ELECTRA

Instructions

Welcome to the carefree Radio Control experience that is Electra. With the flip of a switch — you're flying! No fuel or messy exhaust oil to clean, or adjustments to make on an engine. Electra is a state-of-the-art thoroughbred with the temperament of a pussycat. She is based on the the proven-and-popular Gentle Lady sport sailplane redesigned for the higher performance demands of electric flying.

Building is easy, but to prevent simple mistakes the step-by-step instructions should be followed. Many a modeler has made two right fuselage sides, instead of one left and one right; moral: FOLLOW THE INSTRUCTIONS. Please read through this instruction booklet thoroughly. It doesn't take that long, and building the model and installing your equipment will seem easier.

We think you will find electric flying to be a quiet, yet exciting change of pace — maybe even "Electra-fying!"

Additional Items Needed for Deluxe and Basic Kits
- ☐ 2-Channel (or more) Radio Control*
- ☐ 2 oz. SUPER JET or model airplane glue
- ☐ 6 cell 7.2V battery pack* (1200MAH/1300 MAH)
- ☐ 10 running feet of covering material (24" wide min.)
- ☐ Box of #64 rubber bands
- ☐ Battery Charger*

Additional Items Needed ONLY for the Basic Kit (No. K-41)
- ☐ All above listed items
- ☐ .05 Electric Motor* (CG Turbo 550, N0 675)
- ☐ Nylon Propeller (8-4 or to suit motor)
- ☐ Propeller mount (CG No. 676)
- ☐ 1-3/4" CG Snap-On Spinner

For use with CG Turbo 550 Motor and 3-Channel Motor Control
- ☐ Bracket (CG No. 249)
- ☐ Snap-R Keeper (CG No. 213)
- ☐ Snap Nuts (CG No. 216)
- ☐ Pushrod Connector (CG No. 212)

*Information about selecting these items on page 2.

OPTIONAL PARTS
- ☐ Spare Motor Fuses (CG No. 677)
- ☐ 1/4" x 8" x 12" CG foam rubber
- ☐ Small can of touch-up paint
- ☐ Servo mounting tape

To protect bottom from scratches
- ☐ CGScuff Guard (No. 290)

For canopy tinting
- ☐ Transparent spray enamel

For landing wheel
- ☐ 1-1/2" wheel
- ☐ 3/32" x 8" wire
- ☐ 3/32' Wheel Collars (No. 163)
- ☐ 3/8" Landing Gear Straps (No. 156)

For removable tip option
- ☐ 1/8" x 3" x 18" balsa
- ☐ 3/32" x 12" music wire
- ☐ 3/32" I.D. x 6" brass tube
- ☐ 3/4" vinyl electrical tape

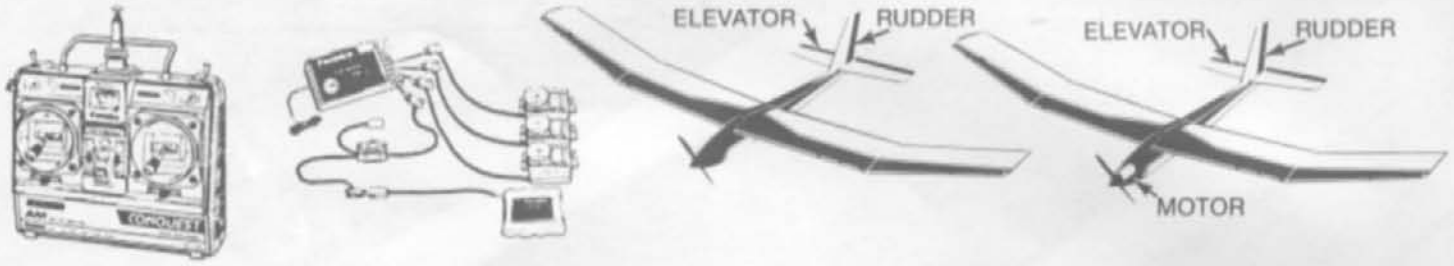
Tools & Supplies Needed
(You probably already have most of these)
- ☐ Miscellaneous rubber bands
- ☐ Wax paper or plastic wrap
- ☐ Modeling knife or single edge razor blade
- ☐ Sandpaper block & sandpaper; any grade 100-200, and any grade 240-320 (1 sht of each)
- ☐ A few dozen straight pins ("T" pins best)
- ☐ Allen wrench (.050 for #4 socket set screw)
- ☐ Flat building board (that you can push pins into) 24" x 60"
- ☐ 1/16" drill bit
- ☐ Pliers
- ☐ Small screwdrivers (1/8" blade tip)
- ☐ Iron for applying covering (small household iron or travel iron may be okay)
- ☐ Masking, drafting, or scotch tape (for holding parts during assembly)

CARL GOLDBERG MODELS INC.

4734 West Chicago Avenue • Chicago, Illinois 60651 2083 1-1086

SELECTING RADIO CONTROL EQUIPMENT

The number of channels your radio control set has will determine how many controls you can use in your model.



An experienced R/C flight instructor is strongly recommended for learning how to fly.

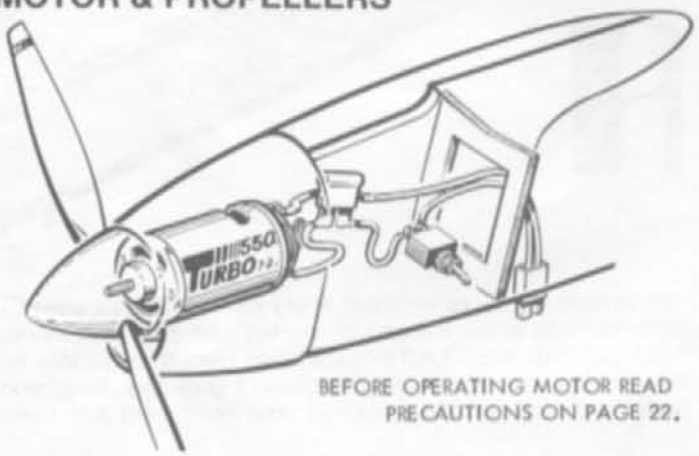
The Electra was designed to fly on two or three-channel radio control equipment. A two-channel system gives you two separate controls; one channel is used for the rudder which controls left and right direction, a second channel operates the elevator, which controls climbing, level flight, and descent. A three-channel system provides you with control of the motor: either on/off with the switch that is included in the Deluxe kit, or "variable speed' with an optional electronic speed controller available from various manufacturers.

We recommend you purchase a 4 (or more) channel system with at least 3 servos and use the third channel for on/off control. Not only is the added dimension of motor control much more fun, but landings are mush easier since you can "go around" if your first approach is not as good as you want. Also, by purchasing a 4-channel set now, you will not need to get one as you move up to more sophisticated models.

Radio sets are battery-powered with either dry cells (small flashlight type batteries) or more reliable rechargeable nickel-cadmium batteries (ni-cads). Sets powered with ni-cads come equipped with a recharging unit, and are more expensive than dry-cell sets. However, if you intend to do a lot of flying, the cost of routinely replacing worn-out dry cell batteries may be much greater than the higher initial cost of a re-chargeable ni-cad radio system; something to consider. Many of the radio systems now available feature "servo reversing" switches which allow you to reverse the response of the servo. This feature simplifies radio installation and is a worthwhile consideration when selecting a radio system. Exponential or dual rates are popular features that if used properly can really help to smooth out the flight of a sensitive model (the Electra is very smooth without these features).

As for what brand of radio to buy, we recommend that you go to your local hobby shop and ask what they recommend. Price should not be your only consideration. Ask about service if your system should need repair, etc. Generally, today's modern radios have proven reliable and will provide years of trouble free operation if treated and handled like the precision instruments they are.

MOTOR & PROPELLERS



BEFORE OPERATING MOTOR READ PRECAUTIONS ON PAGE 22.

We recommend the Carl Goldberg TURBO 550 Motor for your Electra. We feel it has the best performance/value ratio. It will provide you with a good climb for 4 minutes or more, on a standard 6-cell battery and an 8-4 prop. If you don't mind spending more, you can power your Electra with a power unit such as the Challenger 05 Flight System manufactured by Astro Flight with similar results. For the ultimate in performance select a cobalt motor, again such as an Astro Flight system. There are geared systems which will give even more thrust but you may want to reserve that type of power plant for a competition type plane.

The Turbo 550 Motor System is equipped with an in-line fuse. Without a fuse, the motor or battery could be permanently damaged if the prop is installed or jammed while the motor is running. If you will be using another brand of motor make sure it has a fuse — if it doesn't, ask your dealer how to install one. It isn't that difficult.

An 8-4 nylon propeller is included in the Deluxe kit — the best all around prop with the TURBO 550 Motor. Some wooden 8-4 props may give better climb but can easily break on landing. If you use a geared or cobalt motor please refer to manufacturers recommendations.

BATTERY CHARGERS

There is quite a selection of chargers available and most work quite well. For the best advice see your dealer, if you can't, here is a brief description of the various types of chargers and how they work. For more information, see page 30. Some chargers use 12 volts such as a car battery, some 120 volts house current, some will work on both. Most quick chargers charge in 20 minutes or less.

A good accessory to have is a digital volt meter. Not mandatory but handy. See page 30 for more information.

BASIC CHARGERS — With a Mechanical Timer. This type works well but must be used with care to avoid overcharging your batteries. Generally they are the least expensive.

AUTOMATIC WITH DELTA (PEAK) DETECTION. Generally more expensive but very easy to use — just hook up and come back in 20 minutes. They usually operate only from a 12 volt power supply.

AUTOMATIC WITH HEAT SENSOR. Generally the most expensive and work very well. Simply plug in and come back in 20 minutes. Battery must be cool before start of charge cycle. These chargers are available in 12, 120, and 12/120 volt power requirements.

ADHESIVES

All our test models were built using SUPER JET cyanoacrylate glue (C/A) with is specially formulated to firmly glue the plywood, hardwood, plastic, and balsa used in your electra, and we strongly recommend it. Another good glue to use is " 15 Minute Epoxy" or Aliphatic Resin. They will, however, add considerably to the assembly time required (they dry a lot slower the SUPER JET). Also, aliphatic resin does not glue plastic, so you will need one of the adhesives mentioned above (or similar) for the plastic motor mount installation.

There are a few instances where you may prefer to use one or more of the following C/A glues. For example; when gluing the fuselage top in place, thin INSTANT JET penetrates the tightly fitted joints for an immediate bond. When installing the stabilizer and fin on the fuselage, you might want to use SLOW JET which allows more time for careful alignment and part positioning. Whatever C/A product you use, JET DESOLV is a solvent which removes hardened glue from fingers and softens glued joints for repositioning of parts. JET SET is a spray that is used to accelerate drying of all CARL

GOLDBERG C/A GLUES and other brands, JET SET is also handy for building up fillets in high stress areas.

WARNING

Do not use watery THIN types C/A glue for general construction of your Electra, especially for plywood and hardwood parts. Thin C/A glues do not glue plywood adequately.

After you have finished glueing the model together, go back and re-glue all the joints for added strength, and just in case some joints may have been missed the first time. Be careful not to use too little glue. Too little leaves a model weak.

Since SUPER JET almost eliminates waiting for glue joints to dry, you can work straight through and finish each assembly by following the step-by-step building sequence. If you use epoxy, you can save time while waiting for one assembly to dry (the stabilizer, for example) by turning a few pages ahead and starting another part (the fuselage, perhaps). Check-off boxes are provided at each step so you can tell at a glance what steps you have completed.

TACK-CEMENTING. Sometimes it is necessary to temporarily glue a part in place that must later be removed. To provide for easy removal of the part without damage, it should have been glued in place using only a small dab of glue. This is referred to as "tack-cementing" later on in the instructions.

USING SUPER JET. SUPER JET lets you build almost as fast as your hands can press parts together! When pressed into a very thin layer, it sets almost instantly. So be careful, read instructions thoroughly and use check-off boxes to avoid errors (like building two right-hand wings — instead of a left and a right)! SUPER JET allows only for momentary positioning of parts. So be sure to trial fit parts together to check fit and placement before applying glue. After its initial bond, SUPER JET continues to strengthen. SUPER JET sets up a bit slower with plywood and hardwood, so hold such joints together a little longer than you would for balsa. SUPER JET in corners takes a while longer to dry because its not a thin layer. The tendency is for all instant glues to set slower on hardwood or plywood and when in a thick layer. By using JETSET, a treatment for cyanoacrylate glue. JETSET bridges greater gaps, speeds up slow bonds, and provides strong joint fillets.

USING EPOXY. Epoxy comes in two parts which need to be mixed before using. Paper cups and wood coffee stirrers are useful for mixing. When buying epoxy, check the package to see how long it takes to set (some formulas set in 5 minutes, others may take hours). We recommend 15 minute epoxy. Disposable wood strips, cotton swabs, cheap stiff bristle brushes, or acid brushes from auto stores make good applicators.

Because epoxy is so thick, it's easy to apply too much. If you use epoxy to build the entire model, be especially careful to use it sparingly when assembling the fin, stabilizer and wings.

CAUTION

Some people may experience allergic reactions when exposed to fumes from C/A glue or epoxy. This is very rare. However, it is always important that such glues, and also paints, thinners and solvents, be used with adequate ventilation to carry fumes away. A fan is recommended.

GENERAL INFORMATION

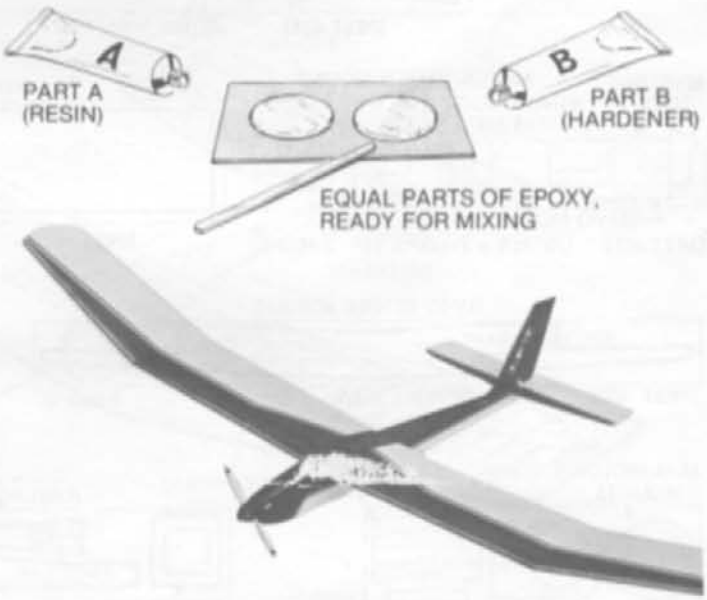
CONSTRUCTION. If you have never made a "built-up" model before, the following describes the basic building procedure.

The Electra is built mainly from die-cut and machine-shaped plywood, hardwood, and balsa parts. The Wood Parts Indentification on the next page shows where to find each part on the die-cut sheets. It also lists wood sizes to further identify parts.

The first step in building the model is to unfold the plan, lay it flat, and study it carefully throughout. You need a flat table top or work bench on which you set a "Pinning" board (such as celotex insulation board), and the Electra plan is the laid flat over the board. Pull the plan flat with tape at the corners. Cover the plan with wax paper of plastic kitchen wrap to prevent gluing parts to the plan. Then wood parts for one unit (for example, the stabilizer) are placed in their correct locations over the plan, and held in place with straight pins and then glued together.

We suggest that you ask an experienced R/C modeler to look at your model at several stages during construction and especially before you cover it. He should also carefully check your radio installation before your first flight. If corrections are needed, they are more easily made at these times.

THE ENTIRE MODEL CAN BE QUICKLY BUILT WITH SUPER JET INSTANT GLUE (USE RIGHT FROM THE BOTTLE, NO MIXING REQUIRED). JET SET MAKES ALL C/A GLUES EVEN FASTER AND EASIER TO USE.



COVERING THE MODEL

Many good covering materials are available. We recommend plastic films. Ask your dealer! The various films are pre-colored, so you can select exactly the finish you desire, with no major additional painting required. The films have a heat-activated adhesive on the back side. Although a household iron can be used to apply films, smaller, easier-to-use irons specifically designed for this purpose are available. More covering information can be found on page 18.

TINTING THE CANOPY

If you want to "tint" the canopy, do not try to dye it (the plastic does not dye well). Instead, we recommend "transparent" spray enamels carefully applied to the inside canopy surface.

LANDING WHEEL OPTION

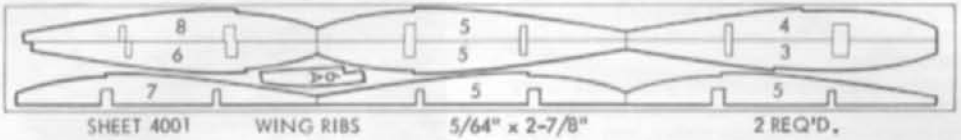
The plans show how to install an optional single landing wheel on your Electra. It really isn't necessary but can help prevent breakage of wooden propellers and prevent damage to the fuselage when landing on gravel or similar surfaces. Instead of a landing wheel, you could also apply CG ScuffGuard, a transparent scuff resistant strip to the bottom of the fuselage. Very easy to apply, we highly recommend it.

REMOVABLE TIP OPTION

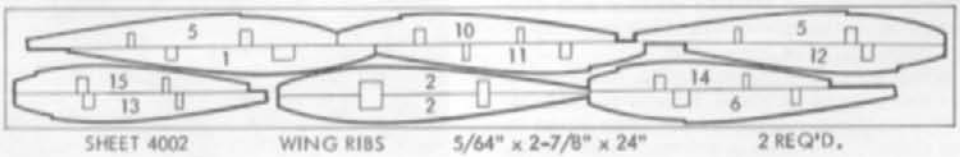
If a 6½ ft. wing will not fit in your car, you will want to build the wing with removable tips as shown on page 9.

WOOD PARTS IDENTIFICATION

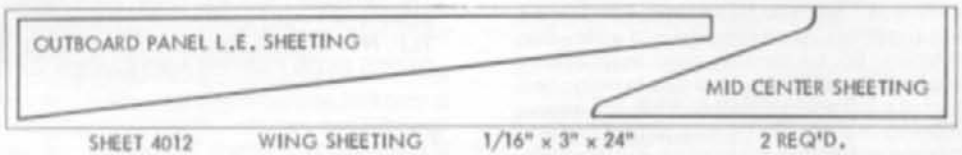
Be careful when removing parts (such as fuselage sides) from die-cut sheets. Long parts are fragile until glued into a structural unit. If necessary, use a razor knife or razor saw to assist in the removal of parts from sheet. Sometimes a little trimming and sanding can improve parts where desired. Save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



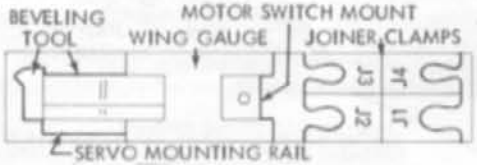
SHEET 4001 WING RIBS 5/64" x 2-7/8" 2 REQ'D.



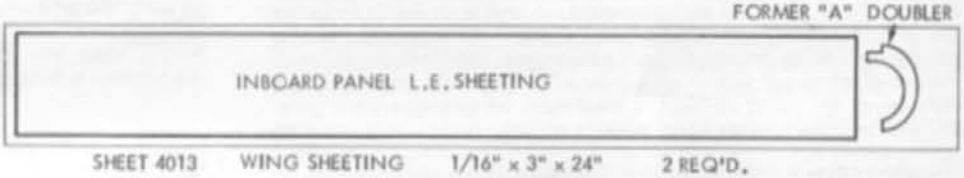
SHEET 4002 WING RIBS 5/64" x 2-7/8" x 24" 2 REQ'D.



SHEET 4012 WING SHEETING 1/16" x 3" x 24" 2 REQ'D.

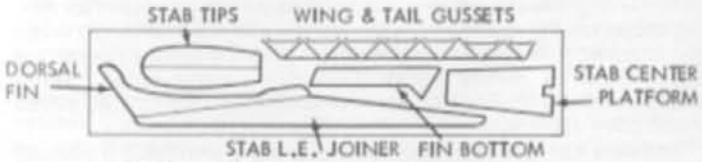


SHEET 4014 1/8" PLY x 2-1/4" x 13" 2 REQ'D.

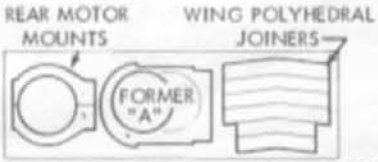


SHEET 4013 WING SHEETING 1/16" x 3" x 24" 2 REQ'D.

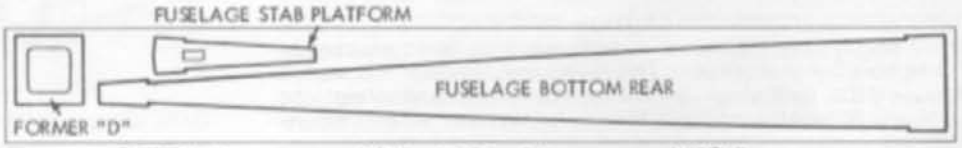
SHEET 4009 1/8" PLY x 2-3/8" x 17" 1 REQ'D.



SHEET 4006 3/16" x 2-7/8" x 9-1/2" 1 REQ'D.

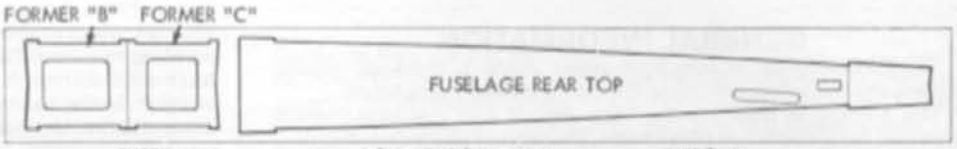


SHEET 4008 1/16" PLY x 2-5/8" x 13-1/2" 1 REQ.



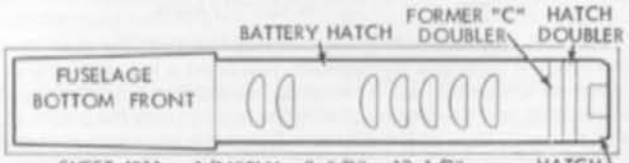
SHEET 4007 1/16" x 2-7/8" x 24" 1 REQ,D

SHEET 4010 1/16" x 2-7/8" x 18" 1 REQ,D

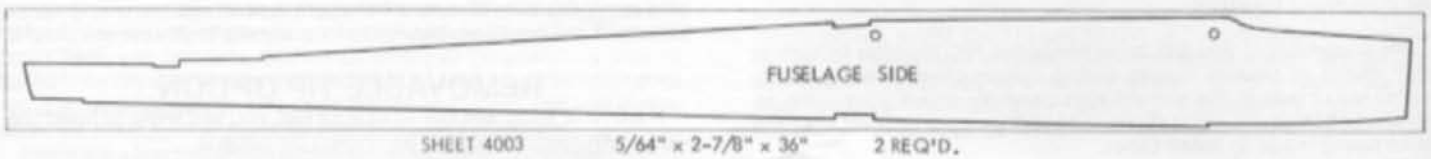


SHEET 4005 1/16 x 2-7/8" x 24" 1 REQ,D

SHEET 4004 5/64" x 2-7/8" x 18" 2 REQ'D.



SHEET 4011 1/16" PLY x 2-5/8" x 13-1/2" 1 REQ,D

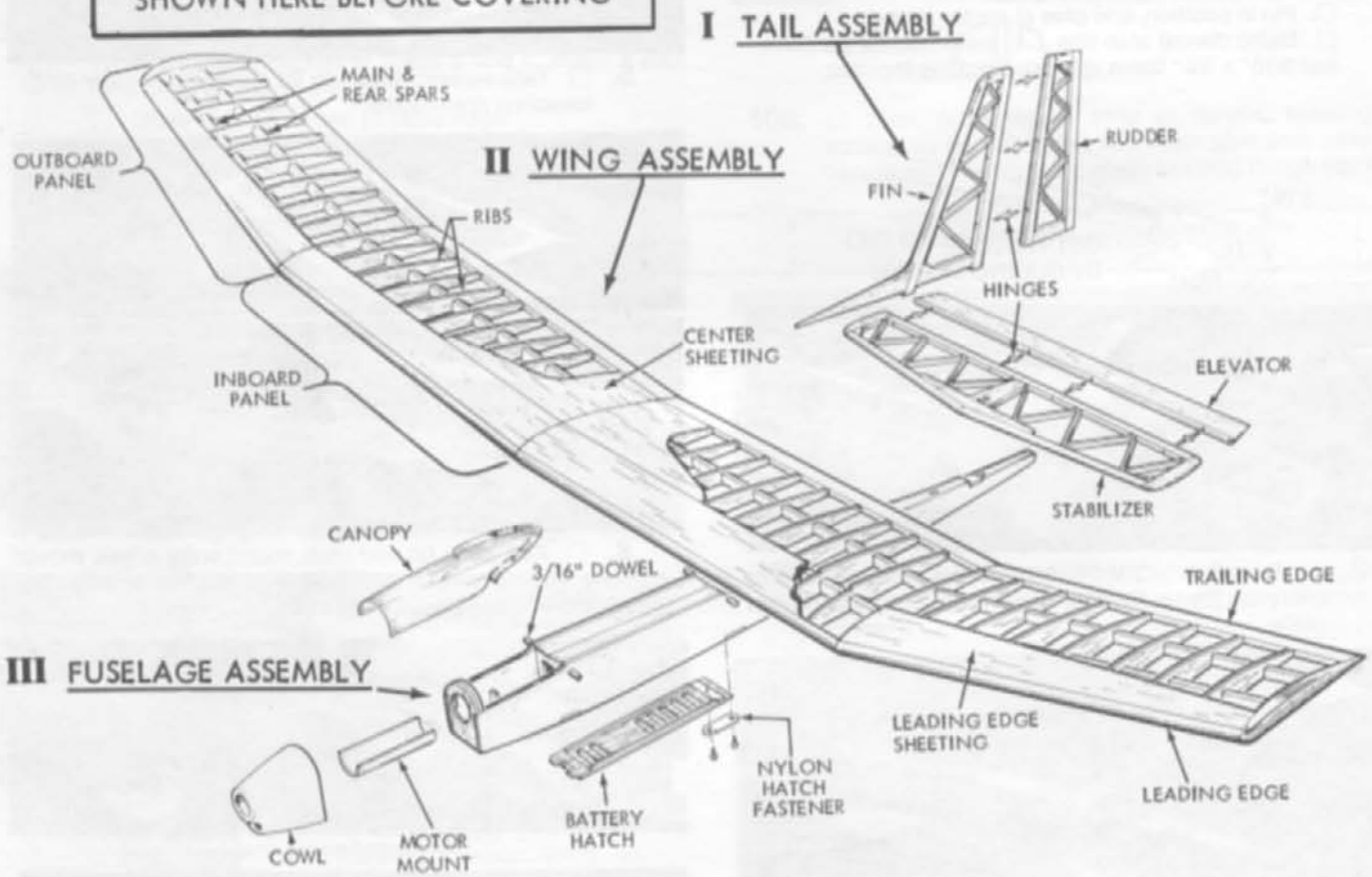


SHEET 4003 5/64" x 2-7/8" x 36" 2 REQ'D.

BEFORE STARTING ASSEMBLY OF MODEL, read instructions carefully and construct your model in the following order:

I. TAIL ASSEMBLY (Steps 1 thru 11, Page 6 of this booklet)
II. WING (Steps 1 thru 29, Page 8)
III. FUSELAGE (Steps 1 thru 14, Page 14)
IV. COVERING and TRIM (Page 18)
Hinge Installation (Page 20)
V. FINAL ASSEMBLY (Page 21)
VI. MOTOR & BATTERY PRECAUTIONS (Page 22)
VI. PREPARATION AND INSTALLATION OF MOTOR & RADIO (Page 23)
VII. WHERE TO FLY (Page 27)
VIII. RADIO CHECK (Page 27)
IX. FLIGHT PREPARATION (Page 27)
X. ILLUSTRATED FIRST FLIGHTS (Page 28)
XI. MOTOR, BATTERY & RADIO CARE & UPKEEP (Pages 30,31)

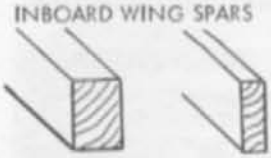
MAJOR PARTS & COMPONENTS SHOWN HERE BEFORE COVERING



FULL SIZE END VIEWS OF STRIP WOOD PARTS

BASSWOOD

INBOARD WING SPARS



FRONT SPAR 1/4" x 13/32" x 20-3/4"

REAR SPAR 1/8" x 3/8" x 20-3/4"

HATCH RAILS 1/8" SQ. x 7-3/8"

(2 OF EACH OF THE ABOVE REQ'D.)

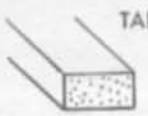
OUTBOARD WING SPARS

FRONT SPAR 1/4" x 3/8" x 17-5/8"

REAR SPAR 1/8" x 3/8" x 17-5/8"

2 OF EACH REQ'D

TAIL ASSEMBLY



3/16" x 3/8" x 21"

(4-REQ'D.)

5/64" x 3/16" x 24"

(3 REQ'D.)

BALSA

PUSHRODS

1/4" SQ. x 17-7/8"

(2-REQ'D.)

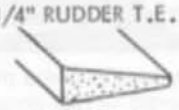
WING LEADING EDGE (L.E.)

INBOARD L.E. 20-3/4"
OUTBOARD L.E. 17-5/8"
(2 OF EACH REQ'D.)

WING TRAILING EDGE (T.E.)

INBOARD T.E. 20-3/4"
OUTBOARD T.E. 17-1/2"
(2 OF EACH REQ'D.)

8-1/4" RUDDER T.E.

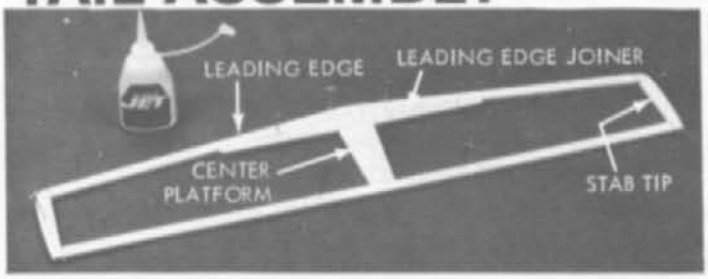


(1-REQ'D.)

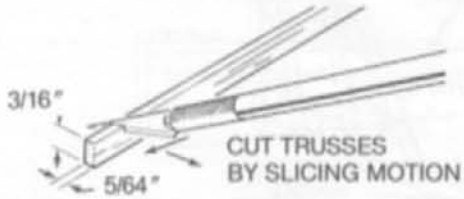
20-3/4" ELEVATOR

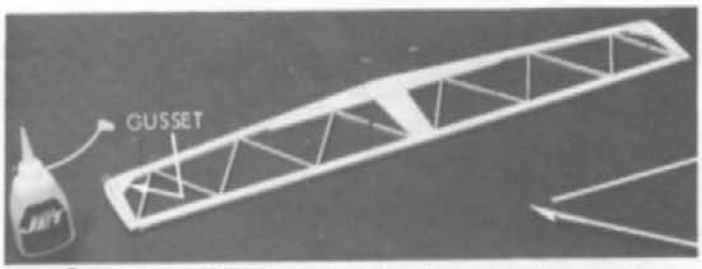
(1 REQ'D.)

TAIL ASSEMBLY

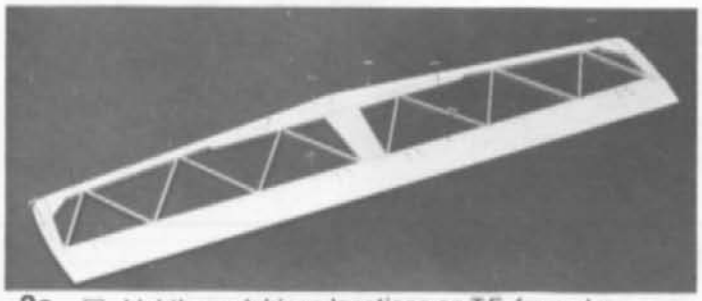


1. ☐ Make stabilizer (stab) leading edge (L.E.) from 3/16" x 3/8" balsa sticks. Cut balsa carefully to match with plan at center joint and exact length at tips.
☐ Pin in position, and glue at center joint.
☐ Using die-cut stab tips, L.E. joiner, center platform and 3/16" x 3/8" balsa, glue stab outline together.



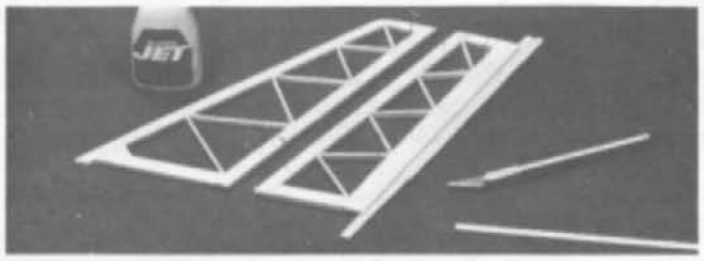


2. ☐ From 5/64" x 3/16" Strip balsa, cut all trusses to size over plan. Trim to fit well — don't force into place. Glue in place.
☐ Glue gussets in place.
☐ Let dry thoroughly.

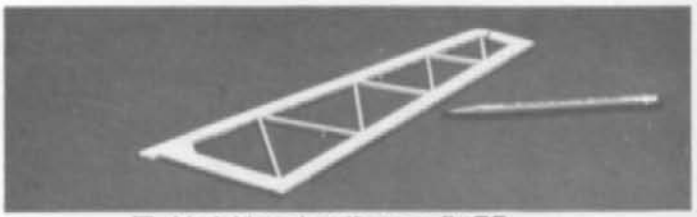


3a. ☐ Lightly mark hinge locations on T.E. from plan.

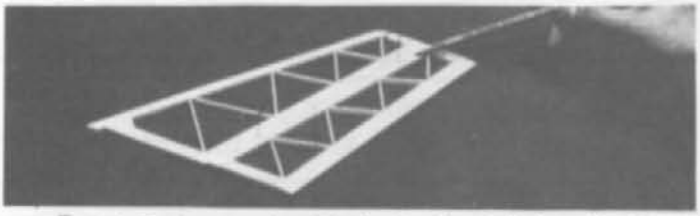
3b. ☐ Using 3 or 4 small drops of glue, tack-cement elevator to stab. Carefully transfer hinge locations onto elevator.



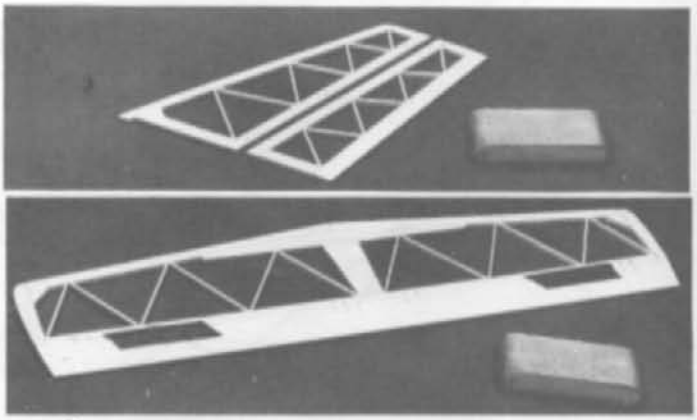
4. ☐ Assemble fin and rudder in same manner as stab. (Note: rudder T.E. is tapered — use scrap from edge of 1/16" balsa as a shim). Let dry.



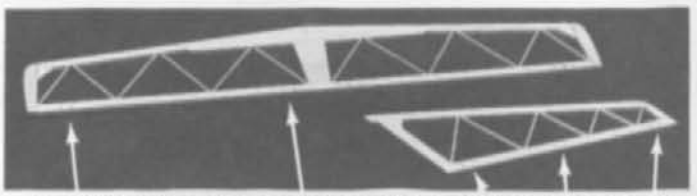
☐ Mark hinge locations on fin T.E.



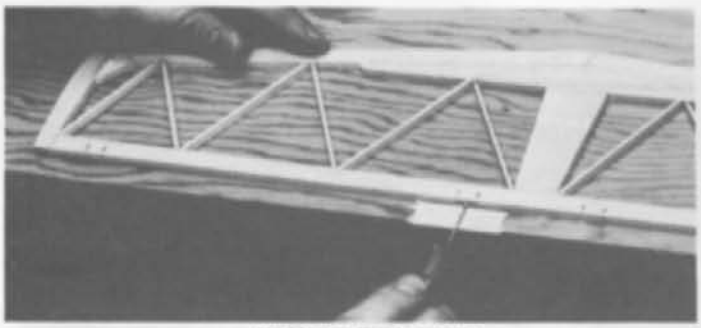
5. ☐ Tack-cement rudder to fin. Carefully transfer hinge locations onto rudder.



6. ☐ Flat sand fin and stab, round outer edges except bottom & lower 2" of fin L.E. Be sure hinge locations remain. Sand elevator tips to blend with stab.



7. ☐ Carefully separate elevator from stab, and rudder from fin. Gently sand to remove rough spots from tack-cementing.
☐ Using CG Center-Line marker provided, mark center lines along edges of parts as shown above. Tilt marker so guide pegs touch the wood, then lightly pass the marker back and forth. Point will scribe center line.



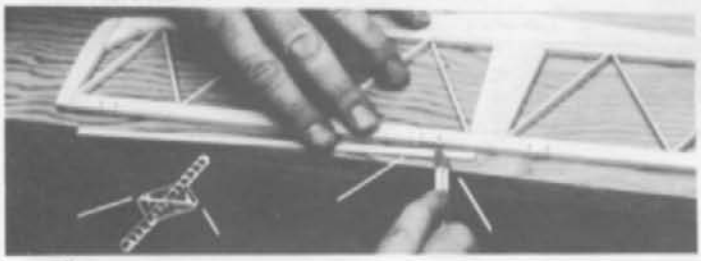
KEEP FLAT ON SHIM

8a. ☐ At locations marked in Steps 5 and 6, make a pilot hole using an awl or similar.

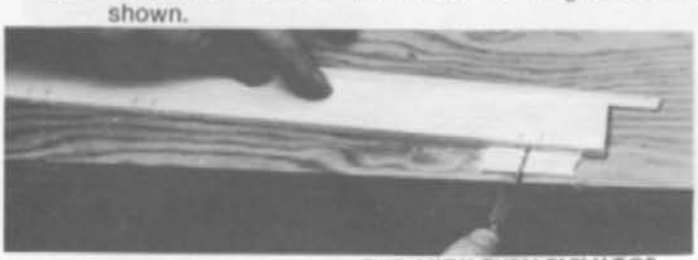
☐ Move stab T.E. close to table edge.

☐ Using scrap 1/16" as a shim, drill 1/16" holes for hinges as shown in sketch.

NOTE: Although you are drilling for hinges now, the hinges are not permanently installed until after model is covered.

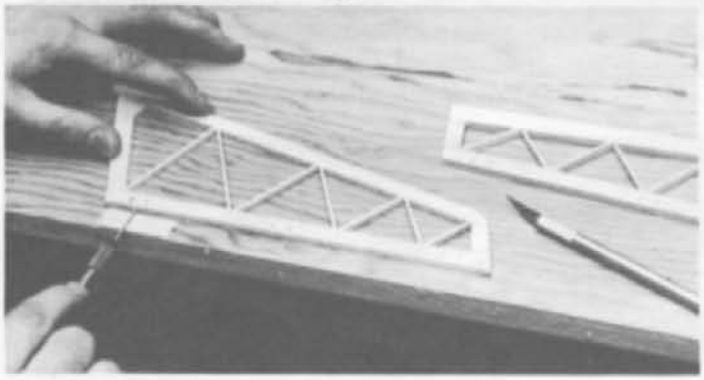


8b. ☐ Cut 45° slots at hole sides for hinge webs as shown.



END VIEW THRU ELEVATOR

8c. ☐ Move elevator close to table edge, support thin edge of elevator with wing rib scrap as shown in sketch and make hinge slots.

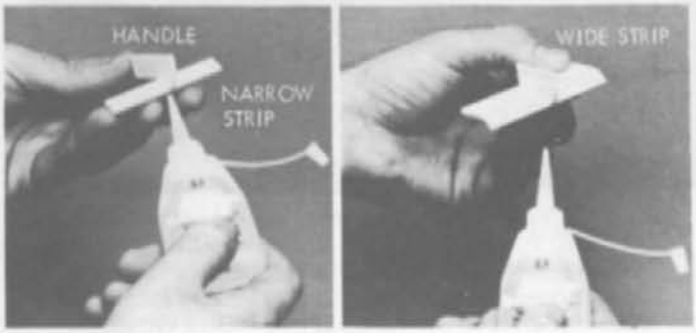


9. ☐ Repeat slotting method in steps 8 & 8a for fin and rudder.

ASSEMBLING DIE-CUT BEVELING TOOL

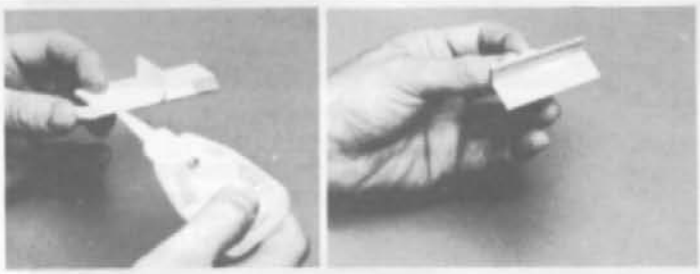
(FROM 1/8" PLY)

Parts for two tools are furnished — only one is used.

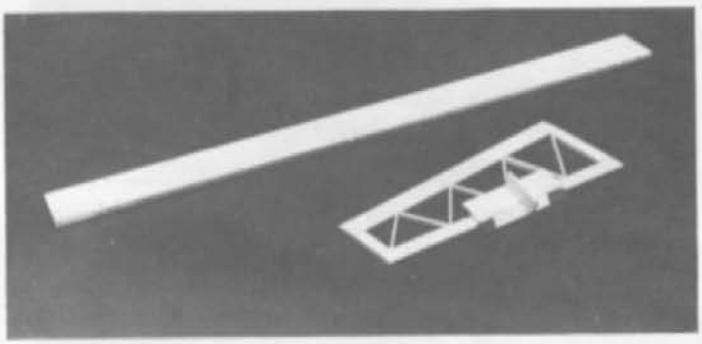


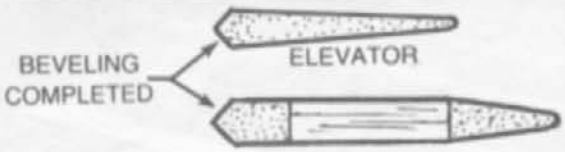
10a. ☐ First, glue narrow strip to handle, keeping it square, as shown above left. Then glue wide strip to handle and narrow strip, again keeping things square.

CUT ONE STRIP SANDPAPER THIS SIZE



10b. ☐ Cut one strip of 100-200 grit sandpaper to size shown above. Tack-cement sandpaper to tool as shown.

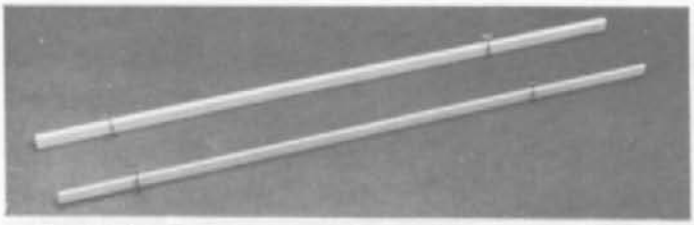




11. ☐ Tape T.E. of elevator and rudder to work surface. Using beveling tool, sand L.E. to center line. Turn parts over and repeat beveling for other side.

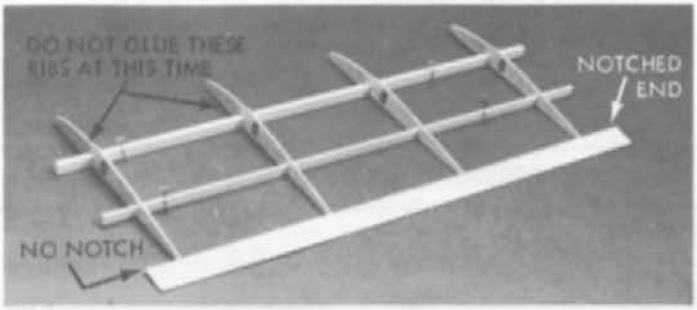
THIS COMPLETES THE TAIL ASSEMBLY CONSTRUCTION.

WING



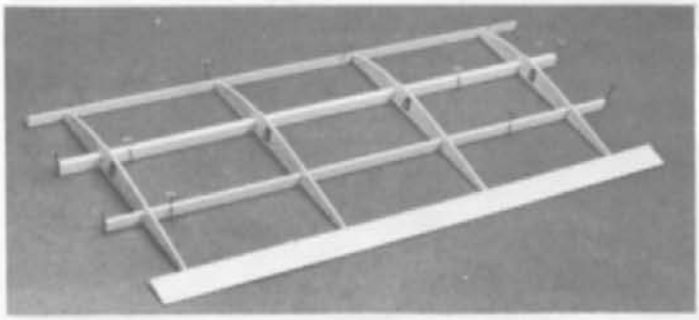
1. ☐ ☐ Position one main spar in place over RIGHT INBOARD PANEL (or LEFT INBOARD PANEL) on plan. Align spar end at center of wing on plan. Hold spar in exact position by crosspinning at circle locations on plan. CAUTION: Do not build two RIGHT WINGS!

☐ ☐ Using no pins, set rear spar in place on plan.



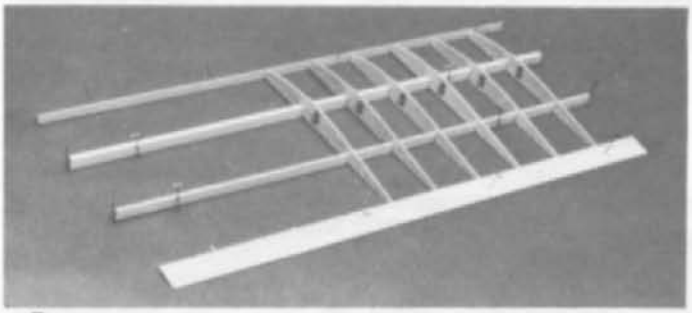
2. ☐ ☐ Align notches in trailing edge (T.E.) with those shown on plan.

☐ ☐ Using no glue, position four number 5 ribs as shown above. Hook each rib over main spar and then over rear spar as you go.

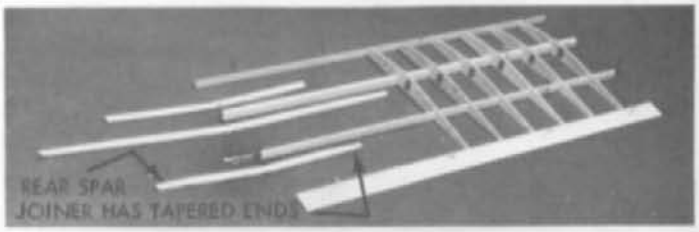


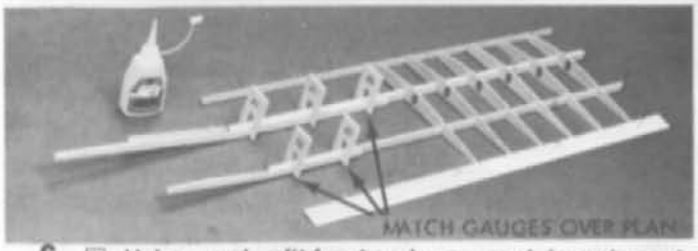
3. ☐ ☐ Position Leading Edge (L.E.) in place over plan and pin in place.

4. ☐ ☐ Pin end of both spars in place as shown above.



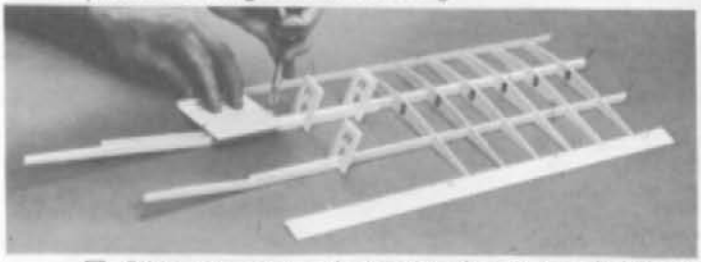
5. ☐ ☐ Remove two no. 5 ribs nearest wing center. Install all remaining no. 5 ribs at locations shown on plan. IMPORTANT! FOR LEFT WING PROCEED DIRECTLY TO STEP 9!



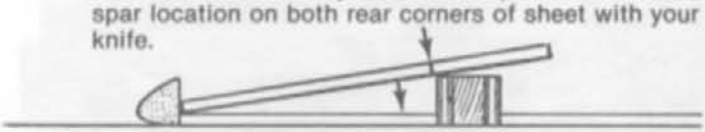


6. ☐ Using no glue fit front and rear spar joiners in position. Glue joiners to spars and hold in place with clamps provided.

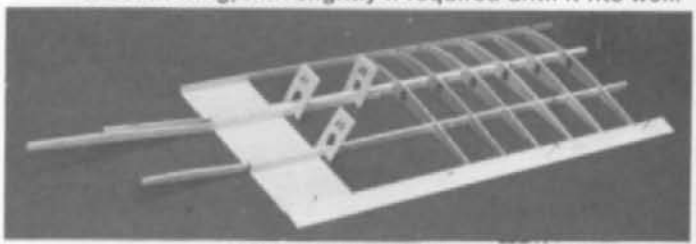
7. ☐ From 1/16" × 3" × 24" (or 8") cut three 3-1/4" long pieces for wing bottom sheeting.



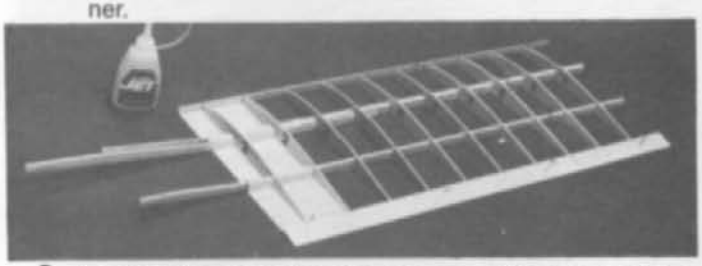
☐ Slide one piece of sheeting forward until it just touches the L.E. Gently hold sheet in position and mark spar location on both rear corners of sheet with your knife.



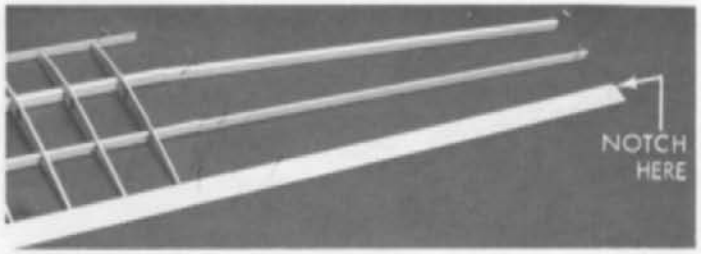
Remove sheet from wing, and using metal straight edge, cut a line across sheet at spar "marks." Replace sheet in wing, trim slightly if required until it fits well.



☐ Install two remaining bottom sheets in same manner.

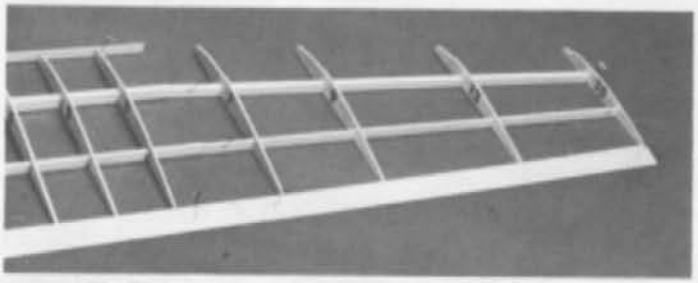


8. ☐ Position and glue ribs 2, 3, and 4 to L.E., bottom sheeting, spars, and T.E. (align rib fronts over front guide lines on plan).



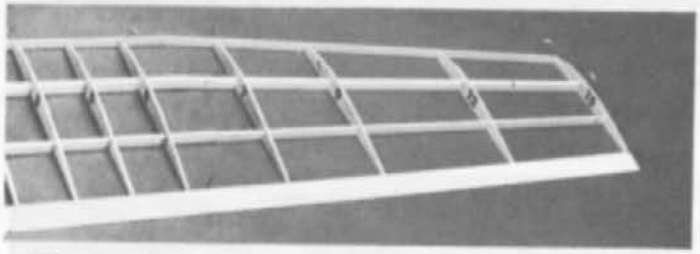
9. ☐ ☐ Pin right (left) outboard main spar in place over plan. Position rear spar in place over plan.

☐ ☐ Using no pins, set T.E. in place on plan. IMPORTANT: the outboard T.E. has no notch at one end — this unnotched end must be at polyhedral joint as shown.

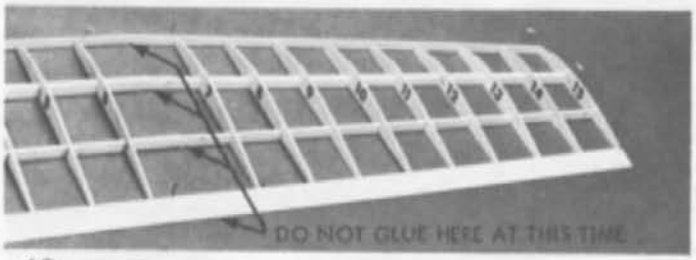


☐ ☐ Using no glue, set the following four ribs in their respective T.E. notches: ribs Nos. 7, 9, 12, & 15, hooking them over the spar as you go.

10. ☐ ☐ Align T.E. and ribs over plan, and pin in place. Glue ribs to spars and T.E.



11. ☐ ☐ Pin L.E. in place and glue it to ribs.

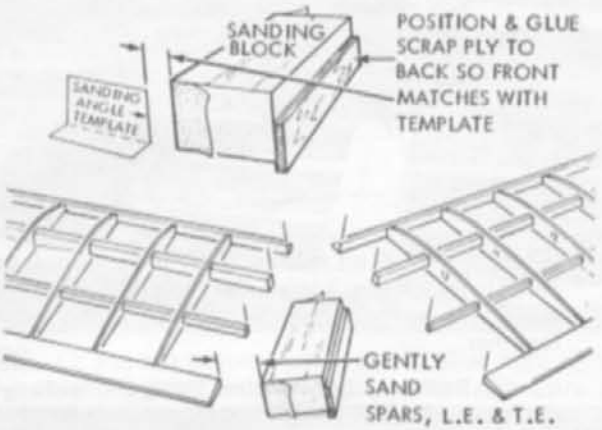


12. ☐ ☐ Working one at a time, glue remaining ribs 8 through 14 in place. Let dry thoroughly.

REMOVABLE TIP OPTION

(Materials not included)

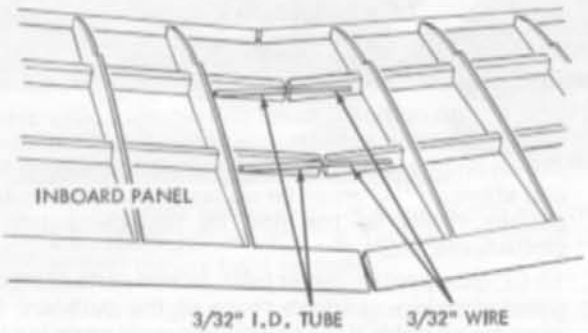
THIS STEP FOR REMOVABLE TIP OPTION ONLY. For one-piece wing proceed directly to step 14.



13a. ☐ ☐ Cut four new ribs #6 from 1/8" hard balsa, using rib pattern at upper right corner of plan (REMOVABLE TIP OPTION.) Do not use die-cut rib *#6.*

13b. ☐ ☐ Use SANDING ANGLE TEMPLATE (cut or copy right corner of plan) and scrap 1/8" ply to establish proper sanding block angle as shown in sketch.

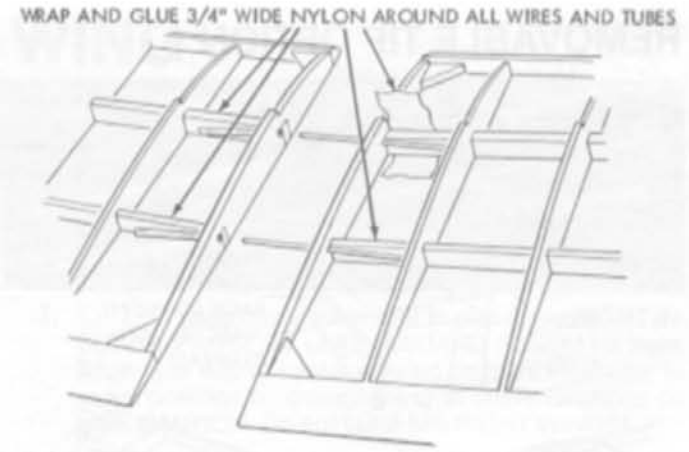
13c. ☐ ☐ Remove pins from inboard panel and gently sand polyhedral ends of spars, L.E.'s and T.E.'s for uniform vertical surfaces.



13d. ☐ ☐ Refer to Step 14 for correct use of die-cut wing gauges and raise inboard wing panel as shown.

☐ ☐ Position 3/32" x 3" wire on back of spars shown, and mark wire location on spars. Carefully groove spars for wire and brass tube respectively as shown in TIP OPTION detail on plan.

☐ ☐ Tack-cement wire to outboard spar, and brass tube to inboard spar. Plug wing panels together, and observe that wing structures butt evenly at polyhedral joint. If corrections are necessary, rework grooves slightly, then reglue metal parts in place.



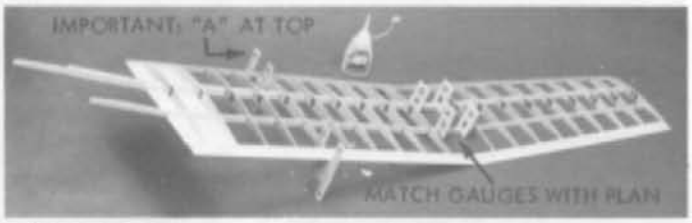
13e. ☐ ☐ Plug wing panels together. Position ribs 6 at polyhedral joint, tilt them slightly towards outboard panel to match spar angles. Carefully glue ribs to their respective wing panels — AVOID gluing panels together.

☐ ☐ Remove inboard panel. Using 3/4" wide nylon fabric and SUPER JET or epoxy, securely bond wire and brass tube in place. Securely glue ribs 6 in place.

☐ ☐ Add gussets at L.E. & T.E. Proceed directly to step 19.

NOTE:

Later on, after wing parts have been covered, the removable tip panels are fastened to inboard wing sections using vinyl electrical tape. This tape holds firmly yet can be removed without damaging covering material.



14. ☐ ☐ With outboard panel still pinned down, raise inboard panel and support it under first rib 5 location as shown on plan using dihedral gauges — IMPORTANT: end stamped "A" must be up (as shown above). Hold gauges firmly to the ribs by tack-cementing, or clothespins, etc.

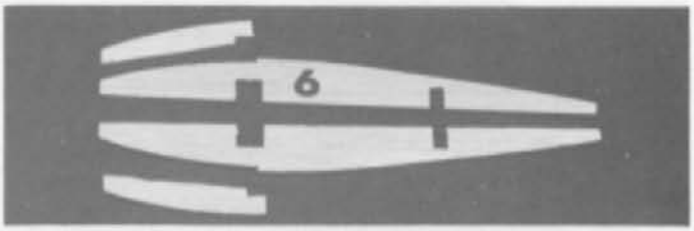
☐ ☐ Study entire center joint; all end parts of inboard panel should just touch those of the outboard (tiny gaps are all right). If the fit between most parts is a little loose because one part protrudes too much, slightly sand only the protruding part for better fit. When sanding it is better to take off too little than too much! Optional: for more precise fit between these parts you can use the sanding tool described in Removable Tip Option above.

15. ☐ ☐ TEMPORARILY set dihedral joiners in place on each side of spars, using die-cut clamps to hold joiners tight against spars.

☐ ☐ Be sure inboard panel is held firmly against outboard panel and pin in place as shown above. Remove joiners.

16a. ☐ ☐ Apply a liberal bead of SUPER JET to all joints of L.E., spars, and T.E.

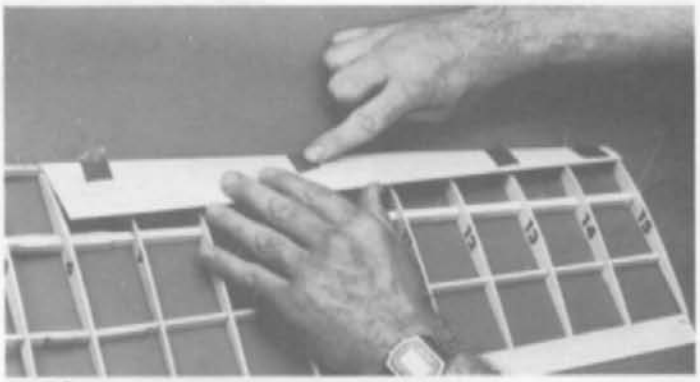
16b. ☐ ☐ Apply glue to joiners and immediately reinstall clamps to hold both joiners tight on spars.



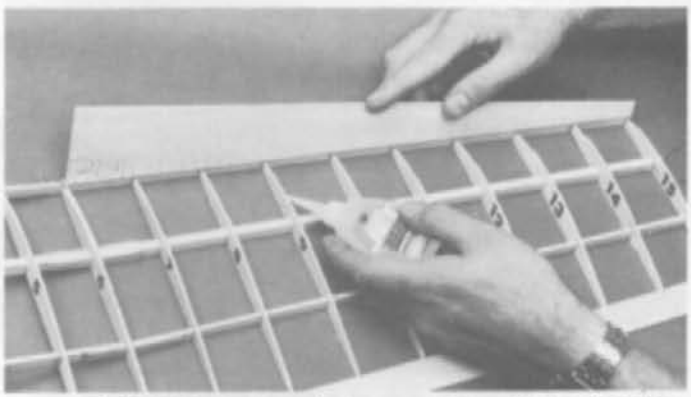
17. ☐ ☐ Lay parts out as shown. Glue rib doubler 6a to rib 6, make one left and one right rib 6. When installing rib 6 in next step, position rib so doubler 6a faces out towards outboard panel.

18. ☐ ☐ Align rib 6 so it aligns with joints in L.E., spars, and T.E. and glue in place.

☐ ☐ Glue gussets to rib 6, L.E. & T.E. at locations shown on plan.

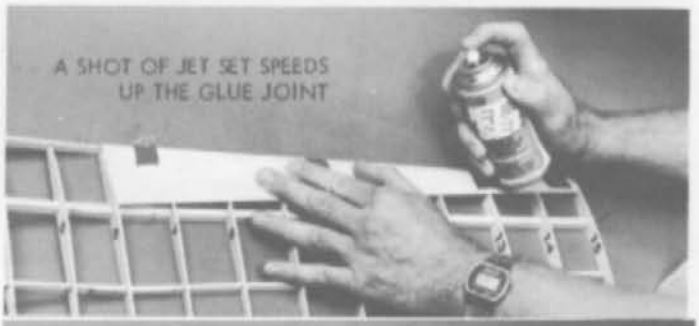


19. ☐ ☐ Set outboard L.E. sheeting in place, matching inboard edge of sheet with joint between ribs 6/6a. Tape sheeting to L.E.

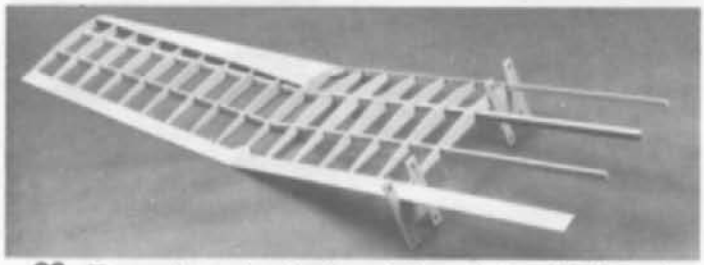


☐ ☐ With the taped edge as a hinge, lift the sheeting. Apply SUPER JET along the top of each rib.

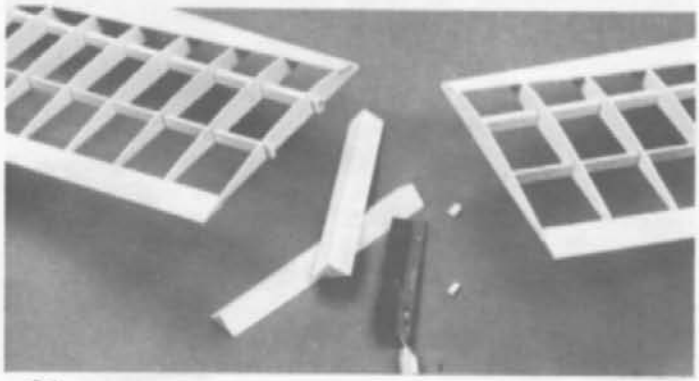
☐ ☐ Press top sheeting down in position, holding it in place until dry. Glue L.E. between tapes.



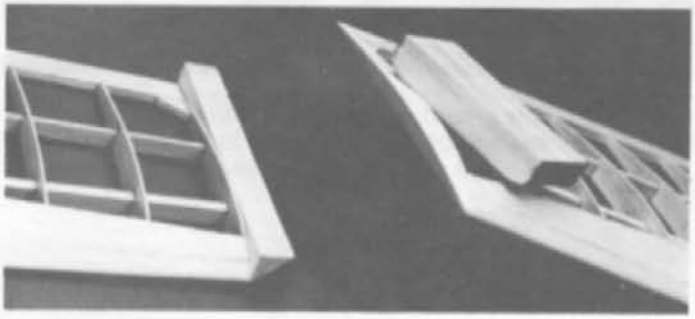
☐ ☐ Remove tapes and glue remaining sheeting to L.E.



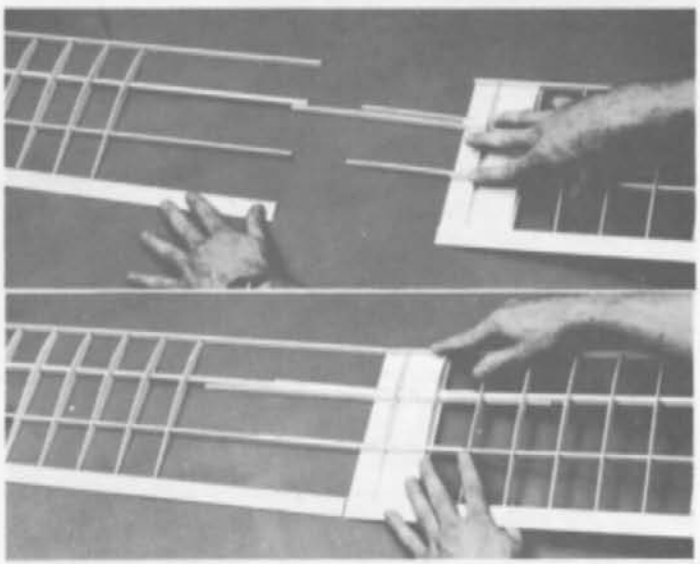
20 ☐ Repeat only steps 1 through 5 and 9 through 19 for left inboard panel.



21. ☐ Trim off excess spar material extending beyond ribs 15. Glue balsa tri-strips in place on wing tips.

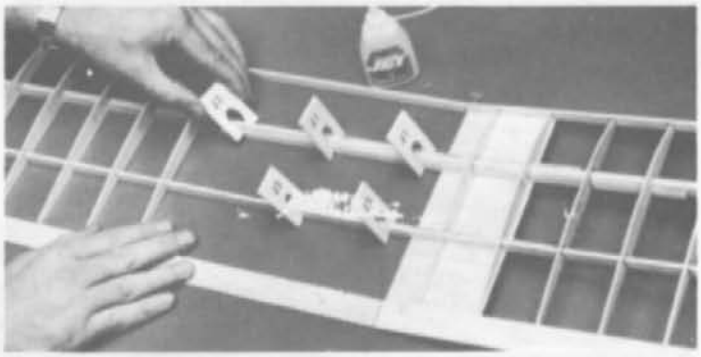


☐ Carve and sand, following top contour of rib (see plan).



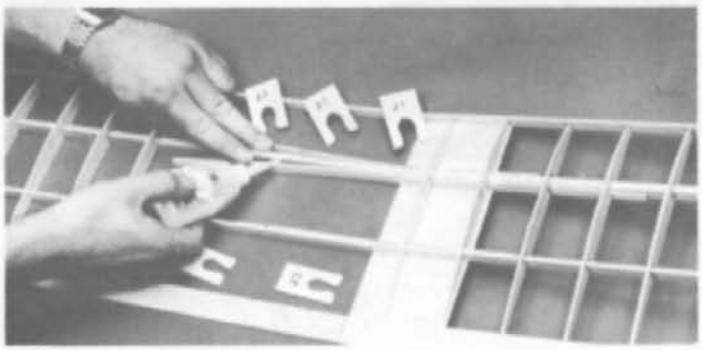
22. ☐ Pin left inboard panel down. Slide right panel up tight next to it while engaging joiners with spars. Raise

right inboard panel and support it at the outermost rib 5 using dihedral gauges, ends stamped "B" must be up.



23. ☐ Examine center joint for good fit and alignment of L.E., spars, joiners, and T.E. Temporarily install clamps to hold joiners tight on spars.

☐ With right wing held firmly against left wing, pin it in place. Remove clamps.



24. ☐ Insert pins between spars and joiners. Apply SUPER JET between parts. Remove pins from joints and immediately reinstall clamps to hold joiners tight on spars. Let dry thoroughly.

☐ Remove all clamps from spars.

25. ☐ Cut three pieces of bottom sheeting from remaining plain balsa sheet. Trim to fit and glue in place.

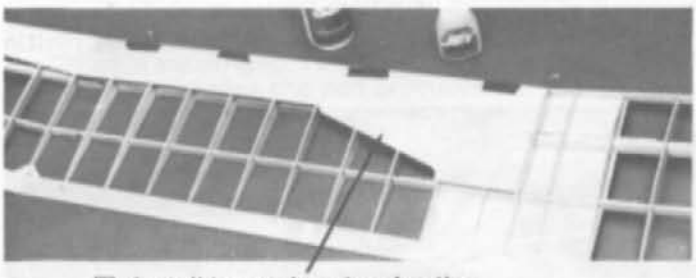
☐ Glue L.E., bottom sheets, and T.E. together at center joint.

26. ☐ Glue remaining ribs 2, 2, 3, & 4 in place.

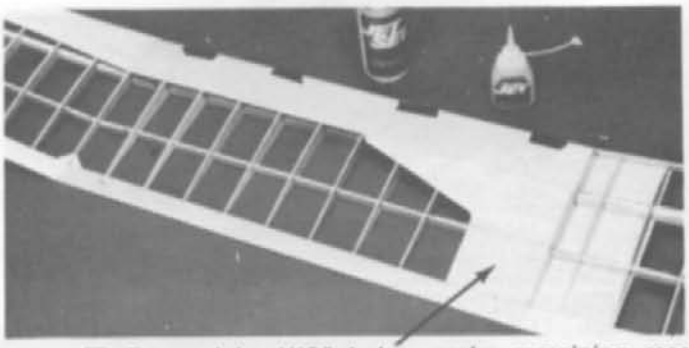
☐ Glue two of rib no. 1 together to make a double thickness rib.

☐ Position rib 1 at center joint and adjust it so it aligns with spar center joint, L.E., bottom sheeting, and T.E. Glue in place.

27. ☐ ☐ Install inboard L.E. sheeting following same procedure as in step 19.



☐ Install tapered center sheeting.

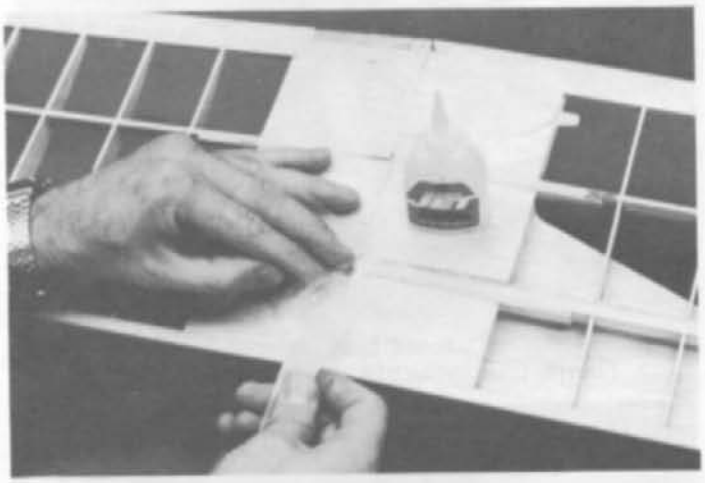


☐ From plain 1/16" balsa, make remaining rear sheeting piece and glue in place.

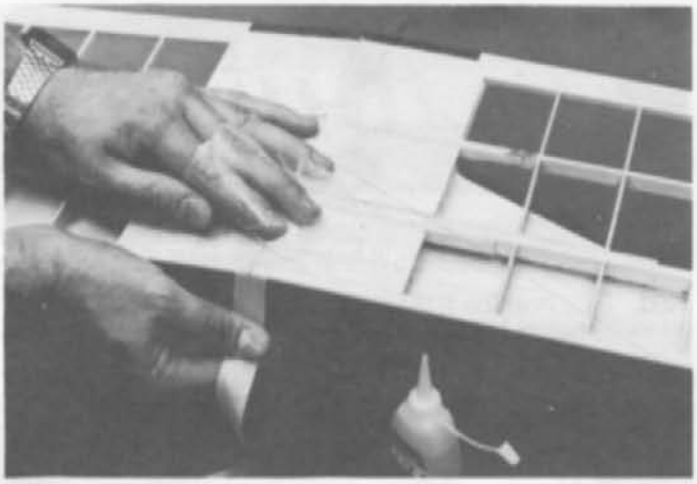
☐ Remove all pins and gauges and repeat this step to complete sheeting of the right wing.

28. ☐ Using 240 grit (fine) sandpaper, flat sand entire wing to blend surfaces and remove high spots.

☐ Cut 1" × 6" half-hard aluminum sheet into two 3" pieces. Lightly sand aluminum surfaces for better gluing. Apply a bead of SUPER JET to half of a 3" aluminum sheet and glue it to wing T.E. as shown above. When dry, apply glue to other half and then wrap it around T.E. Repeat for other 3" piece.



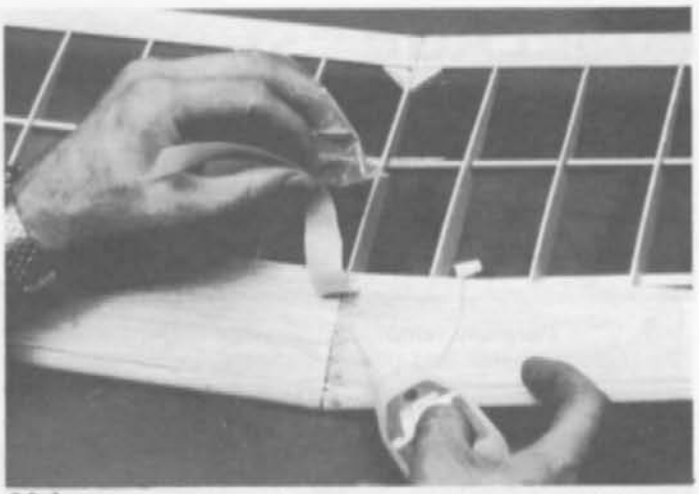
29a. ☐ Apply a spot of SUPER JET on wing bottom and stick one end of 3/4" wide nylon to it. Let dry until the nylon is glued solidly to the balsa.



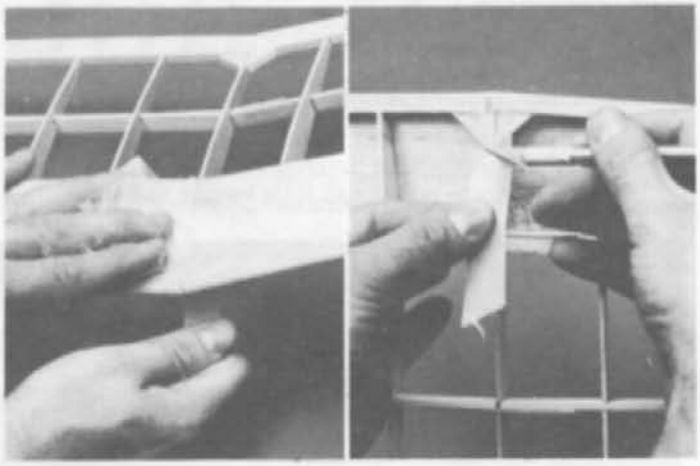
29b. ☐ Apply a squiggle of glue to wing and pull nylon fabric into it. Rub nylon into glue with your finger (cover finger with a plastic bag or similar).

29c. ☐ Repeat gluing procedure and apply nylon around L.E., across top of wing, around T. E. and finally overlapping where you started on wing bottom.

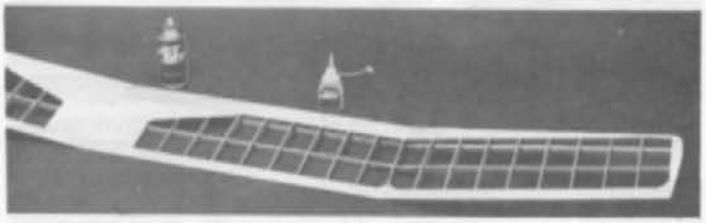
☐ After entire center joint has been wrapped with nylon, apply another coat of glue and force it down through the nylon. Let dry thoroughly.



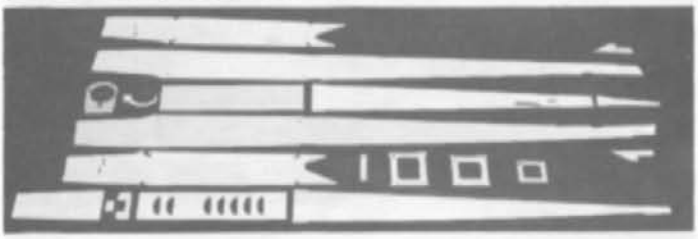
29d. ☐ Repeating this procedure, install nylon fabric at polyhedral sheeting joints.



THIS COMPLETES THE WING ASSEMBLY



FUSELAGE

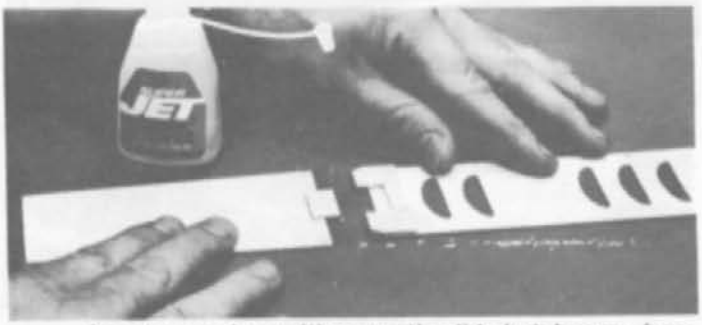


1. ☐ Carefully remove all fuselage (fuse) parts from die-cut balsa and plywood sheets. Lightly sand any rough edges.

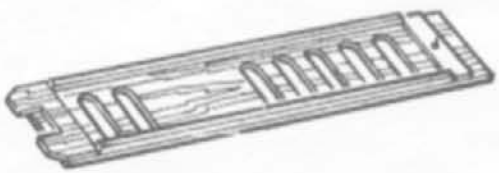
2a. ☐ HATCH ASSEMBLY. Match beveled corner edges of hatch tongue with hatch corners as shown above (Note vent hole positions). Glue tongue to hatch.

2b. ☐ Butt front bottom sheet against hatch and center it by aligning die marked lines with hatch sides as shown.

☐ Carefully glue fuse tongue to bottom sheet (CAUTION: do not glue to hatch parts!). While holding

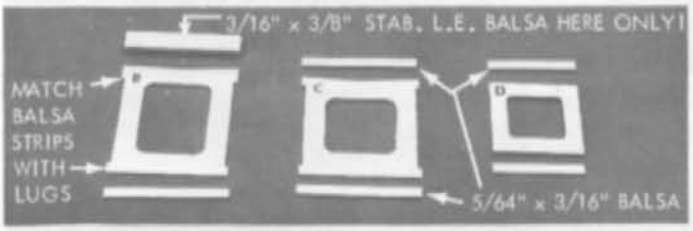


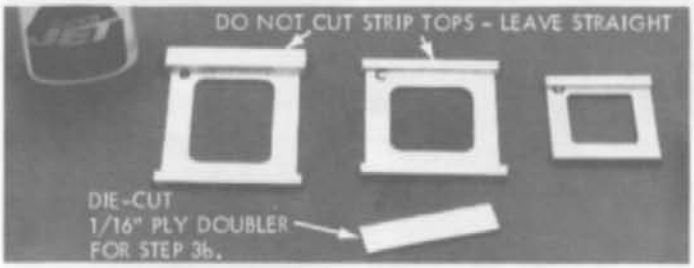
fuse tongue in position, gently slide hatch away from bottom sheet.



2c. ☐ Position 1/8" square × 7-3/8" bass rails behind tongue and flush with hatch sides. Glue in place.

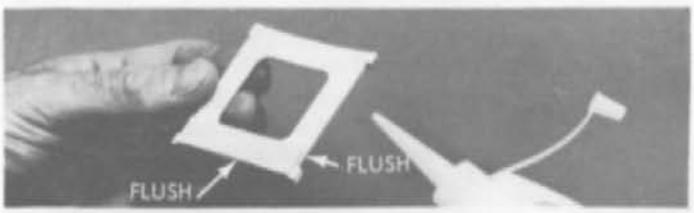
2d. ☐ Position 1/16" ply doubler at end of rails and glue to hatch.



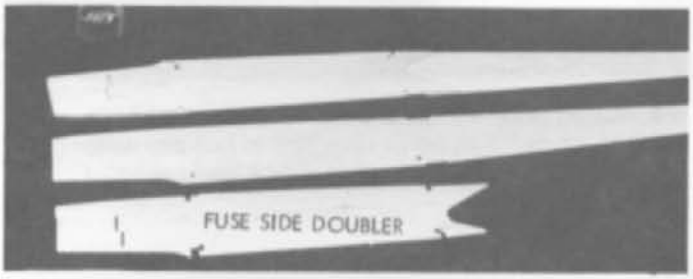


3a. ☐ From 3/16" × 3/8" stab L.E. material, cut and glue one strip to match top of former "B" as shown above.
☐ From 5/64" × 3/16" tail truss material, cut and glue strips to match bottom of former "B."

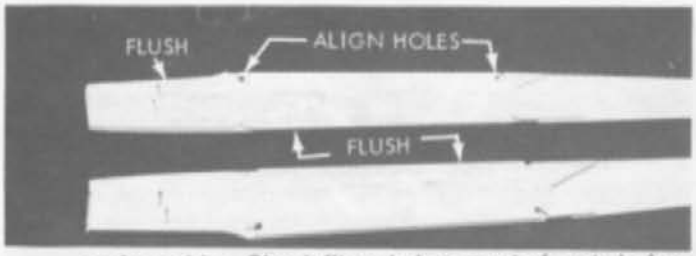
3b. ☐ From 5/64" × 3/16" truss material, cut and glue strips to match top and bottom of formers "C" and "D" as shown above.



☐ Turn former "C" over and glue 1/16" ply doubler flush with bottom edge and sides.

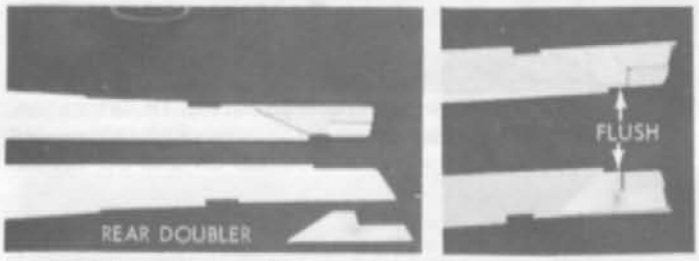


4. ☐ Be sure sides are laid down left & right as shown.
☐ Temporarily position front and rear fuse doublers

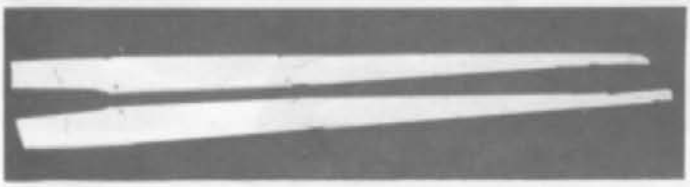


on fuse sides. Check fit and placement of parts before gluing.

☐ Glue front doublers to body sides, making sure to flush parts as shown above.



☐ Glue rear doublers in place.



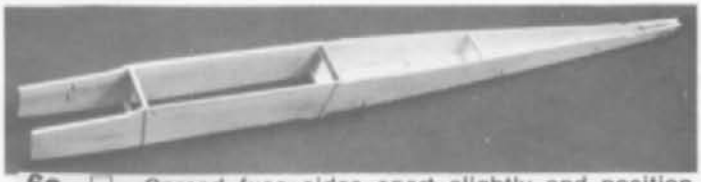
☐ Lay fuse sides over side view on plan and mark location of former "D."

5a. ☐ Using no glue, place fuse sides one on the other, and loosely rubber band rear together around the back end. Spread fuse fronts apart, and plug former "B" into holes in body sides (balsa doubler strips must face towards front of model). Hold parts together with a rubber band.

5b. ☐ With balsa doubler strip facing towards rear of model plug former "C" into holes and hold parts together with a rubber band (Note: formers "B" and "C" are correctly positioned when their "V" cut tops face in towards each other).

6a. ☐ Place pinning board under "FUSELAGE TOP/BOTTOM VIEW" on plan and cover this area of plan with plastic wrap or similar.

6b. ☐ Pin balsa bottom rear sheet in position over plan.



6c. ☐ Spread fuse sides apart slightly and position them around bottom sheet, engaging notches in sides with bottom sheet tabs (slip rubber band off tail end).

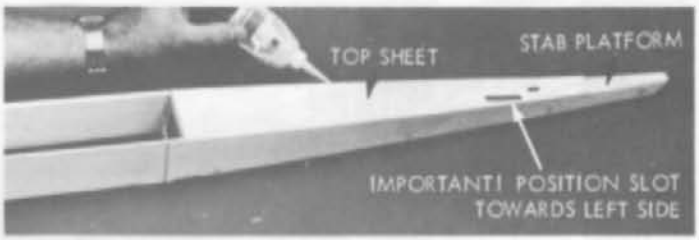
6d. ☐ Hold sides in place on bottom sheet by pinning from outside (apply pins only in the rear area from 2" behind former "C" to the back end).

☐ Remove all pins from inside the fuse.

6e. ☐ Insert former "D" at locations previously marked on fuse sides.

6f. ☐ Glue formers "B," "C," "D" and bottom sheet to fuse sides. Let dry.

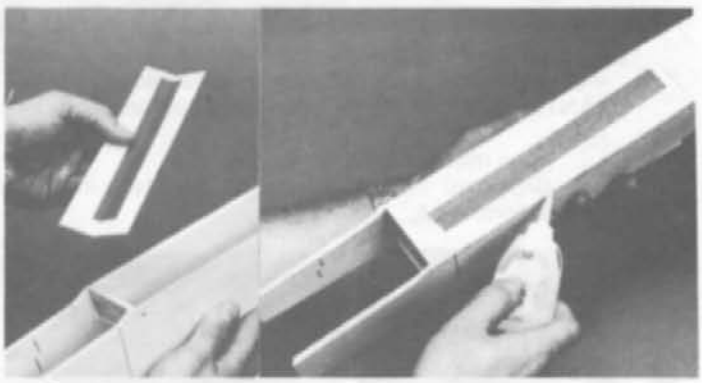
6g. ☐ Position 1/16" ply doubler (from hatch vent scrap) behind former "C" as shown on plan, and glue to bottom sheeting.



7. ☐ Position top sheeting, engaging fuse notches with sheeting tabs. Glue sheeting to fuse sides and formers.

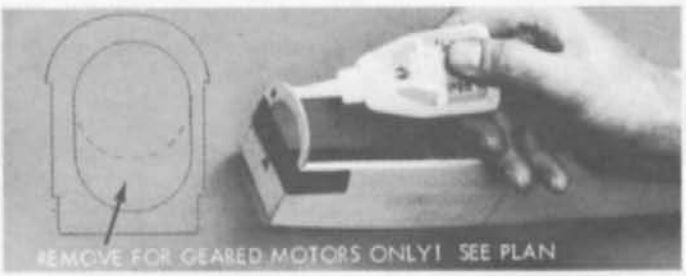
☐ Position stab platform between fuse ends, and glue in place.

☐ After fuse structure is thoroughly dry remove all pins.

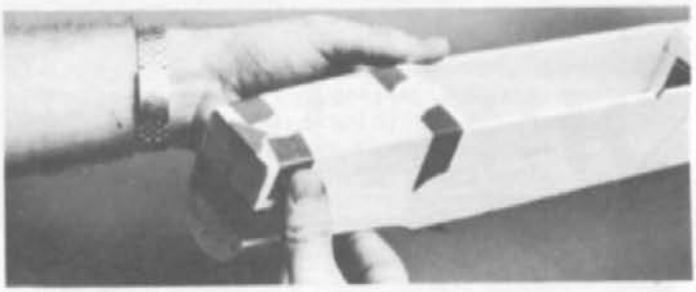


8. ☐ Apply a piece of tape along die-cut center line on wing platform. Bend platform slightly along center line to match dihedral angle in top of formers "B" and "C."

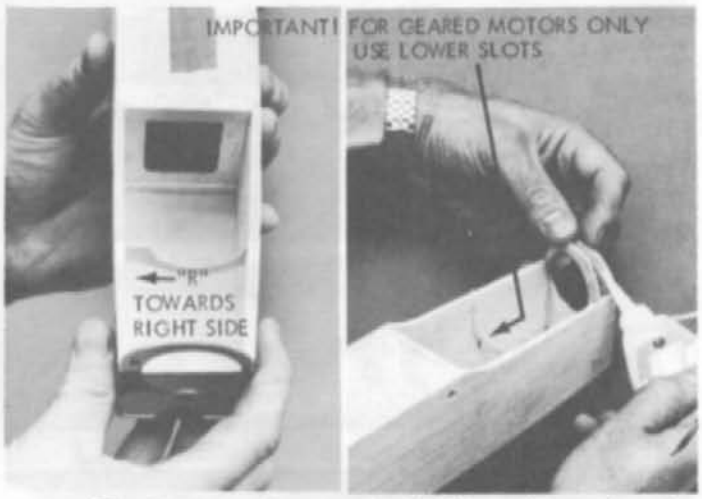
☐ Position wing platform between fuse sides and glue in place.



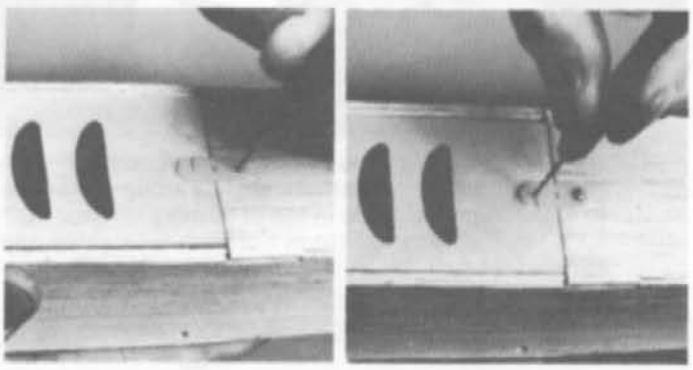
9. ☐ Position former "A" with side stamped "R" towards right side as shown. The "right" side is thought of as it would be to a pilot sitting in the cabin. Hold parts together with tape as shown.
☐ Glue former "A" in place.



10. ☐ Position 1/16" ply front bottom sheeting on fuse sides and behind former "A." Hold parts with tape.
☐ Glue bottom sheeting in place.



☐ Spread sides apart slightly and insert motor mount support into notches in fuse sides. IMPORTANT! side stamped "R" must be positioned on right side.
☐ Glue motor support in place.
☐ Glue two balsa former "A" doublers in place behind former "A."

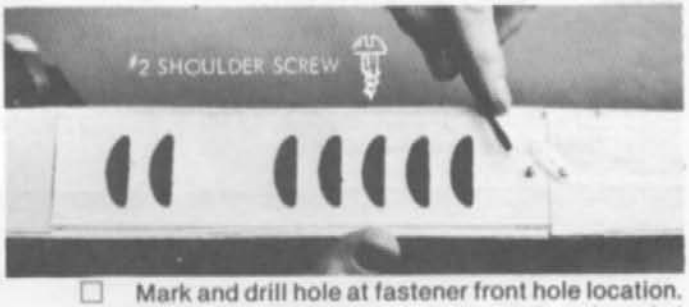


11. ☐ Place battery hatch in fuse bottom.

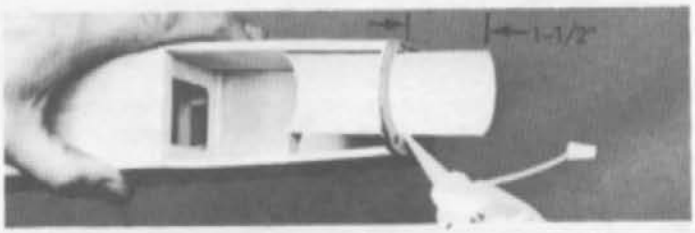
☐ Position nylon fastener at center of fuse, "side-action" end over hatch, the other half over the rear sheeting.

#2 x 3/16" SHEET METAL SCREW

☐ Mark rear hole location on sheeting. Drill 1/16" diameter hold and install nylon fastener on rear sheeting with #2 x 3/16" sheet metal screw.



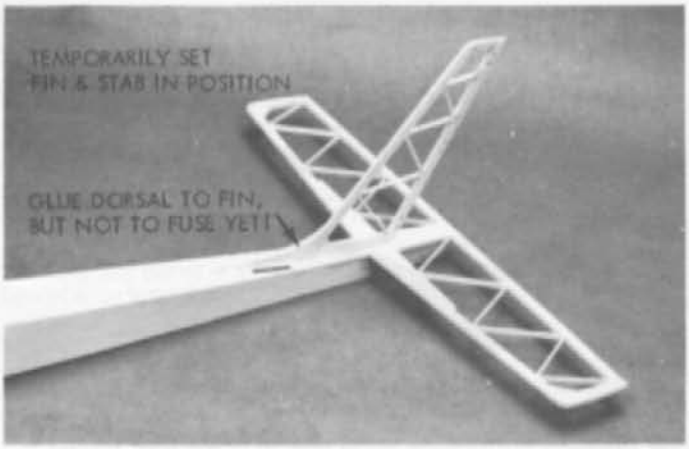
☐ Mark and drill hole at fastener front hole location. Install #2 shoulder screw exposing enough unthreaded shank to engage fastener. Snap on and off several times.



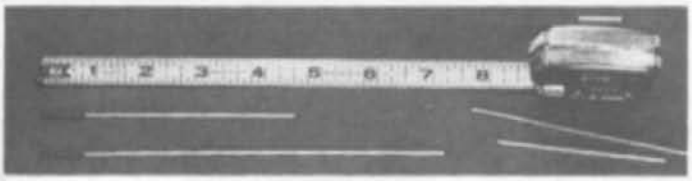
1. ☐ Using Super Jet or Epoxy, install plastic motor mount gluing it to former "A" and rear motor mount. Front of mount should protrude about 1-1/2" from front of former "A."

12. ☐ Temporarily install wing hold-down dowels in fuse. Rubber band wing in place on fuse, making sure it is centered. Viewing model from rear, see if stab sets level with respect to wing.
☐ Sand stab platform area as may be necessary to provide a good level fit for stab. Do not alter the die-cut angle of the fuse sides.

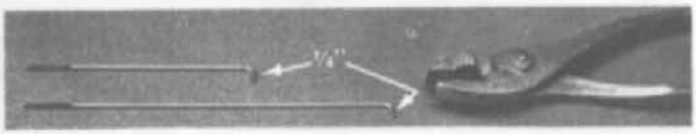
☐ Center stab on fuse, measuring to obtain equal distance from side to side, and from nose of fuse to rear corner of each stab tip . Pin in place.



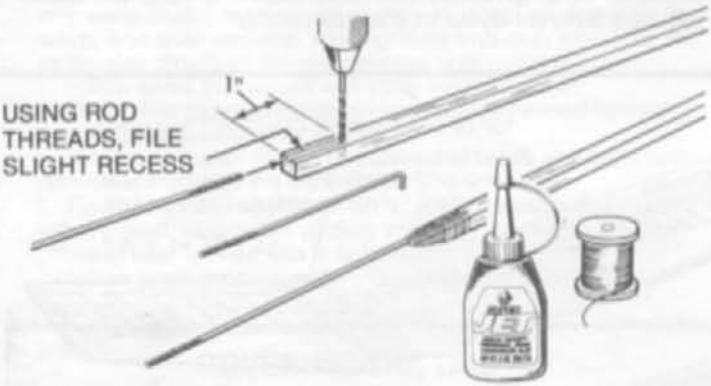
☐ Trial fit fin in place. Glue dorsal fin to main fin but not to fuse, as shown. When dry, watch grain and very carefully trim off die-cut bumps. Finish sanding.



13a. ☐ From the threaded end of two 10" rods, measure and cut one of the rods to 7-1/4" and the other rod to 4-1/4".



13b. ☐ At cut end of rods, bend down about 1/4" making a square hook.



13c. ☐ Using the threaded end of a rod, file a slight recess 1" long at one end of each 1/4" square x 17-7/8" balsa pushrod.

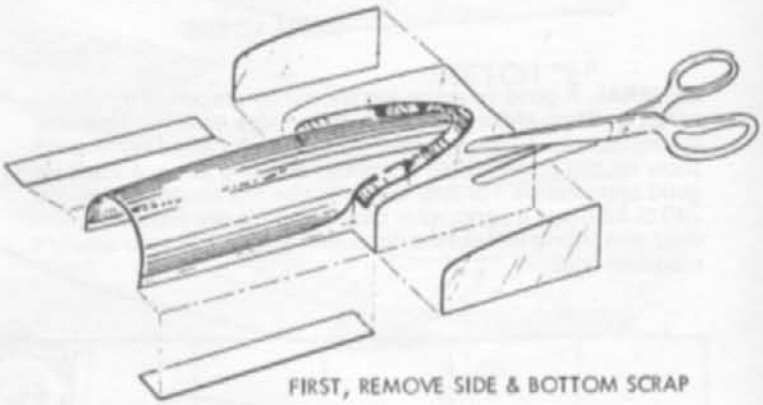
☐ Drill a 1/16" diameter hole 1/4" deep at end of recess in both pushrods.

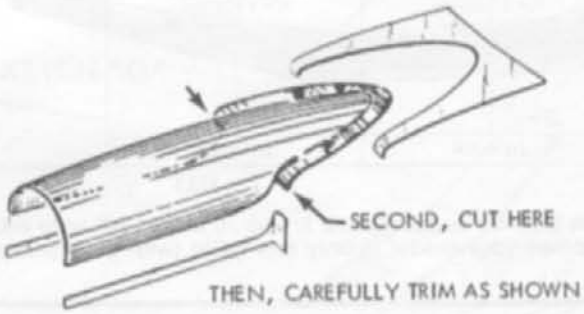
☐ Glue rods into balsa pushrods as shown.

☐ When dry, taper ends of pushrods and round off corners. Bind with strong thread, coat with glue and let dry.

13e. ☐ Cut 1/16" x 12" plain wire in two 4" pieces. Attach these wires to the balsa pushrods by repeating the procedures in steps 13b and c. Save scrap wire for radio installation.

13d. ☐ Read this instruction carefully. Complete the other end of the pushrods as follows: for the 7" rod, cut its balsa pushrod to about 12" long; for the 4-1/2" rod, its balsa pushrod can be left as furnished, about 17-7/8" long (refer to full-size views on plan).

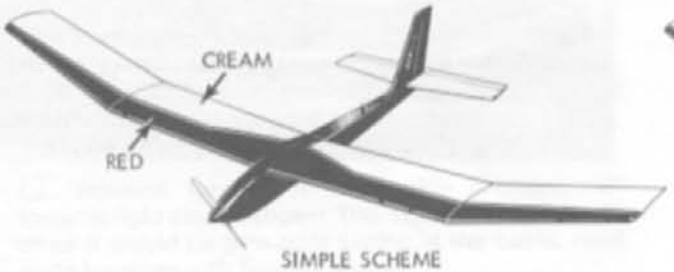




14. ☐ Remove canopy from vac-formed sheet by cutting on lines as shown in sketches above.

THIS COMPLETES THE FUSELAGE ASSEMBLY

IV COVERING

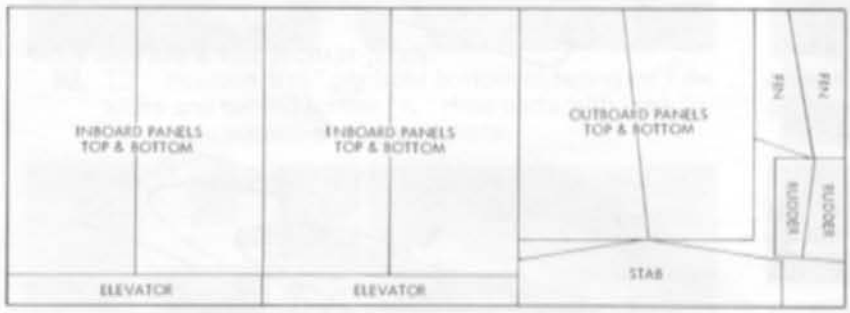


SIMPLE SCHEME

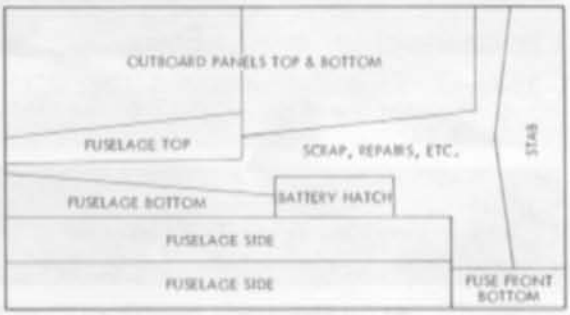
ADVANCED SCHEME

GENERAL. A good covering job should be preceded by careful sanding, filling nicks and dents, then more sanding. Use filler appropriate for balsa. Any irregularities in the wood surface will show on the covering, so a smooth sanding job is a must for good appearance. For final sanding, use the sandpaper (grade 240 to 320) and a sandpaper block. The Electra should be covered with strong films of the "iron-on" variety. Ask your dealer's recommendation.

The following instructions show how to cover your Electra in either of two different color schemes shown above. The first scheme uses basic covering techniques—it is recommended for novices. The second color scheme, shown on the large label photo, is recommended only for experienced builders because it requires carefully splicing two colors of covering material together and then applying it to the stabilizer.



6 FEET



4 FEET

This diagram suggests how to use 10 feet of 26" wide material to cover your model in only **one** color (with generous scrap allowed). Other schemes with more than one color will each require a different layout for material cutting.

COVERING THE WING

The wing covering procedure is to cover the bottom of the wing first, one panel at a time, then cover the top. We show how to apply a different color covering at the L.E. area of the wing top. Adding the L.E. color takes more time but is not difficult since the two colors can be spliced on the wing directly over the solid L.E. sheeting.

☐ Using a fresh razor knife blade or razor blade, cut a piece of covering material 1" larger than one-half of the inboard wing panel bottom. Strip clear film from adhesive side.

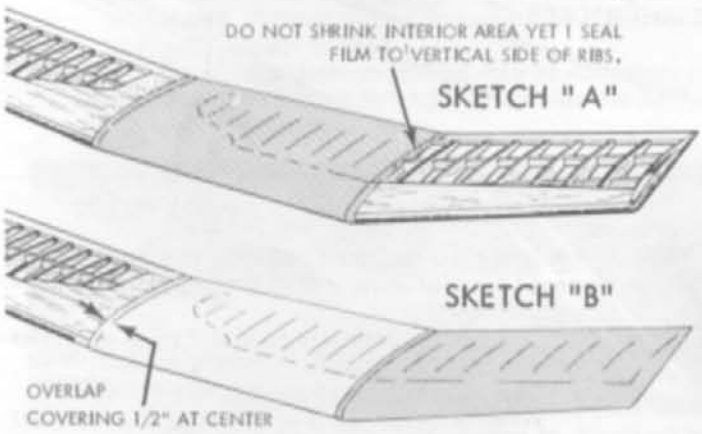
☐ Set iron at proper working temperature—test by applying strip of covering on scrap balsa. Lay covering over balsa, and gently press with iron. If iron burns through covering, iron is too hot. If covering pulls easily away from balsa, iron is not hot enough to melt adhesive.

Position covering on bottom of wing, using iron, tack covering across center of wing.

Work outward, tacking the perimeter edges of the panel, and gently pulling out the main wrinkles as you go.

Seal all around edges of panel (sketch A). Besides sticking the film firmly to the edges of the panel, run some of the film down the vertical side of the rib.

TOP OF WING SHOWN: COVER BOTTOM FIRST



AFTER ALL EDGES & COLOR JOINTS ARE SEALED, SHRINK ENTIRE WING COVERING. CHECK WING ON TABLE FOR FLATNESS.

☐ Glide iron over interior area to tighten covering. Seal covering to all ribs. Trim edges.

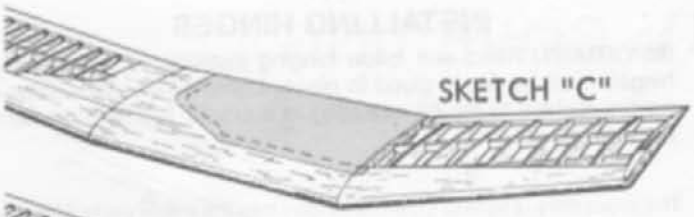
☐ Following same procedure, cover entire bottom (sketch B).

TOP

☐ To cover the wing top in **one solid color,** follow the same procedure as the bottom, working one panel at a time.

☐ To cover the wing top with the **different color** L.E. the technique is the same, except that first one color is applied–then the second color is added to the L.E.

First, cut a piece of rear color covering to ¼" overlaps the L.E. sheeting and leave about 1" at the T.E. and sides (sketch "C"). Overlap front edge ¼" on sheeting and tack it in place. Apply entire piece and seal edges firmly to wing, especially along sheeting.



Working one panel at a time, continue covering entire rear portion of wing top (sketch "D").

From second color material, cut a L.E. piece large enough for ¼" overlap on the first color with about 1" excess around L.E. and sides. Apply this piece (sketch "E").

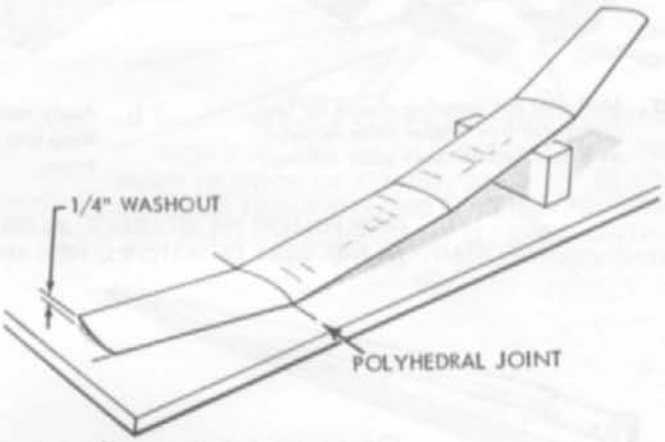
Working one panel at a time, continue covering entire rear portion of wing top (sketch "F").

Apply CG Color-Stripe Tape, to finish wing trim (sketch "G"). It is available in many popular colors. Stripes could also be cut from covering material.

TRUING WING AND SETTING WASHOUT

Truing the wing is an important step, and should not be rushed or omitted. Also, "washout" (explained below) improves the wing's efficiency, and increases the glider's stability at slow speeds (prevents tip stalls).

☐ Set inboard panel on a flat surface to detect warp. To counter any warp found, twist panel slightly in direction opposite to warp, and hold position while gliding iron over covering to re-tension structure. Repeat process until panel is true.
☐ Follow same procedure with other inboard panel.
☐ Check first panel, and correct any change caused by truing second panel.
☐ Block up wing as shown so polyhedral break and outboard panel leading edge are flat on table.
☐ Tip trailing edge should be up ¼" (called washout). As necessary, twist wing while gliding iron over covering . Repeat process until ¼" washout is achieved.
☐ Follow same procedure for other outboard panel.



COVERING THE TAIL

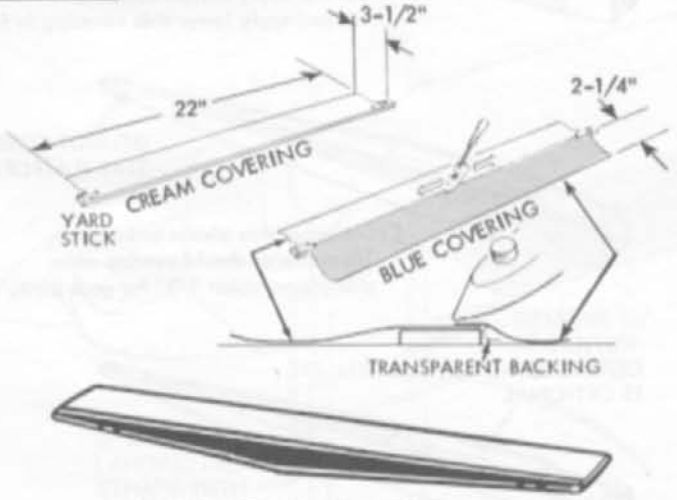
Following same procedure as the wing, cover the stab/elevator and fin/rudder. After covering over hinge slots, immediately go back and slit covering to open slots while the locations are still fresh in your memory.

APPLYING L.E. COLOR. Large areas of covering can be applied directly over another, but usually air bubbles get trapped between the colors. A better way is shown here. It does require careful splicing and therefore is recommended for experienced builders only.

Cut a strip of cream covering 3½" wide x 22" long, and one blue strip 2¼" x 22".

With protective film facing down, check one edge of cream strip with straight edge, and tape ends in place as shown above. Remove protective film from blue strip, and lap the blue about 3/16" over the edge of the cream. Tack together in many spots. Then use the tip area of the iron to bond the blue to the cream in a good seam.

Cover bottom of stab with solid cream film. For top, check placement of blue L.E. so it appears parallel to stab T.E. and apply.

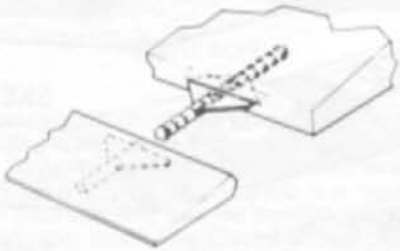


APPLY SPLICED MATERIAL TO STAB TOP

INSTALLING HINGES

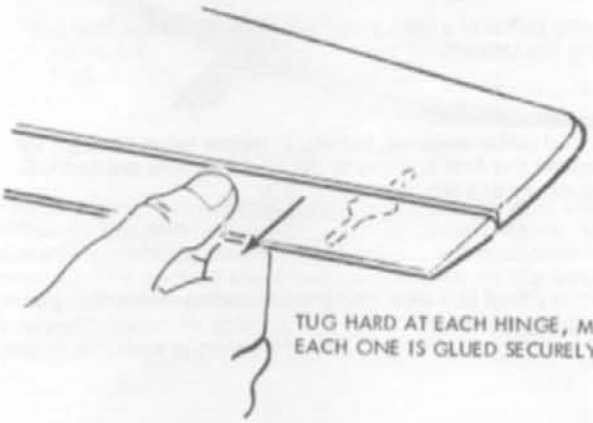
IMPORTANT! Read and follow hinging instructions carefully. All hinges must be firmly glued in place. Loose hinges can allow a control surface to fall off, resulting in a crash! Tug hard on each hinge to check bond.

The procedure is to first glue the hinges into the major parts (the wing, stab, and fin), and then add the control surfaces. Because hinge installation requires time for inserting and adjusting each hinge, quick setting SUPER JET is not recommended here. Instead, use epoxy, aliphatic resin, or equivelent glue.



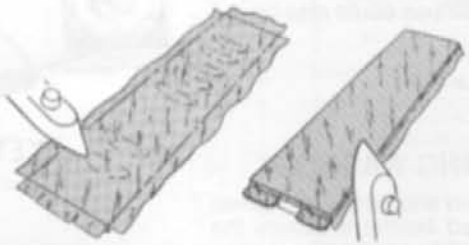
☐ Hinge elevator to stab. When dry, tug hard on each hinge to check bond.

☐ Hinge rudder to fin.

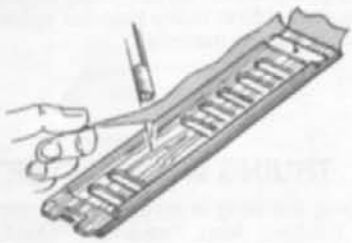


COVERING THE FUSELAGE

a. Mark and cut covering pieces for fuse. Cut pieces from proper color material as they relate to your color scheme.

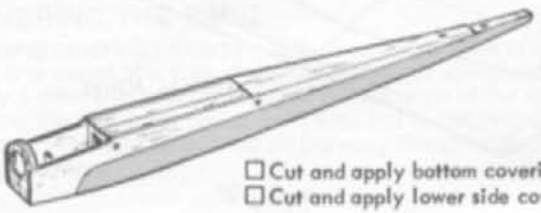


b. Apply covering to hatch bottom. Wrap and seal covering around edges.

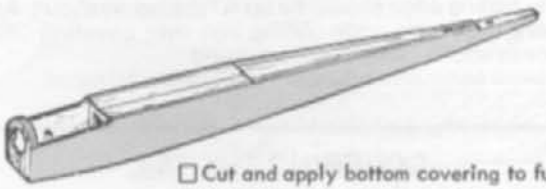


c. Trim covering even with hatch bottom. Carefully remove covering from ventilating holes.

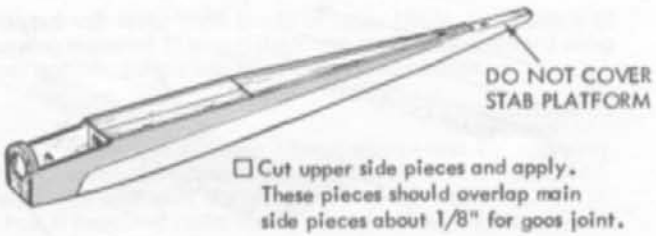
NOW FOLLOW THE SEQUENCE BELOW FOR THE COLOR SCHEME YOU HAVE SELECTED
IMPORTANT: IN THIS SERIES OF SKETCHES, NEW APPLICATIONS OF COVERING ARE SHOWN



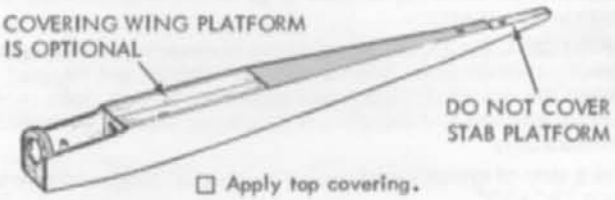
☐ Cut and apply bottom covering to fuse.
☐ Cut and apply lower side covering to fuse.



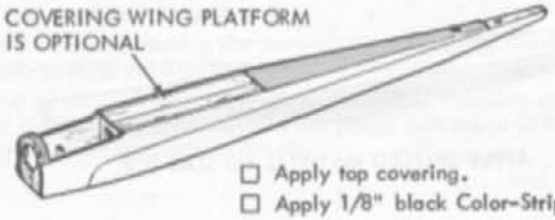
☐ Cut and apply bottom covering to fuse.
☐ Cut main side pieces, and apply.



☐ Cut upper side pieces and apply. These pieces should overlap main side pieces about 1/8" for goos joint.



☐ Apply top covering.



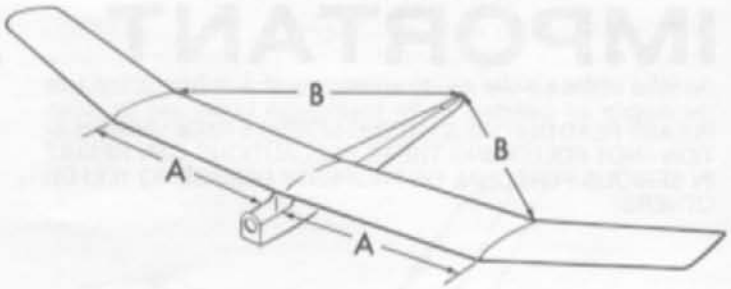
☐ Apply top covering.
☐ Apply 1/8" black Color-Stripe as final trim.

Wash cowl and dry thoroughly. Paint as desired and allow to dry. You can use paints that are not "fuel-proof" (such as model enamels) on the Electra since there is no fuel or oil residue

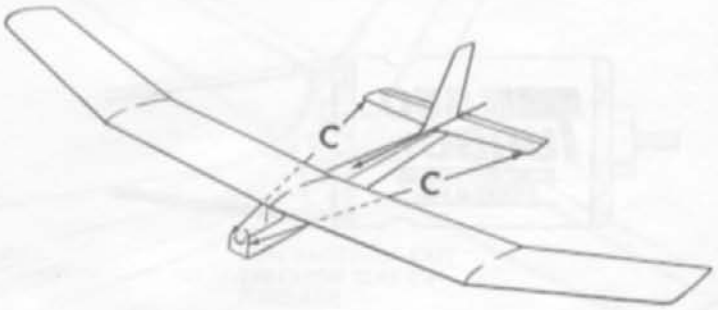
FINAL ASSEMBLY

☐ Position wing dowels so they protrude equally out both sides of fuse and glue in place.

☐ Mount wing on the fuse using rubber bands (six #64s are used for flying). Measure carefully from the fuselage sides out to the polyhedral breaks (arrows 'A') to be sure that the wing is centered. Then measure from the polyhedral breaks to the back end of the fuse (arrows 'B') to make sure wing is square with fuse. Mark the wing and fuse with matching line-up points. Color-Stripe tape can be used for this, or certain marking pens.

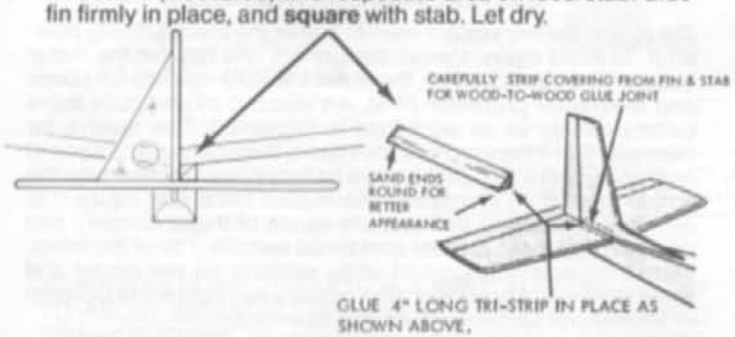


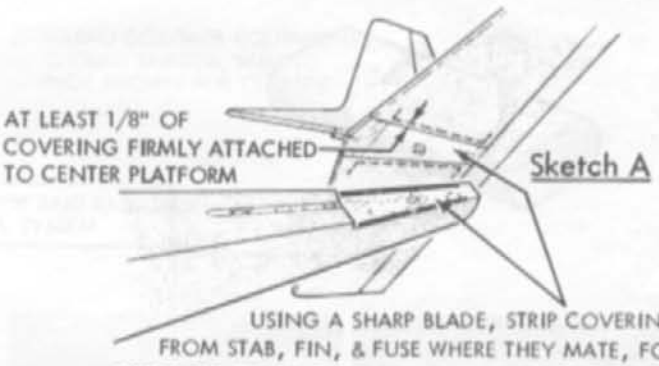
☐ Using no glue, trial fit stab in place on fuse, marking it for center, and adjust as necessary to line up with wing. Then measure from the stab tips to the fuse front (arrows 'C') to make sure stab is square with fuse. Mark match-up lines on fuse and stab for alignment.



☐ To provide a firm wood-to-wood glue joint, strip covering from bottom of stab center where stab contacts fuse (see sketch A). **Avoid cutting structure underneath.** Be certain to leave enough covering **firmly bonded** to stab center (minimum 1/8" to 3/16"). Likewise, if stab area on fuse was covered, remove covering. Glue stab firmly to fuse and let dry. (Slow jet or 5 minute epoxy is recommended for this.)

☐ Trial fit fin in place on fuse/stab (arrow 'D'). Strip covering from fin bottom (if covered) and respective area on fuse/stab. Glue fin firmly in place, and **square** with stab. Let dry.





USING A SHARP BLADE, STRIP COVERING FROM STAB, FIN, & FUSE WHERE THEY MATE, FOR WOOD TO WOOD GLUE JOINT. LEAVE 1/8" TO 3/16" OF COVERING FIRMLY ATTACHED TO CENTER PLATFORM. CAUTION: WHEN TRIMMING COVERING, AVOID CUTTING INTO WOOD STRUCTURE UNDERNEATH.

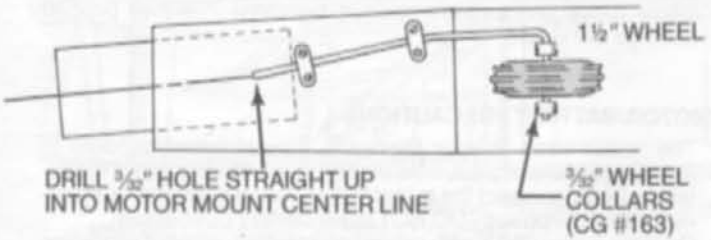
☐ Remove the wing, and cut away covering over hole on left side of fin for the rudder pushrod exit guide. Glue pushrod exit guide in slot.

DECAL INSTRUCTIONS

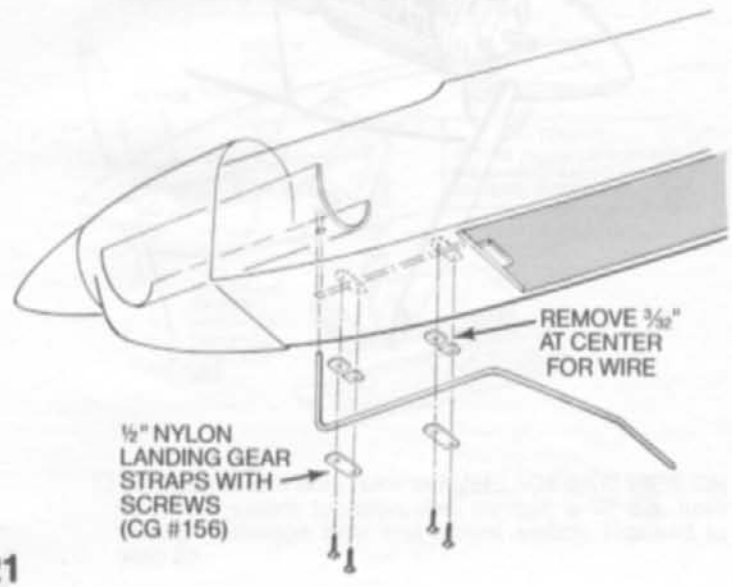
☐ Apply decals to fuse & fin. Cut decal sheet apart in sections as needed. Dip each section in lukewarm water for about 15 seconds. Remove and allow to stand. In about a minute, decal will begin to loosen. Then slide off onto moistened area on model. With soft cloth or cotton, smooth out carefully to remove air bubbles and excess water.

LANDING WHEEL OPTION

(Materials not included)



☐ Refer to fuse side view on plan for location, and drill a 3/32" dia. hole straight up through fuse bottom into center of plastic motor mount. Bend landing gear from 3/32" wire over plan. Install gear as shown above.



IMPORTANT

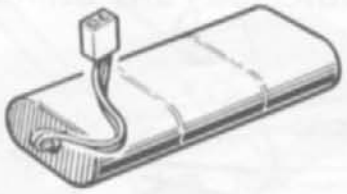
PLEASE READ BEFORE STARTING MOTOR & RADIO INSTALLATION—NOT FOLLOWING THESE PRECAUTIONS CAN RESULT IN SERIOUS PERSONAL OR PROPERTY DAMAGE TO YOU OR OTHERS!

WHEN OPERATING THE MOTOR;
- ALWAYS wear eye protection!
- KEEP safely away from spectators!
- WARNING TO PARENTS; children under the age of 12 require your supervision. DO NOT allow children to operate without adult supervision.
- PROPELLER must be securely installed to prevent excessive motor RPMs.

WARNING

CAUTION; BATTERY HAZARD!

The battery size used to power the Electra motor stores a lot of electrical energy. Be careful to prevent shorting it out. A dead short can cause a powerful surge of electrical current which can ruin your battery and generate enough heat to start a fire and cause burns to you and others.



CAUTION; PROPELLER HAZARD!

The motor/battery system used to power the Electra is very powerful. To avoid injury, always disconnect and remove the motor battery. When switched on, the motor instantly reaches full power and maximum propeller RPM. An electric motor pulls more battery energy as its work load is increased. This means, for example, that if the prop hits your hand, it not only smacks you at high speed but it also draws more battery power to overcome the added load, thus increasing the impact force and injury. It is extremely important that you are aware of these dangers and take precautions to prevent accidental switching on of the motor. This is especially important while working on the model and when storing it. Always store the model away from small children or anyone not familiar with its safe operation.

REMEMBER;
- Install motor battery ONLY when ready to fly or when necessary for checking electrical operation and maintenance.
- AT ALL OTHER TIMES, always disconnect and remove the battery, especially when working on the model and transporting or storing it.

The Carl Goldberg TURBO 550 motor system is designed with a safety fuse to protect the system from excessive motor loads. During motor operation, if the propeller should hit an object, the sudden surge of battery current will blow the fuse and prevent motor/battery burn out or other damage. Use only a 15 or 20 AMP fuse to connect the fuse terminals. Do Not bypass the fuse or directly connect the terminals together—do not operate the system without a fuse!

If you will be using a motor system other than the Goldberg TURBO 550, make sure it is equipped with a fuse. If it isn't, ask your hobby dealer for advice on how to install one. If you do not follow these precautions serious personal injury or property damage will result.

MOTOR/BATTERY PRECAUTIONS
- The motor used in your Electra is powerful and capable of inflicting severe impact, cuts or abrasions. During motor installation, ONLY connect the motor battery when instructions specify for test purposes—DO NOT leave battery connected!
- Operate motor ONLY with propeller installed; without propeller, motor might over-"rev" and become permanently damaged. Propeller MUST be securely installed; always wear eye protection and keep away from spectators.

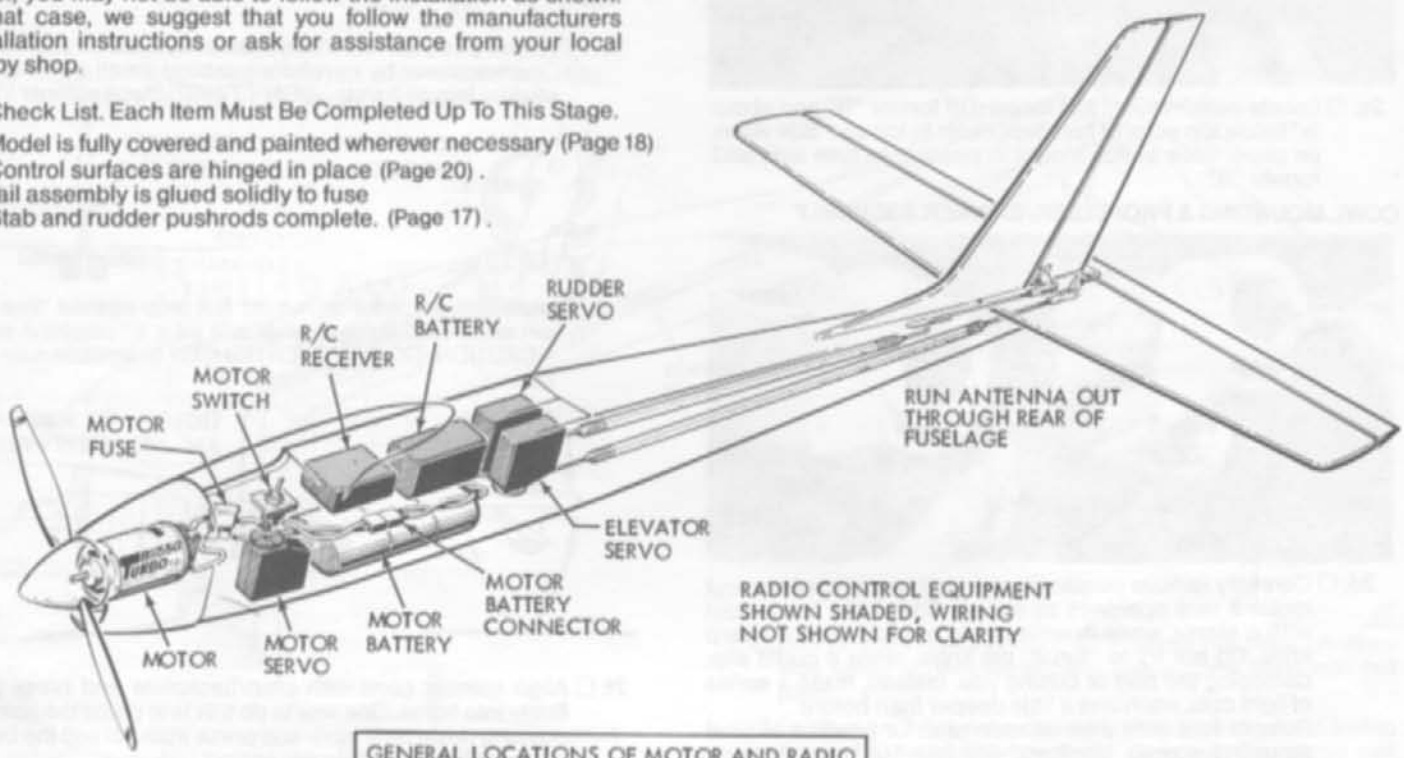
VI MOTOR AND RADIO INSTALLATION

IMPORTANT! Installation of the Turbo 550 Motor/Harness and a typical radio control system is described here. Depending on your radio equipment or if your are using another brand of motor, you may not be able to follow the installation as shown. In that case, we suggest that you follow the manufacturers installation instructions or ask for assistance from your local hobby shop.

1. Check List. Each Item Must Be Completed Up To This Stage.

☐ Model is fully covered and painted wherever necessary (Page 18)
☐ Control surfaces are hinged in place (Page 20) .
☐ Tail assembly is glued solidly to fuse
☐ Stab and rudder pushrods complete. (Page 17) .

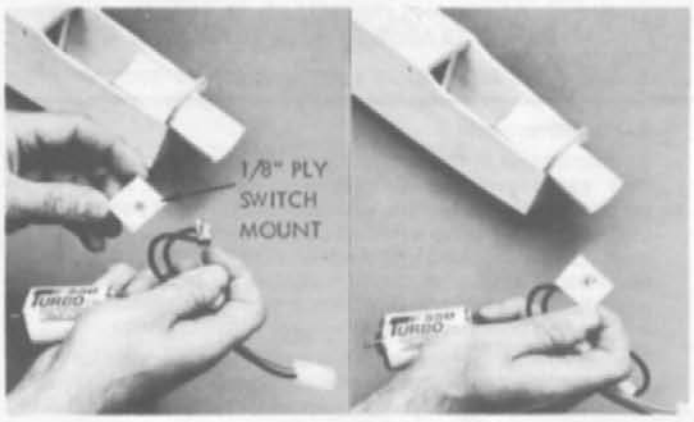
BALANCE NOTE. A final balance check will be made later on. Most all brands of equipment when installed as shown will result in a properly balanced condition.

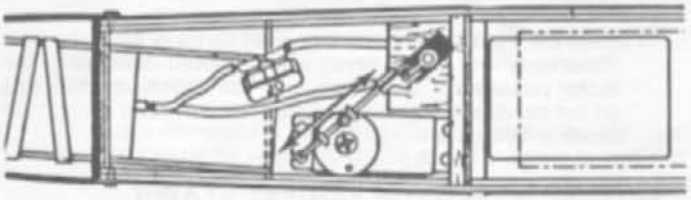


RADIO CONTROL EQUIPMENT SHOWN SHADED, WIRING NOT SHOWN FOR CLARITY

GENERAL LOCATIONS OF MOTOR AND RADIO COMPONENTS FOR 3-CHANNEL SYSTEM

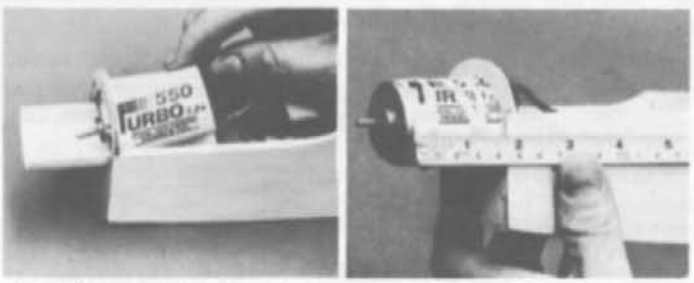
WHEN HANDLING THE MOTOR & SWITCH HARNESS, TRY TO AVOID BENDING THE WIRES NEAR THE SOLDERED CONNCECTIONS. IF HANDLED CARELESSLY, SOLDERED JOINTS CAN BE BROKEN.



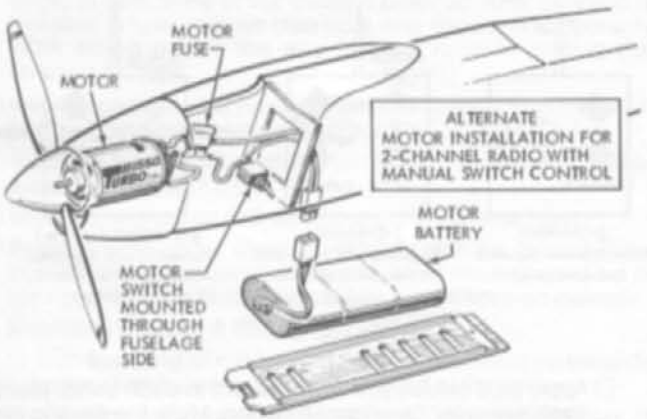


2a. For Alternate 2-Channel installation, proceed directly to step 2b.

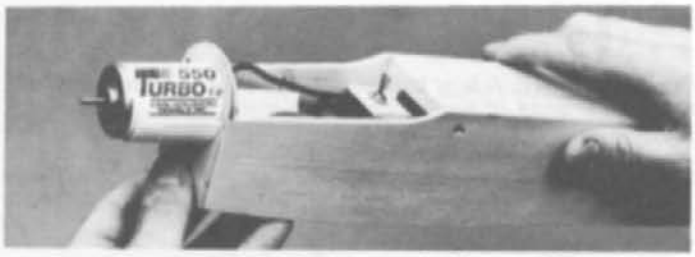
☐ For 3-Channels, install motor switch in ply mounting plate as shown (switch body must be turned so switching action aligns with pushrod from motor servo as shown in fuse top view).



2b. ☐ Insert motor through from rear of former "A" so that motor front protrudes about 1¾" out from front. Hold motor in mount using rubber bands.

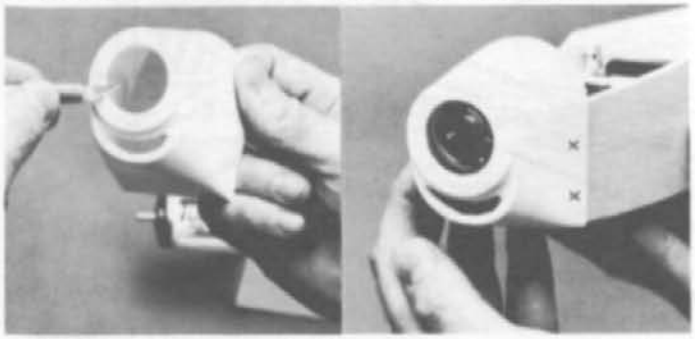


☐ For 2-Channels only, refer to FUSELAGE SIDE VIEW ON PLAN for switch location, drill (or cut) a ¼" dia. hole through fuselage side and mount switch. Proceed to step 2d.



2c. ☐ Locate switch mount just forward of former "B" and about ½" below top edge of fuse side (refer to top and side views on plan). Glue switch mount in position to fuse side and former "B."

COWL MOUNTING & PROPELLER/SPINNER ASSEMBLY



2d. ☐ Carefully remove plastic scrap from base of cowl and cut motor & vent openings as shown. Cowl base can be cut with a sizzor, while openings are best cut with a sharp knife. Do not try to "force" the knife, since it could slip, damaging the part or cutting you. Instead, make a series of light cuts, each one a little deeper than before.

☐ Refer to fuse side view on main plan for position of cowl mounting screws. Mark and drill four 1/16" holes through cowl at these locations.

☐ Set canopy in place on fuse and position cowl over front of fuse and canopy.

3. Radio Installation.

A. Read and follow the instructions that came with your radio.

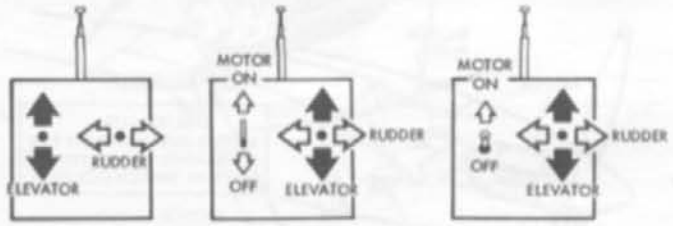
B. If your batteries are dry cells, they should be fresh (we recommend Alkiline batteries). If rechargeable nicads, they should be fully charged.

C. Hook-up Radio and Try Operation.

☐ Refer to "Transmitter Function Sketch," and observe which servo wheels move when stick is moved for various controls.

TRANSMITTER FUNCTION SKETCH

Your transmitter is built like one of those illustrated below. Each sketch shows how the sticks are moved to control various parts of the model.

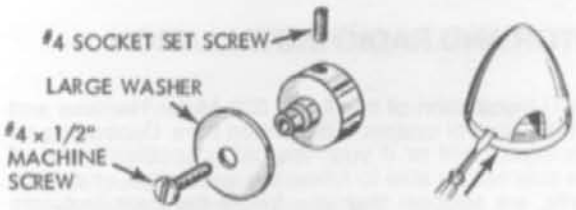


2-CHANNEL
Transmitter with two sticks
Controls 2 Servos

3-CHANNEL
Transmitter with single stick and one sliding tab or button.
Controls 3 Servos (2-Channel Single Stick transmitter is like above, but does not have motor control).

4-CHANNEL (or more)
Transmitter with two sticks. When used for 3 Channels, it controls 3 Servos.

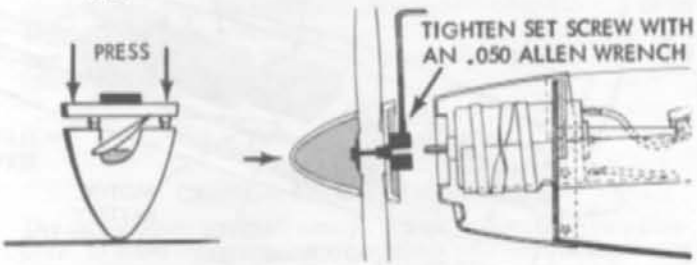
☐ Apply tape (which you can write on) to each servo. Identify each servo for its control function. Mark the plug to each servo the same way: "R" for rudder, "E" for elevator, "T" for throttle, "A" for ailerons if you have them. If your receiver doesn't have separate plugs for each servo, but places for the servos to plug in, apply apiece of tape nearby that you can mark for each application.



2e. ☐ Thread #4 socket set screw in aluminum mount a few turns.

☐ Open spinner by carefully pushing small screwdriver straight into all 3 slots—DON'T TWIST! Place spinner back-

plate and propeller on mount. Set prop against "line-up" pin and install large washer and #4 x ½" machine screw —CAUTION: DO NOT OVERTIGHTEN or threads may strip out!



2f. ☐ Align spinner cone with prop/backplate and press pins firmly into holes. One way to do this is to place the spinner pointing down on a table and press from behind the backplate until all three pins are seated.

☐ Install prop/spinner assembly on motor shaft and securely tighten set screw with an .050 allen wrench.

☐ Align the cowl behind the spinner backplate allowing about ⅛" clearance. Holding cowl in this position, install #2 x ⅜" sheet metal screws at cowl mounting holes. After mounting screws, remove them and apply Super Jet in holes to "harden" the threaded wood (open holes with a pin before glue dries).

WARNING: A SPINNING PROPELLER CAN CAUSE INJURY —WEAR SAFETY GLASSES AND OPERATE AWAY FROM SPECTATORS

5. Servo Movements

As mentioned in the introduction on page 2, radio systems with "servo reversing" simplify radio installation. With a **regular non-reversing** system, you must match each pushrod to its corresponding servo's rotation. With "servo reversing," pushrods can be hooked up to either side of the servo's output wheel, and after checking the control response, a servo responding in the wrong direction is easily switched to correct action (see your radio manufacturer's instructions).

The servo arrangement on the plan is recommended for either "regular" or "servo reversible" systems. For **either** type of radio system, check your equipment out with the following procedure.

☐ Push the transmitter (Tx) motor lever up away from you, and observe where motor servo wheel should connect to the motor pushrod to move switch to "on" position. Mark this on the servo wheel (write on tape). Return motor lever to full down (off position).

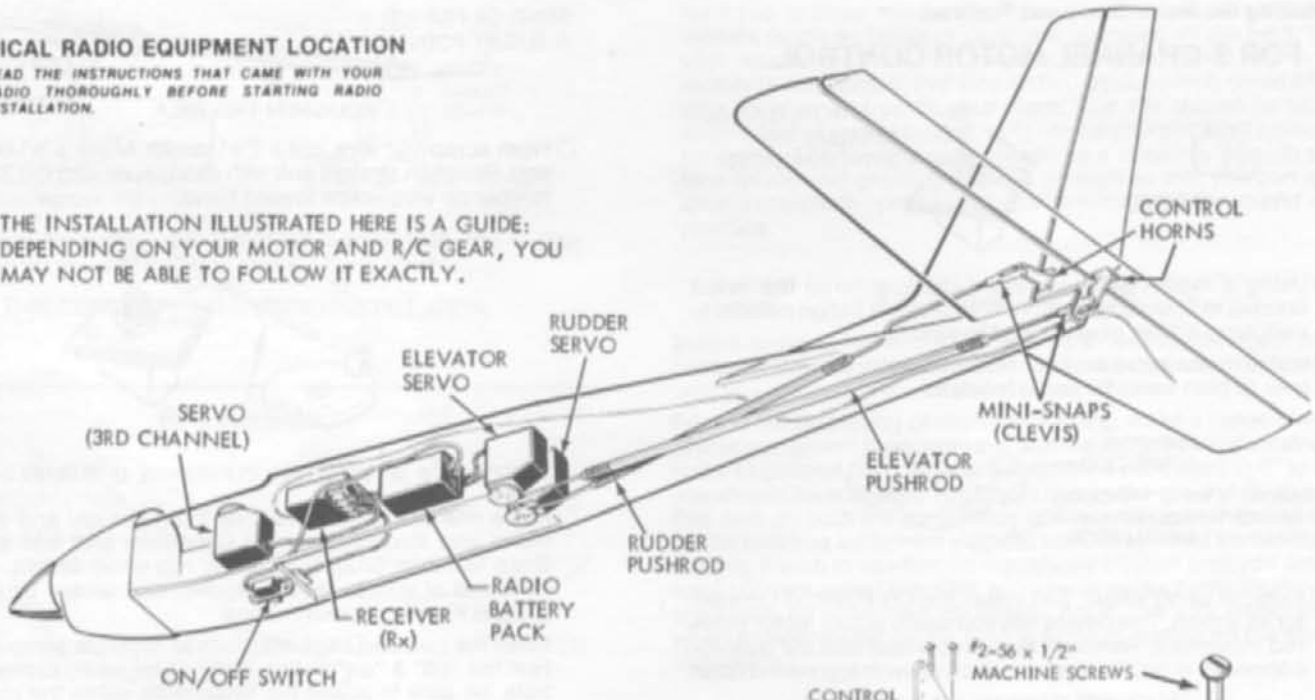
"REVERSE" SERVO CAN BE IDENTIFIED BY A DOT IN MOUNTING FLANGE AS SHOWN HERE, OR A DIFFERENT COLOR CASE OR MARKINGS.

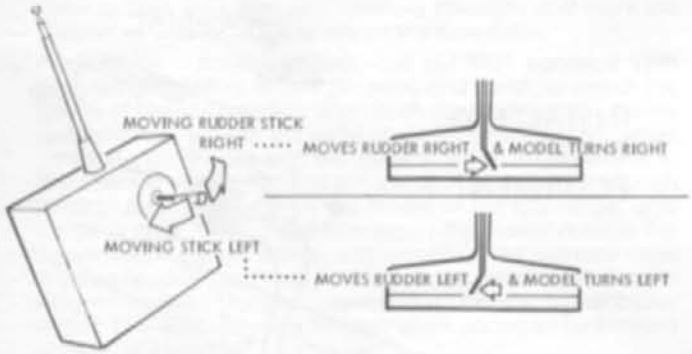
In radio sets without "servo reversing" feature, the rudder servo is usually a "reverse" servo. A "reverse" servo can be identified by a dot (see above), or a different color case of markings.

TYPICAL RADIO EQUIPMENT LOCATION

READ THE INSTRUCTIONS THAT CAME WITH YOUR RADIO THOROUGHLY BEFORE STARTING RADIO INSTALLATION.

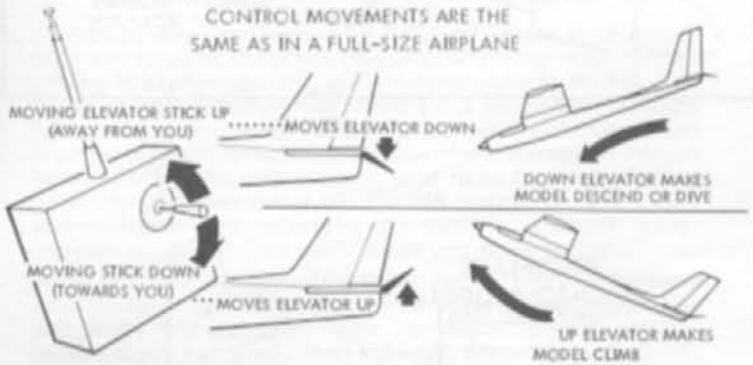
THE INSTALLATION ILLUSTRATED HERE IS A GUIDE: DEPENDING ON YOUR MOTOR AND R/C GEAR, YOU MAY NOT BE ABLE TO FOLLOW IT EXACTLY.





Move rudder stick to the right, and observe where rudder servo wheel should connect to give right rudder. Mark this on the servo wheel.

Remember, for non-reversing radios, that the rudder servo usually needs to be a "reverse" servo.



☐ Move the elevator stick up, and observe where the elevator pushrod must be attached to the elevator servo to pull the elevator down. Mark servo.

6. Mounting The Control Horns and Pushrods.
Rudder Horn.

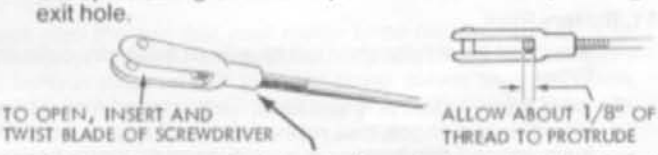
☐ Refer to fuse side view on plan for correct location.

☐ Tack-cement horn on correct side of rudder.

☐ Drill through holes in horn, and mount nut plate on other side using screws as shown. Trim screws flush with nut plate.

☐ Remove covering from die-cut hole in fuse top (adjacent to dorsal fin) for rudder pushrod. Glue nylon pushrod exit guide in hole.

☐ Lay pushrod over pushrod views on plan, and make bends as required. Working from cabin, feed rudder pushrod (threaded end) through fuse rear and out exit hole. Use a loop of string or wire to pull threaded end up through exit hole.



☐ Twist mini-snap (clevis) onto threaded rod. Hold pushrod wire with pliers while installing mini-snap. Connect to rudder horn.

ELEVATOR HORN

☐ Later, you will have to pull the receiver antenna out through the rear of the fuse. Prepare for this by taping a 2 foot length of string to both ends of the elevator pushrod. After pushrod is installed in fuse, remove tape from wire ends and temporarily stick string out of the way for use later in pulling the antenna through.

☐ Insert threaded end of pushrod from radio compartment through fuse rear and out slot opening about 2".

☐ Tape a 2 foot length of string (or thread) to threaded end of elevator pushrod.

☐ Install mini-snap on rod, and connect to elevator horn.

☐ Position horn under elevator—refer to plan for correct location. When horn is centered so mini-snap moves in and out of tail opening without scraping sides, mount horn on elevator.

7. Mounting Elevator & Rudder Servos.

☐ Tape front end of rudder and elevator pushrods up towards battery hatch opening so they are out of the way.

☐ Insert the soft rubber grommets into the mounting holes of your servos.

☐ Measure from the bottom of your servo to the underside of a grommet. Add about ⅛" to this measurement. The total is the height of the top of the servo rail from wing platform.

9. Installing the Motor Servo and Pushrod.

FOR 3-CHANNEL MOTOR CONTROL

☐ Using a model knife (or a 7/64" drill), enlarge the nylon bracket to fit snug on switch. With bracket flange parallel to switching action, glue bracket to switch.

☐ Install motor servo on fuse side with servo mounting tape, refer to plan views for servo location.

☐ Remove servo wheel, and install the CG Pushrod Connector as shown. This device lets you easily adjust motor pushrod movement. Remount the servo wheel with the pushrod connector in approximate position show in top view on plan.

☐ From scrap 1/16" wire, cut a 2 1/8" length. Make a 1/4" bend at end. Roughen straight end with sandpaper. Slip CG Snap-R Keeper on wire—clips toward bend.

☐ Press one CG Snap Nut about 1" on straight end of wire. Insert wire through Pushrod Connector and add second Snap Nut (trim Snap Nuts if they rub servo wheel). Attach bent end of wire to switch bracket and secure by sliding Snap'R Keeper clips over bend.

☐ Move the pushrod back and forth to simulate servo action. Feel the "off" & "on" switch limits. Later, when setting controls, be sure to adjust the Snap Nuts within the range of switch movement.

10. Installing Switch and Charging Jack.

☐ Position switch (and optional charging jack) cover plates on outside of fuse (for 3-channel with motor servo, position on side opposite of motor servo). Mark through cover plates for holes and openings.

☐ Make holes through fuse side. Make sure hole for switch button is long enough for it to move to ON and OFF positions.

☐ Install switch and jack.

☐ Later, when radio is operating, identify ON and OFF positions with decals provided. Preferred "ON" position is forward.

11. Battery Pack.

☐ You must have fully charged nicads or fresh dry cells for flying.

☐ Wrap battery in ½" very soft foam rubber to cushion it from vibration and shock. Use rubber bands or tape to hold the foam around the battery. It is also good to place battery and Rx in individual plastic bags to protect against fuel and oil.

☐ Position battery in fuse, and hold in place with scrap 1/8" plywood as shown on plan.

12. Receiver (Rx).

☐ Do not cut the antenna wire attached to the Rx.

☐ Re-connect all cables so R/C system is operational; be sure that each servo is plugged into its respective Rx terminal.

☐ Place Rx in fuse ahead of the battery and hold in place with 1/16" plywood.

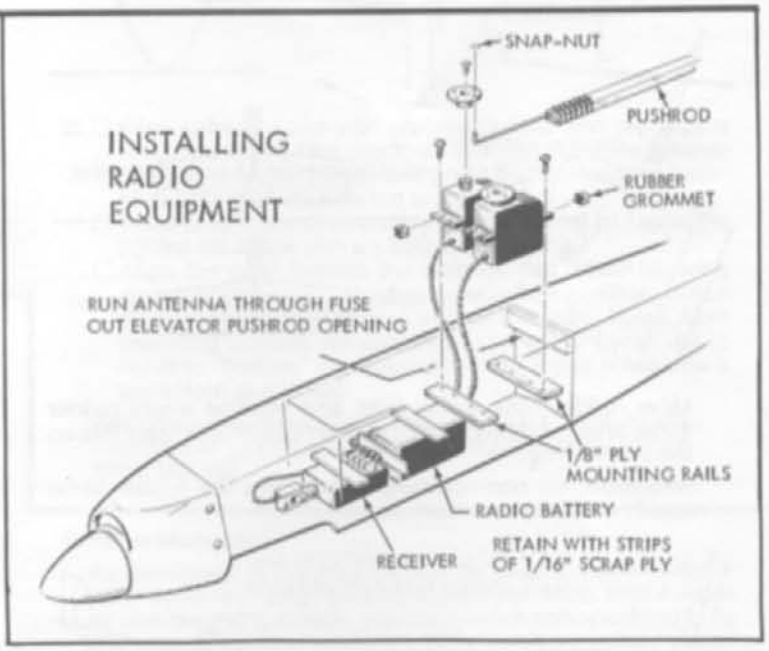
☐ Lead the antenna wire back out rear of fuselage.

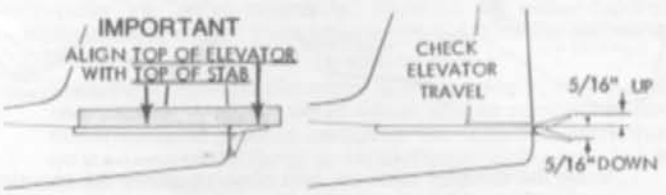
☐ Gather all excess cables together behind Rx, and hold them down with foam or tape.

☐ Apply "ON/OFF" decals to outside of fuse to identify switch positions.

13. Setting Control Surfaces.

All pushrods must move freely, without binding; adjust if required for smooth operation. When setting control travel, be cautious that no servo is hooked to a control in a manner that prevents the servo wheel from moving through its complete range of rotation. For example, if the motor servo "buzzes" when moved to "on" position, the servo still has movement left, but is jammed against the limit position. This can damage the servo and drain the battery, leading to loss of control, and a crash.

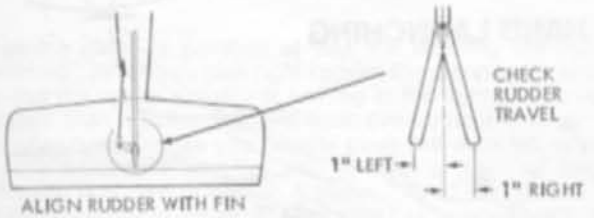




☐ With elevator trim lab on Tx set in center, adjust elevator mini-snap until *top of elevator is flat with top of stab* as shown above.

☐ Move the elevator stick on Tx full up and down. The elevator should move down about 5/16" and 5/16".

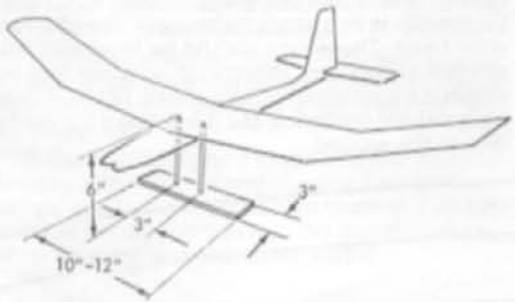
☐ With rudder trim tab on Tx set in center, adjust mini-snap until rudder aligns perfectly with fin.



☐ Move the rudder stick on Tx full right and left. The rudder should move to the right about 1" and left 1".

THIS COMPLETES THE RADIO INSTALLATION.

BALANCING



☐ Refer to plan side view and carefully measure and mark the "Center of Gravity" (CG) range on the fuse sides.

☐ Place motor battery in fuse—but DO NOT connect! With everything installed, mount the wing and carefully check the Center of Gravity. One way is to perch the model on the thumb and forefinger of your left hand (if you're right handed), while steadying the model with the other. A much better way is to use a set-up with a couple of pencils, spaced apart just enough to clear the fuse. Support the model in the CG range, until model is level. If you need to support the model outside the balance range to get it level, add weights to the extreme nose or tail as needed to achieve proper balance. Small self-adhesive weights made just for this purpose should be available at your dealer. The least weight is needed when added as far forward or back as possible.

DO NOT ATTEMPT to fly the model with the CG EVEN SLIGHTLY BEHIND the rearmost recommended position.

VII WHERE TO FLY YOUR MODEL

Fly only in areas sanctioned for R/C, and known to be free of radio interference. There may be a local R/C flying club that uses a flying field near you; this is the natural place to fly. Ask your dealer or other modelers how to find it. But remember, R/C flying fields need to operate by rules to help prevent accidents. Most important of these rules is *cautious use of your transmitter.* Always make sure no one else is using your radio frequency before switching your transmitter on! For this reason, DO NOT TEST your radio gear in the parking lot—you might "shoot down" someone out on the field. That would make you very unpopular!

At the R/C field, ask one of the better flyers if there is someone who can help you through your initial flights. This is very important. Some R/C clubs have their own authorized instructors—inquire about that. If you don't know the whereabout of an R/C club near you, write the Academy of Model Aeronautics (AMA) and ask if they have a club on file in your area. Most clubs are chartered with the AMA and we recommend you become a member. Their address:

Academy of Model Aeronautics
1810 Samuel Morse Drive
Reston, VA 22090

If you determine that no club or related flying site is available, you need to locate a large square space at least the length of four or five football fields, free of trees, poles and other obstructions. A grassy field is ideal. For safe control, this field must be at least two to three miles away from any areas where other R/C models (such as boats or cars) are operated. At the field, turn your receiver on for 2 or 3 minutes to check that no one in the vicinity is operating at that time an R/C device which could affect your receiver and crash your plane. The site should be safely away from houses or busy streets—leave yourself plenty of room for errors. The landing area should be a relatively smooth surface (preferably grass) and large enough so that you can land almost anywhere—precision "spot" landings will come later with practice.

VIII RADIO CHECK

Before going to the field to fly, with batteries fully charged, turn on receiver and transmitter and actuate all controls many times until you are satisfied with all functions.

Prior to the beginning of each day's flying, make a range check of your equipment in accordance with the manufacturer's instructions. In general, with transmitter antenna collapsed to 6" to 8", you should have at least 100 feet range on the ground. To check this, turn on both the transmitter and receiver switches, set the model heading away from you and walk away while transmitting signals. Watch to see that no signals are missed until you are at least 100 feet away. Only if the equipment works perfectly should any flights be attempted. Be careful not to use your transmitter when someone else on the field is flying or testing on the same frequency.

ABOUT LEARNING TO FLY. . .

It enormously increases your chances for success if you have an Instructor. Learning to fly is harder than it looks—and a mistake can seriously damage or destroy your model. Even full-scale pilots have problems learning to fly models, because it's different—they're not in the cockpit. It's worth real effort to find someone to teach you. Ask your dealer for suggestions. **And only if there is no other way** open should you attempt to learn on your own.

As a first step, repeat the range check of your radio, following the manufacturer's directions. Then, stand behind the model, and make sure that the control responses are correct. Moving the control stick to the right should give right rudder. Moving the stick back or down on the Tx should move the elevator up, and vice versa.

Check also the see that your motor turns on when the stick or tab is moved forward or up. Make sure that everything is neatly and firmly in place—motor fastened down, servos snugged down, receiver and battery secure, etc. Nothing should be loose, or unfinished, or unchecked.

With every thing ready, the motor should be started and run several times. While the motor is running, the control surfaces should not jitter or move until you command them. The motor should also respond to your 3rd-channel command.

IF YOU MUST LEARN BY YOURSELF

Before flying, it is very important to prepare yourself as well as your model. You should be rested and relaxed, not in a hurry; be patient, "lest thee bust thy toy!" First flights should be made on a day that is not too windy or gusty. There should be very few people or distractions around. You will need to concentrate.

Your success doesn't depend on following the flying instructions here to perfection—but you should have a flight pattern in mind. Think ahead of the model—don't chase it around the sky always one thought and one control command behind it.

And since you have not flown the Electra before, it is difficult to imagine how much space it requires for climb out, gentle turns, etc. So it is important that you take some time and look over your flying site; become familiar with trees, buildings or other obstacles that you want to stay well away from. Take this into consideration in planning your take-off, climb out, and the direction of the pattern you will fly. We suggest that you plan on flying a simple circular or oval pattern, with only left or right turns—depending on your flying site and what YOU feel comfortable with.

The model should always be launched INTO the wind. On a no-wind day the model will have a slow climb—with wind, the model will appear to climb more quickly, gaining more height in less distance than under no-wind conditions.

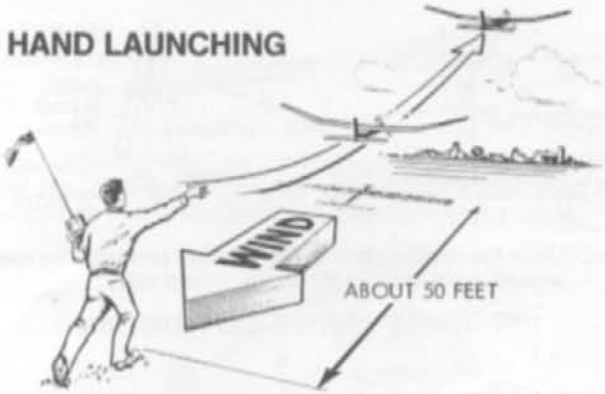
FLYING

We recommend you use 3-channels, this will allow you to cut power whenever you want. On your first few flights, after a couple of minutes you may have "had enough" and want to land and relax. With only 2-channels (without the motor control) you will have no options, you must keep flying until battery power runs down. With motor control you can cut power and land anytime.

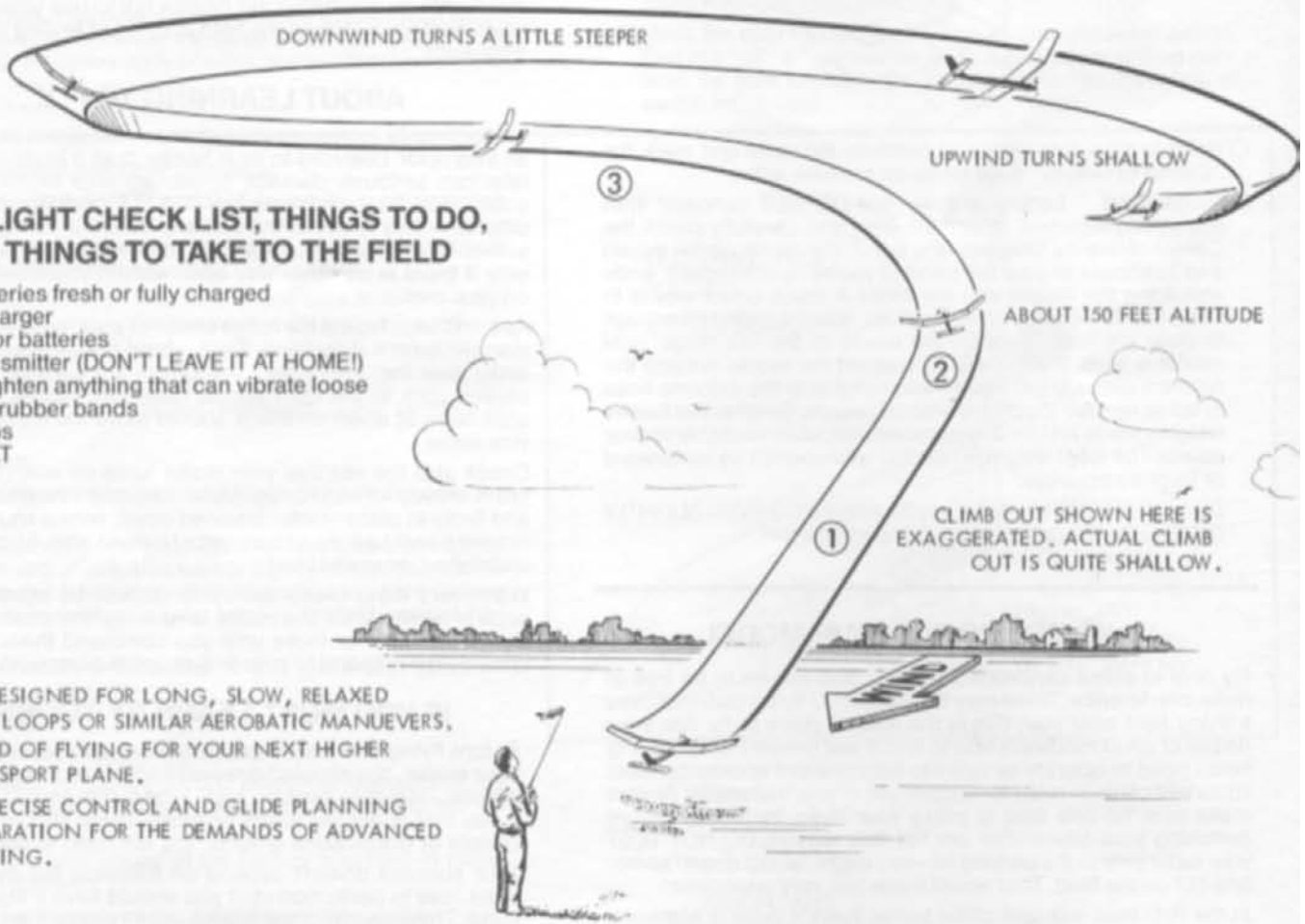
You can expect a good solid 4 or 5 minutes of powered flight with a properly charged battery. In this amount of time, Electra will gain several hundred feet of altitude allowing you time to get oriented and used to control "feel". When the battery power begins to run out, climb will slow down and the model will begin a slow descent. You should continue flying your same pattern as the model slowly glides.

For your initial landings, you should not be concerned about trying to land at a specific spot. A controlled landing always into the wind, with the wings level is your prime concern. With practice you will be able to plan your approaches to land just about where you want.

HAND LAUNCHING



The Electra must be hand launched. This is easy to do but must be done carefully to avoid damaging the model. It is best to launch over some tall grass. Facing INTO the wind, hold the transmitter in one hand, the model in the other and raise it above your head. The wings should be level and the nose pointing straight ahead—not slightly up. Imagine that you are gliding it towards a spot about 50 feet ahead. DO NOT throw the model UP. It's a natural tendency, but it will make the model stall (fall) and dive to the ground.



PRE-FLIGHT CHECK LIST, THINGS TO DO, AND THINGS TO TAKE TO THE FIELD

- ☐ Flight batteries fresh or fully charged
- ☐ Battery charger
- ☐ Extra motor batteries
- ☐ Radio transmitter (DON'T LEAVE IT AT HOME!)
- ☐ Tools to tighten anything that can vibrate loose
- ☐ Extra #64 rubber bands
- ☐ Extra props
- ☐ SUPER JET

ELECTRA WAS DESIGNED FOR LONG, SLOW, RELAXED FLYING - NOT LOOPS OR SIMILAR AEROBATIC MANUEVERS. SAVE THAT KIND OF FLYING FOR YOUR NEXT HIGHER PERFORMANCE SPORT PLANE.

PRACTICING PRECISE CONTROL AND GLIDE PLANNING IS GOOD PREPARATION FOR THE DEMANDS OF ADVANCED AEROBATIC FLYING.

Turn on the Tx and Rx and make sure the control surfaces are responding correctly. See that the Tx trim tabs are centered, and that the meter registers in the "safe" zone. Turn the motor on, the model in one hand and the Tx in the other. Now, running slowly, launch the model. Immediately take the Tx in both hands, and remember to operate the controls smoothly. Add slight back stick pressure if necessary to keep the model from descending and it will soon start to gently climb after it is about 100 feet away from you. Be patient, let it climb slowly (if you climb too steeply the model will "stall" and fall to the ground).

CLIMB OUT. Be gentle on the controls (most crashes are due to moving the controls too much, "overcontrolling" which tends to throw the model out of control).

1. During climb out just try to keep the model flying into the wind and wings level until you have about 150 feet of altitude.

STARTING YOUR PATTERN

2. At about 150-200 ft. altitude, add just a touch of left (or right) stick pressure until the model begins a very shallow turn in the direction you want to go.
3. Try to maintain this shallow turn. The wind will tend to blow your plane and pattern further downwind—try to keep it flying upwind at all times prior to your landing approach. It is more difficult to fly a model when it is downwind, and if a mistake is made the model will end up further downwind, making it more difficult to fly back to the field. To compensate for wind , you should continue making your upwind turns shallow, but make your turns flying with the wind (downwind), a little steeper.

When the plane is pointing at you, the steering will appear "reversed". When you give right rudder, the plane turns to your left—but the model actually is turning to it's right as you commanded. With practice, you will soon overcome this. When the model comes towards you, simply push the stick left or right towards whichever way the ship is turning. Another helpful technique is shown in Sketch A above. "Head-on" disorientation is dangerous in the air where things can happen pretty fast. Spend some time operating the controls with the model set on a table. Familiarize yourself with the rudder movement as you view the model from different positions.

Sketch A

WHILE LEARNING TO FLY, YOU MAY FEEL BETTER ABLE TO CONTROL THE MODEL, AS IT COMES TOWARD YOU, BY LOOKING OVER YOUR SHOULDER AND FACING YOUR BODY IN THE SAME DIRECTION AS THE MODEL IS FLYING.

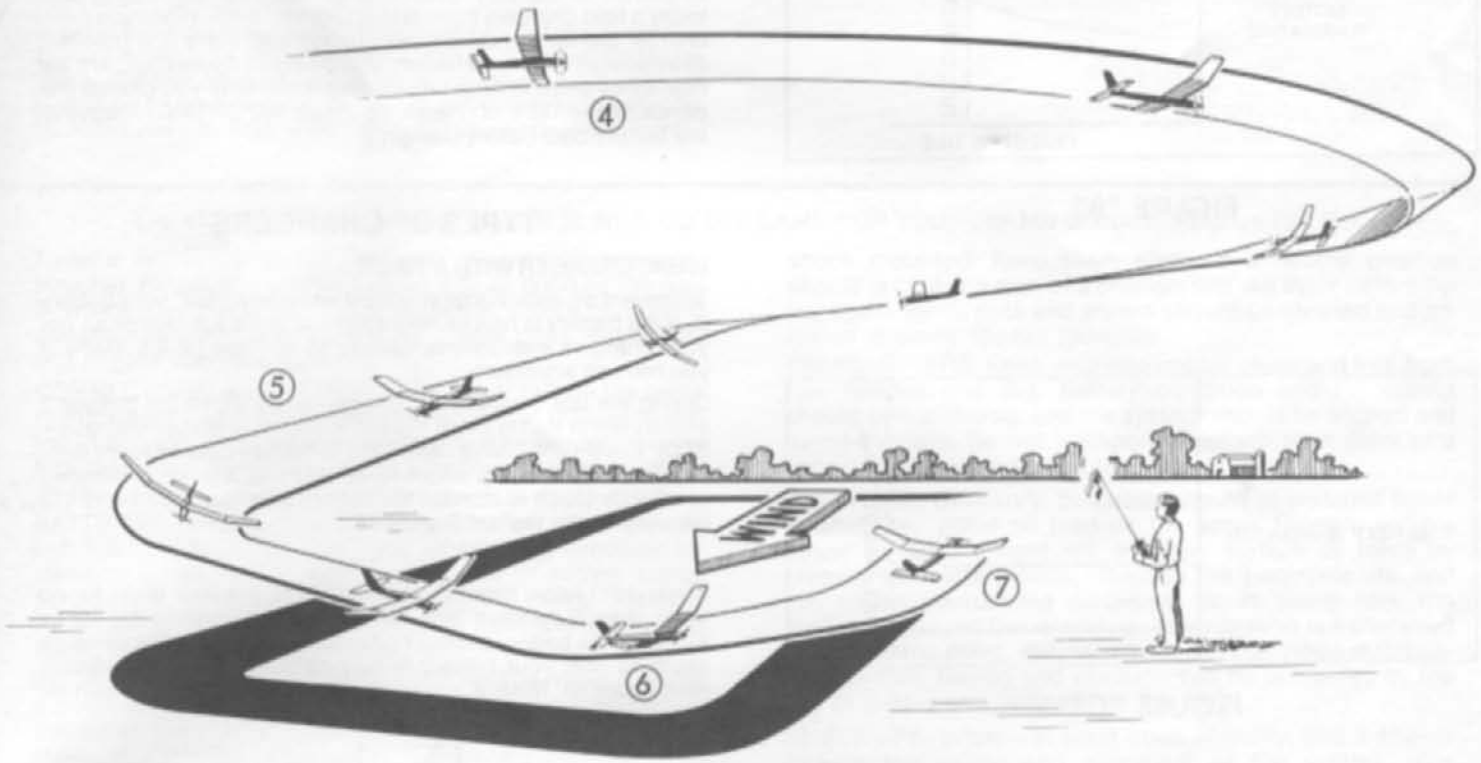
LANDING

For 2-Channels, when the battery begins to run out, the model will start a gradual descent.

4. Continue your pattern and start thinking ahead how much longer the model will glide. After imagining how much glide you have, you can start planning ahead for landing.

For 3-Channels, if you have a helper, they can be timing your flight and tell when you have been flying for about four minutes. If you turn the motor off now, you will have a solid one or two minutes of battery power left.

With the power off, the model begins it's slow descent and you should get comfortable with it gliding and imagine how far it will glide. You can start planning your approach for landing. If you're not happy with your approach, you can turn the motor back on, climb out and set up for another pass, don't rush it.



LANDING APPROACH

5. Try to plan your approach so that the model is about 100 ft. high and ready to complete the downwind portion of your pattern.

6. Continue making a shallow turn bringing the plane around until you have it pointed directly into the wind. Be patient, keep your glide steady and gentle, not too steep. Keep the wings level.

7. A controlled landing into the wind is your prime concern. Don't be concerned with trying to land the model near you—it is better to walk a few blocks to recover a whole airplane than to pick up pieces at your feet. Just before the model is ready to touch down, you can add just a touch of back stick pressure to "flare" for landing.

Retrieve your plane, switch off the receiver first, then the Transmitter. Stop shaking, congratulations!

As you get used to the controls, you probably will notice the model turning somewhat to the left or right, or climbing or descending, without any stick pressure on your part. These tendencies can be corrected in the air by moving the trim tabs on the Tx. After landing, the setting of the rudder or elevator should be similarly adjusted as best you can by means of the clevises. This, in turn, permits the Tx trim tabs to be re-centered. Further flights will show if more adjustment is required.

A severely out-of-trim condition (caused by a warped wing, for example), might not be correctable using above trim techniques. In that case, taking the model home and straightening the warp with heat is necessary.

MOTOR AND BATTERY, MAINTENANCE AND CHARGING

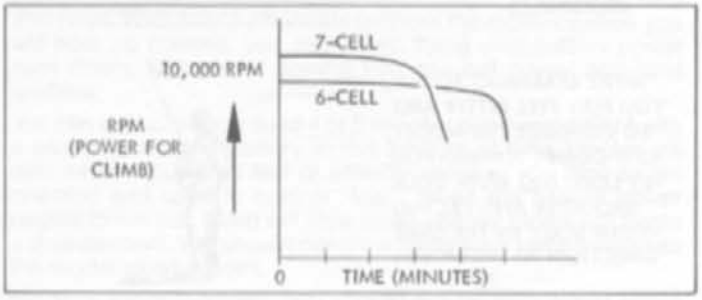


FIGURE "A"

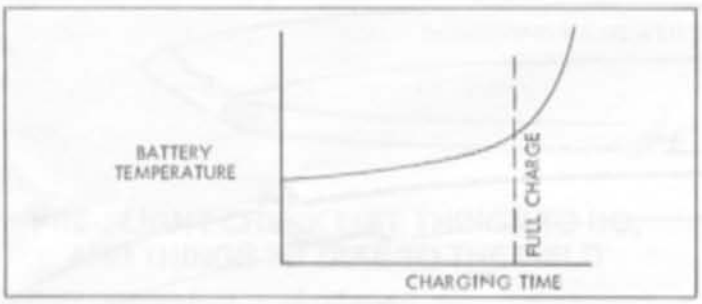


FIGURE "B"

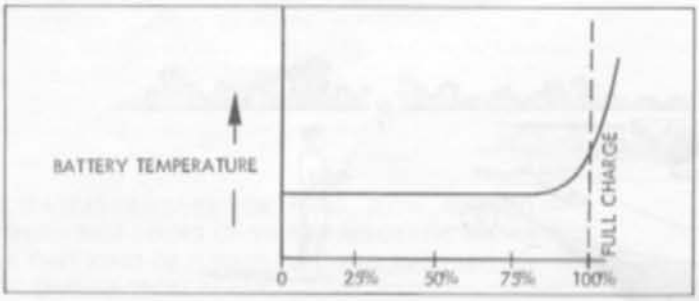


FIGURE "C"

Please take time to read this section very carefully. If you don't understand, read it again, this material is very important for both your safety and to obtain maximum performance from your Electra.

The Turbo 550 motor is a special Mabuchi motor designed for electric plane use on 6-cell 1,200 MAH. nicad battery packs. This battery is commonly used with the 1/10 scale "Off Road" electric cars and is readily available. You can also use 7-cell batteries and get a better climb rate but you also will have a shorter engine run and the motor will run hotter (see figure A).

MOTOR

The motor is ready-to-use, just install as shown ensuring there is enough ventilation for cooling. After a few flights you should notice a small increase in power as the motor breaks in. You may also want to experiment with other propellers but we recommend you stay in the 7-4 to 8-4 size range.

BATTERY

This section is particularly important! One way to look at battery charging is to imagine the battery is a bucket and electricity is water. What you are trying to do is fill up the battery but not to overfill. At the very quick charge rate that is common with today's field chargers there is little room for error. When you overcharge, the temperature rises quickly and there is a potential of explosion or at least battery damage (see figure B). There are numerous ways to help prevent this, and HOW you charge depends on the TYPE of charger you have. IMPORTANT! Always let the battery cool before charging!

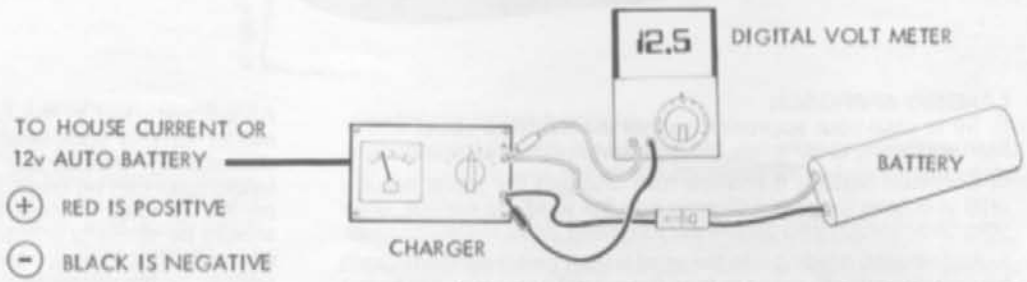
TYPES OF CHARGERS

BASIC CHARGER WITH A TIMER

To prevent an overcharge you must know how "full" your battery is. If the battery is new or near empty, give it a full charge as per your chargers instructions, usually 15 minutes (at 4.5 AMPS. if you have an ammeter).

During the last 5 minutes of charge, lightly touch the battery, if slightly warm that is OK. If too hot to touch—it is over charged—STOP CHARGING IMMEDIATELY! Let battery cool to room temperature before using, about 15-20 mintues. It is recommended you lightly touch to monitor the battery's temperature every 1-2 minutes during the last 5 minutes.

If you don't know how full your battery is, set your timer for no more than 5 minutes and monitor the temperature by lightly touching the battery every 1 or 2 minutes. When the temperature starts to rise, your battery is fully charged. Stop immediately (see figure C). Note: if you have a DIGITAL volt meter, it can be



very useful in detecting when the battery reaches full charge. As the battery fills, the voltage goes up. When it's fully charged, the voltage will stop rising and in a minute or two as the battery temperature rises the voltage will drop slightly. As soon as it drops, stop charging. This is an excellent way to get maximum battery performance (see figure D).

AUTOMATIC CHARGERS

DELTA OR PEAK DETECTION CHARGERS. These are excellent methods of charging your battery. You simply connect and push a start button and wait. After approximately 15 minutes to ½ hour, disconnect the battery and it's ready to use. We still recommend you monitor temperature every 1-2 minutes after 10 minutes by lightly touching pack. If slightly warm—that's great, if too warm to hold—it is overcharging so STOP immediately! These chargers are more expensive but generally work very well.

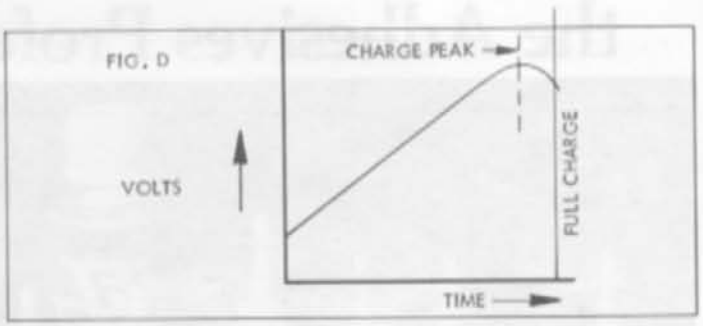


FIGURE "D"

TEMPERATURE SENSITIVE CHARGERS. Like the Peak detectors the thermal chargers work very well, but are more expensive. They also will charge a battery pack in 20 minutes or less and it doesn't matter how "full" the pack is when you start. Just follow the manufacturer's instructions carefully. This charger "senses" when the battery temperature signals full charge and automatically stops charging. Battery must be cool before charging or it will cut off prematurely.

EQUALIZING YOUR BATTERIES

Any battery that hasn't been used for a week or more should be equalized for best performance. To equalize the battery, charge for 10 to 20 minutes at the indicated rate, then trickle charge for three to four hours. Refer to your chargers instructions regarding trickle charge technique. Equalizing the battery will assure you top performance every time.

HOW MANY BATTERIES?

To get in the most flying each session we suggest you purchase three battery packs. While one pack is cooling and waiting to be charged, a second pack can be on charge and the third can be in your plane ready for use. Of course, you can fly with only one pack, but you may have to wait up to 40 minutes between flights.

TREAT YOUR RADIO RIGHT — AND IT WILL DO THE SAME FOR YOU! by Hal deBolt Famous R/C Pioneer

Today's RC systems are very well engineered and constructed. However, they will remain only as good as the way in which they are USED. Experience has shown us how to use them to perfection. Follow the proper rules religiously, and anyone can have success.

CONNECTORS: In using connectors, never pull on the wires to disconnect; grasp the plugs instead. Clean them by dunking in solvent; dope thinner is fine. Do tape the connectors together when installing, and be sure that there is no strain on the cables.

BATTERIES: Nicads can suffer from vibration. Wrap them in soft foam rubber before installing. Check their condition by measuring the voltage with a volt meter or battery tester periodically. Charge them before EVERY flying session. When stored (winter months), charge them every 30 days. Never store in a discharged condition.

RECEIVERS: Receivers must be vibration free. Wrap them in a minimum of ½" soft foam rubber (not plastic foam) when installing. Keep clear of all cables and batteries. Tune annually as indicated below under "Check-Ups."

RECEIVER ANTENNA: The receiver antenna must be routed directly out of the airplane and to the top of the fin, or preferably to the stabilizer tip. At no place should it be close to anything metal or electronic. Visualize it as being about 3" in diameter instead of 1/16". Do not allow anything other than wood or plastic to be within the 3" diameter.

SERVOS: Servos are vibration prone. Do mount them with grommet shock mounts in servo trays which are in turn shock mounted. Keep them clean. If a neutral position should drift, it is a sign of a change; find out WHY before flying again. Servo pots and wipers should be cleaned and adjusted annually. Do not lubricate.

TRANSMITTERS: Keep your transmitter clean and free from fuel residue and dirt. Battery condition and RF output should be monitored, and the system should be aligned and tuned annually. Do not transport under vibration (floor of a car); place them on something soft.

PUSHRODS: Obviously, pushrods should be installed freely so that they place no load on the servo. Using a servo's power to move a tight rod or heavy surface by force increases the battery drain, shortens the electronic life, and can cause neutralizing problems. While being free, the pushrod must not flex or vibrate. Any vibration is transferred directly to the servo, its gear, motor and pot. While maintaining freedom, flexing and vibration can be prevented by the use of guides and fairleads on the rods.

CHECK-UPS: When—at least once annually, and it should include the tuning and alignment of the system, plus TESTING the batteries. Also, any time anything unusual occurs during usage. A malfunction or "glitch" is the first sign of an impending failure; it should not be ignored.

Where—at a factory authorized center that understands your particular equipment. If not available, an established center can offer advice.

AND: ADD A SMALL PORTION OF GOOD LUCK.

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