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. No adjustments to make on an engine. Electra performs like a thoroughbred but has a stable pony temperament. She is based on the proven and popular Gentle Lady sport sailplane, but has been modified for the higher performance demands of electric flight. Building is easy, but carefully FOLLOW THESE STEP-BY-STEP INSTRUCTIONS to prevent simple mistakes. Many a modeler has built two right wings because he failed to follow the instructions. You'll also find many installation and flying tips included. We think you will find electric flying to be a quiet, yet exciting change of pace–maybe even "Electra-fying!"

WARNING!

THIS IS NOT A TOY! A radio-controlled model is not a toy and is not intended for persons under 16 years old. Keep this kit out of the reach of younger children, as it contains parts that could be dangerous. A radio-controlled model is capable of causing serious bodily injury and property damage. It is the buyer's responsibility to build this kit correctly and to properly install the motor, radio, and all other equipment. Test and fly the finished model only in the presence and with the assistance of another experienced R/C flyer. The model must always be operated and flown using great care and common sense, as well as in accordance with the safety standards of the Academy of Model Aeronautics (5151 Memorial Drive, Muncie, IN 47302, 1-800-435-9262). We suggest you join the AMA and become properly insured prior to flying this model. Also, consult with the AMA or your local hobby dealer to find an experienced instructor in your area. Per the Federal Communications Commission, you are required to use only those radio frequencies specified "for Model Aircraft."

Pt. # 2083 4/00

ITEMS NEEDED TO COMPLETE KIT

- ☐ RADIO GUIDANCE SYSTEM (2-CHANNEL MINIMUM)
- ☐ 6 CELL 7.2 VOLT BATTERY PACK
- ☐ 2-OZ. BOTTLE CA GLUE
- ☐ 3 ROLLS COVERING
- ☐ 1 TUB JET MODEL MATE™ FILLER
- ☐ BOX OF #64 RUBBER BANDS
- ☐ BATTERY CHARGER
- ☐ SPOOL OF SEWING THREAD

ADDITIONAL ITEMS FOR REMOVABLE WINGTIP

- ☐ 1/8” x 3” x 18” HARD BALSA SHEET
- ☐ 3/32” x 12” MUSIC WIRE
- ☐ 3/32 I.D. x 6” BRASS TUBE
- ☐ 3/4” VINYL ELECTRICAL TAPE

OPTIONAL ITEMS

- ☐ 1/2” x 8” x 12” CGP FOAM RUBBER
- ☐ FUEL PROOF PAINT™
- ☐ SERVO MOUNTING TAPE
- ☐ SPARE MOTOR FUSES
- ☐ 1-1/2” WHEEL
- ☐ 3/32” x 8” WIRE
- ☐ 3/32” WHEEL COLLAR
- ☐ 3/8” LANDING GEAR STRAP
- ☐ TRANSPARENT SPRAY ENAMEL FOR CANOPY

FOR USE WITH CGP TURBO 550 MOTOR AND 3-CHANNEL RADIO SYSTEM

- ☐ BRACKET
- ☐ SNAP-R KEEPER
- ☐ SNAP NUTS
- ☐ PUSHROD CONNECTOR

NECESSARY TOOLS AND SUPPLIES

- ☐ MISCELLANEOUS RUBBER BANDS
- ☐ WAXED PAPER
- ☐ MODELING KNIFE AND RAZOR BLADES
- ☐ SANDPAPER (ASSORTED GRITS, INCLUDING MEDIUM (150) AND FINE (220-320)
- ☐ SANDING BLOCK
- ☐ "T" PINS (at least 75)
- ☐ BUILDING BOARD (24" x 60")
- ☐ ELECTRIC DRILL
- ☐ 1/16" DRILL BIT
- ☐ ALLEN WRENCH (.050 FOR #4 SOCKET SET SCREW)
- ☐ SMALL SCREWDRIVER (1/8” BLADE TIP)
- ☐ MASKING TAPE
- ☐ SMALL PLIERS
  COVERING IRON (OR SMALL HOUSEHOLD IRON)
- ☐ HEAT GUN (OPTIONAL)
- ☐ 10" 30-60-90 DRAFTING TRIANGLE

LIMITED WARRANTY

Carl Goldberg Products, Ltd. takes pride in the care and attention given to the manufacture of its model airplane kits. The company warrants replacement of any materials found to be defective for their intended use, prior to their use in construction of the aircraft, provided the buyer requests such replacement within a period of one year from the date of purchase and provided the defective part is returned, if so requested by the company.

No other warranty, expressed or implied, is made by the company with respect to this kit. The buyer acknowledges and understands that it is his responsibility to carefully construct a finished flying model airplane and to fly it safely. The buyer hereby assumes full responsibility for the risk and all liability for personal or property damage or injury arising out of the buyer's use of the components of this kit.

INTRODUCTION

USING THIS INSTRUCTION MANUAL

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

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

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

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

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

HOW TO READ THE PLAN

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

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

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

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

HOW TO USE THE PLAN

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

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

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

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

IDENTIFYING PARTS

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

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

PREPARING FOR ASSEMBLY

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

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

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

CONSTRUCTION TIPS

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

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

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

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

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

Sometimes you will be asked to “tack cement” a piece of wood that will later be taken apart. To provide for easy removal without damage, use only a small drop of glue.

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

ADHESIVES & GLUING TECHNIQUES

The ELECTRA was designed for fast assembly using SUPER JET™ CA (cyanoacrylate adhesive), which is specially formulated to firmly glue the plywood, hardwood, and balsa used in your model and to withstand vibration. However, there are times, such as when you are installing the stabilizer and fin on the fuselage and want more set-up time for careful alignment and positioning, when you should use JET EPOXY™. Occasionally, you also will want to use INTANT JET™, which "wicks" into the surrounding areas. Aliphatic resin glue or similar water-based glues can also be used, but they will add to the assembly time because they dry so much more slowly than SUPER JET™.

WARNING

Never use watery THIN type CA glue for gluing plywood and hardwood parts. Thin CA's do not adequately bond these areas.

SUPER JET™ is strongly recommended for most model building tasks because, when pressed into a very thin layer, it sets almost instantly. After the initial bond, SUPER JET™ continues to strengthen. However, because of SUPER JET's™ quick set-up, you must be careful to read instructions thoroughly, as you will have only seconds for positioning of parts. Be sure to trial fit parts together before gluing.

SUPER JET™ is used in two general ways. One is to apply the CA to one part and then press the two parts to be glued together. Or, you can position parts in contact and then run SUPER JET™ into the joint. As it seeps into the joint, it will leave a slight reinforcing fillet. If you don't see a slight fillet, the CA has soaked into the wood edges and a second coat is needed.

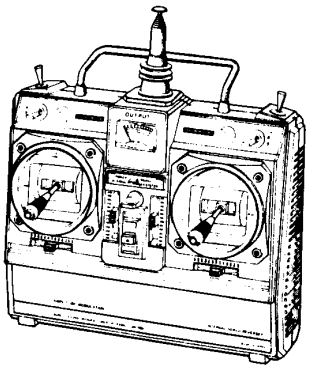
SUPER JET™ sets up a bit slower with plywood and other harder woods, so hold such parts together a little longer than you would for balsa. Corner fillets take even longer to dry because there is a thick layer. To speed up such slow drying joints, use JET SET™, an accelerator for all brands of CA glue. JET SET™ bridges greater gaps, speeds up slow bonds, and provides strong glue joint fillets.

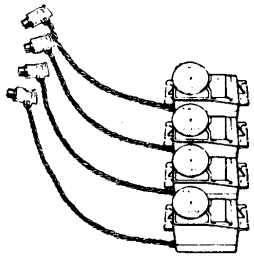
CAUTION. Some people may experience an allergic reaction when exposed to fumes from CA glue or epoxy. As with paints, thinners, and solvents, it is always important to use glues only where there is adequate ventilation to carry fumes away. A fan is recommended. Also, special care must be taken when using CA, as it will bond skin as well as other surfaces. JET DE-SOLV™ is a CA solvent which removes hardened glue from fingers and softens glued joints for repositioning. Before using any CA, carefully read all label precautions. When using CA, protective eye-wear and care in keeping the glue away from the face is highly recommended. If CA does happen to get into the eye, hold lid open and flush with water only. Seek immediate medical attention.

Epoxy glues come in two parts which need to be mixed before using. When buying epoxy, check to see how long the glue takes to set. We recommend either JET 6 MINUTE EPOXY™ or JET 20 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 is easy to apply too much. Use sparingly, especially when assembling the fin, stabilizer, and wings.

CHOOSING A RADIO

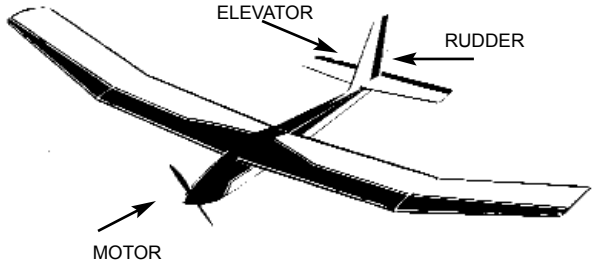
IMPORTANT: When selecting a radio, remember that there are many radio frequencies available, but not all of these frequencies can be used legally to operate model airplanes. Be sure to tell your dealer that you want a radio with a "Model Airplane" frequency.





Although the **ELECTRA** is designed to fly on 2 or 3-channel radio equipment, we recomend you purchase at least a 4-channel radio with 3 servos. This will be more useful, if later you wish to move up to more sophisticated aircraft.

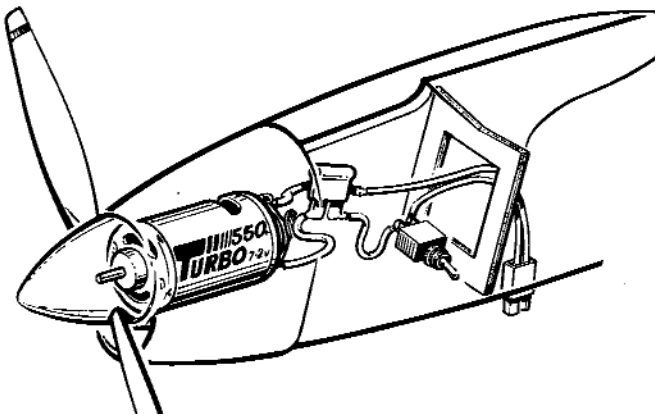
In flight, the model is controlled by using the rudder and the elevator (see drawing). One radio channel controls the rudder, which is the primary turn control. It rolls, or "banks" the model. Another channel operates the elevator, which controls the pitch (climbing, level flight, and descent). The third channel is for the motor.



Radios are battery powered with rechargeable nickel-cadmium batteries (ni-cads). Such sets come equipped with a recharging unit. Also, many of the radio systems now available feature "servo reversing" switches which allow the pilot to reverse the response of the servo. This feature simplifies installation and is a worthwhile consideration when selecting a radio system. Other radios come with a variety of sophisticated features, such as dual rates, exponential and control mixing, etc. These features are typically used by more advanced flyers and are not necessary for flying the **ELECTRA.**

MOTORS & PROPELLERS

The Carl Goldberg Models **TURBO 550 Motor** is included in your **ELECTRA** kit because it has excellent performance and will provide you with a good climb for four minutes or more, using a standard 6-cell battery and 8-4 prop. If you don't mind spending more, you can power your **ELECTRA** with various other power units. We suggest you consult your hobby retailer or a modeler who has experience in electric flight. Since electric flight has become an increasingly popular option for sport fliers, the technology has been changing rapidly.



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 plan to buy another brand of motor, make sure it has a fuse or, if it doesn't, ask your dealer how to install one.

An 8-4 nylon prop also is included in your kit. It is the best all-round prop to use with the Turbo 550. Although some wood props may give better climb, they can break easily in a slightly rough landing. If you use a geared or cobalt motor, refer to the manufacturer's recommendations on props.

BATTERY CHARGERS

Many different battery chargers are available and most work quite well. For the best advice, see your local hobby dealer. If there isn't one nearby, here is a brief description of the various types of chargers and how they work.

Some chargers use 12 volts, such as in a car battery, and some use 120 volt house current. Some will work on both 12 and 120 volts and most will accomplish a quick charge in 20 minutes or less. A handy accessory to have is a digital volt meter.

BASIC CHARGERS (with a mechanical timer) work well, but must be used with care to avoid overcharging your batteries. These are generally the least expensive chargers.

AUTOMATIC WITH DELTA (PEAK) DETECTION CHARGERS are more expensive, but very easy to use. Just hook it up and come back in 20 minutes. These chargers usually operate only from a 12 volt power supply.

AUTOMATIC WITH HEAT SENSOR CHARGERS are generally the most expensive type. These chargers, which are available in 12, 120, and 12/120 volt power requirements, work extremely well. Simply plug in and hook up the COOL battery. Return in 20 minutes to a fully charged unit. (Note: the battery must be cool before the charge cycle begins.)

ELECTRA CONSTRUCTION OPTIONS

NOTE: Materials for these options are not included in your kit. They must be purchased separately.

REMOVABLE TIP OPTION If a 6-1/2 foot wing will not fit in your car, you will want to build the wing with removable wing tips.

TINTING THE CANOPY If you wish to "tint" the canopy, do not try to dye the plastic. Instead, purchase a "transparent" spray enamel paint and apply carefully to the INSIDE of the canopy surface.

LANDING WHEEL OPTION The plans show how to install an optional single landing wheel on your **ELECTRA**. Although this really is not necessary, it can help prevent breakage of wooden propellers and damage to the fuselage when landing on gravel or other rough surfaces. Another way to prevent damage to the fusage is to apply CGM ScuffGuard, a transparent scuff resistant strip, to the bottom of your aircraft. Application is very easy and highly recommended.

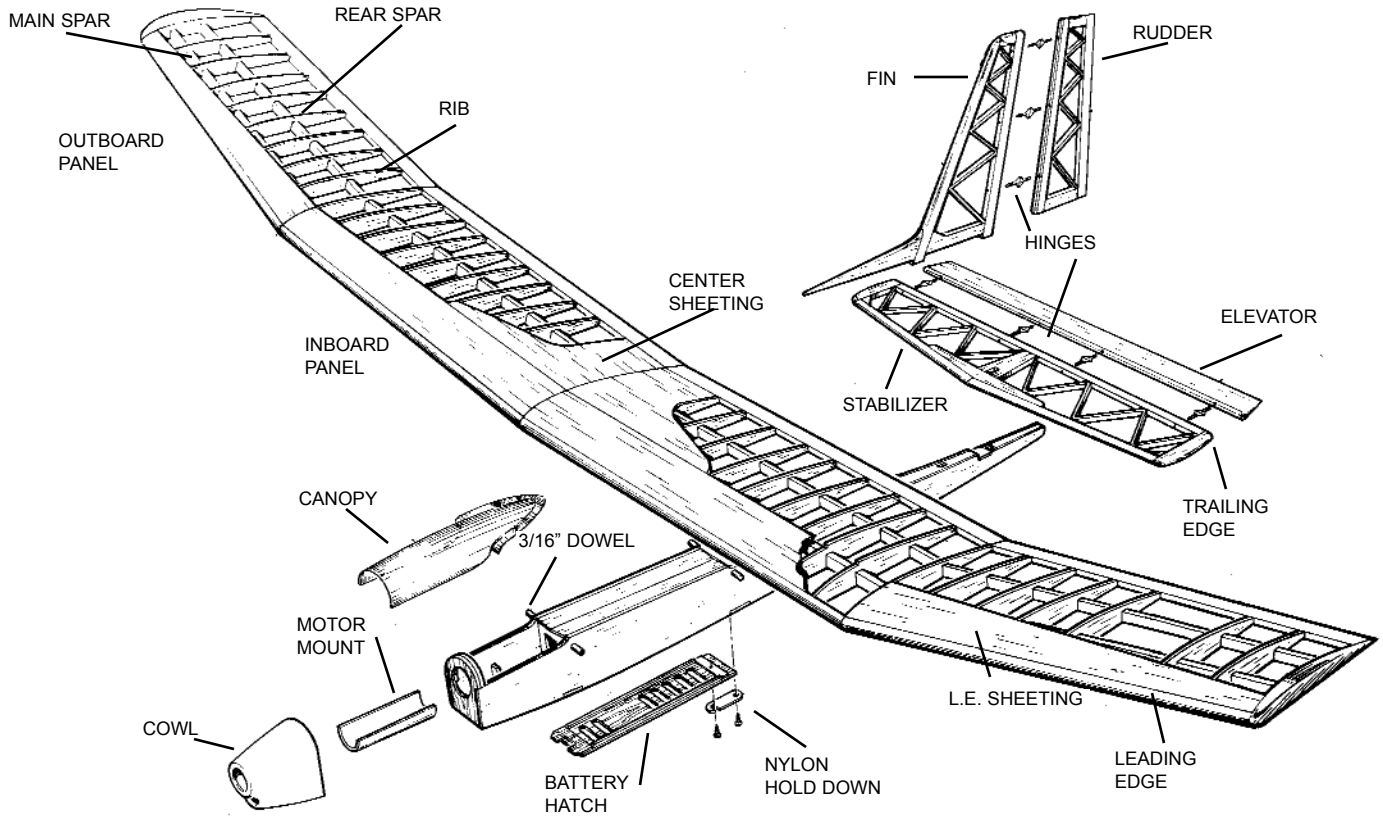
WOOD PARTS

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

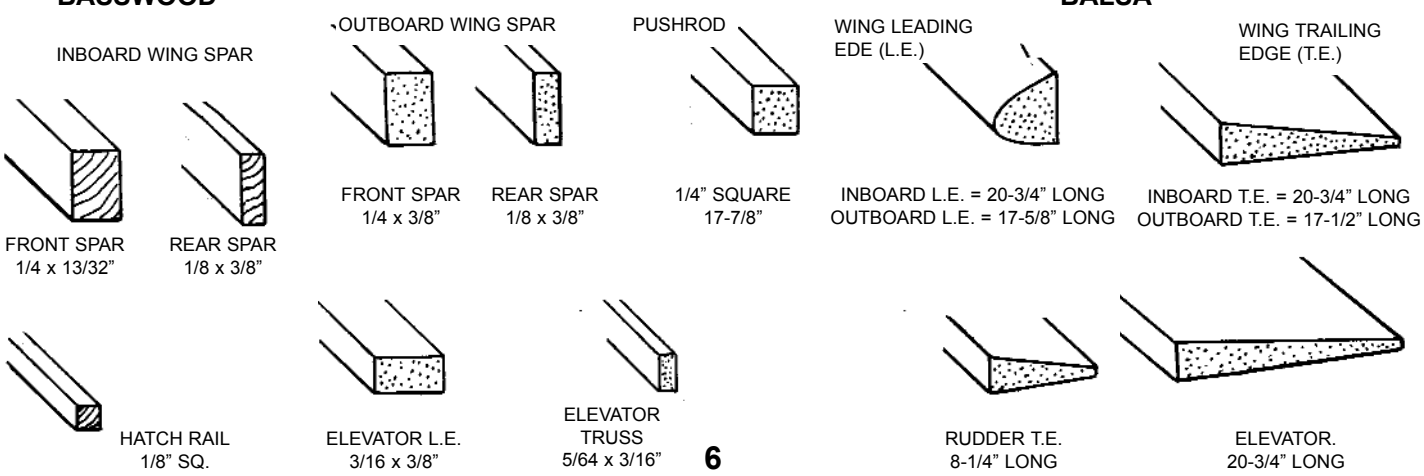
ABOUT THE WOOD IN THE KIT

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

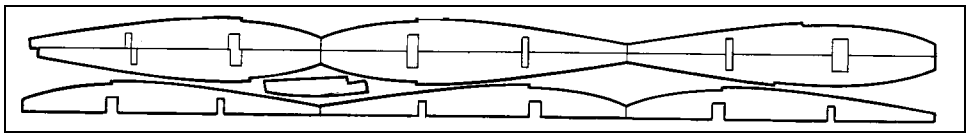
BASIC STRUCTURE



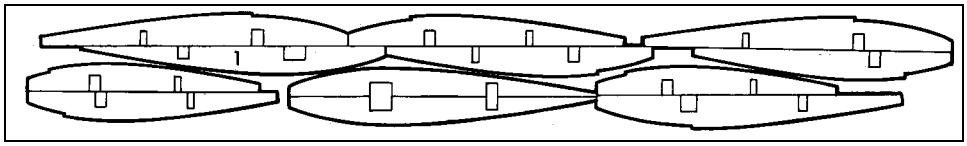
END VIEW OF STRIP WOOD PARTS



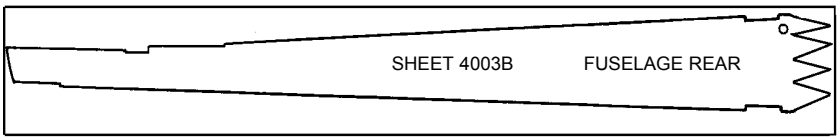
DIE-CUT WOOD SHEETS

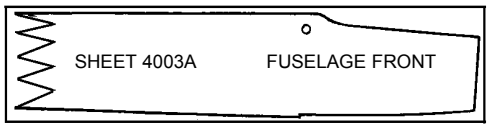


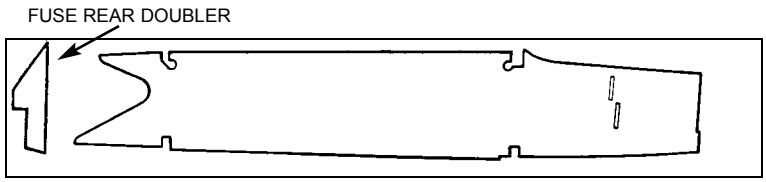
SHEET 4001 WING RIBS 5/64 x 2-7/8" 2 REQ'D.



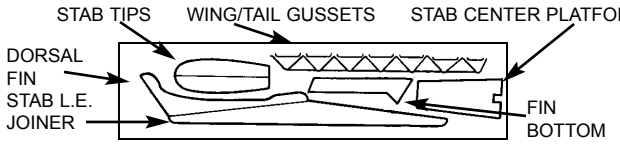
SHEET 4002 WING RIBS 5/64 x 2-7/8" 2 REQ'D.



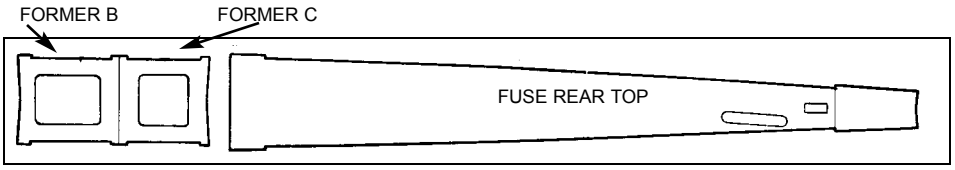




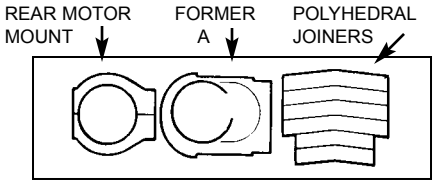
SHEET 4004 5/64 x 2-7/8 x 18" FUSELAGE SIDE DOUBLER 2 REQ'D.



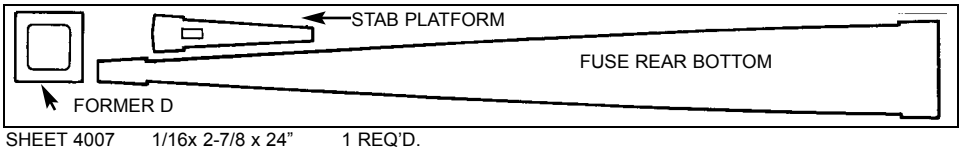
SHEET 4006 3/16x 2-7/8 x 9-1/2" 1 REQ'D.



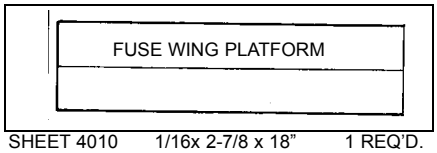
SHEET 4005 1/16x 2-7/8 x 24" 1 REQ'D.



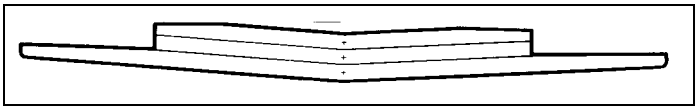
SHEET 4008 1/16x 2-5/8 x 13-1/2" 1 REQ'D.



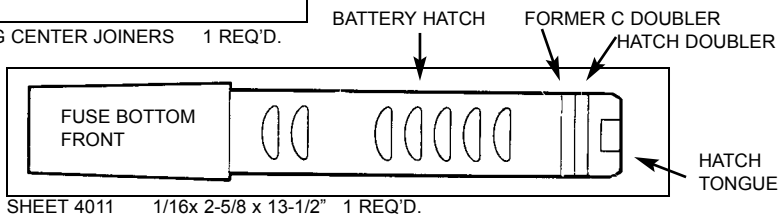
SHEET 4007 1/16x 2-7/8 x 24" 1 REQ'D.



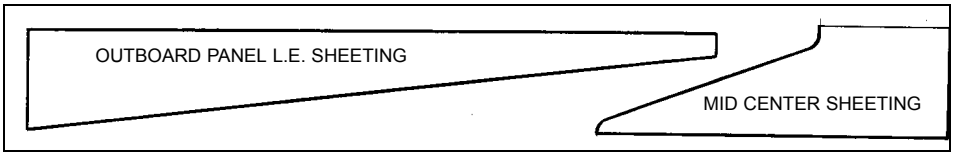
SHEET 4010 1/16x 2-7/8 x 18" 1 REQ'D.



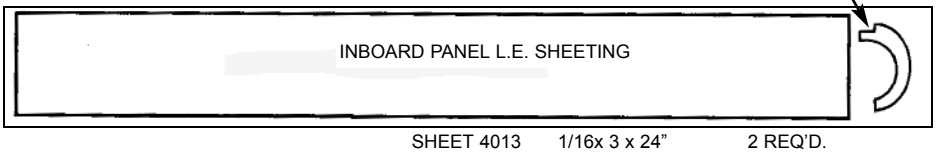
SHEET 4009 1/8x 2-3/8 x 17" WING CENTER JOINERS 1 REQ'D.



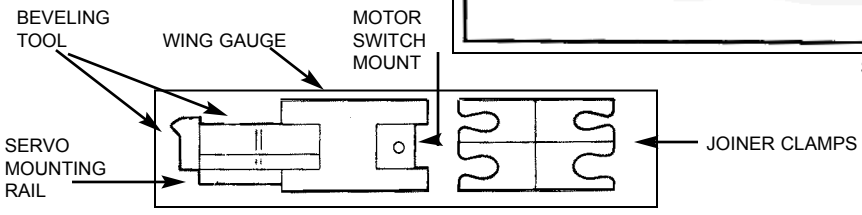
SHEET 4011 1/16x 2-5/8 x 13-1/2" 1 REQ'D.



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



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

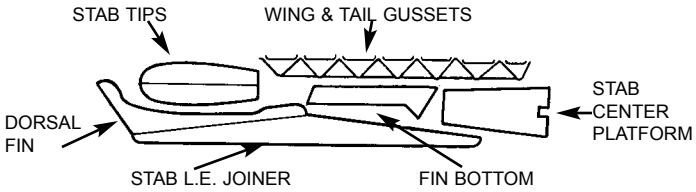


SHEET 4014 1/8 x 2-1/4 x13" 2 REQ'D.

GLOSSARY OF MODELING TERMS

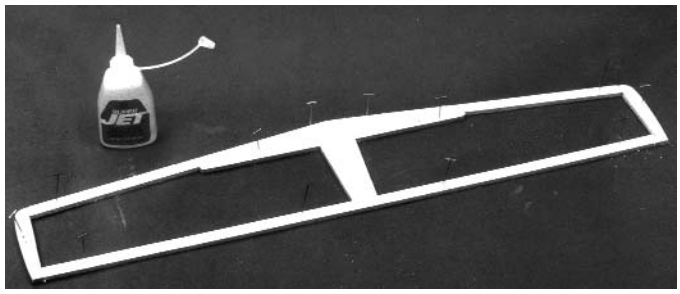
ARF: Almost Ready to Fly
AILERON: the control surface on the wing that rolls the plane
AIRFOIL: the shape of the wing as seen from the end
ANGLE OF ATTACK: the angle at which the wing meets the air flow
BEVEL: to sand to an angle shape
BURR: the rough edges on a piece of wood or metal after it is cut
CAP STRIP: a thin strip glued to the edges of the ribs to shape the wing
CONTROL HORN: a device attached to each control surface to provide an attachment point for the pushrod
COWL (COWLING): the nose section of the fuselage that encloses the engine
DECALAGE: the difference between the incidence of the wing and stabilizer
DIHEDRAL: the upward angle of the wings, as seen from the front
ELEVATOR: the moveable part of the horizontal tail, which controls pitch
EMPENNAGE: the tail of the plan
FIN: the fixed vertical part of the tail
FIREWALL: the hard wooden former at the front of the fuselage, to which the engine is mounted
FORMER: a piece which shapes the fuselage; and to which the sides of the fuselage are attached.
GUSSET: a small triangular piece glued into a corner to strengthen it
INCIDENCE: the angle of the wing or the tail in relation to the thrustline
LAMINATE: to glue two thin sheets of material together to form a thick sheet
LEADING EDGE (L.E.): the edge of the wing that first meets the airflow
LONGERON: a stringer that runs the length of the fuselage
OUTPUT ARM: the piece that attaches to the servo and connects it to the pushrod
PITCH: an up and down movement of the nose of the plane, which is controlled by the elevator
POLYHEDRAL: a wing with more than one upward angle
PROTOTYPE: the full scale airplane from which the model design was taken
PUSHROD: the long, stiff dowel or plastic piece that connects the servo with the control horn
RTF: Ready to Fly
RIB: the airfoil-shaped piece that connects the leading edge, spars and trailing edge of the wing together and holds them in shape
RETRACTS: devices for extending and retracting the wheels on command
ROLL: tilting of the plane as viewed from the front, controlled by the ailerons
RUDDER: the moveable vertical tail of the plane, which controls yaw
RX: radio receiver, the portion of the radio located inside the fuselage
SERVO: the part of the airborne radio system that moves the control surfaces
SHEAR WEB: wood sheeting that connects the top and bottom spars to stiffen the wing
SHIM: a thin piece of wood inserted between two other pieces to improve their fit
SPAR: a wooden stick running lengthwise through the wing that serves as its backbone
SPINNER: the rounded cone that fits over the propeller hub
STABILIZER (STAB): the fixed horizontal part of the tail
STALL: a situation in which the plane is flying too slowly to move sufficient air across the wing to produce lift
STRINGER: a long piece of wood attached to the formers to shape the fuselage
THRUSTLINE: a line drawn from the center of the propeller hub straight through the airplane
TORQUE: a rolling tendency caused by the spinning propeller
TRAILING EDGE (T.E.): the edge of the wing that faces the rear of the plane
TRAVEL: the movement of the control surfaces (rudder, elevator, aileron) from side to side or up and down
TRIM: small adjustments made to the control surfaces to cause the plane to fly straight and level by itself
TX: radio transmitter, the part of the radio system that is held by the pilot and which sends signals to the model
WASHIN: a twist in the wing tip that makes the trailing edge lower than normal
WASHOUT: a twist in the wingtip that makes the trailing edge higher than normal
WING SADDLE: the shaped part of the fuselage in which the wing rests
WHEEL COLLAR: a metal ring that holds the wheel on the axle
YAW: a right-to-left movement of the nose, controlled by the rudder

TAIL CONSTRUCTION



1. ☐ Collect the following items.

(4)	3/16 x 3/8 x21” BALSA	PT. #4853
(1)	1-3/4 SQ. x 21” BALSA	PT. #4696
(3)	5/64 X 3/16 X 24” BALSA	PT. #4698
(1)	1/2” SQ. x 8-1/4” BALSA	PT. #4701
(1)	D/C SHEET 4006 BALSA containing: Stab center platform Stab leading edge joiner Wing and tail gussets Stab tips Dorsal fin	PT. #3606
(1)	CENTERLINE MARKER	PT. #1425
(7)	SMALL FLEX-POINT HINGE	PT. #1448



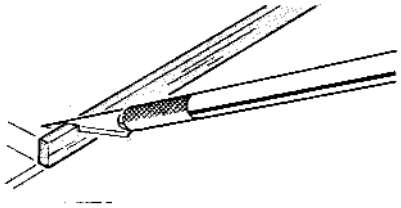
2. ☐ Lay the horizontal stabilizer portion of the plan over the building board and cover with waxed paper.

☐ Buidling over the plan, carefully cut two 3/16 X 3/8” balsa sticks to form the stabilizer leading edge. Make sure to exactly match the plan from the center mark to the tips.

IMPORTANT! SAVE SCRAP MATERIAL FOR USE IN CONSTRUCTING THE FUSELAGE.

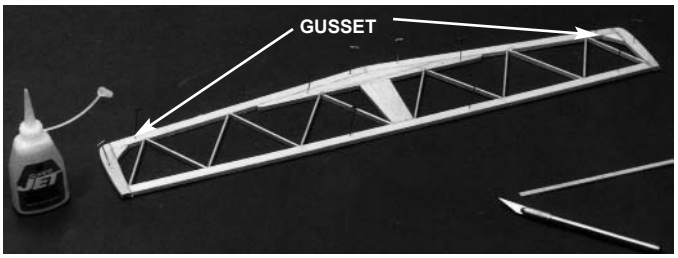
☐ Pin the pieces in position and glue at the center joint.

3. ☐ Continue building the stab outline, pinning and gluing the stab tips, the L.E. joiner, the center platform, and additional 3/16 x 3/8” balsa sticks in place as shown above.

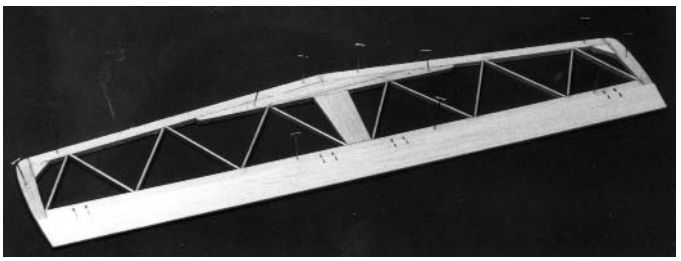


4. ☐ Still working over the plan, and using the technique shown above, cut 5/64 x 3/16” balsa sticks to form stab trussing. Trim carefully to size, so that each truss fits in place without forcing. **SAVE THE SCRAP MATERIAL!**

☐ When satisfied with the fit, glue in place.



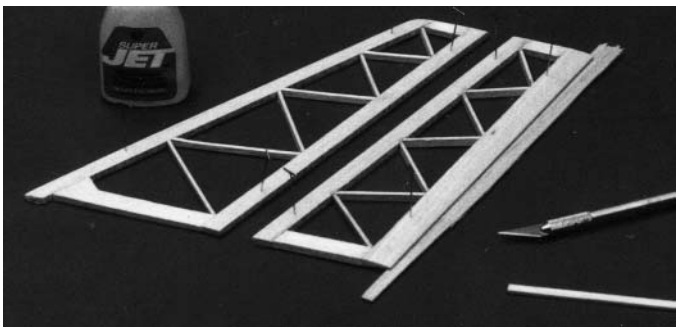
5. ☐ Glue the gussets in place and allow the entire stab to dry thoroughly.



6. ☐ Referring to the plan, mark the hinge locations on the top of the trailing edge with a soft pencil.

☐ Using 3 or 4 drops of Super Jet™, tack-cement the elevator to the stab.

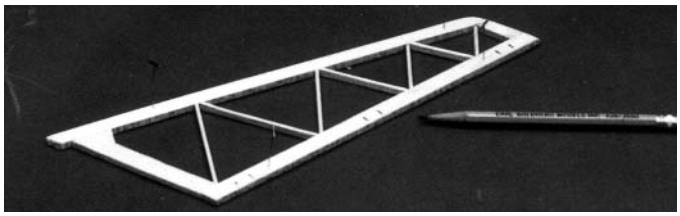
☐ Carefully transfer the hinge location marks onto the elevator.



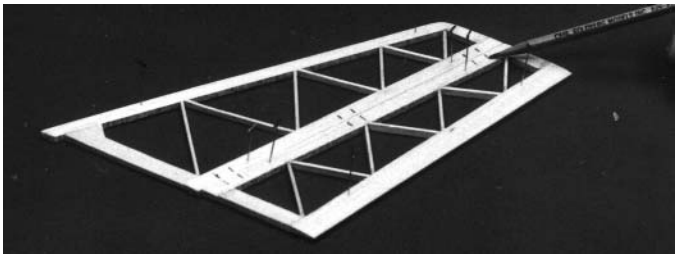
7. ☐ Again working over the plan, assemble the fin and rudder in the same manner as the stabilizer.

NOTE: Since the rudder trailing edge. is tapered, it should be shimmed with 1/16” balsa scrap before gluing, so that it will be level.

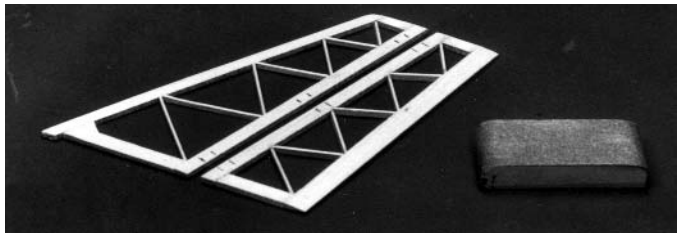
☐ After gluing the fin and rudder pieces, allow to dry before continuing.

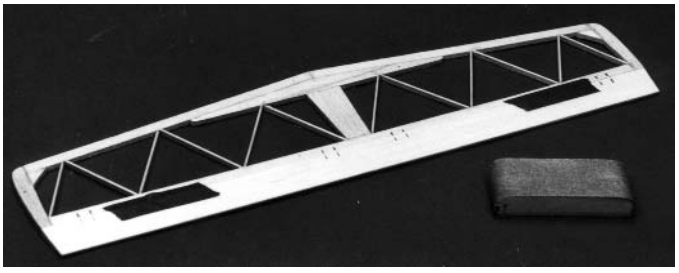


8. ☐ Referring to the plan, mark the hinge locations on the fin T.E.



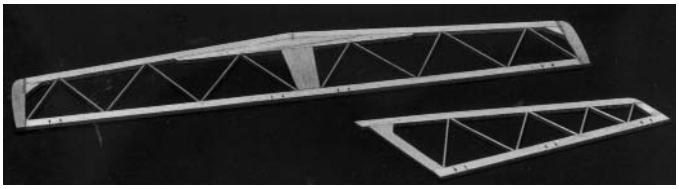
9. ☐ Tack cement the rudder to the fin and then transfer the hinge locations onto the rudder. Do not sand.



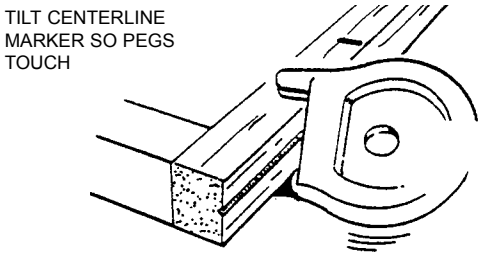


10. ☐ Referring to the plan, flat sand the fin/rudder assembly and the stab/elevator assembly, rounding all outer edges except the bottom and lower 2" of the fin leading edge. Take care not to sand away the hinge locations.

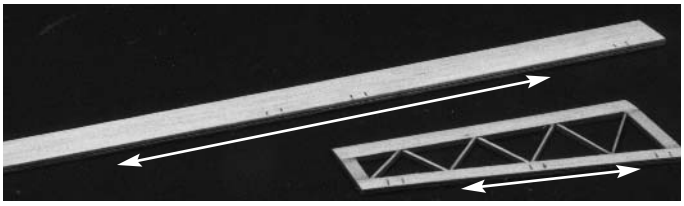
☐ Sand the elevator tips to blend with the stab.



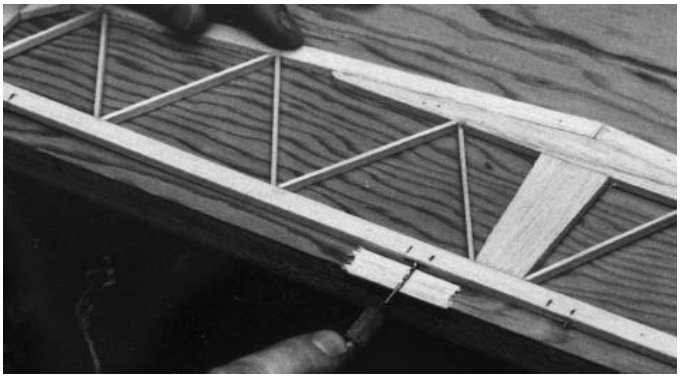
11. ☐ Carefully separate the stab from the elevator and the fin from the rudder. Gently sand to remove any rough spots from tack-cementing.

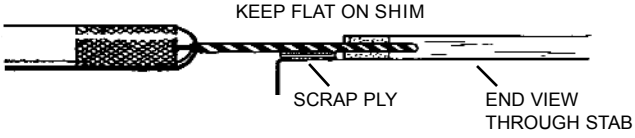


☐ Holding the CGM centerline marker at an angle, so that the pegs touch the wood, lightly pass the marker back and forth so that the point scribes a line, marking the hinge locations on the fin and the stab.



☐ Again using the centerline marker, mark a centerline along the entire leading edge of both the elevator and the rudder.

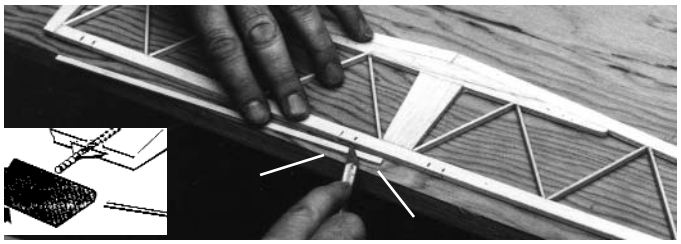




12. ☐ Using an awl or similar tool, make a pilot hole at the hinge locations on the fin and the stab.

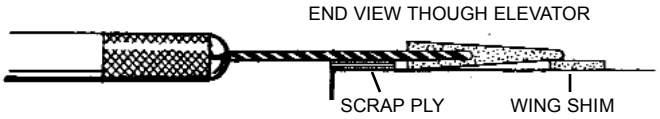
☐ Move the stab T.E. close to the edge of the table and, using 1/16" scrap ply as a shim, make sure the T.E. is level and steady.

☐ Carefully drill 1/16" holes for the hinges, as shown above.



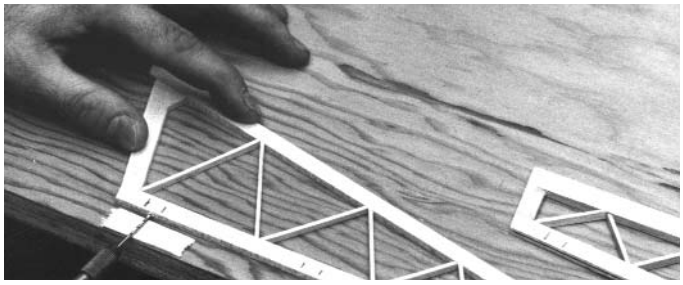
13. ☐ Next, cut 45º slots on each side of each hole to accommodate the hinge webs.

NOTE: The CGM hinge slotting kit (Item # 600) is handy for this process.

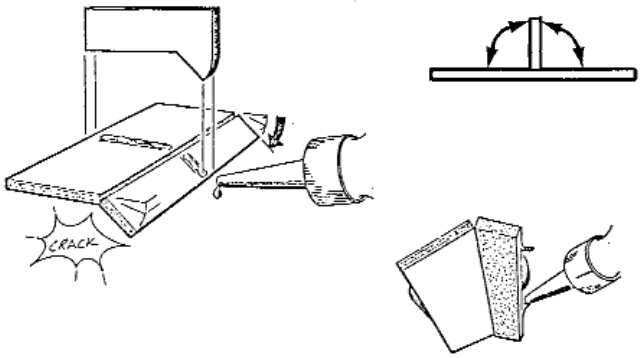


14. ☐ Move the elevator close to the edge of the table and support the thin edge with wing rib scrap, as shown.

☐ Carefully cut hinge slots, as, at the proper locations.

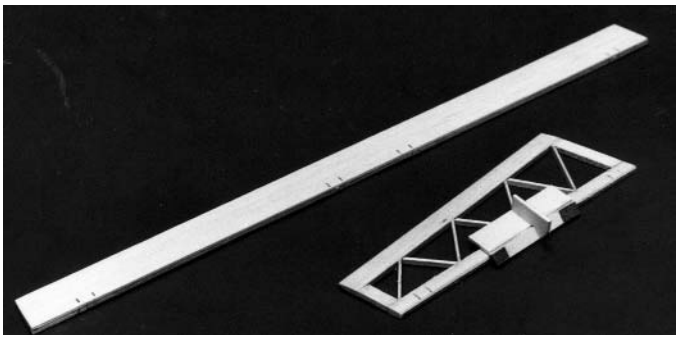


15. ☐ Repeat the slotting method for the fin and rudder.



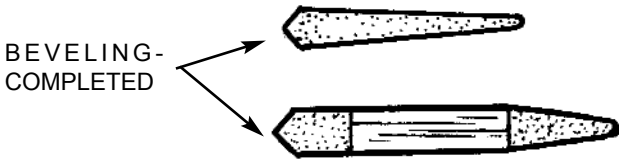
16. ☐ Referring to the above diagrams, assemble the beveling tool. First glue the narrow strip to the handle, taking care to keep it square. Then glue the wide strip to the handle and the narrow strip.

☐ When the glue has dried, cut a strip of 100-200 grit sandpaper to size and tack-cement the sandpaper to the tool, as shown.



17. ☐ Tape the T.E. of the elevator to the work surface. Using the beveling tool, sand the L.E. to the centerline. Then turn the parts over and bevel the other side.

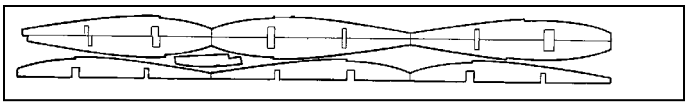
☐ Repeat this process for the rudder. When finished the pieces should look like the drawing below.



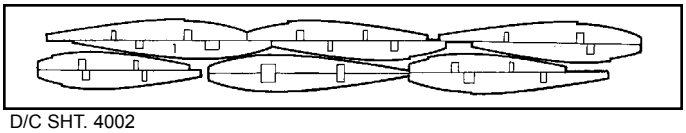
THIS COMPLETES THE TAIL CONSTRUCTION. PUT THE PIECES ASIDE UNTIL THEY ARE NEEDED LATER.

WING CONSTRUCTION

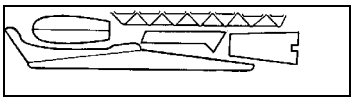
IMPORTANT: YOU WILL BE BUILDING A RIGHT AND THEN A LEFT WING. FOLLOW THE STEPS CAREFULLY TO AVOID CONFUSION.



D/C SHT. 4001

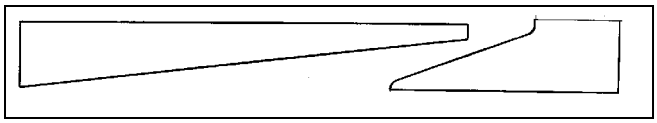


D/C SHT. 4002

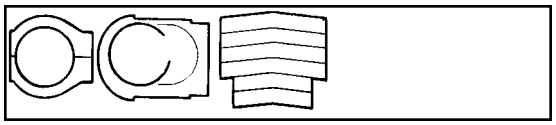


D/C SHT. 4006

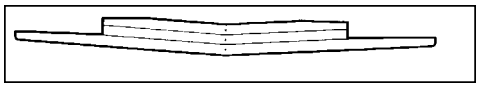
D/C SHT. 4010



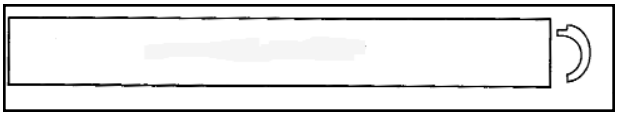
D/C SHT. 4012



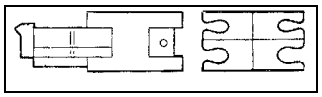
D/C SHT. 4008



D/C SHT. 4009



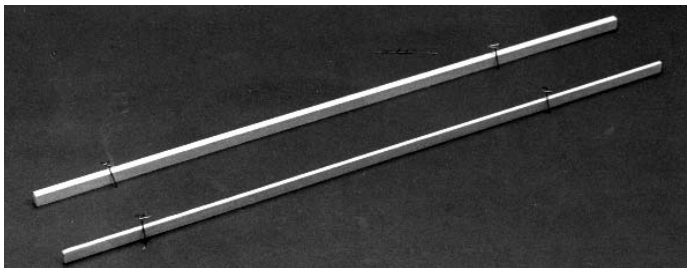
D/C SHT. 4013



D/C SHT. 4014

1. ☐ Collect the following items:

(2)	D/C SHT. 4001 5/64” Balsa Contains: WING RIBS	PT. #3601
(2)	D/C SHT. 4002 5/64” Balsa Contains: WING RIBS	PT. #3602
(1)	D/C SHT. 4006 WING GUSSETS	PT. #3606
(1)	D/C SHT. 4008 1/16” Ply Contains: POLYHEDRALJOINERS	PT. #3608
(1)	D/C SHT. 4009 1/8” Ply Contains: WING CENTER JOINERS	PT. #3609
(1)	D/C SHT. 4010 Balsa	PT. #3610
(2)	D/C SHT. 4012 1/16” Balsa Contains: WING SHEETING	PT. #3612
(2)	D/C SHT. 4013 1/16” Balsa Contains: WING SHEETING	PT. #3613
(2)	D/C SHT. 4014 Ply Gauges & clamps	PT. #3614
(4)	BALSA SHEET 1/16x3x12”	PT. #4600
(2)	INBOARD T.E.LONG	PT. #4688
(2)	OUTBOARD T.E.SHORT	PT. #4689
(2)	INBOARD L.E. LONG	PT. #4690
(2)	OUTBOARD L.E. SHORT	PT. #4691
(2)	INBOARD MAIN SPAR Bass	PT. #4692
(2)	OUTBOARD MAIN SPAR	PT. #4694
(2)	INBOARD REAR SPAR Bass	PT. #4855
(2)	OUTBOARD REAR SPAR balsa	PT. #4874
(1)	3/4 X 38” NYLON FABRIC	PT. #9524
(1)	1 x 6” ALUMINUM STRIP	PT. #1390

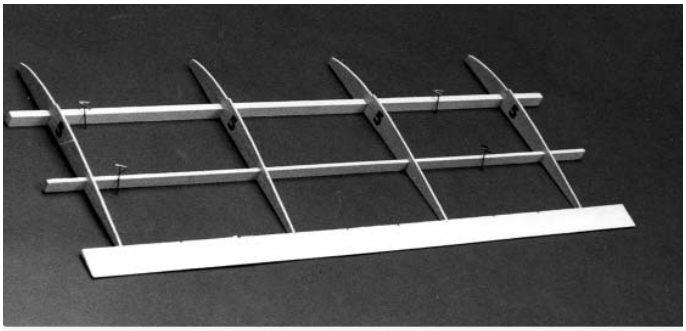


2. ☐ Working over the **RIGHT INBOARD PANEL** of the plan, place a 1/4” x 13/32” basswood spar main spar so that the spar end is aligned with the wing center on the plan.

NOTE: If building the second half of the wing, you will be working over the LEFT INBOARD PANEL. DO NOT BUILD TWO RIGHT WINGS!

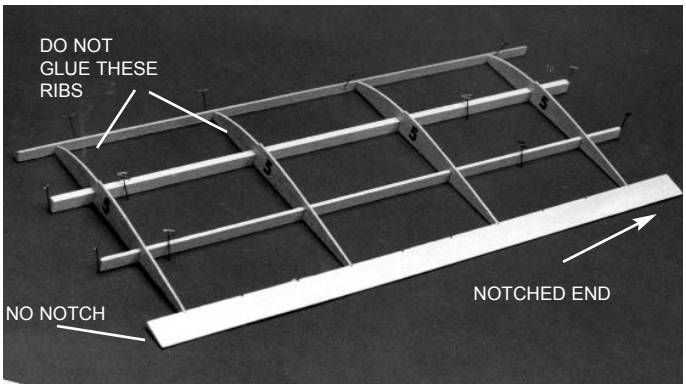
☐ Hold the spar in place by cross-pinning between the ribs shown on the plan.

☐ Position the rear spar on the plan.



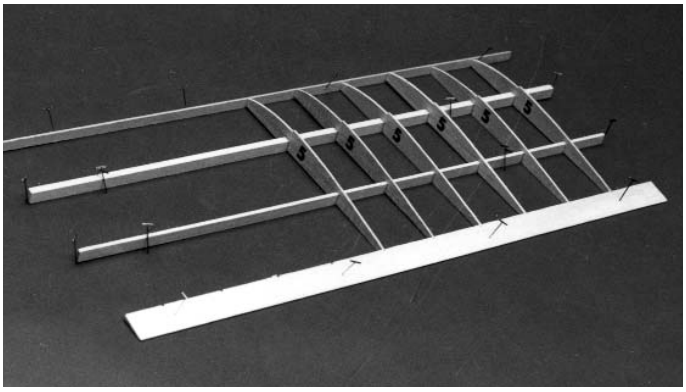
3. ☐ Align the notches in the wing trailing edge (T.E) with those shown on the plan.

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



4. ☐ Position the wing leading edge (L.E.) in place over the plan and pin.

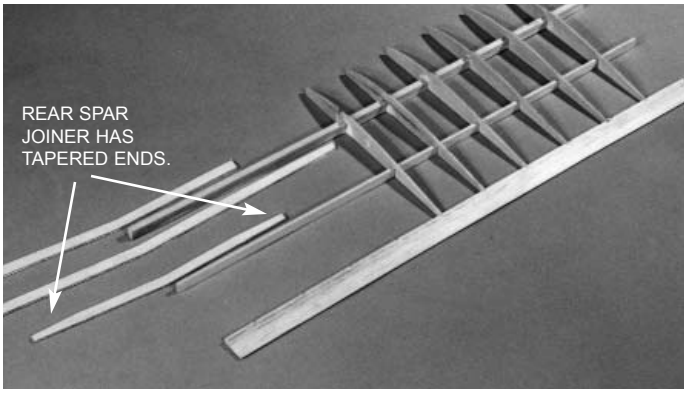
   ☐ Secure the ends of both spars with pins, as shown.

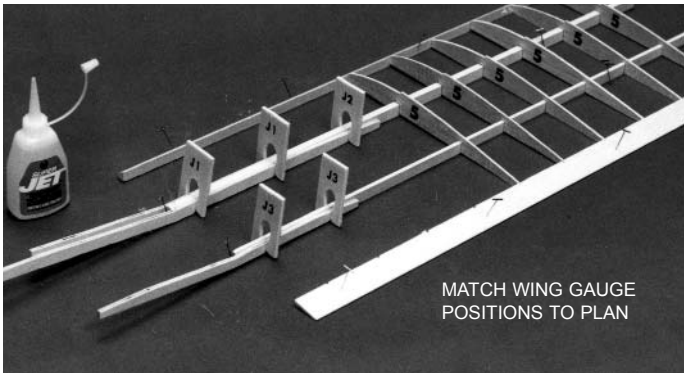


5. ☐ Remove the two #5 ribs nearest the wing center.

   ☐ Glue all remaining #5 ribs, as shown on the plan.

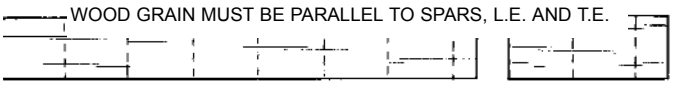
IMPORTANT! IF BUILDING THE LEFT WING, PROCEED DIRECTLY TO STEP 10.



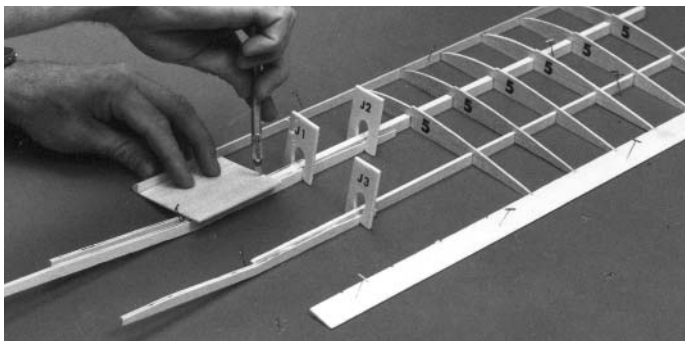


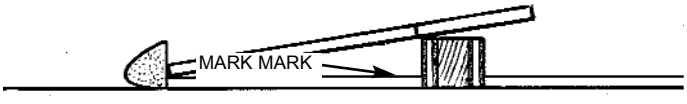
6. ☐ Noting that the rear spar joiner has a tapered end, fit the front and rear spar joiners into position as shown.

   ☐ Glue the joiners to the spars and, referring to the plan, hold in place with the gauges. Allow to dry.



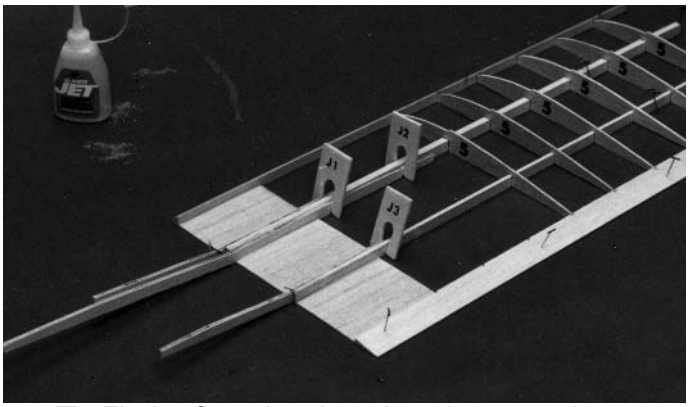
7. ☐ Taking care to make sure that the grain of the sheeting will run parrallel to the spars, L.E. and T.E., cut three 3-1/4" pieces from a 1/16 x 3 x 24" balsa sheet.



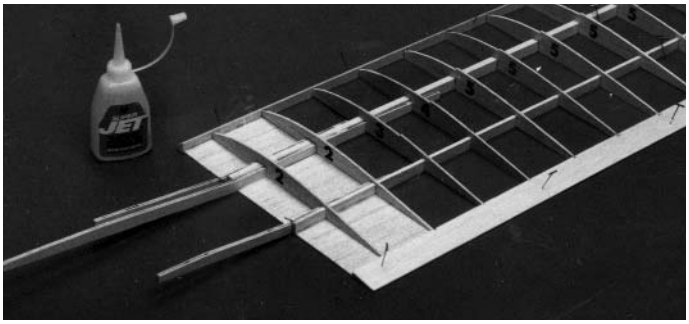


8. ☐ Slide one piece of sheeting forward until it just touches the L.E. Gently holding the sheet in position, mark the spar location on both of the rear corners of the sheet.

- ☐ Remove the sheet from the wing and, using a metal straight edge, carefully trim the sheeting so that, when the piece is laid flat, it just fits between the L.E. and the spar.
- ☐ Following the same procedure, trim and fit two more sheeting pieces for the bottom center section.

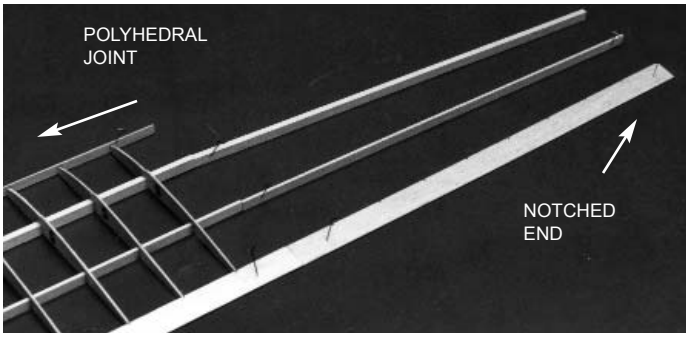


- ☐ Fit the first sheeting piece between the spars and, holding it flat to the building board, Super Jet the edges to the spars.
- ☐ Install the other two sheeting pieces in the same manner.



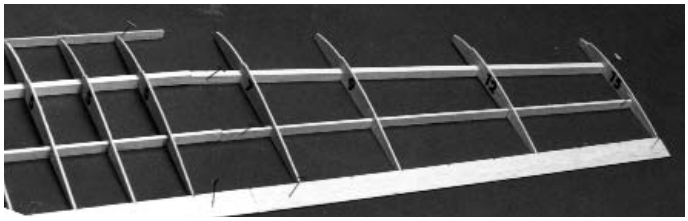
9. ☐ Position ribs #2, 3, and 4, making sure to align the rib fronts over the front guide lines on the plan.

- ☐ When satisfied with the alignment, glue to the L.E., the bottom sheeting, the spars, and the T.E.



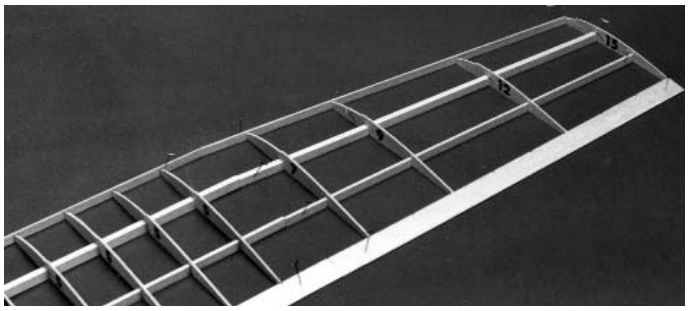
10. ☐ Pin the outboard main spar in place over the plan. Then set the rear spar and the T.E. in place.

IMPORTANT! The outboard T.E. has no notch at one end. This unnotched end must be at the polyhedral joint, as shown.

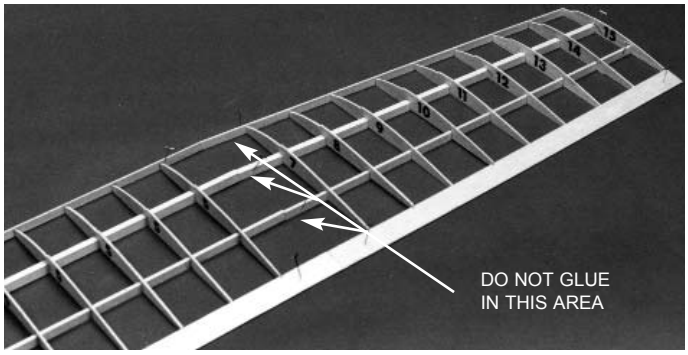


11. ☐ Using no glue, set ribs #7, 9,12, and 15 in their respective T.E. notches, hooking them over the spars as you go.

- ☐ Making sure the T.E. and the ribs are correctly aligned over the plan, pin in place.
- ☐ Glue the ribs to the spars and the T.E.



12. ☐ Pin the outboard L.E. in place and glue it to the ribs.



13. ☐ One at a time, position and then glue the remaining ribs # 8 through #14 in place. Let dry thoroughly.

NOTE: IF YOU ARE CONSTRUCTING A ONE-PIECE WING, CONTINUE AT STEP 14. IF YOU WISH TO BE ABLE TO REMOVE THE WING TIP, REFER TO THE FOLLOWING OPTIONAL INSTRUCTIONS.

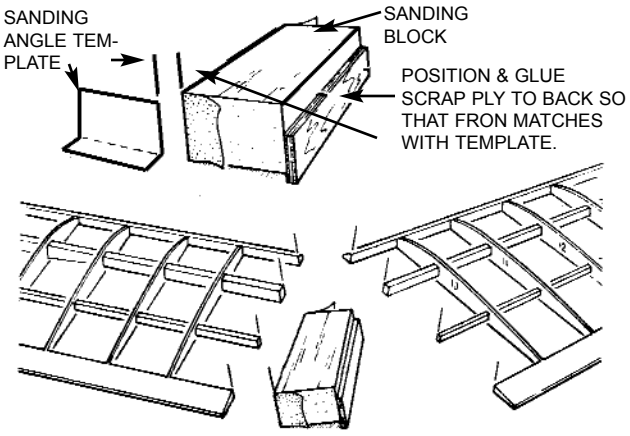
REMOVABLE TIP OPTION

NOTE: The materials needed to make the wing tip removable are NOT INCLUDED in your kit. Necessary templates for this option are found in the upper right corner of the *wing half* of the plan.

Follow these steps ONLY IF YOU WANT TO BE ABLE TO REMOVE THE WING TIPS. Otherwise, continue at Step 14.

A. ☐ Collect the following items:

1/8" x 3" x 18" HARD BALSA SHEET
3/32" x 12" MUSIC WIRE
3/32 I.D. x 6" BRASS TUBE
3/34" VINYL ELECTRICAL TAPE

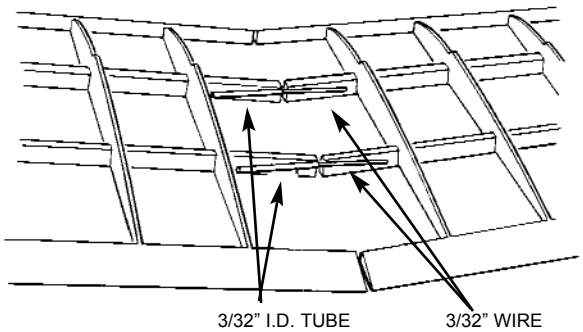


B. ☐ Make a sanding block from 1/8" scrap plywood, using the SANDING ANGLE TEMPLATE from the plan. Make sure to establish tthe proper sanding block angle, as show above.

C. ☐ From the 1/8" hard balsa sheet, cut four NEW #6 ribs. DO NOT USE THE #6 die cut ribs that are included with your kit.

D. ☐ Remove the pins from the inboard panel and use the sanding block to gently sand the polyhedral ends of the spars, the L.E., and the T.E. to insure uniform vertical surfaces.

E. ☐ Referring to Step 14 for correct use of the die-cut wing gauges, raise the inboard wing panel, as shown.



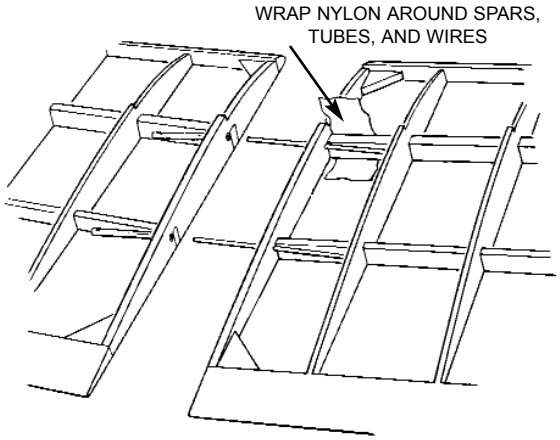
F. ☐ Position the 3/32 x 3" wire on the back of the spars, as shown.

☐ Referring to the TIP OPTION on the plan, carefully groove the spars for the wire and for the brass tube.

G. ☐ Tack-glue the WIRE to the OUTBOARD SPAR and the BRASS TUBE to the INBROARD SPAR.

☐ Plug the wing panels together and make certain the wing structures butt evenly at the polyhedral joint. If adjustments are needed, take the panels apart and rework the grooves slightly.

☐ When satisfied with the fit of the joint, glue the metal parts in place.



H. ☐ With the wing panels plugged together, position the new #6 ribs at the polyhedral joint. The ribs should be tilted slightly toward the outboard panel, so that they match the spar angle.

☐ TAKING CARE TO NOT GLUE THE WING PANELS TOGETHER, carefully glue the ribs to their respective wing panels.

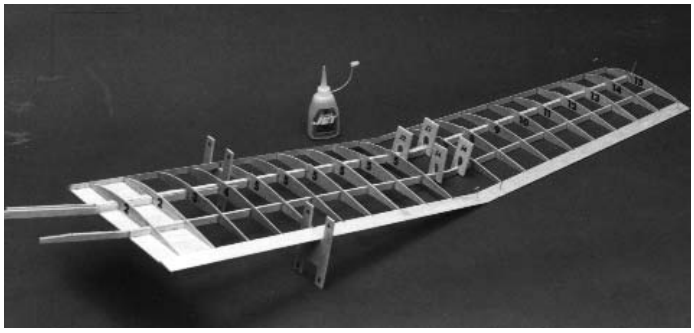
I. ☐ Unplug the wing panels. Then, working on first the inboard panel and then the outboard panel, wrap a about 2" of 3/4" wide nylon fabric (included in your kit) around each of the spars to secure the wire and brass tubing.

☐ Saturate the nylon fabric with Super Jet or Jet Epoxy, to create a sturdy bond.

J. ☐ Add gussets (D/C Sht. 4006) at the L.E. and T.E., as shown above.

NOTE: This completes the removable tip option construction for the first wing half. When working on the second wing half, you again will follow the above instructions. After the wing parts are covered, the removable panels are fastened to the inboard wing sections using vinyl electrical tape. This tape holds firmly, yet can be removed without damaging the covering material.

NOW PROCEED DIRECTLY TO STEP 19.



14. ☐ With the outboard panel still pinned down, raise the inboard panel and support it with the wing dihedral gauges under the first rib #5 location, as shown on the plan.

IMPORTANT: The end of the gauge stamped "A" must be up. Hold the gauges firmly in place by tack-cementing, clothespins, etc.

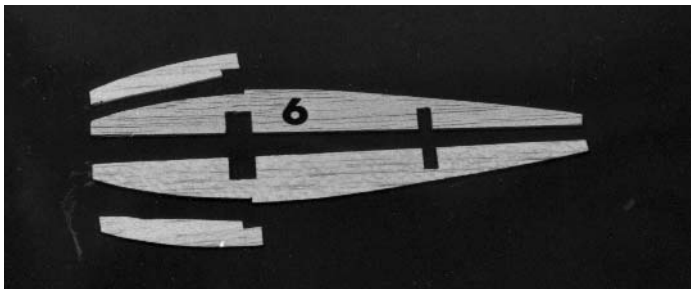
☐ Carefully inspect the panel joint to make sure all of the end pieces of the inboard panel fit tightly to those of the outboard panel. If one part protrudes too much, sand slightly for a better fit. WARNING: always sand just a little at a time, so that you do not remove too much wood. You may find it helpful to use the sanding tool described in the removable tip option.

15. ☐ TEMPORARILY install the diihedral joiners on each side of the spars. Use die-cut clampls to hold in place.

☐ When satisfied with the fit of the inboard and outboard panels, pin in place, as shown above.

16. ☐ Remove the dihedral joiners and apply a liberal bead of Super Jet to all joints of the L.E., spars, and T.E.

☐ Quickly apply glue to the joiners and immediately reinstall. Use the clamps again to hold both joiners tight to the spars. Allow to dry.

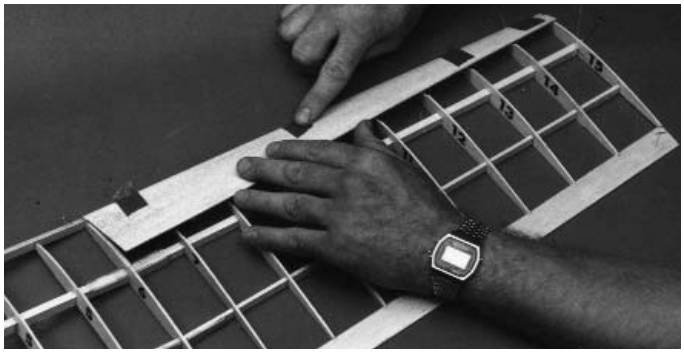


17. ☐ Lay out two #6 ribs, and two doublers, as shown.

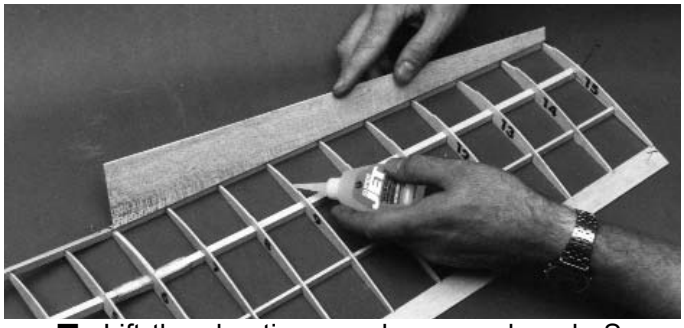
☐ Glue rib doubler #6a to each rib, taking care to make on left and one right rib.

18. ☐ Position rib #6 so that it aligns with the joints in the L.E., the spars, and the T.E. Make sure that the doubler is facing out, toward the outboard pannel. When satisfied with the fit, glue in place.

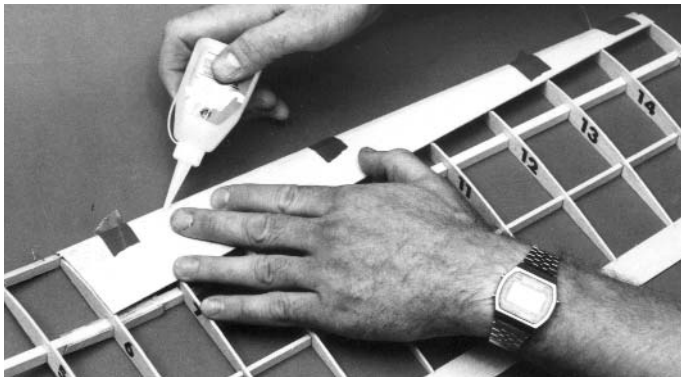
☐ Referring to the plan for location, glue gussets to rib #6, the L.E., and the T.E.



19. ☐ Set the outboard L.E. sheeting in place, aligning the inboard edge of the sheet with the joint between rib #6 and the #6a doubler. When correctly positioned, tape the sheeting to the L.E.



☐ Lift the sheeting, as shown, and apply Super Jet™ along the top of each rib where it will contact the sheeting.



☐ Fold the sheeting back down over the ribs and hold in place until dry.

☐ Apply a bead of glue to the L.E./sheeting joint, in the areas between the tape. Allow to dry.

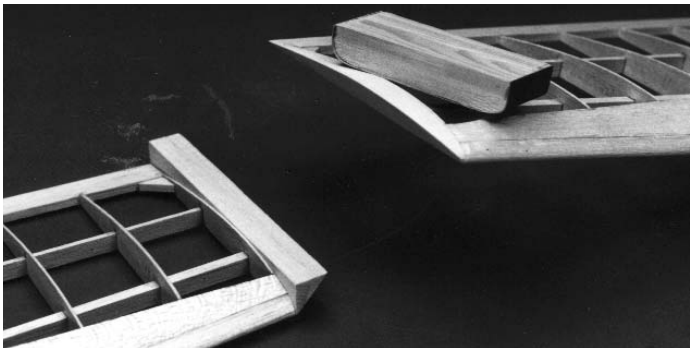
HINT: Using Jet Set™ accelerant speeds this (and many other) gluing processes.

☐ When the joint is firm, remove the tape and apply glue to the remaining unglued areas of the joint.

If this is your first wing half, set it aside and begin building the left half of the wing.

MAKE SURE YOU WORK OVER THE LEFT WING PORTION OF THE PLAN. DO ONLY STEPS 1 THROUGH 5 AND 10 THROUGH 19 FOR THE LEFT INBOARD PANEL.

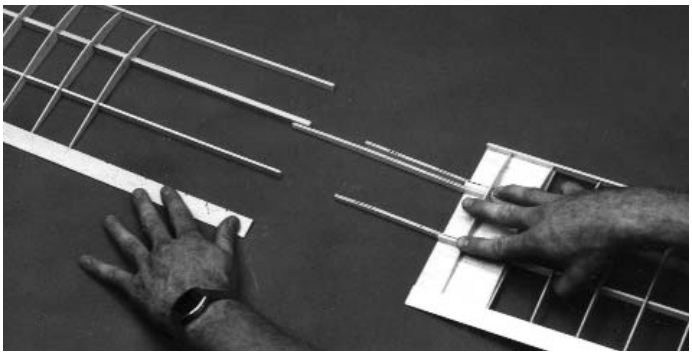
When both halves are complete to this point, continue with Step 20.

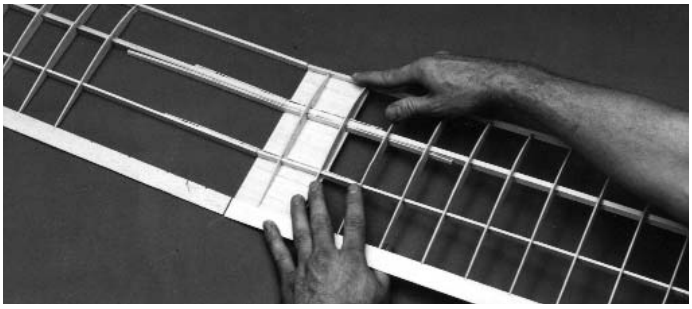


20. ☐ Trim off excess spar material extending beyond the #15 ribs (wing tip ribs)

21. ☐ Glue trip strip to the #15 ribs, as shown.

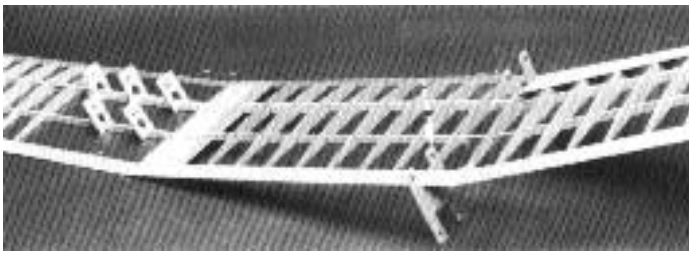
☐ Carve and sand balsa tri-strips, so that they match the top contour of the wing tip ribs.





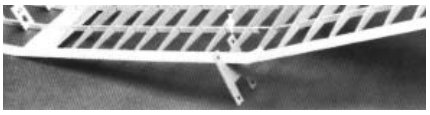
22. ☐ Still working over the plan, pin down the left inboard panel.

☐ Slide the right inboard panel up tight next to the left inboard panel, engaging the joiners with the spars, as shown above.



23. ☐ Raise up the right inboard panel, supporting it with the dihedral gauges at the outermost rib #5 position.

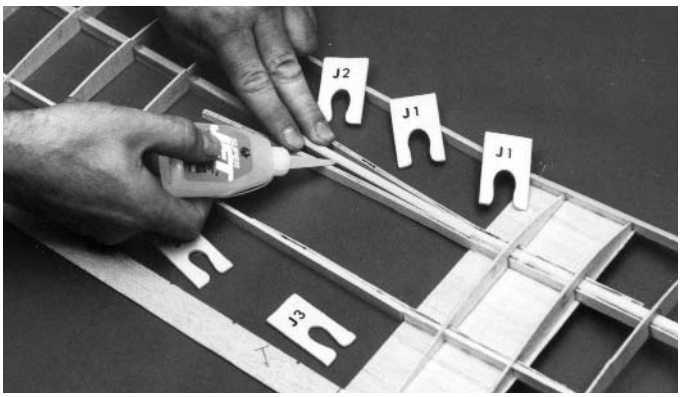
IMPORTANT! The ends stamped “B” must be up.



☐ Examine the center joint for good fit and alignment of the L.E., the spars, the joiners, and the T.E. Adjust as necessary, sanding slightly to make the pieces fit together.

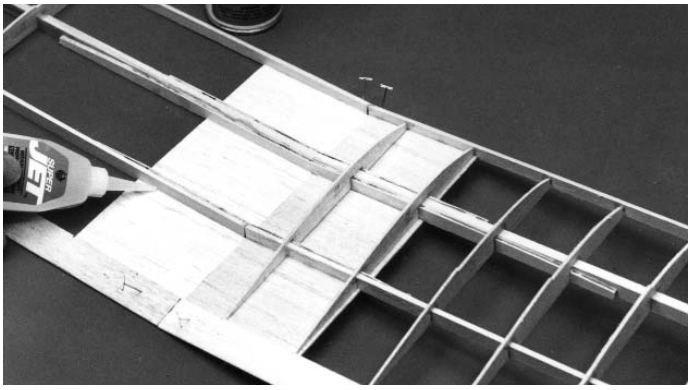
☐ Temporarily install the clamps to hold the joiners tight on the spars.

☐ When satisfied with the fit, pin the wings together.



24. ☐ Remove the clamps and insert pins between the spars and the joiners.

☐ Apply Super Jet™ between the parts and then remove the pins, allowing the pieces to come back together. Immediately replace the clamps to hold the joiners tight on the spars. Let dry thoroughly.

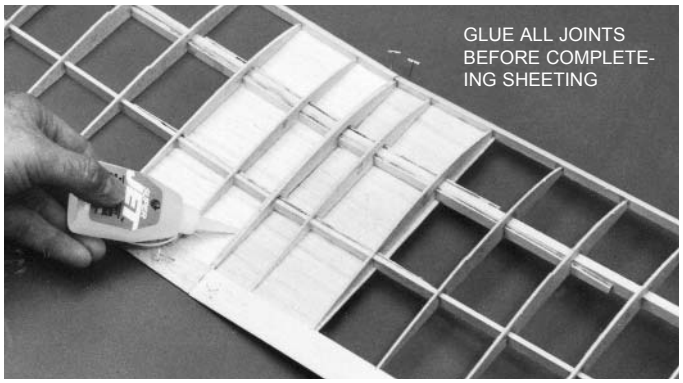


25. ☐ When the glue has dried, remove all clamps from the spars.

☐ Cut three 3-1/4” pieces of bottom sheeting from the remainder of the 1/16” balsa sheeting.

☐ Trim to fit between the spars, just as was done in Step 7. When satisfied with the fit, glue in place.

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



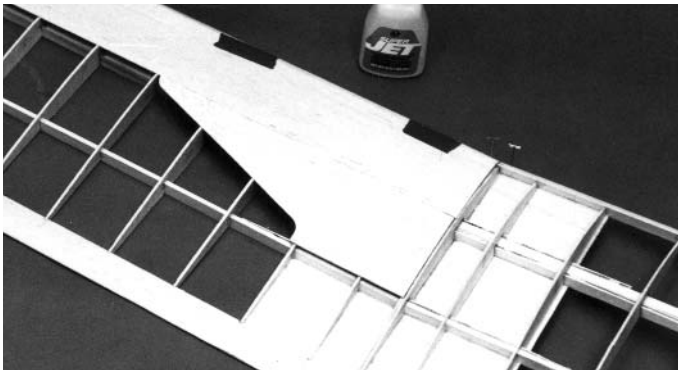
26. ☐ Glue the remaining ribs #2, #3, and #4 in place.

☐ Glue together two #1 ribs to make a single, double-thickness rib.

☐ Position this doubled #1 rib at the center joint, making sure it aligns with the spar center joint, the L.E., the bottom sheeting, and the T.E. Glue in place.

NOTE: Make sure all joints are well-glued before completing the center sheeting.

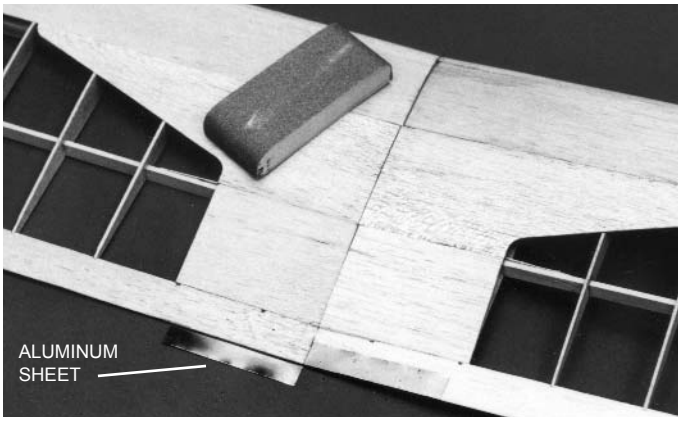
27. ☐ Following the same procedure used in Step 19, install the inboard L.E. sheeting.



☐ When the L.E. sheeting is dry, install the die-cut, tapered center sheeting.

☐ From plain 1/16 x3 x 12” balsa, cut and fit the remaining rear sheeting piece.

☐ Remove all pins and gauges and complete the sheeting of the right wing.



28. ☐ Using 240 grit (fine) sandpaper, flat sand the entire wing to blend the surfaces and remove high spots. Take care not to sand too much, or the sheeting will be thin and weak.

☐ Cut the 1 x6” aluminum strip into two 3” pieces and sand lightly for better glue adherence.

☐ Apply a bead of Super Jet™ to one half of one of the aluminum pieces and glue it to the bottom of the wing, as shown above.

☐ When dry, apply glue to the other half of the strip and wrap it around the T.E.

☐ Repeat this procedure for the other aluminum piece.

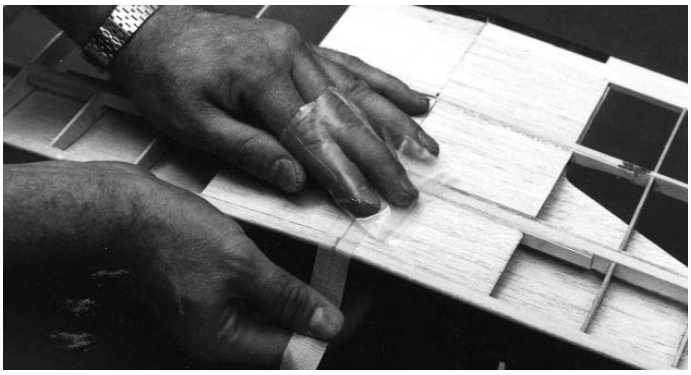
IMPORTANT!

The following procedure must be done in a WELL-VENTILATED AREA.

29. ☐ Cut a piece of 3/4” wide nylon long enough to wrap completely around the wing with a small overlap.

☐ Apply a spot of Super Jet™ on the wing bottom at the center joint.

☐ Immediately stick one end of the nylon strip to the wing and let dry until it is firmly glued to the balsa.

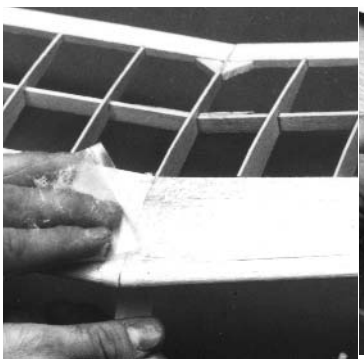


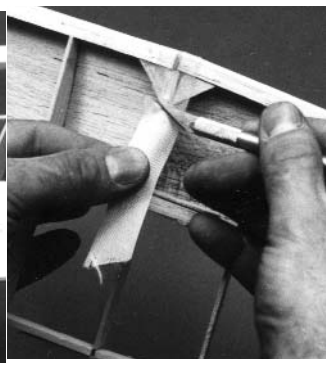
☐ Before continueing, protect fingers with a plastic bag or plastic wrap.

☐ Starting with the bottom of the wing, apply a squiggle of glue along the wing joint and lay the nylon strip over it.

☐ Rub the glue thoroughly into the nylon strip.

☐ Continue applying the nylon strip around the L.E., across the top of the wing, around the T.E., and finally overlapping where you started on the wing bottom.

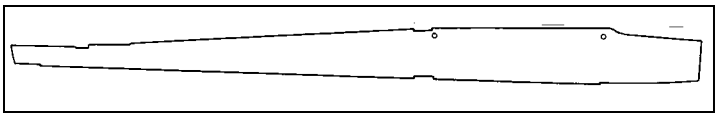




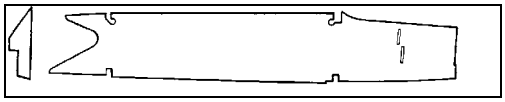
☐ Unless you have made the removable wing tip option, repeat the above procedure, installing nylon fabric at the polyhedral sheeting joints.

THIS COMPLETES THE WING ASSEMBLY. SET ASIDE UNTIL IT IS TIME TO COVER.

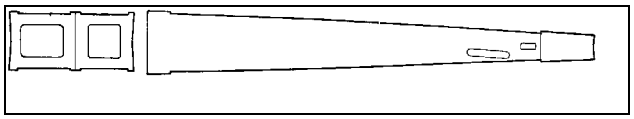
FUSELAGE CONTRUCTION



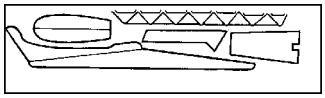
D/C SHT. 4003



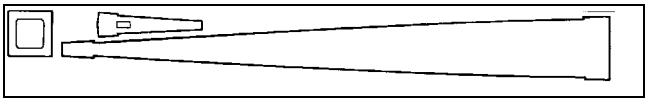
D/C SHT. 4004



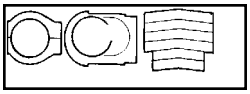
D/C SHT. 4005



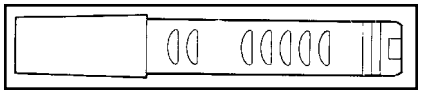
D/C SHT. 4006



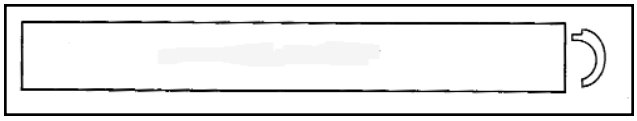
D/C SHT. 4007



D/C SHT. 4008



D/C SHT. 4011



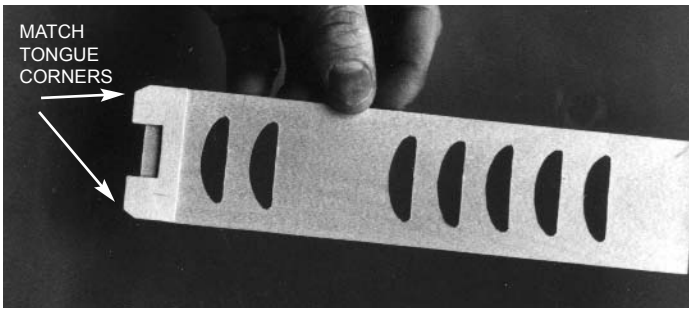
D/C SHT. 4013

1. ☐ Collect the following parts:

(2)	D/C SHT. 4003 Fuse Side	PT. #3603
(2)	D/C SHT. 4004 Fuse Doubler	PT. #3604
(1)	D/C SHT. 4005 Fuse Top	PT. #3605
(1)	D.C SHT. 4006 Dorsal Fin	PT. #3606
(1)	D/C SHT. 4007 Fuse Bottom	PT. #3607
(1)	D/C SHT. 4008 Ply	PT. #3608
Containing: Former “A”, Rear Motor Mount, Polyhedral Joiners		
(1)	D/C SHT. 4011 Ply	PT. #3611
Containing: Fuse bottom front, Battery hatch, Hatch doubler, Hatch tongue, Former “C” doubler		
(2)	D/C SHT. 4013	PT. #3613
(2)	DOWEL 3/16x3-7/8”	PT. #1748
(2)	PUSHROD 1/4x1/4x17-7/8”	PT. #4699
(2)	HATCH RAIL 1/8x1/8x7-3/8”	PT. #4875
(1)	FLAT HOLD DOWN	PT. #1434
(1)	#2x3/16” PAN HEAD SCREW	PT. #1085
(1)	MOTOR MOUNT	PT. #1665
(2)	10” THREADED ROD	PT. #1272
(1)	CLEAR CANOPY	PT. #1628
(1)	#2 x 3/16” SHOULDER SCREW	PT. #1105

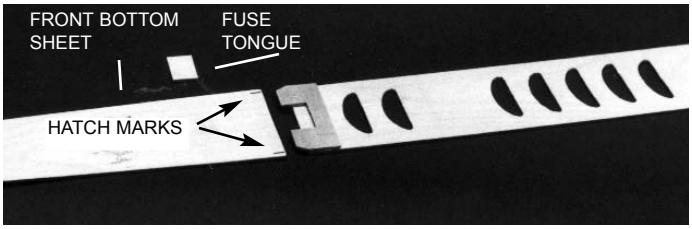
☐ Remove the die cut fuse parts and lightly sand any rough edges.

☐ Place the fuse section of the plan over the building board and protect with waxed paper.

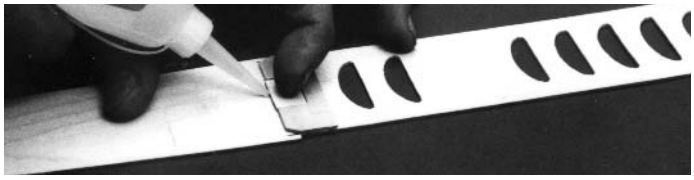


2. ☐ Match the beveled corner edges of the hatch tongue with the hatch corner. Note the vent hole positions.

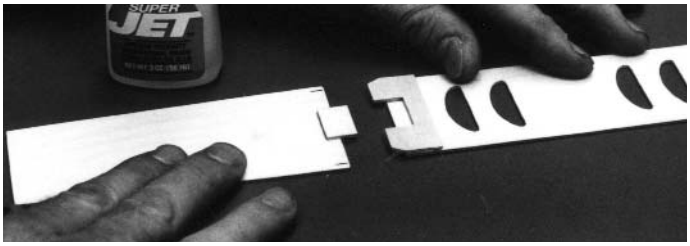
☐ When aligned, glue the tongue to the hatch.



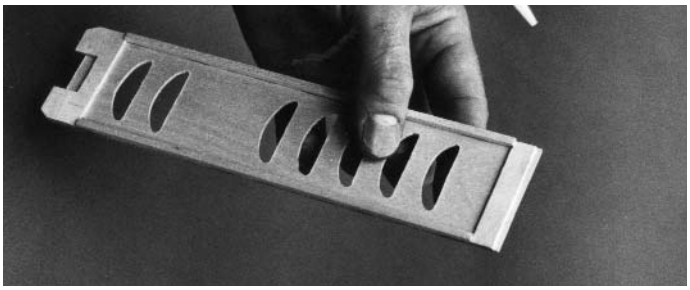
3. ☐ Butt the fuse front bottom sheet against the hatch and center it by aligning the die-marked lines with the hatch sides, as shown.



☐ Carefully glue the fuse tongue to the fuse bottom sheet. DO NOT GLUE TO HATCH PARTS! Allow to dry.

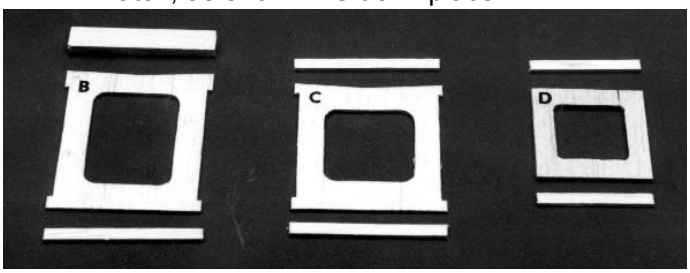


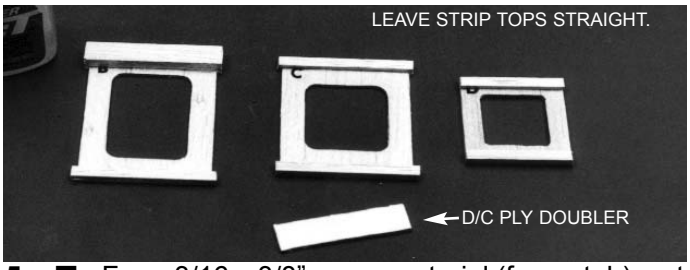
- ☐ When dry, gently slide the hatch away from the fuse bottom sheet.



4. ☐ Position 1/8” square x 7-3/8” bass rails behind the hatch tongue and flush with the hatch sides. Glue in place.

☐ Positiion the 1/16” ply doubler at the end of the hatch, as shown. Glue in place.

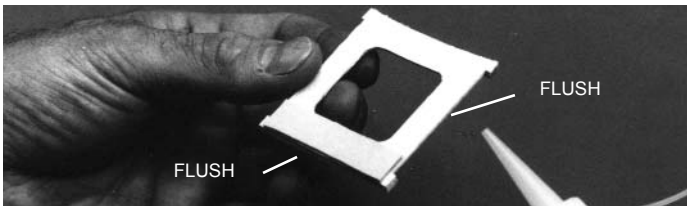




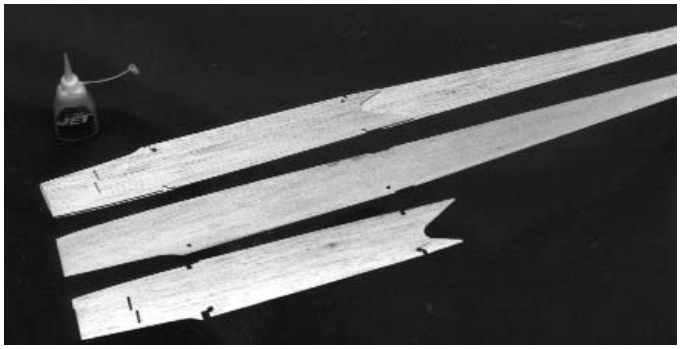
5. ☐ From 3/16 x 3/8” scrap material (from stab), cut and glue a strip to match the top of Former “B”.

☐ From 5/64 x 3/16” scrap (stab trussing material), cut and glue a strip to match the bottom of Former “B”.

☐ Using additional 5/64 x 3/16” material, cut and glue strips to match the tops and bottoms of Former “C” and Former “D”, as shown above.

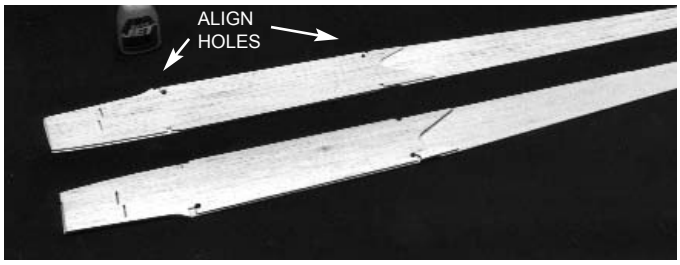


- ☐ Turn Former “C” over and glue the die-cut (D/C Sht. 4011) 1/16” ply doubler flush with the bottom edge.

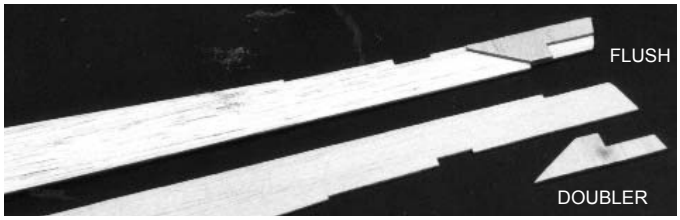


6. ☐ Lay out the fuselage, as shown, so that there is a left and a right side.

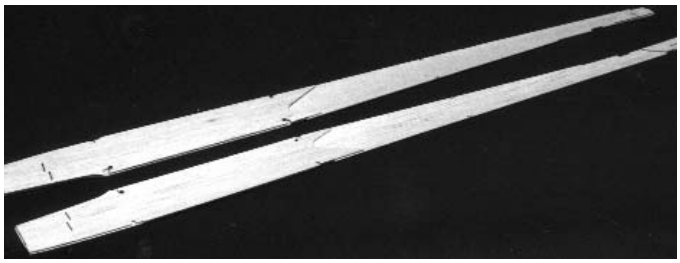
☐ Temporarily position the front and rear doublers on each fuse side to check for fit.



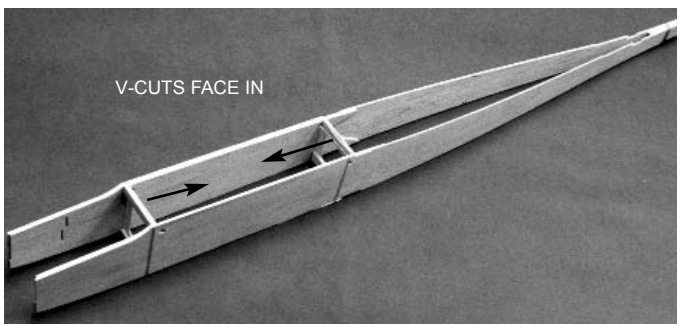
- ☐ Making sure all holes are aligned and edges are flush, glue the front doublers to the fuse sides.



- ☐ Next, glue the rear doublers in place.



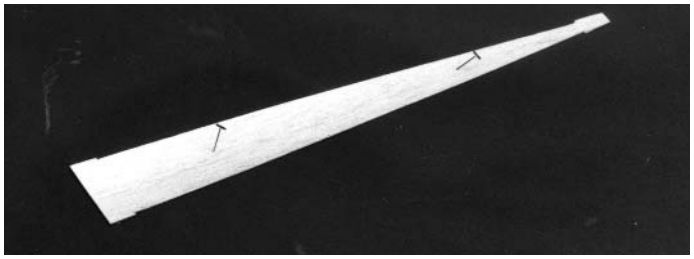
7. ☐ Place the doubled fuse sides over the side view on the plan and mark the location of Former “D.”



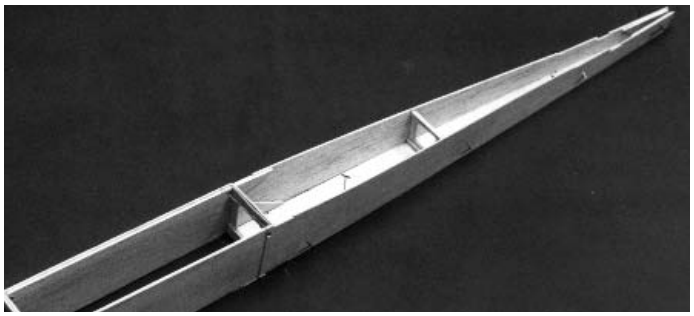
8. ☐ Using no glue, place the fuse sides together and loosely rubberband the two pieces together at the tail. Make sure “V” cuts are facing in.

- ☐ Spread the fuse front apart and, with the **doubler strips facing toward the front** of the model, plug Former “B” into the holes in the fuse sides.
- ☐ Now, with the doubler strips facing thr rear of the plane, insert Former “C”.

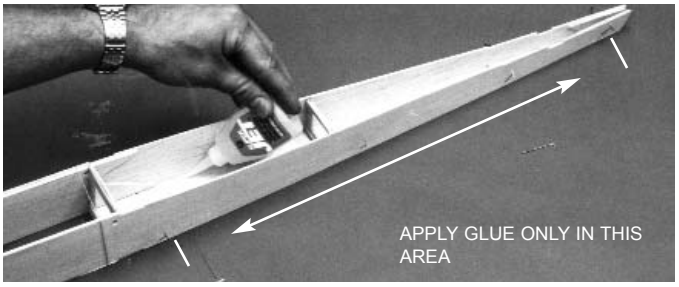
NOTE: The v-cut tops of the formers face in toward each other.



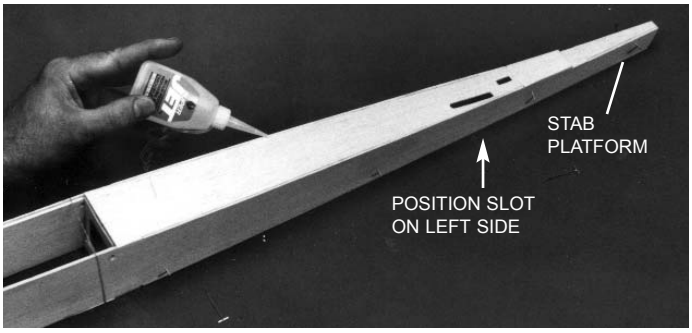
9. ☐ Working over the plan, pin the balsa bottom rear sheet in position.



- ☐ Spread the fuse sides slightly apart and position them over the rear bottom sheet, taking care to engage the notches in the fuse sides with the tabs in the bottom sheet. Remove the rubber band on the tail.
- ☐ Hold the sides in place on the bottom sheet by pinning from the outside. Apply pins only in the area 2” behind Former “C” to the rear of the the fuse.
- ☐ Remove the pins on the inside (holding down the fuse bottom).
- ☐ Insert Former “D” at locations previously marked on fuse sides.

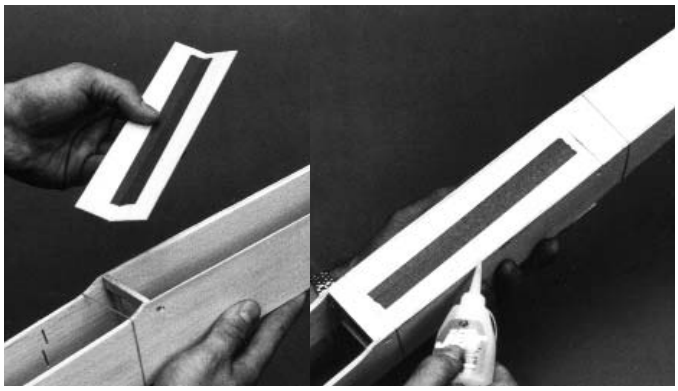


- ☐ Thoroughly glue all of the joints attaching Formers “B”, “C”, and “D” to the fuse bottom and to the fuse sides. Allow to dry.



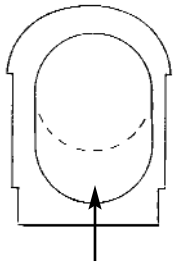
10. ☐ With the die-cut slot on the left side (as the pilot faces the front) of the model, and engaging the fuse notches with the sheeting taps, position the top sheeting on the fuse. Glue in place.

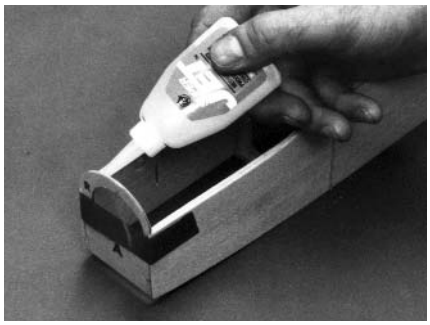
- ☐ Position the stab platform at the rear of the fuse, between the fuse sides. Glue in place.
- ☐ When the entire fuse assembly is completely dry, remove all pins.



11. ☐ Apply a piece of electrical tape along the die-cut centerline of the wing platform. Bend gently along the centerline, until the wing platform matches the dihedral angle on the top of Formers “B” and “C.”

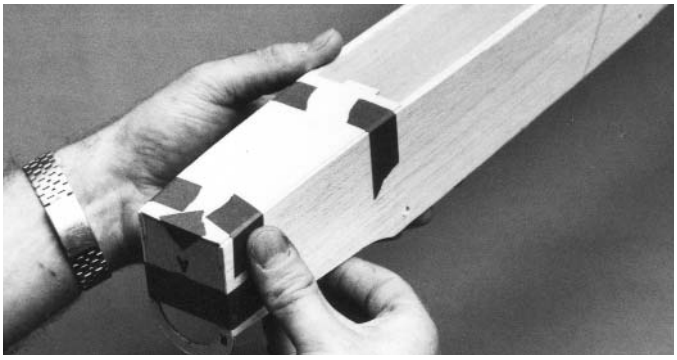
- ☐ Position the wing platform between the fuse sides and glue in place. Remove tape and apply glue to the center area.





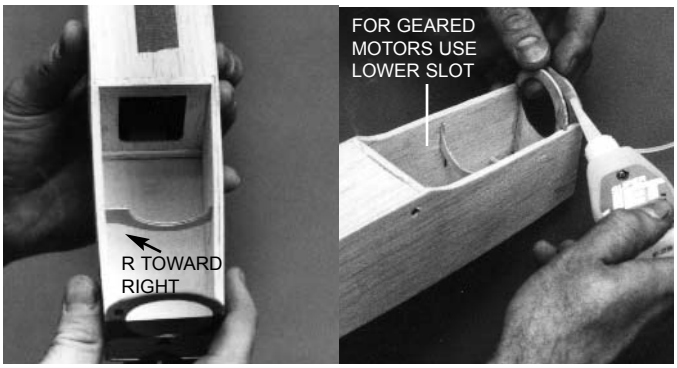
12. ☐ Take Former “A” and, ONLY IF USING A GEARED MOTOR, remove the lower portion of the cut-out. Refer to plan.

- ☐ Position the former with the side stamped “R” facing forward on the right side of the model, as shown.
- ☐ Glue Former “A” in place and allow to dry.



13. ☐ Turn the fuse over and position the 1/16” ply front bottom sheet on the fuse sides, behind Former “A.”

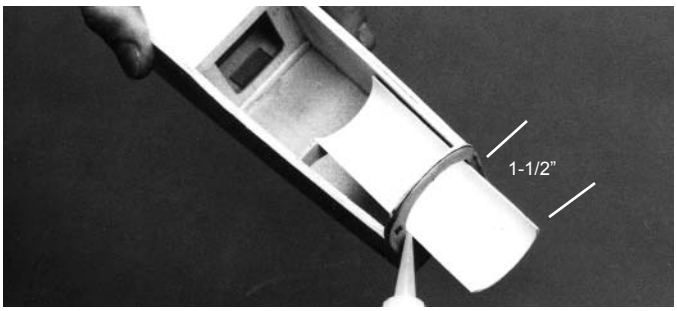
☐ Tape the sheet in position and then glue the joints. When dry, remove the tape and apply the glue to the taped areas.



14. ☐ Referring to the plan, spread the fuse sides slightly and insert the motor mount support into the notches. **IMPORTANT!** The side stamped “R” must be positioned on the right side of the model.

☐ Glue the motor mount support in place.

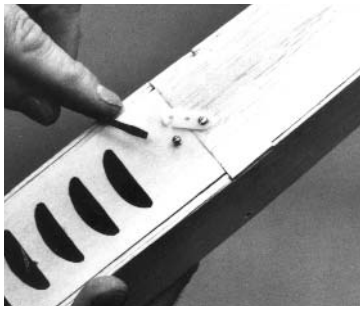
☐ Then, insert and glue the two Former “A” doublers in place behind Former “A.”



15. ☐ Position the plastic motor mount so that approximately 1-1/2” protrudes in from of Former “A.”

☐ Using either Super Jet™ or Jet Epoxy, glue to Former “A” and the rear motor mount. Allow to dry.

NOTE: The motor mount is offset to compensate for motor torque and to help the plane fly straight.

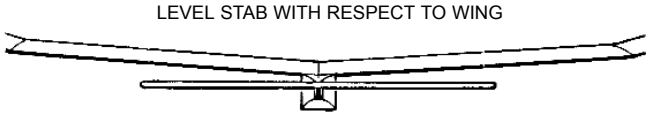


16. ☐ Place the battery hatch in the fuse bottom and position a nylon flat hold-down at the centerline of the fuse. The open-hole half of the fastener should rest on the battery hatch and the close-hole half on the fuse rear bottom sheet.

☐ Mark the fastener hole locations with a pencil.

☐ Using a 1/16” drill bit, first install the hold-down on the fuse bottom sheet with a #2 x 3/16” sheet metal screw.

☐ Install the #2x 3/16” shoulder screw with enough of the unthreaded shaft exposed to engage the fastener. Test for fit.



17. ☐ Temporarily install the wing dowels in the fuse.

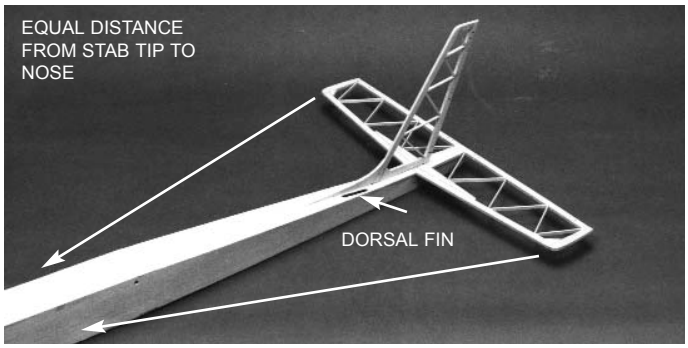
☐ Rubberband the wing onto the fuse, making sure it is centered and level.

☐ Trial fit the stab in place, determining whether or not it sits level with respect to the wing.

☐ If necessary, sand the stab platform to provide a good, level fit for the stab. **DO NOT ALTER THE DIE-CUT ANGLE OF THE FUSE SIDES!**

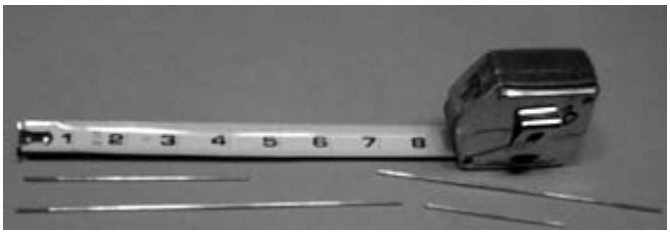
☐ Center the stab on the fuse. Measure from the stab leading edge to the front of the fuse to make sure the stab is exactly centered.

☐ When satisfied with the fit, pin in place.



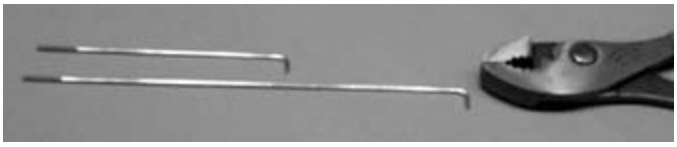
18. ☐ Glue the dorsal fin to the main fin. When dry, carefully trim off the die-cut bumps.

☐ Trial fit the fin assembly onto the stab. DO NOT GLUE. Sand as necessary to obtain a good fit.

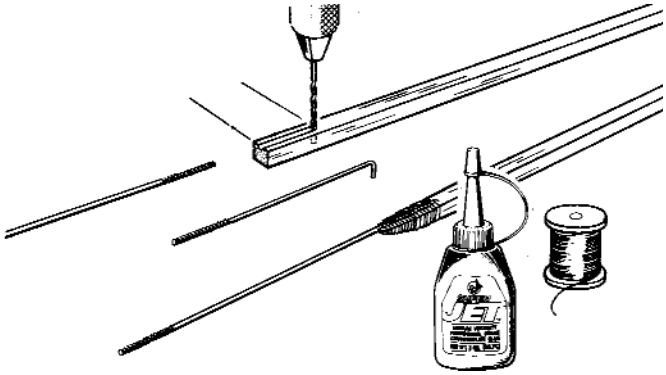


19. ☐ Take one of the two 10” threaded rods and mark 7-1/4” from the threaded end. Cut at the mark.

☐ Take the other threaded rod and cut to a length of 4-1/4”.



☐ On each of the rods, bend the cut down about 1/4”, as shown.



20. ☐ Using the threaded end of one of the rods, file a slight recess 1” long at one end of each 1/4” sq. x 17-7/8” balsa pushrod.

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

☐ Glue the threaded rods into the balsa pushrods, as shown.

☐ When the assembly is dry, taper (by sanding) and round the balsa ends of each pushrod where it meets the threaded rod.

☐ Bind the rod/balsa joint with strong thread, coat with Super Jet™, and allow to dry.

21. ☐ Referring to the full-size drawings on the plan. take the shorter (rudder) pushrod with the 7” wire attached and trim the balsa end so that the entire balsa piece measures 12”.

☐ Place the threaded wire over the fuse side drawing on the plan and bend the wire to match the plan.

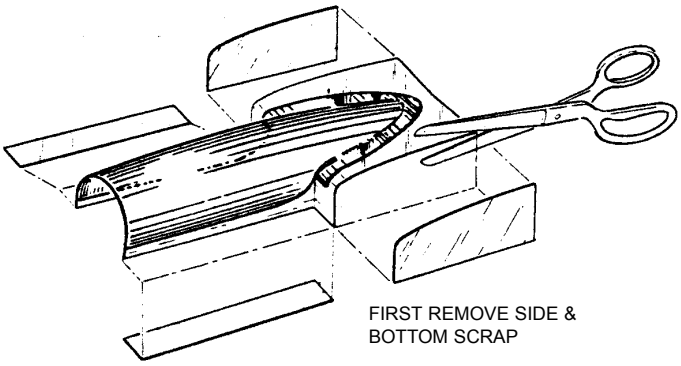
NOTE: Leave the balsa on the other pushrod at its original length, approximately 17-7/8”.

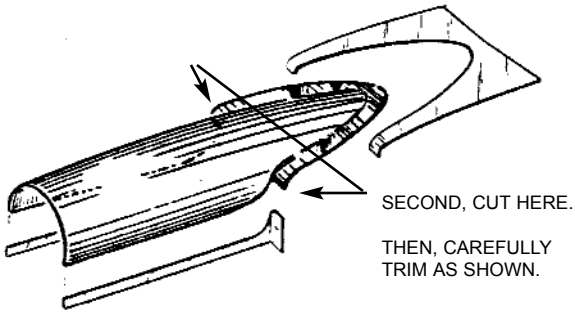
22. ☐ Take the 1/16 x 12” unthreaded wire rod and cut into two 4” pieces. Save the scrap wire for the radio installation.

☐ As was done with the threaded wires, bend down one end of each 4” wire.

☐ Again, make a recess in the wood and drill a hole at the end of the recess to accept the hooked end of the wire.

☐ Attach each wire to the other end of each balsa pushrod and secure, as before.





23. ☐ Remove the canopy from its vac-formed sheeting by carefully cutting along the trim lines, as shown above.

THIS COMPLETE THE CONSTRUCTION OF THE FUSELAGE. IT IS NOW TIME TO TAKE ALL OF THE MODEL COMPONENTS AND COVER THEM.

COVERING

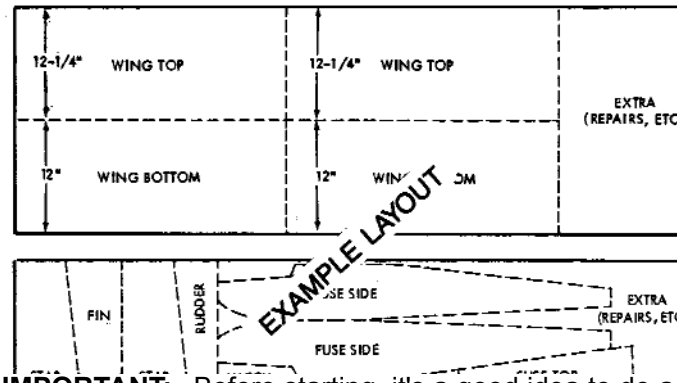
INTRODUCTION

There are several ways to cover the frame of a model airplane. Years ago, the open framework of most airplanes was covered with a combination of tissue (or silk) and dope; the solid structures were painted. Today, most models are covered with polyester films that resemble either a painted finish or a fabric finish. These films are easy to apply and actually increase the strength of the aircraft. The following instructions describe the general procedure for covering a model. However, it is important to carefully read the instructions that come with the film, as different products are applied in somewhat different ways.

PREPARATION

Any irregularities in the wood surface will show on the covering, so a good covering job MUST be preceded by careful sanding, filling of nicks and dents (we recommend *JET* Model Mate™ balsa filler), and then more sanding. For the final sanding, use fine sandpaper (240-320 grade) and a sanding block.

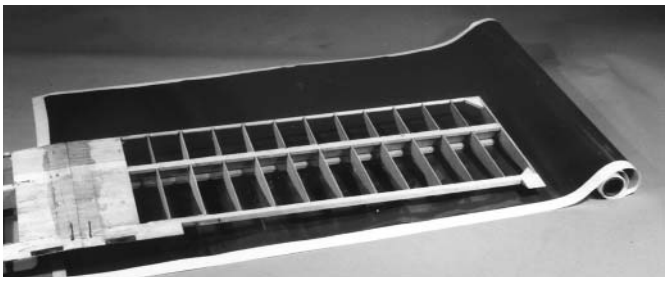
COVERING THE MODEL



IMPORTANT: Before starting, it's a good idea to do a lay out of the covering pieces you will need to cut from the covering rolls, so that you make efficient use of your material. You can draw patterns on UltraCote's paper backing. **BE SURE TO LEAVE EXTRA MATERIAL** (1½" to several inches) around all pieces, so you will have plenty of covering to go around the edges of each section.

Generally, one first covers the wing, then the tail, and finally the fuselage. Other small parts (such as the hatch) are covered separately.

Set the covering iron to the proper temperature. Test it by laying a small strip of covering over a scrap piece of balsa and firmly pressing with the iron. Make sure the iron is hot enough to activate the adhesive, but not so hot that it burns the covering.

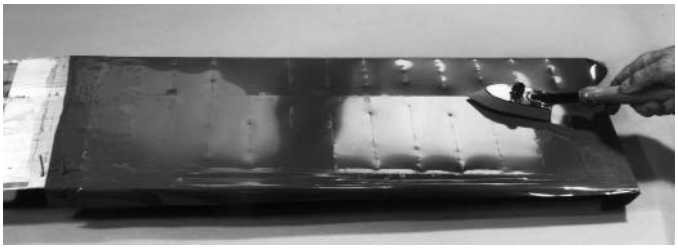


COVERING THE WING

Using a fresh model knife blade or razor blade, cut a piece of covering material at least 1" larger than one-half of the inboard wing bottom panel.

Remove the protective backing paper and lay the covering over the **bottom** of the wing, making sure there is enough excess material for wrap-around at the L.E., T.E., and wing tip.

HINT: Leave a minimum of 3" excess at the wing tip.



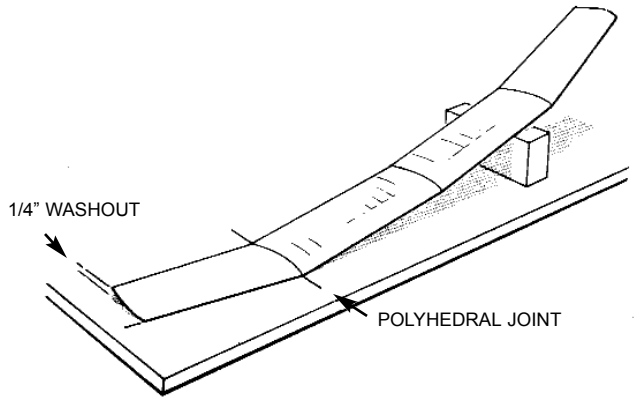
Work from the center out and tack to the ribs, sheeting, and other wood surfaces, using medium heat. Gently rub the covering with a soft cloth to help set it in place.

Press the covering around the edges, again rubbing with a cloth and making sure to apply enough pressure to work the adhesive into the wood.

For inside corners, follow the instruction that come with your covering, as different materials may require slightly different techniques.

Using your iron (or a special covering "heat gun,") set at relatively high heat, shrink the covering tight. Neatly trim off any surplus.

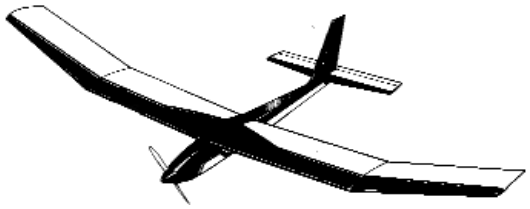
Following the same procedure, cover the remainder of the wing bottom and then cover the wing top. Be sure to overlap all seams at least ¼". Remember that there must be sufficient overlap to allow for the shrinkage when high heat is applied.



TRUING THE WING

IMPORTANT: After the wing has been covered, you must check to make sure it is free of warps. **This is a very critical step and should not be rushed or omitted.**

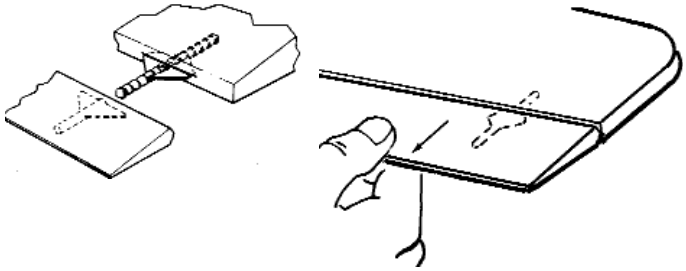
To detect warp,.set each section of the wing on a flat surface and make certain the panel sits flat. To counter any warp, twist panel slightly in the direction opposite to the warp and hold this position while gliding the iron over the covering to re-tension the structure. Repeat process until the panel is true. NOTE: The wing tip will rise up about 1/4 from the flat surface.



COVERING THE TAIL

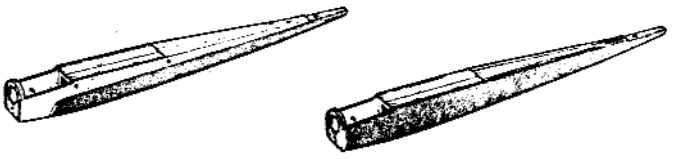
Cover all tail components (the stabilizer, the elevator, the fin, and the rudder), following the same procedure as with the wing. The component pieces should each be covered separately, before assembly. Then, the covering should be carefully removed from the areas to be glued, so that a strong WOOD-SURFACE-TO-WOOD-SURFACE adhesion is achieved.

IMPORTANT: Once the tail sections have been covered, and while the hinge locations are still fresh in your memory, IMMEDIATELY slit the covering to open up the hinge slots. (Refer to the plan for help in locating the hinge slots.)



After locating and opening the hinge slots, insert and glue a hinge into each of the stab slots. Let the glue wick into the slots and allow to dry. Then, attach the elevators by inserting the other half of each hinge into the elevator slots. Again, glue and allow to dry. Repeat this procedure to attach the rudder to the fin.

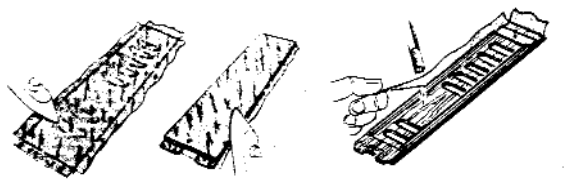
When the glue has dried, firmly pull at each hinge location to make sure the bond is secure. FAILURE TO FIRMLY INSTALL HINGES CAN LEAD TO LOSS OF CONTROLL AND A CRASH. Periodically check control surfaces to make sure the bond has not weakened.



COVERING THE FUSELAGE

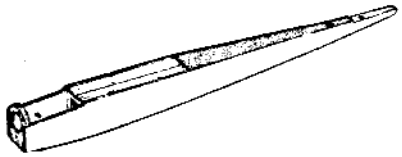
For added realism, the cabin interior may be painted now, before the pieces are covered. Use UltraPaint™ or even auto primer.

Cut pieces of covering for the fuse bottom, sides, and top. Again, make sure the pieces are large enough to allow for overlap.



Cover the hatch bottom, carefully sealing around the edges. Trim the covering even with the hatch bottom and remove the covering from the ventilation holes.

Apply covering to the solid bottom pieces, wrapping and sealing around the edges. If necessary, slit the corners for a smooth appearance.Apply covering to the sides next, and then to the top. Make sure to overlap seams at least ¼", so that when high heat is applied, the shrinking will not create a gap.

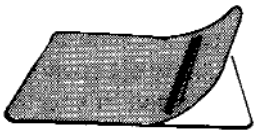


When covering the top of the fuse, do not cover the stap platform, as proper installation of the stab requires a wood-to-wood bond.

To minimize abrasion in landing, triple-cover the underside of the fuse from the nose to about 6" back.

Finally, it's a very good idea to permanently affix your name, address, phone number, AMA number and the word "REWARD" on your aircraft. Then, if your model should fly away for any reason, you'll have a chance of getiing it back.

APPLYING DECALS



Clean the model surfaces thoroughly before applying decals.

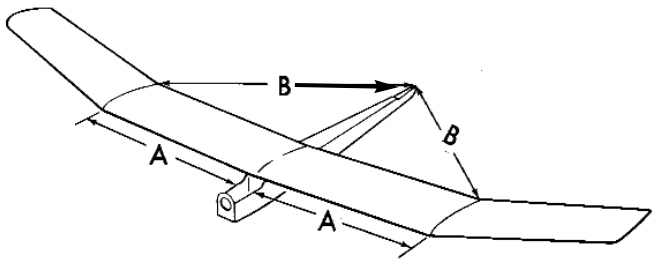
Cut the decal sheet into sections, as needed. Fold the decal in half, front to rear. Then open at the fold and lay the decal out flat. The protective backing will bubble away from the decal at the fold location.Using a scissors, cut the backing along the bubble, removing about a 1" wide strip of backing. Carefully position the decal on the model and, working from the center out, rub the decal down while peeling off the backing.

FINAL ASSEMBLY

1. ☐ Gather the various covered elements of the model, as well as the wing dowels and, if you choose, any materials for the landing wheel option.

2. ☐ Position the wing dowels so that they protrude equally out of both sides of the fuse. Glue in place and allow to dry.

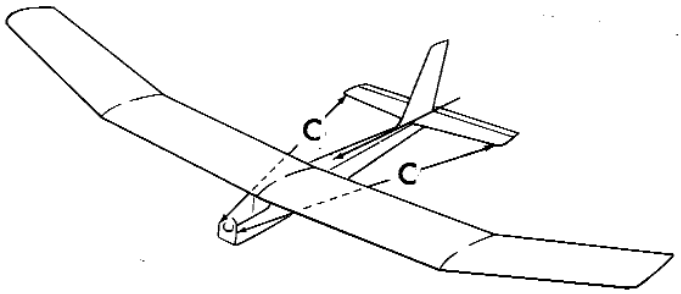
3. ☐ Using #64 rubber bands (at least 6 on each side of the fuse), mount the wing onto the fuse.



4. ☐ Measure carefully from the fuse sides to the polyhedral breaks ("A" arrows), making sure the wing is centered.

☐ Next, measure from the polyhedral joints to the back end of the fuse, making sure the wing is square with the fuse.

☐ Using a piece of striping tape or a marking pen, mark both the wing and the fuse with matching line-up points, so that you will know where to set the wing.



5. ☐ Using no glue, trial fit the stab in place, adjusting as necessary to line it up with the wing.

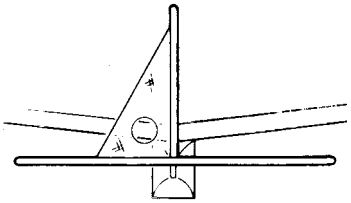
☐ Measure from the stab tips to the fuse front ("C" lines) to make sure the stab is square with the fuse.

☐ As was done with the wing, mark match-up lines on the fuse and stab. Draw a line from the stab L.E. marks to the stab T.E. marks.

6. ☐ **Taking care to avoid cutting the wood underneath**, strip away the covering in the area of the stab that contacts the fuse. Be certain to leave at least 1/8" to 3/16" of covering **firmly bonded** to the stab center.

   ☐ Again making sure not to cut the wood below, remove covering on the fuse top in the area where the stab will sit.

7. ☐ Using Slow Jet™ or JET 6 Epoxy™, firmly glue the stab in place on the fuse and allow to dry thoroughly.

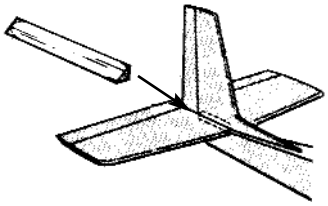


8. ☐ Trial fit the fin in place on the fuse/stab assembly.

   ☐ Use a 90º triangle to make sure the fin is perpendicular to the stab.

   ☐ Strip covering from the areas of contact on both the stab top and the fin bottom. Agaiin, be certain to leave about 1/8" of covering in the area of contact.

   ☐ When satisfied that the fin and stab are square, glue in place with JET 6 Epoxy™ or Slow Jet™.



9. ☐ From the 4" piece of tri-stock balsa, cut two 2" pieces.

   ☐ Round the ends by sanding lightly to improve fit.

   ☐ Position the tri-stock at the fin/stab joint and trace the outline. Remove the covering inside the trace line.

   ☐ Glue both pieces in place on either side of the fin.

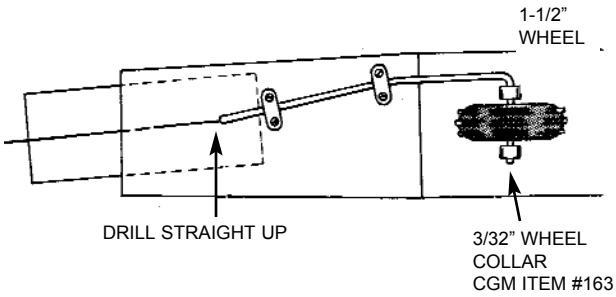
10. ☐ Remove the wing and cut away the covering over the hole on the left side of the fuse top. This slot is for the rudder pushrod exit.

    ☐ Glue a pushrod exit guide in the slot.

LANDING WHEEL OPTION

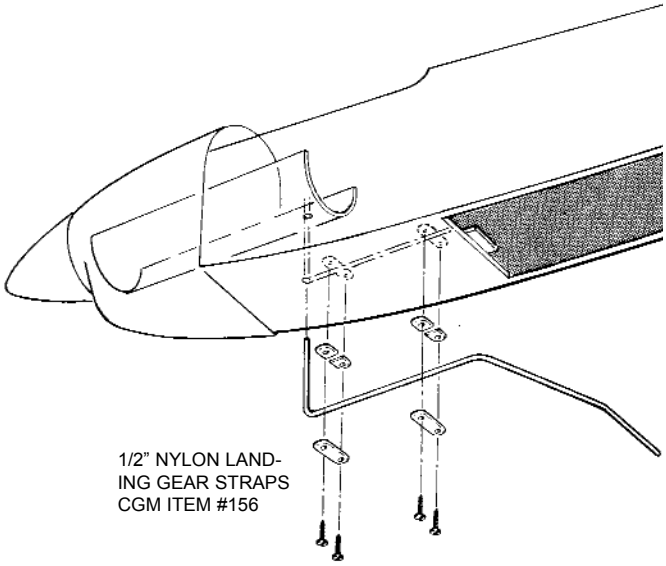
NOTE: The materials needed for the landing wheel option are NOT INCLUDED in your kit. Refer to the inside cover of this manual for materials needed.

Follow these steps ONLY if you want to install a landing wheel in your models. Otherwise, continue with information on your Turbo 550 motor.



1. ☐ Referring to the fuse side view on the plan for location, drill a 3/32" dia. hole straight up through the fuse bottom into the center of the plastic motor mount.

2. ☐ Using 3/32" wire, shape the landing gear by bending over the plan drawing.



3. ☐ Using two 1/2" landing gear straps to secure the wire, install the gear as shown.

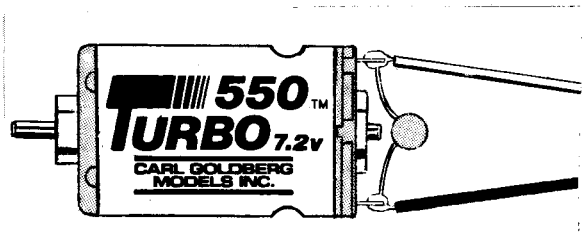
4. ☐ Install a 1-1/2" wheel, using 3/32" wheel collars.

MOTOR INSTALLATION

IMPORTANT!

PLEASE READ THIS SECTION BEFORE BEGINNING MOTOR & RADIO INSTALLATION.

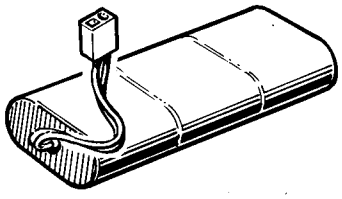
FAILURE TO FOLLOW THESE PRECAUTIONS CAN LEAD TO SERIOUS PERSONAL INJURY TO YOURSELF OR OTHERS, AND CAN RESULT IN PROPERTY DAMAGE.



SAFETY PRECAUTIONS:

WHEN OPERATING THE MOTOR:

- ALWAYS wear eye protection!
- KEEP AWAY from spectators!
- KEEP AWAY FROM CHILDREN. DO NOT allow children to operate without adult supervision.
- PROPELLER must be properly installed to prevent excessive RPMs.
- MOTOR BATTERY SHOULD BE DISCONNECTED except when ready to fly or when necessary for checking electrial operation and maintenance.
- OPERATE MOTOR ONLY WITH PROPELLER INSTALLED.



BATTERY HAZARD!

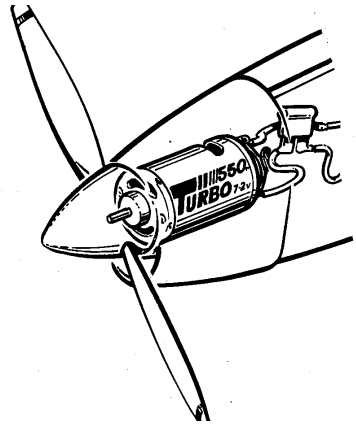
The battery size used to power the **Electra** motor stores a lot of electrical energy. Be careful to prevent shorting it out. A dead short can cause a powerful surge of electrical current which can ruin your battery and generate enough heat to start a fire. It can also cause burns to you and others.

The motor/battery system used to power the **Electra** is very powerful. To avoid injury, always disconnect and remove the motor battery when you are not flying the airplane.

PROPELLER HAZARD!

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, it also draws more battery power to overcome the added load. Therefore, the impact force and injury are increased. It is extremely important that you are aware of these dangers and take precautions to prevent accidentally switching on the motor. This is especially important while working on the model or when storing it. Always remove the battery when storing the model and make sure it is kept away from children and anyone else who is not familiar with its safe operation.

REMEMBER: ALWAYS DISCONNECT AND REMOVE BATTERY WHEN WORKING ON THE MODEL, TRANSPORTING, OR STORING IT. DO NOT LEAVE THE BATTERY CONNECTED EXCEPT WHEN FLYING!



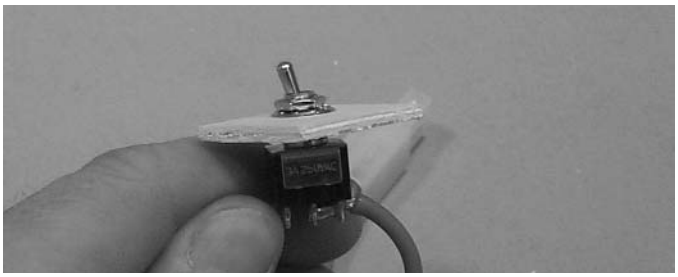
The Carl Goldberg TURBO 550 motor system is designed with a safety fuse to protect the system from excessive motor loads. During motor operation, if the propeller should hit an object, the sudden surge of battery current will blow the fuse and prevent motor/battery burn out or other damage. Use only a 15 or 20 AMPfuse to connect the fuse terminals. **DO NOT BYPASS THE FUSE** or directly connect the terminals together. If using another brand of motor, make sure it is equipped with a fuse. If it isn't, ask your hobby dealer how to install one. **DO NOT OPERATE YOUR ELECTRA MOTOR SYSTEM WITHOUT A FUSE!**

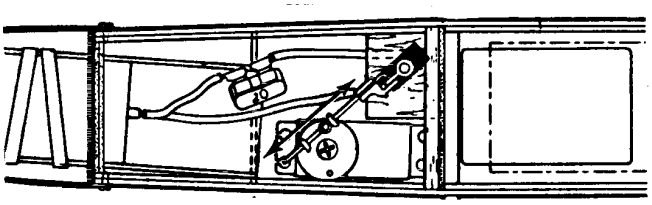
Operate motor ONLY with propeller securely installed. Without propeller, the motor may "over-rev" and be permanently damaged.

NOTE: When handling the motor and switch harness, try to avoid bending the wires near the soldered connections. If handled carelessly, these joints can be broken.

The following instructions are for installing the Turbo 550 motor. If using another motor, you may need to modify the installation according to the motor manufacturer's instructions.

IF USING A 2-CHANNEL INSTALLATION, PROCEED TO STEP 4 and return to the fuselage side view on the plan for switch location..





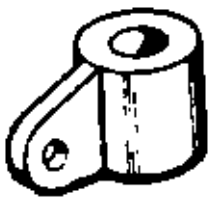
FUSE TOP VIEW

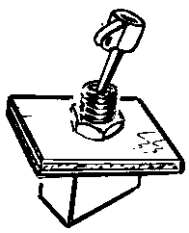
1. ☐ **For a 3-channel installation**, remove the lock washer and nut from the top of the switch and insert the ply mounting plate, as shown.

2. ☐ Locate switch mount just forward of former "B" and about 1/2" below the top edge of the fuse side. Refer to the top and side views on the plan.

NOTE: The motor switch body must be turned, so the switching action aligns with the pushrod from the motor servo.

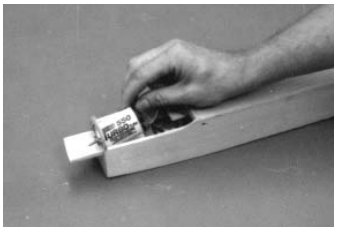
☐ When satisfied with the position, glue the switch mount to the fuse side and former "B".

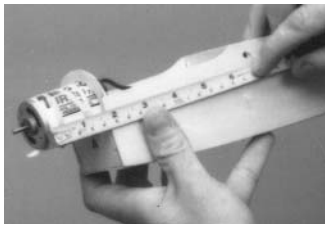




3. ☐ Using a 7/64" drill, enlarge the nylon bracket to fit snugly on the switch. You may need a modeling knife to make the hole slightly larger than 7/64".

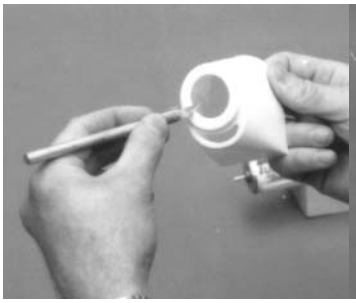
☐ With the bracket flange parllel to the switching action, glue the bracket to the switch.

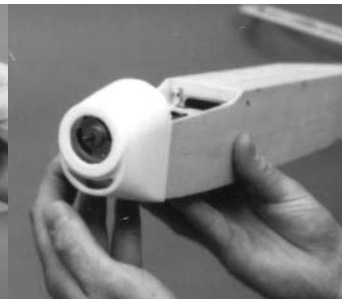




4. ☐ Insert the motor through from the rear of Former "A", so that the motor front protrudes about 1-3/4" out from the front of the fuse. Hold the motor in its mount, using rubber bands.

For 2-channel only, drill or cut a 1/4" dia. hole through the fuse side and mount the switch.





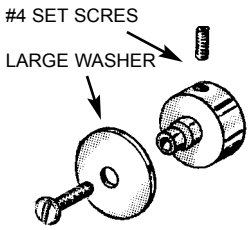
5. ☐ Using a scissors, carefully remove excess plastic from the base of the cowl.

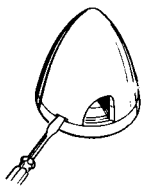
☐ Using a sharp hobby knife, rather than the scissors, cut motor and vent holes. Do not try to "force" the knife, since it could slip and damage either the part or you. Instead, make a series of light cuts, each a little deeper than the last.

6. ☐ Referring to the fuse side view on the plan for the location of the screws, mark the location of the screws and drill four 1/16" holes through the cowl.

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

☐ When satisfied with the fit, screw the cowl in place.



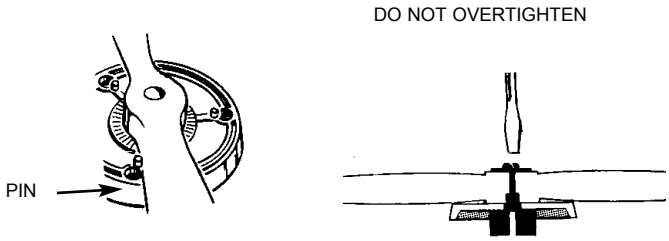


6. ☐ Thread a #4 socket set screw in the prop mount and turn a few times.

☐ Open the spinner supplied by carefully inserting a small screwdriver straight into each of the slots. **DO NOT TWIST! JUST PRY OPEN.**

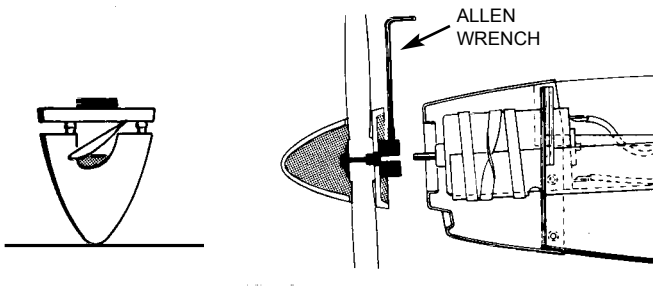
NOTE: Carefully read the instructions included with your spinner. Rehydrating of the plastic will make it easier to open and close the spinner .

☐ When the spinner backplate has been removed, place it on the propeller mount.



7. ☐ Place the propeller on top of the backplate so that it lines up with the pin, as shown above.

☐ Place a large washer on top of the prop and then install, using a #4 x 1/2” machine screw. CAUTION: DO NOT OVER-TIGHTEN, as this may cause the threads to strip out.



8. ☐ Align the spinner cone with the prop/backplate and press pins firmly into the holes. One way to do this is to have the cone pointing downward on a table and press until all pins are seated.

☐ Install the prop/spinner assembly on the motor shaft and securely tighten the set screw with a .050 Allen wrench.

9. ☐ Align the cowl behind the spinner/backplate assembly, allowing about 1/8” clearance.

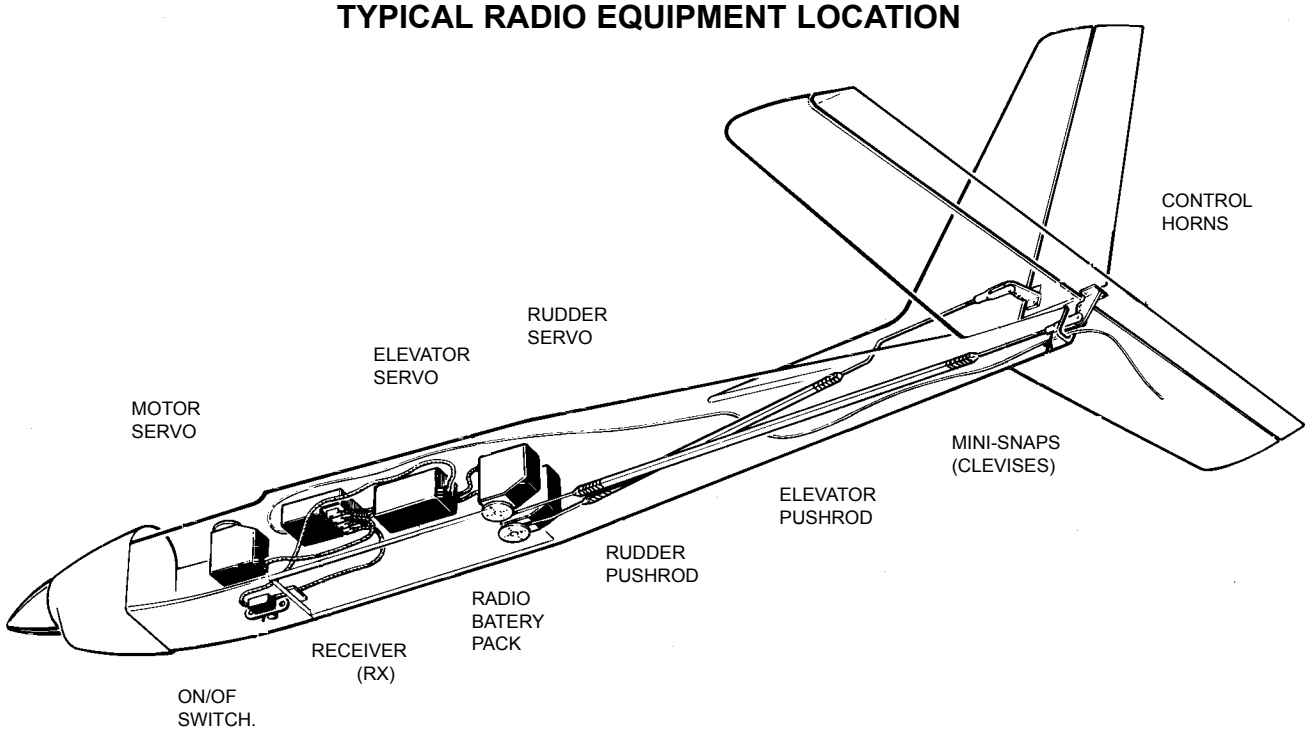
☐ Holding the cowl in this position, install #2 x 3/8” sheet metal screws at the cowl mounting holes.

☐ When finished, remove screws and apply a few drops of Super Jet™ to “harden” the threaded wood holes. Open the holes with a pin before the glue dries.

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

RADIO INSTALLATION

TYPICAL RADIO EQUIPMENT LOCATION

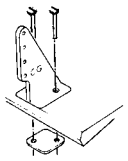


IMPORTANT! Installation of the Turbo 550 motor and a typical radio system is described in this booklet. Depending on the equipment you are using, you may not be able to follow exactly these instructions. Follow the installation instructions included with your equipment or seek help from your local hobby dealer.

Before beginning, make sure that each of the following items have been completed:

1. Model is fully covered and painted, if required.
2. All control surfaces are hinged in place.
3. The tail assembly is glued solidly to the fuse.
4. The stab and rudder pushrods are complete.

CONTROL HORN INSTALLATION



1. ☐ Refer to the fuse side view on the plan to determine the location of the rudder control horn.

☐ Tack-glue the control horn on the correct side of the rudder.

☐ Drill through the holes in the control horn and then mount the nut plate on the other side of the rudder, using 2-56 x 1/2” machine screws. Trim the screws flush with the nut plate.

2. ☐ Again referriing to the plan, and following the same general procedures, determine the location for the elevator control horn and mount it in place.

PUSHROD INSTALLATION

1. ☐ Take a 2-foot piece of string and tape it to the 17” elevator pushrod at both ends. This string will be used later to help thread the antenna through the fuse.

2. ☐ Starting in the radio compartment, insert the threaded-rod end of the pushrod through the fuselage to the rear opening. Allow approximately 2” of wire to stick out.

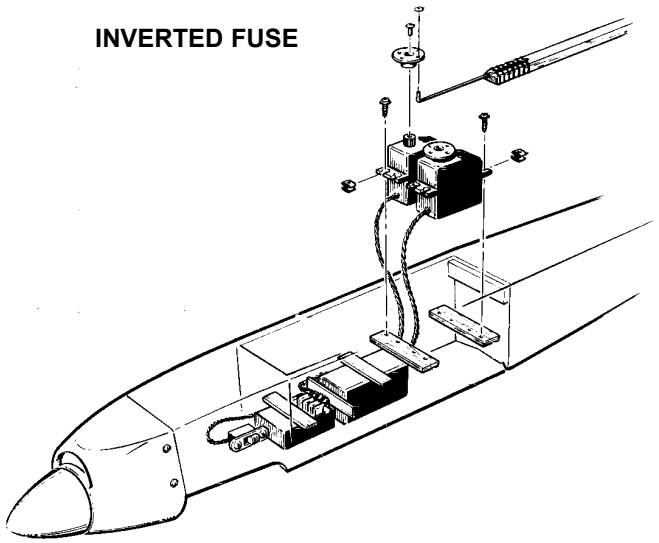
3. ☐ Holding the pushrod wire with a pliers, twist a mini-snap onto the threaded rod, so that the rod can be seen in the center of the snap link.

4. ☐ Connect the mini-snap to the elevator control horn.

5. ☐ Install the rudder pushrod in the same manner.

6. ☐ Tape the front ends of the rudder and elevator pushrods near the battery hatch opening, so that they will be out of the way.

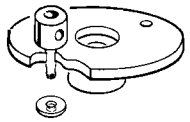
ELEVATOR AND RUDDER SERVO INSTALLATION



1. ☐ Insert the soft rubber grommets into the mounting holes of your servos.
2. ☐ Measure from the bottom of your servo to the underside of a grommet. Add about 1/8" to this measurement to get the total distance between the wing platform and the servo rail.
   ☐ Referring to the plan, glue the rear rail against Former "C", at the predetermined height.
   ☐ Place a servo on the rear rail and determine the location of the front rail. Be sure to allow enough clearance to allow easy insertion and removal of both servos.
   ☐ Glue the front servo rail in place.
3. ☐ Place both the rudder servo and the elevator servo in position on the servo rails. The elevator servo goes on the right (as viewed from the pilot's seat) and the rudder servo goes on the left. There should be approximately 1/4" between them.
   ☐ Mark through the grommets for the location of the servo mounting screws. Remove the servos.
   ☐ Using a 1/16" drill bit, drill holes through the rails for the screws.
4. ☐ Referring to the plan, and using #2 x 3/8" sheet metal screws, install the rudder servo on the left and the elevator servo on the right.
   ☐ Untape the pushrod wires and attach each of them to the corresponding servo, as shown.

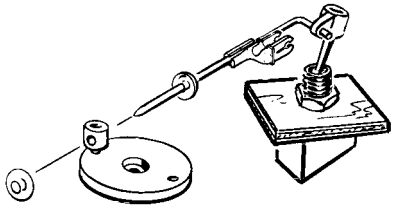
MOTOR SERVO INSTALLATION (3-CHANNEL)

1. ☐ Referring to the plan for proper location, insert the motor servo onto the fuse side with servo mounting tape.



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

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



4. ☐ Position a CGM snap nut about 1" onto the straight end of the wire.
   ☐ Insert the wire through the pushrod connector and add a second snap nut. (Trim the snap nuts if they rub against the servo wheel.)
5. ☐ Attach the bent end of the wire to the motor switch bracket and secure by sliding the Snap R Keeper clips over the bend.
   ☐ Move the pushrod back and forth to simulate servo action. Feel the OFF and ON switch limits. Later, when setting controls, be sure to adjust the snap nuts within the range of switch movement.

RADIO SWITCH AND CHARGING JACK INSTALLATION

1. ☐ Position the radio switch (and optional charging jack) cover plates on the outside of the fuse.

NOTE: In a 3-channel system installation, position these plates on the side opposite the motor servo.

☐ Insert a pencil through the holes in the cover plates, to mark the location of all holes and openings.

2. ☐ Cut the necessary holes in the fuse side, making sure the opening for the switch button is long enough to allow the button to move to the ON and OFF positions.

3. ☐ Referring to your radio equipment instructions, install the switch and the charging jack in the side of the fuse. Since the Electra is frequently hand-launched, we prefer to install the switch with the ON position toward the rear of the model.

☐ Later, when the radio is operational, identify the ON and OFF positions with the decals provided.

BATTERY PACK INSTALLATION

1. ☐ You must have fully charged nicads for flying.

2. ☐ Wrap the battery in 1/2" very soft foam rubber to cushion it from vibration and shock. Use rubber bands or tape to hold the foam around the battery.

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

RECEIVER (Rx) INSTALLATION

NOTE: Do not cut, shorten or store inside the fuselage the antenna wire attached to the receiver. This will greatly reduce the range of the radio.

1. ☐ Connect all servo wires to the receiver, so that the radio system is operational. Be sure that each servo is plugged into its respective Rx terminal.

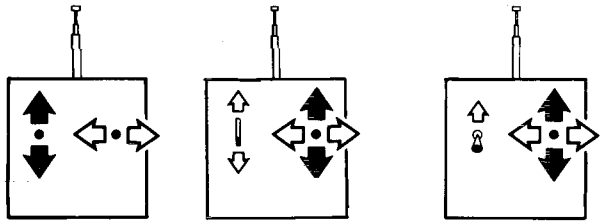
2. ☐ Wrap the Rx in foam, as was done for the battery. Again, keep the Rx firmly in position with scrap plywood.

3. ☐ Temporarily tape the antenna wire to the string that was previously threaded through the fuselage. Then, use the string to gently pull the antenna out the rear opening of the fuse.

4. ☐ Gather together all excess lengths of servo wires and tape down.

5. ☐ Apply ON/OFF decals to the outside of the fuse at the switch location.

SERVO MOVEMENTS



2-CHANNEL	3-CHANNEL	4-CHANNEL (OR MORE)
2 STICKS CONTROL 2 SERVOS	1 STICK AND 1 SLIDING TAB OR BUTTON CONTROL 3 SERVOS	2 STICKS WHICH MAY BE USED TO CONTROL 3 OR MORE SERVOS

1. ☐ First read and follow the instructions that came with your radio. The above sketches illustrate the basic configuration of most transmitters.

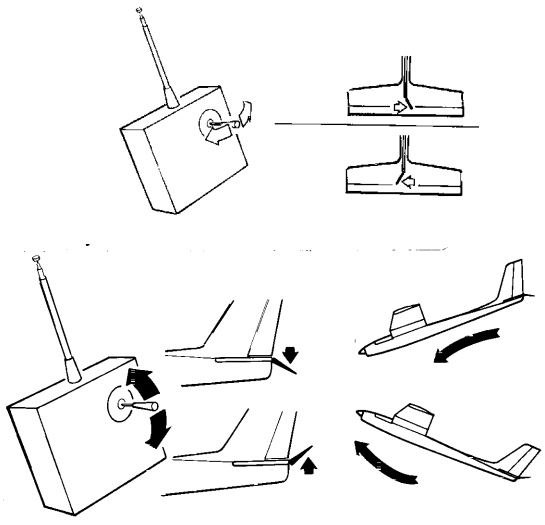
☐ Move the transmitter controls and observe which servo wheels move when the stick is moved for various controls.

2. ☐ Apply tape (which can be written upon) to each servo and identify each for its control function: "R" for rudder, "E" for elevator, etc. Mark the plug for each servo the same way. If your Rx does not have separate plugs for each servo, but instead has places for the servos to plug in, apply the tape mark nearby.

NOTE: As mentioned earlier in this book, radios with the "servo reversing" feature greatly simplifies radio installation because they allow the pushrods to be hooked up to either side of the servo's output wheel. Then, after checking the control response, a servo responding in the wrong direction is easily switched to correct the action (see radio manufacturer's instructions for me detail).

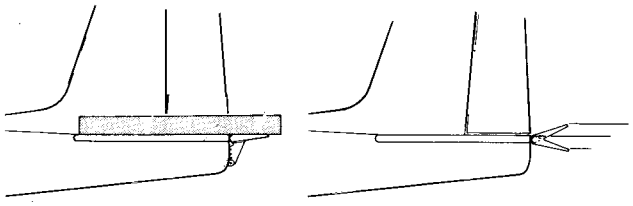
3. ☐ Push the transmitter motor lever up away from you and observe where the motor servo wheel should connect to the motor pushrod to move the motor switch to the ON position. Mark this on the servo wheel and then return the motor lever to the full down (OFF) position.

Study the diagrams below to gain an understanding of the various Tx functions and the effects they have on the aircraft.



SETTING CONTROL SURFACES

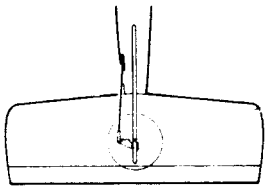
All pushrods must move freely, without binding. Adjust them, if necessary, for smooth operation. When setting the travel (movement of rudder or elevator), make certain that no servo is hooked to a pushrod in a manner that prevents the servo wheel from moving through its full range of motion. For example, if the servo motor "buzzes," when moved to the ON position, the servo still has movement, but it is jammed against the limit position. This can damage the servo and drain the battery, leading to loss of control and a crash.

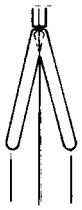


1. ☐ With the elevator trim tab on the Tx set in the center, or neutral, position, screw the mini-snap on the elevator pushrod until the top of the elevator is level with the top of the stab, as shown above.

☐ Move the elevator stick on the Tx full up. This should cause the elevator to move down about 5/16".

☐ Now move the elevator Tx stick full down. This should cause the elevator to move up about 5/16". If adjustment is needed move the snap link toward the bottom of the control horn for more "throw."





2. ☐ With the rudder trim tab in the center position, adjust the mini-snap on the rudder pushrod until the rudder aligns perfectly with the fin.

☐ Move the rudder stick full right. The rudder should move about 1" to the right.

☐ Move the rudder stick full left. The rudder should move about 1" to the left.

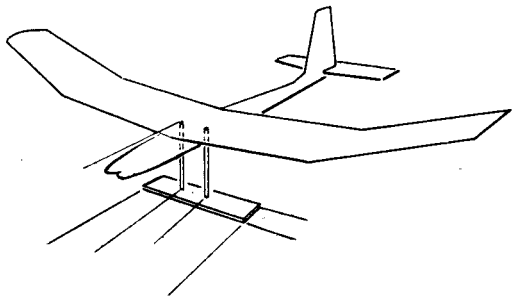
THIS COMPLETES THE INSTALLATION OF THE RADIO SYSTEM.

BALANCING THE MODEL

IMPORTANT: NEVER NEGLECT THIS STEP WITH ANY AIRPLANE. If you try to fly a plane with the balance point outside of the recommended range, you run the risk of having an unstable aircraft and the strong likelihood of a crash. **TAKE THE TIME TO PROPERLY BALANCE YOUR MODEL!**

1. ☐ Referring to the fuse plan, side view, carefully measure and mark the center of gravity (CG) randge on the fuse sides.

☐ Next, mark the desired CG on the underside of the wing.



2. ☐ Place the fully assembled aircraft, with all equipment installed, on a model balancing stand, as shown above. You can make this simple set-up with a couple of ¼" dowels with rounded tops, spaced just far enough apart to clear the fuselage.. Alternatively, lift the model under the wing near the fuse by your finger tips. (You may wish to get help from a friend if using the latter method.

3. ☐ Move the position of the plane on the balance stand until the model is level.

4. ☐ If the plane cannot be balanced with the stand supports inside the marked CG range, remove the wing and move some of the R/C equipment away from the heavy end of the model.

☐ Replace the complete model on the stand to see if the model is now balanced in the correct CG range.

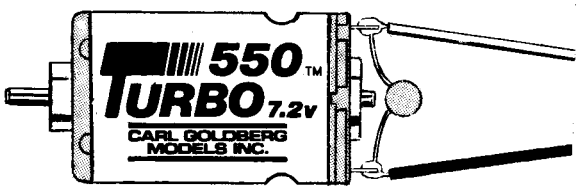
5. ☐ If shifting the R/C gear still doesn't balance the model, add weight (available from your local hobby dealer) to the far end of the nose or tail, until the plane is properly balanced. The least weight is needed when added as far forward or back as possible. Fasten the weight permanently in place.

DO NOT attempt to fly the model with the CG <u>EVEN SLIGHTLY OUTSIDE</u> of the recommended position.

MOTOR & BATTERY MAINTENANCE & CHARGING

IMPORTANT! THIS SECTION CONTAINS MATERIAL ESSENTIAL TO YOUR SAFETY AND THE MAXIMUM PERFORMANCE OF YOUR ELECTRA!

Please take the time to read this section very carefully. If you don't understand, read again or get help from an experienced electric pilot.



The Turbo 550 is a special motor designed for electric plane use on 6-cell 1200 MAH nicad battery packs. This battery is commonly used with 1/10 scale "off road" electric cars and is therefore readily available. 7-cell batteries also may be used and give a better climb rate, but this will produce a shorter engine run and the motor will run hotter. See figure A below.

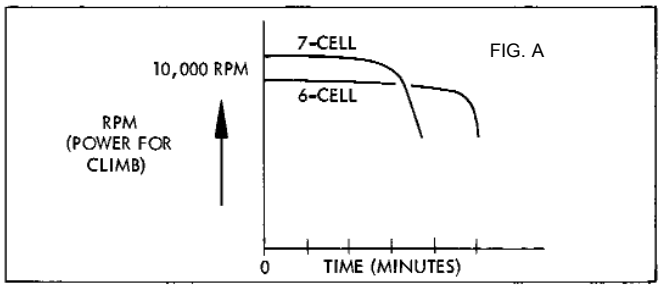


FIG. A

MOTOR

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

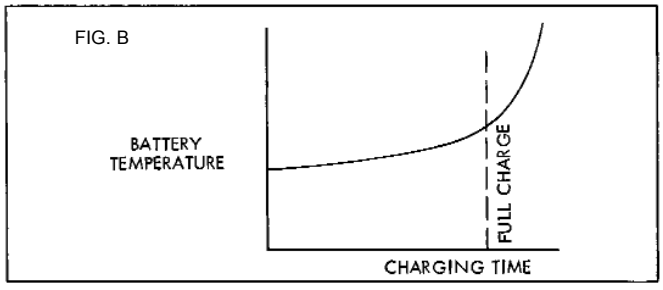


FIG. B

BATTERY

This section is particularly important! One way to think of a battery charging is to imagine the battery as a bucket and electricity as water. What you are trying to do is to fill up the bucket (battery), but not overfill it. At the very quick charge rate that is common with today's field chargers, there is little room for error. When you over-charge a battery, the temperature rises quickly and there is **potential for EXPLOSION**, or at least battery damage (Figure B). There are numerous ways to prevent this. ***How*** you charge depends on the ***type*** of charger you use.

IMPORTANT! ALWAYS ALLOW THE BATTERY TO COOL BEFORE CHARGING.

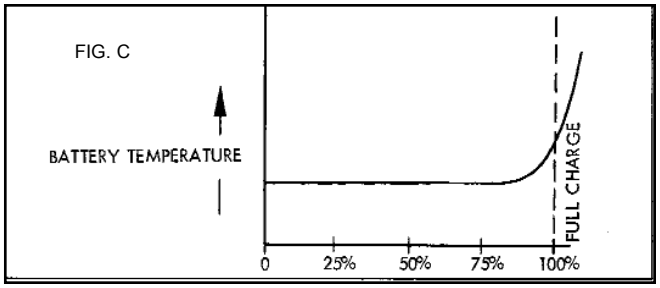


FIG. C

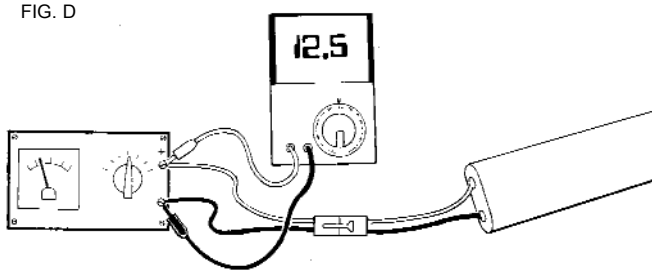
TYPES OF CHARGERS

Basic Charger with a Timer. To prevent an overcharge, you must know how full the battery is. A new or nearly empty battery should receive a full charge, per the instructions that come with the battery. This is usually about 15-minute charge (at 4.5 AMPS, if you have an ammeter.)

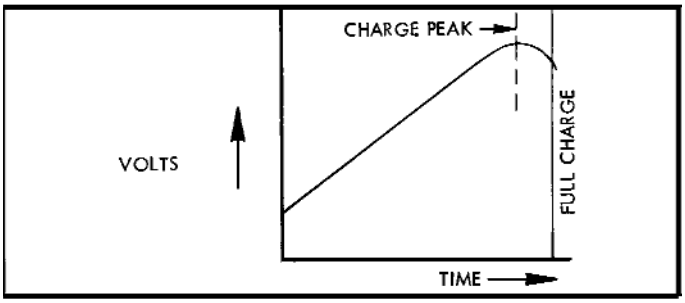
During the last 5 minutes, lightly and carefully touch the battery several times (ever minute or so). If it is slightly warm, that is OK. If it is hot to the touch, that signals that it is overcharged. STOP CHARGING IMMEDIATELY! Allow the battery to cool to room temperature (usually 15-20 minutes) before using.

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 1-2 minutes. When the temperature starts to rise, the battery is fully charged. Stop immediately (Figure C).

FIG. D



If you have a digital volt meter, it can be very useful in detecting when the battery reaches a 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 batter performance. (Figure D.)



Automatic Chargers. DELTA or PEAK DETECTION CHARGERS are excellent methods of charging a battery, as one simply connects the charger, pushes the start button, and waits. Within approximately 15-30 minutes, the battery may be disconnected and used. It is still a good idea to monitor the battery temperature (by lightly touching) every minute or so after 10 minutes of charging. If you suspect the battery is overcharging, STOP IMMEDIATELY!

TEMPERATURE SENSITIVE (THERMAL)CHARGERS also work well, although they are more expensive the other charges described. The thermal charger charges a battery pack in approximately 15-20 and it doesn't matter how full the pack is charging begins. This charger "senses" when the bateery temperature signals a full charge and automatically stops charging. However, the battery must be absolutely cool when charging begins, or the charger will cut off prematurely.

Follow the manufacturer's instructions carefully when using any type of charger.

BATTERY EQUALIZATION

Any battery that hasn't been used for a week or more should be equalized for best performance. This is done by charging the battery for 10-20 minutes at the indicated rate and then giving the battery a trickle charge for three to four hours. Refer to the charger instructions for the recommended trickle charge technique. Equalizing the battery will asssure top performance every time.

HOW MANY BATTERIES ARE NEEDED?

To get in the most flying at 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 the charger, and the third pack can be in the plane and ready to fly. With only one battery pack, there may be up to a 40-minute wait between flights.

"TREAT YOUR RADIO RIGHT AND IT WILL DO THE SAME FOR YOU!" by Hal deBolt

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. Always follow the rules of proper usage and all manufacturer's instructions for your particular piece of equipment.

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 (such as on the floor of a car) without cushioning.

RECEIVERS: Receivers must be vibration free. When installing in the aircraft, wrap them in a minimum of ¼" soft foam rubber (not plastic foam). Keep well clear of all cables and batteries. Tune annually (or as recommended by the manufacturer), as indicated below under "Check-Ups."

SERVOS: Servos are vibration prone. Be sure to mount them with grommet shock mounts in servo trays which are also shock mounted. Also be sure to keep them clean. If the neutral position "drifts," this is a sign of change which should not be ignored; find out WHY before flying again.

BATTERIES: Nicads also can suffer from vibration, so they too should be wrapped in soft foam rubber before installing. Check their condition periodically by measuring the voltage with a volt meter or battery tester. Charge the batteries before EVERY flying session. When not used for a period of time (such as during the winter months) the batteries should be charged every 30 days. Never store batteries in a discharged condition.

PUSHRODS: Obviously, pushrods should be installed to operate 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. In addition, it is important the pushrods do not flex or vibrate. Any vibration is transferred directly to the servo, and its gear, motor, and pot. To avoid flexing and vibration, use guides and fairleads on the rods.

CONNECTORS: In using connectors, never pull on the wires to disconnect; grasp the plugs instead. Clean them by dunking in a solvent, such as dope thinner. Tape the connectors together when installing and make sure there is no strain on the cables.

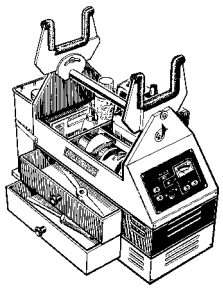
CHECK-UPS: A full check-up by the factory or an authorized service center should be done AT LEAST ONCE A YEAR, as well as any time something unusual occurs during usage. A malfunction or "glitch" is the first sign of an impending failure; it should not be ignored. The checkup should include tuning and alignment of the system, as well as battery testing.

FLYING THE ELECTRA

LEARNING TO FLY

Flying R/C is both fun and challenging. As with other portions of this book, the following section is meant to introduce you to the basics. Read carefully before taking your model out to the field and attempting first flights. And remember, becoming an R/C pilot takes time and patience, but the rewards are well worth the effort.

CGM SUPERTOTE



Equipment Checklist

- ❑ Flight batteries, fully charged
- ❑ Extra battery packs
- ❑ Radio transmitter
- ❑ Battery charger
- ❑ Tools for tightening any parts that can vibrate and loosen
- ❑ Extra #64 rubber bands
- ❑ Extra props and an extra spinner
- ❑ Prop wrench
- ❑ Bottle of **Super Jet™**

CHECK YOUR EQUIPMENT

Prior to going to the flying field, with radio batteries fully charged, turn on both receiver (Rx) and transmitter (Tx) and actuate all controls many times until you are satisfied with all functions.

Before beginning 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"-8", you should have an at least 100 foot range on the ground. To check this, turn on both the transmitter and the receiver switches, set the model heading away from you, and walk away while transmitting signals to move the control surfaces. 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. Again, **be careful to not use your transmitter when anyone else at the field is flying or testing on the same frequency!**

After the range check, stand behind the model and make sure the control responses are correct. Moving the control stick to the right should give right rudder (on a 3-channel set-up) . Moving the stick back or down on the Tx should move the elevator up, and vice versa.

Finally, make sure that everything on your aircraft is neatly and firmly in place-motor fastened down, servos snugged down, receiver and battery wrapped in foam rubber, etc. Prop and spinner must be tight. The receiver antenna must be extended, not coiled up inside the model. Nothing should be loose, or unfinished, or unchecked.

With everything ready, the motor should be started for a short time. While the motor is running, make sure the control surfaces do not jitter or move until you command them and that the motor switch also responds properly to your command.

With transmitter and receiver switched on, hand launch the model directly into the wind. Gently correct the flight path as necessary. If any adjustments are needed to maintain straight and level flight, get experienced help to move the clevises.

In flight control. most of the beginner's trouble comes from over-controlling or holding a signal too long. It is better to operate your transmitter slowly and smoothly.

A troublesome tendency is letting the model get downwind. New flyers should try to keep the model upwind at all times prior to the landing approach.

If you are a novice, seek the help of an experienced flyer. Do not hesitate to ask one of the better flyers at the field for help. Usually, they are glad to spend a little time to get somebody started right, and they very likely were helped in the same manner themselves.

WHERE TO FLY

Fly only in areas sanctioned for R/C and known to be free of radio interference. Ask your hobby dealer or other modelers if there is an R/C flying field that is used by a local R/C club. This is the ideal place to fly. If you don't know of an R/C club nearby, contact the Academy of Model Aeronautics (AMA), at the address on the front of this booklet, for information on a club in your area. Remember: R/C flying fields need to have rules to help prevent accidents, so ask about them before you turn on any of your equipment! **DO NOT TEST your transmitter in the parking lot or anywhere nearby until you are sure no one else is using your radio frequency. This could cause another flyer to crash and make you very unpopular!**

If there is no club or other R/C flying site available, locate a square area (preferably a grassy field), at least **four or five football fields long**, which is free of power lines, trees, poles, houses, busy streets and other obstructions. It must be at least three miles away from any areas where other R/C models, such as boats or cars, are operated. It should also have a relatively smooth surface, as it will take practice to learn precision landings. If you find a suitable location, turn your receiver on for 2 or 3 minutes to check that no one in the vicinity is operating an R/C device which could affect your receiver and cause your plane to crash.

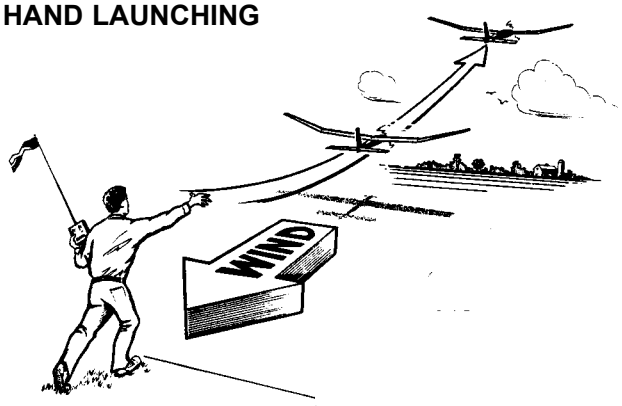
The Electra was designed for long, slow, relaxed flying - not loops or similar aerobatic maneuvers. Save that kind of lying for your next, higher performance sport plane. Practicing precise control and glide planning on the Electra is good preparation for the demands of advanced aerobatic flying.

We recommend you use 3 channels, as this will allow you to cut power whenever you wish to do so. On your first few flights, after a couple of minutes, you may feel you have "had enough" and want to land and relax. A 2-channel system without motor control will not give you this option; you will have to keep flying until the battery power runs down.

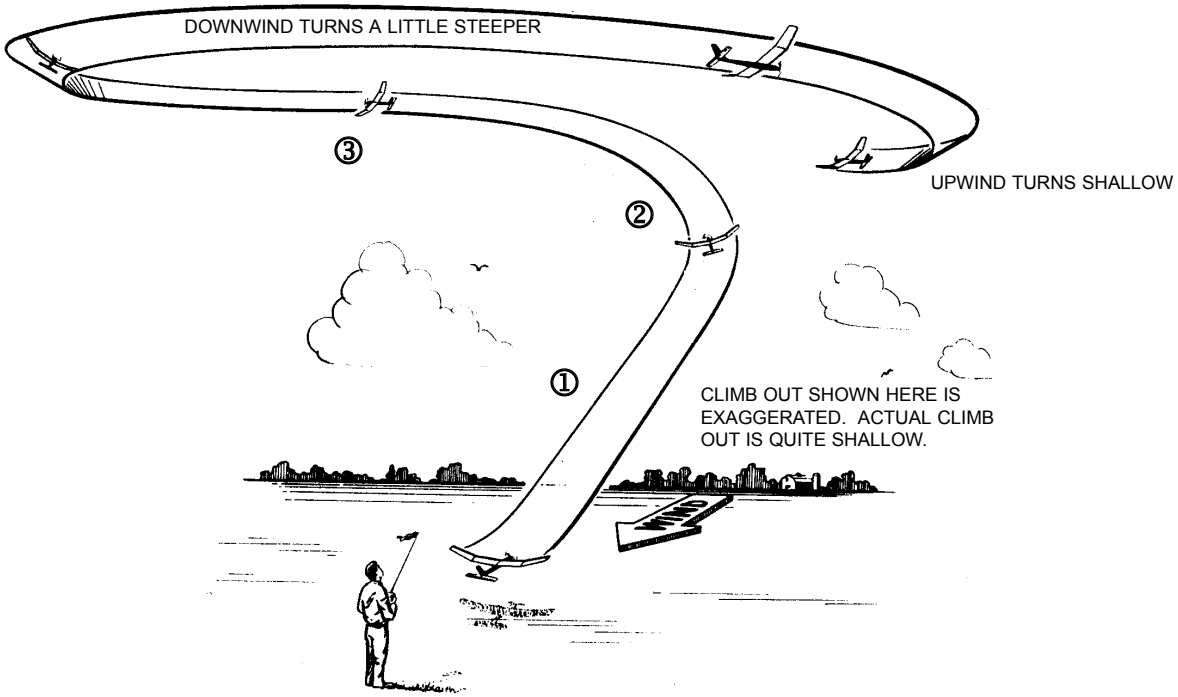
You can expect a good solid 4 or 5 minutes of powered flight with a properly charged battery. In this amount of time, Electra will gain several hundred feet of altitude and will allow you time to get oriented and familiar with the control "feel." When the battery power begins to run out, climb will slow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

For your initial landings, you should not be concerned about trying to land at a specific spot. Your prime concern should be a controlled landing, always into the wind, with wing level. 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.

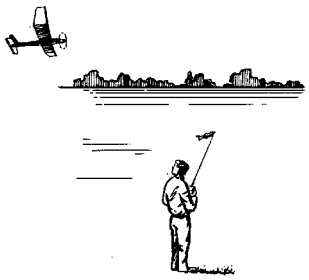


After checking all controls, seeing that the Tx trim tabs are centered, and making sure the Tx meter registers in the safe zone, turn on the motor and hand launch the model into the wind. Immediately take the Tx in both hands and, remembering to operate the controls smoothly, begin to direct the model in a gentle climb. Add slight back stick pressure, if necessary, to keep the model from descending. Soon, when it is about 100 feet away from you, it will start to climb. Be patient; let it climb slowly. If the climb is too steep, the model will stall and fall to the ground. Avoid over-controlling.

CLIMB OUT. 1. During the climb out, just try to keep the model flying into the wind with the wings level until you reach an altitude of at least 150 feet.

STARTING THE PATTERN 2. At 150-200 feet of 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 the pattern further downwind. Try to keep it flying upwind at all times prior to your landing approach. It is more difficult

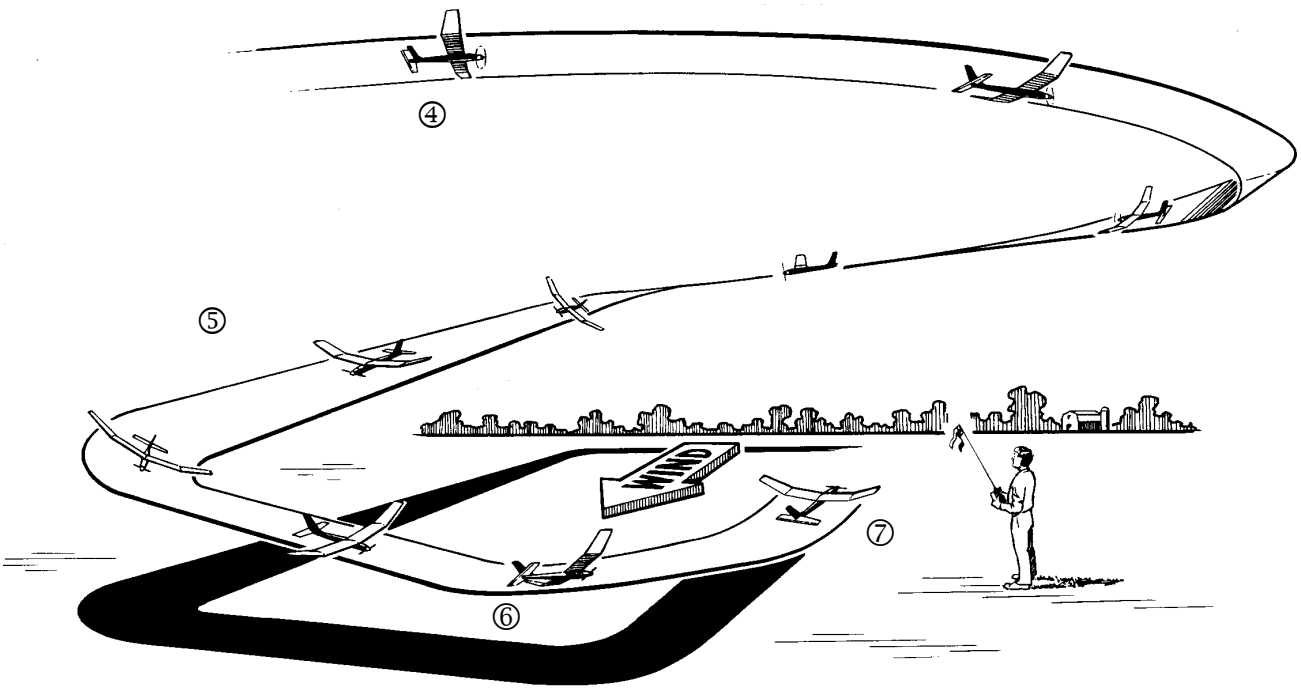
to fly a model when it is downwind, and if a mistake is made, the model will end up further downwind, making it more difficult to fly back to the field. To compensate for wind, continue to make upwind turns shallow, but make the downwind turns a little steeper.



When the plane comes toward you, the steering will seem reversed. When you give right rudder, the plane turns to your left, but it is actually turning to ***its*** right. With practice, you will soon get used to this. (It's a good idea to practice using the controls with the model sitting on a table before you actually begin flying.) Simply push the stick left or right towards whichever way the ship is turning. A helpful technique is shown in the above sketch. You may feel less disoriented and better able to control the model by facing in the same direction as the plane is flying and looking over your shoulder.

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, get an experienced flier to help adjust the setting of the rudder or elevator by adjusting the mini-snaps (clevises). If the wing or other structures have become warped, it is best to discontinue flying and take the model home to straighten it.

If flying with a 2-channel system, when the battery begins to run out, the model will start a gradual descent. If flying a 3-channel system, it's good to have a helper to let you know when you have been flying for about four minutes. Then you can turn the motor off and have about one or two minutes of battery power left. If you are not happy with your first approach, you will then be able to restart the motor and set up another pass.



LANDING

4. Continue your pattern and try to determine how much longer the model will glide. Start planning for the landing. With the power off, you will get used to the model's glide. **5.** Try to plan your approach so that the model is about 100 feet 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 and keep your glide steady and gentle, with the wings level. **7.** A controlled landing into the wind is your prime concern. Don't worry about trying to land the model near you when you are first learning to fly. 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" the landing. Retrieve your plane and switch off first the transmitter and then the receiver.

Take things slow and easy and you'll be able to enjoy flying your Electra for years to come.