PARTS
BS20R01	BS40R01	BS60R01	1	Balsa Shaped Rudder
BS20R02	BS40R02	BS60R02	1	Balsa Shaped Fin Rear
BS20R03	BS40R03	BS60R03	1	Balsa Shaped Fin Front
BS20A08	BS40A08	BS60A08	1	BASSWOOD SPARS
BS20W06	BS40W06	BS60W06	4	Hardwood Main Spar
BS20W07	BS40W07	BS60W07	4	Hardwood Front Spar
BS20A09	BS40A09	BS60A09	1	BALSA SHEAR WEB
BS20W09	BS40W09	BS60W09	16	Balsa Shear Web (18 in 40 & 60)
BS20A10	BS40A10	BS60A10	1	BASSWOOD SPAR DOUBLERS
BS20W10	BS40W10	BS60W10	4	Hardwood Spar Doubler
BS20M02	BS40M02	BS60M02	1	HARDWARE
GLTP005	GLTP003	GLTP004	1	Fiberglass Tape
RUBB001	RUBB001	RUBB001	10	Rubber Bands
WBNT121	WBNT115	WBNT119	1	Bent Wire Nose Gear
WIRES16	WIRES16	WIRES16	2	Wire Pushrod
BS20M01	BS40M01	BS60M01	1	HARDWARE
NUTS001	(none)	(none)	4	4-40 Blind Nut
(none)	NUTS003	NUTS003	4	6-32 Blind Nut
NUTS014	NUTS014	NUTS014	4	8-32 Hex Nut
NYLON03	NYLON02	NYLON02	2	Nylon Control Horn
NYLON09	NYLON09	NYLON09	24	Nylon Hinges (20 size has 12)
NYLON13	NYLON13	NYLON13	4	Nylon 1/4-20 Wing Bolt
NYLON16	NYLON16	NYLON16	1	Nylon 5/32 Steering Arm
NYLON17	NYLON17	NYLON17	4	Nylon Clevis
NYLON20	NYLON20	NYLON20	2	Nylon Swivel
NYLON21	NYLON21	NYLON21	2	Nylon Clevis
SCRW001	(none)	(none)	4	2-56 x 3/8 Screw
(none)	SCRW002	SCRW002	4	2-56 X 5/8 Screw
SCRW004	SCRW004	SCRW004	10	#4 X 1/2 Screw (.40 has 6,.60 has 2)
(none)	SCRW010	(none)	4	#4 x 5/8 Screw
(none)	(none)	SCRW011	4	#6 x 5/8 Screw
(none)	(none)	SCRW018	4	#6 x 3/4 Screw
SCRW020	SCRW020	SCRW020	2	6-32 x 3/16 Screw
(none)	SCRW033	SCRW033	4	6-32 X 3/4 Screw
SCRW035	SCRW035	SCRW035	2	8-32 X 1-1/2 Bolt
SCRW036	(none)	(none)	4	4-40 x 3/4 Bolt
WBNT116	WBNT116	WBNT120	1	Wire Tail Wheel Assembly
WBNT117	WBNT117	WBNT117	1	Wire Aileron Torque Rod Set
WBNT118	WBNT118	WBNT118	1	Wire Tailskid
WHCL005	WHCL005	WHCL005	2	5/32 Wheel Collar
BS20W01	BS40W01	BS60W01	1	BALSA WING PARTS
BS20W02	BS40W02	BS60W02	2	Balsa Notched Leading Edge
BS20W03	BS40W03	BS60W03	2	Balsa Tapered Trailing Edge
BS20W04	BS40W04	BS60W04	4	Balsa Trailing Edge Sheeting
BS20W05	BS40W05	BS60W05	2	Balsa Shaped Ailerons

IMPORTANT TIP

In order to insure maximum security at the points where the nylon clevises attach to the nylon elevator and rudder control horns, the following procedure must be observed:

1. Cut two 1/8 inch lengths from your silicone fuel line tubing as shown here.
2. Slide one of the above silicone bands over each of the steel pushrod wires before attaching the nylon clevises.
3. Screw the nylon clevises onto the threaded ends of the steel pushrods.
4. Attach the nylon clevises to the nylon elevator and rudder control horns and snap the clevises shut.
5. Slide the silicone bands over the nylon clevises to insure that they do not pop open during flight.

