The Extra 300

KIT K-55

Wingspan:	68”
Length:	61”
Weight:	7.5-8.5 lbs.
Engine Size:	2-cycle .60 -.90
	4-cycle .90 -1.20

INSTRUCTIONS

If there’s an aerobatic subject that can challenge the thrill of the Goldberg Ultimate, it’s this **Extra 300**! The **Extra’s** generous moments, light wing loading and strong airframe make it an excellent airplane for the aerobatic pilot, whether he is learning his first maneuvers or is an unlimited class competition flyer. Yet with all it’s aerobatic potential, this is still a very well-behaved aircraft, making takeoffs and landings a breeze. And when it comes to engines, please note: **bigger is not better**. A good .60 will do an excellent job. **A larger than recommended engine may overly stress your model, causing structural failure.**

WARNING

A radio-controlled model is not a toy. It is capable of causing serious bodily injury and property damage. It is the buyer’s responsibility to build this kit correctly and to properly install the motor, radio, and all other equipment. The first test flights should be made only with the assistance of an experienced R/C flyer. The model must always be operated and flown in accordance with the safety standards of the Academy of Model Aeronautics.

Per the Federal Communications Commission, you are required to use only those radio frequencies specified “for Model Aircraft.”

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Pt. #2060 - 8/97

ITEMS NEEDED TO COMPLETE THIS KIT

- ☐ 1 RADIO GUIDANCE SYSTEM (4 CHANNEL MINIMUM REQUIRED)
- ☐ 1 ENGINE 2-CYCLE .60-90
4-CYCLE .90-1.20
- ☐ PROPELLER (TO MATCH ENGINE SIZE)
- ☐ 1 3” DIAMETER SPINNER (LARGE ENOUGH FOR PROP TO FIT WITHOUT MODIFICATION)
- ☐ 1 FUEL TANK TO MATCH ENGINE (12 OZ. SHOWN ON PLAN)
- ☐ 1 24” SILICONE FUEL LINE
- ☐ 2 3” DIAMETER WHEELS
- ☐ 1 1-1/4” DIAMETER TAILWHEEL
- ☐ 1 2 OZ. BOTTLE MEDIUM CYANOACRYLATE GLUE
- ☐ 1 CYANOACRYLATE ACCELERATOR
- ☐ 1 20-MINUTE EPOXY
- ☐ 1 LIGHTWEIGHT BALSA FILLER
- ☐ 1 1/2 x 8 x 12” FOAM PADDING
- ☐ 3 ROLLS OF COVERING
- ☐ FUEL-PROOF PAINT FOR COWL AND WHEELPANTS

OPTIONAL ITEMS

- ☐ SCALE PILOT
- ☐ PITTS STYLE MUFFLER
- ☐ SMOKE SYSTEM
- ☐ COMMERCIAL INCIDENCE GAUGE

NECESSARY TOOLS AND SUPPLIES

- ☐ MISCELLANEOUS RUBBER BANDS
- ☐ WAXED PAPER
- ☐ MODELING KNIFE AND RAZOR BLADES
- ☐ SANDPAPER (ASSORTED GRITS, INCLUDING COARSE (80), MEDIUM (150) AND FINE (220-320)
- ☐ SANDING BLOCK
- ☐ “T” PINS (at least 75)
- ☐ BUILDING BOARD (24” x60”)
- ☐ ELECTRIC DRILL
- ☐ 1/16” DRILL BIT
- ☐ 3/32” DRILL BIT
- ☐ 5/16” DRILL BIT
- ☐ 3/8” DRILL BIT
- ☐ ALLEN WRENCH SET
- ☐ SMALL SCREWDRIVER
- ☐ MASKING TAPE
- ☐ LONG NOSE PLIERS
- ☐ COVERING IRON AND HEAT GUN
- ☐ RAZOR SAW
- ☐ SPRAY BOTTLE
- ☐ SMALL SOLDERING IRON & SOLDER
- ☐ 10” 30°-60°-90° DRAFTING TRIANGLE

INTRODUCTION

USING THIS INSTRUCTION MANUAL

Before you start gluing and sanding, take some time becoming familiar with the plans and looking through this entire Instruction Booklet. It is designed to guide you through the construction process step by step, so build in the order given in this book. Balancing, setting up and flying the model are also covered.

Like a full-size airplane, the **Extra 300** is built from basic structures (stabilizer, fin, wing, etc.), which are then assembled into the complete airplane.

Special procedures or comments will usually be explained before a step, so you will be prepared. If a step begins with a statement like “Note,” ‘Warning,” or “Important,” it is a good idea to read through the step before doing it.

A check-off box appears at the beginning of each step. Check these boxes as you build, so you can tell at a glance what steps you have completed. Some steps are repeated and must be marked twice, as in the case of the left and right wing panel.

Some of the instructions deal with general procedures. Boxes are not needed for these sections.

HOW TO READ THE PLAN

There are two plan sheets in this kit, showing the Fuselage (Body), the Wing, and the Tail Parts. Everything on the plan is drawn to full-size and shape and shows how the finished parts fit together.

The plan is drawn to show the model completely assembled, but as a result, the areas inside or underneath are covered up, making it hard to understand how these parts fit together. Therefore, for clarity, some parts are drawn with hidden lines, others with breakaway views, and some are entirely removed from the structure and shown separately.

For example, on the fuselage, the left side of the completed model has been removed to show the details inside. Sometimes a surface is broken away to reveal the detail behind or underneath. Dashed lines indicate details that are hidden behind or under another part of the surface.

The model is made from four varieties of wood: balsa, bass, birch, and various plywoods. Each kind of wood has its own characteristic *end grain pattern* (as viewed from the end) which has been drawn on the plan. You can easily use these end grain patterns to identify what kind of wood is shown for a part, if you are in doubt.

HOW TO USE THE PLAN

The plan is used in several ways. The wings, stabilizer, and fin are assembled directly over the plan. Each wood part is matched over its corresponding location printed on the plan and pinned in place. To prevent ruining your plan from gluing your wings, etc. to it, cover the area you are working on with waxed paper.

The paper the plan. is printed on can expand or contract slightly with changes in temperature or humidity. Because of this, a preformed part such as the notched wing trailing edge may not exactly match the plan. This is no problem, as slight deviations in the outline or size will not noticeably affect flight performance.

Because the fuselage plugs together and is self-aligning, it is not built directly over the plan. As you assemble the fuselage, you will find the plan helpful in identifying parts and how things fit together.

The plan also shows the installation of a typical radio, battery and all remaining equipment and hardware needed to complete the model. By referring to the examples shown, you should be able to install your own radio, etc., even if it is not the same as what is shown on the plan.

IDENTIFYING PARTS

Parts for the wing are bundled together; likewise, parts for the tail assembly are also grouped. Die-cut plywood and balsa sheets of common sizes are bundled together, so they are less likely to be damaged during shipping and handling.

The various screws, hinges, and fittings are packaged in plastic bags.

PREPARING FOR ASSEMBLY

Set a flat, warp-free pinning board on your work bench. Any material that accepts pins, such as insulation board, soft plywood, or dry-wall (sheet rock) will work. **Important: *any warps or bends in the pinning board will result in wings or tail surfaces that are also warped or bent, making your model more difficult to fly.*** Make sure that the pinning board is flat by laying a straight edge across it. You may be able to correct a warped board by shimming its low areas.

Position the area of the plan (such as the stabilizer) on which you are going to build over the pinning board and tape it in place so the plan lays flat and wrinkle free.

Place a sheet of waxed paper or plastic kitchen wrap over the work area to prevent the C/A glue from sticking to your plan and ruining it.

CONSTRUCTION TIPS

In assembling your model, the following tips will prove helpful.

IMPORTANT: ALWAYS READ A FEW STEPS AHEAD. This will alert you to coming instructions and will help you plan accordingly.

You may find it convenient to empty all of the small parts from the hardware bags into a common container, such as a margarine tub. This will help you find items quickly.

When drilling any 1/16” holes in balsa, you may find it easier to twist the drill between your thumb and index finger. This procedure allows more control in positioning the drill on the center mark.

Punch out only the die-cut (D/C) parts you need as you proceed. This will help you keep track of parts, especially the small ones.

After completing each section of the aircraft, you may want to go back and reglue the joints, just in case some area has been missed. Be careful not to use too little glue, which will leave the model weak or too much glue, which can make the model heavy. Properly glued joints are important to the overall strength of the model. Medium C/A glue is recommended for most parts of the assembly, although Jet Epoxy may be used when more time is needed for careful placement.

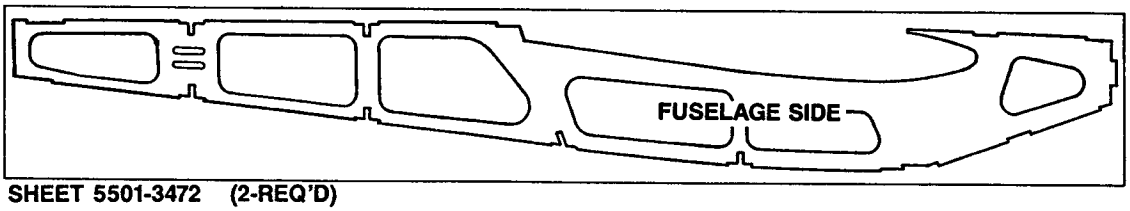
PARTS IDENTIFICATION

WOOD PARTS

Be careful Men removing parts (such as fuselage sides) from the die-cut sheets. Long parts are fragile until glued into a structural unit. If necessary, use a razor knife or razor saw to assist in the removal of parts from the sheet. Sometimes a little trimming and sanding can improve parts, Mere desired. Save scrap until the model is completed, in case a part is missing or damaged. Also, scrap is used in some building steps.

ABOUT THE WOOD IN THE KIT

We strive to supply good quality materials in your kit. Wood parts are inspected with regard to the function they will serve. If an imperfection is spotted in a scrap corner of a die-cut sheet and doesn't affect actual parts, the sheet is considered acceptable. Also, internal stresses in wood are relieved as it is cut into parts. These relieved stresses may cause some parts to bow. Bows in wood parts (such as leading edges) readily straighten out as they are glued into a structural unit



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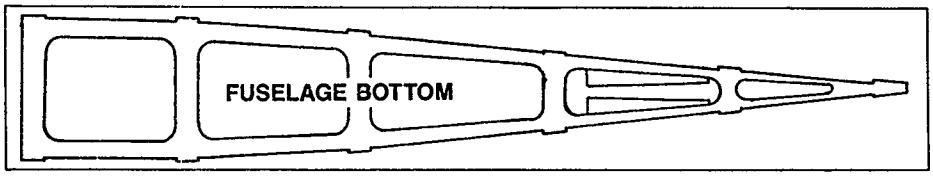

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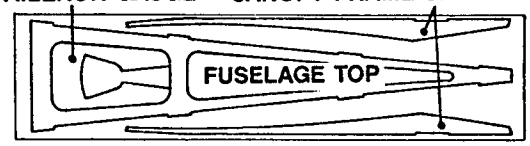

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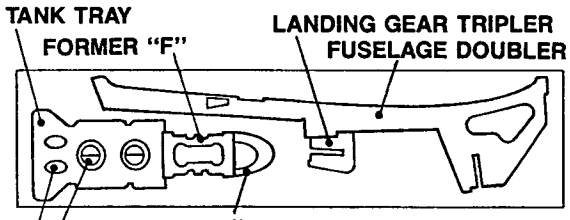

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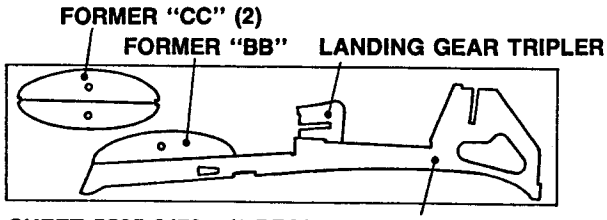
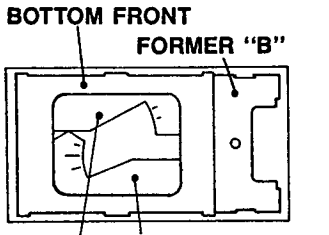


SHEET 5505-3476 (1 REQ'D) FUSELAGE DOUBLER



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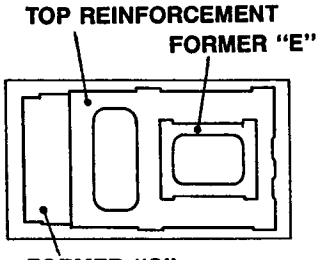

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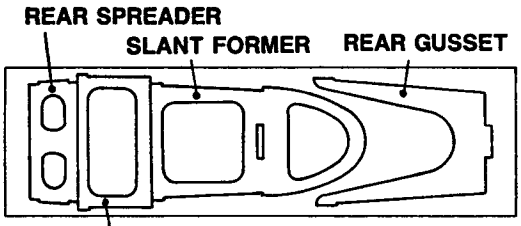

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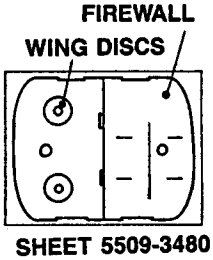

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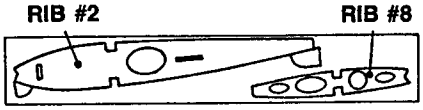

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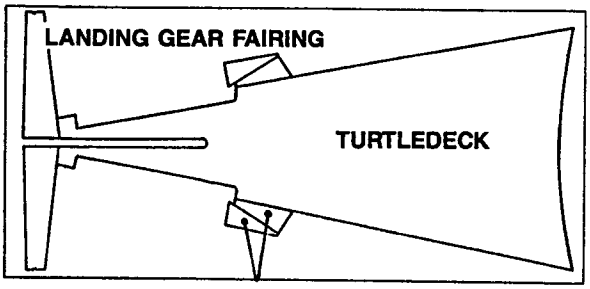

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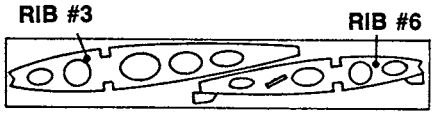

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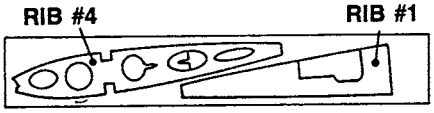

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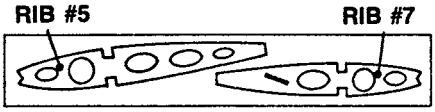

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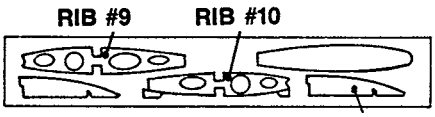

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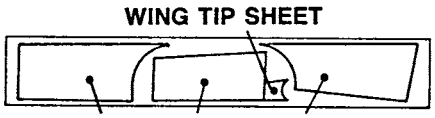
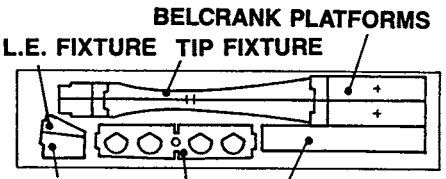


WING CENTER SHEETING
SHEET 5515-3330 (4-REQ'D)



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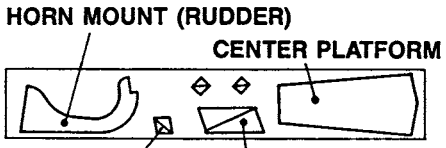

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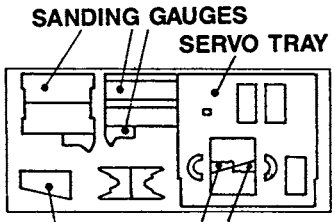

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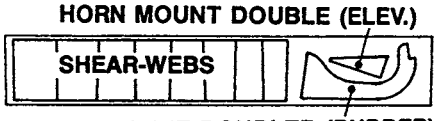

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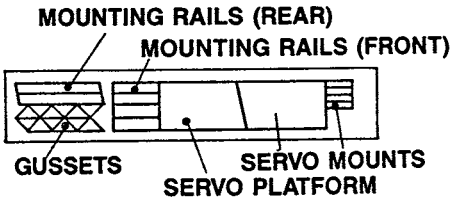

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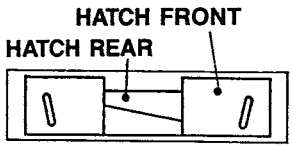


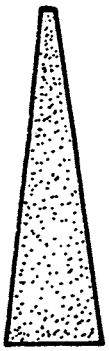
SHEET 5522-3334 (1-REQ'D)

3/16" x 5/16" x 16"
BALSA (3 REQ'D)

3/16" x 5/16" x 28"
BALSA (5 REQ'D)

5/16" x 5/16" 16"
BALSA (8 REQ'D)

5/16" x 5/16" x 20"
BALSA (1 REQ'D)



T.E. STOCK
(2 REQ'D)

1/8" x 1/2" x 18"
BALSA (2 REQ'D)

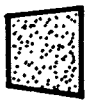
3/8" SQ. X 35"
BASS (4 REQ'D)

1/16" x 1/4" x 24"
BALSA (5 REQ'D)

SHAPED L.E.
(2 REQ'D)

3/8" x 1/2" x 2-1/4"
BASSWOOD

1/2" x 7"
TRI STOCK (1 REQ'D)



NOTCHED T.E.
(2 REQ'D)

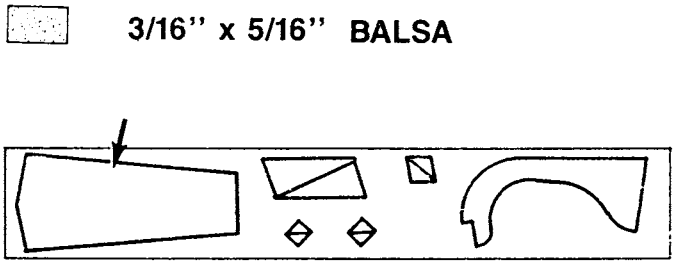
HORIZONTAL STABILIZER CONSTRUCTION (5 Steps)

1. Collect all of the items you will need to construct the HORIZONTAL STABILIZER. They include:

   (1) D/C SHEET 5517 3/16" BALSA PT. # 1331
   Includes:
   CENTER PLATFORM

   (5) 3/16 x 5/16 X 28" BALSA STICKS PT. #4371

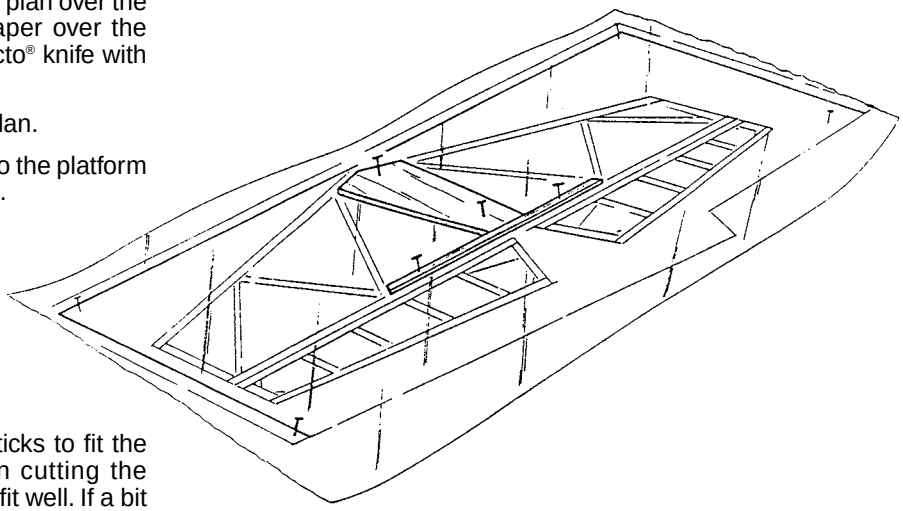
   (4) 1/16 x 3 x 30" BALSA SHEETING PT. #4539



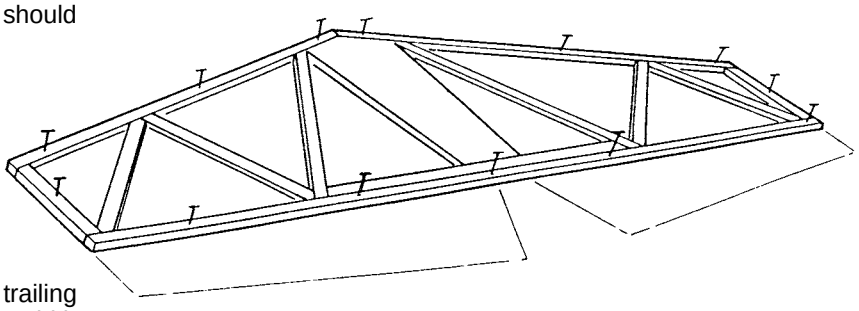
2. ☐ Lay the horizontal stabilizer portion of the plan over the building board and place the waxed paper over the plan. You will also need "T" pins, an X-Acto® knife with a #11 blade, and a razor saw.

   ☐ Pin the CENTER PLATFORM over the plan.

   ☐ Cut a 3/16 x 5/16" balsa stick and glue it to the platform with medium CA, pinning it over the plan.

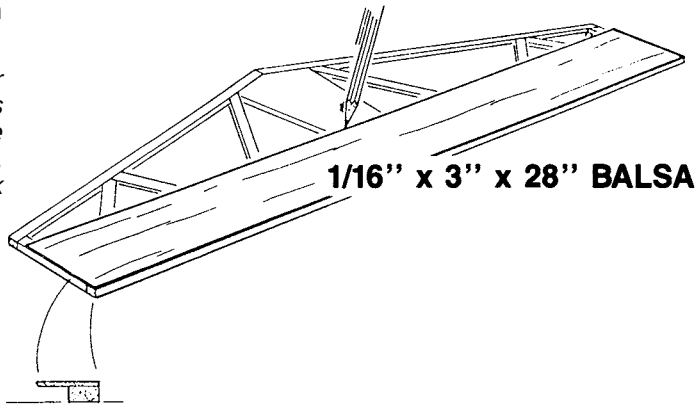


3. ☐ Trim the remaining 3/16 x 5/16" balsa sticks to fit the plan, pinning and gluing as you go. In cutting the diagonal trusses for the tail, trim them to fit well. If a bit oversize, don't force them in place. The pieces should fit before gluing



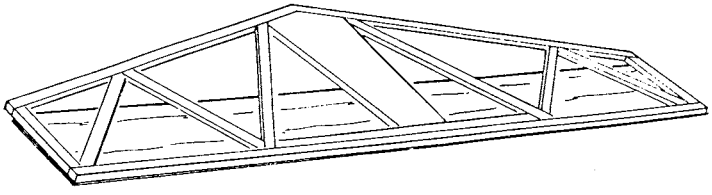
4. ☐ Place a 1/16 x 3 x 28" balsa sheet flush to the trailing edge (T.E.) of the stabilizer and mark the sheet width onto the stab sticks.

HINT: In selecting the sheeting for the stab, choose the firmer or heavier wood. whenever sheeting any surface, is helpful to lightly sand both sides of the sheet before using medium C/A. Also, whenever joining sheeting, "truing" the edges to be glued with a long sanding block and prefitting can make a big difference.



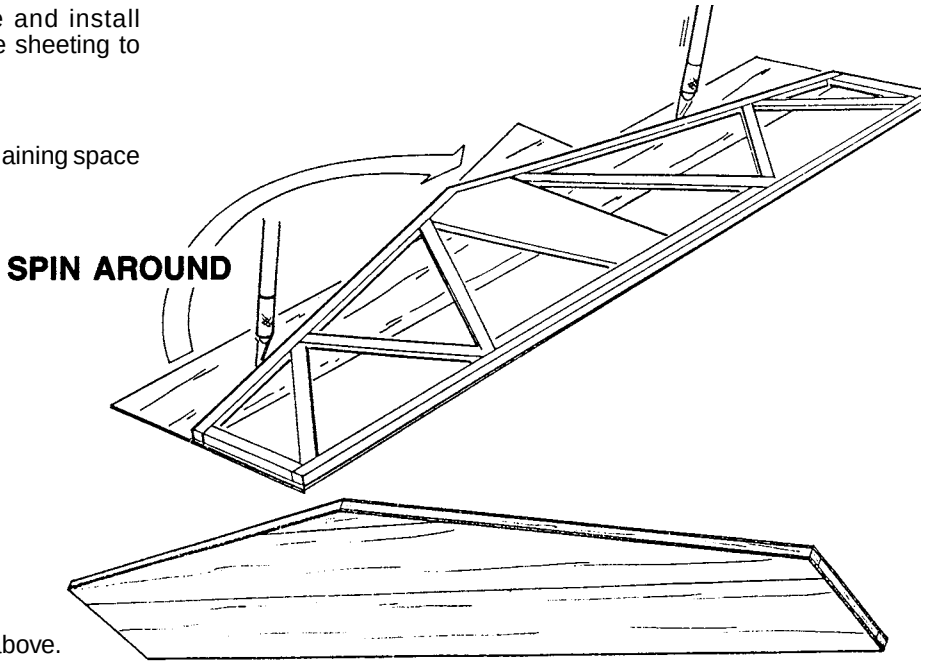
   ☐ Remove the sheet and apply medium C/A to the stab sticks up to the sheet-width mark

   ☐ Place the glued stab frame over the 1/16" sheeting, making sure that the trailing edge is flush with the sheet.



5. ☐ Glue the remainder of the stab frame and install another 1/16" balsa sheet. Then, trim the sheeting to the profile of the stab.

☐ Spin the cut-off around and glue to the remaining space on the frame.



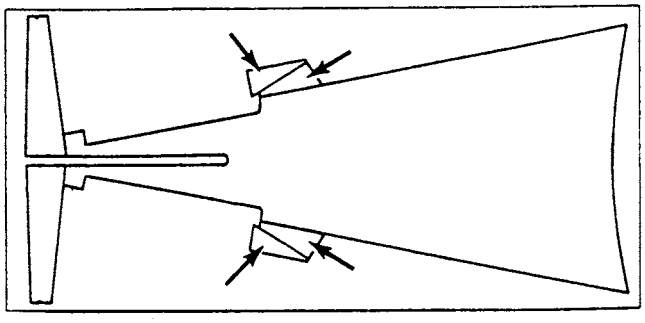
☐ Flip the stab over and sheet it as shown above.

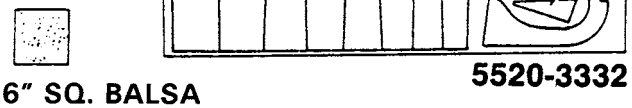
THIS COMPLETES THE HORIZONTAL STABILIZER. PUT IT ASIDE FOR NOW; YOU WILL NOT NEED IT UNTIL YOU ARE READY TO INSTALL THE HINGES.

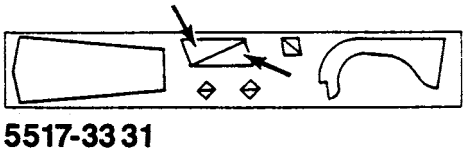
ELEVATOR CONSTRUCTION (4 Steps)

1. ☐ Collect all of the parts needed to build the two ELEVATOR HALVES. They include:

(5)	5/16" sq. x 16" BALSA STICKS	PT. #4370
(1)	BIRCH PLY D/C SHT. 5518 CONTAINING:	
	(4) HORN MOUNTS	PT. #3481
(1)	D/C BALSA SHT. 5520 CONTAINING:	
	(2) HORN MOUNT CORES	PT. #3332
(2)	D/C SHT. 5517 (BALSA) CONTAINING:	
	(1) BALSA CORNER GUSSETS	PT. #3331
	(1) BALSA HORN MOUNT CORES	PT. #3331

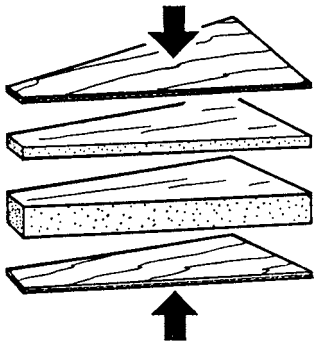






2. ☐ Laminate the two 1/32" PLYWOOD HORN MOUNTS to the 3/16" and 1/16" BALSA CORES.

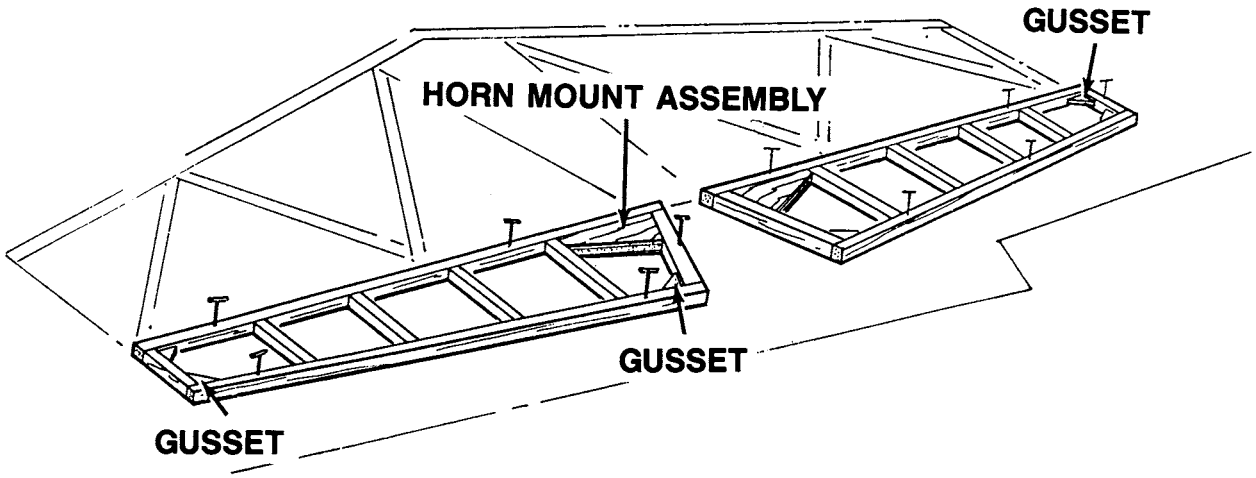
☐ Make two such assemblies, one for each elevator half.



3. ☐ Place waxed paper over the elevator section of the plan.

   ☐ Trim and glue the 5/16" square balsa sticks over the plan, pinning as you go.

4. ☐ Glue the HORN MOUNT ASSEMBLIES and the CORNER GUSSETS into the frame.

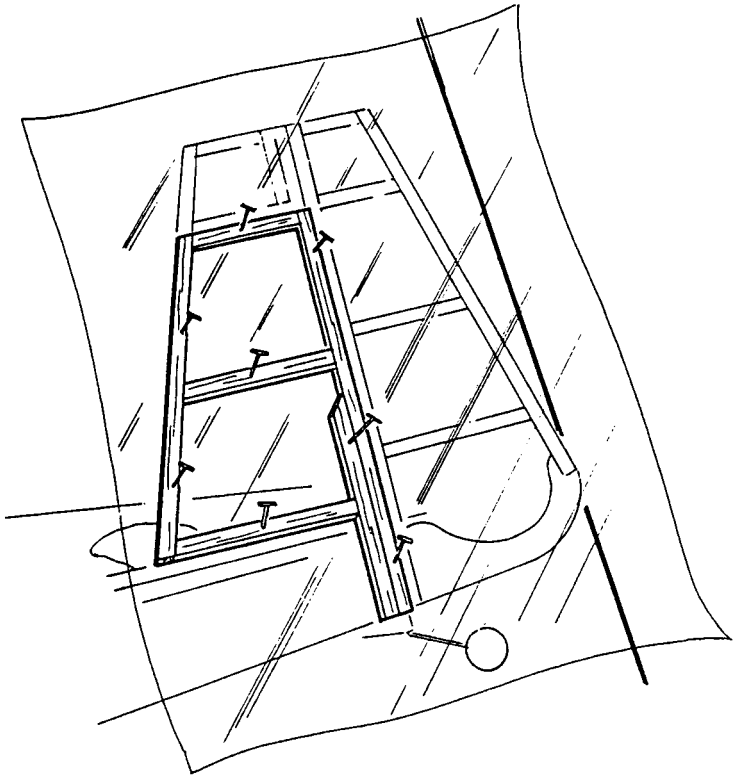


VERTICAL FIN CONSTRUCTION (4 Steps)

1. ☐ Collect the items needed to construct the VERTICAL FIN. They include:

   (3) 3/16 x 5/16 x16" BALSA STICKS PT. #4369

   (2) 1/16 x 3 x 18" BALSA SHEETS PT. #4538



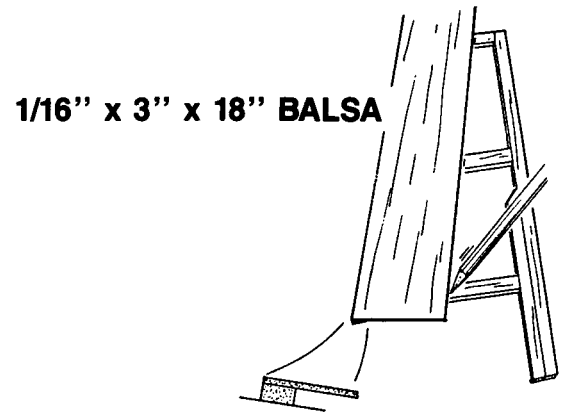
2. ☐ Cover the fin portion of the plan with waxed paper.

   ☐ Trim the 3/16 x 5/16" balsa sticks and pin over the plan, gluing as you go.

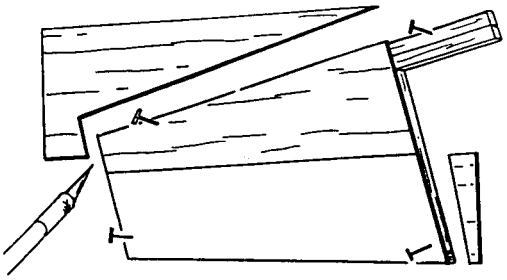
3. ☐ Place the 1/16” balsa sheeting flush with the Leading Edge (L.E.) and mark the width of the sheet onto the frame.

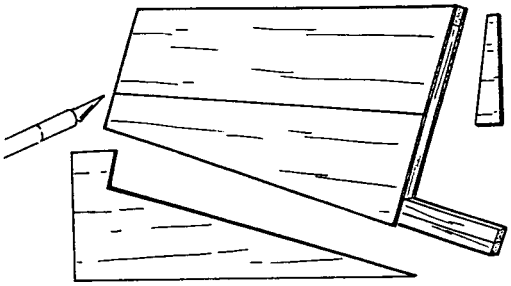
   ☐ Apply Jet to the frame, up to the width marks, and permanently install the sheeting. Pin down to insure a flat assembly.

   ☐ Trim the sheeting and use the drop-off to cover the remaining area of the fin side, trimming to the profile of the fin as you go.



4. ☐ Flip the fin over and repeat the sheeting operation, as illustrated.





THIS COMPLETES THE VERTICAL FIN CONSTRUCTION. PUT IT ASIDE UNTIL YOU ARE READY TO INSTALL THE HINGES.

RUDDER CONSTRUCTION (4 Steps)

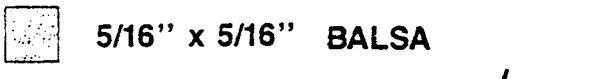
1. ☐ Collect all of the parts you will need to construct the RUDDER. They include:

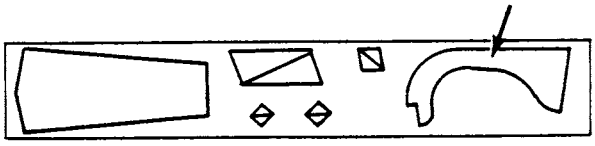
   (3) 5/16” sq. x 16” BALSA STICKS PT. #4370

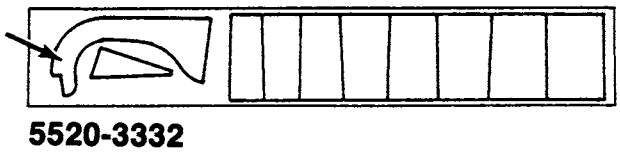
   (1) D/C BALSA SHT. 5517 PT. #3331
   CONTAINING:
   (1) 3/16” HORN MOUNT

   (2) D/C BALSA SHT. 5520 PT. #3332
   CONTAINING:

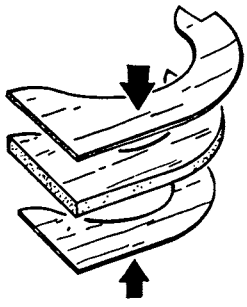
   (1) 1/16” HORN MOUNT



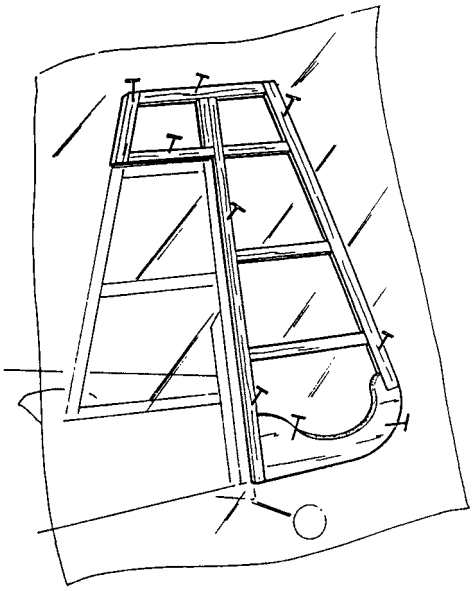




2. ☐ Laminate the three horn mounts as shown, making sure that the 3/16” horn mount is in the middle.



3. ☐ Cover the RUDDER portion of your plan with waxed paper and pin the laminated horn mount assembly over the plan.



4. ☐ Trim, glue, and pin the 5/16" square balsa sticks over the plan as shown.

NOW GATHER THE HORIZONTAL STABILIZER, THE ELEVATOR HALVES, THE FIN AND THE RUDDER AND PROCEED TO THE NEXT SECTION, "ROUNDING AND HINGING."

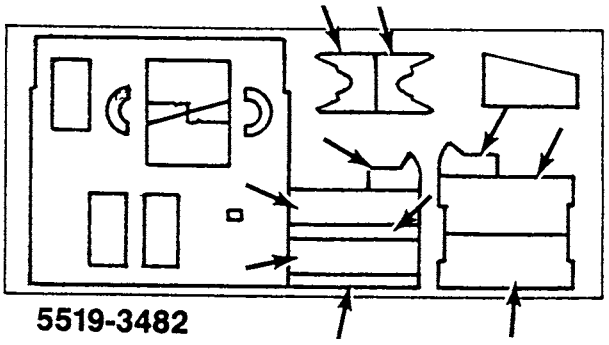
ROUNDING & HINGING (11 Steps)

1. ☐ Collect all of the items needed to complete this section. In addition to the following kits parts, you will need a small drill, drill bits, a modeling knife, a sharp pencil, a sanding block, and fine and medium grit sandpaper.

   (9) JET HINGES PT. #1667

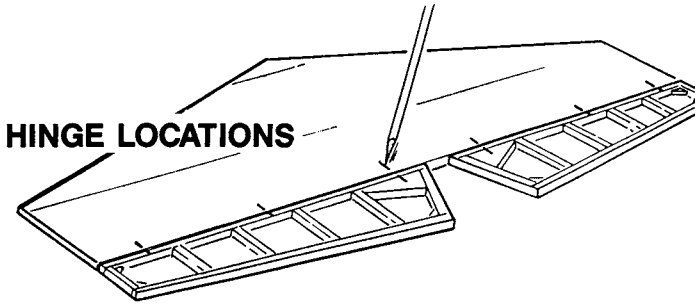
   (1) D/C PLY SHT. #5519 PT. #3482
   CONTAINING:
   (1) ROUNDING TOOL
   (1) "R"BEVEL TOOL
   (1) "AE" BEVEL TOOL

   (1) CG NYLON CENTERLINE MARKER PT. #1425

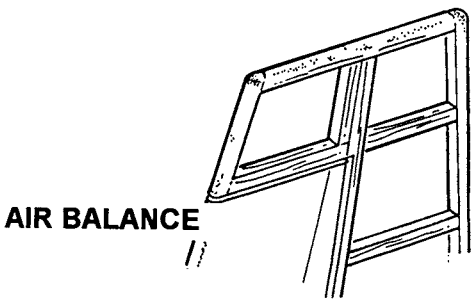


2. ☐ From the plan, transfer the hinge locations onto the rudder and the elevator halves.

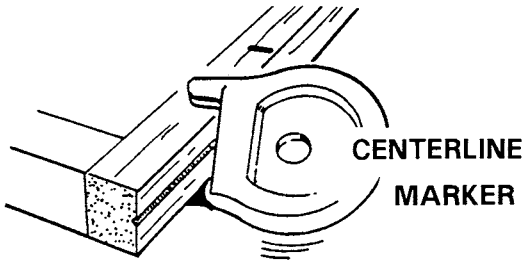
   ☐ Next, transfer the hinge locations from the rudder to the fin, and from the elevators to the stab.



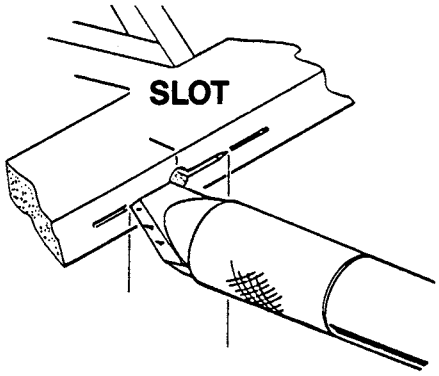
NOTE: Leave a 1/16" gap between the air balance on both the rudder and the fin.



3. ☐ Using the centerline tool, scribe the centerline onto the rudder post, the fin post, the hinge line of the stabilizer, and onto both elevators

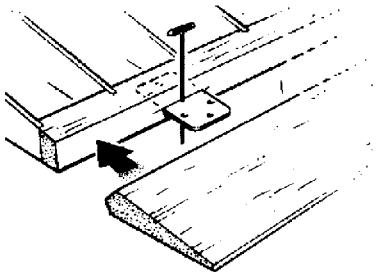


4. ☐ Carefuly cut a slot approximately 1/2" deep and slightly wider than the hinge, using your favorite knife blade.



5. ☐ After all slots have been made, mark the center of your hinge and insert a pin (see illus.) This will hold the hinge in place while sliding the matching part (aileron, etc.) onto the JET HINGE.

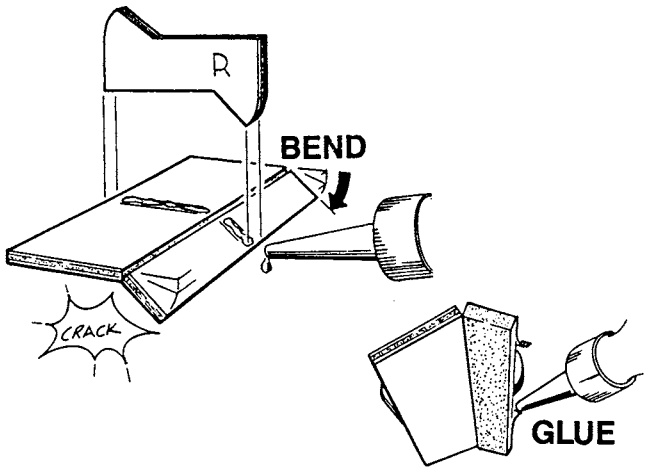
DO NOT GLUE!



☐ With both surfaces hinged and assembled, check the alignment. For good control response, the hinge gap should be as small as possible, but s h o u l d allow for full deflection when needed.

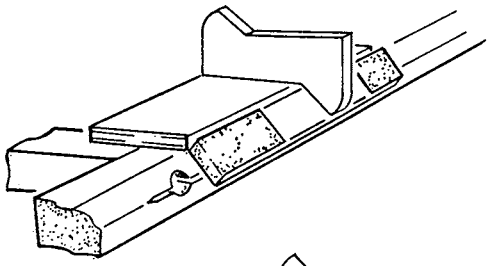
Remove the hinges.

6. ☐ Assemble the two bevel tools and install a strip of medium grit sandpaper, as shown.

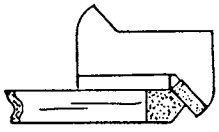


7. ☐ Using the tool marked "R," bevel the rudder-side of the hingeline to a point at the centerline. You may want to bevel near the air balance with a knife, if you can't use the tool in the corner.

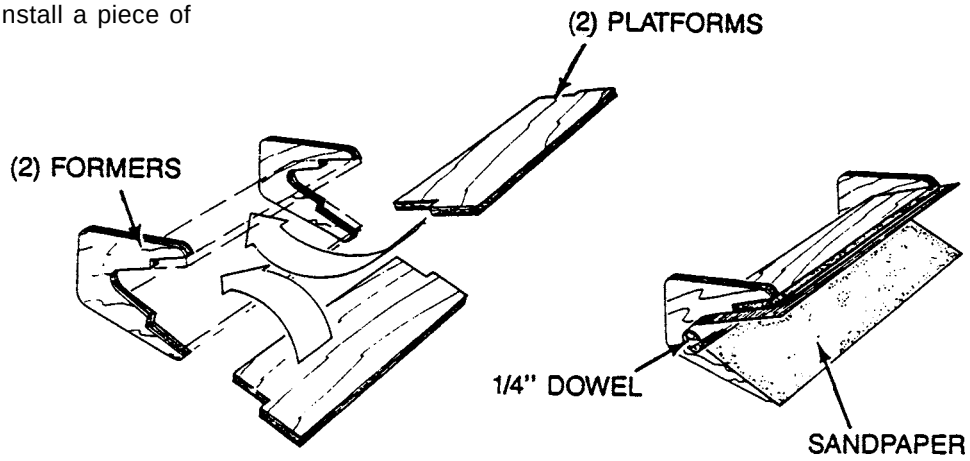
☐ Using the tool marked "AE," bevel the elevators to a point at the centerline.



8. ☐ Temporarily hinge the rudder/fin and the stab/elevators to check the surface alignment and to round the perimeter of the assemblies.

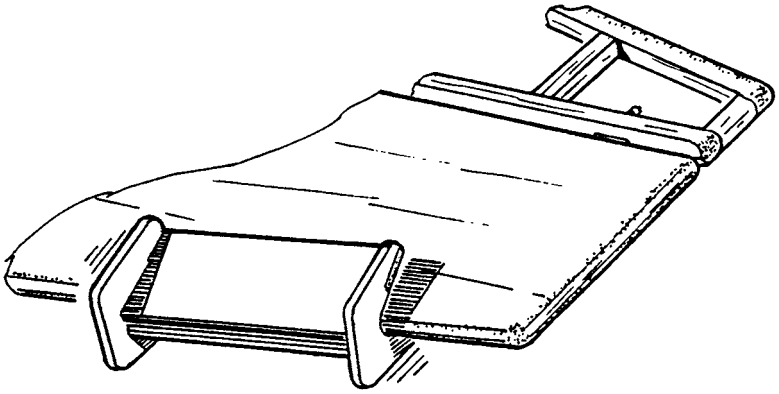


9. ☐ Assemble the Rounding Tool and install a piece of **medium** sandpaper.



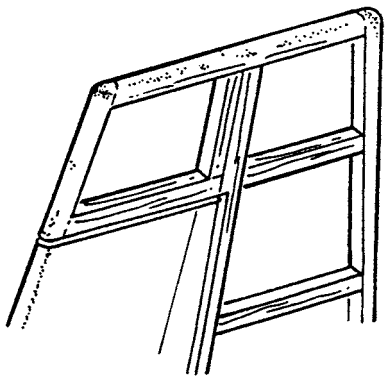
10. ☐ Using the tool, round the perimeter of the fin/rudder and the stab/elevators.

☐ When you are satisfied with the shape, use a piece of fine sandpaper to remove the deep scratches.



11. ☐ Finish sand all of the tail parts, using a sanding block and **fine** sandpaper.

HINT: Sanding will cause gaps at the joints to fill with balsa dust. Use this to your advantage by putting a drop of thin C/A glue into the gap. Then sand after the glue dries.



☐ Separate the fin from the rudder and the elevators from the stabilizer.

THIS COMPLETES THE CONSTRUCTION OF THE TAIL SECTION PARTS. PUT THEM ASIDE UNTIL YOU ARE READY TO ATTACH THEM TO THE FUSELAGE.

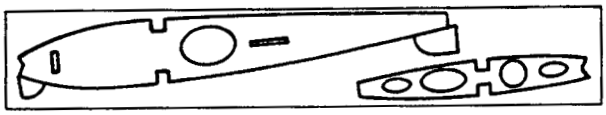
CONSTRUCTING THE WING (35 Steps)

THE INSTRUCTIONS WILL LEAD YOU THROUGH THE ASSEMBLY SEQUENCE, OCCASIONALLY SENDING YOU BACK TO REPEAT STEPS. CAREFULLY READ EACH STEP BEFORE YOU PROCEED TO DO THE INSTRUCTION.

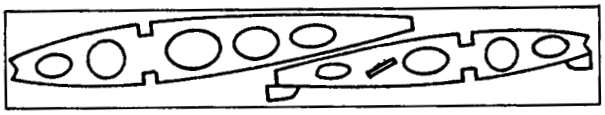
1. Find all the parts that you will need to build the wing.

THEY INCLUDE:

(4)	3/8" SQ. X 35" SPAR BASS	(MIL #4528)
(2)	SHAPED L.E BALSA	(MIL #4524)
(2)	NOTCHED T.E BALSA	(MIL #4523)
(2)	WING RIBS 2 & 8 BALSA	(D.C. 5310-3325)
(2)	WING RIBS 3 & 6 BALSA	(D.C. 5511-3326)
(2)	WING RIBS 4 & 1 BALSA	(D.C. 5512-3327)
(2)	WING RIBS 5 & 7 BALSA	(D.C. 5513-3328)
(2)	WING RIBS 1, 9 & 10 BALSA	(D.C. 5514-3329)
(4)	WING CENTER SHEETING	BALSA (D.C. 5515-3330)
(2)	SHEAR-WEBS BALSA	(D.C. 5520-3332)
(2)	WING JOINER	PLY
(2)	BELCRANK PLATFORMS	PLY (D.C. 5516-3483)
(2)	DOWEL SUPPORT	PLY (D.C. 5516-3483)
(1)	WING SUPPORT FRT	PLY (D.C. 5516-3483)
(1)	WING SUPPORT REAR	PLY (D.C. 5516-3483)
(1)	WING SUPPORT TIP	PLY (D.C. 5516-3483)
(1)	SERVO PLATFORM PLY	(D.C. 5516-3483)
(1)	DOWEL GUIDE PLY	(D.C. 5509-3480)
(2)	INBOARD T.E.	BALSA (MIL #4526)
(5)	1/16" x 1/4" x 24" CAPS	BALSA (STK #4525)
(2)	AILERONS	BALSA (MIL #4527)
(6)	1/16" x 2-3/4" x 35"	BALSA (SHT #4888)
(4)	1/16" x 2-1/2" x 35"	BALSA (SHT#4887)
(1)	3/4" x 33" NYLON FABRIC	(NYL #5210)
(1)	5/16" x 4-3/4" DOWEL	BIRCH (MIL #1759)
(2)	.063" x 20-3/4" AILERON WIRE	(MTL #1230)
(2)	.063" x 7" THREADED ROD	(MTL #1270)
(2)	AILERON BELCRANKS	(NYL #1410)
(2)	AILERON BUSHINGS	(MTL #1182)
(2)	2-56 NUT	(MTL #1115)
(2)	2-56 x 1/2" MACHINE SCREW	(MTL #1041)
(2)	#2 WASHER	(NYL#1461)
(4)	NYLON SNAP-NUT	(NYL #1138)
(3)	1/16" I.D. x 1" BRASS TUBE	(BRS #1376)
(1)	AILERON COUPLER BLOCK	(NYL #1427)
(1)	2-56 x 3/4" MACHINE SCREW	(MTL #1042)
(1)	2-56 x 1/8" MACHINE SCREW	(MIL #1040)
(1)	SNAP LINK	(NYL #1405)
(8)	FLEX POINT HINGES	(NYL #1449)
(1)	C.G. CENTERLINE TOOL	(NYL #1425)

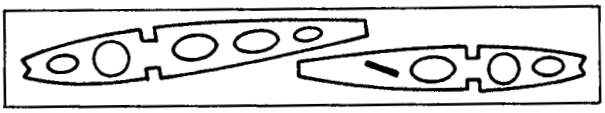


5510-3325



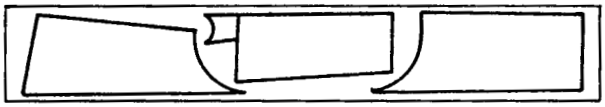
5511-3326

5512-3327

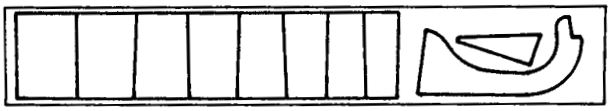


5513-3328

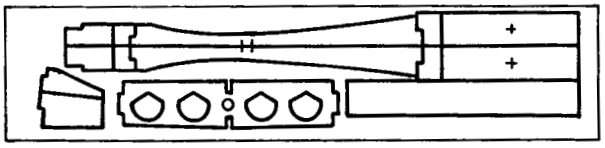
5514-3329



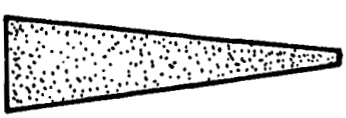
5515-3330



5520-3332

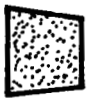


5516-3483



AILERON STOCK

1/16'' x 1/4'' x 24''



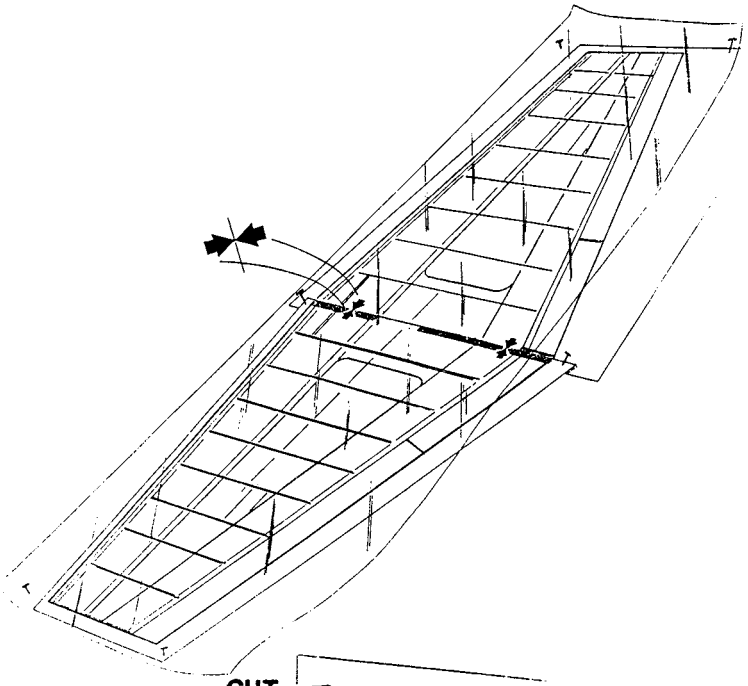
NOTCHED T.E. BALSA

3/8'' SQ. BASSWOOD

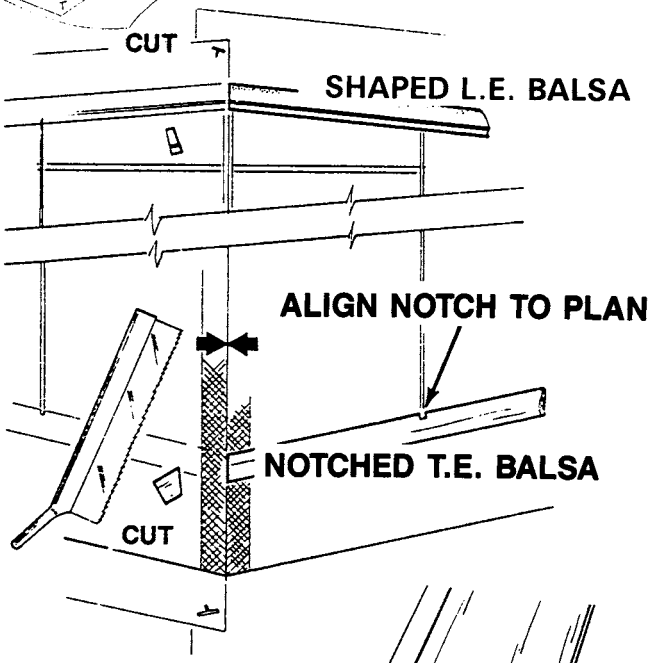
SHAPED L.E. BALSA

NOTE: IF USING AN ENGINE LARGER THAN A.60 2-CYCLE, YOU WILL WANT TO FOLLOW THE INSTRUCTIONS FOR THE TWO SERVO OPTION, WHICH ARE FOUND IMMEDIATELY AFTER THE WING SECTION.

NOTE: YOU WILL BE BUILDING TWO WING HALVES. DO NOT BUILD BOTH HALVES OVER THE SAME SECTION OF THE PLAN. FOLLOW STEPS CAREFULLY TO AVOID CONFUSION

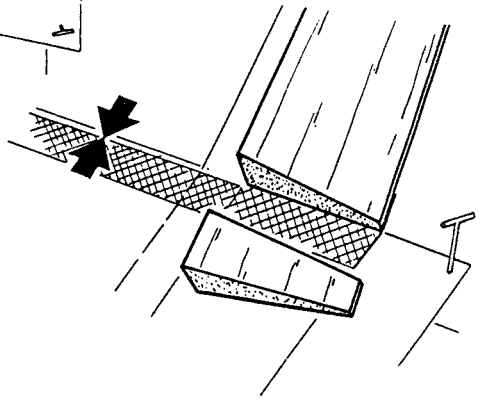


2. ☐ Cut the vying plan along the dotted line. Position the left wing plan overlapping the right plan, aligning the arrows as shown. Pin or tape the plan to the building board and cover with waxed paper,

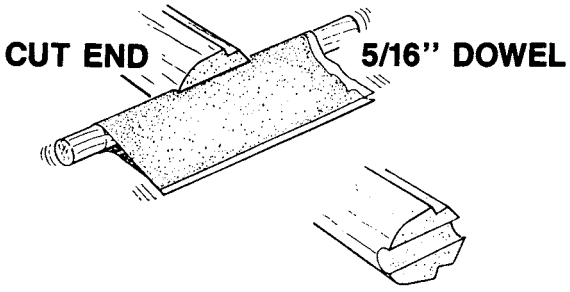


3. ☐ Lay a shaped LEADING EDGE over the plan and cut the angle at the centerline. Repeat this step on the other L.E.

☐ Next, place the notched TRAILING EDGE over the over the plan, aligning the notches to insure that you cut the correct end. Cut the angle at the centerline and then repeat this step on the other notched T. E.

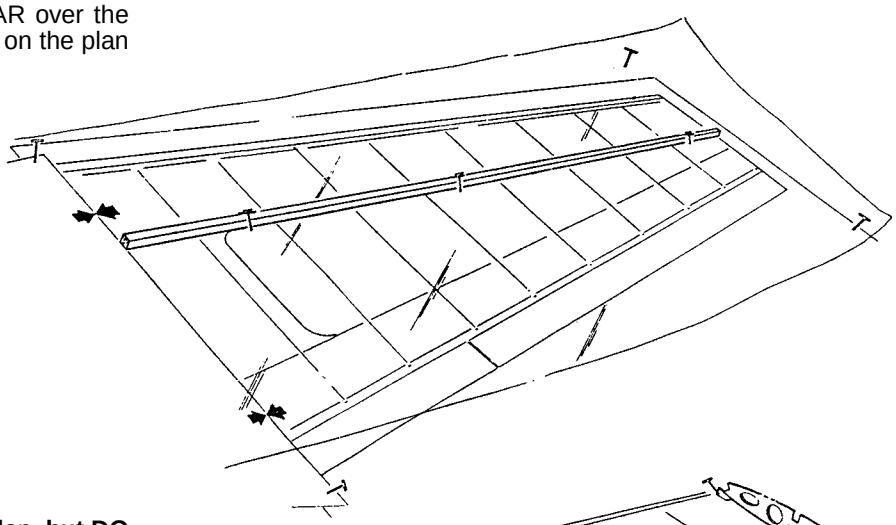


☐ Referring to the plan, cut the inboard T. E. parts to the correct length and angle.

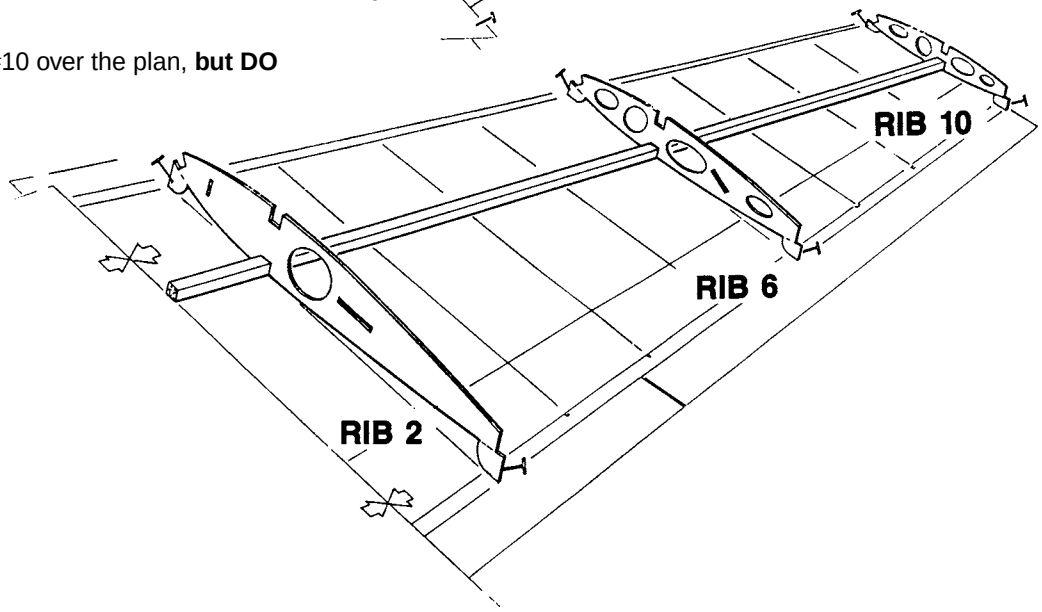


4. ☐ Wrap a piece of **fine** sandpaper around the 5/16" DOWEL and sand the wing pin notch into the angle-cut end of the shaped L.E.

5. ☐ Scissors-pin a 3/8” sq. BASSWOOD SPAR over the plan, as shown. Make sure that the end is on the plan centerline.

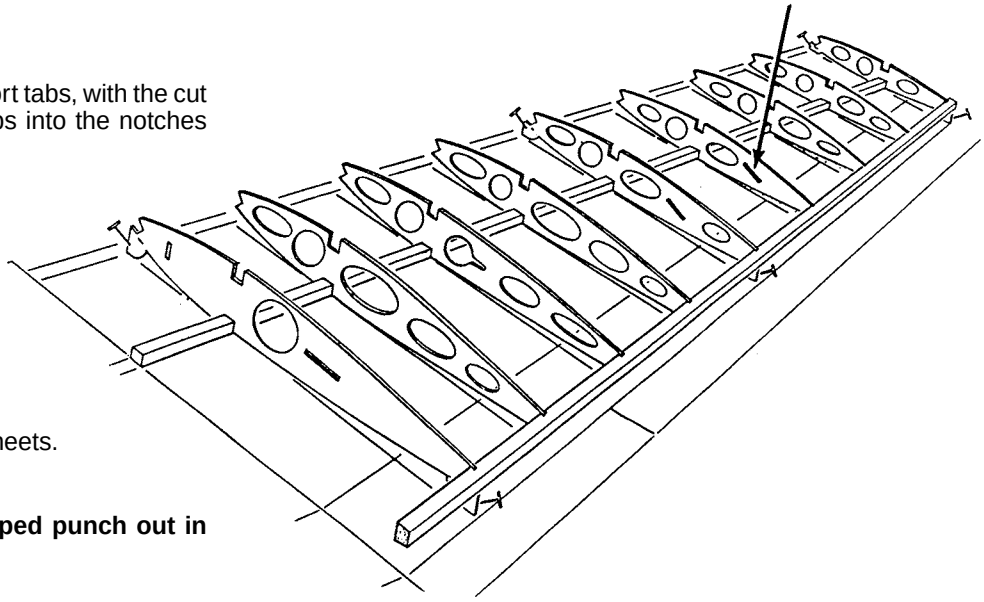


6. ☐ Pin tabbed Rib #2, #6, and #10 over the plan, **but DO NOT GLUE at this time.**



NOTE THE ANGLE OF THE SLOT

7. ☐ Place the notched T.E. on the support tabs, with the cut end at the centerline. Press the ribs into the notches and glue.



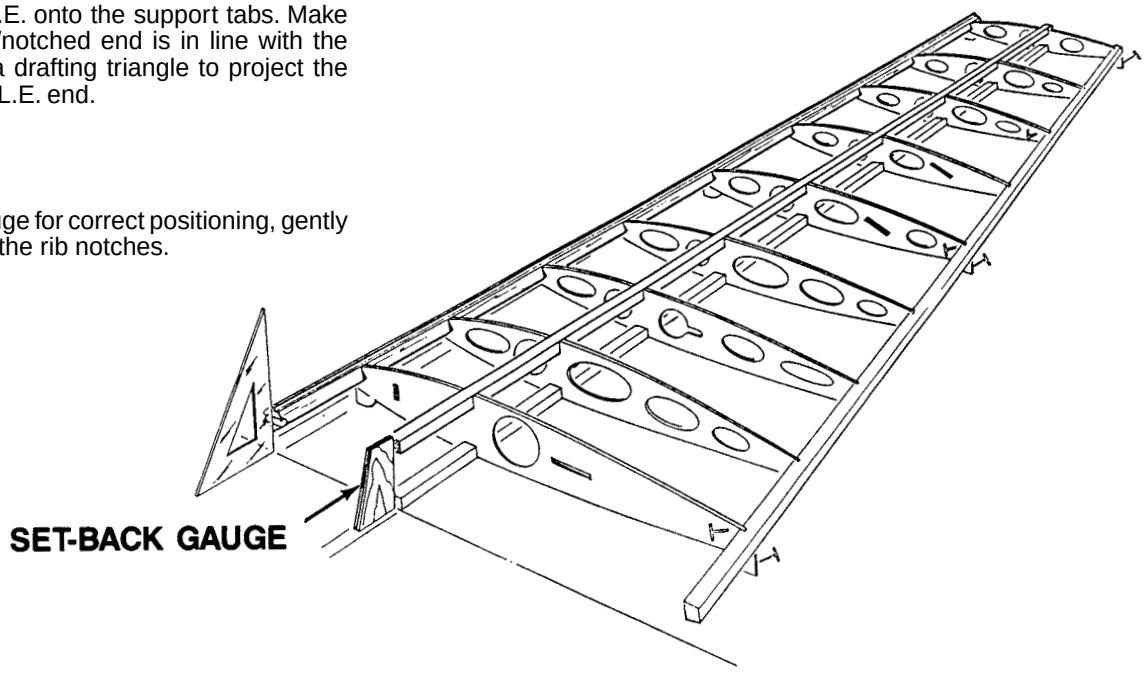
☐ Remove the other ribs from their sheets.

IMPORTANT: Save the “horseshoe”- shaped punch out in Rib #4, as you will need it for Step #29.

☐ Place the remaining ribs into the notched T.E. and onto the spar, **but DO NOT GLUE**. Make sure that you correctly install Rib #7, as shown. Match the bellcrank support slot direction to Rib #6.

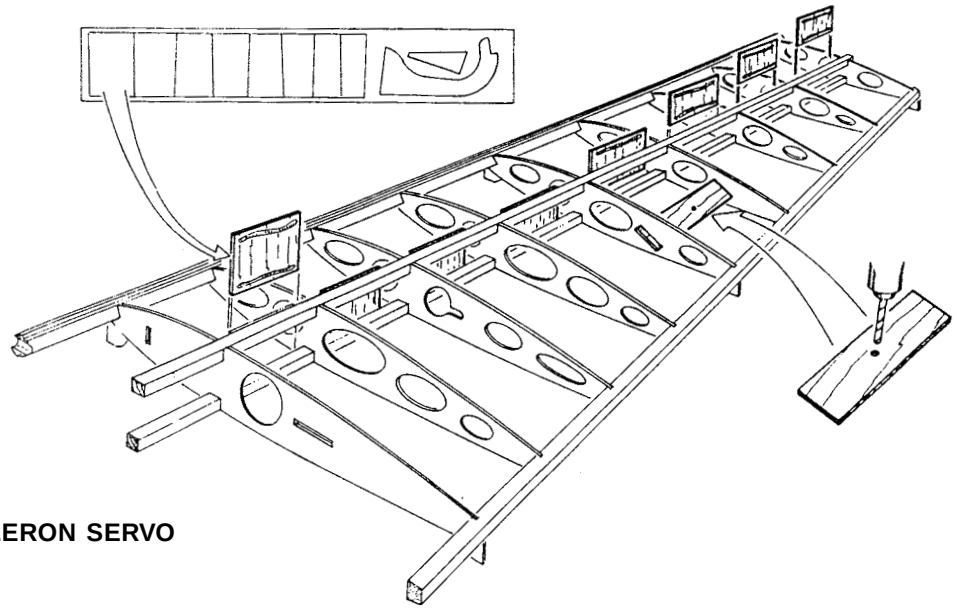
8. ☐ Position the shaped L.E. onto the support tabs. Make sure that the beveled/notched end is in line with the wing centerline. Use a drafting triangle to project the wing centerline to the L.E. end.

☐ Using the set-back gauge for correct positioning, gently slide the top spar into the rib notches.



☐ Check the wing alignment with the plan underneath. Then, place a drop of Jet glue at each joint along the Leading Edge, the Spar, and the Trailing Edge.

9. ☐ Glue the balsa shear webs to the front side of the spars, centering the shear webs between the wing ribs.



NOTE: IF YOU ARE USING THE TWO-AILERON SERVO SYSTEM, OMIT THE FOLLOWiNG.

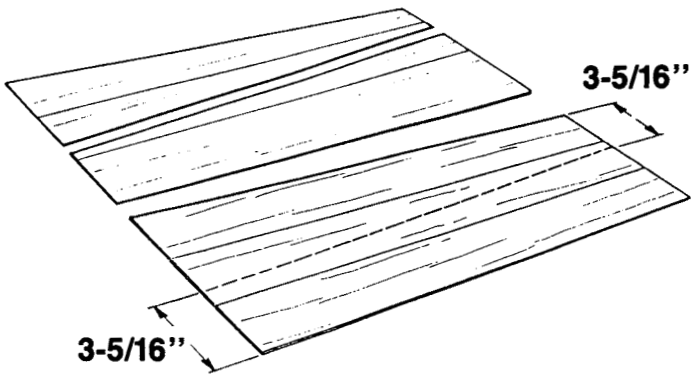
☐ Drill a 1/16" diameter hole at the center mark on each of the aileron bellcrank supports and glue the support between Ribs #6 and #7.

USE THE TWO AILERON SERVO OPTION IF USING AN ENGINE LARGER THAN A .60 2-CYCLE.

10. ☐ Edge glue two sets of three 1/16 x 3 x 36" balsa sheets.

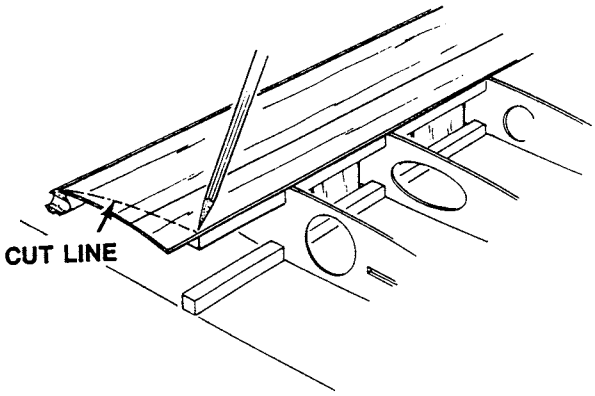
☐ Measure 3-5/16" from opposite edges, as shown, and mark.

☐ Cut along the line established by the two marks. Repeat this process on the other glued sheet. This gives you the L.E. sheeting for the entire wing.



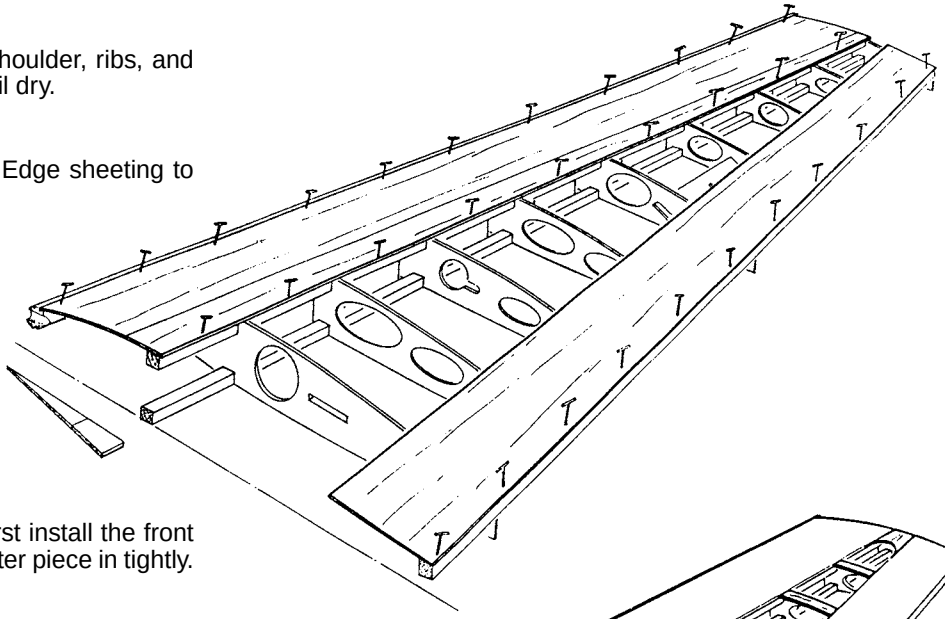
11. ☐ Position a full sheet edge against the L.E. shoulder. Align the corner with the L.E. centerline end and roll onto spar.

☐ Mark the sheet in line with the top spar end and cut along the line formed. Use this sheet as a template to cut the other three L. E. sheets.



12. ☐ Glue the L.E. sheeting to the L.E. shoulder, ribs, and spar, pinning or taping to secure until dry.

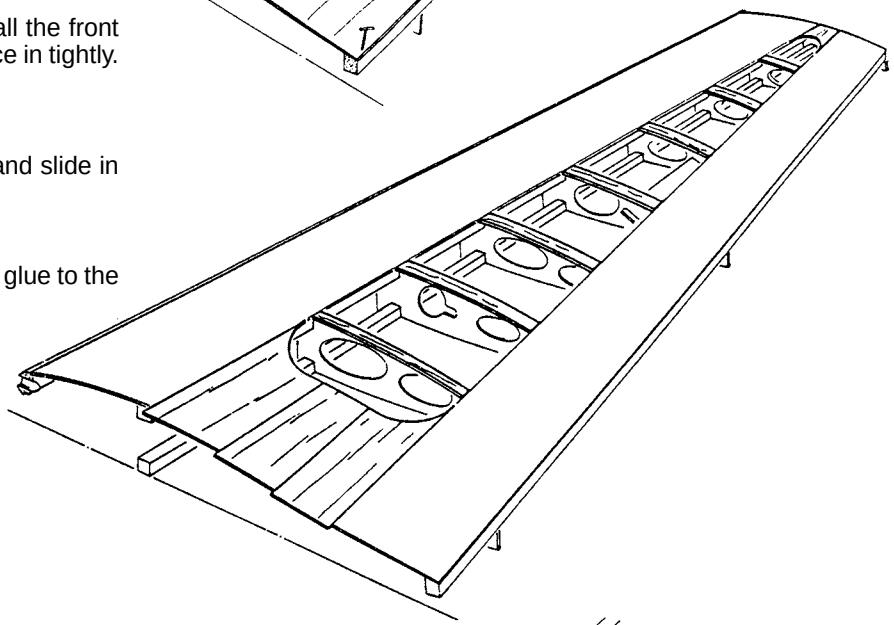
☐ Glue the 1/16 x 2-1/2 x 36" Trailing Edge sheeting to the notched T.E. and the wing ribs.



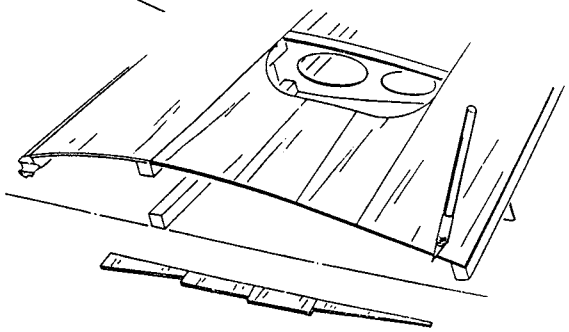
13. ☐ To glue the center sheet in place, first install the front and back pieces. Then, slide the center piece in tightly. Trimming may be necessary.

☐ Place some glue on the wing tip sheeting and slide in place.

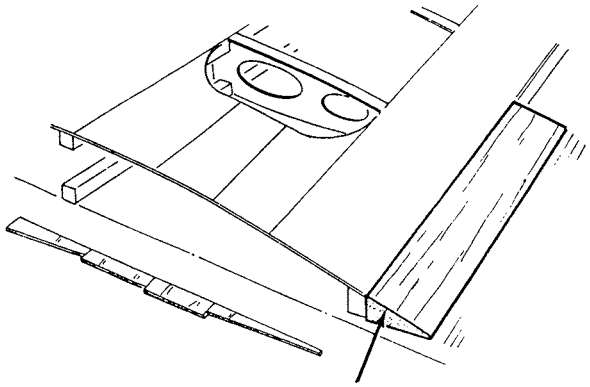
☐ Cut the 1/16 x 1/4" balsa capstrips to fit and glue to the wing ribs.



14. ☐ Trim the sheeting along the wing centerline.



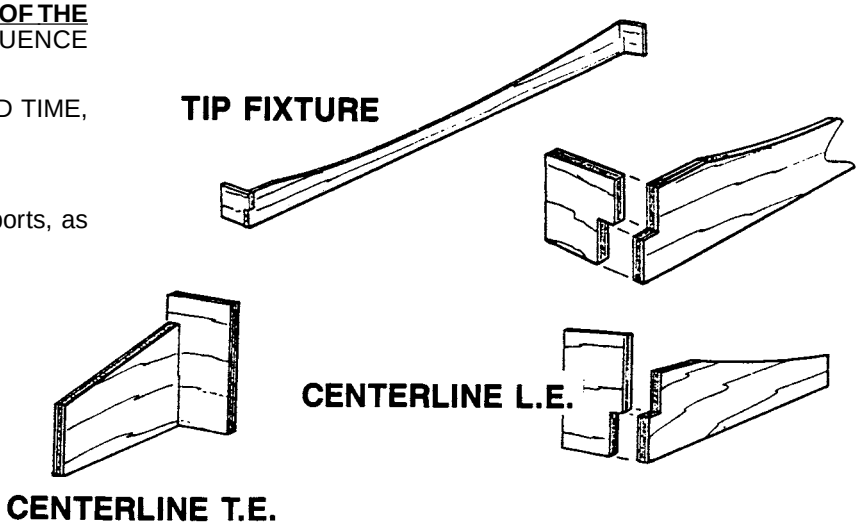
15. ☐ Glue the pretrimmed Trailing Edge part to the wing. Align the “angle-cut” side with the notched T.E. Make sure the top of the T.E. and the wing sheeting are flush over the entire length.



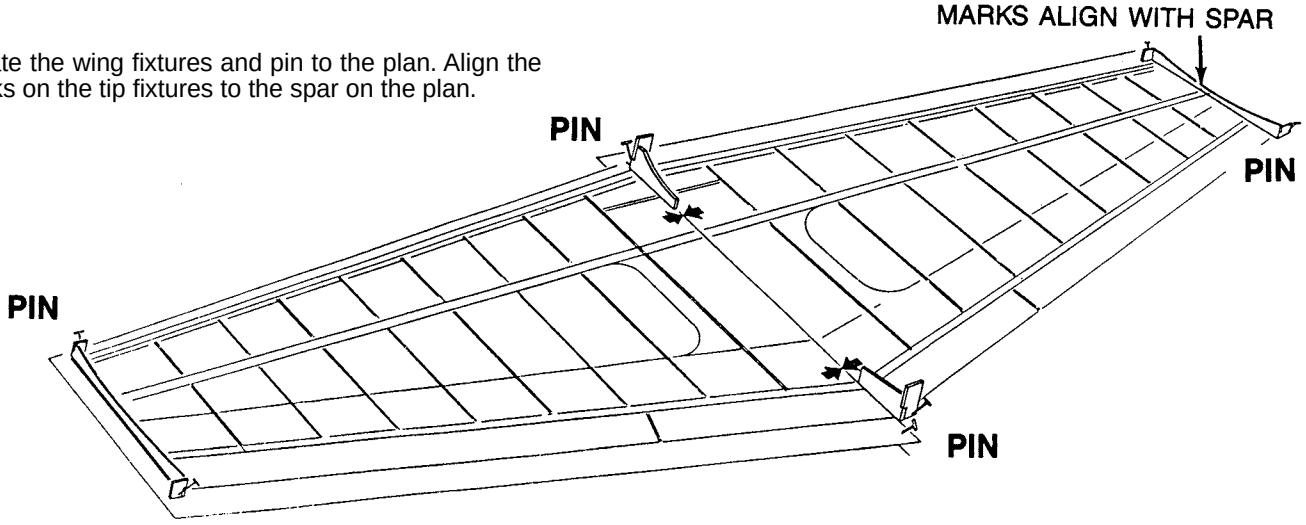
REMOVE THE WING PANEL AND GO BACK TO STEP #3. **MAKING SURE TO WORK OVER THE OTHER HALF OF THE WING PLAN.** REPEAT THE CONSTRUCTION SEQUENCE FOR THE OTHER WING PANEL.

AFTER COMPLETING STEP #15 FOR THE SECOND TIME, GO ON TO THE NEXT STEP.

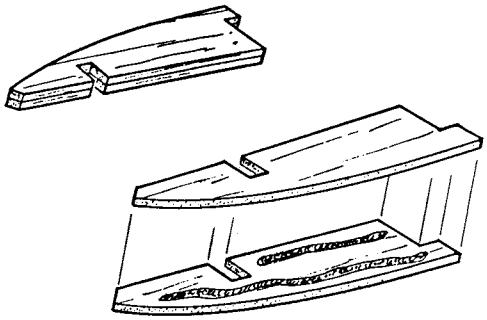
16. ☐ Glue the front, rear, and tip wing fixture supports, as shown.



17. ☐ Locate the wing fixtures and pin to the plan. Align the marks on the tip fixtures to the spar on the plan.

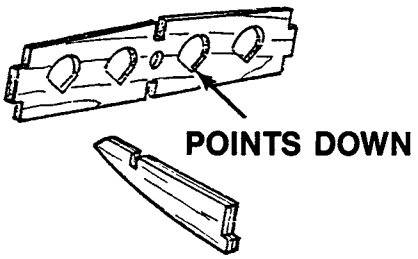


18. ☐ Laminate the top and bottom portions of Rib #1.

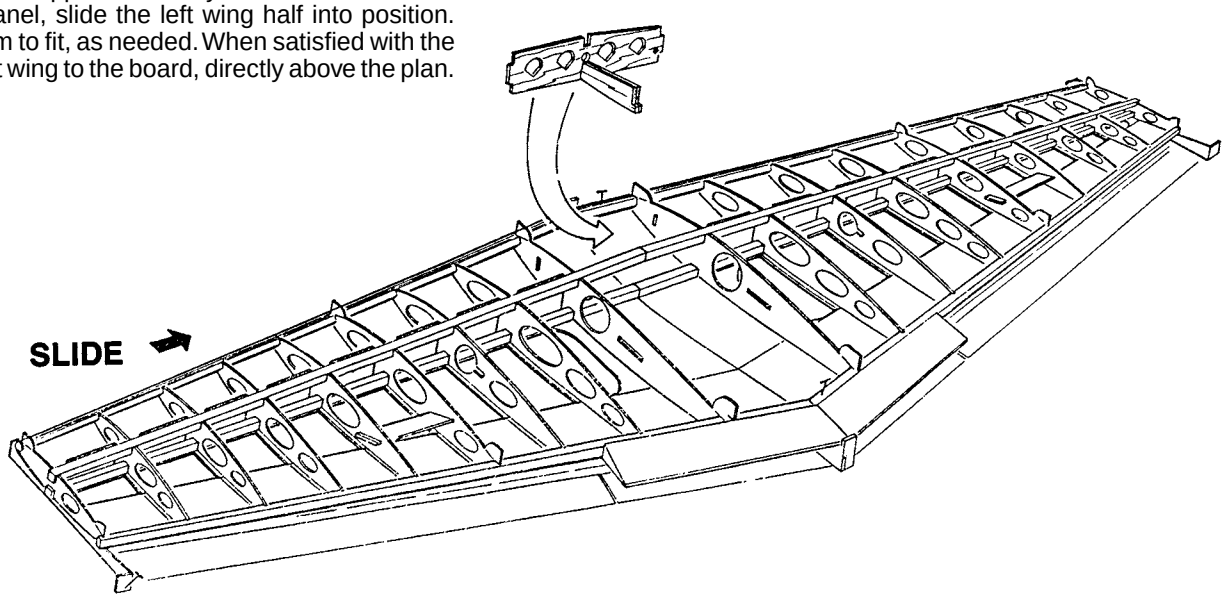


19. ☐ Pin the right wing panel to the building board, directly above the wing plan outline.

☐ With the cut-outs pointing down assemble the dowel support to one of the Rib #1 front sections, **BUT DO NOT GLUE**.

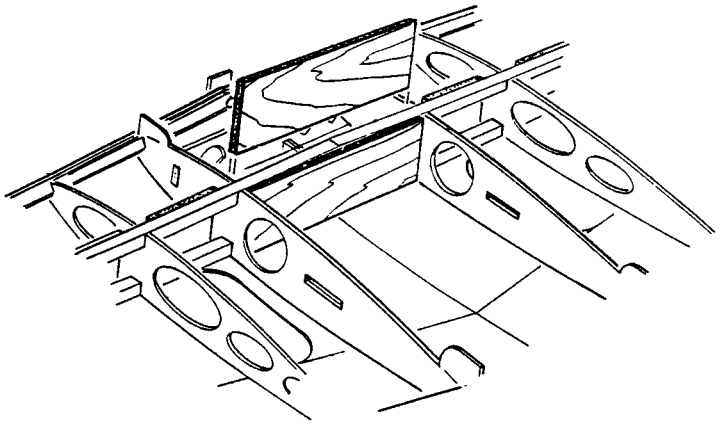


☐ With the dowel support assembly inserted into the fixed right wing panel, slide the left wing half into position. Sand and trim to fit, as needed. When satisfied with the fit, pin the left wing to the board, directly above the plan.

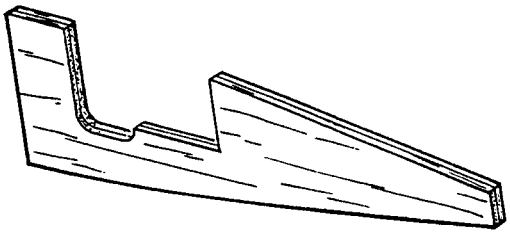


20. ☐ Lightly sand joiners and spars for maximum bond. Then, apply **20 MINUTE EPOXY** to the wing joiners and insert into the wing around the spars.

☐ Clamp to form a gap-free joint. Check to see that the wing is firmly on the fixtures while the joiners are drying.

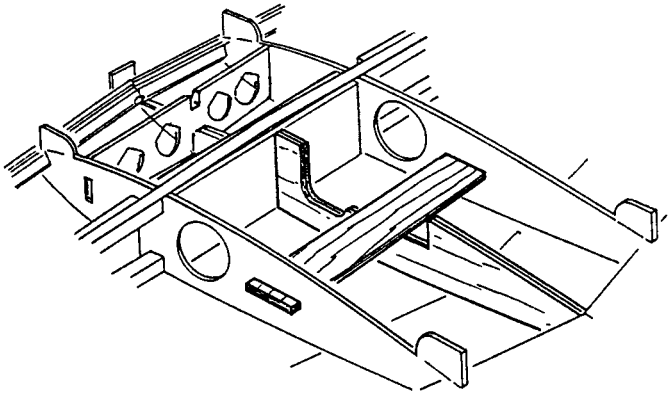


21. ☐ Laminate the rear portion of Rib #1.



NOTE: IF YOU ARE PLANNING TO USE THE TWO-AILERON SERVO SYSTEM, DO NOT PUNCH OUT THE CENTER-MOUNTED SERVO BLANK, AS SHOWN HERE. GLUE IT IN PERMANENTLY.

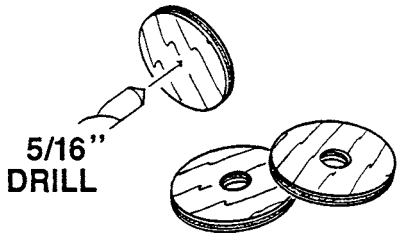
☐ Install the rear portion of Rib #1 directly over the centerline and glue. Trim to fit, if needed.

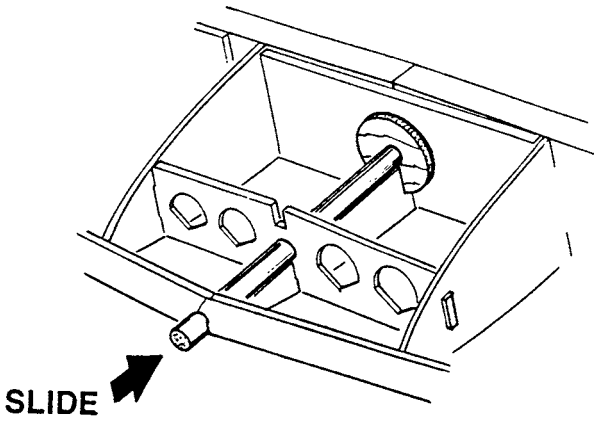


NOTE: OMIT THE FOLLOWING STEP, IF BUILDING THE TWO-SERVO OPTION.

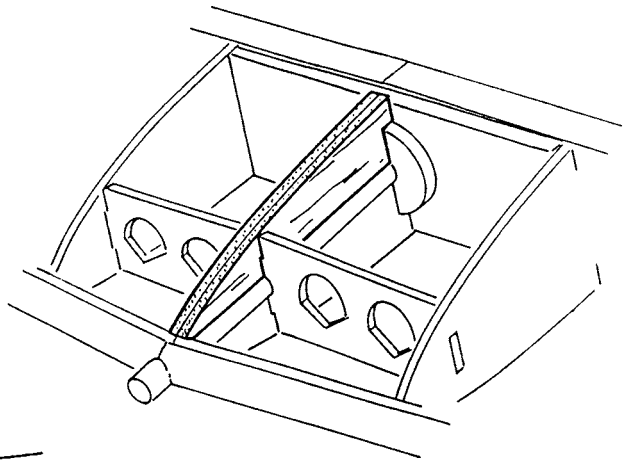
☐ Install and glue the servo mount into the slots in Ribs #2 and onto Rib #1.

22. ☐ Drill a 5/16” diameter hole at the center mark of both discs. Then, slide the dowel through the Leading Edge, the support, and the dowel guide.

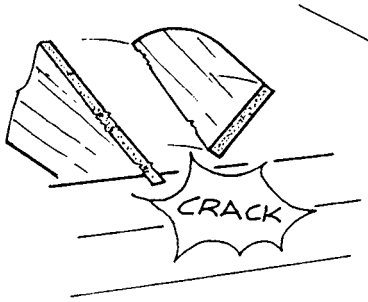




☐ Insert the remaining front portion of Rib #1 onto the dowel. Generously **EPOXY** the entire front rib area, as well as the dowel support tabs in Rib #2.



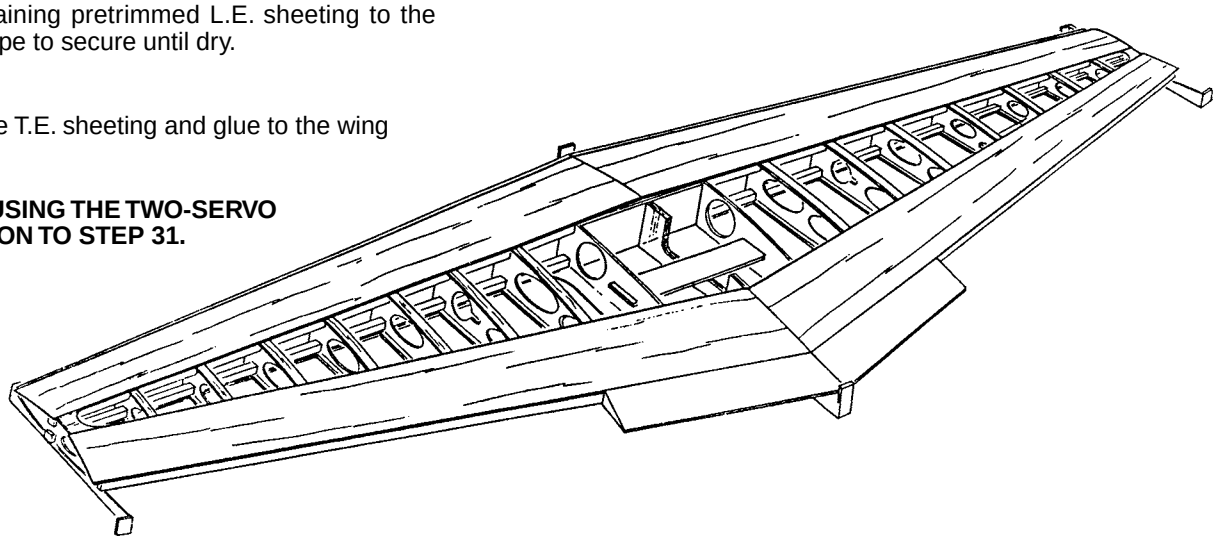
23. ☐ Crack off all of the support tabs.



☐ Glue the remaining pretrimmed L.E. sheeting to the wing. Pin or tape to secure until dry.

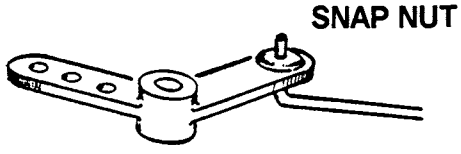
☐ Fit and trim the T.E. sheeting and glue to the wing

NOTE: IF YOU ARE USING THE TWO-SERVO OPTION, GO ON TO STEP 31.

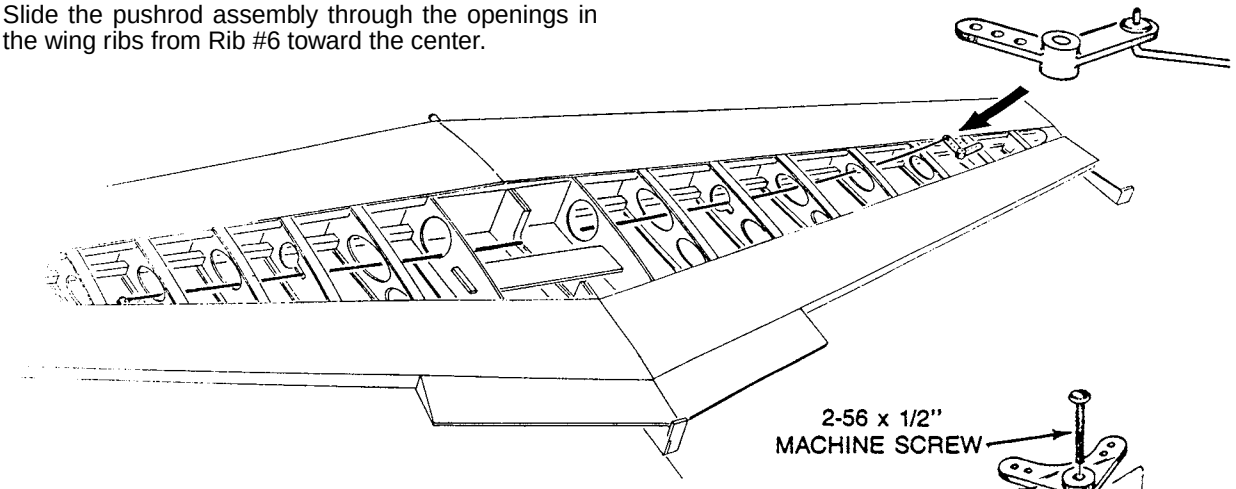


24. ☐ Bend a 5/16” x 900 angle at one end of the .063 diameter x 20-3/4” wire pushrod.

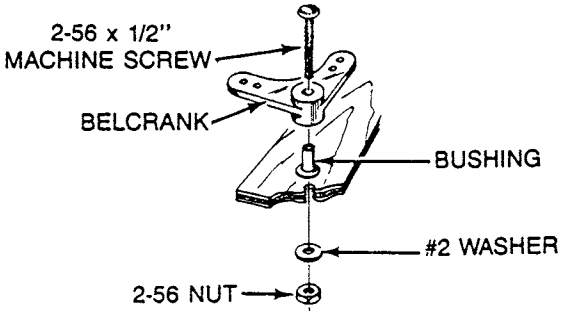
☐ Install an aileron bellcrank onto the bend. (See plan for correct orientation.) Secure with a snapnut. Place a drop of JET glue on the snap-nut.



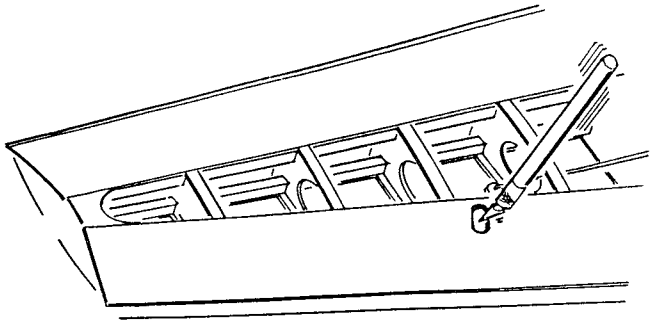
☐ Slide the pushrod assembly through the openings in the wing ribs from Rib #6 toward the center.



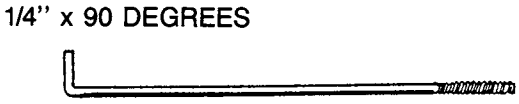
☐ Install the hardware to mount the bellcrank to the platform.



25. ☐ Using the plan for reference, cut the aileron pushrod exit holes in the T.E. sheeting.

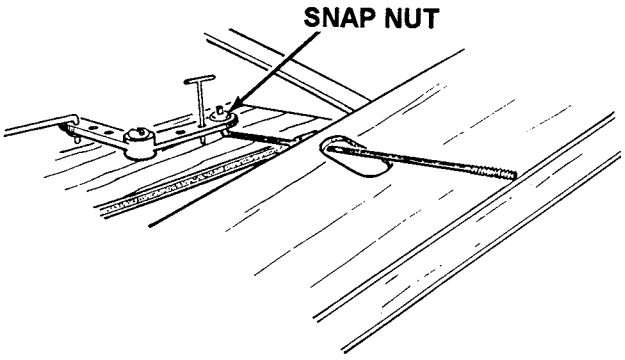


26. ☐ Make to pushrods to fit the template shown here.

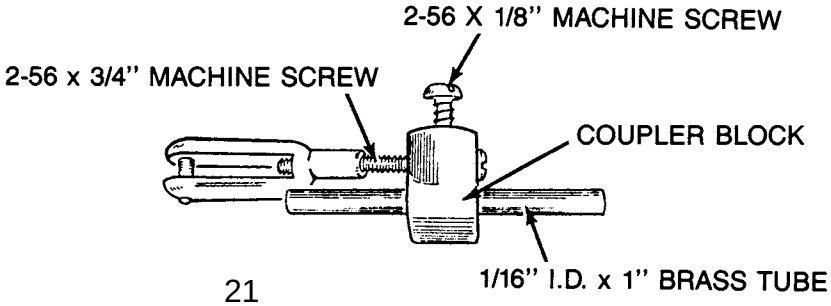


27. ☐ Install the threaded pushrods onto the bellcranks and secure with a snap-nut. Place a drop of JET glue onto the snap nuts.

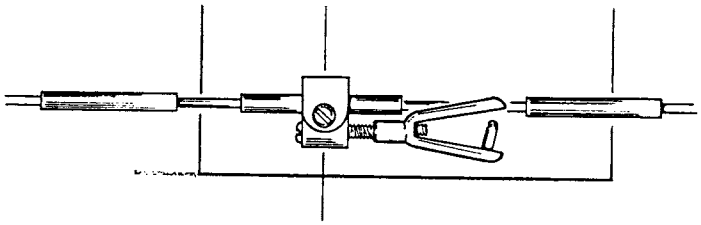
☐ Referring to the plan, fix the bellcranks in the neutral position with a "T" pin.



28. ☐ Assemble the aileron coupler.

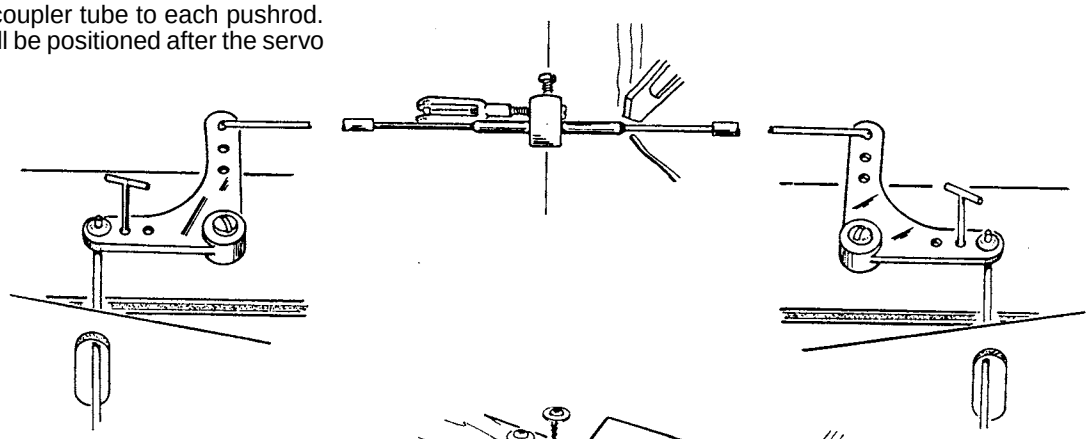


29. ☐ Slide one 1/16” ID. x 1” brass tube onto the left aileron pushrod and one tube onto the right aileron pushrod.

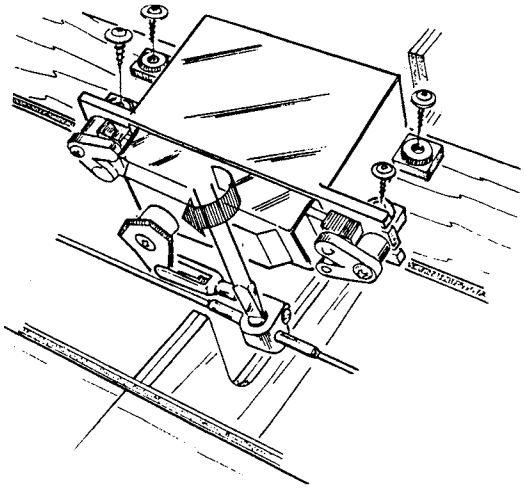


☐ Slide the aileron coupler assembly onto both pushrods. The coupler block should be centered on the wing centerline.

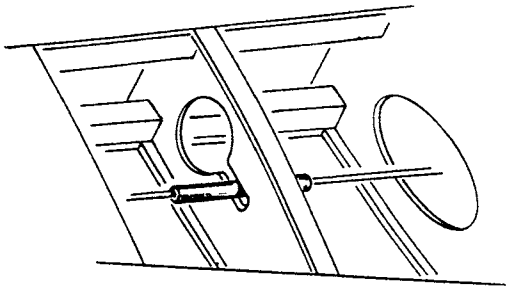
☐ Check that the bellcranks are still “fixed”in the neutral position and solder the coupler tube to each pushrod. The other brass tubes will be positioned after the servo is mounted.



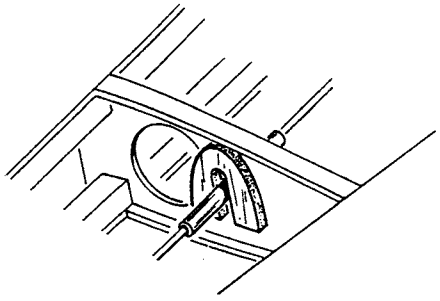
30. ☐ Connect the aileron servo to the pushrod. Locate the servo so that the bellcranks are in the neural position. Tighten the setscrew and mount the servo.



☐ In each wing half, center the brass tubes on the aileron pushrods at Rib #4.



☐ Glue the “horseshoe”-shaped balsa piece (retained from Step #7) to Rib. 4, laterally locking the brass bushing in the wing.

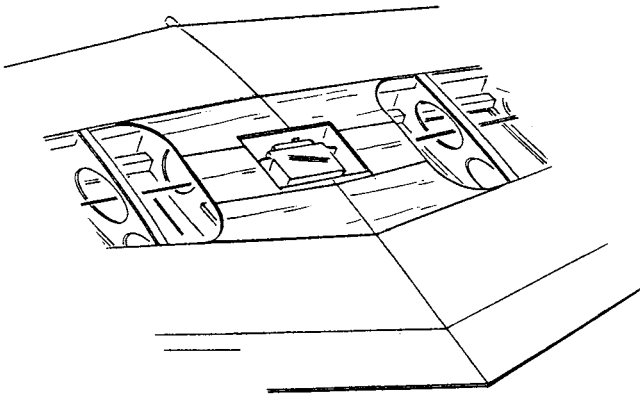


31. ☐ Cut out the opening for the aileron servo as you install the center sheeting.

NOTE: IF YOU ARE USING THE TWO-SERVO OPTION, CUT A SMALLER OPENING FOR SERVO LEAD ACCESS ONLY.

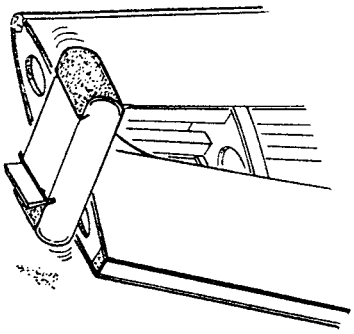
☐ Glue the tip sheeting in place and install the capstrips.

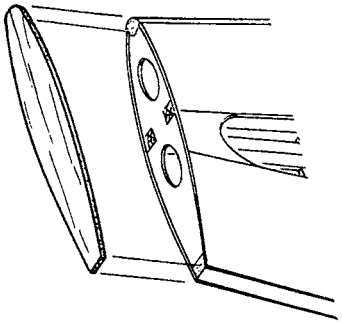
☐ Remove the wing assembly from the building board.



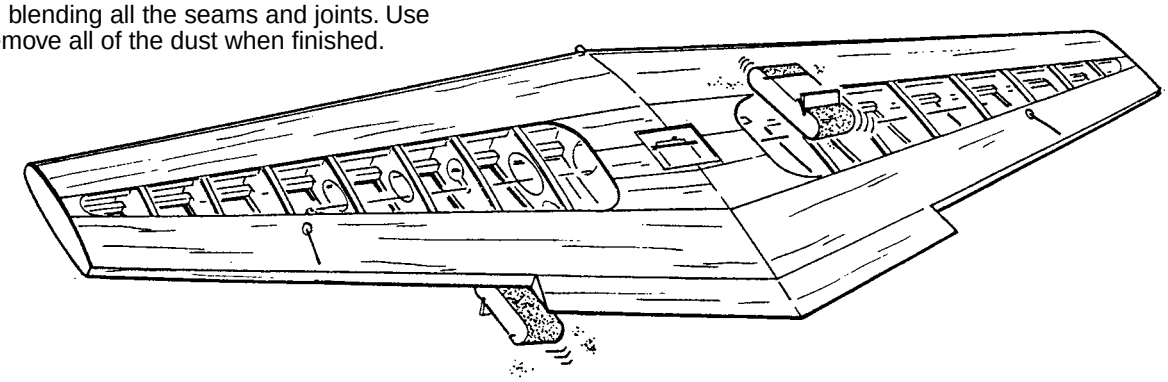
32. ☐ Sand flat the end ribs and glue the balsa tip rib to both tips.

☐ Sand the perimeter to match the airfoil.

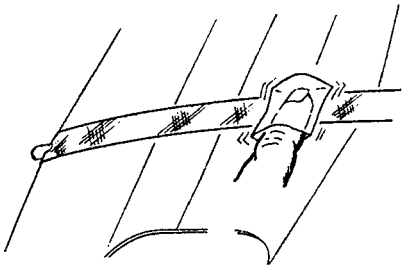


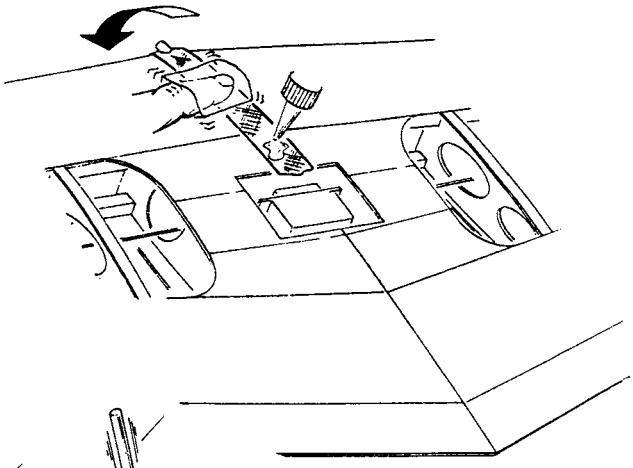


33. ☐ Sand the wing, blending all the seams and joints. Use a tack rag to remove all of the dust when finished.

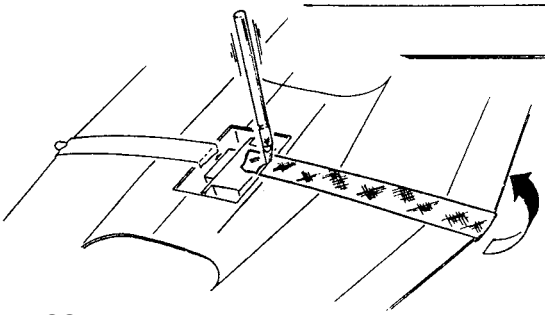


34. ☐ Starting at the front of the servo cut-out, completely wrap the center of the wings with 3/4" nylon tape. Smear glue through the fabric weave, using a plastic bag to protect your finger.

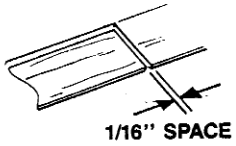


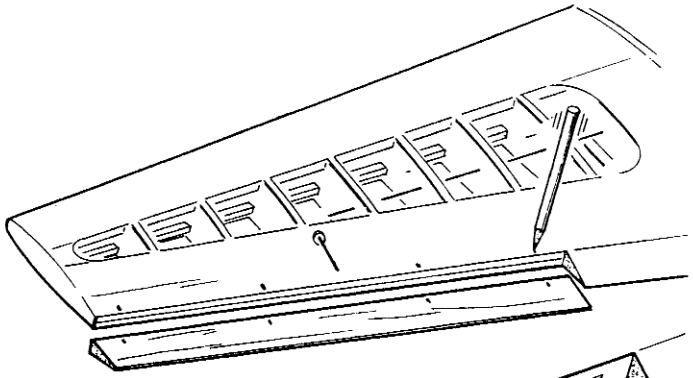


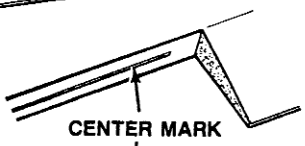
☐ Trim the excess at the rear servo cut-out.

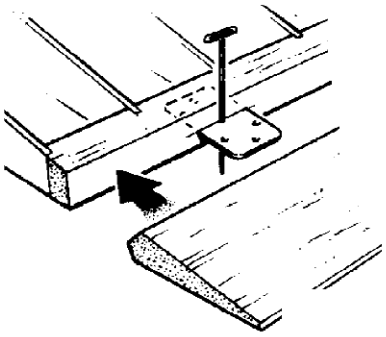


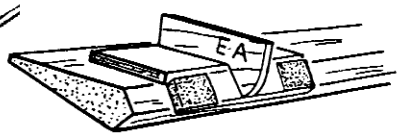
35. ☐ At this time, transfer hinge locations from the plan to the ailerons. Next, transfer these marks to the wing. Be sure to leave a 1/16" gap between the aileron and the T.E. center section.











☐ Use a CGM centerline tool and scribe a hinge centerline into both ailerons and wing halves.

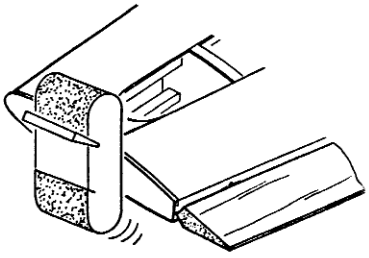
☐ Hinge the ailerons just like you did the elevator and rudder

☐ Bevel the ailerons to the center scribe line, using the bevel tool marked "AE."

☐ Temporarily hinge the ailerons to the wing to test the fit. Then, sand the aileron to the tip plane of the wing.

NOTE: Permanent assembly of the ailerons to the wings, as well as control horn installation, is done after covering.

IF YOU ARE INSTALLING ONLY ONE SERVO, THE WING CONSTRUCTION IS NOW COMPLETE.



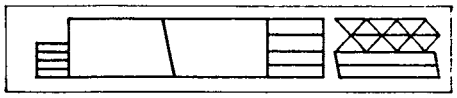
TWO-SERVO SYSTEM CONSTRUCTION (6 Steps)

TO BE INSTALLED ON A COMPLETED WING

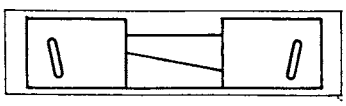
NOTE: The two-servo option should be used for aircraft using an engine larger than a .60 2-cycle.

1. ☐ Collect the following parts needed to install an aileron servo in each wing panel.

(1)	D/C SHT. #5521 PLY CONTAINING SERVO MOUNTING PARTS	PT. #3484
(1)	D/C SHT. #5522 BALSA CONTAINING HATCH COVERS	PT. #3334
(16)	#2 x 5/16" SHT. METAL SCREW	PT. #1086
(16)	#2 WASHER	PT. #1138



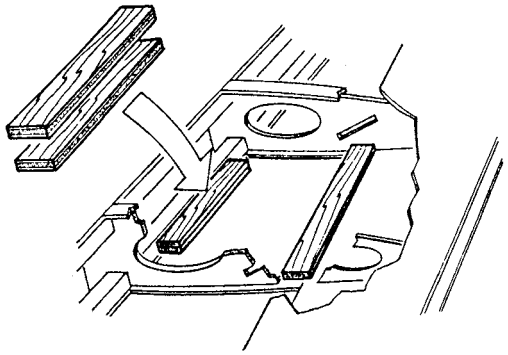
5521-3484



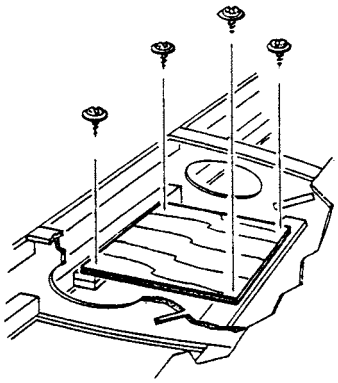
5522-3334

2. ☐ Laminate the two ply front platform supports and glue to the spar, centering between Ribs #6 and #7.

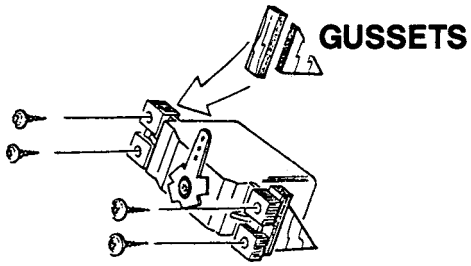
☐ Glue the rear platform support to Ribs #6 and #7 and to the T.E. sheeting.



3. ☐ Drill a 1/16" diameter hole in each corner of the platform and mount to the rails, using four of the #2 x 5/16" screws and washers.



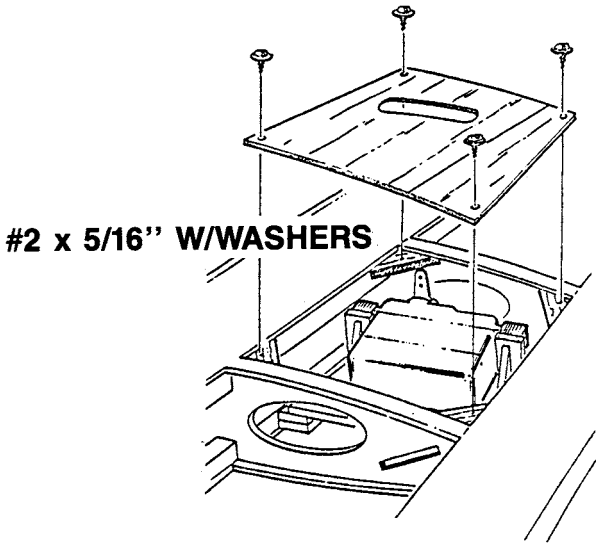
4. ☐ Glue the corner gussets to the servo mounts and fasten the assemblies to a servo.



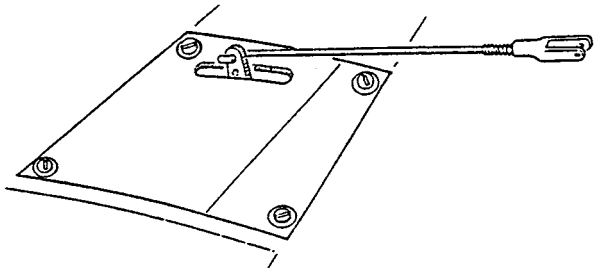
5. ☐ Glue a corner gusset to each corner of the servo bay, as shown.

☐ Fabricate the balsa hatch and drill a 1/16" diameter hole in each corner.

☐ Center the servo arm in the slotted hole of the hatch cover to locate the servo. Remove the hatch and glue the servo gussets and mounts to the platform.



6. ☐ After the wing is covered, and with both the servo and aileron in the neutral position, measure and connect the pushrod.

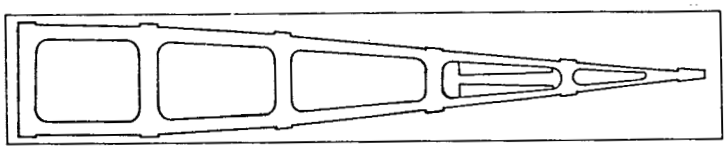


THIS COMPLETES THE WING. NOW LET'S MOVE ON TO THE FUSELAGE.

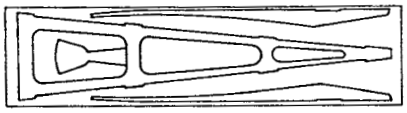
CONSTRUCTING THE FUSELAGE (36 Steps)

1. ☐ Gather all of the parts needed to construct the FUSELAGE. They include:

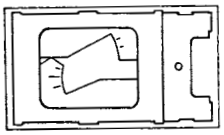
(2)	D/C SHT. 5501 PLY SIDES	PT. #3475
(1)	D/C SHT. 5502 PLY FUSE BOTTOM	PT. #3473
(1)	D/C SHT. 5503 PLY CONTAINING TOP & BACKUPS	PT. #3474
(1)	D/C SHT. 5504 PLY CONTAINING DOUBLER, TRIPLER, FORMERS & FUEL TANK TRAY	PT. #3475
(1)	D/C SHT. 5505 PLY CONTAINING DOUBLER, TRIPLER & FRMRS	PT. #3476
(1)	D/C SHT. 5506 PLY FRMRS & GAUGES	PT. #3477
(1)	D/C SHT. 5507 PLY FORMERS	PT. #3478
(1)	D/C SHT. 5508 PLY FORMERS	PT. #3479
(1)	D/C SHT. 5509 PLY FIREWALL	PT. #3480
(1)	D/C SHT. 5518 PLY TURTLEDECK	PT. #3481
(1)	1/32" PLY FRONT/TOP SHEET	PT. #4602
(1)	BASS WING MOUNTING BLOCK	PT. #4372
(1)	1/4" PLY LANDING GEAR BLOCK	PT. #4373
(2)	BASS MOTOR SPACER	PT. #4374
(1)	1/2" x 7" BALSA GUSSET	PT. #4217
(2)	1/8 x 1/2 x 18" BALSA STICK	PT. #4376
(6)	6-32 BLIND NUT	PT. #1124
(6)	6-32 x 1-1/4" SOCKET HD. SCREW	PT. #1024
(2)	#6x3/4" WASHER	PT. #1144
(4)	#6 x 3/4" SHT. METAL SCREW	PT. #1082
(2)	MAIN LANDING GEAR WIRE	PT. #1322
(2)	MOTOR MOUNT	PT. #1466



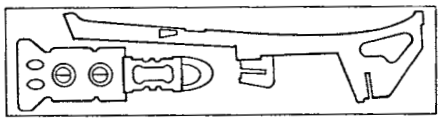
5502-3473



5503-3474



5506-3477



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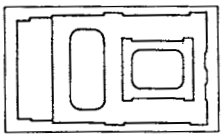

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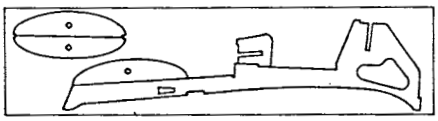

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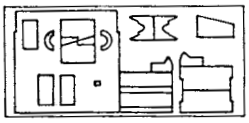
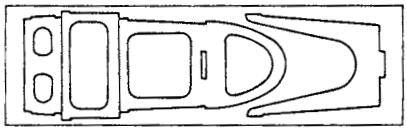
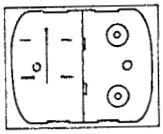


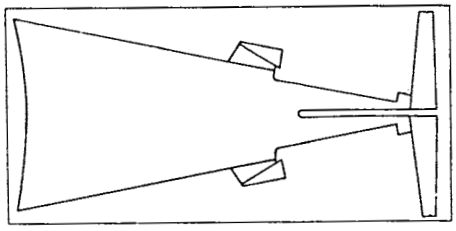
5519-3482



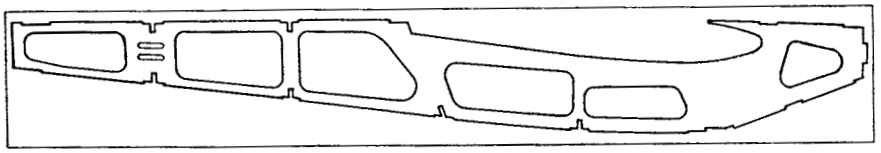
5508-3479



5509-3480



5518-3481



5501-3472

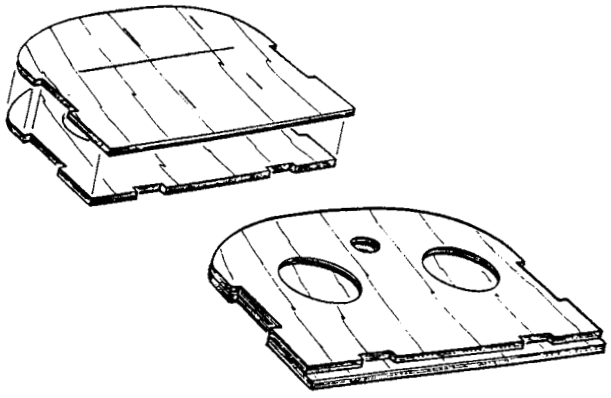
1/2'' x 7'' BALSA

1/8'' x 1/2'' x 18'' BALSA

BASS SPACER

2. ☐ Carefully remove the parts from the die sheets and lightly sand the rough edges of each part.

3. ☐ With the scribe lines exposed, glue FIREWALL FORMER "AF" to the other firewall half. Make sure the top and side edges match. Note the bottom offset fit. Tape together and allow the assembly to dry on a flat surface.



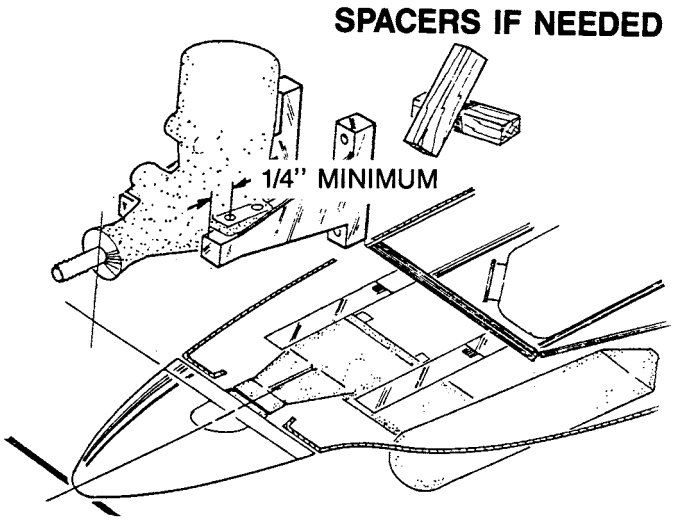
☐ Drill a 3/8" diameter hole at the center mark.

4. ☐ Position the 'DRIVE WASHER," of your engine over the drive washer on the plan.

☐ Place the MOTOR MOUNT against the firewall over the plan. You may require spacers to accomplish the proper position.

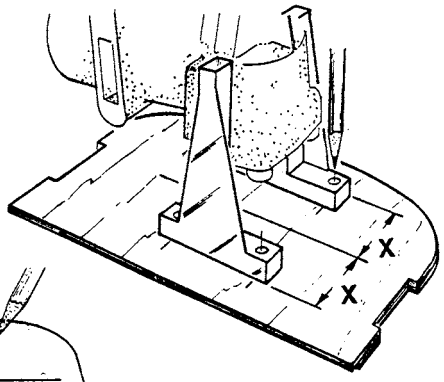
☐ Tack glue the engine to the mounts.

NOTE: MAKE SURE THAT THIS DIMENSION IS AT LEAST 1/4". If not, use basswood spacers between the firewall and the motor mounts.

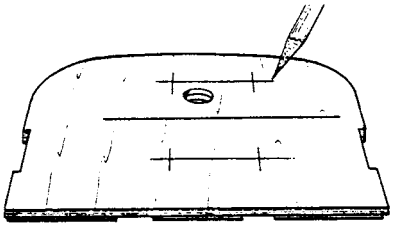


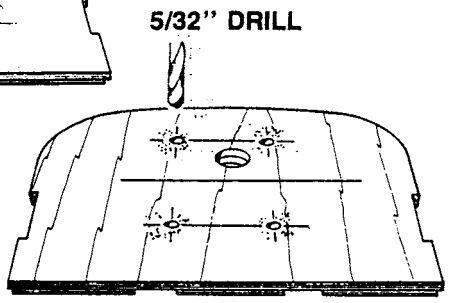
5. ☐ Place the motor assembly over the "AF" side of the firewall.

☐ Measure 1/2 of the total distance between the mounts, from the scribe mark on the firewall to one of the mounts.



☐ With the holes on the vertical scribe marks on the firewall, mark all four mounting bracket locations.

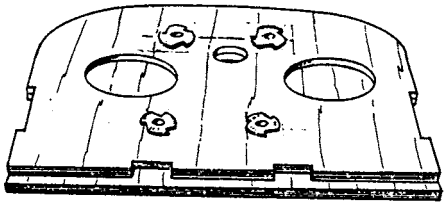




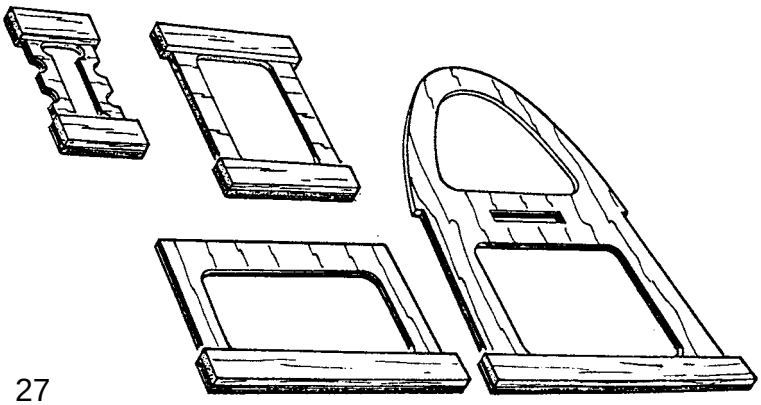
☐ Drill a 5/32" hole at each location.

☐ Turn the firewall over and insert the four 6-32 blind nuts. Seat them with a soft hammer blow.

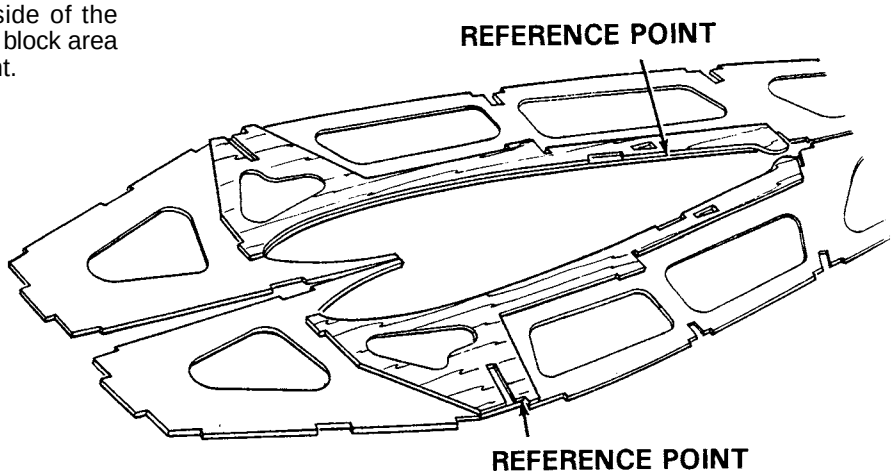
☐ Coat the edges of the nut with JET GLUE. Be careful to not get glue in the threads. Put the assembly aside for now.



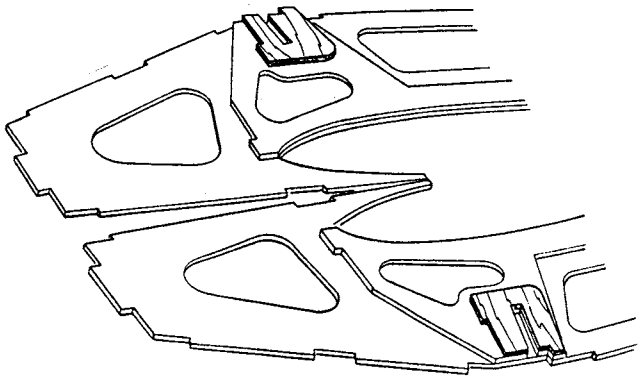
6. ☐ Locate, glue, and trim the 1/8 X 1/2" balsa doublers to the four formers, "D," "E," "F" and the SLANT former.



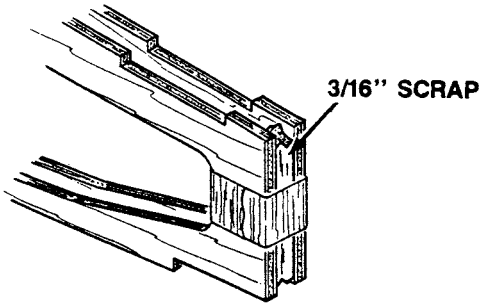
7. ☐ Glue the wing-saddle doublers to the inside of the fuselage sides. Reference the landing gear block area and the wing curve for the correct alignment.



8. ☐ Glue the landing gear triplers onto the wing saddle doublers. Make sure that the landing gear wire slots are in line.

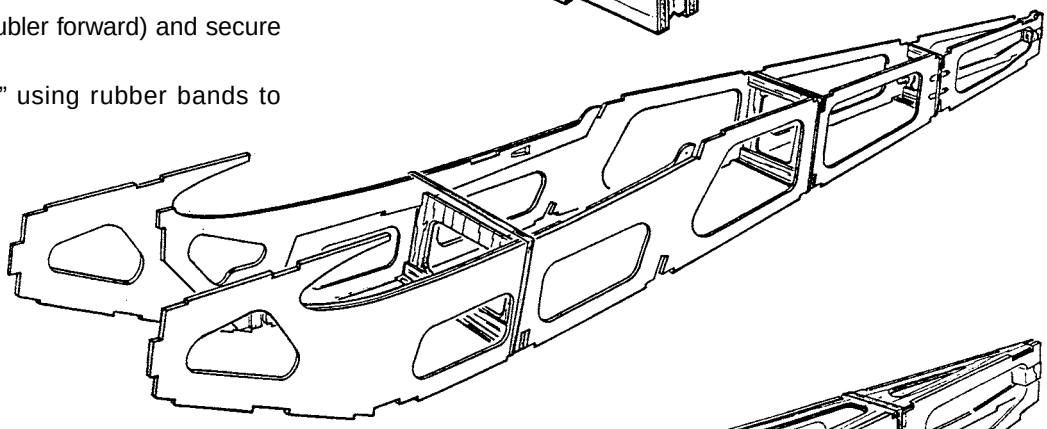


9. ☐ With the triplers face to face, tape the fuselage sides together at the rudderpost end. Use a scrap piece of 3116" balsa spacer between the sides.

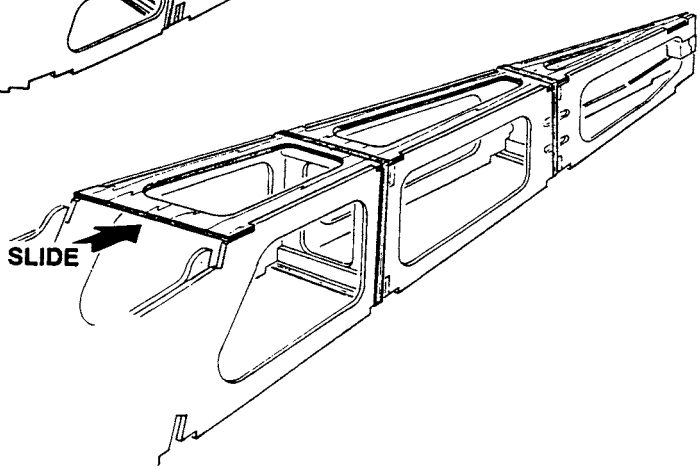


☐ Install Former "D" (balsa doubler forward) and secure with a rubber band.

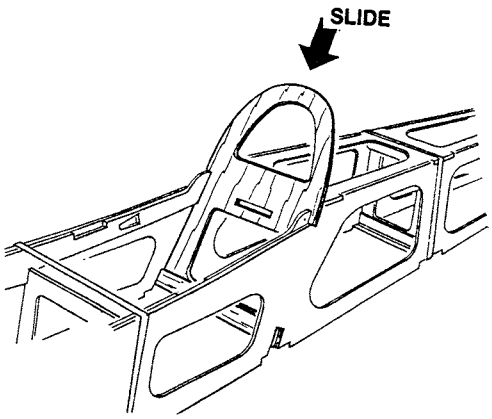
☐ Install Formers "E" and "F," using rubber bands to secure at each former.



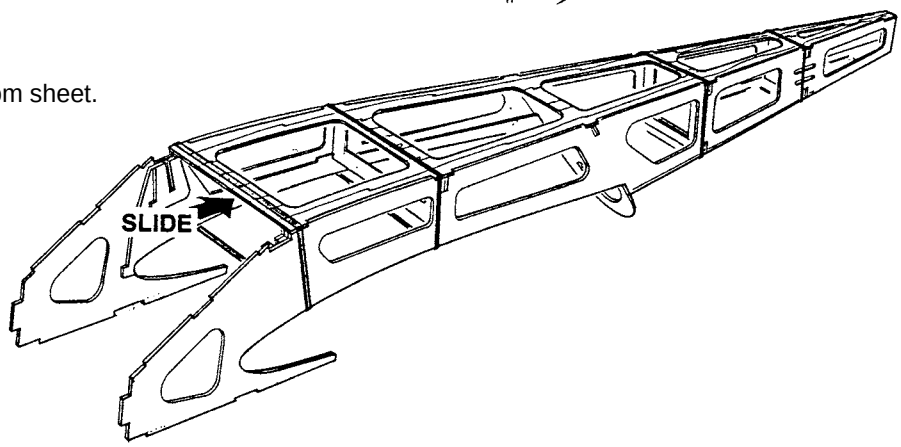
10. ☐ Slide the fuselage top under the rubber bands and press into position. Loosen the tape at the rudderpost end to allow top to fit.



11. ☐ Slide in the “SLANT” former.

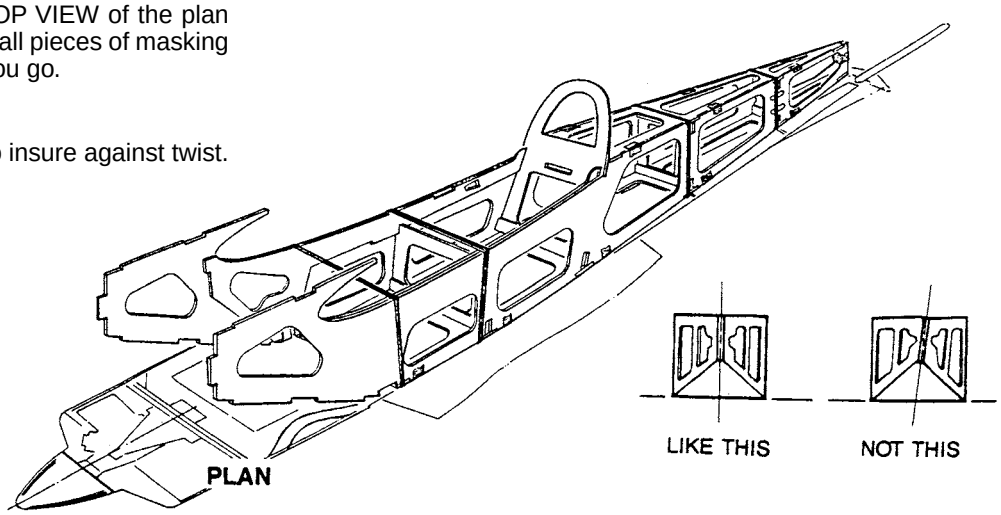


12. ☐ Flip the fuselage over and install the bottom sheet.

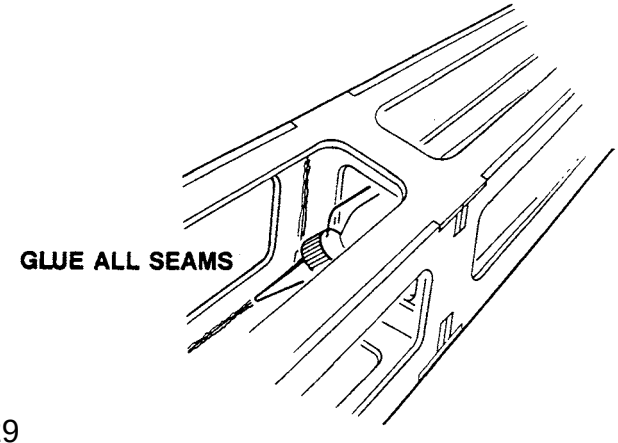


☐ Position the fuselage over the TOP VIEW of the plan and check the alignment. Use small pieces of masking tape to secure the structure as you go.

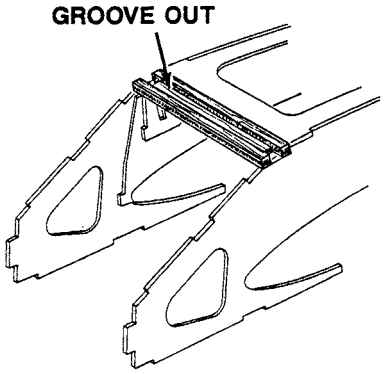
☐ Sight-check down the fuselage to insure against twist.



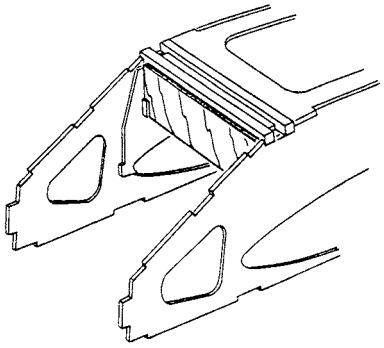
13. ☐ When the fuselage is perfectly aligned, glue all of the seams created by the sides, top, bottom and formers.



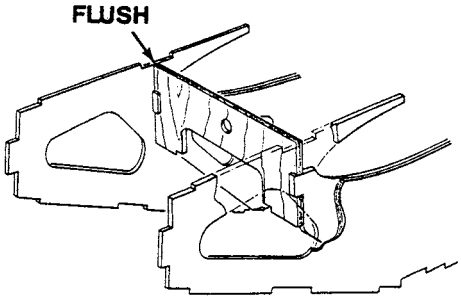
14. ☐ Glue the landing gear block to the fuselage assembly. **Make sure the groove is facing out.**



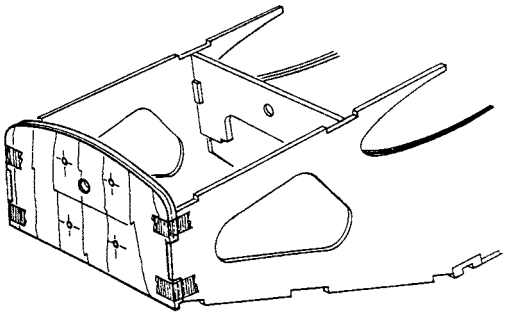
☐ Glue Former “C” to the landing gear block and the triplers.



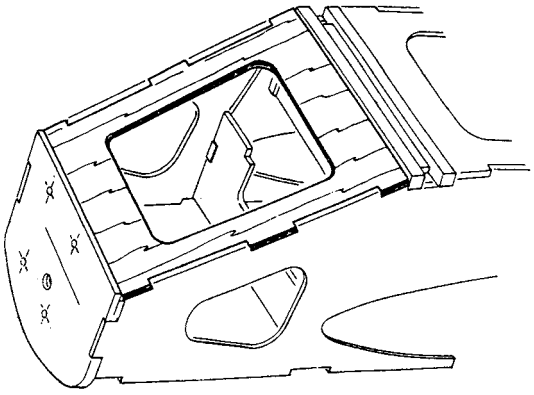
15. ☐ Glue in Former “B.” Check that the former is flush with the fuse side slot.



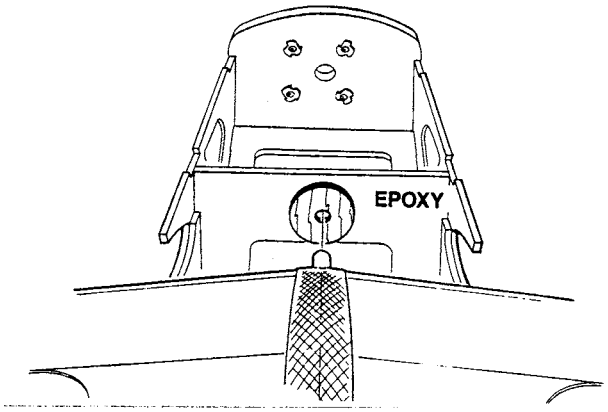
16. ☐ Glue the FIREWALL onto the fuselage assembly. Make sure that the blind nut flanges are on the inside.



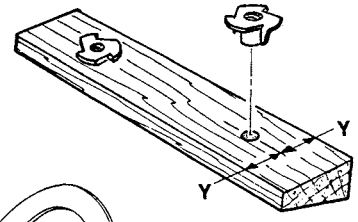
17. ☐ Glue the bottom-front piece in place.



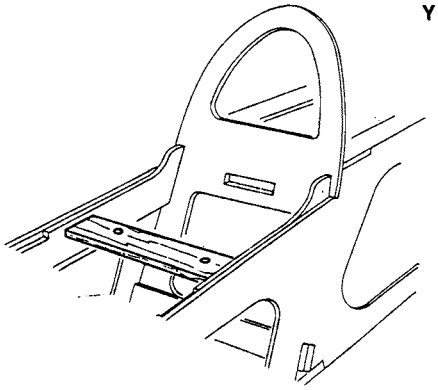
18. ☐ Use the wing to locate the doubler disc. Correctly position the disc to Former “B” and epoxy in place.



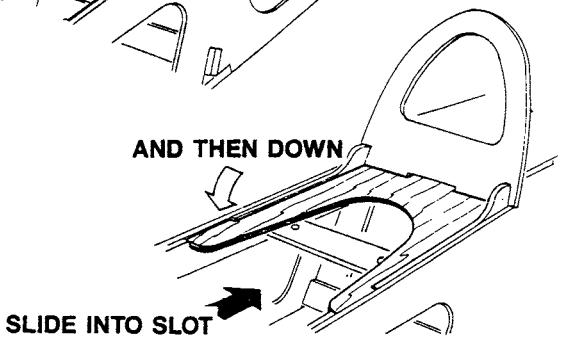
19. ☐ To the wing mounting block, insert a 6-32 blind nut into each hole on the surface Mere the holes are centered. Make sure that the nut spurs are full set into the wood. Tap with a hammer to insure a good fit.



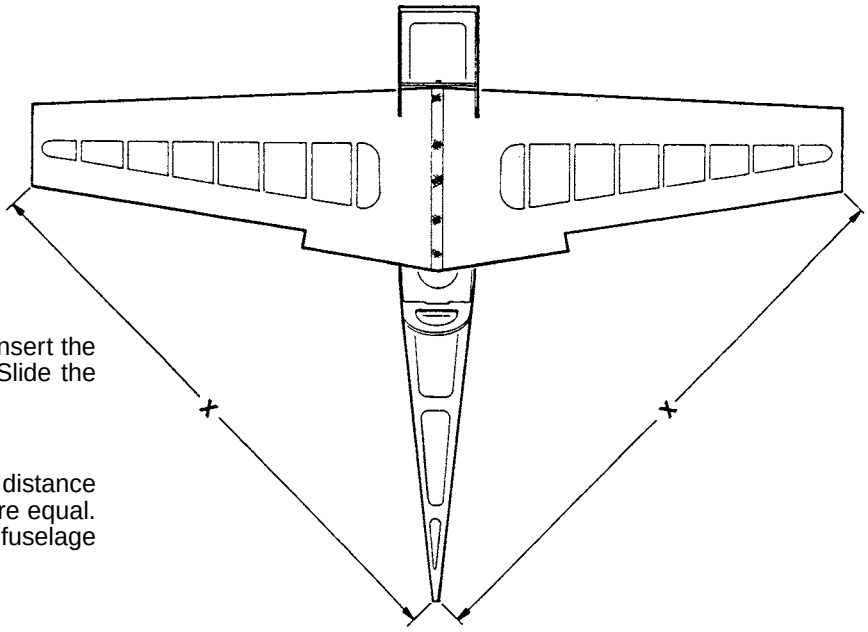
20. ☐ With the blind nuts on the under side, test fit (and trim, if necessary,) the block assembly into the cutouts in the doublers. When you have a proper fit, Epoxy in place.



21. ☐ Install the gusset into the slot in the slant former and down into the notches in the doublers. The gusset should also rest on the wing mounting block. When you are satisfied with the fit, glue in place.



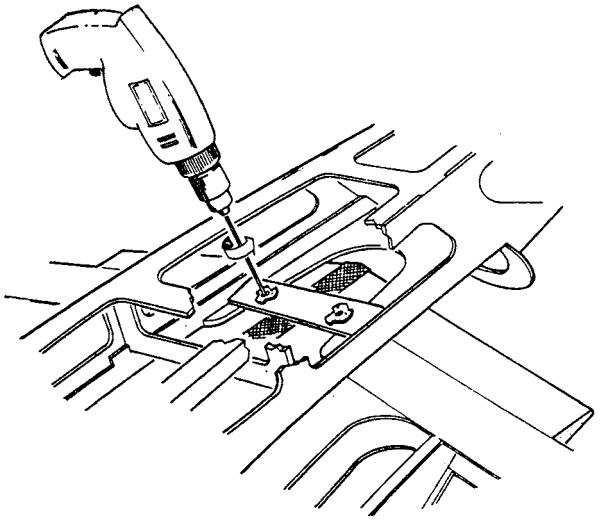
22. For the next few steps, you will need the wing.



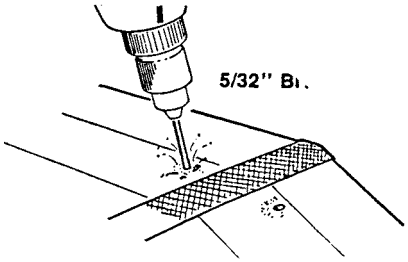
☐ Place the fuselage on a stable, flat surface. Insert the wing pin dowel into the hole in Former “B.” Slide the wing as far forward as it will go.

☐ True the wing to the fuselage by adjusting the distance from the wing-tip to the tail until both sides are equal. When you are satisfied, secure the wing to the fuselage with tape.

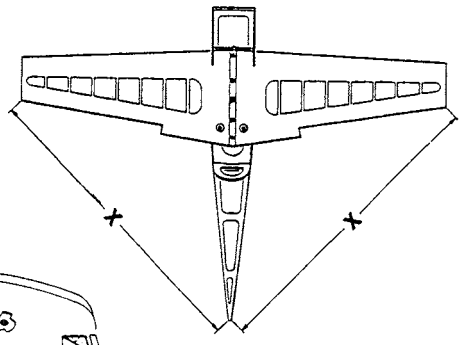
23. ☐ Flip the wing/fuse over and drill a small pilot hole (no larger than 7/64”) through the wing.



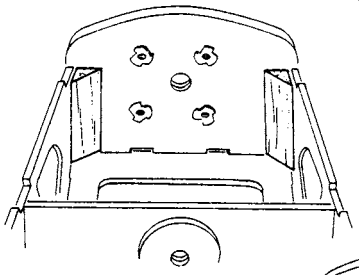
☐ Remove the wing from the fuse and drill a 5/32” hole, using the pilot hole as a guide.



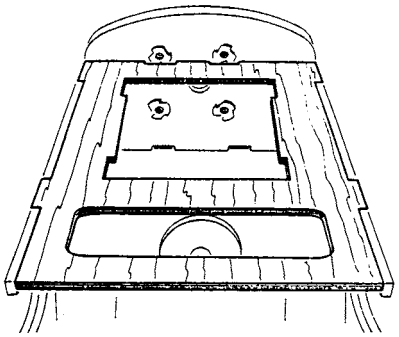
☐ Test bolt the wing to the fuselage and check to make sure the tip-to-tail dimensions are still equal.



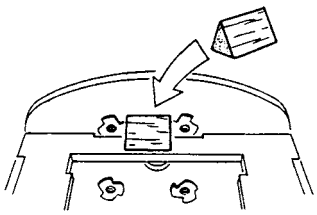
24. ☐ Trim and glue the 1/2” balsa triangle stock behind the firewall.



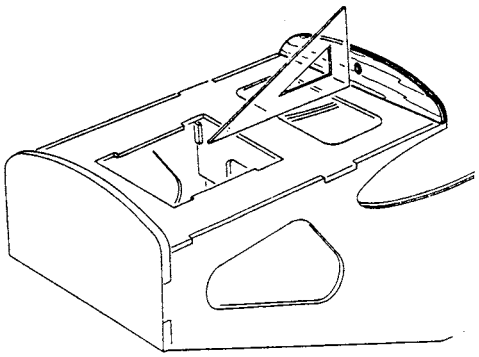
25. ☐ Glue in the top reinforcement.



26. ☐ Glue in the remaining triangle stock, as shown.

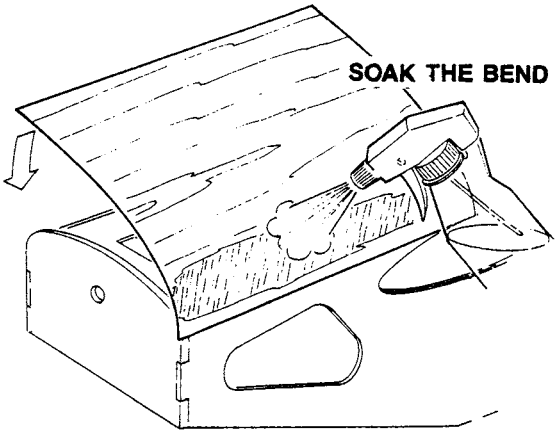


27. ☐ Locate Former "BB" at a 900 angle to the front reinforcement and glue.

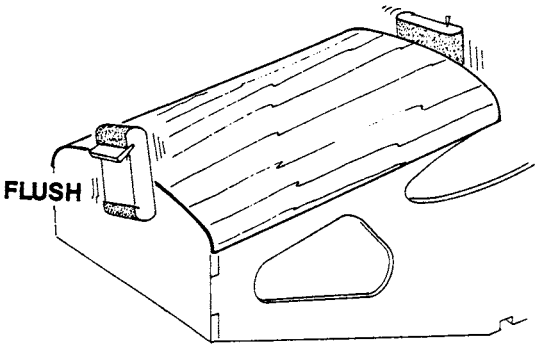


28. ☐ Glue one edge of the 1/32" ply TOP SHEET to the fuse. Then, using a spray bottle to soak the sheet, slowly roll to the opposite side, gluing as you go.

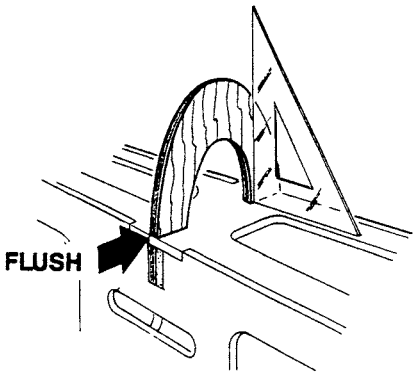
NOTE: MARK THE CENTERLINE ON THE TOP SHEET AND THE FUSE TO INSURE A CORRECT FIT.



☐ Sand the edges in line with the firewall and Former "BB."

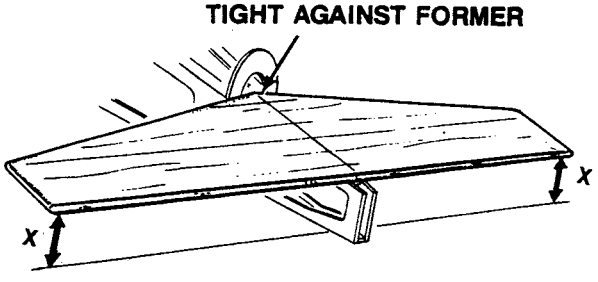


29. ☐ Install Former "FF directly above Form "F" and at a 900 angle to the fuse top.



30. ☐ Mark the centerline onto the horizontal stabilizer and on the stab platform of the fuselage.

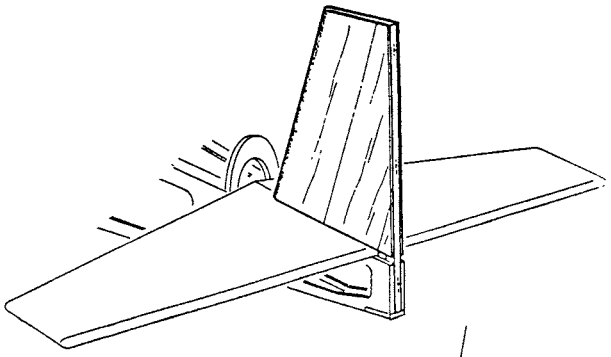
☐ Glue the stabilizer to the platform, locating it on the centerlines and against Former "FF." Check the stabilizer to insure that it is parallel to the base.



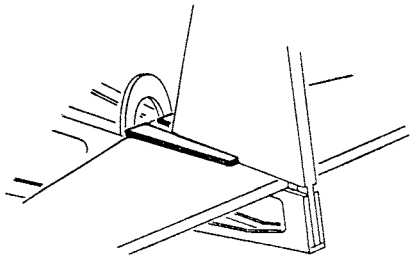
31. ☐ Install the vertical fin. Insert the rudderpost into the rudderpost slot. Tilt the fin forward until it rests on the top surface of the stab.

☐ Check that the assembly is square, using a 900 triangle.

☐ Permanently glue the fin to the stabilizer and fuselage.



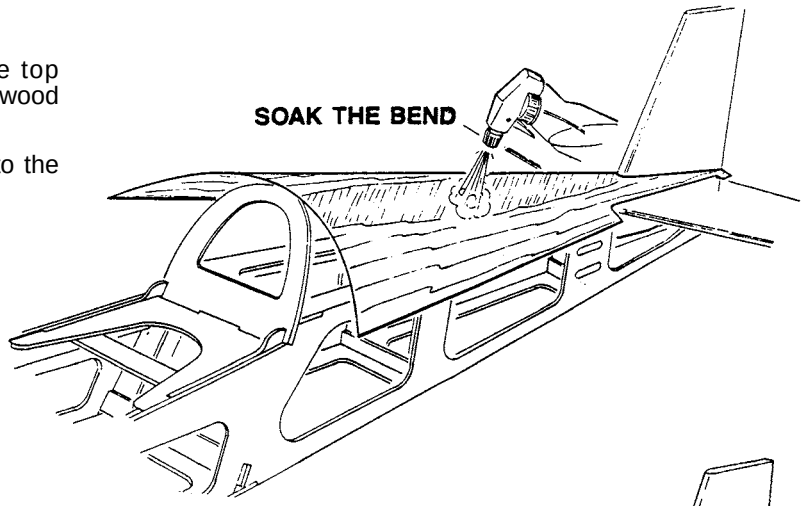
32. ☐ Glue the ply "BACKUP" pieces to the stab on each side of the fin.



33. ☐ Slide the 1/32" ply turtledeck around the fin.

☐ With a water spray bottle, liberally soak the top centerline of the turtledeck. This will allow the plywood to be formed without splitting.

☐ Wrap the ply around the formers and down onto the fuselage sides. Sand the sides for a smooth fit.

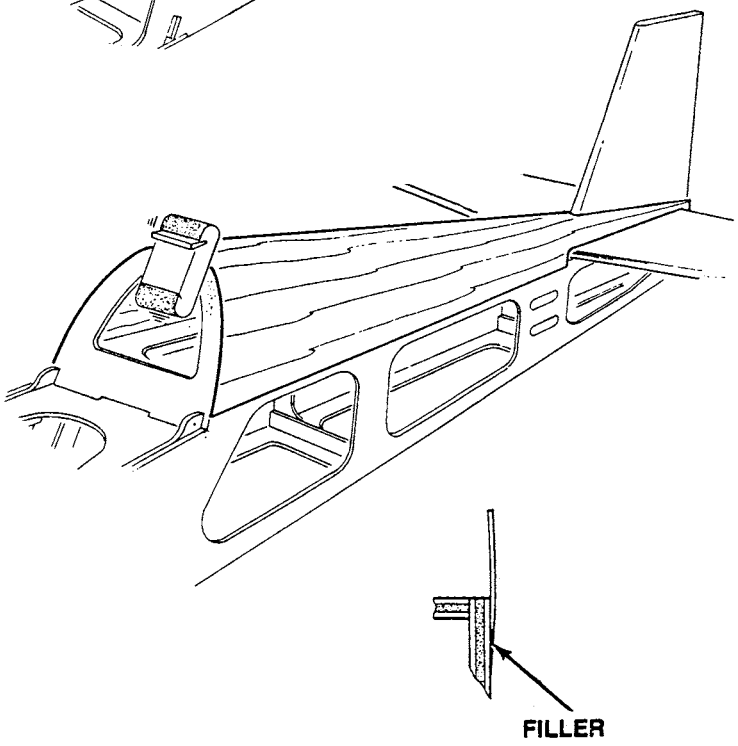


34. ☐ When satisfied with the fit, apply glue to the formers, fuselage sides, fin and stab.

☐ Quickly wrap the plywood down to the fuselage and tape in place until dry.

35. ☐ Bevel the plywood edge at the fuselage lap-joint and sand the edge flush with the slant former. Fill the step with CGM Model Magic filler.

☐ Apply additional filler to the fin and stabilizer seams and blend to create a smooth transition.



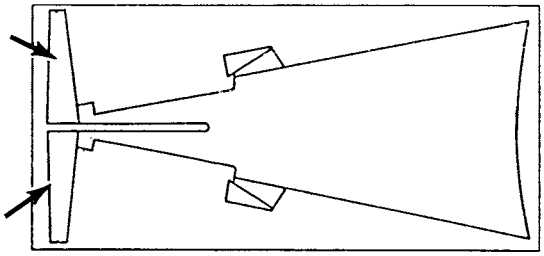
36. ☐ Go over the fuselage, sanding all seams and joints with medium sandpaper. Then, sand the entire fuselage with fine grit sandpaper. The effort you put into finish sanding will show, as no covering material will hide a poor sanding job!

☐ Now go back to all of the built-up parts to inspect the sturdiness of joints and to finish sand. When satisfied with the finish, the aircraft is ready for covering.

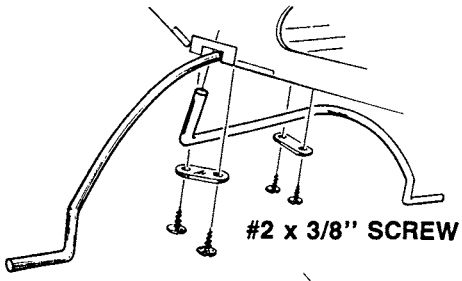
CONSTRUCTING LANDING GEAR FAIRINGS (7 Steps)

1. ☐ Collect the parts needed to construct the LANDING GEAR FAIRINGS. They include:

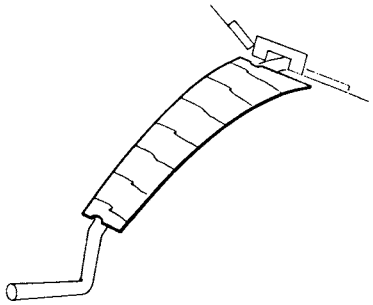
(2)	LANDING GEAR 3/16" WIRE	PT. #1322
(2)	LANDING GEAR STRAP	PT. #1418
(4)	#2 x 3/8" SHT. METAL SCREW	PT. #1087
(1)	D/C SHT. #5518 1/32" PLY	PT. #3481
	CONTAINING (2) FAIRINGS	
(2)	BALSA SHEET 1/16 x 2-7/8 x 10"	PT. #4886



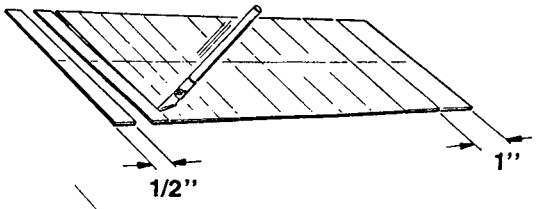
2. ☐ Install the LANDING GEAR WIRES and secure them in place with the nylon straps and screws.



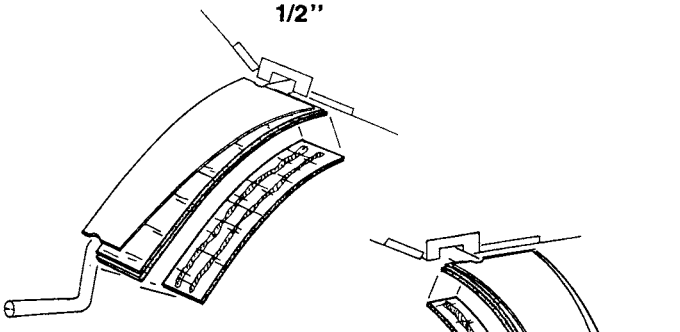
3. ☐ Tack glue the plywood FAIRINGS to the wire gear. Align the half moon notches with the wire and keep the root end parallel to the fuse bottom.



4. ☐ Edge-glue the two 1/16 x 2-7/8 x 10" BALSA SHEETS together and cut:
   - (6) 1/2" cross-grained strips
   - (6) 1" cross-grained strips.

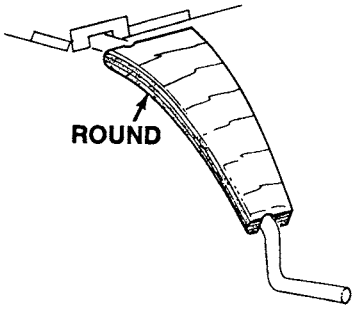


5. ☐ Laminate three 1" strips to the ply failing. Wet the balsa, if necessary, to bend into position.



6. ☐ Repeat the process with the 1/2" strips on the front side of the fairing.

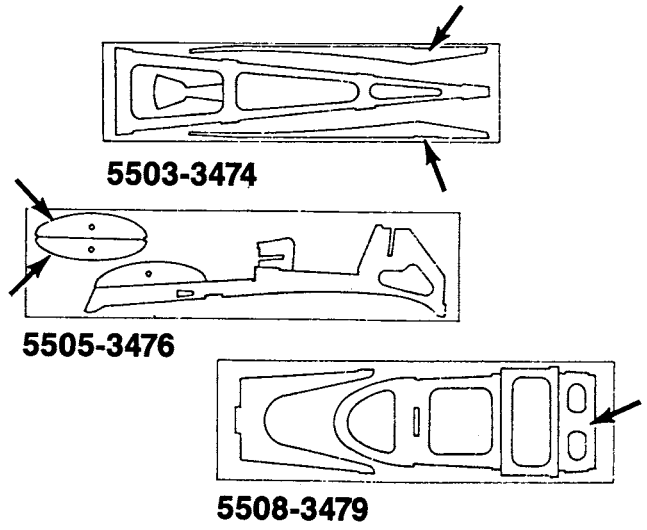
7. ☐ Sand the completed fairings to shape. You may want to remove the fairing from the wire to shape it. After the fairings are covered or painted, permanently attach them with silicon adhesive.



CONSTRUCTING THE CANOPY FRAME (6 Steps)

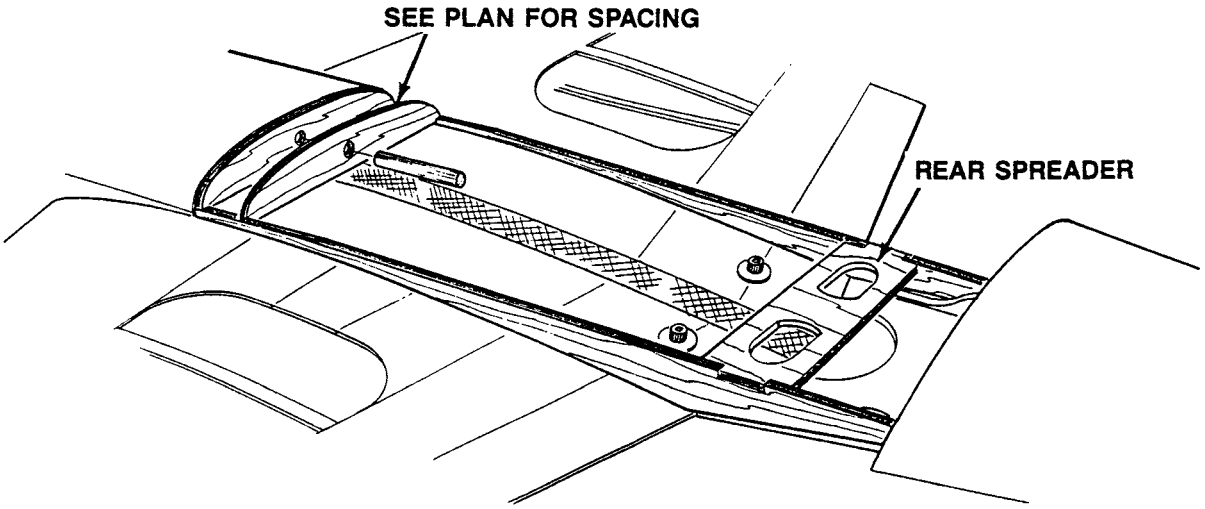
1. ☐ Collect the following parts.

(1)	D/C SHT. #5503 (REMAINDER) PLY CONTAINING (2) RAILS	PT. #3474
(1)	D/C SHT. #5505 (REMAINDER) PLY CONTAINING (2) FORMER "CC"	PT. #3476
(1)	D/C SHT. #5508 (REMAINDER) PLY CONTAINING (1) SPREADER	PT. #3479
(1)	DOWEL 1/4 x 1-3/4" BIRCH	PT. #1755
(1)	CANOPY	PT. #9515
(1)	COCKPIT INSERT	PT. #9518
(2)	4-40 BLIND NUT	PT. #1125
(2)	4-40 x 1/2" PAN HEAD SCREW	PT. #1048
(2)	#2 WASHER	PT. #1139



2. ☐ Mount the wing to the fuse.

☐ Position the two rails on top of the wing, as shown. Tape to the wing, if you wish.

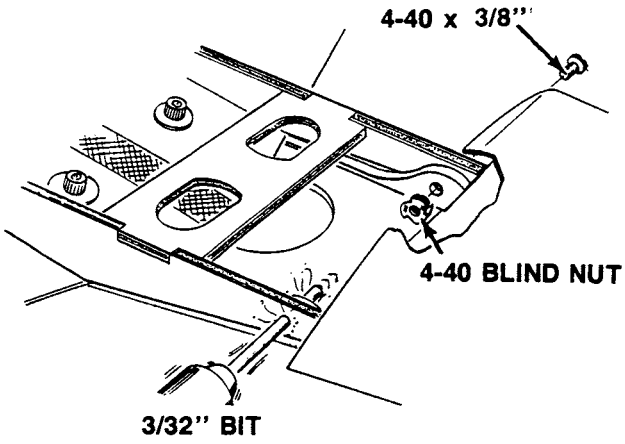


☐ Referring to the plan for the distance between the two Formers "CC", glue them to the rails. Use the 1/4" dowel as an alignment pin to the fuselage Former "BB."

☐ Install the rear spreader into the slots in the rails and glue.

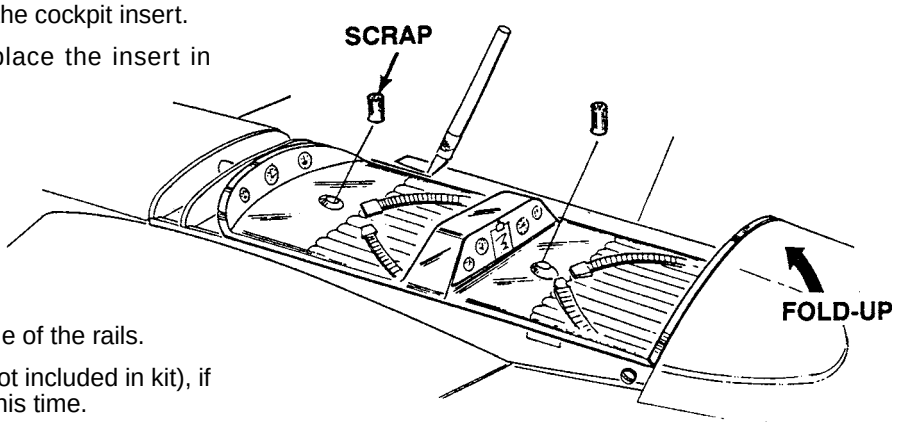
3. ☐ Drill a 3/32" hole through the rail and the fuselage tab.

☐ Press a blind nut into each tab and, temporarily, bolt the canopy frame to the fuselage.



4. ☐ Pretrim the back flip-up portion of the cockpit insert.

   ☐ Glue the top of the frame and place the insert in position.

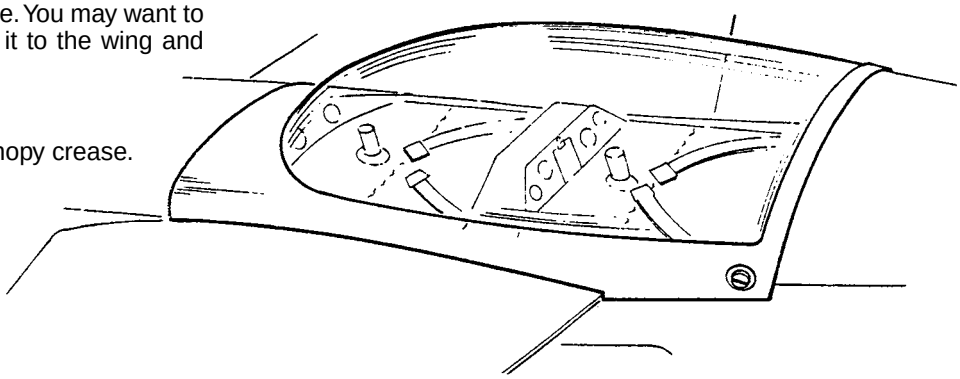


   ☐ Trim the insert flush with the outside of the rails.

   ☐ Add control sticks and pilot (both not included in kit), if desired. Also, paint the interior at this time.

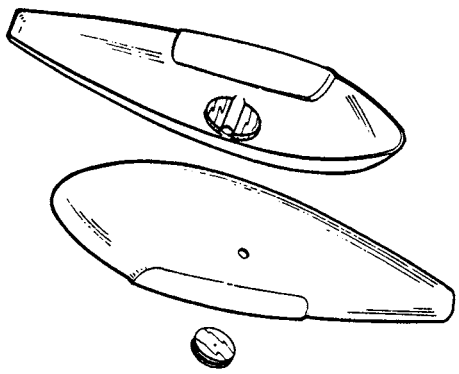
5. ☐ Trim the canopy along the scribe line. You may want to trim it a little long and precisely fit it to the wing and fuselage.

6. ☐ Paint the canopy deck up to the canopy crease.



ASSEMBLING THE WHEEL PANTS (6 Steps)

1. ☐ Clean up the edges of the pant halves by gently sliding them over sandpaper on a flat surface.

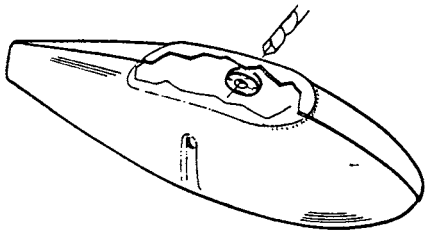


2. ☐ On both the outer and the inner pant half, drill a 3/16” hole at the axle location.

   ☐ Glue the two support plates to the inner pant half.

   ☐ Glue the axle support plate to the outer pant half, aligning the center mark on the plate concentric with the hole.

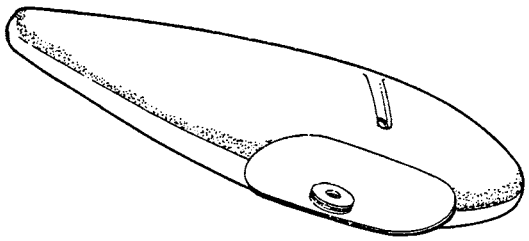
3. ☐ Rough-cut the wheel opening in all four pant halves. Then glue an outer half to an inner half, forming a lap joint. Align the outer half edge to the scribe line on the inner half all around.



4. ☐ Carefully trim to the wheel well line. Use a small round file to clean up the edges.

   ☐ Fill the step of the lap seam with filler and sand smooth. Repeat if necessary.

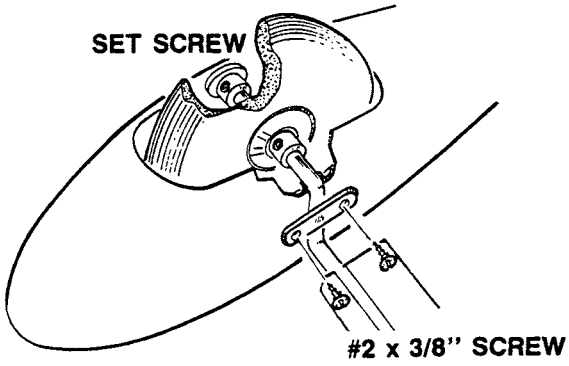
   ☐ Repeat the process for the other wheel pant. When both are finished to satisfaction, paint.



5. ☐ Slide the wheel pant, collar, wheel, and other collar onto the landing gear axle.

   ☐ Snap the landing gear into the pant groove and permanently install the nylon strap.

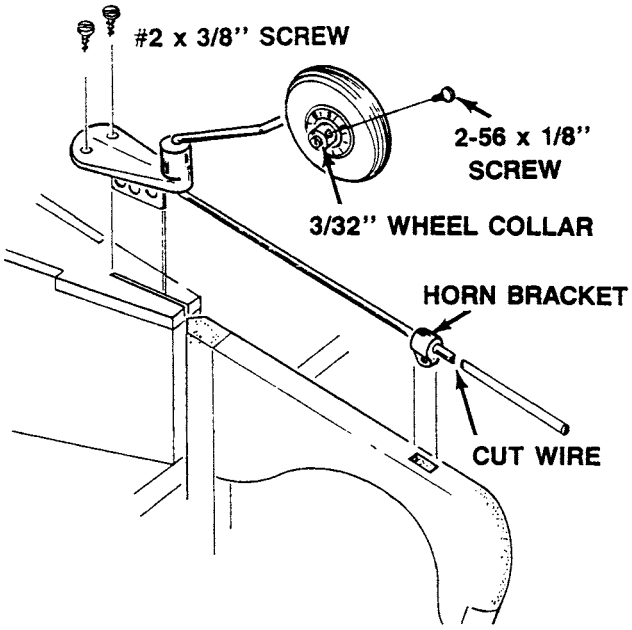
   ☐ With the wheel in the center of the pant, tighten set screws in the collars, allowing the wheel to spin freely.



6. ☐ Install the tailwheel bracket. Secure using two #2 x 3/8" screws.

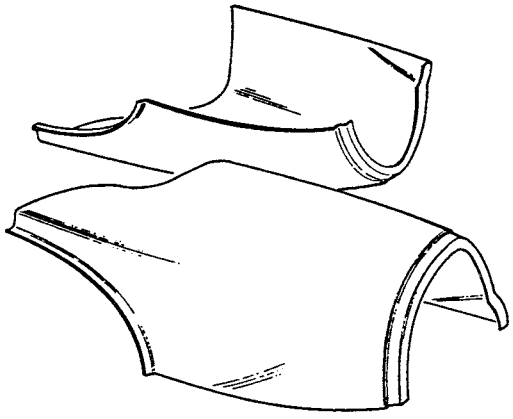
   ☐ With the horn bracket on the wire, notch the bottom of the rudder and glue in the bracket.

   ☐ Install a 1-1/4" diameter wheel.



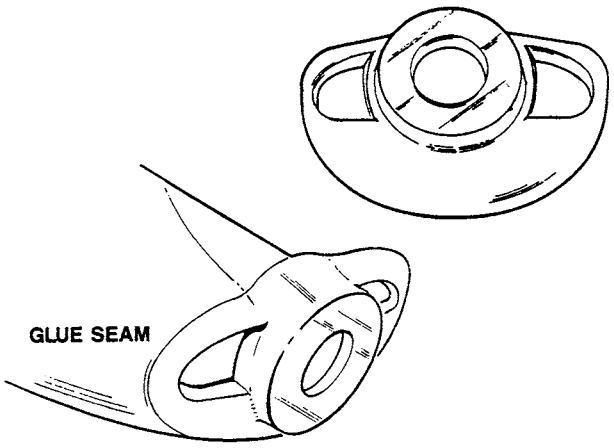
ASSEMBLING THE ENGINE COWL (9 Steps)

1. ☐ Carefully cut the cowl halves along the scribe lines around the perimeter. Sand the edges straight along the top and bottom seam line. Don't forget the cowl exhaust area.



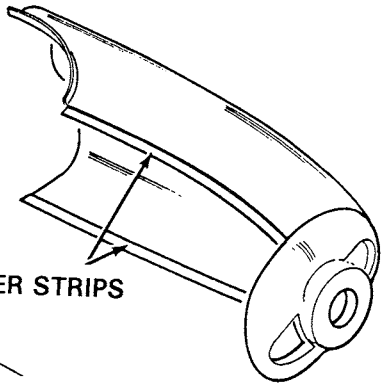
2. ☐ Cut the front piece along the scribe line around the circumference.

☐ Cut out the two air intake openings on each side of the spinner ring along with the bottom opening and the prop shaft opening. Use a small round file to lean up the edges of each intake.

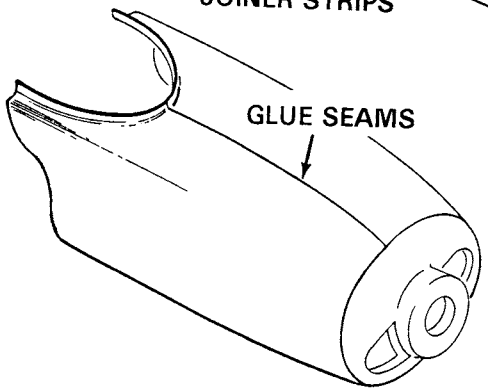


3. ☐ Glue the front piece onto one of the sides.

4. ☐ Glue the joiner strip to the top and bottom seam. Leave half of the strip width exposed to allow a gluing surface for the other cowl half.



5. ☐ Glue the remaining half to the front piece and onto the joining strip. Fit all seams as tightly as possible. This will eliminate excessive filling and sanding.



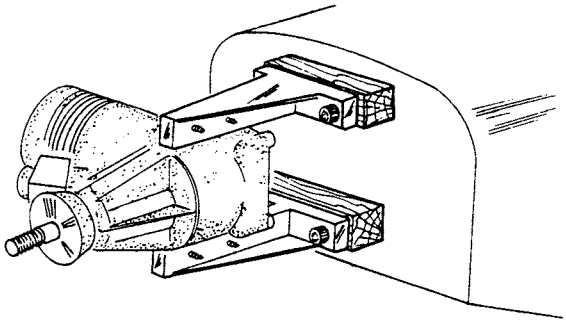
6. ☐ Fill the seams with filler and sand smooth.

7. ☐ Paint the cowl with a good quality, fuel resistant paint.

8. ☐ Permanently install the motor mounts to the firewall using four 6-32 x 1-1/4" socket head screws with washers.

NOTE: If you are not using the engine spacers, you must cut the screws so they do not interfere with the fuel tank. Don't forget right thrust.

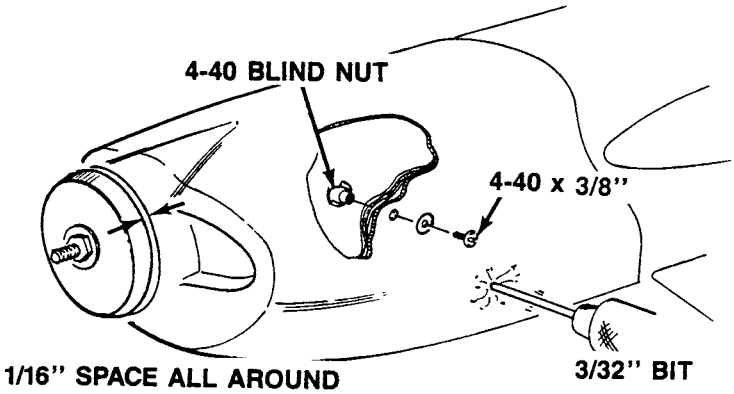
☐ Screw the engine to the mounts using four #6 x 3/4" screws with washers.



9. ☐ Slide the cowl on over the engine and install the spinner backplate on the prop-shaft.

☐ Allow a 1/16" space between the backplate and the cowl. Locate the cowl off the spinner backplate and attach to the fuselage using four 4-40 x 3/8" screws and washers. See plan for locations.

NOTE: If you prefer to install fiberglass, rather than plastic parts, these may be obtained directly from Carl Goldberg Products. See ordering information on the Parts List.



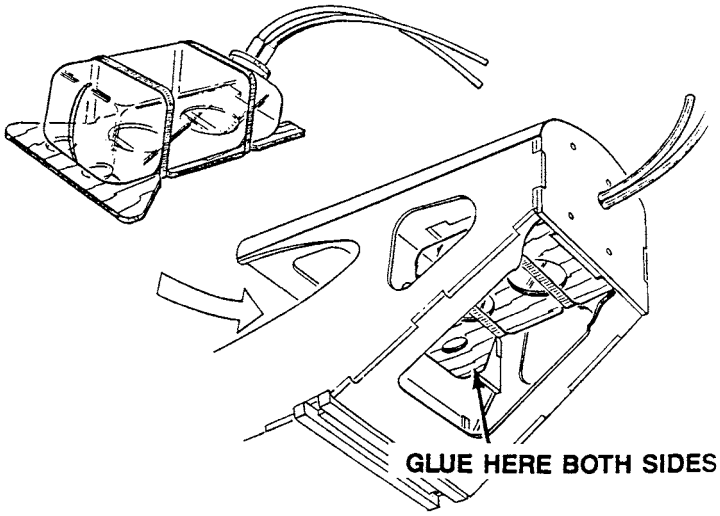
FUEL TANK INSTALLATION (3 Steps)

1. ☐ Rubber band the tank to the platform.

2. ☐ Make a small opening in the firewall. Attach the fuel lines and feed them through the opening in the firewall.

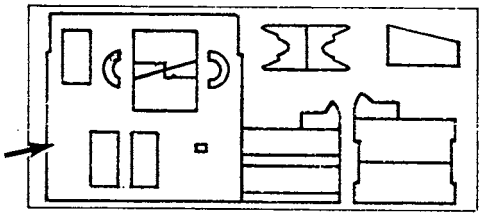
3. ☐ Slide the tank platform forward and insert the tabs into the notches in the firewall.

   ☐ Glue the wide end of the platform to the notches in Former “B.”



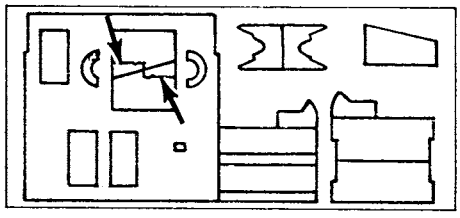
RUDDER CABLES

A word here about rudder actuation. The EXTRA uses a “pull/pull” system. The rudder servo must be located as shown on the plans to insure the correct cable alignment with the cable exits. This is not a problem if the die cut servo tray (D/C SHEET 5519, supplied in this kit) is used. Solder the threaded coupler to the cables, being careful to keep both assembly lengths equal. With the servo in the neutral position, trim tab centered, attach the cables to the control horn and to the servo arm. Adjust the snap-links until the rudder is perfectly straight. A ball bearing servo is recommended for the rudder control.

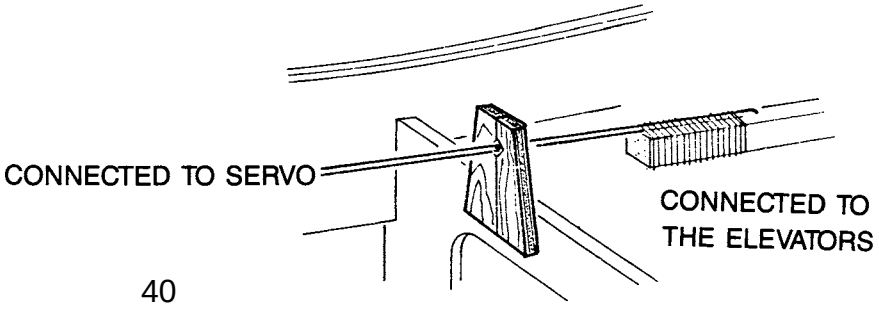


ELEVATOR PUSHROD GUIDE

You will note that the plans show an elevator support guide glued to the top of Former “D.” This two-part support is on D/C SHEET 5519 and is to be installed after the servo is connected to the elevator horns.

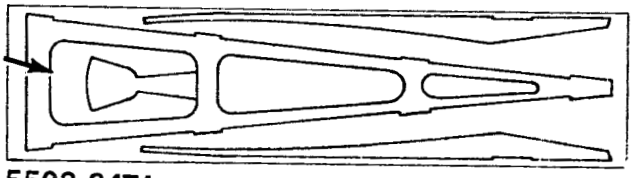


After you finish covering the entire model, permanently install the hinges. The GENERAL INFORMATION BOOK also covers this.

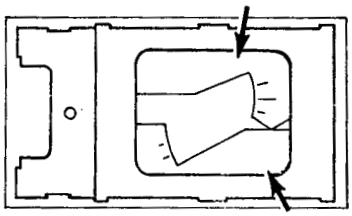


CONTROL SURFACE TRAVELS

Use the control surface travel gauges supplied in this kit on D/C SHEETS 5503 and 5506. The gauges provide two settings: GENTLE response, and a quicker AEROBATIC mode. Even if you are a proficient flyer, we encourage you to start out with the gentle marks and work up to the aerobatic settings. This will give you an opportunity to experience the different travel responses.



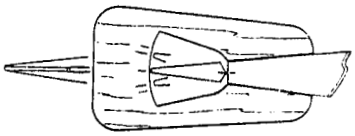
5503-3474



5506-3477

AILERON GAUGE

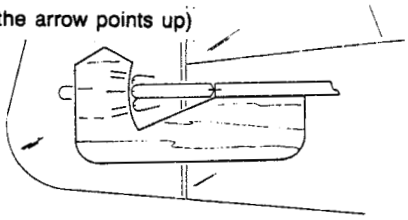
Place the gauge at Rib #10 (wing tip) to measure aileron travel. Equal movement up and down. Note the GENTLE and AEROBATIC setting marks.



ELEVATOR GAUGE

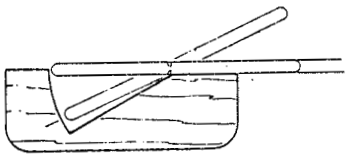
With the point point 'UP," locate the gauge at the tip of the horizontal stab. The travel movements are not the same up and down. Note the GENTLE and AEROBATIC setting marks.

(Note the arrow points up)



RUDDER GAUGE

Locate the gauge at the air balance space. Flip the gauge to the opposite side to check opposite travel. Note that there is only one setting for rudder.



SETTING UP AND FLYING THE EXTRA 300

SETTING UP

Time spent in setting up pays big dividends during your first flights. Some flyers prefer VTR on flying surfaces, Mile others prefer EXPO. If you choose EXPONENTIAL, start with 25% and adjust from there. Set the throws to the higher setting and use the EXPO to "soften the neutral." For VTR, inhibit the dual rate, but set as follows: AILERON 65%, ELEVATOR 65%. Note again that the max throws are in the high position on the travel gauges, which is a good starting point. From there, adjust to personal taste.

Balance is very important, as too far forward will cause the aircraft to want to nose over on takeoff, particularly in grass. Balance that is too far back will make the aircraft pitch unstable and difficult to control. Balance **CAREFULLY**, reference the plans. Start with the forward location and add tail weight carefully.

FLYING TIPS

This **EXTRA** is very easy to fly, if properly set up. On take off the plane has excellent stability, but it will feel nose heavy. Always use full up elevator when taxiing to prevent nosing over. Keep first flights short and check the aircraft often.

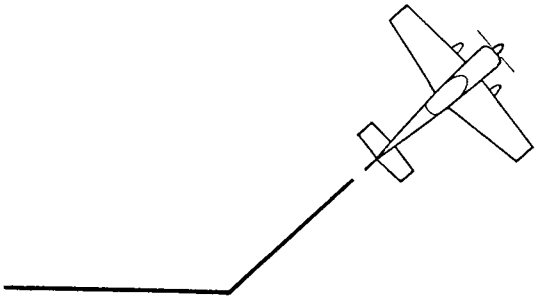
Landing is quite straight forward. The plane is "clean" and will glide well. However, it won't snap unless rudder is applied. Try to land in a 3-point configuration and, Men the mains touch, release some of the "up" used in the flair. This will eliminate the bounce on landings.

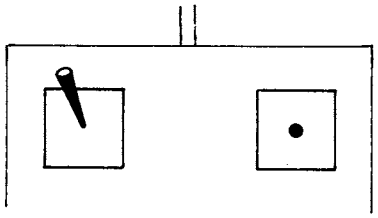
In knife edge, the **EXTRA** will take some opposite aileron flight to keep the wings perfectly vertical. It can be hand flown or, with a computerized radio, automatically mix in the correction. Mix 4% opposite aileron for rudder direction used. No elevator mix is required.

SETTING UP AND FLYING THE EXTRA 300

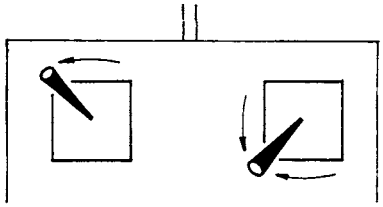
FLYING SNAP ROLLS

Pull up and climb at 45 degrees, and go to knife edge.



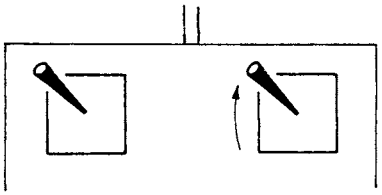


50% RUDDER THEN...



FULL RUDDER AND FULL AILERON
FULL UP. . .

AFTER 1-1/2 SNAPS. . .



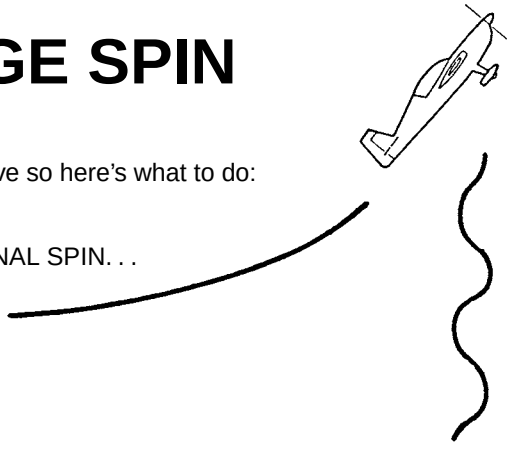
FULL DOWN. . .

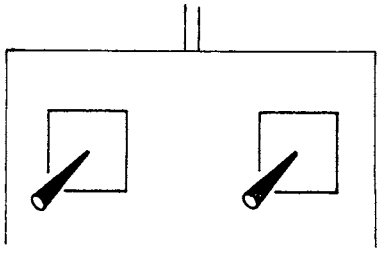
After 4 or 5 snaps the Extra will be ready to fly out straight and level.

KNIFE EDGE SPIN

A unique maneuver to observe so here's what to do:

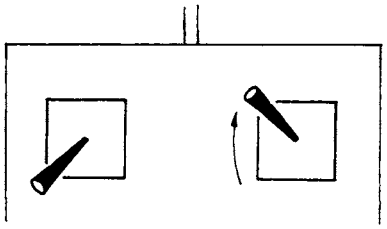
ENTER A CONVENTIONAL SPIN. . .





FULL LEFT RUDDER AND FULL LEFT AILERON
FULL UP. . .

AFTER 1 OR 2 TURNS. . .



FULL DOWN. . .

The plane will go into a knife edge spin and will lose altitude very quickly. . . so be advised!

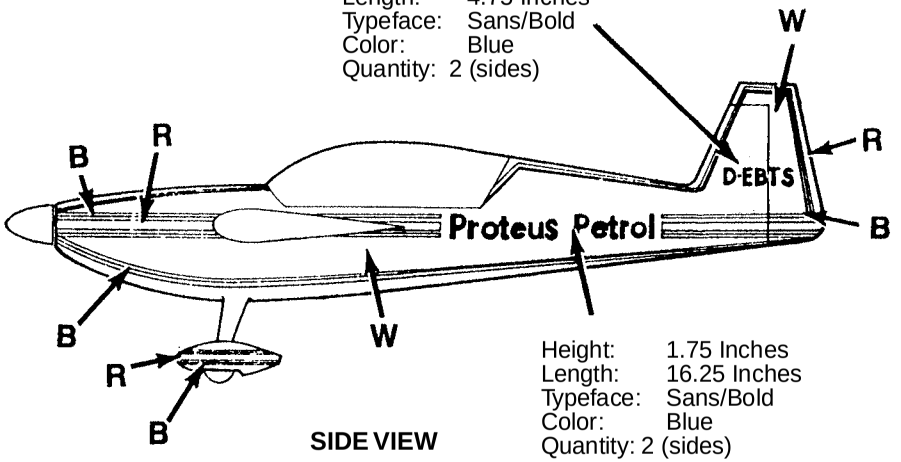
COLOR SCHEME & DECAL LOCATIONS

COLORS:

R DEEP RED

W WHITE

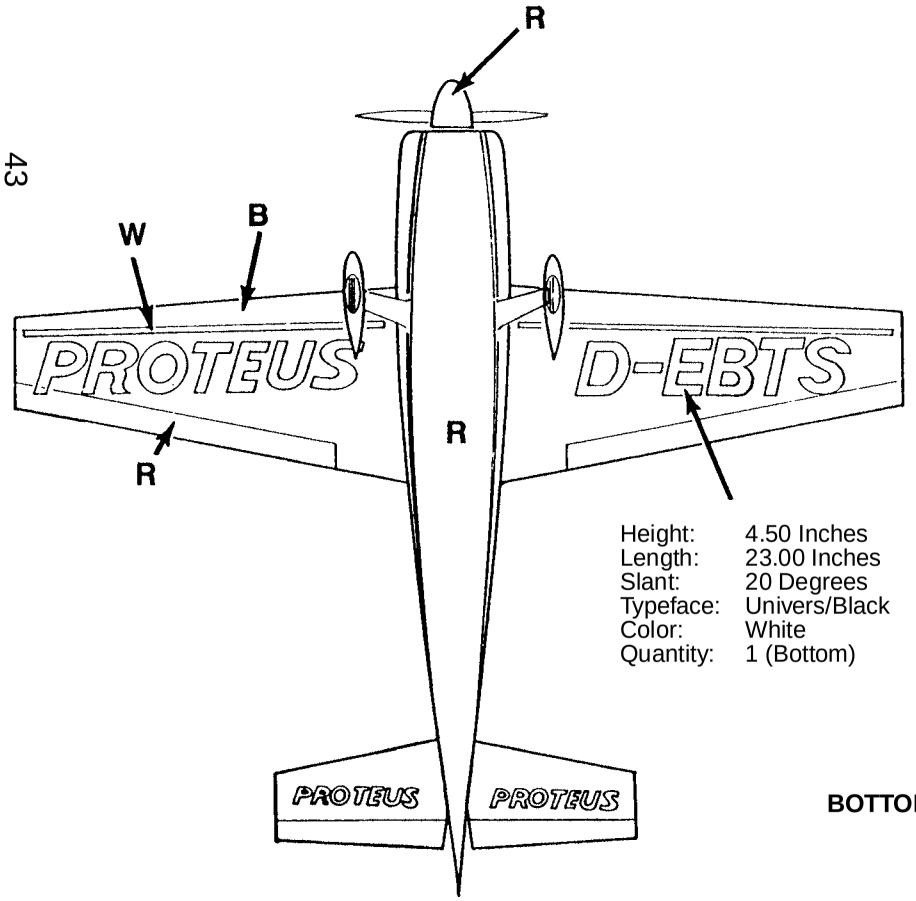
B MIDNITE BLUE



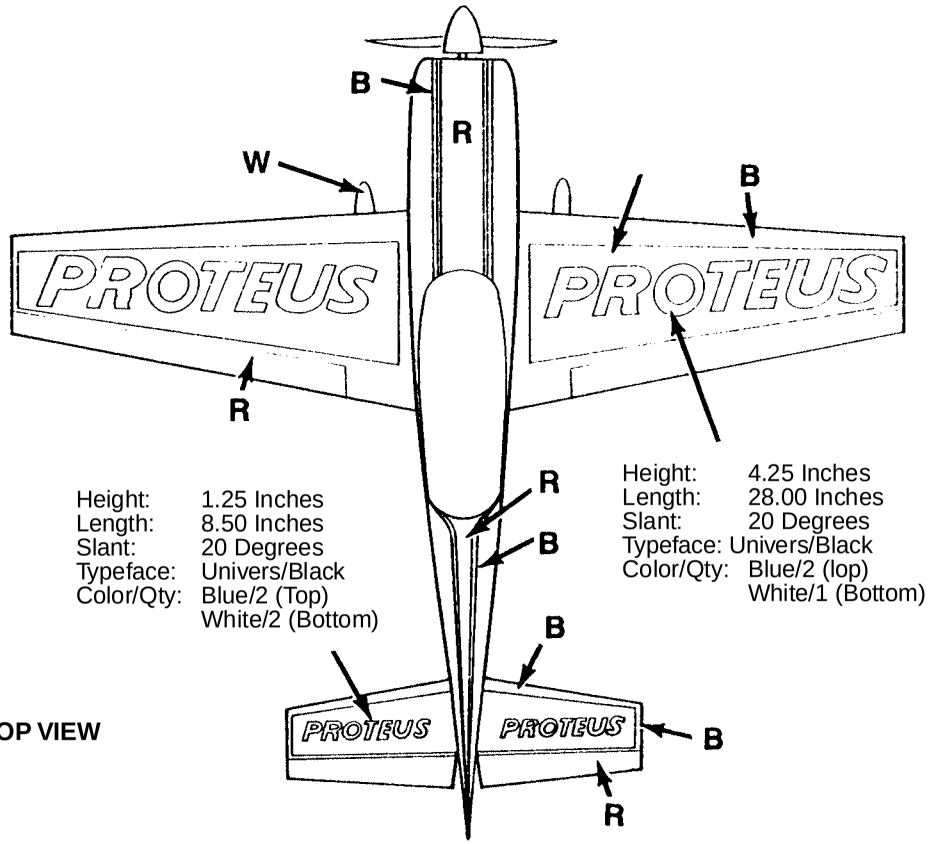
Height: 1.25 Inches
Length: 4.75 Inches
Typeface: Sans/Bold
Color: Blue
Quantity: 2 (sides)

Height: 1.75 Inches
Length: 16.25 Inches
Typeface: Sans/Bold
Color: Blue
Quantity: 2 (sides)

SIDE VIEW



Height: 4.50 Inches
Length: 23.00 Inches
Slant: 20 Degrees
Typeface: Univers/Black
Color: White
Quantity: 1 (Bottom)



Height: 1.25 Inches
Length: 8.50 Inches
Slant: 20 Degrees
Typeface: Univers/Black
Color/Qty: Blue/2 (Top)
White/2 (Bottom)

Height: 4.25 Inches
Length: 28.00 Inches
Slant: 20 Degrees
Typeface: Univers/Black
Color/Qty: Blue/2 (lop)
White/1 (Bottom)

BOTTOM / TOP VIEW

For your next kit...

Is it *my* turn yet?

THE EX-TREME 330 3-D ARF

WINGSPAN:	46.5 IN.
WING AREA:	744 SQ. IN.
LENGTH:	43.5 IN.
FLYING WEIGHT:	3.5-4.5 LBS.
POWER:	.32-.46 2-CYCLE .40-.63 4-CYCLE
STREET PRICE:	$159.95

Kit comes with a complete hardware package, including aluminum landing gear, wheels, and fuel tank.

Imagine this... you're hovering just a few feet above the runway, then apply full power and full up-elevator for a quick backwards flip, right back to hover. Now feed in aileron and you're torque-rolling.

OUTSTANDING 3-D AEROBATIC PERFORMANCE IN AN ARF

Or, maybe you'd rather try knife-edge loops, climbing inverted snaps, or harrier landings. No matter what the 3-D aerobatics , this profile aerobat can do everything the giant-scale models can do, at a fraction of their high prices.

We've designed the Ex-Treme 330 3-D ARF from the ground up to be the best fun-fly model you can buy. Features like the wing's thick chord give rock-solid stability. All control surfaces oversized and efficiently vector the engine's thrust for outstanding manueverability.

Also, the servos are mounted close to the surfaces to provide short, slop-free control. Something only found in Goldberg's Extreme 3-D ARFs.

BUILDS FAST, ACCURATE AND EASY

Like other Goldberg ARFs, the Ex-Treme 330 3-D ARF is 90% pre-built and features top-quality hardware. All major components are of finest balsa and light ply, pre-covered in premium iron-on covering. A step-by-step instruction booklet will have you out at the field in record time.

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The Ex-Treme 330 3-D ARF is the first of our Extreme 3D series of ARFS and is available your local hobby retailer. Pick one up and you'll be an Extreme 3-D expert in no time.

The Ex-Treme 330 3-D ARF from Carl Goldberg Products.

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