F-15 EAGLE

INSTRUCTION BOOK

(Armament package sold separately)

WARRANTY

Great Planes Model Manufacturing Co., Inc. guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Great Planes' liability exceed the original cost of the purchased kit. Further, Great Planes reserves the right to change or modify this warranty without notice.

In that Great Planes has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user-assembled product the user accepts all resulting liability.

If the buyer is not prepared to accept the liability associated with the use of this product, he is advised to immediately return this kit in new and unused condition to the place of purchase for a full refund.

READ THROUGH THIS INSTRUCTION BOOK FIRST. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

GREAT PLANES™
MODEL MANUFACTURING COMPANY

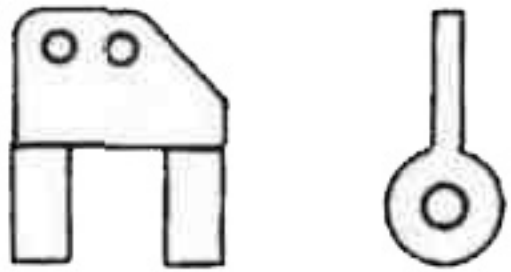
P.O. BOX 788 URBANA ILLINOIS 61801 217398-8970

 F154P03 V1.0

LAST MINUTE ADDITIONS

Staple this inside your **book**

1. In step 5 on page **24** and in step 3 on page **40,** we have provided a slightly different style of nylon torque rod horn than shown. You will need to drill these horns with a 7/64" drill and tap them using the 6-32 thread-cutting screw provided.



F154ADD1

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METRIC CONVERSIONS

1"= 25.4 mm (conversion factor)

1/64" = .4 mm
1/32" = .8 mm
1/16" =1.6 mm
3/32" = 2.4 mm
1/8" = 3.2 mm
5/32" = 4 mm
3/16" =4.8 mm
1/4" =6.4 mm
3/8" = 9.5 mm
1/2" =12.7 mm
5/8" =15.9 mm
3/4" =19 mm
1" =25.4 mm
2" = 50.8 mm
3" = 76.2 mm
6" = 152.4mm
12" =304.8 mm
15" =381 mm
18" =457.2 mm
21" =533.4 mm
24" = 609.6 mm
30" = 762 mm
36" =914.4 mm

WARNING! THIS IS NOT A TOY! THIS IS NOT A BEGINNER'S AIRPLANE!

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

Academy of Model Aeronautics
1810 Samuel Morse Dr.
Reston, VA 22090 (703)435-0750
address and phone
expires June 30, 1993

Academy of Model Aeronautics
5151 E. Memorial Drive
Muncie, IN 47302 (317)289-4236
Change of Address and phone
active July 1, 1993

INTRODUCTION

Congratulations and thank you for purchasing the Great Planes **F-15 EAGLE!**

The Great Planes F-15 is a high performance propeller-driven sport airplane that resembles the real F-15 Eagle. In the air, the prop is invisible, adding to the realism. The smoothness and speed of this airplane allow you to experience the thrills of flying a Jet-like airplane without the complexity and high cost of a ducted fan model. And yet, the F-15 is very stable and forgiving, allowing even less-experienced pilots to enjoy it.

This is not a beginner's airplane! While the F-15 Eagle is not hard to build and flies great, we must discourage you from selecting this kit as your **first** R/C airplane. It is very fast, highly maneuverable, and lacks the self-recovery characteristics of a good **basic trainer** such as the Great Planes **PT Series** airplanes. On the other hand, if you are confident with your flying skill and can safely handle aileron airplanes such as the Great Planes **Big Stik Series** airplanes, the F-15 is an excellent choice.

Please inspect all parts carefully before starting to build! If any parts are missing, broken or defective, or if you have any questions about building or flying this airplane, please call us at (217) 398-8970 and we'll be glad to help. If you are calling for replacement parts, please look up the part numbers and the kit identification number (stamped on the end of the carton) and have them ready when calling.

PRECAUTIONS

1. You must build the plane **according to the plans and instructions.** Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the plans and instructions may differ slightly from the photos. In those instances you should assume the plans and written instructions are correct. Also, you may notice a slight difference in length between longer parts and the plans. This is normal and is caused by the plans expanding and shrinking with the changing moisture content in the air. **Do not modify the parts to fit the plan.**

2. You must take time to **build** straight, true and strong. **IMPORTANT -** Glue should never be substituted for a good-fitting joint. Take a little extra time to get a good fitting joint and glue it properly and it will be stronger, neater, and much lighter than a bad joint held together with a glob of glue!

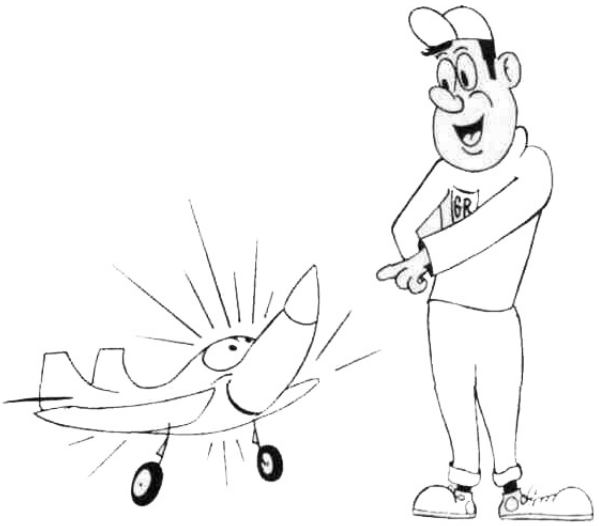
3. You must use a proper R/C **radio** that is in first class condition and meets the current AMA and FCC requirements and the requirements of your local flying club, the correct sized engine and correct **components** (fuel tank, wheels, etc.).

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

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

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

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



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

OTHER ITEMS REQUIRED

- D Four-channel radio with 4 servos
- D Propellers (see engine instructions **for** recommended sizes)
- D 2-1/4" Spinner (Hobbico® 2-1/4" Jet spinner (HCAQ3750) recommended)
- D 2-3/4" Main Wheels (Great Planes GPMQ4204 recommended) See page 5
- D 2-1/4" Nose Wheel (Great Planes GPMQ4202 recommended) See page 5
- D 10oz Fuel Tank (Great Planes GPMQ4104 recommended)
- D 5/32" Wheel **Collars - (6 needed) (2 packages** of GPMQ4306)
- D Iron-on Covering Material (2 rolls) (Top Flite® Aluminum Super MonoKote® recommended)
- D Fuelproof Paint for trim ***We used Chevron "Perfect Paint" silver on the turtle deck***
- D Semi-flexible Pushrods (2-sets) (GPMQ3714)
- D Silicone Fuel Tubing (GPMQ1234)
- D 1/16" thick Wing Seating Tape (GPMQ4422))
- D 1/4" thick Latex Foam Rubber Padding
- D Plastic Pilot. Williams Bros Military 1-1/2" Scale #171
- D Quick-Connectors - (3 needed) (2 packages of GPMQ3870)

SUPPLIES AND TOOLS NEEDED

- D 2 oz Thin CA Adhesive (Top Flite Supreme)
- D 2 oz Medium or Thick CA Adhesive (Supreme)
- D 30-Minute Epoxy (Bullet)
- D Hand or Electric Drill
- D Drill Bits 1/16", 5/64", 7/64", 1/8", 5/32", 3/16", 13/64", 1/4" and 5/16"
- D Sealing Iron (Hobbico or Top Flite recommended)
- D Heat Gun (Hobbico or Top Flite recommended)
- D Hobby Saw (Razor Saw)
- D Hobby Knife, #11 Blades
- D Screw Drivers
- D T-Pins
- D Straightedge
- D Strapping Tape (Required for construction)
- D Sandpaper (coarse, medium, fine grit) *
- D T-Bar Sanding Block (or similar)
- D Waxed Paper
- D Lightweight Balsa Filler (Hobbico Hobbylite™)
- D Vaseline Petroleum Jelly
- D Isopropyl Rubbing Alcohol (70%)
- D 3M "77" Spray Adhesive (optional)
- D Dremel Moto Tool or similar (optional)

NOTE: On our workbench, we have four 11" T-Bar sanders, equipped with #50, #80, #100 and #150-grit sandpaper. We also keep some #320-grit sandpaper handy for finish sanding, before covering.

DECISIONS YOU MUST MAKE NOW

ENGINE, MOUNT AND MUFFLER SELECTION

The recommended engine for the F-15 is a .40* - .50 cubic inch displacement **2-cycle** ***NOTE** Performance may be marginal if a non-schneurle-ported 40 cu in 2-Cycle engine is used The engine you select will determine how you build the fuselage nose section, so it is important that you have the engine close at hand while building Because of the size limitations and the nature of this model, 4-cycle engines are more difficult to install and balance and therefore are **not recommended.**

This kit includes a Great Planes **EM4070** adjustable engine mount (or similar mount) that will fit most .40 - .61 (2-Cycle) engines If the supplied mount does not fit your engine, it may be necessary to purchase a different mount (check with your hobby dealer).

SELECTION OF WHEELS

To save weight, we recommend using Great Planes Ultralight wheels **REMEMBER:** Large wheels are ugly and unrealistic on a model of this type, so try to keep the wheels as small as possible

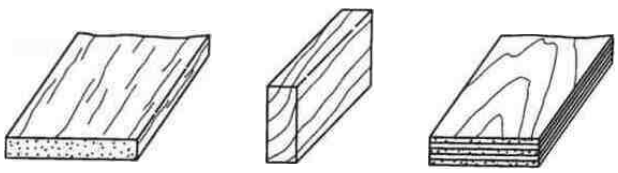
If you will be flying from a concrete or asphalt runway, we recommend 2-1/4" main wheels and a 2" nose wheel.

For grass fields, larger wheels will be required, such as 2-3/4" main wheels and a 2-1/4" to 2-1/2" nose wheel

COMMON ABBREVIATIONS USED IN THIS BOOK AND ON THE PLANS:

Elev = Elevator
Fuse = Fuselage
LE = Leading Edge (front)
LG = Landing Gear
Ply = Plywood
Stab = Stabilizer
TE = Trailing Edge (rear)
Tri = Triangle
" = Inches

TYPES OF WOOD



Balsa **Basswood** **Plywood**

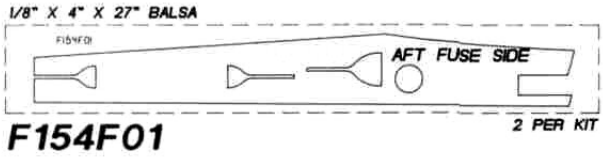
GET READY TO BUILD THE F-15

D 1. Unroll the plan sheets and re-roll them inside out to help them lie flat.

D 2 Remove all parts from the box As you do, figure out the name of each part by comparing it with the plans and the parts list at the back of this book Using a felt tip pen, write the part **name** or **size** on each piece to avoid confusion later Use the die-cut part patterns shown on page 6 to identify the die-cut parts but do not punch them out until you are ready to use them **Save all scraps.** If any of the die-cut parts are difficult to punch out, do not force them' Instead, first cut around the parts with a hobby knife After punching out the die-cut parts, use your T-Bar or sanding block to **lightly** sand the edges to remove any die-cutting irregularities.

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

DIE-CUT PATTERNS



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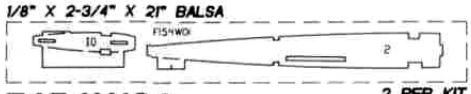

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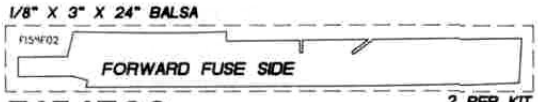

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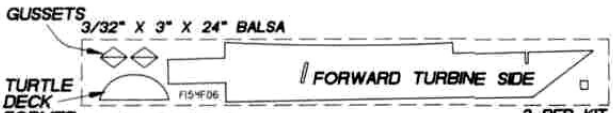

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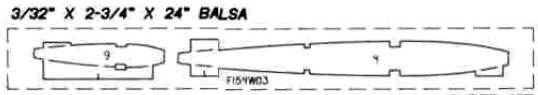

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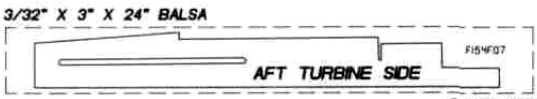

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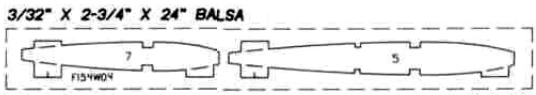

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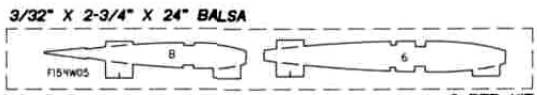

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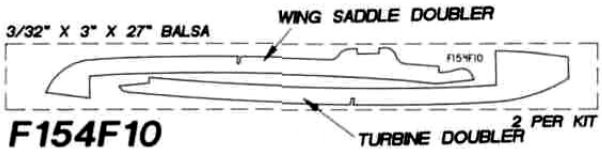

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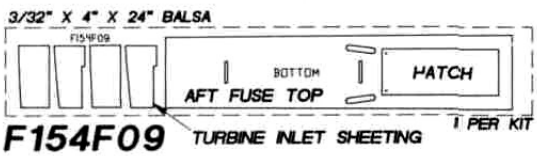

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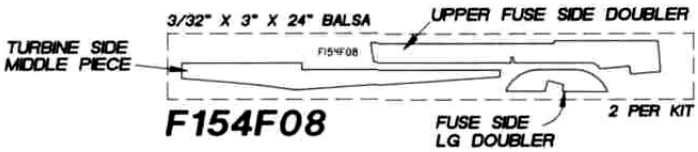

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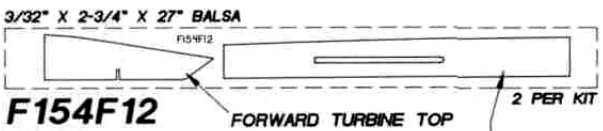

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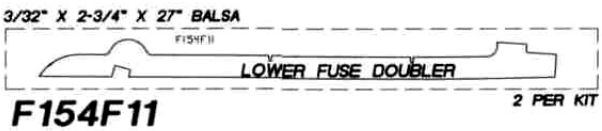
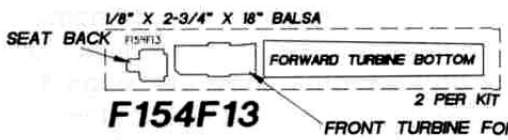


F154F11

AFT TURBINE TOP



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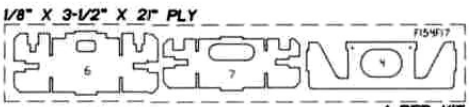
FRONT TURBINE FORMER



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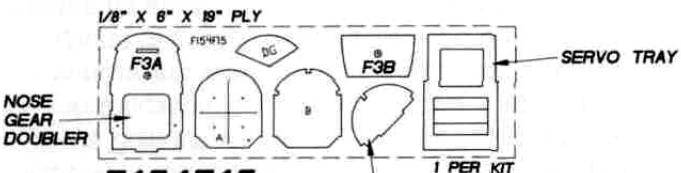
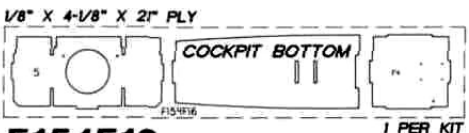


F154F15

DASH



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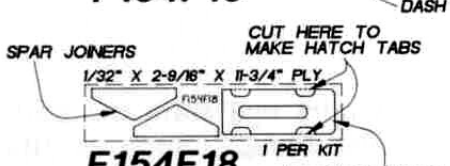
WING FACE PLATE



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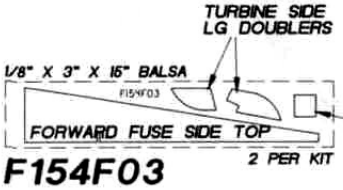

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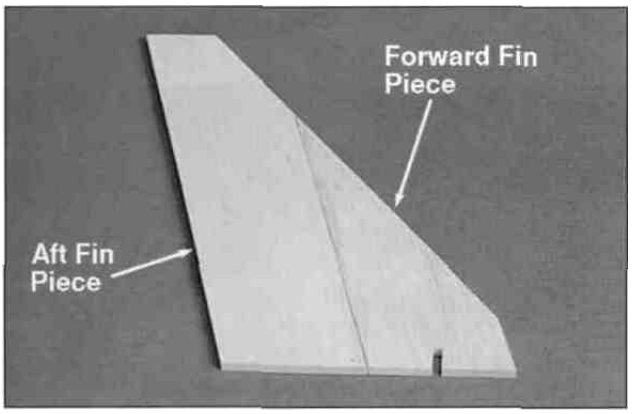
F154W06

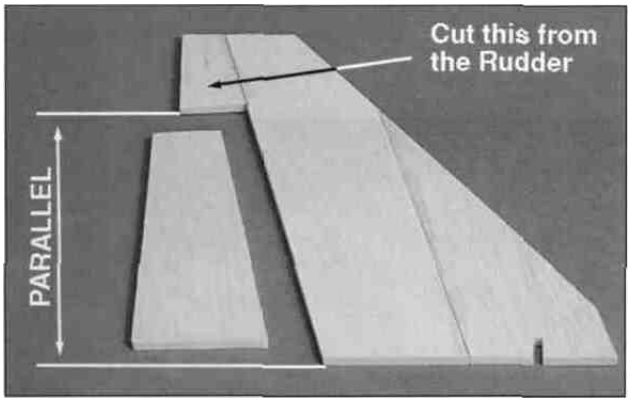
TAIL FEATHERS

BUILD THE FIN AND RUDDER

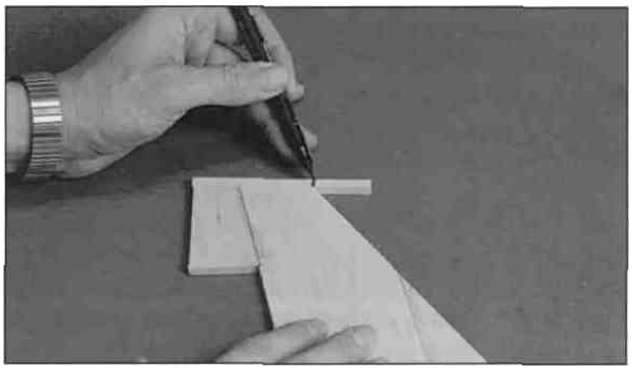
Note: The construction sequence that follows does not require building over the plans. You will however, occasionally need to refer to the plans.



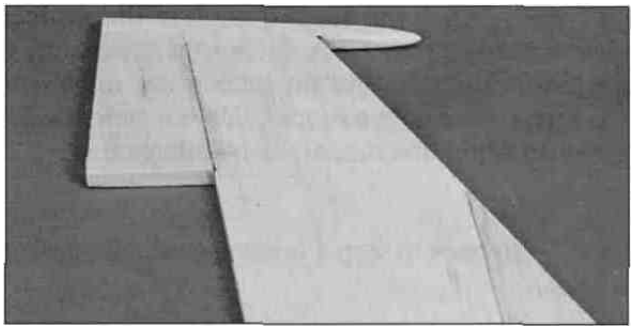
D D 1. Glue the 1/4" balsa **forward fin piece** (F154R01) to the 1/4" balsa **aft fin piece** (F154R02) so their bottoms are even with each other.



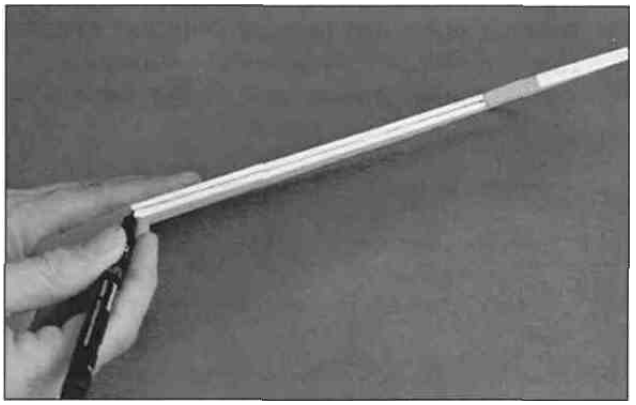
D D 2. Using the plans as a guide, cut the top **2-1/2"** off a 1/4" balsa **rudder** (F154R03) with a razor saw. Glue the top portion to the aft fin piece as shown above. The bottom edge of the top portion should be parallel with the bottom edge **of** the fin.



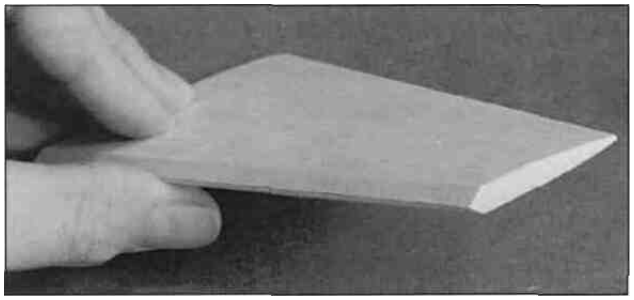
D D 3. Cut the 1/4" **sq. x 7-7/8" basswood stick** (F154R04) in half to make two **fin tips** approximately 3-7/8" long . Hold a fin tip in place on top of the fin so the aft end just overlaps the fin **TE.** Mark on the fin tip where the fin LE starts. Remove the fin tip. Carve and sand the front of the fin tip to a round cross section but do not sand behind the line you just made.



D D 4. Glue the fin tip to the top of the fin. Sand the aft edge of the tip flush with the fin TE.



D D 5. Use a sanding block with medium (150) grit sandpaper to sand the edges and both sides of the fin smooth. Carefully draw a **centerline** all around the edges of the fin and rudder. This will make it easier to maintain symmetry when sanding later.



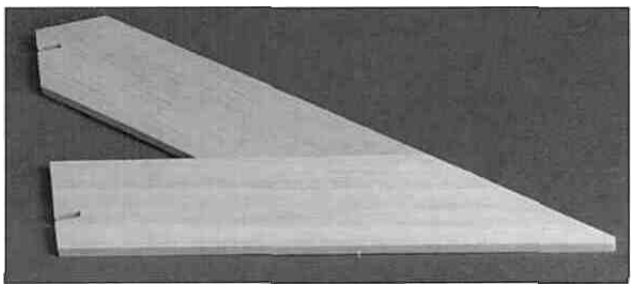
D D 6. Using a sanding block and **coarse** (50 or 80-grit) sandpaper, sand both sides of the rudder to a **taper** (see cross-section on plans). The trailing edge should end up approximately 3/32" wide. (Do not sand to a sharp edge). Leave the top and bottom edges square. Sand the leading edge of the **rudder** to a **"V-shape"** as shown on the plan. **HINT:** It is a good idea to keep new, sharp sandpaper on your sanding blocks. You will notice that it "cuts" the wood and the glue cleaner and produces a much smoother finish.

D D 7. Sand the leading edge of the **fin** to a rounded shape (see cross-section on plans). Sand the trailing edge of the **fin** (above the rudder) to the same taper as the rudder. Do not sand the TE **of** the fin where the rudder will be attached.

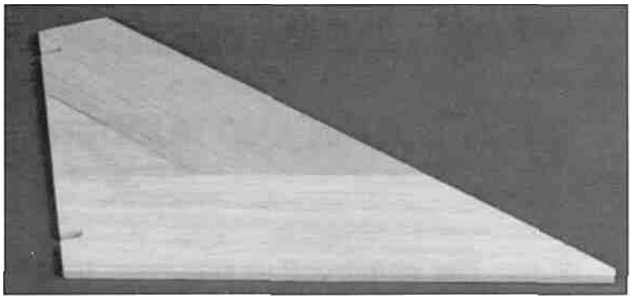
D 8. Go back to step 1 and build another fin and rudder.

BUILD THE STABILIZER AND ELEVATORS

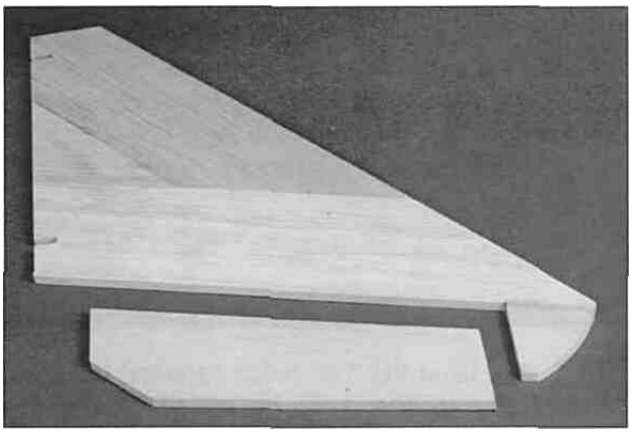
Note: The construction sequence that follows does not require building over the plans. You will however, occasionally need to refer to the plans.



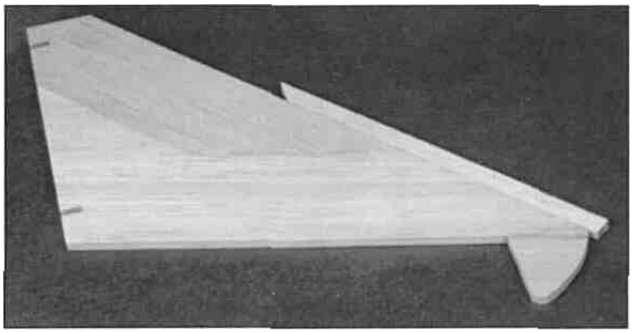
D D 1. Glue the 1/4" balsa **forward stab piece** (F154S01) to the 1/4" balsa **aft stab piece** (F154S03) so the root ends are even with each other.



D D 2. Test fit the 1/4" balsa **middle stab piece** (F154S02) in place. Sand it if necessary to achieve a good fit and glue it in place. Sand the **root** of the stab until all three pieces are even with each other.



D D 3. Position the 1/4" balsa **elevator** (F154S04) over the plan and mark where the stab tip will be cut off. Cut the tip off with a razor saw and glue it to the stab rear. Do this over the plans so you will be sure to position it correctly.



D D 4. Position the **1/4" x 1/2" x 18" balsa stick** (F154S05) over the plans and cut it in half at an angle to make the **stab leading edge extensions.** Glue an extension to the leading edge of the stab, and sand it to match the contour of the stab as shown on the plans.

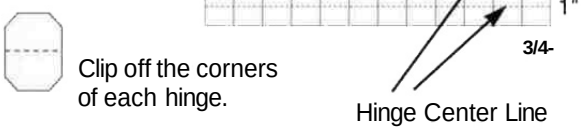
D D 5. Use a sanding block with medium (150) grit sandpaper to sand the edges and both sides of the stab smooth. Carefully draw **a centerline** all around the edges of the stab and elevator. This will make it easier to maintain symmetry when sanding later.

D 6. Sand the tip and leading edges of the **stab** to a rounded shape (see cross-section on plans).

D 7. Now go back and build the other side.

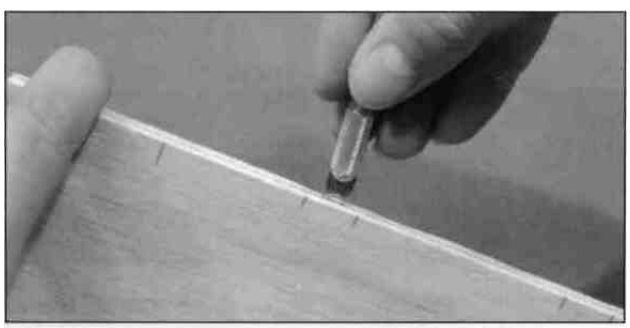
TEMPORARILY INSTALL HINGES AND TORQUE RODS

D 1. Cut 24 hinges 3/4" x 1" from the 2" **x** 9" **CA** hinge strip. (NYLON87).



D 2. Using the plans as a guide, mark the hinge locations on the stabs, elevators, fins and rudders. Also designate one of each as being **"right"** and the others as **"left".**

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

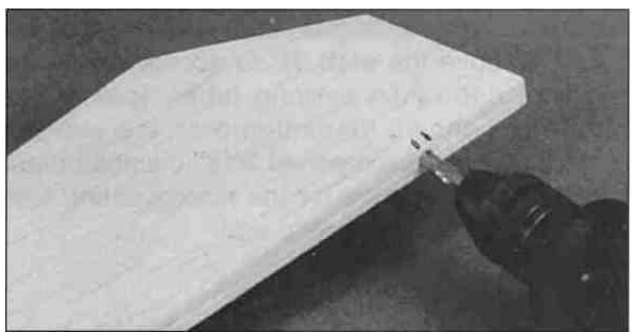


D 2. Cut the hinge slots on the centerlines you drew earlier. Our recommended hinge slotting method is described in the next column.

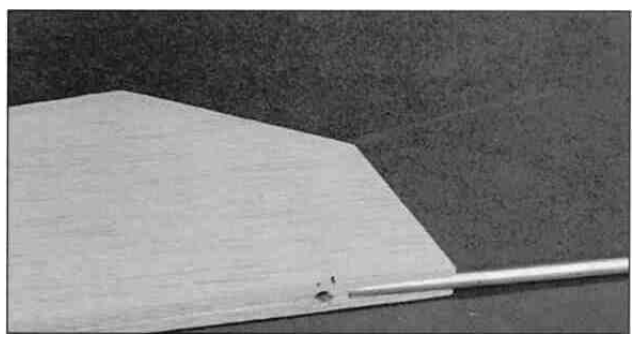
A. Begin by carefully cutting a **very shallow slit** at the hinge location. The first cut is to establish your cut in the right place, so concentrate on staying on the line and **don't cut too deep.**

B. Make three or four more cuts in the same line, **going slightly deeper each time.** As you make these additional cuts, work on going straight into the wood. Continue this process while **"wiggling"** the knife handle forward and backward until the blade has reached the proper depth for the hinge.

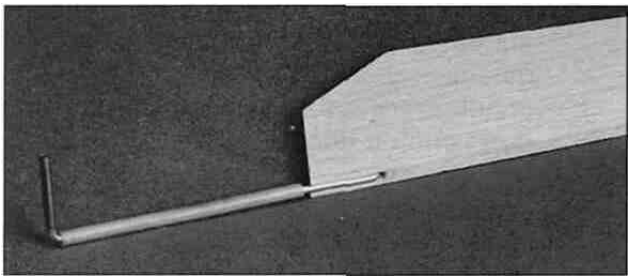
C. Trial fit the hinge into the slot. If the hinge is difficult to push in, re-insert the knife and move it back and forth in the slot a few times to enlarge the slot. **Do not glue the hinges yet.**



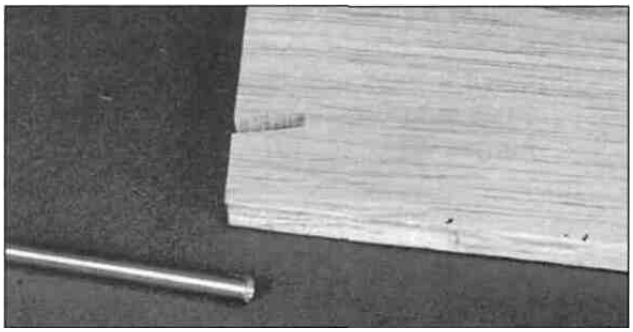
D 4. Using the plans for reference, mark the location of the torque rods on the **elevators.** Drill **a 1/8"** hole 1-1/8" deep into each elevator as shown in the photo.



D 5. Groove the elevator leading edge to accept the torque rod wire. **HINT:** Use a hobby knife to

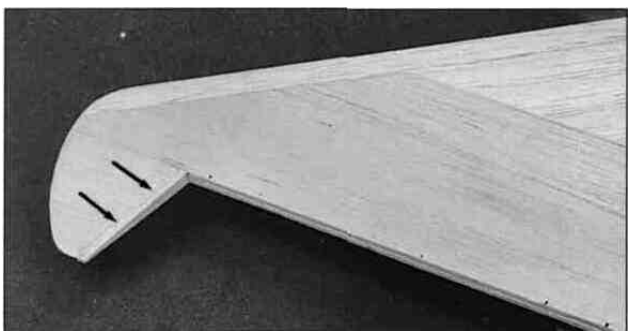


sharpen the inside of one end of a 1/8" diameter brass tube, and use it to cut this groove.



D 6. Groove the **stab TE** to accept the torque rod wire and nylon bearing tube. Ideally, the torque rod should be centered on the elevator hinge line. Use a sharpened 3/16" diameter brass tube to cut the groove for the nylon bearing tube and a 1/8" brass tube for the wire.

D 7. Using a sanding block and **coarse** (50 **or** 80-grit) sandpaper, sand both sides of each elevator to a **taper** (see cross-section on plans). The trailing edge should end up approximately 3/32" wide (Do not sand to a sharp edge). Leave the ends square. Sand the leading edge of the **elevator** to a **"V-shape"** as shown on the plan. Sand the trailing edge of the stab tip to the same taper as the elevator.

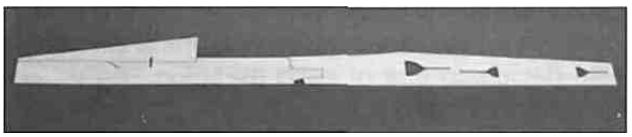


D D 8. Cut a piece of 1/8" balsa, 1/4" wide and 2" long, from the border of a die-cut 1/8" sheet. Glue this piece to the inside of the stab tip. Sand it **to** the contour of the stab as shown in the photo.

D 9. Trial fit all these parts together using the torque rods and hinges. Check the operation of the elevators, but **do not glue anything yet.**

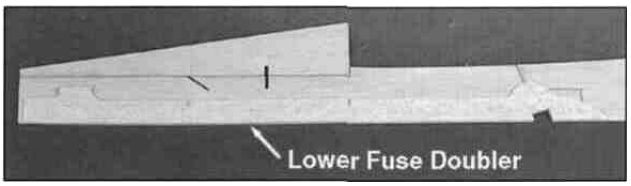
FUSELAGE ASSEMBLY

PREPARE FUSE SIDES

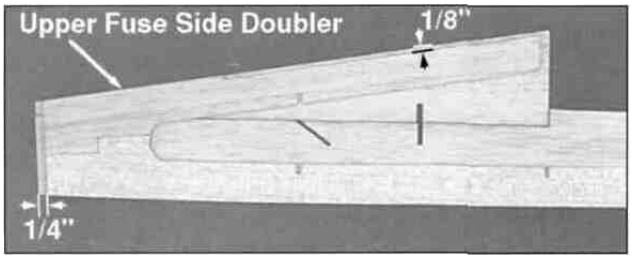


D D 1. Working over the fuselage side view covered with waxed paper, trial fit a die-cut 1/8" balsa **forward fuse side** (F154F02), **forward fuse side top** (F154F03) and **aft fuse side** (F154F01) together, sanding as necessary for a good fit. Use a straight edge along the bottoms to keep them aligned and glue them together.

NOTE: If this is your second time through, remember to make a right and a left side.

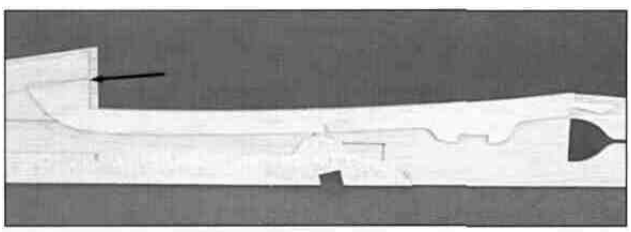


D D 2. Position a die-cut 3/32" balsa **lower fuse doubler** (F154F11) by lining it up with the landing gear block cut-out and the bottom of the fuse side. Apply **thin** CA **all** around the doubler to glue it in place.



D D 3. Position a die-cut 3/32" balsa **upper fuse side doubler** (F154F08) near the top of the fuse side so it fits against the lower fuse doubler. Note that the aft portion of this doubler is recessed 1/8" below the top of the fuse side to allow for the cockpit bottom. Glue the doubler to the fuse side by applying **thin** CA around **all** edges of the doubler.

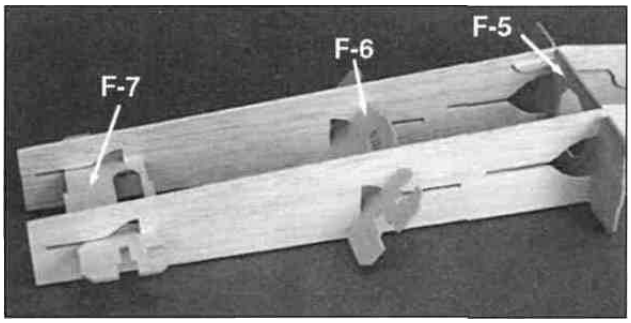
> ***NOTE: The doublers stop 1/4" before the front of the fuse side to align the firewall.***

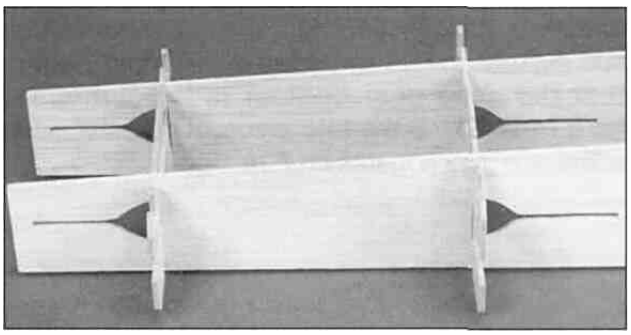


D D 4. Position a die-cut 3/32" balsa **wing saddle doubler** (F154F10) as shown in the photo. Notice that the aft edge of the front portion is aligned with the aft edge of the fuse doubler top. The top surface of the doubler should be flush with the edge of the fuse side.

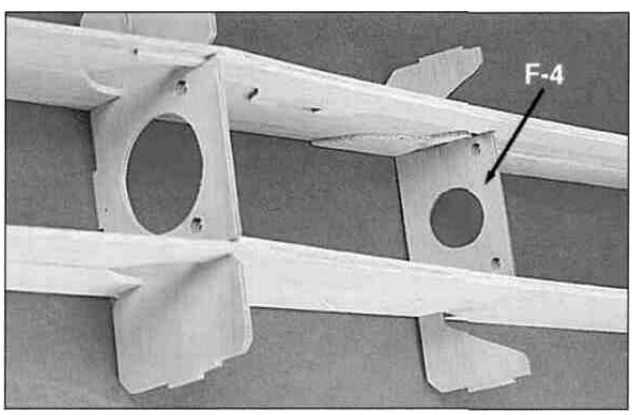
D 5. Go back to step 1 and build another fuselage side. **Be sure to make a right and a left side!**

> ***NOTE - in the following steps, the fuselage will be assembled without being securely glued together. This technique allows all of the self aligning parts to be installed before the fuselage is locked together with glue.***

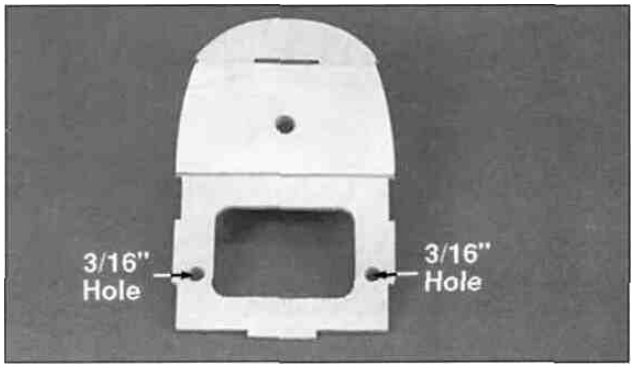




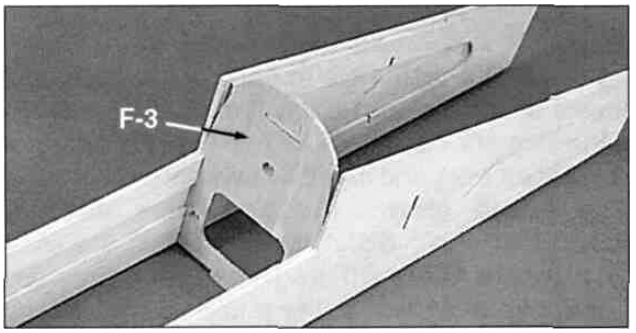
D 6. Drill a 3/16" hole at each of the two punch marks on the die-cut 1/8" ply former **F5** (F154F16). Slide formers **F5, F6** and **F7** (F154F17) into their respective slots and carefully twist them into place. The photo shows the sequence used to accomplish this. Slide the former into the slots, and rotate them 90 degrees until they are positioned as shown in the photo above. Do not glue them yet. **Make sure they are upright and not inverted!**



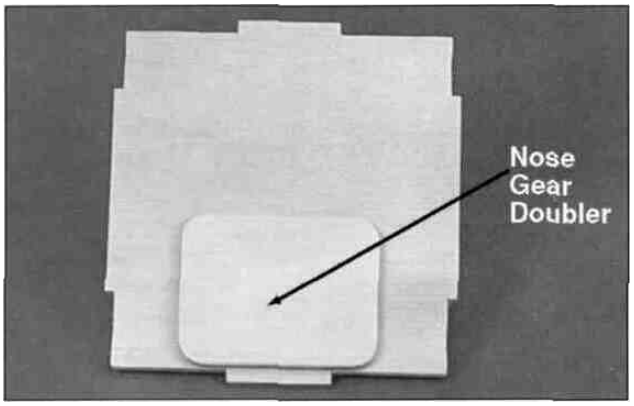
D 7. Drill a 3/16" hole at each of the two punch marks on the die-cut 1/8" ply former **F4** (F154F17). Install F4 by sliding it up from the bottom of the fuse. **Tack** glue it in place against the **aft** edge of the landing gear block slot.



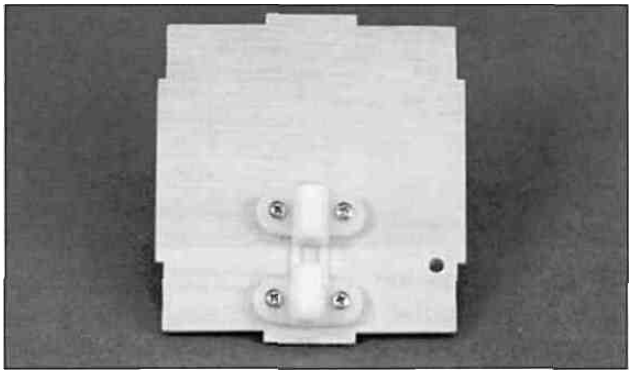
D 8. Securely glue die-cut 1/8" ply former **F3B to** former **F3A** (F154F15). Align it with the hole and the tabs in F3A as shown in the photo. **Notice that the nose gear doubler is the lightening hole from F3. Save this piece.** Drill 3/16" holes at the two punch marks on F3A.



D 9. Tack glue F3 in place in the fuselage with **F3B** towards the nose of the plane. Only apply a couple drops of thin CA on the bottom half of F3. You will glue the top portion of the former later.

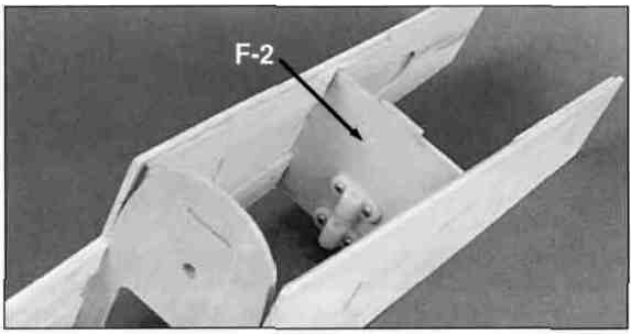


D 10. Glue the die-cut 1/8" ply **nose gear doubler** (from former F3A) to former F2 (F154F16). Locate it on the side **opposite** the nose gear bearing punch marks and just above the bottom of the former (not the tab) as shown.

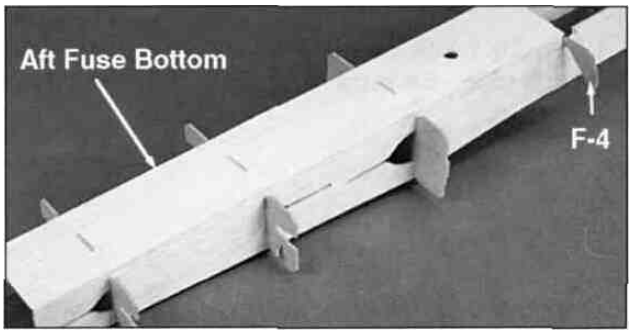


D 11. Flip former F2 over and drill a **5/64"** hole **at** each of the four nose gear bearing punch marks. Also drill a **3/16"** hole at the remaining punch mark for the throttle pushrod. Attach the nylon **nose gear bearing** (NYLON33) using four #4 **x 1/2" screws** fSCRW004^.

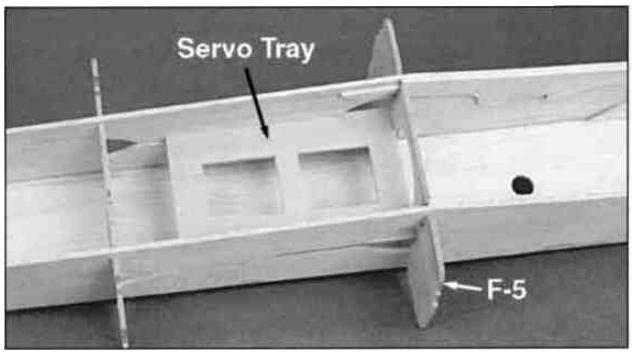
Apply a drop of thin CA to the back side of each #4 screw to keep them from vibrating loose.



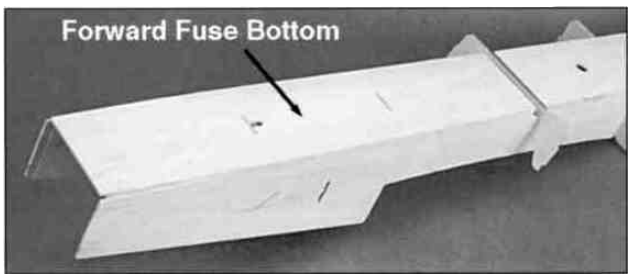
D 12. Tack glue F2 into the fuse with a few drops **of** thin CA. The nose gear bearing should be towards the rear of the fuselage.



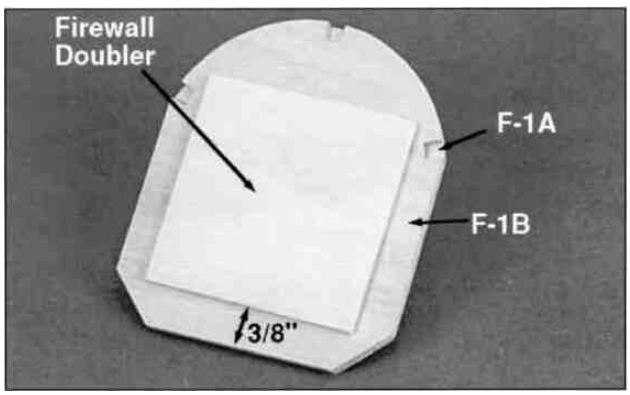
D 13. Lay the die-cut 1/8" balsa **aft fuse bottom** (F154F05) in place and allow the formers to key into the notches in the bottom. Center the aft fuse bottom on former F4 and tack glue it in place with thin CA.



D 14. Slide the die-cut 1/8" ply **servo tray** (F154F15) down into the slot through which F5 was inserted. It is a tight fit, but insert one tab into the slot and then twist the other tab into place. Slide the tray up against F-5 and glue it in place. Now that the aft half of the fuselage is held straight, add glue to F4, F5, F6, F7 and the aft fuse bottom to **securely** hold everything together. We recommend applying thin CA to all joints, followed by medium CA.

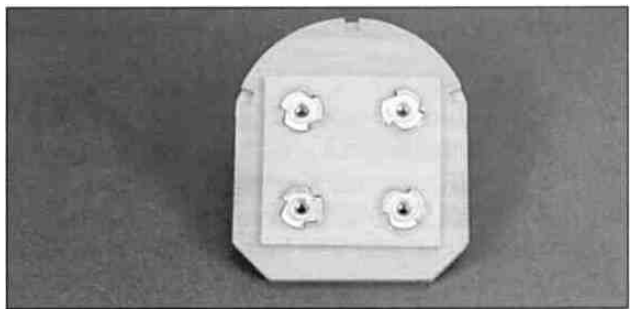


D 15. Lay the die-cut 1/8" balsa **forward fuse bottom** (F154F04) in place and allow formers F2 and F3 to key into it. Center the forward fuse bottom at the LG block and tack glue the fuse bottom to the fuse sides between F-2 and the LG block. Do not glue forward of F-2 at this time.

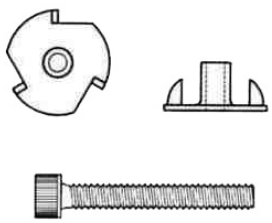


D 16. Locate the die-cut 1/8" ply **F-1A** and **F1B** (F154F15) and use a fine sanding block to remove any fuzzy edges. Use epoxy to glue the two pieces together making a 1/4" thick firewall. Make sure they are accurately lined up with one another and the **side of F1A with the punch marks is showing.** Wipe off any excess glue before it cures. Glue the 1/8" x 2-3/8" x 2-3/8" plywood **firewall doubler** (F154F30) to **F1B.** It should be positioned approximately 3/8" above the bottom of the firewall and centered side to side.

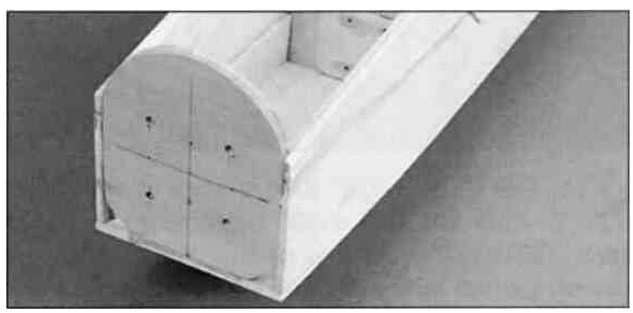
D 17. If you are using the supplied **Great Planes Adjustable Engine Mount** (EM4070), drill a 5/32" hole at each of the four punch marks on the face of the firewall. If you are using another mount, center it on the embossed center lines to determine where to drill the holes.



D 18. Lay the firewall down with F1A against the work surface. Use a hammer to gently tap a **6-32 blind nut** (NUTS003)mto each 5/32" hole.

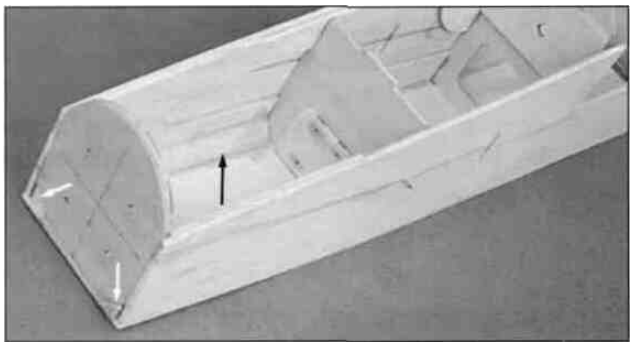


Temporarily attach the engine mount to the firewall with the **6-32 x 1" socket head bolts** (SCRW078) to make sure the holes are in the correct position. Adjust the holes if necessary and then add a bead of thick CA or epoxy around each blind nut to hold them in place. Do not allow the glue to get on the threads.

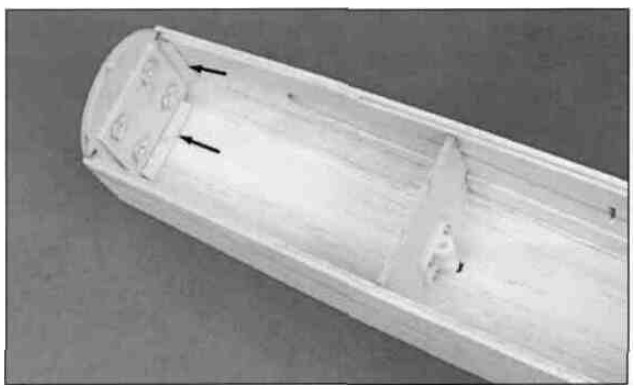


D 19. Use epoxy to securely glue the firewall into place making sure it is centered on the forward

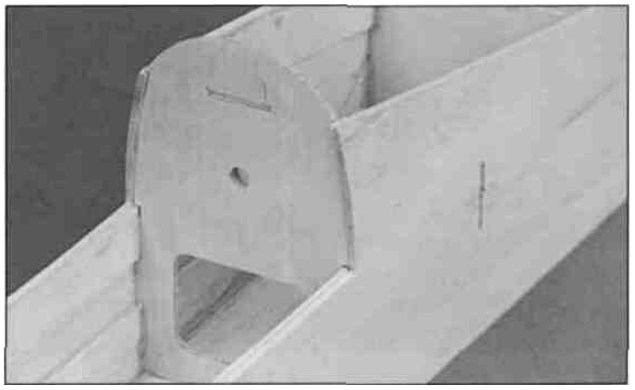
fuse bottom. The firewall should be positioned against the fuse doublers to properly set the engine down thrust. Apply thin CA along the fuse side/forward fuse bottom joint.



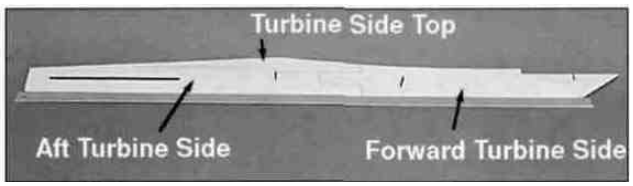
D 20. Slide the **1/2" x 30"** balsa **triangle stock** (WSTR014) through one of the triangular holes at the bottom of the firewall until it touches former F2. Cut the 1/2" triangle off flush with the front of the firewall. Press the triangle into the corner formed by the fuse side and the fuse bottom and apply **thin** CA along the edges of the triangle. Install another piece of 1/2" balsa triangle on the other side of the fuselage. Sand the fuse sides, fuse bottom and the triangle flush with the front of the firewall.



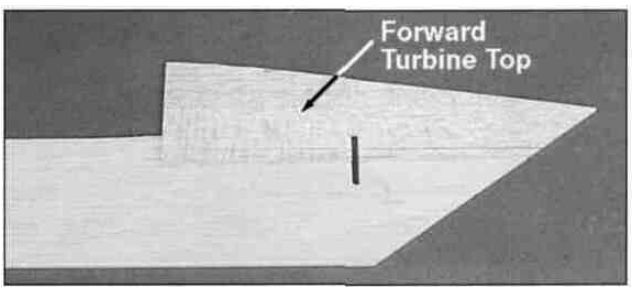
D 21. Cut three **1-7/8"** long pieces of 1/4" balsa triangle from the 1/4" **x 30"** balsa **triangle stock** (WSTR015) . Glue one of the pieces into the corner formed by the firewall and the fuse bottom. Glue the other two pieces into the corners formed by the firewall and the fuse sides. **Note:** you may need to trim the triangle to get it to fit.



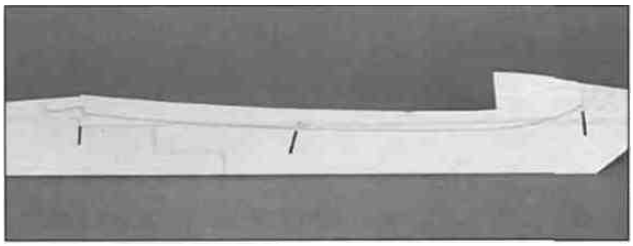
D 22. Pull the fuse sides up tight against the top portion of former F3 and securely glue them in place. Strapping tape can be used to hold the fuse sides in place while the glue cures. Add glue to all the front fuse joints to securely glue everything together.



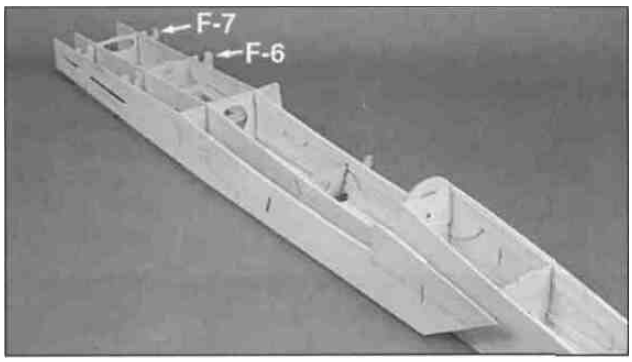
D 23. Trial fit the die-cut 3/32" balsa **forward turbine side** (F154F06), the **aft turbine side** (F154F07) and the **turbine side** top(F154F08) together on a flat surface covered with waxed paper. Sand them if necessary to get them to fit together nicely. Use a straight edge along the bottom edges to keep them aligned and glue them together with **thin** CA. **Note: Do not lose the die-cut gussets that are in F154F06.**



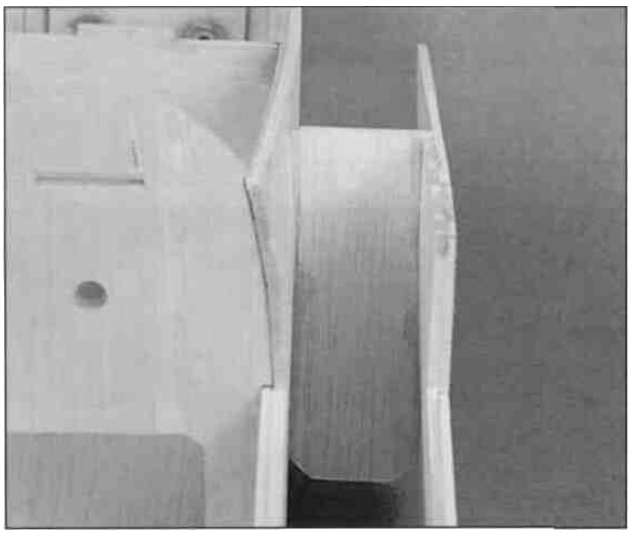
D 24. Glue the die-cut 3/32" balsa **forward turbine top** (F154F12) in place. Assemble the other turbine side.



D 25. Glue a die-cut 3/32" balsa **turbine doubler** (F154F10) to each turbine side. They should be aligned with the wing saddles. **Be sure to make a right and a left turbine side!**

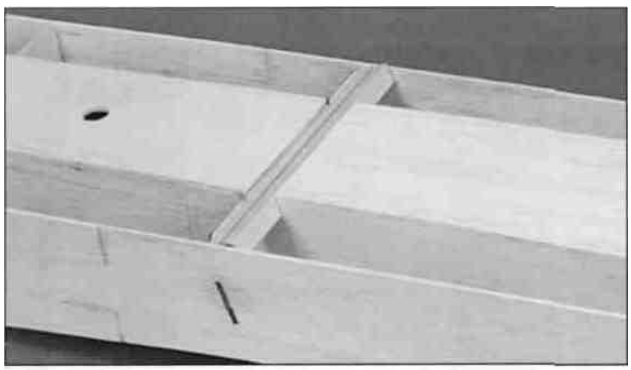


D 26. Glue a turbine side onto formers F4 and **F5.** Pull the turbine side up against former F7 and make sure the bottom of the turbine side is level with the bottom of the former. Glue it to the former. Do the same for former F6 and then go back and add thick CA to each joint.

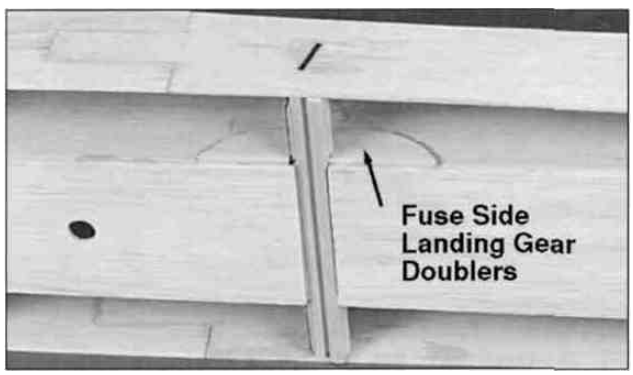


D 27. Snap the die-cut 1/8" balsa **front turbine former** (F154F13) into its slots and glue it in place as shown in the photo. Make sure the bottom of the former is flush with the bottom of both the fuse side and the turbine side.

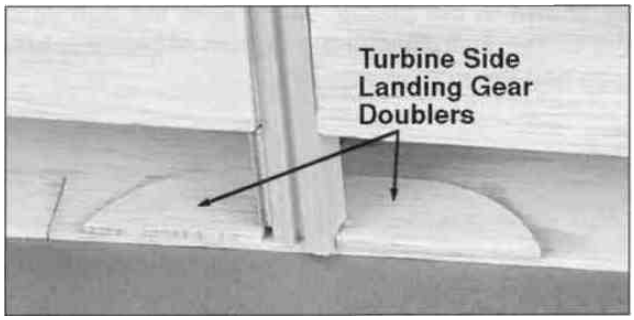
D 28. Install the other turbine side and front turbine former using the same technique described **above.**



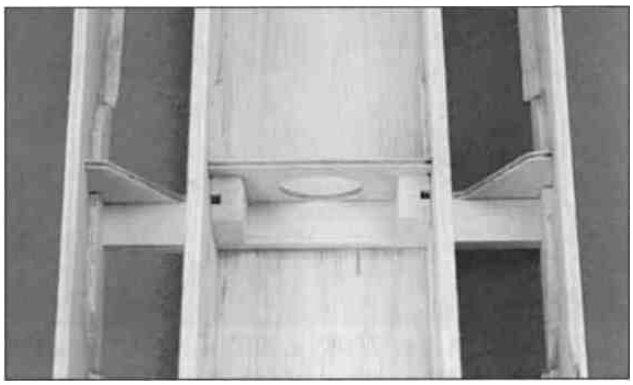
D 29. Test fit the 7/16" x 5/8" x 6-5/8" grooved basswood **landing gear block** (F154F21) into its slot in the bottom of the fuselage. Trim the slot or sand the ends of the block if necessary to get the landing gear block to fit. Securely glue it in place.



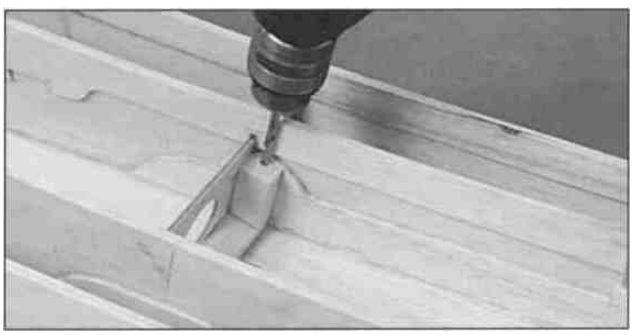
D 30. Glue the die-cut 3/32" balsa **fuselage side landing gear doublers** (F154F08) to the **outside of** each fuse side as shown in the photo.



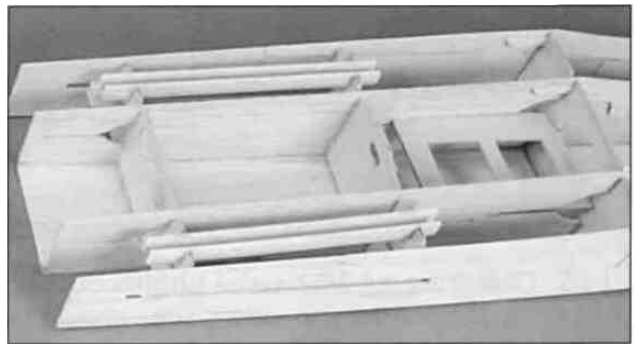
D 31. Glue the four die-cut 1/8" balsa **turbine side landing gear doublers** (F154F03) to the **inside** of each turbine side as shown in the photo.



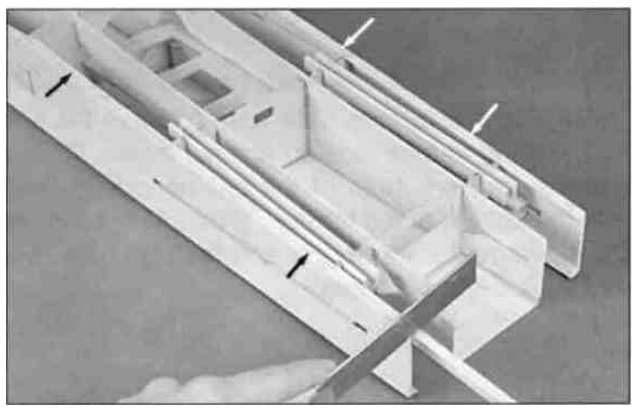
D 32. Securely glue (using epoxy) the two 7/16" x 5/8" x 1-1/4" grooved basswood **short landing gear blocks** (F154F22) in place against the fuselage side doubler. The grooved side of the blocks should be against the fuse doubler.



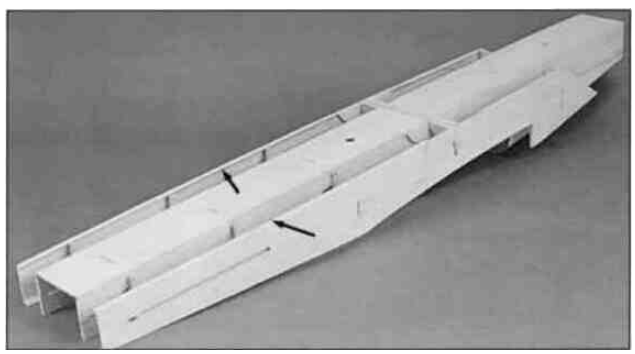
D 33. Drill two 5/32" holes through the long landing gear block by using the grooves in the short blocks as guides. Cut two 1-1/2" long pieces of 1/4" balsa triangle. Glue them to the front of each short L.G. Block. These are not shown in the photos, but are illustrated on the fuselage plan.



D 34. Cut eight **7-1/2"** long **fin** and **stab braces** from the two **1/8" x 1/2" x 30"** balsa sticks (F154F29). Glue these in place as shown on the plans and in the photo. They should be securely attached to formers F6 and F7. The stab braces should also be attached to the turbine sides. The top of the fin braces should be flush with the top of the formers.

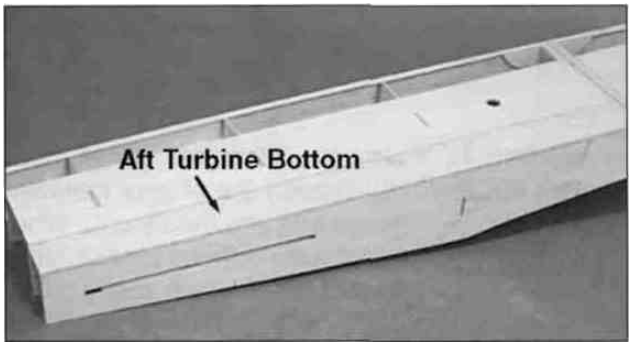


D 35. Cut two **15-3/4"** long pieces of 1/4" **x 30"** balsa triangle (WSTR015). Glue these inside the top edge of each turbine side from **F5** rearward. Make sure the top edge of the triangle is flush with the top edge of the turbine side.

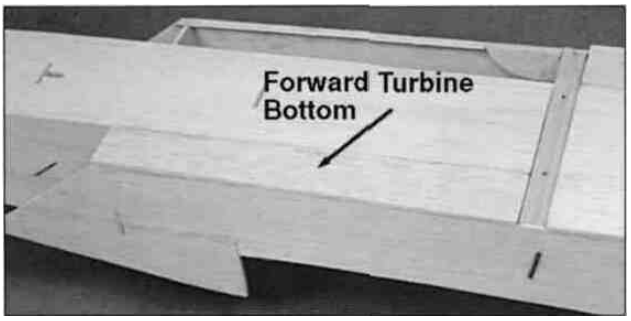


D 36. Flip the fuselage over and install 1/4" balsa

triangle along the bottom edge of the turbines. Do not install triangle over the landing gear doublers. The triangle should extend all the way from the front to the aft ends of the turbine sides. Make sure the bottom edge of the triangle is flush with the bottom edge of the turbine side.



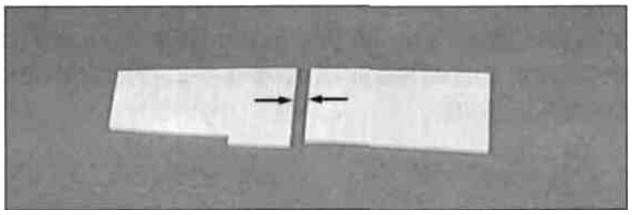
D 37. Glue a 1/8" x 2" x 25" balsa **aft turbine bottom** (F154F14) in place. It is butt-glued up against the LG block and the bottom fuse sheeting, so hold it flush with the bottom sheeting while you glue it with **thin** CA. Add a bead of medium CA **inside** the fuselage to reinforce this joint. Glue the other aft turbine bottom in place.



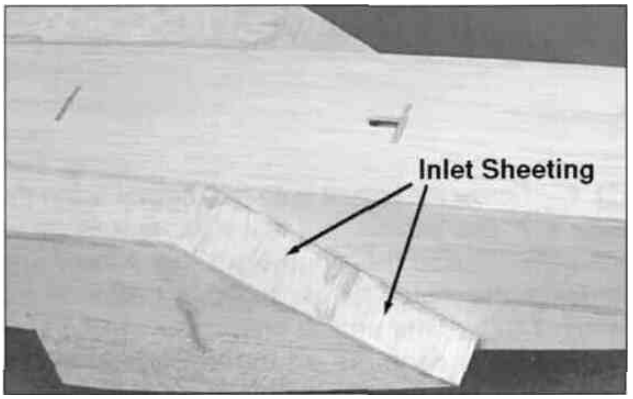
D 38. Glue a die-cut 1/8" balsa **forward turbine bottom** (F154F13) in place. It is butt-glued up against the bottom fuse sheeting so hold it flush with the bottom sheeting while you glue it with **thin** CA. Add a bead of medium or thick CA **inside** the fuselage to reinforce this joint. Glue the other forward turbine bottom in place.

D 39. Trim and sand the edges of the turbine bottoms flush with the turbine sides and fronts.

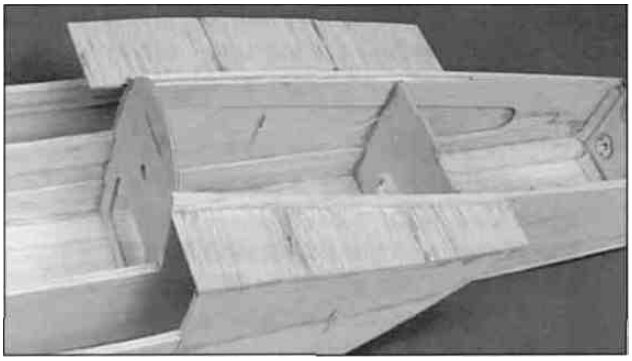
SUGGESTION: From this point on, we recommend using a padded "cradle" such as a Robart Super Stand to protect the fuselage from dents and dings. You can modify the stand to fit the fuselage by cutting one upright off flat and enlarging the other upright to fit the front of the fuselage. Line the uprights with foam rubber to protect the plane.



D 40. Glue two die-cut 3/32" balsa **turbine inlet sheeting** pieces (F154F09) together.



D 41. Glue the inlet sheeting in place in its slot near the front of a turbine. Bend the turbine side in to meet the inlet sheeting as shown in the photo and glue it to the sheeting. Assemble the other turbine inlet sheeting and glue it in place on the other turbine. Sand the inlet sheeting flush with the bottom sheeting and the turbine sides.

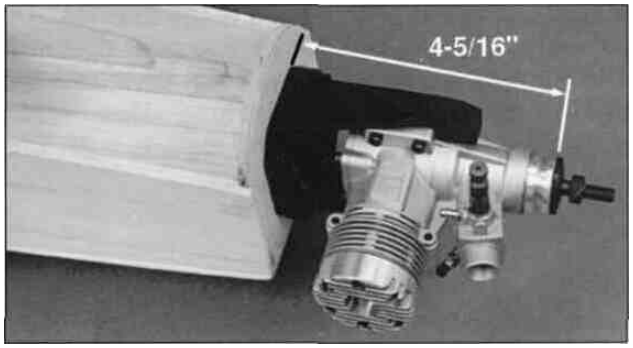


(COCKPIT BOTTOM NOT SHOWN)

D 42. Temporarily install the die-cut 1/8" ply **cockpit bottom** (F154F16) to hold the fuselage sides in position. Cut six **1-3/4"** long pieces of turbine forward top sheeting from the **3/32" x 3" x 12"** balsa sheet (F154F26). Starting at the front of the turbine, glue three pieces along the top edge of each turbine side. Sand them slightly to make them fit nicely up against the fuselage side. Make sure the sheeting is installed so it is level (parallel with the fuse bottom). Sand the edges of the sheeting flush with the turbine side and the turbine inlet sheeting. The aft end of the sheeting must be even with the aft edge of former F-3. Remove the cockpit bottom.

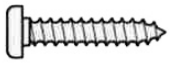
MOUNT ENGINE AND INSTALL SERVOS

D 1. Screw the mount onto the firewall using the 6-32 x 1" cap screws, but leave the screws loose for now. Place the engine on the mount and squeeze the mount halves together until they are within 1/32" of the engine crankcase. Make sure the mount is centered on the embossed center lines and tighten the engine mount screws. Position the engine on the mount so the distance from the front of the firewall to the face of the thrust washer is 4-5/16". Mark the engine mounting hole locations on the mount. Remove the engine and accurately drill 7/16" (or #36) holes. NOTE: If you have access to a drill press, use it for drilling these holes to ensure that they are drilled vertically.



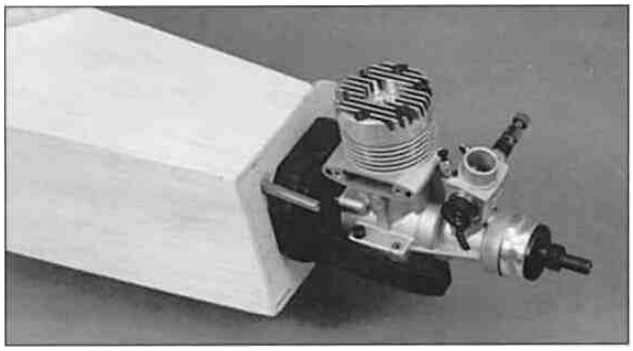
D 2. Now you may use one of the following methods to attach your engine to the mount:

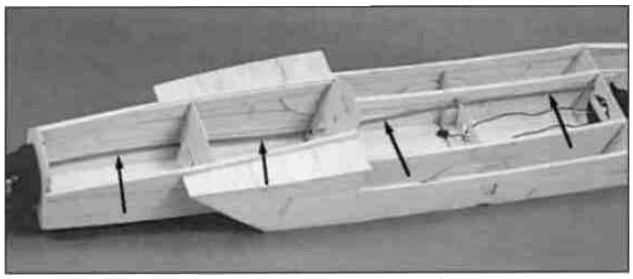
Method 1: Screw the #6 x 3/4" **sheet metal screws** (SCRW018) through the engine mounting flange and into the mount. When first installing these screws, put a drop of oil into each screw hole.



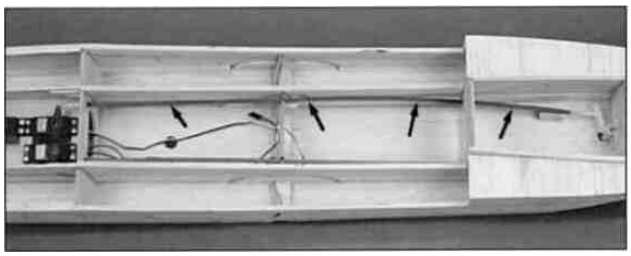
Method 2: Cut and tap threads into the holes you just drilled using a 6-32 tap and tap wrench. If you use this method, you will have to supply your own 6-32 x 1" socket head cap screws for attaching the engine to the mount.

D 3. Install the rudder, elevator and throttle servos using the screws that came with the servos. Cut all but one arm off of the throttle and elevator servo horns and use a long two arm horn for the rudder servo.

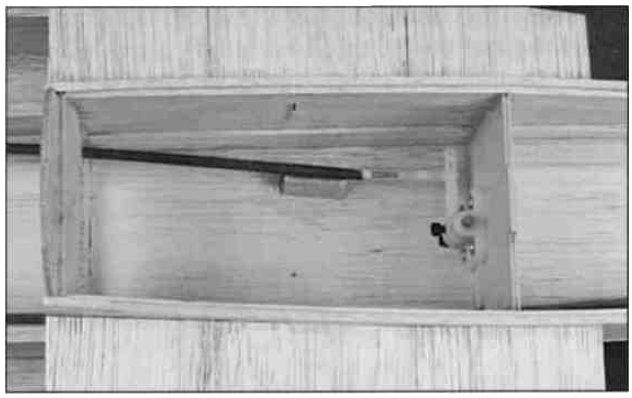




D 4. Determine where the throttle pushrod should exit the firewall and drill a **3/16"** hole there. Route the throttle pushrod outer tube from the firewall to former **F5.** We used a Great Planes Semi-Flexible Pushrod (GPMQ3714). Cut the outer tube to the correct length and remove it from the plane. Scuff up the outside of the tube with medium grit sandpaper, replace the tube and glue it in place.

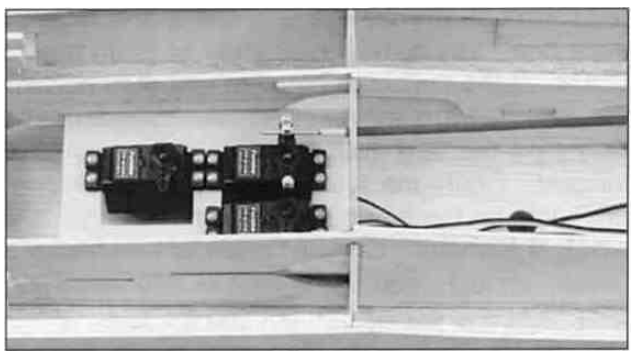


D 5. Install the nose gear steering pushrod outer tube using the same technique outlined in the last step. Notice that the outer tube extends to within 1-7/8" of former F2. We used a Great Planes Semi-Flexible Pushrod (GPMQ3714). If you are using a different type of pushrod, just adapt the instructions to fit your style of pushrod.



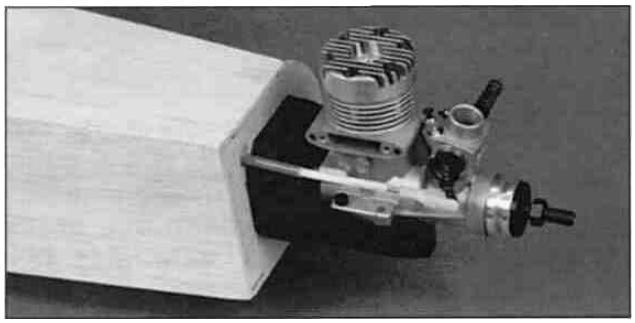
D 6. Assemble the **nylon steering arm** (NYLON16) by inserting a **5/32" wheel collar** (WHCL005) inside the steering arm and securing it with a **6-32 x 1/4" socket head cap screw** (SCRW007). Slide the **5/32" wire nose gear** (WBNT006) into the bearing, and through the steering arm. Install a nylon clevis onto the plastic inner pushrod using the 1" threaded rod that came with the pushrod. Insert the inner pushrod into the outer tube and snap the clevis onto the steering arm. Slide the silicone retainer over the clevis. Cut a scrap piece of balsa to support the end of the steering outer tube and glue it in place on the fuse bottom. Glue the steering outer tube to the balsa piece but make sure the steering arm can operate throughout its range without binding.

D 7. Install three Quick-Connectors (Not Included) on the rudder servo horn as shown in the photo.

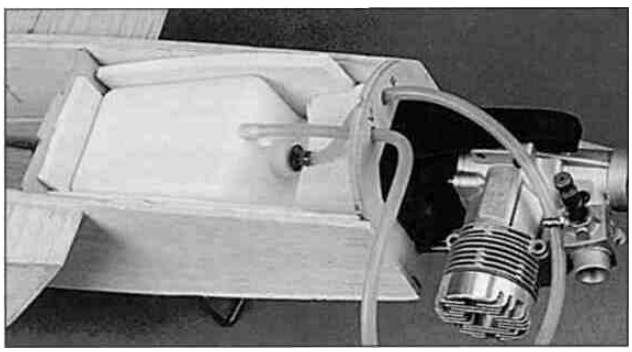


D 8. Install the horn on the rudder servo and

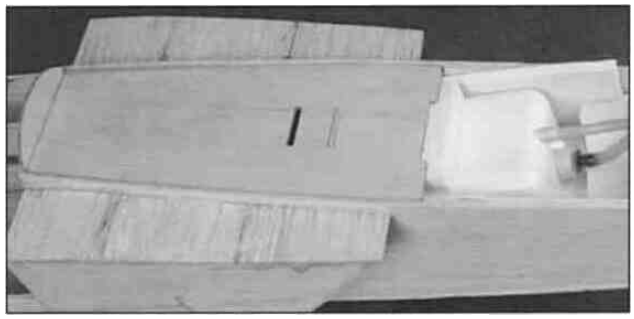
complete the assembly of the steering pushrod. We threaded the pushrod wire that came with the pushrod into the inner pushrod tube and then inserted the unthreaded end through the Quick Connector.



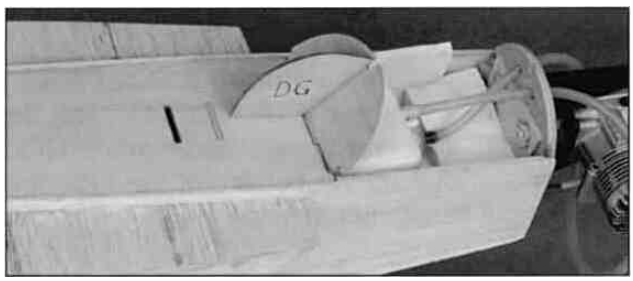
D 9. Assemble the throttle pushrod and temporarily install it to check its length and operation. Make sure the muffler will not interfere with the throttle operation!



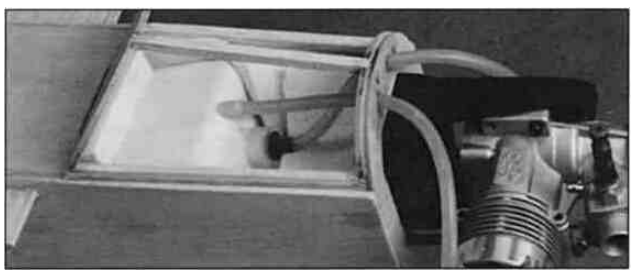
D 10. Assemble your 10 oz. fuel tank (not included). Determine where the fuel lines should pass through the firewall and drill a 1/4" hole for each line. Lay a 1/2" thick layer of foam on the bottom of the tank compartment and then position the tank toward the back of the compartment. Surround the tank with foam so it can not shift forward. Route the fuel lines through the firewall and mark on the firewall, which line is the fuel and which is the vent. One 20" piece of fuel tubing is usually enough, and if it is kept in one piece until later, dust and dirt will not get into the tank. When you get the tank in position, seal where the fuel tubes pass through the firewall with silicone sealer.



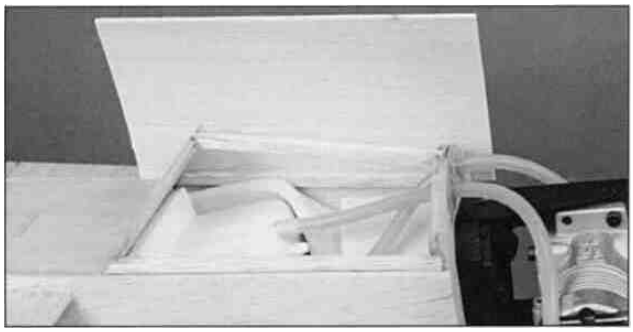
D 11. Test fit the die-cut 1/8" ply **cockpit bottom** (F154F16) in place. Lay a piece of foam above the fuel tank so the cockpit bottom will hold the tank in place. Sand the cockpit bottom slightly if necessary to achieve a good fit and glue it in place.



D 12. Glue the die-cut 1/8" ply **dash** (F154F15) in place using the die-cut **dash gauge** (F154F15) to set the proper angle. **Do not glue the dash gauge in place.**

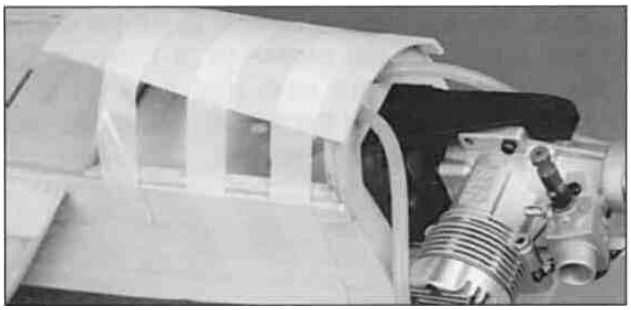


D 13. Cut three 3/16" sq. balsa **stringers** from the **3/16" sq. x 18"** balsa stick (F154F27) to fit between the firewall and the dash. Be careful when gluing the top stringer in place so you don't change the angle of the dash. The dash gauge can be used during this step.

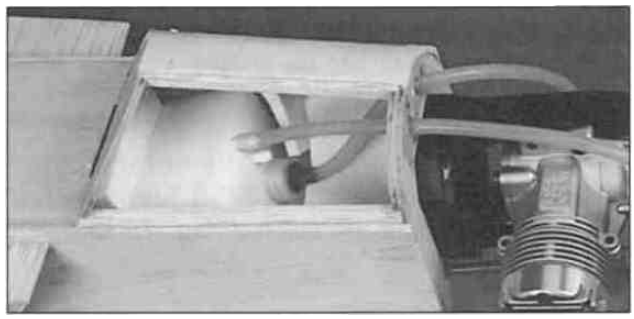


D 14. Cut the **3/32" x 3 x 12"** balsa sheet (F154F28) in half to make two 6" long pieces Glue one piece of sheeting to the left fuse side and bottom stringer so it overlaps the firewall by approximately **3/8".**

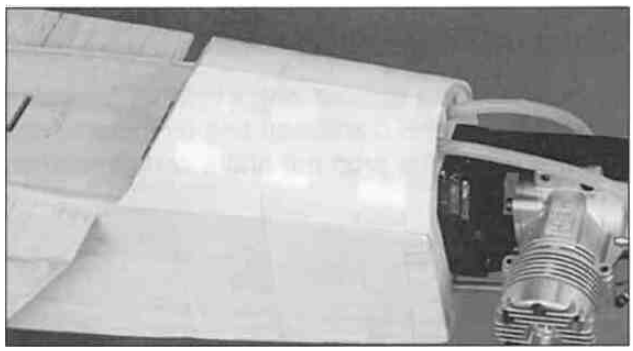
NOTE - The technique described in the next step will be very helpful throughout your modeling career.



D 15. Cut three or four **12"** long pieces of strapping tape and **securely** stick them down on the nose sheeting so they extend down across the fuse side and around to the bottom of the fuselage. Carefully pull the two outside pieces of tape around to the other fuse side Stick them to the fuse side making sure the sheeting is bending nicely and lying against the firewall and the dash. Pull the remaining piece of tape around and stick it to the fuse side The tape should keep the wood from splitting Now apply **thin** CA to glue the sheeting to the dash and the firewall **Do not glue it to the top stringer yet.** Also do not glue the sheeting to the firewall or dash past the top stringer If your tape is waterproof, you can wet the sheeting **after the tape is applied** to help the sheeting bend.

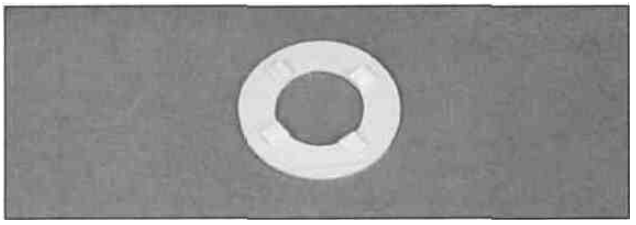


D 16. Trim the sheeting flush with the dash and the firewall. Cut the excess sheeting off at the middle of the top stringer. **Be very careful so you don't cut the fuel tubing when trimming the sheeting around the firewall.** Glue the sheeting to the top stringer with thin CA.



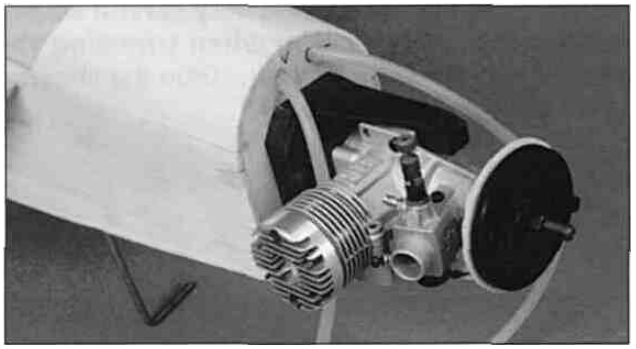
D 17. Install the right side nose sheeting using the same technique described above, except after you bend the sheeting into place, mark where it needs to be cut to fit against the left side sheeting. Release the tape and peel it back a couple of inches so you can cut the sheeting to its correct width. Replace the tape and bend the sheeting into position. Make sure it is lying in place correctly. If not, trim it again until it does lie properly. Glue the sheeting to the firewall, the dash and the top stringer. Trim and sand the sheeting flush with the dash and the firewall. If it takes several tries to get the sheeting to fit well, you should replace the tape Once it loses its stickiness, the wood will start to crack.

BUILD THE NOSE SECTION

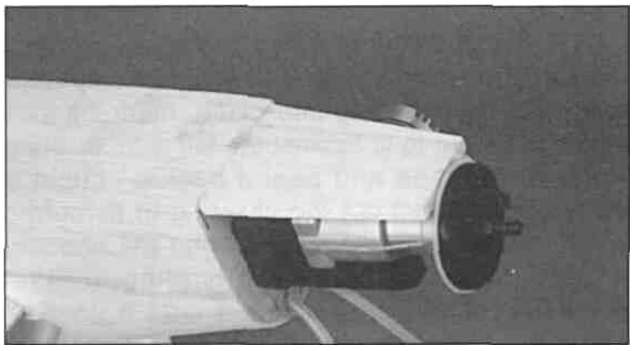


D 1. From a scrap of 1/16" balsa, cut four small pieces and tack glue them to the die-cut 1/16" ply spinner ring (F154F19) as shown, using a small amount of thick CA.

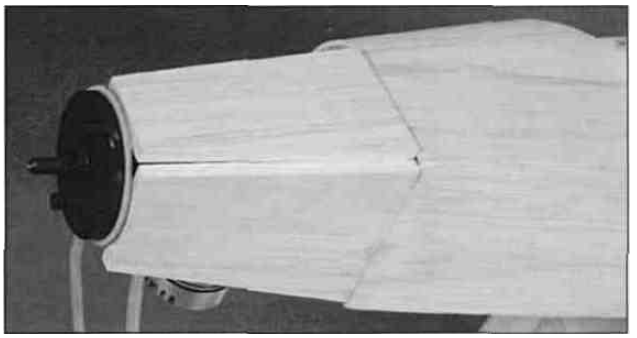
D 2. Center your 2-1/4" diameter spinner backplate (Hobbico HCAQ3750 "Jet Spinner" recommended) over the spinner ring and **tack** glue it to the 1/16" balsa.



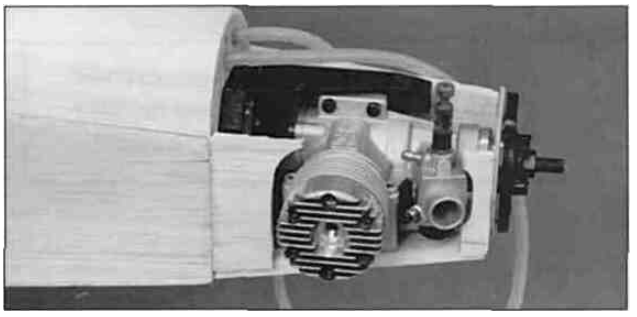
D 3. Slide the spinner ring / spinner backplate assembly onto the crankshaft and temporarily hold it in place with the prop nut and a couple washers if necessary.



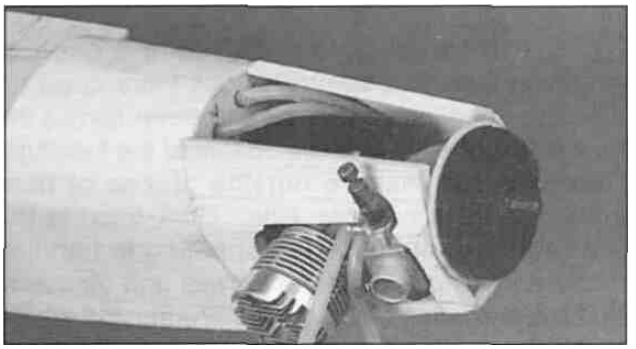
D 4. Sand a 1/4" balsa shaped **nose bottom** (F154F23) to fit between the spinner ring and the firewall. Glue it in place as shown in the photo. Be careful so you don't warp the spinner ring while doing this.



D 5. Sand a 1/4" balsa shaped **nose side** (F154F130) to fit on the left side of the nose (the side opposite the engine head) and glue it in place. Notice that it is not glued flush with the fuse side or outside edge of the spinner ring but protrudes approximately 3/32". This allows the nose side to be sanded to a curved shape.

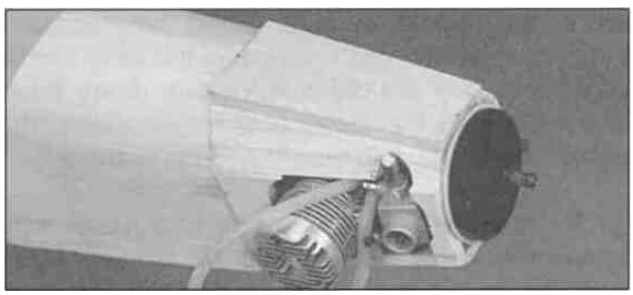


D 6. Cut the remaining 1/4" balsa shaped **nose side** as needed to fit around the engine. Do not worry about getting a tight fit around the engine because you still have to be able to get the engine in and out. Just cut pieces to fit between the spinner ring and the carb and another to fit between the head and the firewall. Leave at least a 3/16" gap all around the engine.



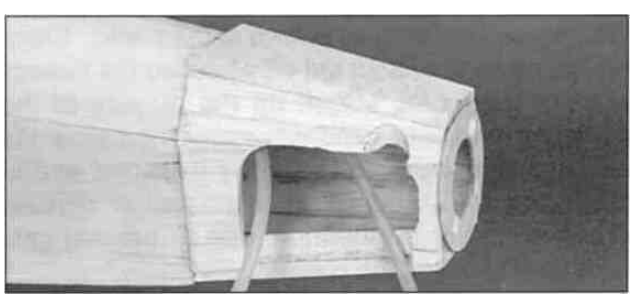
D 7. Install two side 1/4" balsa **nose tops** (F154F25) by beveling the bottom edge to fit against the nose sides and gluing them in place.

Trim the right piece to fit around the needle valve. After the glue is cured, sand the top edges to a bevel so the remaining nose top will fit in the next step. You may need to remove the needle valve before sanding the top edge. If you do, stuff the needle valve opening with a piece of paper towel to keep the dust out.



D 8. Sand the remaining 1/4" balsa shaped nose top to fit and glue it in place. Cut the spinner backplate loose from the spinner ring and remove **it.**

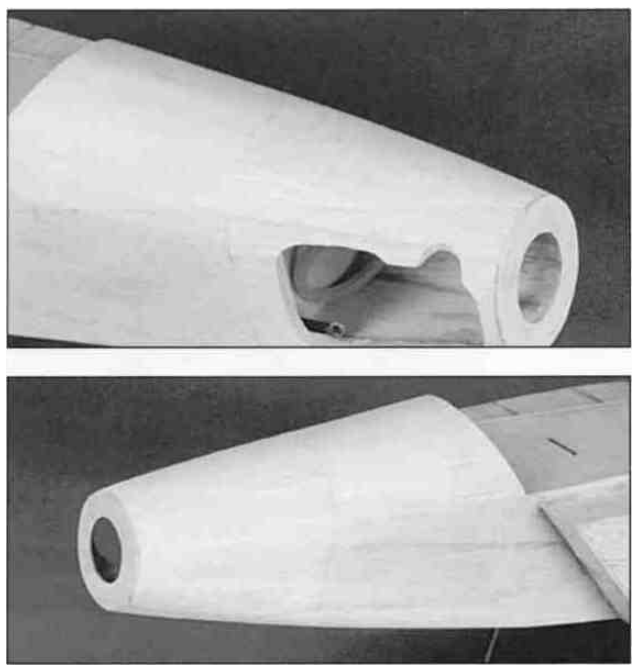
D 9. Carefully cut enough of the nose away so you can remove the screws holding the engine in place. Unhook the throttle clevis and try to remove the engine You will probably have to cut away some of the nose right top side before you can remove the engine. Also remove the engine mount.



D 10. Cut two pieces of **1/2" balsa triangle** (WSTR014) to fit in the bottom comers of the nose and glue them inside the bottom corners as shown in the photo.

D 11. Re-install the engine, mount and throttle cable to make sure you can easily get the engine in and out. If not, carve more wood away until you can.

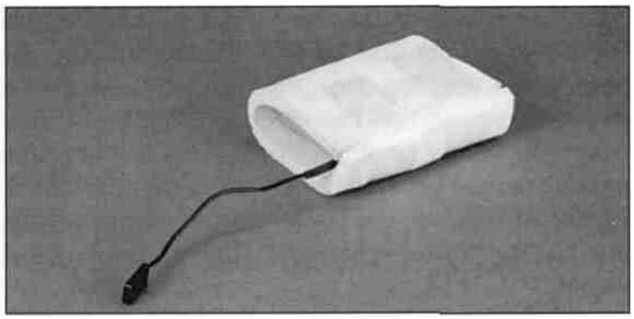
D 12. Remove the engine, mount and the throttle cable again. As you have probably noticed, the nose sides and top are going to get quite thin in several places when the nose is carved to shape. Add " Bondo" or another filler to the inside of the engine compartment to build up these thin areas. Apply polyester resin (or epoxy thinned with alcohol) to the entire engine compartment to fuel proof it.



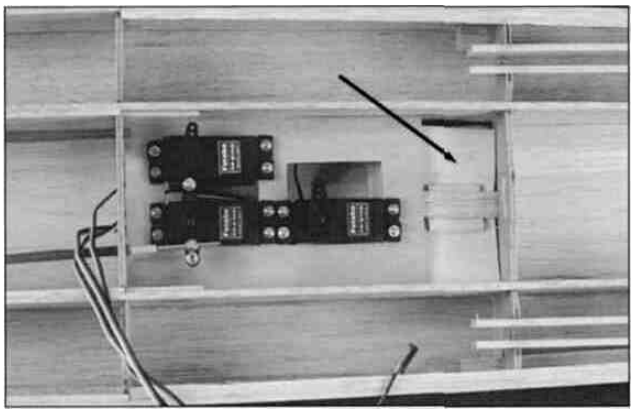
D 13. Using a razor plane and a sanding block, rough sand the nose section to a smooth cross section as shown in the photo. The nose should be round at the spinner ring and smoothly transition to the cross sections shown on the plans at the firewall and F2. Fill any voids with Hobbylite or other wood filler Note- The spinner ring is approximately 1/16" larger in diameter than most 2-1/4" diameter spinners to allow room for final sanding. **Make sure to sand the nose section to blend smoothly with your spinner.**

INSTALL THE RECEIVER BATTERY

D 1. The receiver battery should normally be installed in the aft portion of the servo compartment to help balance the plane. It may be necessary to move it forward later if the plane is tail heavy but we suggest you go ahead and install it there now.



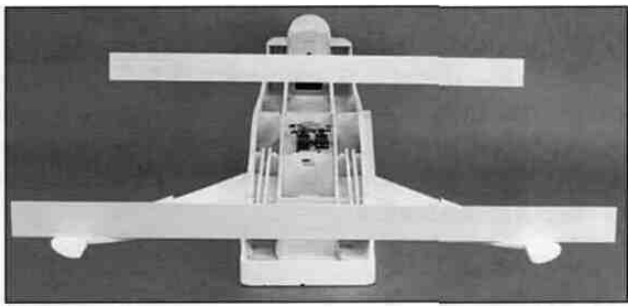
D 2. Wrap the battery in at least 1/4" of latex foam rubber and secure the foam with tape.



D 3. Slide the battery down behind the elevator servo and route the battery wire up between the rudder and throttle servos. Glue a scrap piece of balsa from F6 to the servo tray to hold the battery **in place.**

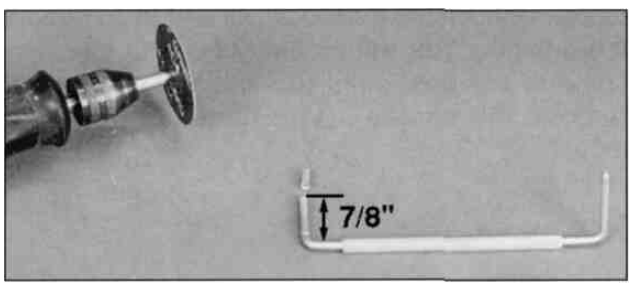
GLUE THE STABILIZERS IN PLACE

D 1. Sand the aft part of each turbine side smooth. Slide the stabs into their slots until they butt up against the fuse sides. Make sure the stabs are all the way forward in their slots. Lay an aileron or other long **straight** piece of wood across the stabs as shown in the photo. Lay another straight piece of wood across the fuselage wing saddle.



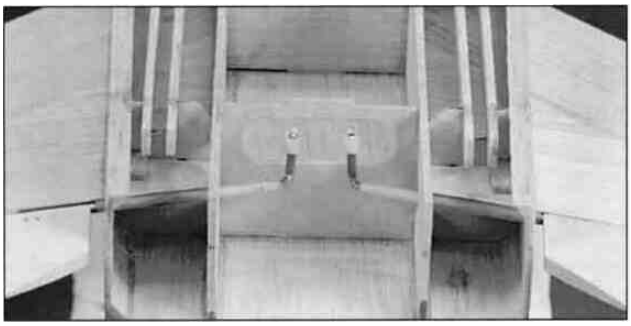
D 2. Using the long piece of wood (aileron) across the stabs as a guide, adjust the stabs until they are level with each other and the wing saddle (sight from behind the plane when doing this). **Securely** glue the stabs to the fuse sides, the turbine sides, the stab braces and the formers.

D 3. Insert the torque rods into place and temporarily install the elevators and hinges. Make sure the torque rods fit nicely and the elevators move freely without binding anything. Also make sure that both elevators are aligned with each other when the **threaded** ends of the torque rods are aligned.



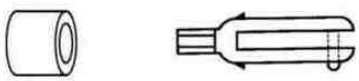
D 4. Cut off the threaded end of the torque rod **7/8"** above the bend as shown in the photo. Clean up the cut with a file or cut-off wheel so the threads are not damaged. Scuff up the outside of the nylon bearing with sandpaper and then slide the bearing tube down towards the threaded end of the torque rod. Apply a small amount of vaseline on each end of the bearing tube to prevent glue from getting inside the bearing.

D 5. Use the 6-32 thread-cutting screw (SCRW103) to tap the holes in two of the **nylon torque rod horns** (NYLON95).

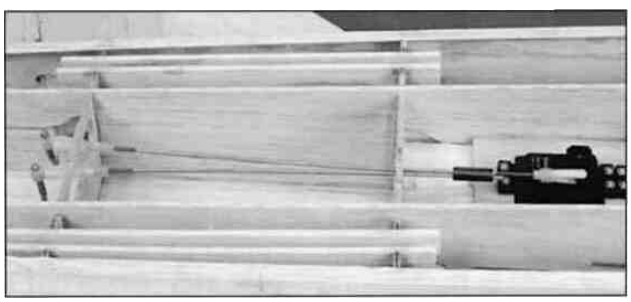


D 6. Screw a threaded horn onto each elevator torque rod until the hole in the horn is 3/4" above the horizontal part of the torque rod. Replace the torque rods in the plane along with the elevators and hinges. Check the operation of the elevators one more time and then glue the torque rod bearings to the stab. Be careful to avoid getting glue inside the bearings. **Do not glue the elevators or the hinges yet!**

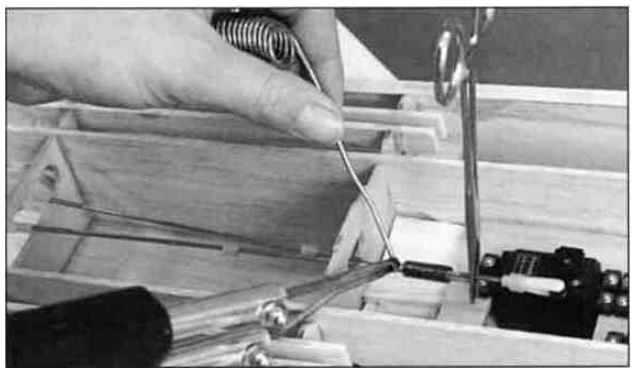
MAKE THE ELEVATOR PUSHROD



D 1. Thread a **nylon clevis** (NYLON17) onto two **12" threaded rods** (WIRES16) and a **4" threaded rod** (WIRES72) until the threads are exposed inside the clevis. Slip a **clevis retainer** (PLTB021) onto each clevis. Cut the two 12" rods so they are **8-1/2"** long from the clevis pin to the end of the wire. Cut the 4" wire to 2-3/4" long from the clevis pin to the end of the wire. **NOTE:** If you positioned your elevator servo other than where shown on the plan, you may have to alter the length of these pushrod wires.



D 2. Position the two 8-1/2" rods in the fuselage as shown above and snap the clevises onto the torque rods. Slide the **1/4" split wire coupler** (METAL057) over the two wires. Slide the third wire (2-3/4" long) into the split coupler from the other direction and then attach the clevis to the elevator servo horn. Operate the elevators to make sure the formers do not interfere with the movement of the rods. If they do, carve away the former or lower the nylon torque rod horns a twist or two.



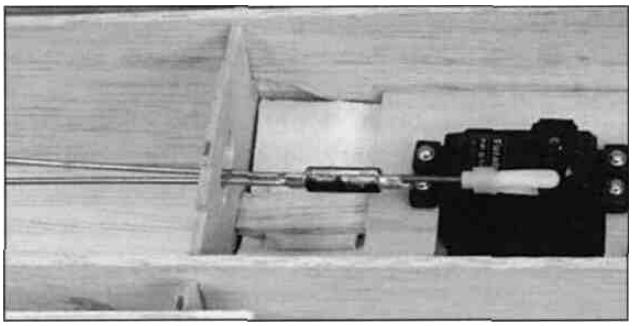
D 3. Adjust the elevator servo horn and both elevators so they are in their neutral position and the split coupler is centered on the overlapping wires. Tape the elevators in position. **Tack** solder the three wires together being careful not to melt the clevis. **Hint:** A pair of hemostats or a small pair of vise-grips clamped on the wire between the coupler and the clevis will act as a heatsink to help prevent the clevis from melting.

HINT: The following steps will help you achieve a good solder joint.

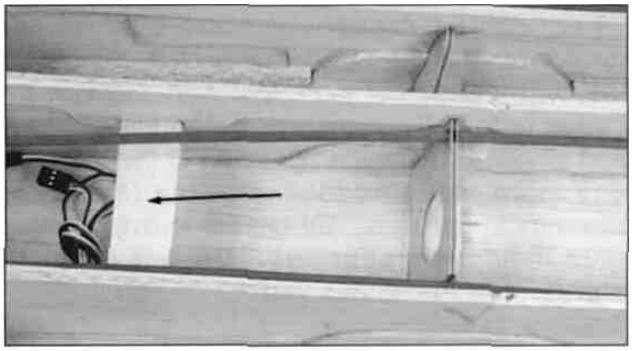
A. Roughen the area to be soldered with fine sandpaper, then thoroughly clean the items to be soldered with alcohol or degreasing solvent.
B. Assemble the items to be soldered.
C. Apply a small dab of soldering flux.
D. Heat the metal with a soldering gun or iron, and apply solder to the metal. The metal must get hot enough to melt the solder, and the solder must freely flow into the joint.
E. Do not move the parts until the solder has cooled.
F. Clean off the excess flux with alcohol or solvent.
G. Test the joint by pulling hard.

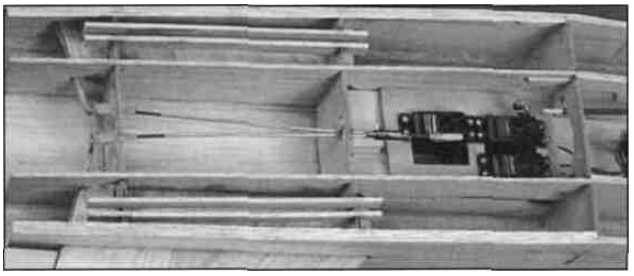
FINISH UP THE FUSELAGE

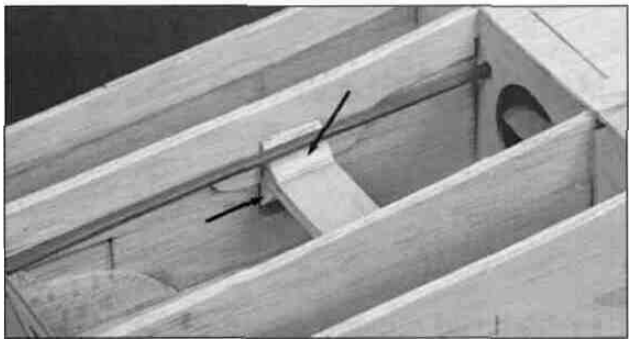
D 1. If you are going to install a receiver antenna tube, now is a good time to do it. We used an extra inner pushrod tube and routed it along the inside of the left turbine and out the back of the fuselage.



D 4. Remove the front clevis and clevis retainer and completely solder the split coupler to the **wires. A** piece of aluminum foil underneath the coupler will keep the excess solder from burning anything. Be careful not to move the wires while soldering the coupler.

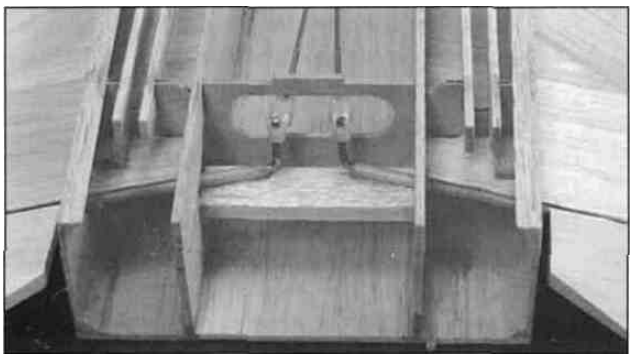




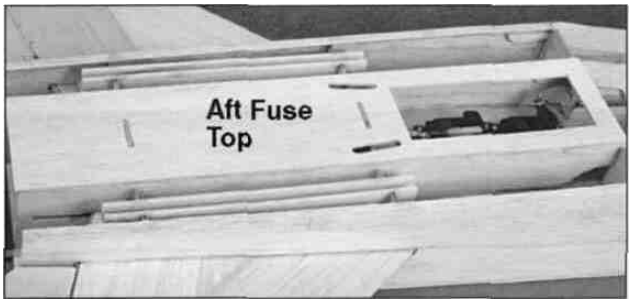


D 5. Allow the wires to cool and then replace the clevis retainer and the nylon clevis. Attach the clevis to the servo horn and check to make sure the wires have not moved. Slide the clevis retainers over the torque rod clevises. Make sure the retainers do not hit former F7.

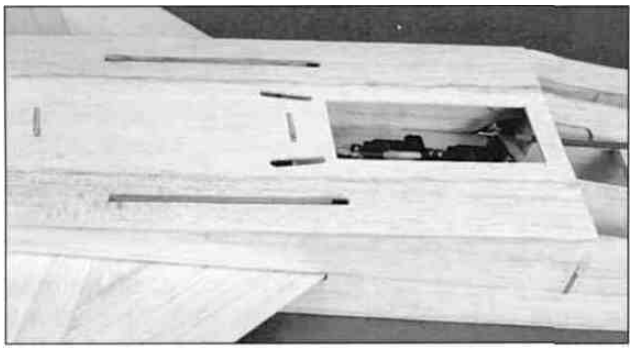
D 2. Securely glue the 1/4" x 1" x 3-1/8" ply **wing bolt block** (F154F20) in place. Soak the area around the block with thin CA to help harden the wood there. Glue 1/2" triangle stock above and below both ends of the bolt block.



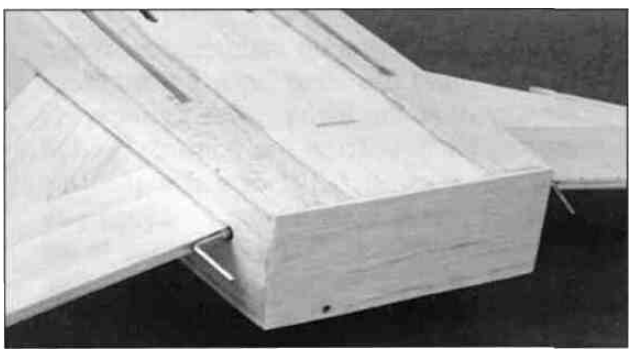
D 6. Sand the 1/4" x 7/8" x 3-1/16" balsa **torque rod brace** (F154F31)to fit between the fuse sides just beneath the torque rods. Glue it in place against the torque rods and securely glue the nylon bearings to the torque rod brace. **Be very careful not to get glue inside the bearing tubes.**



D 3. Sand the aft top edges of the fuselage with a sanding block to remove any high spots. Glue the die-cut 1/8" balsa **aft fuse top** (F154F09) in place with the word "BOTTOM" down. **NOTE: Do not lose the hatch which is die-cut from the fuse top.**

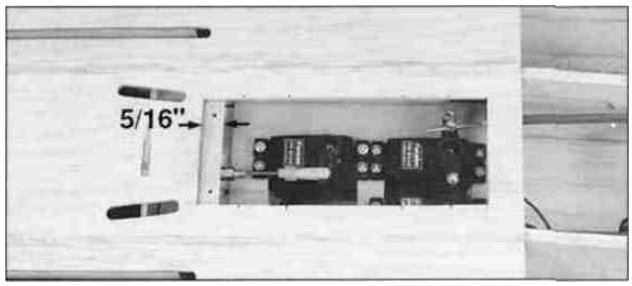


D 4. Glue the die-cut 1/8" balsa **turbine tops** (F154F12) in place. Make sure the fin slots line up with the fin braces. They are butt-glued up against the aft fuse top so hold them flush with the top while you glue them with **thin** CA. Also, be sure to glue the fin braces to the turbine tops.

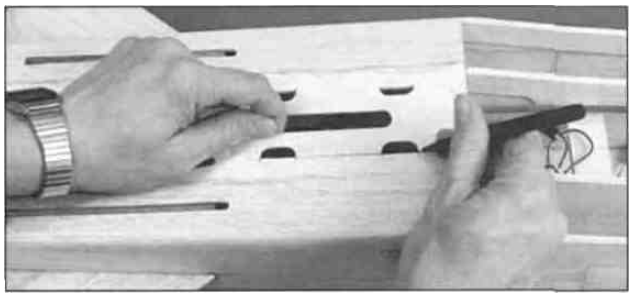


D 5. If you haven't already done so, remove the elevators and the hinges. Sand the aft end of the fuselage to even out all the sides and the tops and bottom. Glue the 3/32" x 2-1/2" x 6-1/2" balsa **fuse back** (F154F32) in place. If you installed an antenna tube, drill a hole in the back to allow it to exit the fuse. Sand the edges of the fuse back flush with the sides of the fuselage.

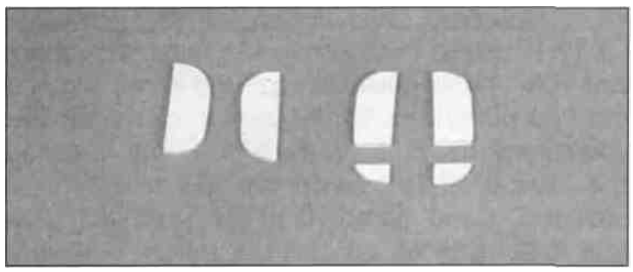
D 6. Use a razor plane and a sanding block to round off the top and bottom corners of the fuselage as shown on plan cross sections. Lightly sand the wing saddle to remove any high spots, but do not round off the corners there or on top of the turbine intakes.



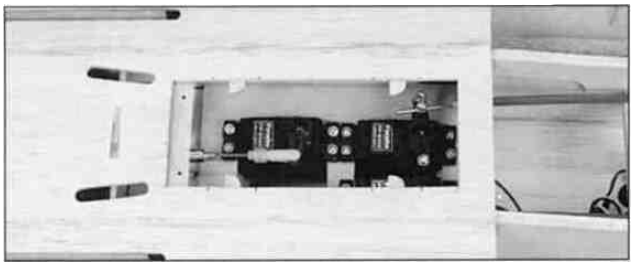
D 7. Glue the 1/8" x 3/8" x 3" ply **hatch screw block** (F154F33) onto the bottom of the aft fuse top so approximately 5/16" of it is exposed through the hatch cutout.



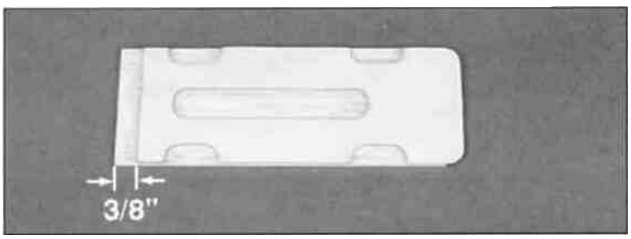
D 8. Hold the die-cut 1/32" ply **hatch doubler** (F154F18) in the hatch cutout with the square end up against the front edge of the screw block. Mark the limits of the doubler recesses on the edge of the hatch cutout. This will tell you where to install the hatch tabs in the next step.



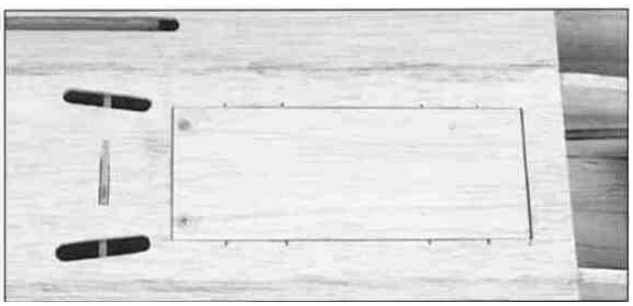
D 9. Use a razor saw to square off one end of each of the 1/32" ply **hatch tabs** (cut these from the hatch doubler sheet) as shown in the photo.



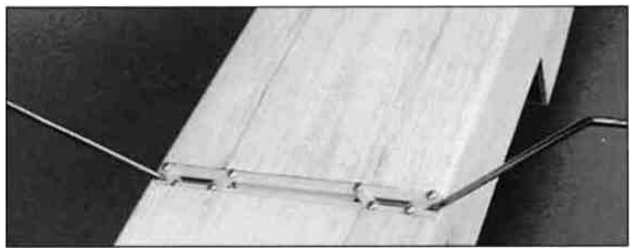
D 10 Glue the 1/32" ply hatch tabs to the bottom of the aft fuse top so they are centered between the marks you just made The tabs should extend approximately 1/4" out into the hatch cutout.



D 11 Position the 1/16" ply hatch doubler on the 3/32" balsa hatch (it was die-cut from the fuse top) so that the hatch overlaps the doubler by 3/8" as shown in the photo The side of the hatch with the punch marks should be opposite the doubler and the punch marks should be near the squared off end of the doubler Apply thin CA around the edges of the doubler to glue the two together. Keep the hatch against a flat surface while doing this so it doesn't end up bowed.



D 12 Position the hatch in the hatch cutout and drill **1/16"** holes down through the screw block at the two punch marks Remove the hatch and countersink the holes in the **hatch only** to accept the #2 **x 3/8" flat head screws** (SCRW069) provided Sand the edges of the hatch until there is a 1/32" gap all around the hatch when it is positioned in the hatch cutout To remove the hatch from the fuselage, just press down on the front edge of the hatch



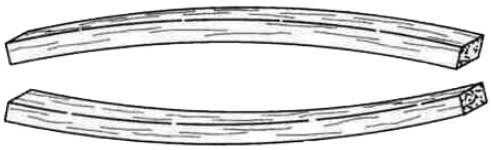
D 13. Grind off any burrs on the ends of the **main landing gear** (WBNT186) and press the gear into the grooved LG block Cut the four **nylon landing gear straps** (NYLON36) apart and position them on the grooved LG block as shown Mark where to drill the mounting holes Drill 1/16" diameter holes at each of the marks and install the straps using the **#2 x 3/8" screws** (SCRW024) provided.

WING

NOTE: *The following instructions explain how to build the wing on a flat surface, directly over the plans The jig tabs will automatically build in the correct dihedral and the required 1-3/4° of washout This enables you to build a wing as straight as your work surface It is a good idea to lay a piece of "Celotex'* or some ceiling tiles or other semi-soft (and flat) surface, into which you may easily stick pins, on your work surface Because this wing has a lot of taper, it is not advisable to build it on a wing jig ^Available from lumber companies and home centers.*

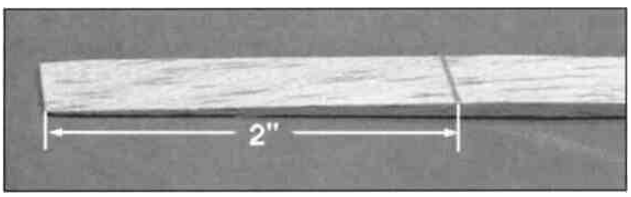
SPARS

D 1 Before using the hard balsa **spars,** examine them carefully for possible imperfections. Look for knots, soft spots, diagonal grain and any other imperfections If possible, position each spar so the imperfections (if any) are on the outer half of the wing panel (toward the tip), where they will be least affected by high stress If the spars are warped slightly try to "balance them out" by installing the warped spars in opposite directions (see sketch on next page) **NOTICE: If you feel that any of the wing parts are unusable due to severe warps or other defects, give us a call and we'll replace the parts.**



Two warped spars installed this way will result in a straight wing

Two warped spars installed this way will result in a warped wing



D 2. Sand one end of each **1/8" x 3/8" x 18" balsa spar doubler** (F154W08) to a 2" taper as shown in the **"Wing Spar Detail"** on the plan.

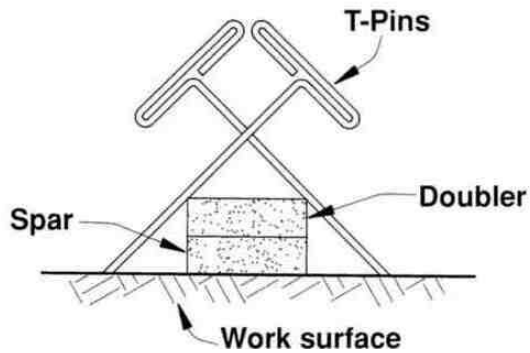
D 3. Glue the spar doublers to the **1/8" x 3/8" x 30" balsa spars** (F154W07) with thick CA as shown in the "Wing Spar Detail." Take your time and press the spar assembly flat against the work surface while the glue is curing. Also rotate the assembly onto its side and press it down to keep the doubler and spar aligned and straight. Do this on a **flat** work surface and most warps can be eliminated. Wipe off any excess glue before it cures.

BUILD THE WING PANELS

NOTE: This wing is constructed with 1-3/4° of washout built-in. When the wing is upright, the tabs on the rear portion of the ribs set the ribs at the proper angles to achieve this slight twist. When you flip the wing over to work on the bottom side, the jig tabs on the top of the wing will hold the correct washout in the wing. If the tabs break off during construction, tack glue or tape them back on.

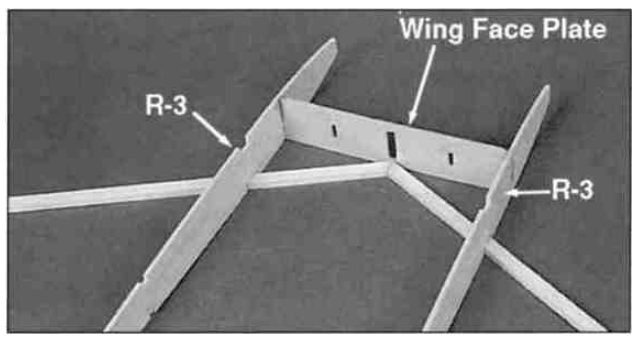
D 1. Tape the wing panel plan to your flat work surface, and cover it with waxed paper (so you won't glue the wing to the plan!). **NOTE:** Do not cut the left and right wing half drawings apart. We recommend you build this wing in one piece.

D 2. Carefully punch out all the die-cut 3/32" and 1/8" balsa **wing ribs.** Sand the edges **slightly to** remove any die-cutting irregularities or "fuzz".

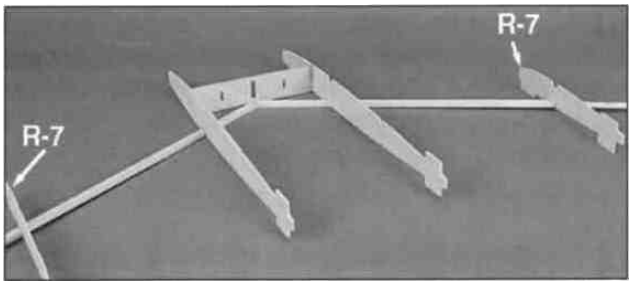


D 3. Place two spars in position on the plan with the spar doublers up, and the thick end (two laminations) toward the root (center of the wing). These will be the right and left bottom spars. The **tapered** end of the spar doublers should end just inside rib #8. Cut the root of the spars to the correct angle at the wing centerline so they fit together nicely. Securely glue the two spars together with either thick CA or epoxy and cross pin the spars in place.

In the next several steps, notice that the <u>bottom</u> a ft jig-tabs are marked with a vertical slit cut near the middle of the jig tab.

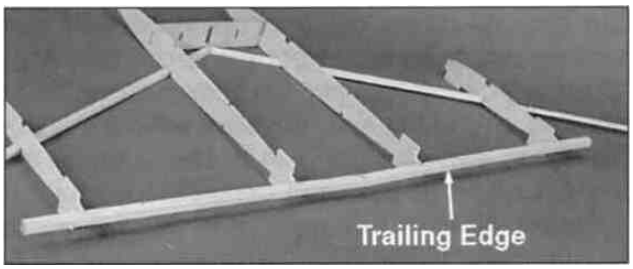


D 4. Position the #3 ribs on the spars in their correct position. Install the die-cut 1/8" ply **wing face plate** (F154W06) between the ribs and glue it to the ribs. Make sure the ribs are lined up with the plans and glue them to the spars.

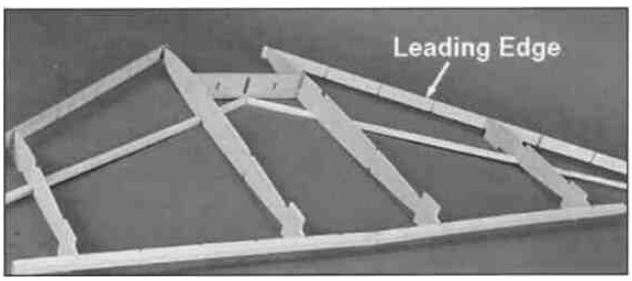


D 5. Position a #7 rib over the plan and **raise the spar up off the work surface** and into the rib notch. Use a 90 degree triangle to keep the rib perpendicular to the work surface and **tack** glue the rib to the spar. Do this for both sides of the wing. **HINT:** You can tack glue or pin the rib jig-tabs to the work surface to keep things in position.

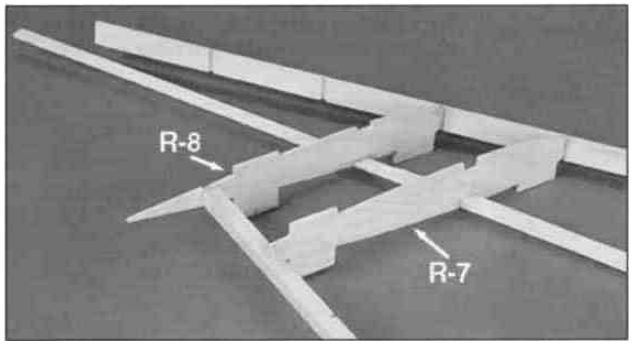
D 6. The shaped and notched wing **trailing edges** (F154W23) are fastened together by a thin strip of balsa. Separate them by **cutting** with a hobby knife Position the TE'S over the plan so the notches are lined up with those on the plan and **carefully** cut the TE'S to the correct length.



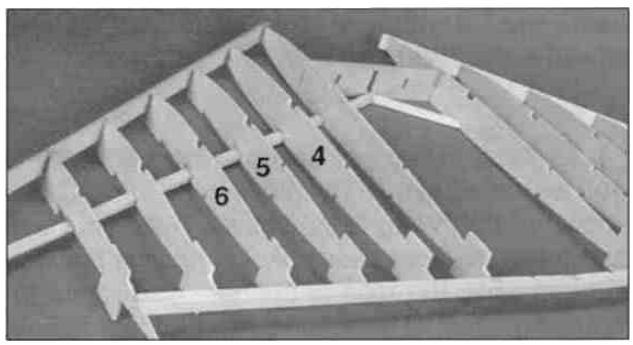
D 7 Position the TE'S in place by working the aft end of the #3 and #7 ribs into their respective notches in the TE Center the TE'S vertically on the ribs and glue them with thin CA. Make sure the TE'S meet nicely at the wing centerline and glue them together.



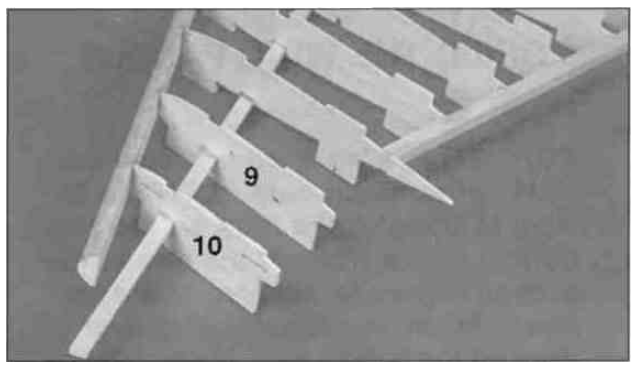
D 8. Position a notched balsa **Leading Edge** (LE) so ribs 3 and 7 are centered vertically in their notches and glue it in place Install the other LE. **Note:** It is important to center the ribs vertically on the LE so the 1/16" balsa LE sheeting (installed later) will fit flush with the LE.



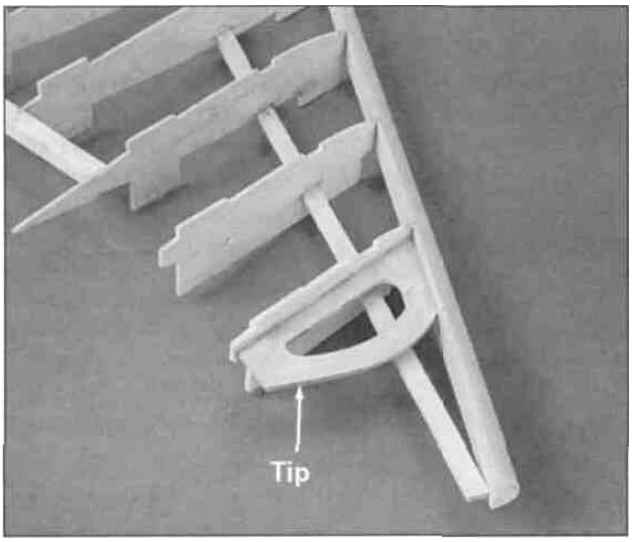
D 9. Glue the #8 ribs to the LE'S and the ends of the TE'S. Raise the spar up into the rib notch and glue it in place. Notice on the photo and on the plans exactly where the TE is attached to the rib.



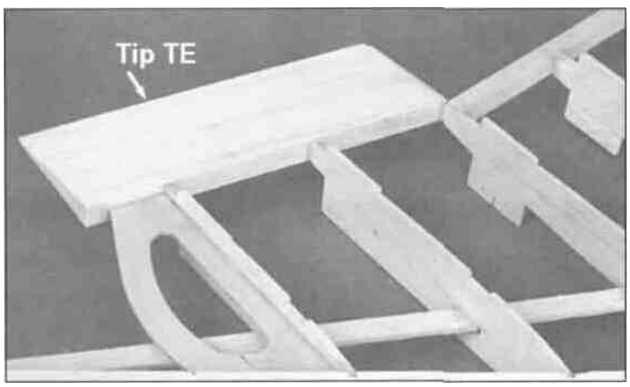
D 10. Install ribs **4, 5 and 6**. Be sure to center the ribs on the leading and trailing edges before gluing them in place.



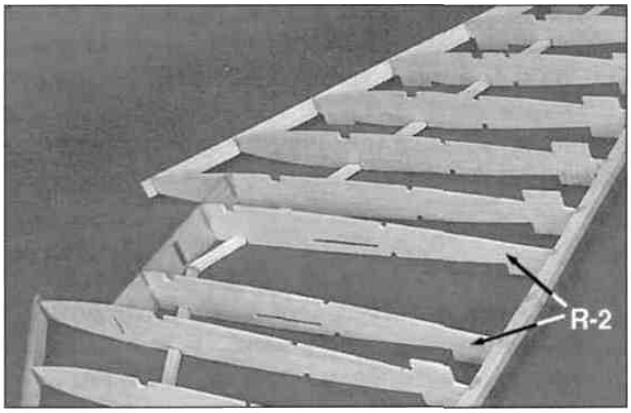
D 11. Bend the tips of the spars up slightly and slide ribs **9 and 10** into place Glue the ribs to the LE and the spar, making sure to keep the spar pressed up into the rib notches.



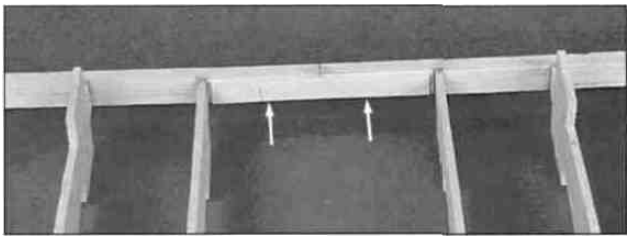
D 12. Glue the die-cut 1/8" ply **wing tips** (F154W06) in place against the LE'S and the #10 ribs. Raise or lower the outboard edge of the tips to keep them level with the work surface. Sand the front of the tips if needed to get them to fit well. **Do not force the wing tips up against the LE or you may skew the wing.** Cut the excess LE and spar off even with the wing tip for now.



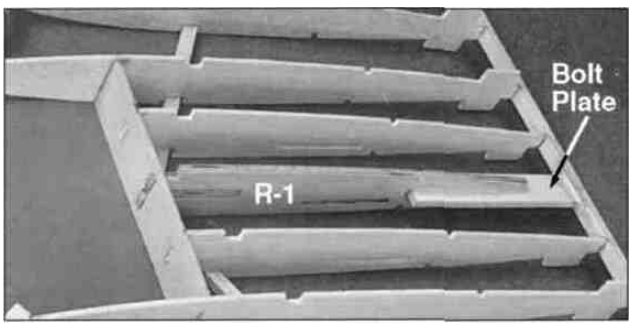
D 13. Test fit a tapered balsa **tip trailing edge** (F154W11) in place. You may need to sand the inboard end of the tip trailing edge or the aft ends of ribs 9 and 10 to achieve a good fit. When satisfied with the fit, glue it in place making sure it is aligned with rib 8. Also make sure ribs 9 and 10 are centered on it to allow room for the capstrips which will be applied later. Install the other tip trailing edge.



D 14. Twist the die-cut 1/8" balsa #2 ribs into place with their jig tabs against the work surface. Align the TE with the ribs and glue them in place.



D 15. Securely glue (epoxy) the 1/16" x 7/16" x 3-1/2" ply **TE brace** (F154W21) to the forward face of the TE'S as shown in the photo.

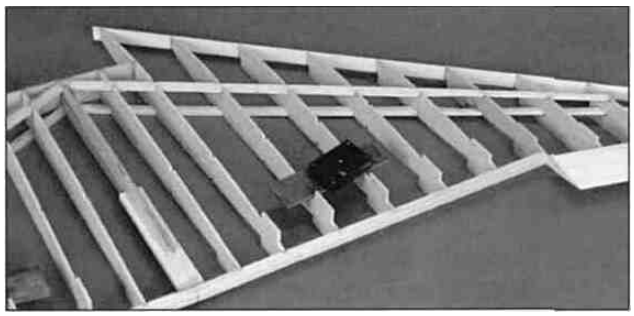


D 16. Glue the two die-cut 1/8" ply rib #1's (F154W06) together. Test fit the 1/4" x 1" x 5-7/8" **wing bolt plate** (F154W20) into the aft slot in the ribs. Sand the slot if necessary to allow the bolt plate to fit all the way in. Position the #1 ribs, with the bolt plate in the slot, in place in the wing with the aileron servo slot down. Push it fully into the wing face plate until it hits the spars. Apply epoxy to the aft edge of the wing bolt plate and to the bolt

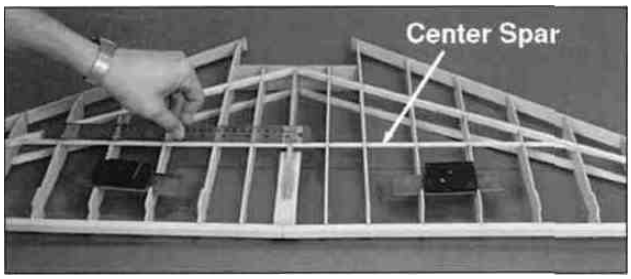
plate/#1 rib joint. Slide the bolt plate aft in its slot until it touches the TE brace. Align everything with the plans and make sure the bolt plate is centered vertically on the TE brace. **Securely** glue everything in place with **epoxy.** Make a generous epoxy fillet around all wing bolt plate joints.

NOTE: From this point on it is very important to keep all the rib jig-tabs on the work surface. Use weights or pins to keep everything down. The bottom spar will actually be bowed and have a tendency to lift the middle ribs off the work surface.

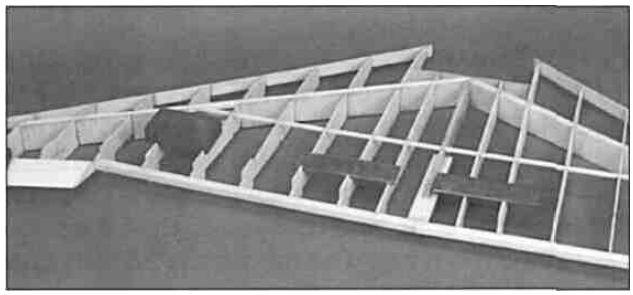
A few zip lock bags filled with sand work well for holding down the wing panels.



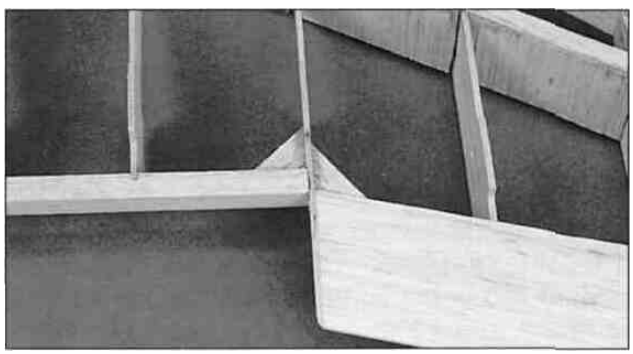
D 17. Cut the two **top spars** to fit together and place them in the rib notches (with the spar doubler down). Make sure they are fully seated in the notches so they do not protrude above the top surface of the ribs. Securely glue the two top spars together and to the ribs. Remember, the spar doubler stops just before rib 8. Cut the excess spar off flush with rib 10.



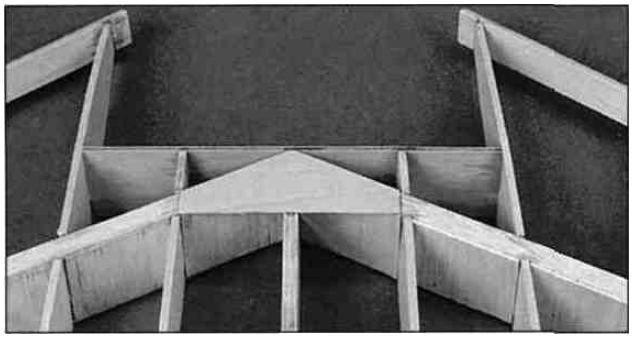
D 18. Position a 1/8" x 1/4" x 30" basswood **center spar** (F154W09) in its notches. Cut the ends off at an angle so it will fit **neatly** against the top wing spar. Use a straight edge to press it all the way down into the notches and glue it in place. **It is not intended to be flush with the top surface of the wing.** Make sure to get **good** glue joints where it attaches to the wing spars. Apply excess glue to these joints to form generous fillets.



D 19. Glue the pre-cut 1/16" balsa vertical grain **shear webs** (F154W18) to the **rear edge** of the main spars in all rib bays **except between ribs 6 and 7. The shear web should attach to the front of the spars in that rib bay.** Line up the top edge of each shear web with the top edge of the spar. Later, when the wing is flipped over, you can trim the webs flush with the bottom spar. **NOTE:** The webs must be **securely** glued to the spars.

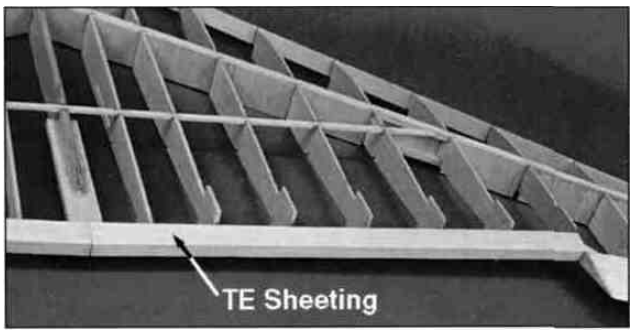


D 20. Locate the die-cut 1/8" balsa **TE gussets** (F154F06) and glue them in place on both sides of the #8 ribs. You may have to sand them to fit nicely in the corners.

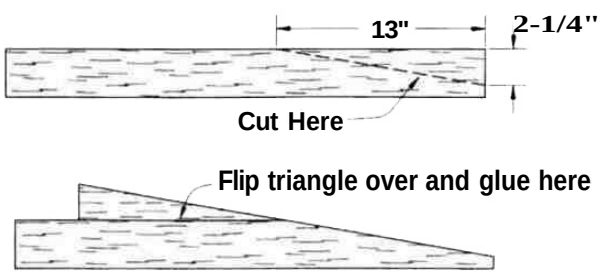


D 21. Sand the area near where the main spars join to remove any high spots. Securely glue a die-cut 1/32" ply **spar joiner** (F154F18) in place as shown in the photo.

INSTALL WING TOP SHEETING



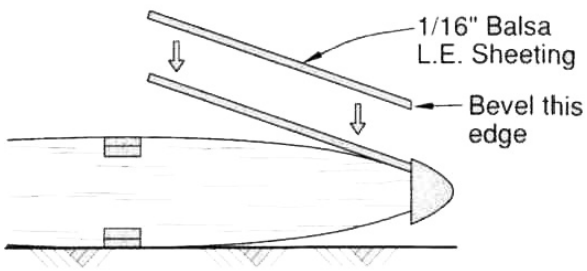
D 1. Lightly sand the tops of the ribs to blend with the notched trailing edge. Cut two 1/16" x 7/8" x 18" balsa **trailing edge sheets** (F154W15) to fit from the wing centerline to the outside edge of the #8 ribs. Use weights to make sure the rib jig-tabs are all against the work surface and glue the TE sheeting in place. **NOTE:** The edge of the TE sheet may not be exactly straight, but just position the sheet so it slightly overlaps past the TE. Any overlap can be sanded off flush with the TE later.



D 2. Make four leading edge sheets by cutting a triangle **2-1/4"** wide and **13"** long off of one end **of** each 1/16" x 3" x 30" balsa **wing sheet** (F154W14). **HINT:** Use a hobby knife and cut a straight line using a metal straight edge. Flip the triangle over and glue it to the rest of the sheet as shown in the sketches above.

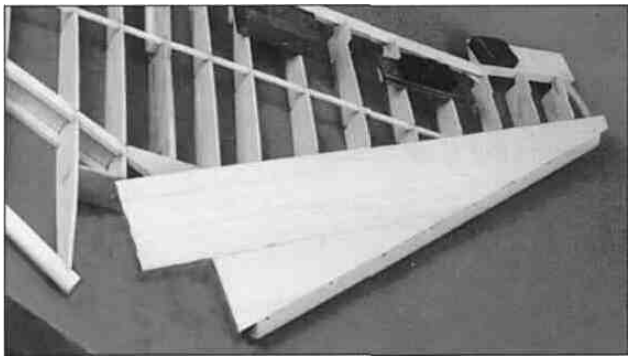
D 3. Sand **both** sides of each LE sheet smooth with a sanding block and fine grit sandpaper.

D 4. Before applying the leading edge sheeting in the next steps, use your T-bar to lightly sand off the edges of the shear webs and smoothly blend the ribs to the main (front) spar. Also, clean up the LE\rib joints to remove any excess glue.

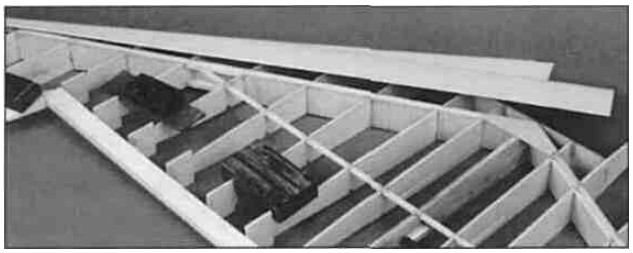


D 5. Sand the **front edge** of the LE sheeting (the edge that includes the triangle) to a slight bevel so it will fit snugly against the back of the leading edge. Trial fit it in place before proceeding. Position the sheeting left or right until the **aft** edge of the sheeting is approximately in the middle of the spar. ***Note: The sheeting must extend past the wing tip. (see photos on page 34).***

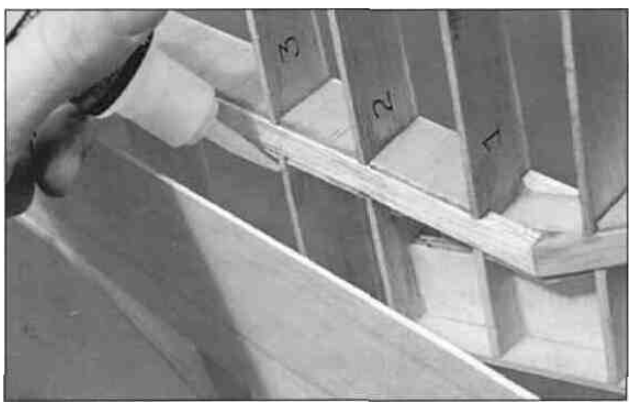
NOTE: It will be helpful to have the following items handy for the next steps: thin CA, thick (slow cure) CA, a straight piece of wood (such as an aileron) and a wet cloth.



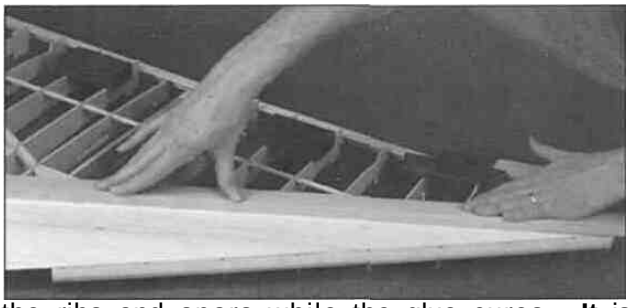
D 6. Hold the sheeting tightly against the LE at a slight angle so it sits down on the LE of the ribs.



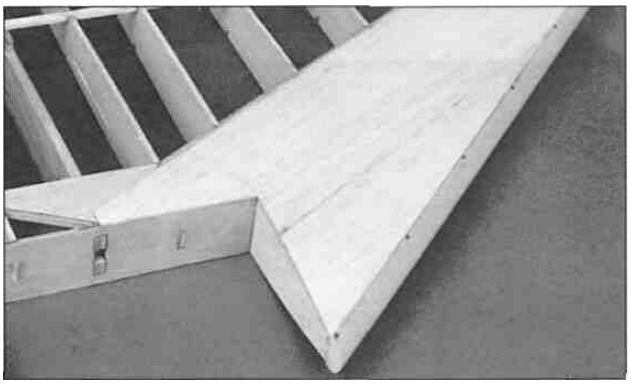
Use **thin** CA to glue the sheeting to the LE only. Do not glue it to the ribs or to the LE past rib **10** yet.



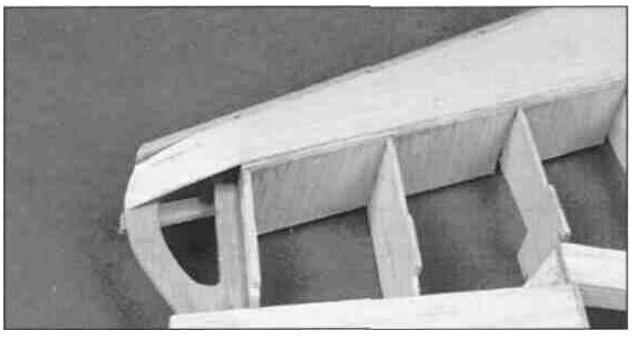
D 7. Tilt the wing up, with the LE down, and apply a drop of thick (slow curing CA) to each rib. Hold the wing at an angle so the glue will drip down and coat the edge of each rib. Apply a line of glue to the front edge of the spar and immediately place the wing on your **flat** work surface. Replace the weights or pins to keep the wing jig tabs against the work surface. Press the sheeting down into place and use a piece of wood (an aileron works OK) to hold the sheeting against



the ribs and spars while the glue cures. **It** is important to keep the wing flat during this process **as** the LE sheeting will start to "lock" the wing **together.**



D 8. Trim the **root** end of the sheeting flush with the centerline of the wing, rib 3 and the wing front plate. Cut the LE off flush with rib 3.



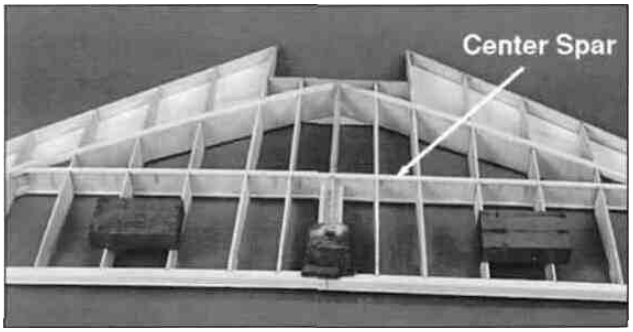
D 9. Wet the **tip** portion of the LE sheeting and allow it to soak for a few minutes. Bend the sheeting down against the wing tip and glue it in place. Trim the sheeting even with the edge of the tip.

D 10. Sheet the opposite wing panel using the same procedure outlined above.

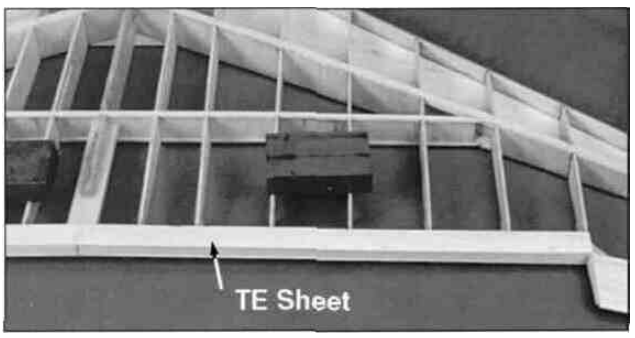
INSTALL THE BOTTOM WING SHEETING

D 1. Flip the wing over and carefully trim off the jig tabs on the bottom of the wing (the side **opposite** of the side you just sheeted). Also trim the shear webs flush with the spar and cut the bottom spar off flush with rib 10. Use a sanding block with fine grit sandpaper to touch up where the jig-tabs were and to blend the ribs into the TE. **Be careful not to change the shape of the ribs during this step.**

D 2. Install the 1/16" x 2-15/16" x 1" balsa **center spar shear webs** (F154W19) by securely gluing them to the top center spar in all the rib bays. Cut them to fit when required and make sure they are in full contact with the spar. ***Notice that they are glued to the bottom of the spar and not the front or back.***



D 3. Cut the remaining 1/8" x 1/4" x 30" basswood **center spar** (F154W09) to fit as you did earlier on the top surface. Apply a bead of thick CA on the top surface of all the center spar shear webs and install the center spar. Make sure all the jig-tabs are on the work surface and the center spar is pressed down against the shear webs. **NOTE:** The spar need not be flush with the bottom edge of the ribs. Make a glue fillet around the center spar where it contacts the main spars. After the glue is fully cured, remove the wing from the work surface and inspect the shear web joints. Add medium CA to the joints if necessary to achieve good strong joints. Replace the wing on the work surface.



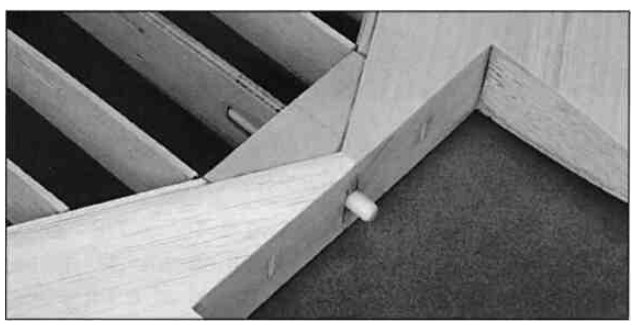
D 4. Add the remaining two 1/16" x 7/8" x 18" balsa **TE sheets** (F154W15) just as you did earlier on the top surface. Do one panel at a time and keep the wing flat on the work surface until the glue cures.

D 5. Sand the area near where the main spars

join to remove any high spots. Securely glue the remaining die-cut 1/32" ply **spar joiner** (F154F18) in place as shown in the photo.

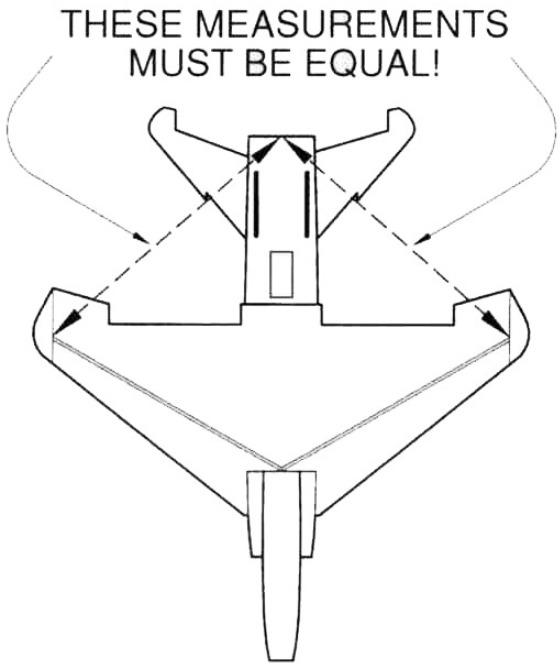
D 6. Install the two remaining LE sheets using the same procedure outlined in steps 5 - 10 on pages 33 to 35. This final sheeting process really "locks" in the desired 1-3/4° washout (wing twist), so make sure the jig tabs are down on a flat surface when applying this sheeting.

D 7. Enlarge the hole in the wing face plate to **5/16".** Be careful to keep the hole centered when doing this. **Note:** A good way to do this is the use a 5/16" drill bit in a reversible drill. By using the bit in reverse rotation, it won't grab and the hole will stay centered better.

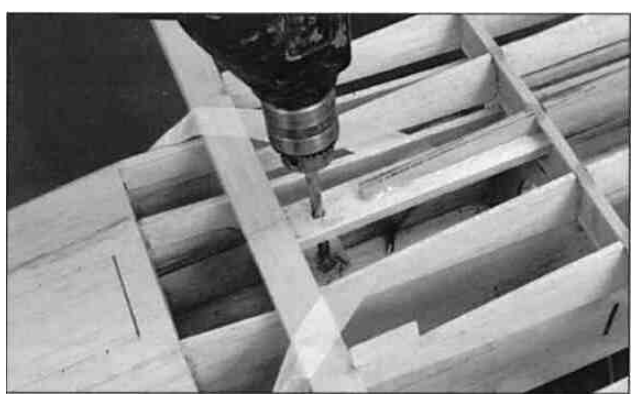


D 8. Round off both ends of the 5/16" **x 3" hardwood dowel** (DOWEL042). Securely glue the dowel into the wing using epoxy. Wipe any excess epoxy off of the wing faceplate before it cures.

D 9. Test fit the wing on the fuselage with the jig tabs up. You may need to enlarge or elongate the dowel hole in former F3 **slightly** to get the wing to fit nicely.

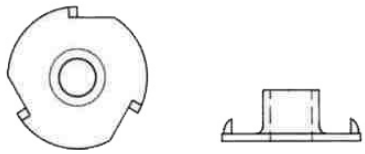


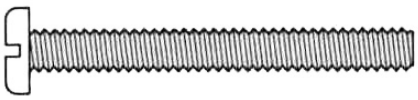
D 10. Use a T-pin and a piece of string to check the alignment of the wing. Stick the T-pin in the middle of the tail and loop the string around the pin. Pull the string over to the end of one spar and hold your finger there on the string Swing the string over to the other tip and compare the measurement. Adjust the wing if necessary and do this again until the measurements are equal. When they are equal, make a mark on the wing TE and the fuse so you can tell when they are aligned. Use a couple strips of strapping tape to hold the wing in place.



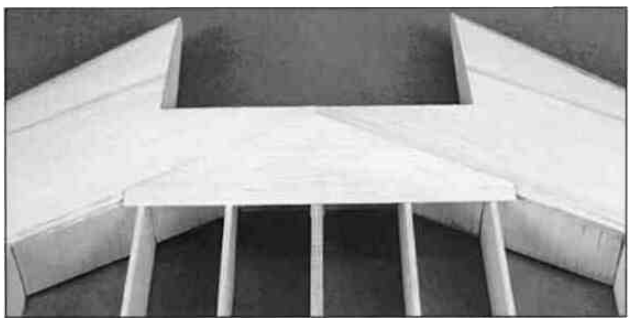
D 11. Drill a 1/4" hole down through the 1/4" ply wing bolt plate and the wing bolt block. The drill should be **perpendicular** to and **near the centerline** of both plates. Do not allow the wing to move during this process.

D 12. Remove the wing and enlarge the hole in the **wing only** to 5/16". Flatten out or cut off the three "teeth" on the 1/4" **blind nut** (NUTS020). If you have a 1/4-20 tap, run it through the blind nut a couple of times **from the unflanged end** to clean up the threads. Firmly press the blind nut into the wing from the top. Install the wing on the fuselage using the 1/4-20 nylon bolt inserted through the die-cut hole in the bottom of the fuse.

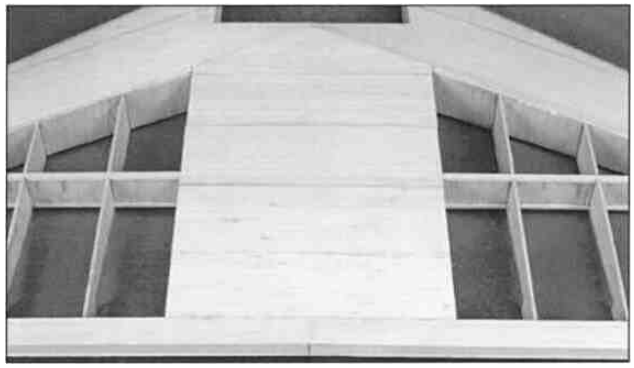




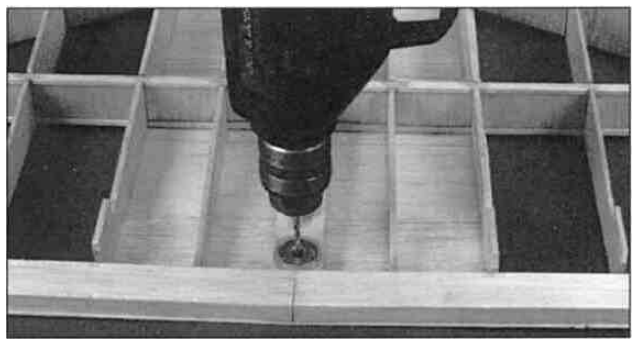
Tighten the bolt down and apply thick CA or epoxy around the blind nut to hold it in place. **Do not glue the bolt to the blind nut!** Remove the wing from the fuselage.



D 13. Place the wing back on the work surface with the jig-tabs down (wing upside-down). Cut one piece of 1/16" x 2-5/8" x 8" balsa **wing center sheeting** (F154W16) to fit up against the leading edge sheeting. Glue it in place as shown in the photo. Do not worry about the slight bumps that are caused by the 1/32" ply wing spar joiner, the sheeting will be sanded smooth later.



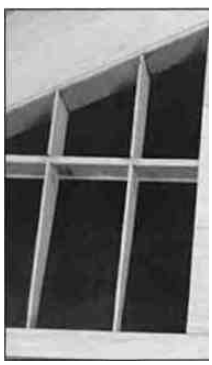
D 14. Glue four more 1/16" balsa wing center sheets in place behind the first one. The last one will have to be cut to fit.

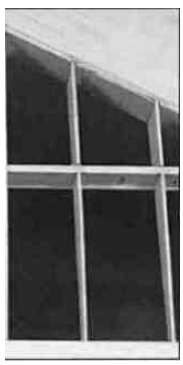


D 15. Flip the wing over (wing right-side-up) and, using the blind nut as a guide, drill a 1/8" hole in the center sheeting to mark where the bolt should go.

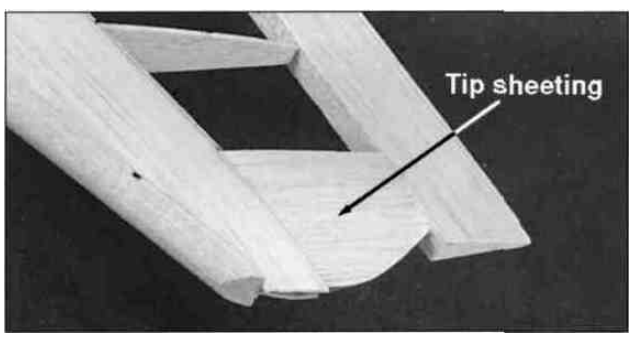
D 16. Twist the 3/16" x 3/8" x 2" basswood **aileron servo rails** (F154W10) into place on either side of the #1 ribs. Position the aft rail at the back of the slot and use your aileron servo to determine where the forward rail should go. Allow enough room between the rails to get the servo in and out, then securely glue the rails in place.

D 17. Using the servo rails as a guide, cut a 1" wide rectangle in the center sheeting so you will know where the rails are.



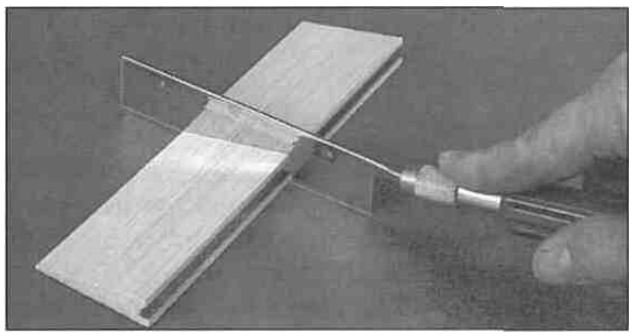


D 18. Trim the jig-tabs off of the wing top surface and use a sanding block to smooth out the ribs. Install the 1/16" balsa wing **center sheeting** just as you did on the bottom of the wing.

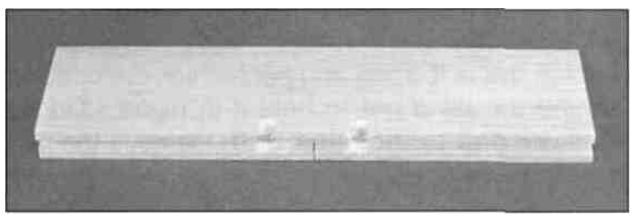


D 19. Cut four pieces of wing tip sheeting from the remaining 1/16" **wing sheeting** using the pattern on the wing plan as a template. Test fit the pieces in place and trim them if needed to achieve a good fit between the LE sheeting and the TE. Glue the pieces to the **LE sheeting first** so they overlap rib 10 about 3/16". Then glue the pieces to rib 10, the TE, and the wing tip. Do not worry about shaping the wing tip yet.

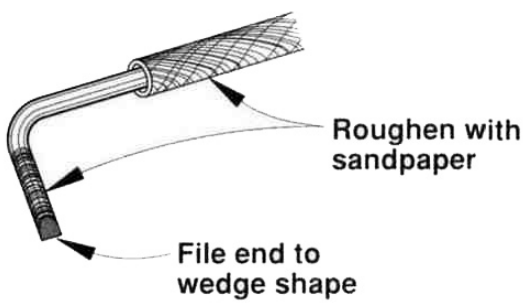
INSTALL THE AILERON TORQUE RODS



D 1. Measure to locate the middle of the grooved balsa **center TE** (F154W17) and make a perpendicular relief cut **almost** all the way through (within 1/16") with a razor saw. **Do not cut all the way through!** This cut is needed to allow the center TE to conform to the dihedral angle of the wing as shown in step 7 on the next page.

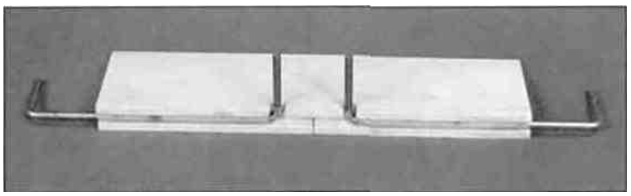


D 2. Place the center TE over the wing plan and mark where to notch it for the torque rods. Notice that the notches are on the **opposite** side of the cut you just made. Cut a notch for each torque rod as shown in the photo. Now hold the center TE in place against the wing and mark where to cut notches in the bottom of the wing TE. Cut similar notches in the bottom of the wing TE.



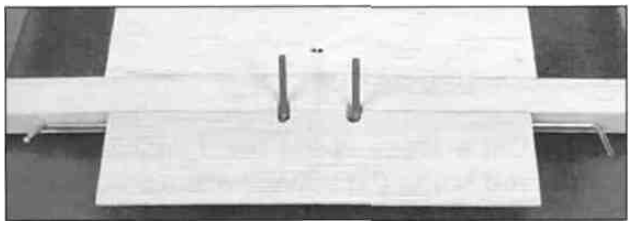
D 3. Roughen the unthreaded end of the **aileron torque rods** (WBNT188) with 100-grit sandpaper, and file the same end to a wedge shape. Roughen the surface of the plastic bearing tubes with 100-grit sandpaper.

D 4. Clean the torque rods and bearing tubes with alcohol. Slide the plastic bearings toward the threaded end of the torque rods, then use a toothpick to apply a small amount of petroleum jelly to the ends of the plastic tubes (to help prevent glue from getting inside and locking up the torque rods).



D 5. Use epoxy to glue the plastic bearing tubes into the grooves in the center TE. Make sure the torque rods are fully seated in the groove, wipe off any excess glue and allow it to harden. **Notice that there is a right and a left torque rod.** Be sure to assemble them as shown in the photo.

D 6. Sand the TE of the wing to make it straight with square edges.



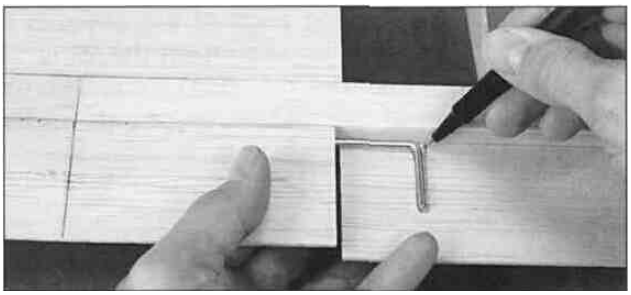
D 7. Carefully glue the center TE to the wing so the torque rods are exiting the **bottom** of the wing. The slot you cut earlier should allow the center TE to fit the dihedral. Make sure the center TE is properly aligned with the wing and is not tilted up or down. Also be careful not to get any glue on the torque rod wires.

ASSEMBLE AILERONS

NOTE: Do not glue the aileron hinges until after your model has been covered.

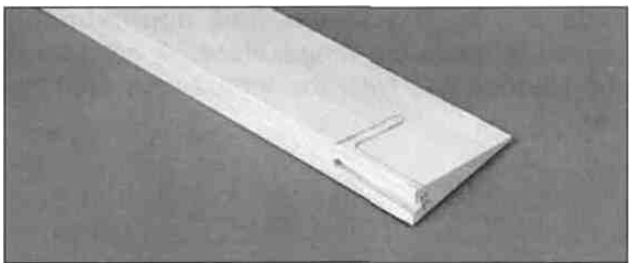
D 1. Cut the tapered **ailerons** (F154W12) to fit between the center TE and the tips with a 1/16" gap on each end. Mark the **inside** end of each aileron with an "L" for the left one and an "R" for the right one.

D 2. Draw an accurate **centerline** along the LE of the tapered balsa ailerons and the wing TE.



D 3. Lay the ailerons in place in their respective openings, with the torque rods resting on top of the ailerons. **Mark the torque rod locations on the top of the ailerons.**

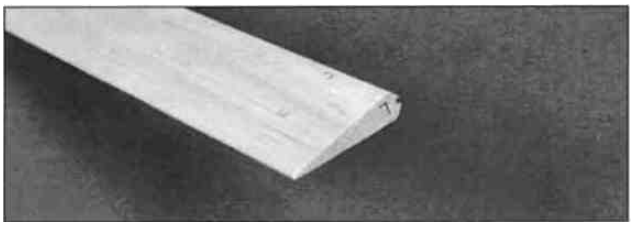
D 4. Drill a **1/8"** hole in the ailerons at the torque rod locations, starting at the leading edge centerline and drilling **straight** in to the proper depth.



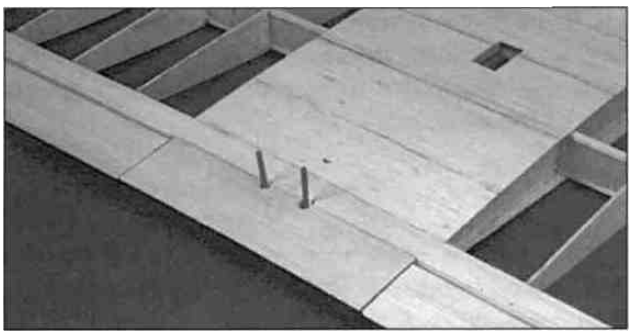
D 5. Use the sharpened 1/8" diameter brass tube to **cut a groove in the leading edge of the ailerons** to accept the torque rods. Trial fit the ailerons onto the torque rods and cut or file the groove as necessary until they fit.

D 6. Lay the ailerons on the plan and mark the **hinge locations** on the ailerons. Place the ailerons against the wing TE and transfer the marks over to the wing.

D 7. Cut the hinge slots in the ailerons and wing TE using a hobby knife, following the procedure and cautions on page 9.

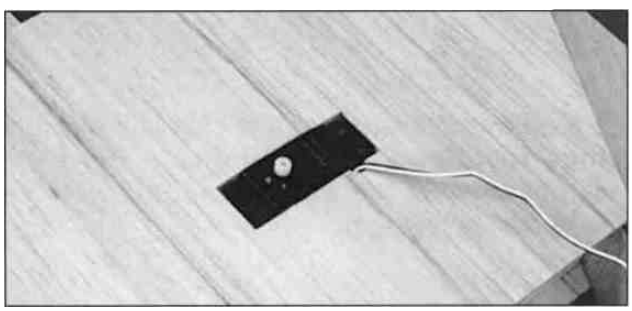


D 8 Sand the leading edge of the ailerons to the same **"V"-shape** as shown on the wing rib detail drawing Round off the sharp corners on the top and bottom of the aileron as shown on the plans and in the photo



D 9 Insert the hinges into the slots and trial fit the ailerons in place on the wing **Do not glue the hinges until after you have covered the wing.** Tape both ailerons in their neutral position and check to see if the threaded portion of the torque rods are both parallel and approximately perpendicular to the wing surface If not, remove the ailerons and twist the torque rods until they are.

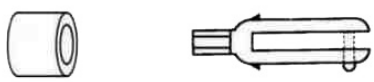
INSTALL AILERON SERVO



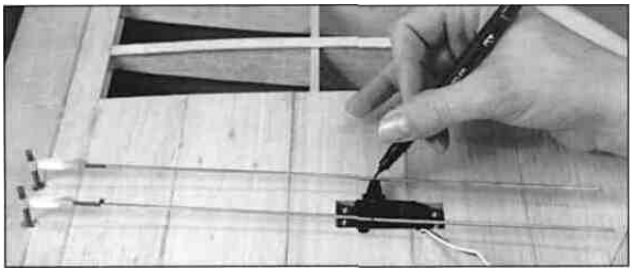
D 1. Enlarge the hole you made for the aileron servo on the bottom of the wing to fit your servo The opening should extend to the back of the rear servo rail you installed earlier Test fit your servo in place on the rails and cut out the top wing sheeting if needed to allow you to install the servo mounting screws Cut a notch in the sheeting for the servo wire **CAUTION: Do not cut into the center wing spar!**

D 2. Use the **aileron servo** to determine where to drill the mounting holes in the rails Drill the holes with a 1/16" diameter bit and mount the servo using the screws provided with your radio Remove the servo and put a drop of **thin** CA on each mounting hole and allow the glue to cure Remount the servo and install a large "X" type servo horn that has had two opposite arms cut off.

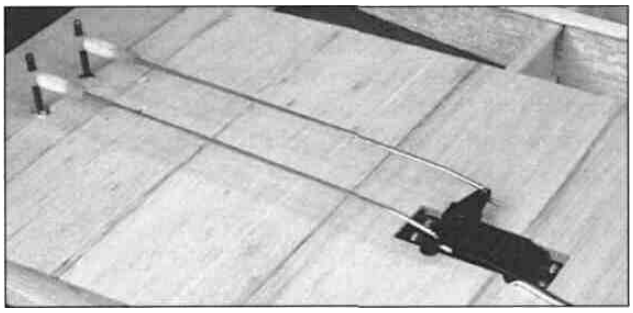
D 3. Cut threads in the two remaining nylon **torque rod horns** (NYLON95) with a 6-32 thread - cutting screw (provided) just as you did for the elevator torque rods earlier Screw the nylon horns onto the aileron torque rods until the holes are approximately 5/8" above the wing sheeting.



D 4. Screw a **nylon clevis** (NYLON17) onto the two remaining **12" threaded pushrod wires** (WIRES17) until the threads are exposed inside the clevis Slide a **silicone clevis retainer** (PLTB021) onto each wire.

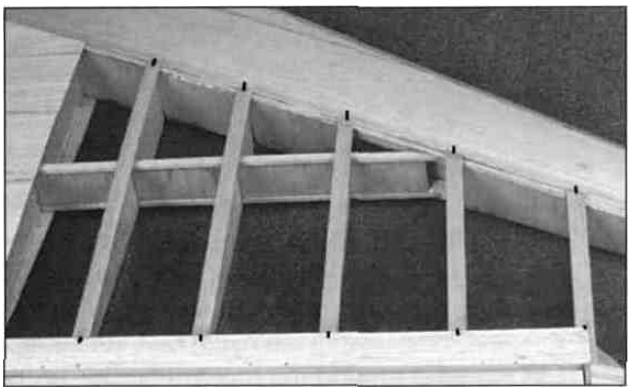


D 5. Attach the clevises to the torque rod horns. With the ailerons taped in the neutral position and the servo horn perpendicular to the wires, mark where the pushrod wires cross the holes in the servo horn. Remove the pushrods and make a **"Z-bend"** in the rods at that point.

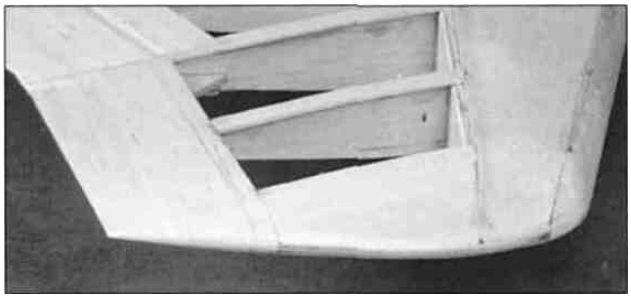


D 6. Remove the servo horn from the servo and work the Z-bends into the horn. **NOTE:** You may have to enlarge the servo horn holes with a 5/64" diameter drill bit. **CAUTION: Do not enlarge the holes enough to produce any aileron slop!** Replace the servo horn and check the operation of the ailerons. Enlarge the notches in the center TE and the wing TE'S if required to achieve full aileron throw (See page 47 for the recommended amount of aileron movement).

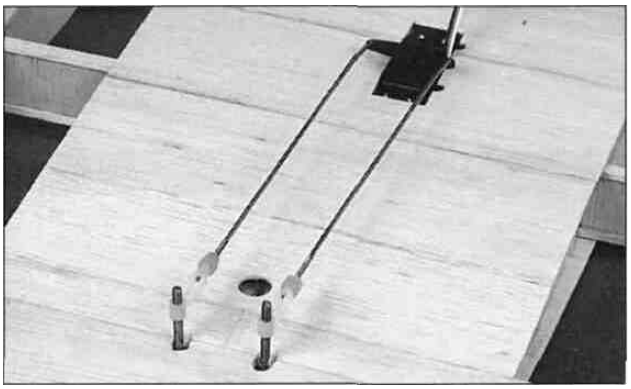
FINISHING THE WING



D 1. From the 1/16" x 3/8" x 30" balsa sticks (F154W13) cut the **cap strips** to fit between the leading edge sheeting and the trailing edge sheeting and glue them in place over each rib. Do this for both sides of all the ribs. HINT - For easier positioning of the cap strips, first mark the location of the ribs on the LE and TE sheeting.



D 2. Final sand the entire surface of the wing using a sanding block with fine sandpaper. Smoothly blend the LE into the LE sheeting. Cut the tip trailing edges off to match the plans and sand the area around the wing tips to blend everything together.

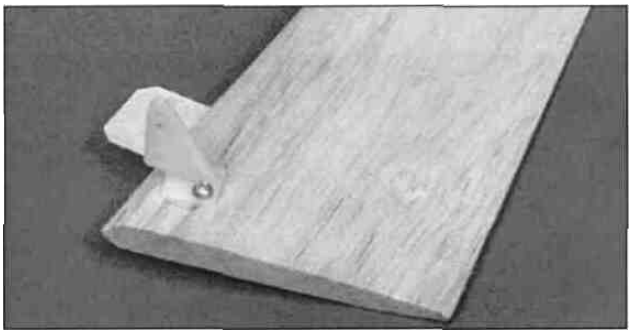


D 3. Enlarge the wing bolt hole in the **bottom** center sheeting to **1/2"** diameter. Harden the area around the hole with **thin** CA.

FINAL ASSEMBLY

MAKE RUDDER PUSHRODS

D 1. Temporarily install the fins in the fuselage and slide them all the way aft in their slots. Enlarge the notch at the base of the fin if necessary to allow the fins to seat flat against the **stabs.**

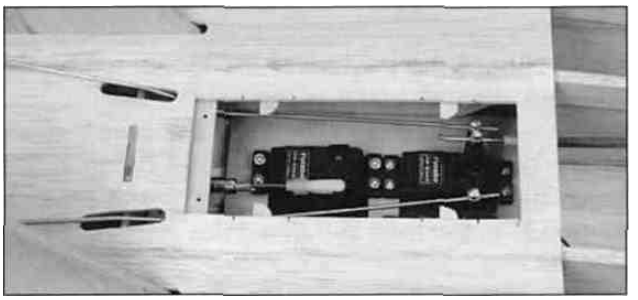


D 2. Refer to the plans to determine where to mount the **nylon control horns** (NYLON03) on the rudders. Mark where to drill the mounting holes and drill them with a **3/32"** bit. Install the horns on the rudders with the **2-56 x 5/8" screws** (SCRW002) provided Notice that the control horns go on the **inside** of both rudders, so be sure and make a right and left rudder.

D 3. Install the rudders on the fins using hinges so the control horns are between the rudders.

D 4. Screw a **nylon clevis** (NYLON17) onto the two remaining 12" **threaded pushrod wires** (WIRES16).

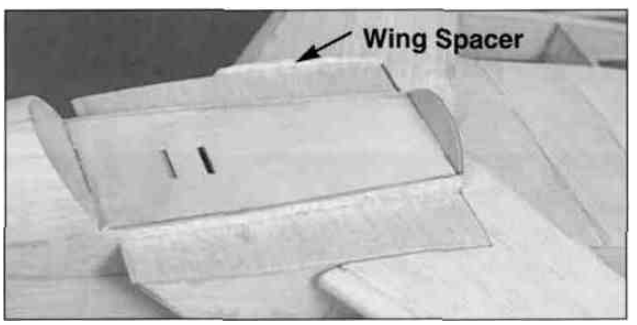
D 5. Carefully bend the 12" rods using the fuselage plan as a guide. Test fit the wires into place and adjust the bends as necessary. Try to keep the wires as straight as possible to prevent unnecessary control surface slop.



D 6 Install the unthreaded end of the pushrods in the Quick-Connectors and tighten down the screws with the servo arm and the rudders in their neutral position. Rotate the servo arm to make sure the rudders move freely without the pushrods binding. If they do, adjust the bends until they operate smoothly. Cut oft the excess wire so it doesn't hit former F5.

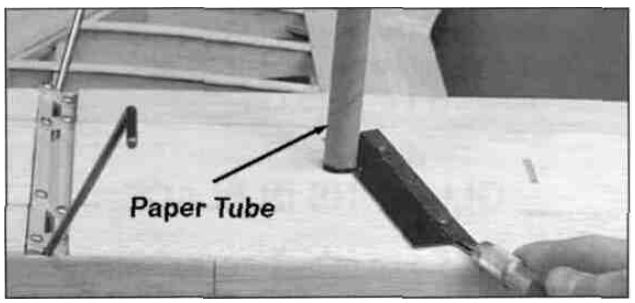
FIT THE WING TO THE FUSE

D 1. Gently sand the wing saddle smooth and then set the wing in place **right-side-up.** Check the fit of the wing in the saddle. If it does not seat well, remove the wing and sand the **saddle** slightly to improve the fit.



D 2. Check to make sure the center TE clears the aft fuse sheeting. If not, sand it until it will and the wing will sit all the way down onto the saddle When satisfied with the fit of the wing in the saddle, temporarily install the nylon bolt, and check the fit of the wing around the forward portion of the fuselage. Ideally there should be a 1/8" gap

between the #3 ribs and the turbine sides. If this is the case, glue the die-cut 1/8" balsa **wing spacers** (F154W02) to the inside of both #3 ribs If the gap is much less than 1/8", trace the die-cut 1/8" spacers onto thinner wood and use the thinner spacers. Sand the spacers flush with the contour of the wing and test fit the wing back onto the fuselage **NOTE:** Because of the fuselage taper, the wing is installed by holding the wing above the fuselage so the faceplate is about 1" behind former F3. Lower the wing into the saddle and slide it forward into place If the wing will not fit now, sand the spacers down until it will. If there is still a gap, add more wood to make this a neat joint When you are finished fitting the wing, there should be a 1/32" gap between the wing and the turbine side. The fit must not be too tight or the wing will not slide on and off easily Also, using scrap wood, fill the gap between the wing and former F-3.



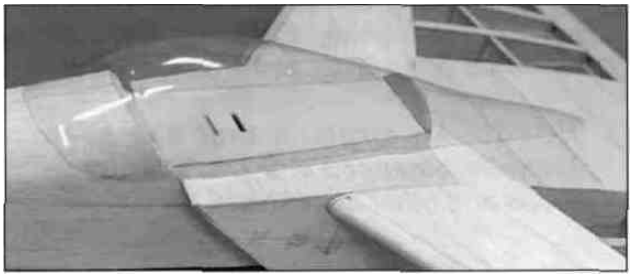
D 3. Turn the plane upside down and insert the nylon bolt in its hole. Slide the **1/2" diameter paper tube** (PTUBE001) into the hole and push it down over the head of the nylon bolt and against the wing bolt block. Carefully glue it to the fuse bottom with thick CA. **Be careful and only use a drop or two of CA so it doesn't drip down and glue the bolt in place.** Remove the bolt and add a **little** thick CA around the tube to glue it to the wing bolt block Cut off the excess tube with a razor saw. Sand the tube flush with the bottom of the fuse and then soak the tube with thin CA.

PREPARE THE CANOPY

NOTE; ***Although the real F-15's generally have clear canopies, some modelers prefer to tint their canopies.***

You may tint your canopy by immersing it in a concentrated mixture of Rit Dye and hot tap water. The colors blue, black, brown and dark green work well. Remove the canopy after 5 minutes and rinse it off to check the amount of tint. The hotter the water and the longer you leave it in the dye solution the darker it will tint. The powdered dye will produce a darker tint than will the liquid. CAUTION: Do not heat the dye water above hot tap water temperature, as this could deform the canopy.

D 1. Using a scissors, carefully cut the canopy (CANPY057) along the trim line.



D 2 Install the wing on the fuselage. Trial fit the canopy onto the fuse, lightly pressing it into place. Refer to the plans to get an idea where the canopy should be positioned. The canopy edge should ideally fit right on top of the inlet sheeting Trim and sand as necessary for a good fit. You can also sand former F3 slightly if needed to get the canopy to fit, but it is important that the canopy fit well against the top of F3. ***NOTE: The trim line on the canopy is approximate. Your canopy trim will vary, depending on how you sanded the fuselage.***

D 3. Final sand the edges of the canopy with fine (320 grit) sandpaper. It is important that the canopy does not have any chips or cracks along the edges, as the engine vibration could cause them to spread.

NOTE: Do not glue the canopy in place until after you have covered your model.

BALANCE THE AIRPLANE LATERALLY

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

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

D 1. Place the receiver in the right turbine as shown on the plans Temporarily attach the wing and engine (with muffler) to the fuselage

D 2 With the wing level, lift the model by the engine shaft and at the exact centerline of the fuse rear (this may require two people) Do this several times.

D 3. If one wing always drops when you lift, it means that side is heavy Balance the airplane by gluing weight to the inside of the other wing tip.

NOTE: An airplane that has been laterally balanced will track better in loops and other maneuvers.

FINAL SANDING

D 1 Check over the entire structure carefully, inspecting for any poorly glued joints, gaps and **"dings".** Apply additional glue and/or balsa filler **as** necessary, then sand the entire fuselage and wing smooth using progressively finer grades of sandpaper.

COVERING

Because it is assumed that you have had some previous model building experience, we won't go into detail in regard to the covering procedure Follow the instructions included with your covering material.

A FEW COVERING NOTES

When covering the tail surfaces, cut the covering, before applying it. **(DO NOT, under any circumstances, attempt to cut the covering material after it has been applied to the fin and stab,** except around the leading and trailing edges and the tip) Modelers who do this often cut through the covering and part-way into the balsa stab This can weaken the stab to the point where it may fail in flight' We highly recommend using the Top Flite "SmartCut™ " MonoKote trim tool when covering your plane It allows you to effortlessly achieve smooth consistent cuts and end up with a great looking covering job.

RECOMMENDED COVERING SEQUENCE:

D 1. Stab bottom
D 2. Stab top
D 3. Elevators
D 4. Fins - only cover to where they will intersect the turbine tops.
D 5. Rudders
D 6. Fuse bottom
D 7 Fuse sides
D 8 Fuse top
D 9. Inlets - we used black here
D 10. Hatch
D 11 Back of fuse
D 12 Ends of ailerons
D 13 Bottom of ailerons
D 14 Top of ailerons
D 15 Bottom of left wing panel
D 16 Bottom of right wing panel
D 17. Top of left wing panel (overlap covering 1/4" at wing LE)
D 18. Top of right wing panel (overlap covering 1/4" at the LE)

GLUE FINS IN PLACE

D 1. Apply a strip of masking tape along each side of both fin slots This will help keep the excess glue off the plane Mix up a batch of 30 minute epoxy and apply it to the exposed wood on both sides and the bottom of each fin Insert the fins into their correct slots and wipe off any excess epoxy with a paper towel soaked in rubbing alcohol Make sure the fins are fully seated in their slots, that they are aligned with each other and perpendicular to the fuselage (Vertical).

GLUE THE AILERON HINGES

D 1. Lay the ailerons on the plans and mark on **the** leading edge of each, the locations of the hinges and torque rods Now use a sharp hobby **knife to** cut slits in the covering at the hinge locations Trial fit the hinges to make sure you have "found" the slots which you previously cut In **the** same manner, slit the covering at the hinge locations in the wing Also cut the covering away from the torque rod slots.

D 2 Using a small stick, work a generous amount of 30 minute **epoxy** into the aileron torque rod holes Push the ailerons and aileron hinges into place and **wipe off all excess epoxy** Now carefully position the ailerons so they have the correct spacing at the root and tips Glue the hinges in place using 4 to 6 drops of thin CA on each side of each hinge Quickly wipe off any excess glue that does not soak into the wood

THERE SHOULD BE NO HINGE GAP!

GLUE RUDDER & ELEVATOR HINGES

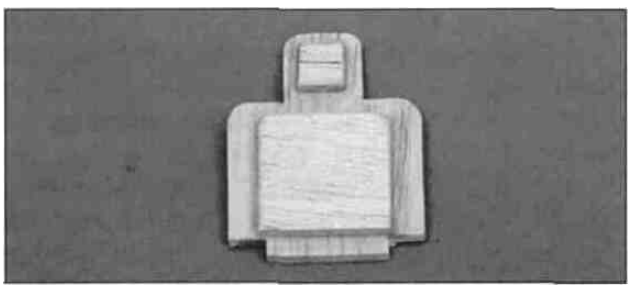
❑ 1. Lay the rudders and elevators on the plans and mark, on the leading edge of each part, the locations of the hinges and torque rods. Now use a sharp hobby knife to cut slits in the covering at the hinge locations. Trial fit the hinges to make sure you have "found" the slots which you previously cut. Transfer the hinge marks over to the fins and stabs. In the same manner, slit the covering at the hinge locations in the fins and stabs. Also cut the covering away from the torque rod slots on the elevators.

❑ 2. Using a small stick, work a generous amount of 30 minute **epoxy** into the torque rod holes. Push the elevators and hinges into place and **wipe off all excess epoxy**. Now check the side-to-side positioning of the elevators and **securely** glue the hinges in place with **thin** CA.

THERE SHOULD BE NO HINGE GAP!

D 3 Install the rudders and **securely** glue the hinges with **thin** CA Reinstall the rudder horns

COCKPIT & SEAT



D 1. Locate the three die-cut 1/8" balsa **pilot seat parts** (two sets included, but only one is needed) found on the die-cut sheets F154F03, F154F06 and F154F13 Sand one set smooth and round off the edges of the parts Glue them together as shown in the photo Glue the seat in the remaining slot in the cockpit bottom.

D 2. Position the canopy in place and hold it down while you trace around the front of it with a fine tip permanent marker Paint the cockpit and the top of the fuselage (in front of the dash) to within 3/8" of the line you just drew (we used flat black) Rubbing alcohol will remove the permanent marker when you're done

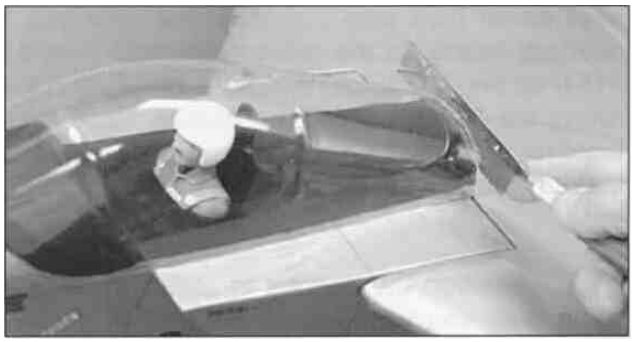
D 3. Assemble and paint the pilot We used a Williams Bros. #171 1-1/2" scale Military pilot. Securely glue him to the cockpit bottom It is a good idea to scrape or sand the paint off the cockpit bottom where the pilot will be attached, for a good glue bond.

D 4. Cut the instrument panel decal out of the decal sheet and stick it in place

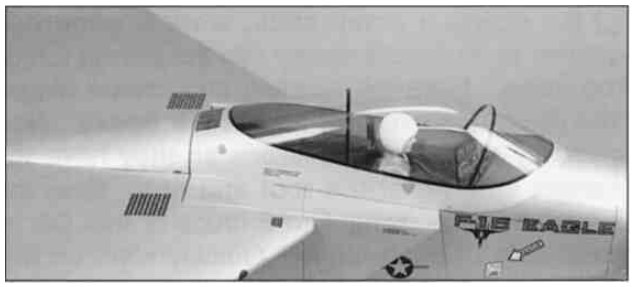
GLUE CANOPY IN PLACE

D 1. Install the wing on the fuse with the nylon bolt and set the canopy in place Poke **pinholes** (1/8" apart) through the covering material in the area where the canopy will be glued to the fuselage and the wing Lightly sand a strip approximately 1/4" wide along the inside edge of the canopy to help the glue stick to it Carefully clean the canopy and the cockpit to remove any dust.

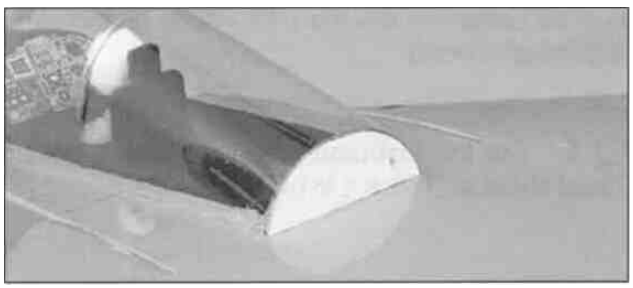
D 2. Apply a bead of **thick** CA around the top of former **F3** Place the canopy on the fuselage and very carefully apply **small** amounts of **thin** viscosity CA glue around the edges **Do not glue the canopy to the wing yet!** To control the amount of CA, it is very helpful to use the small diameter Teflon applicator tubing which is supplied with most CA glues Allow plenty of time for the CA to fully cure **Do not use accelerator spray on the canopy.** Take your time on this step' If you have a preferred method of gluing the canopy in place, feel free to use it Many modelers use Wilhold R/C 56 to attach canopies.



D 3. When the glue has completely cured, use a razor saw and/or a hobby knife to carefully cut the canopy in two just **behind** former F3.



D 6. Remove the wing and mask off the turtle deck so you can paint it. Mask off the canopy using the molded-in trim line as a guide. Great Planes Flex Mask (GPMR1000) works great for this. Paint the bottom portion of the canopy, the canopy frames and the turtle deck. You can either paint them to match the plane or flat black. We used Chevron Perfect Aluminum paint. It matches MonoKote very well.



D 4. Position the die-cut 1/8" balsa **turtle deck former** (F154F06) near the front edge of the wing. Trim and sand the former to allow the aft portion of the canopy to match up with the front part. Poke holes or cut the covering away from where the former will be glued to the wing and glue it in place approximately 1/32" behind former F3. Use care to avoid gluing the wing to the fuse.

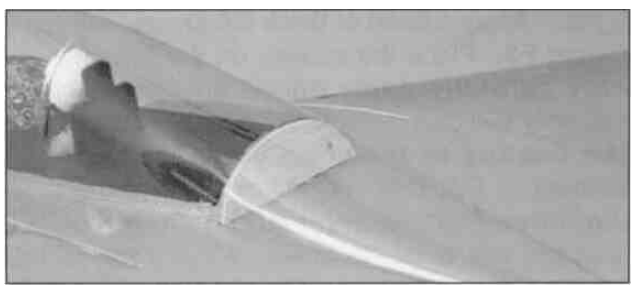
DECALS AND TRIM

D 1. The decal sheet included gives you everything you need to trim your model the way our prototypes were done. Study the photos on the box to determine where to place the decals.

D 2. Thoroughly clean your airplane before applying decals.

D 3. Cut out the individual decal items and apply them in the locations shown or wherever you prefer.

HINT: To apply decals accurately, peel only a small portion of backing from one end, cut off the peeled backing with a scissors, position the decal carefully, press down the exposed portion of the decal, peel off the rest of the backing, then (working from the already stuck down end) carefully press down the rest of the decal.



D 5. Securely glue the aft part of the canopy to the wing and the turtle deck former. This aft portion of he canopy is now known as the "Turtle Deck."

D 4. If you wish to add "panel lines," you may try a "Staedtler Lumocolor 313 Permanent" fine point pen, which is available from engineering/drafting supply stores. Although not completely fuelproof, we like using this pen because it draws very nicely on Super MonoKote, and the lines may be removed if necessary with 70% rubbing alcohol. The plane may be cleaned with most cleaners without affecting the lines, however.

WING SEATING

D 1 Apply 1/16" thick x 1/4" wide foam **wing seating tape** to the turbine sides in the wing saddle area to seal the wing/fuse joints

NOTE: An alternate method of sealing the wing/fuse joint is to use 'silicone bathtub sealer" This is an excellent method, used by many experts because it results in a permanent and nearly perfect wing saddle joint Briefly, the technique is as follows 1. Cover the bottom of the wing center section with waxed paper or plastic kitchen wrap Pull out all wrinkles and tape it to the wing 2. Squeeze out a bead of silicone sealer onto the wing saddle area and front of the inlets 3. Lay the wing in the saddle and push down gently The excess silicone sealer will squeeze out 4. Allow to dry without disturbing for at least 24 hours 5. Remove the tape then remove the wing from the saddle (leaving the waxed paper or plastic wrap in place) 6. Gently pull the waxed paper or plastic wrap away from the sealer 7. Using a new single-edge razor blade, trim the sealer flush with the turbine sides, and along the inside of the fuselage

RE-INSTALL ENGINE & RADIO

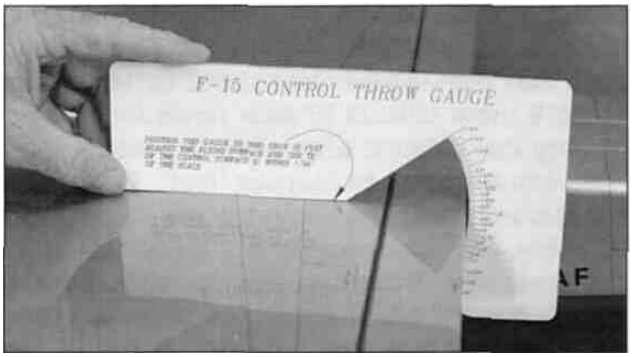
D 1 Mount the radio switch in the fuselage near former F5 and run a pushrod to the left outside of the plane as shown on the plans **NOTE:** The Great Planes Switch/Charge Mount is perfect for this application.

D 2 Install the receiver in the right turbine bay and hook everything up to it Wrap the receiver in 1/2" latex foam to protect it Scrap pieces of balsa can be used to hold the receiver in place

D 3 Re-install the engine, propeller, spinner and wheels Attach the wing to the fuselage Check the operation of all controls to make sure they operate smoothly

WE RECOMMEND THE FOLLOWING CONTROL SURFACE THROWS:

NOTE: Throws are measured at the widest part of the control surface, with full deflection of the transmitter stick. Cut the control throw gauge out of the wing plan and use it to set the following throws:



	LOW RATE	HIGH RATE
ELEVATOR:	5/8" both ways	7/8" both ways
RUDDER:	1/2" both ways	3/4" both ways
AILERONS:	1/4" both ways	1/2" both ways

If your radio does not have "dual rates", we recommend setting up for the "high rate" throws, or slightly less

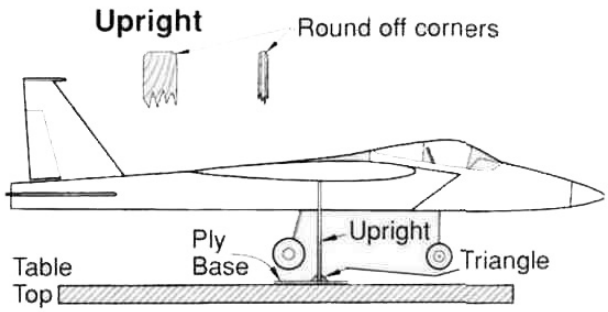
NOTE: These control surface "throws" are approximate and provide a good starting point for the first flights with your F-15. You may wish to change the throws slightly to provide the smoothness or quickness you prefer. Due to the maneuverability of this model and the high control surface throws that it will handle, it might be a good idea to use exponential type control surface movements if your radio is capable of this.

BALANCE YOUR MODEL

NOTE: This section is VERY important and must not be omitted! A model that is not properly balanced will be unstable and possibly unflyable.

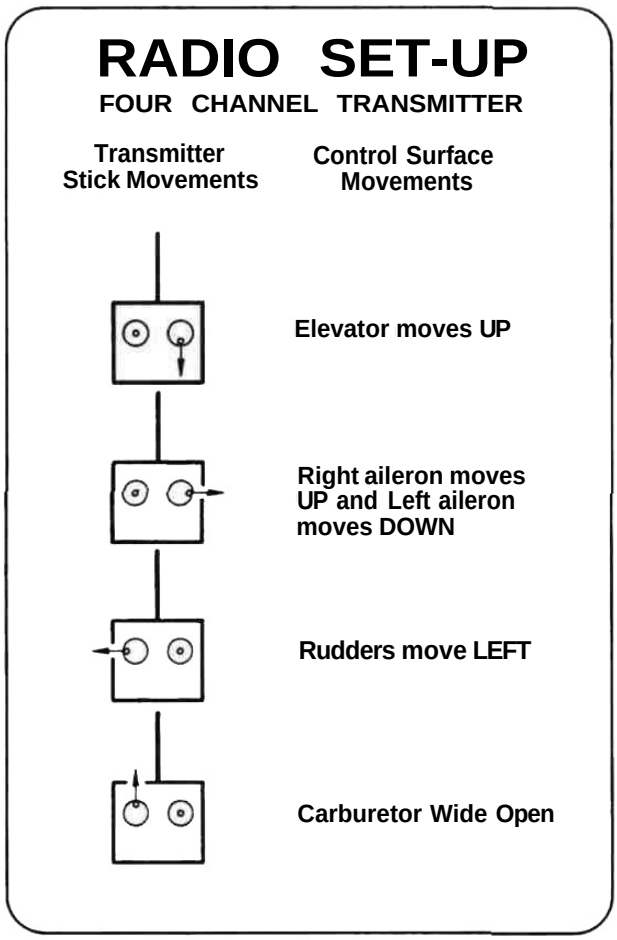
D 1 Accurately mark the balance point on the BOTTOM of the wing on both sides of the turbine sides The balance range is shown on the plan

(CG), and is centered where the **main spar** meets rib #5 This is the balance point at which your model should balance for your first flights. Later, you may wish to experiment by shifting the balance up to 1/2" **forward or back** to change the flying characteristics Moving the balance **forward** may improve the smoothness and arrow-like tracking, but it may then require more speed for takeoff and make it more difficult to slow down for landing Moving the balance **aft** makes the model more agile with a lighter and snappier "feel" If you move the balance aft, the elevator will have more authority, possibly resulting in a plane that is too maneuverable If this happens, you should reduce the maximum elevator throw slightly In any case, **do not balance your model outside the recommended range.**



D 2. The best way to balance your F-15 is to make a **balancing stand** from two squares of 1/4" plywood and two 1/4" plywood uprights Mark the fore and aft limits of the balance range on the **bottom** of the wing (marking the limits on rib #6 will allow the balancing stand to rest against the wing sheeting instead of open structure), and place the airplane on the balancing stand with the fuel tank empty Move the airplane forward or aft on the stand until it balances with the stab level If it balances outside the "balance range," you must either shift the location of radio components (the battery pack can be installed all the way up into the compartment between F2 and F3 if needed) or add weight to the nose or tail until it balances within the range Tail weight may be added by using Great Planes "stick-on" lead weights (GPMQ4485), and, later, if the balance proves to be OK you can open the fuse bottom and glue these in permanently

FINAL HOOKUPS AND CHECKS



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

D 2. Check for wing twist as follows:

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

If you do not own a **wing incidence meter,** we recommend that you purchase one from your local hobby dealer or borrow one from another modeler With the wing attached to the fuselage, block up the fuselage until the stab is exactly level, then use the incidence meter to check the angle of your wing at the tips The meter should read **minus** 1-3/4° at the tips (this means that the trailing edge is higher than the leading edge at both tips) If the incidence meter reveals a deviation of more than 1/4 degree from the desired readings, you must

grasp the wing at the tip and twist it slightly, while reheating the covering material Keep checking, twisting and reheating until the wing twist is removed **NOTE:** If you have corrected a wing twist by this method, you should periodically re-check to make sure the correction has held.

PRE-FLIGHT

CHARGE THE BATTERIES

Follow the battery charging procedures in your radio instruction manual You should **always** charge your transmitter and receiver batteries the night before you go flying, and at other times as recommended by the radio manufacturer.

FIND A SAFE PLACE TO FLY

The best place to fly your R/C model is an AMA (Academy of Model Aeronautics) chartered club field Ask your hobby shop dealer if there is such a club in your area and join Club fields are set up for R/C flying which makes your outing safer and more enjoyable The AMA can also tell you the name of a club in your area We recommend that you join AMA and a local club so you can have a safe place to fly and also have insurance to cover you in case of a flying accident (The AMA address is listed on page 3 of this instruction book).

If there is no flying club in your area, you need to find a large area free of obstructions, with a smooth surface that can be used as a runway, and located at least 6 miles away from any other R/C airplane operation and away from houses, buildings and streets A schoolyard may look inviting but it is too close to people, power lines and possible radio interference

GROUND CHECK THE MODEL

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler **to** check to see that you have the radio installed correctly and that all the control surfaces do what they are supposed to The engine operation must also be checked and the engine "broken in" on the ground by running the engine for at least two tanks of fuel **Follow the engine manufacturer's recommendations for break-in.** Check to make sure all screws remain tight, the hinges are secure and the prop is on tight.

RANGE CHECK YOUR RADIO

Check the operation of the radio before every time you fly This means with the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 100 feet away from the model and still have control Have someone help you Have them stand by your model and, while you work the controls, tell you what the various control surfaces are doing.

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

ENGINE SAFETY PRECAUTIONS

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

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

Get help from an experienced pilot when learning to operate engines

Use safety glasses when starting or running engines

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

Keep your face and body as well as all spectators away from the plane of rotation of the propeller as you start and run the engine

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

Follow the instructions that came with your electric starter or "Chicken Stick" for proper operation

Make certain the glow plug clip or connector is secure so that it will not pop off or otherwise get into the running propeller

Make all engine adjustments from **behind** the rotating propeller

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

To stop the engine, cut off the fuel supply by closing off the fuel line or follow the engine manufacturer's recommendations.

Do not use hands, fingers or any body part to try to stop the engine.

Do not throw anything into the prop of a running engine.

AMA SAFETY CODE

Read and abide by the Academy of Model Aeronautics Official Safety Code, a portion of which is reprinted here

GENERAL

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

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

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

6. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model

8 I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind). ..

RADIO CONTROL

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

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

3. I will perform my initial turn after takeoff away from the pit or spectator areas, and I will not thereafter fly over pit or spectator areas unless beyond my control.

4 I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission...

FLYING

The Great Planes **F-15** is a great flying sport scale airplane that flies smoothly and predictably, yet is highly maneuverable It does **not** have the self-recovery characteristics of a primary trainer, therefore you must either have mastered the basics of R/C flying or seek the assistance of a competent R/C pilot to help you with your first flights.

TAKEOFF: If you have dual rates on your transmitter, set the switches to "high rate" for takeoff, especially when taking off in a cross wind Although the F-15 has good low speed characteristics, you should always build up as much speed as your runway will permit before lifting off, as this will give you a safety margin in case of a "flame-out" When the plane has sufficient flying speed, lift off by **smoothly** applying a little up elevator (don't "jerk" it into a steep climb'), and climb out gradually.

FLYING: We recommend that you take it easy with your F-15 for the first several flights and gradually "get acquainted" with this fantastic ship as your engine gets fully broken-in Add and

practice one maneuver at a time, learning how she behaves in each one High speed passes and **"victory rolls"** are certainly most impressive, but always remember to keep safety in mind Do not exceed the recommended throws for the elevator, as this will only result in an increased possibility of tip stalls when full elevator is applied Snap rolls and spins are not as natural to this airplane as with those designed for aerobatics They may require some experimentation with throws, balance and technique.

CAUTION (THIS APPLIES TO ALL R/C AIRPLANES) If, while flying, you notice any unusual sounds, such as a low-pitched "buzz", this may be an indication of control surface "flutter". Because flutter can quickly destroy components of your airplane, any time you detect flutter you must immediately cut the throttle and land the airplane' Check all servo grommets for deterioration (this will indicate which surface fluttered), and make sure all pushrod linkages are slop-free If it fluttered once, it will probably flutter again under similar circumstances unless you can eliminate the slop or flexing in the linkages Here are several things which can result in flutter: Excessive hinge gap, Not mounting control horns solidly; Sloppy fit of clevis pin in horn, Elasticity present in flexible plastic pushrods, Side-play of pushrod in guide tube caused by tight bends, Sloppy fit of Z-bend in servo arm, Insufficient glue used when gluing the torque rods into the control surfaces Excessive flexing of aileron, caused by using too soft balsa aileron; Excessive "play" or "backlash" in servo gears; and Insecure servo mounting.

LANDING: When it's time to land, do a couple of slow fly-bys at a safe altitude and get familiar with the plane's slow flying characteristics. The aerodynamic design of the F-15 gives it a flying quality not often found in R/C models You will notice that as the nose comes up, the fuselage starts lifting As this happens, the plane will tend to balloon This is the same characteristic that helps give the F-15 its maneuverability in normal flight Once the plane has entered this "floating" stage it is still very controllable and can be slowed down for a very gentle landing The trick to making smooth **slow** landings is to slow the plane earlier than normal and gently allow the plane to enter its floating mode Then use the throttle to regulate the glide path It will take a little practice, but it sure is fun to learn.

IMPORTANT NOTE CONCERNING ANY PLANE UTILIZING HARDWOOD DOWELS TO HOLD THE WING ON

After each of the first few flights and periodically thereafter, remove the wing and inspect the wing dowel If the dowel is a loose fit in the former, the wing can vibrate and the former will actually burn through the dowel in just a few flights. This vibrating can often be heard as an unusual hum If a dowel shows signs of wear or burn marks, repair it before flying the plane again Small amounts of wear can be filled in with epoxy, but dowels with excessive wear should be replaced The problem can usually be prevented by applying the correct thickness of foam tape on the wing saddle to keep the dowel pressed up against the top of its hole

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

GOOD LUCK AND GREAT FLYING!

SEE THE FULL LINE OF GREAT PLANES AIRPLANES AT YOUR HOBBY DEALER. WE HOPE YOU WILL SELECT ANOTHER "GREAT PLANE" AS YOUR NEXT PROJECT. THANK YOU!

TWO-VIEW DIAGRAM