Old Timer™

INSTRUCTION MANUAL

Wingspan: 73 in [1854mm]
Wing Area: 735 sq in [47 dm²]
Weight: 5-1/4 lb [2434 g]
Wing Loading: 17 oz/sq ft [52 g/dm²]
Fuselage Length: 55 in [1397mm]
Radio: 3-Channel
Engine: .30 – .40 cu in two-stroke,
.40 – .52 cu in four-stroke

WARRANTY

Great Planes® Model Manufacturing Co. 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, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.

GREAT PLANES® MODEL MANUFACTURING COMPANY
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(217) 398-8970, Ext. 2
airsupport@greatplanes.com

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INTRODUCTION

The Great Planes Old Timer™ 40 is a very gentle, easy to fly plane. The classic lines of the Old Timer 40 will bring back memories of when R/C was in its infancy. The Old Timer 40 flies great at half throttle on a .40-size engine and a 3-channel radio. If you enjoy spending a lazy afternoon just puttering around the sky, then you're going to love the Old Timer 40.

For the latest technical updates or manual corrections to the Old Timer 40, visit the web site listed below and select the Great Planes Old Timer 40. If there is new technical information or changes to this kit, a "tech notice" box will appear in the upper left corner of the page.

http://www.greatplanes.com/airplanes/index.html

PROTECT YOUR MODEL, YOURSELF & OTHERS...FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS

1. Your Old Timer 40 should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, the Old Timer 40, if not assembled and operated correctly, could possibly cause injury to yourself or spectators and damage to property.

2. You must assemble the model according to the instructions. Do not alter or modify the model, as doing so may result in an unsafe or unflyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.

3. You must take time to build straight, true and strong.

4. You must use an R/C radio system that is in first-class condition, and a correctly sized engine and components (fuel tank, wheels, etc.) throughout the building process.

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

6. You must check the operation of the model before every flight to insure that all equipment is operating and that the

model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.

7. If you are not already an experienced R/C pilot, you should fly the model only with the help of a competent, experienced R/C pilot.

We, as the kit manufacturer, provide you with a top quality kit and 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 the instructions to end up with a well-built model that is straight and true.

Before starting to build, compare the parts in this kit with the Parts List, and note any missing parts. Also inspect all parts to make sure they are of acceptable quality. 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, or e-mail us at:

productsupport@greatplanes.com

If you are contacting us for replacement parts, please be sure to provide the full kit name (Old Timer 40) and the part numbers as listed in the Parts List.

You can also check the following web site for the latest Old Timer 40 updates:

www.greatplanes.com/airplanes/index.html

If you are new to R/C, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.

In addition to joining an R/C club, we strongly recommend you join the AMA (Academy of Model Aeronautics). AMA membership is required to fly at AMA sanctioned clubs. There are over 2,500 AMA chartered clubs across the country. Among other benefits, the AMA provides insurance to its members who fly at sanctioned sites and events. Additionally, training programs and instructors are available at AMA club sites to help you get started the right way. Contact the AMA at the address or toll-free phone number below:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302
Tele: (800) 435-9262
Fax (765) 741-0057
Or via the Internet at:
http://www.modelaircraft.org

DECISIONS YOU MUST MAKE

Engine Selection

.30 - .40 cu. in. 2-stroke
.40 - .52 cu. in. 4-stroke

The Old Timer 40 is a large airplane, but is built very light. When it was test flown, the O.S.® .40LA engine provided plenty of power. It easily cruised around at half throttle. Using a more powerful engine is not necessary. If you are installing a 2-stroke engine, an exhaust extension is required for the muffler to clear the side of the fuselage.

ADDITIONAL ITEMS REQUIRED

Hardware & Accessories

This is the list of hardware and accessories required to finish the Old Timer 40. Order numbers are provided in parentheses and are recognized by most distributors and hobby shops and are listed for your convenience.

- ❏ Engine – s*ee **"Engine Selection"** above*
- ❏ 3-Channel with 3 standard servos
- ❏ (2) 3" Main wheels (GPMQ4225)
- ❏ (1) 1-1/4" Tail wheel (GPMQ4242)
- ❏ (1) 2-1/4" Spinner
- ❏ Propeller (Top Flite® Power Point®); refer to your engine's instructions for proper size.
- ❏ Medium fuel tubing 2' (GPMQ4131)
- ❏ (1) 8oz. Fuel tank (GPMQ4103)
- ❏ 1/4" Latex foam rubber padding (HCAQ1000)
- ❏ Fuelproof paint – s*ee **"Painting"** section*
- ❏ (2) 3/32" Wheel collar (GPMQ4302)
- ❏ (4) 3/16" Wheel collar (GPMQ4308)
- ❏ Switch and Charge Jack Mounting Set (GPMM1000)
- ❏ (4) Rolls covering film

Adhesives & Building Supplies

In addition to common household tools (screwdrivers, drill, etc.), this is the "short list" of the most important items required to build the Old Timer 40. *We recommend Great Planes **Pro**™ CA and Epoxy glue.*

- ❑ 1 oz. Thin Pro CA (GPMR6002)
- ❑ 1 oz. Medium Pro CA+ (GPMR6008)
- ❑ 6-Minute Epoxy (GPMR6045)
- ❑ 30-Minute Epoxy (GPMR6047)
- ❑ Canopy glue
- ❑ Hobby knife (HCAR0105)
- ❑ #11 blades (HCAR0211)
- ❑ Single-edge razor blades (HCAR0212)
- ❑ Small T-pins (HCAR5100)
- ❑ Masking tape (TOPR8018)
- ❑ Builder's triangle (HCAR0480)
- ❑ Electric drill and 1/16" [1.6mm], 1/8" [3.2mm], 5/32" [3.9mm], 3/16" [4.7mm], 7/32" [5.5mm] drill bits
- ❑ 1/4-20 Tap and drill (GPMR8105)
- ❑ Small phillips and flat blade screwdrivers
- ❑ Pliers with wire cutter (HCAR0630)
- ❑ Great Planes Plan Protector (GPMR6167) or wax paper
- ❑ Sanding tools and sandpaper assortment *(see **Expert Tip - "Easy-Touch**™ **Bar Sander"** section)*
- ❑ Sealing iron (TOPR2100)

Optional Supplies & Tools

Here is a list of optional tools mentioned in the manual that will help you build the Old Timer 40.

- ❑ Great Planes CG Machine™ (GPMR2400)
- ❑ Top Flite Precision Magnetic Prop Balancer™ (TOPQ5700)
- ❑ Top Flite Hot Sock™ iron cover (TOPR2175)
- ❑ Straightedge with scale (HCAR0475)
- ❑ Cutting mat (HCAR0456)
- ❑ CA Debonder (GPMR6039)
- ❑ CA Applicator tips (GPMR6033)
- ❑ CA Accelerator (GPMR6034)
- ❑ Microballoons (TOPR1090)
- ❑ Epoxy brushes (GPMR8060)
- ❑ Mixing sticks (GPMR8055)
- ❑ Threadlocker (GPMR6060)
- ❑ Denatured alcohol (for epoxy clean up)
- ❑ Non-elastic monofilament or Kevlar fishing line (for stab alignment)
- ❑ Felt-Tip marker (TOPQ2510)
- ❑ Razor plane
- ❑ Small metal file
- ❑ Rotary tool such as Dremel® Moto-Tool®
- ❑ Rotary tool reinforced cut-off wheel (GPMR8020)
- ❑ 1/16" to 1/4" drill bit set
- ❑ Curved-tip canopy scissors for trimming plastic parts (HCAR0667)
- ❑ Dead Center™ engine mount hole locator (GPMR8130)
- ❑ Great Planes AccuThrow™ deflection gauge (for measuring control throws, GPMR2405)
- ❑ Accu-Point™ laser incidence meter (GPMR4020)

EASY-TOUCH BAR SANDER
A flat, durable, easy to handle sanding tool is a necessity for building a well finished model. Great Planes makes a complete range of **Easy-Touch™ Bar Sanders** and replaceable **Easy-Touch Adhesive-backed Sandpaper**. While building the Old Timer 40, we used three 11" Bar Sanders equipped with 80-grit, 150-grit and 220-grit Adhesive-backed Sandpaper.

Here's the complete list of Easy-Touch Bar Sanders and Adhesive Backed Sandpaper:

5-1/2" Bar Sander (GPMR6169)
11" Bar Sander (GPMR6170)
22" Bar Sander (GPMR6172)
33" Bar Sander (GPMR6174)
44" Bar Sander (GPMR6176)
11" Contour Multi-Sander (GPMR6190)

12' roll of Adhesive-backed 80-grit sandpaper (GPMR6180)
150-grit (GPMR6183)
180-grit (GPMR6184)
220-grit (GPMR6185)
Assortment pack of 5-1/2" strips (GPMR6189)

We also use Top Flite 320-grit (TOPR8030, 4 sheets) and 400-grit (TOPR8032, 4 sheets) wet-or-dry sandpaper for finish sanding.

IMPORTANT BUILDING NOTES

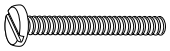
• There are two types of screws used in this kit:

Sheet metal screws are designated by a number and a length.

For example #6 x 3/4"

This is a number six screw that is 3/4" long.

Machine screws are designated by a number, **threads per inch**, and a length.



For example 4-40 x 3/4"

This is a number four screw that is 3/4" long with forty threads per inch.

• When you see the term ***test fit*** in the instructions, it means that you should first position the part on the assembly **without using any glue**, then slightly modify or *custom fit* the part as necessary for the best fit.

• Whenever the term ***glue*** is written you should rely upon your experience to decide what type of glue to use. When a specific type of adhesive works best for that step, the instructions will make a recommendation.

• Whenever just ***epoxy*** is specified you may use ***either*** 30-minute (or 45-minute) epoxy ***or*** 6-minute epoxy. When 30-minute epoxy is specified it is **highly** recommended that you use only 30-minute (or 45-minute) epoxy, because you will need the working time and/or the additional strength.

• **Photos** and **sketches** are placed **before** the step they refer to. Frequently you can study photos in following steps to get another view of the same parts.

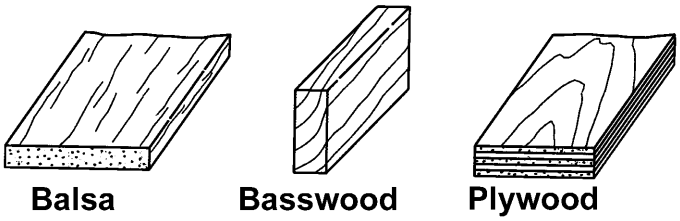
• Not all die-cut parts have a name, or their complete name stamped on them, so refer to the die patterns on pages 6 and 7 for identification. When it's time to remove the parts from their die sheets, if they are difficult to remove, do not force them out. Instead, use a sharp #11 blade to carefully cut the part from the sheet, then lightly sand the edges to remove any slivers or irregularities. Save some of the larger scraps of wood.

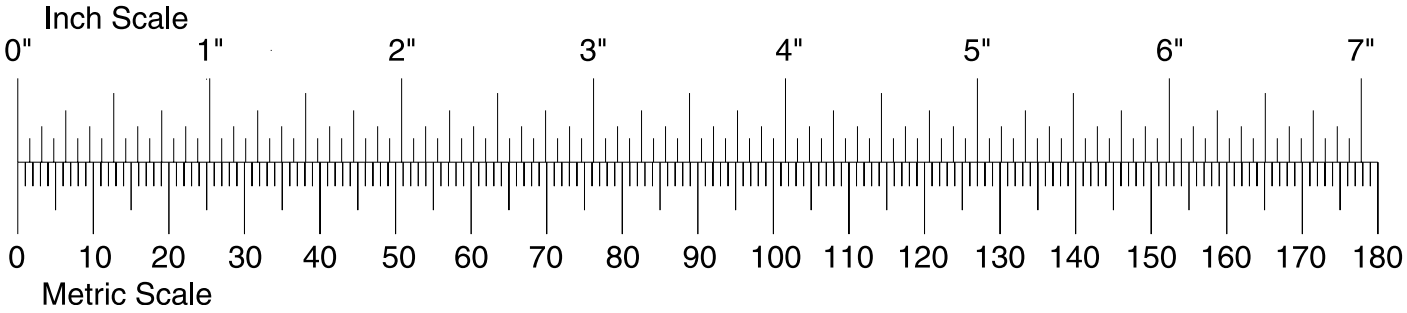
• The easiest way to cut balsa sticks is with a single-edge razor blade or razor saw. Position the stick over the plan, mark its size, then cut the part on a piece of scrap wood. A modeling miter box works well for cutting square corners and 45° gussets.

Common Abbreviations

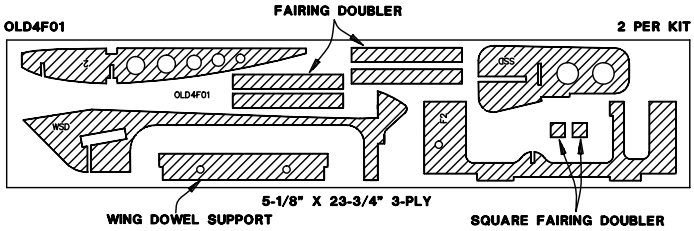
Fuse = Fuselage
Stab = Horizontal Stabilizer
Fin = Vertical Fin
LE = Leading Edge
TE = Trailing Edge
LG = Landing Gear
Ply = Plywood
" = Inches

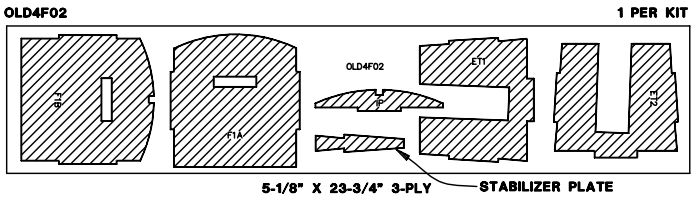
Types of Wood

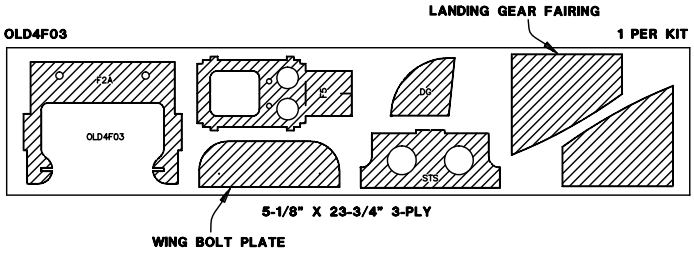


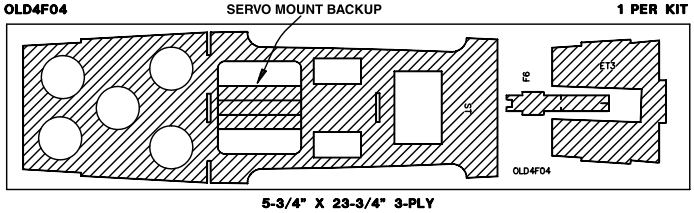


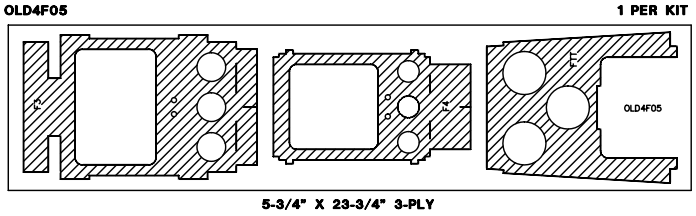
DIE PATTERNS

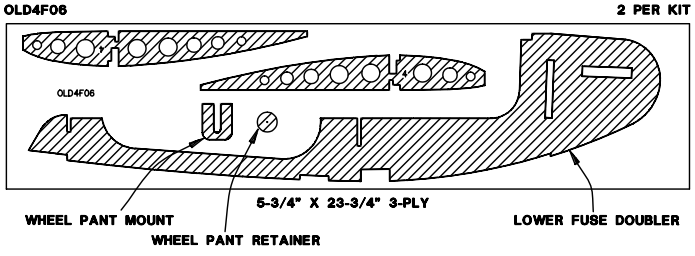


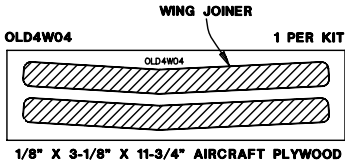


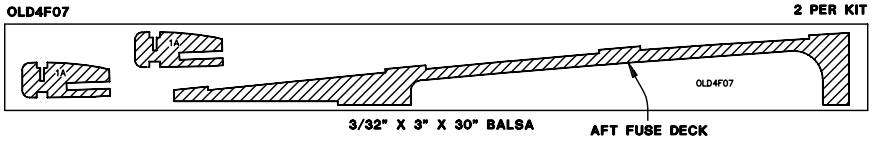






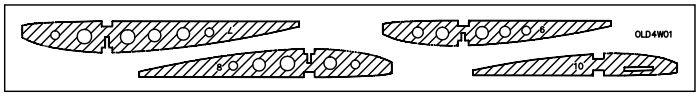






DIE PATTERNS

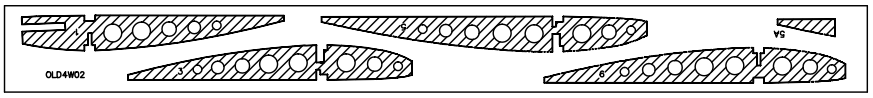
OLD4W01 — 2 PER KIT



3/32" X 3" X 24" BALSA

GREAT PLANES MODEL MFG.
DIE NO. OLD4W01
FOR 3/32" BALSA

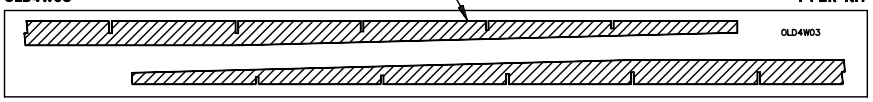
OLD4W02 — 2 PER KIT



3/32" X 3" X 30" BALSA

OUTER WING PANEL SHEAR WEB

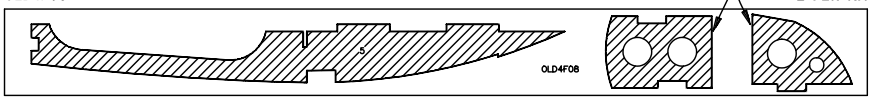
OLD4W03 — 1 PER KIT



1/8" X 3" X 30" BALSA

WING TIP

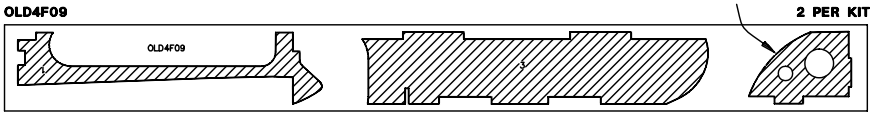
OLD4F08 — 2 PER KIT



1/8" X 3" X 30" BALSA

WING TIP

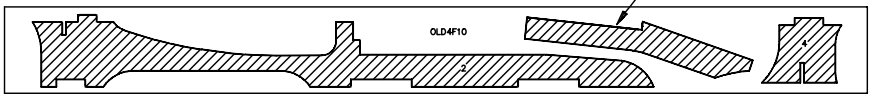
OLD4F09 — 2 PER KIT



1/8" X 3" X 30" BALSA

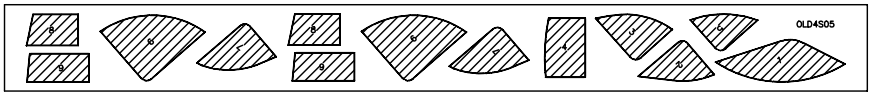
FIN BASE

OLD4F10 — 2 PER KIT



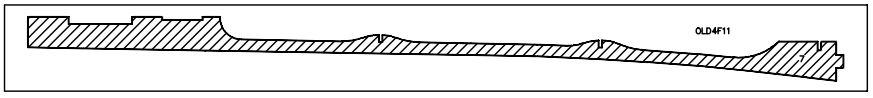
1/8" X 3" X 30" BALSA

OLD4S05 — 1 PER KIT



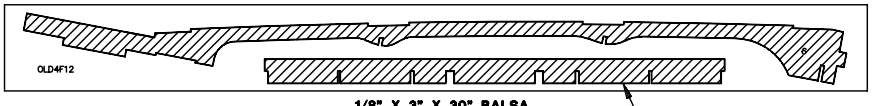
1/8" X 3" X 30" BALSA

OLD4F11 — 2 PER KIT



1/8" X 3" X 30" BALSA

OLD4F12 — 2 PER KIT



1/8" X 3" X 30" BALSA

CENTER WING PANEL SHEAR WEB

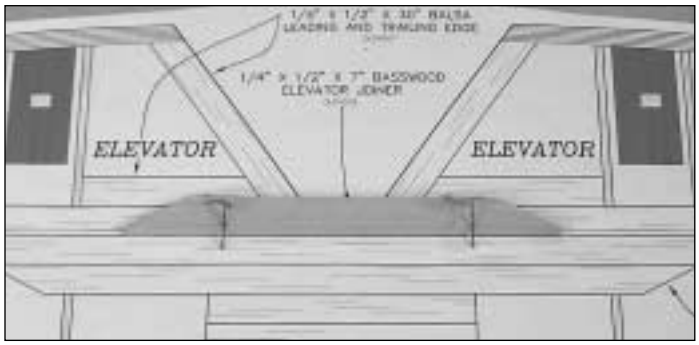
BUILD THE TAIL SURFACES

Build the Stabilizer & Elevator

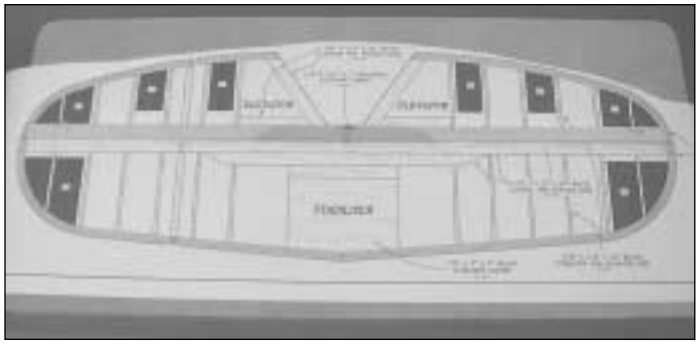
❏ 1. Unroll the plan sheets. Roll them inside out so they will lie flat.

❏ 2. The stabilizer and fin LE and elevator and rudder TE are built using five laminations of balsa. These instructions will cover two methods to build them. The first method is quick and uses CA, but may be more difficult to sand a radius on the lamination. The second method requires more time and uses Aliphatic Resin (wood glue), but is much easier to sand. Both methods work well and it is up to you which method you prefer.

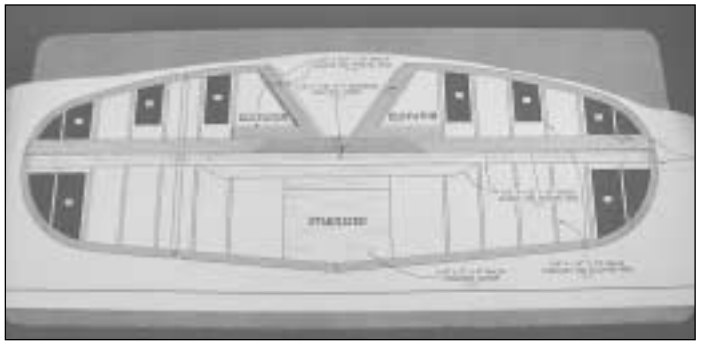
❏ 3. If you are going to use the aliphatic resin method to build the laminations, we recommend that you cut out the stabilizer/elevator and fin/rudder plans from the wing plan. Pin the plans in a corner of your building board so that you can continue working on the wing while waiting for the glue to dry on the laminations. Cover the stabilizer/elevator plan with wax paper or Great Planes Plan Protector so glue will not adhere.



❏ 4. From the 1/4" x 1/2" x 7" [6.4mm x 12.7mm x 178mm] basswood stick, trim and pin the **elevator joiner** over the plan.

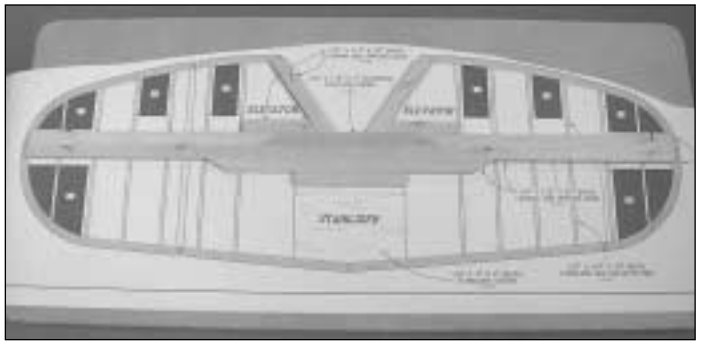


❏ 5. From one of the 1/4" x 1/2" x 30" [6.4mm x 12.7mm x 762mm] balsa sticks, cut the two **elevator LE halves** so that they fit tight against the elevator joiner. Use 6-minute epoxy to glue the elevator LE's to the elevator joiner.



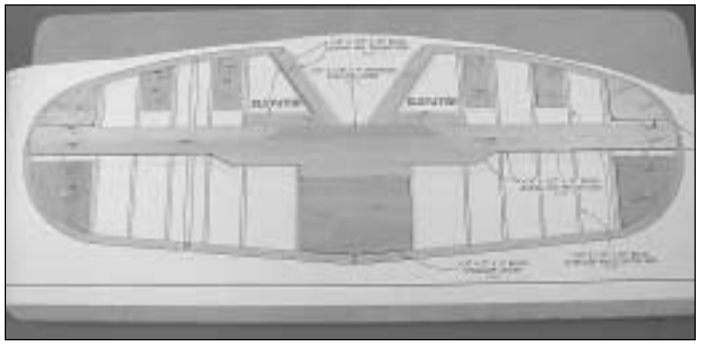
❏ 6. From the remaining 1/4" x 1/2" [6.4mm x 12.7mm] balsa stick and a second 1/4" x 1/2" x 30" [6.4mm x 12.7mm x 762mm] balsa stick, cut and glue the remaining frame to the elevator LE.

❏ 7. From a third 1/4" x 1/2" x 30" [6.4mm x 12.7mm x 762mm] balsa stick cut the stabilizer TE to length and pin it over the plan.



❏ 8. From the remaining 1/4" x 1/2" [6.4mm x 12.7mm] balsa stick, cut and glue the **stabilizer TE doubler** to the TE and the **aft stabilizer center** to the TE doubler.

❏ 9. Trim and glue the 1/4" x 3" x 4" [6.4mm x 76.2mm x 102mm] balsa **stabilizer center** to the aft stabilizer center.

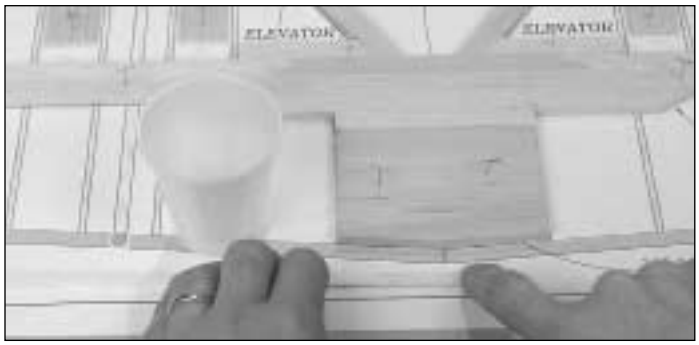


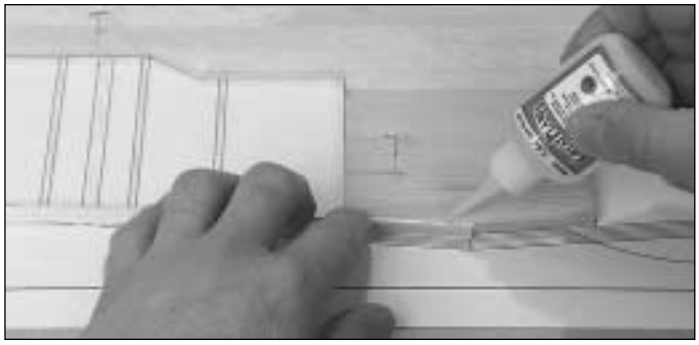
❏ 10. Pin the die-cut 1/8" [3.2mm] balsa bending jigs in position over the stab/elevator plan.

Make the Outer Frame Laminations

This is where you have a choice on how you are going to proceed: The CA or aliphatic resin method or if you have another favorite method to laminate LE and TE's.

CA Lamination Method



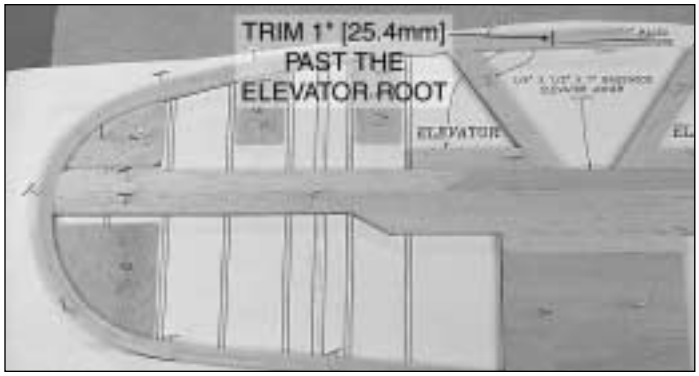


❏ ❏ 1. Select two 1/16" x 1/4" x 30" [1.6mm x 6.4mm x 762mm] balsa strips for the stab/elevator outer frame. Wet one side of the first strip by dipping your finger in water, then running it along the one side of the strip. Take care not to wet both sides. Using medium CA, secure the dry side of the strip to the middle of the stab center, working toward the edge.

Note: Water accelerates CA much like commercial accelerators, so be careful not to get anything wet that should not be.

Hint: Another way to wet the strips is by holding them in the air and spraying with a spray bottle. Do not spray the strips while sitting on a flat surface, or both sides will get wet.

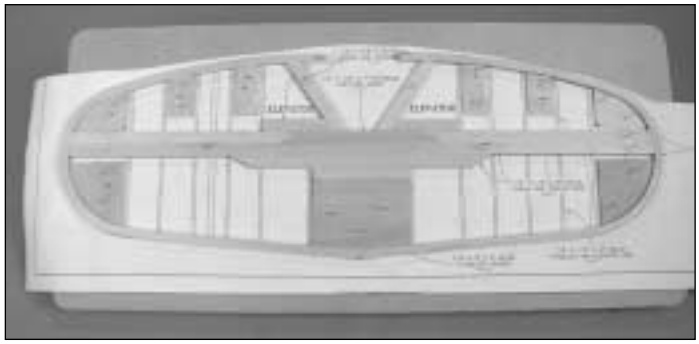
❏ ❏ 2. Slowly wrap the two glued strips from the stab center all the way around to the center of the TE of the elevator, securing it to the end of the elevator LE and stab TE edge with thin CA. Take care to stay tight against the bending jigs. Do not glue the strip to the bending jigs.



❏ ❏ 3. Wet one side of the next strip. Turn it over and lay a bead of medium CA down the center of the strip. Glue the strip onto the previously installed strip.

Note: If you work quickly, the previous strip will still be wet on the outside. This will accelerate the CA, securing the strips to one another immediately. If you crack the strip, don't worry. Just hold it in place until the CA cures and then, seal it with thin CA if necessary.

❏ ❏ 4. Apply 5 strips to make a lamination 1/4" x 5/16" [6.4mm x 7.9mm].

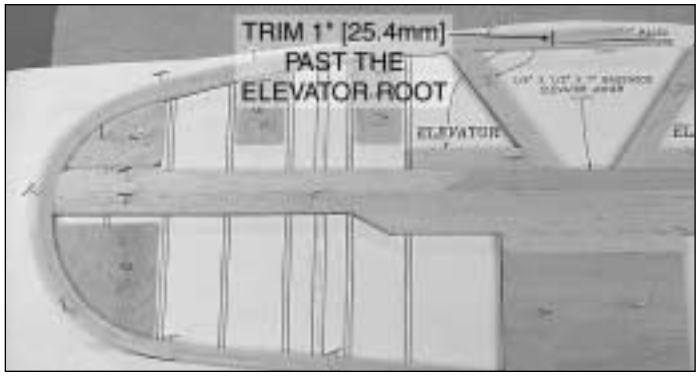


❏ 5. Return to step 1 and repeat the lamination process on the other side of the stabilizer and elevator.

6. Proceed to ***"Finish the Stabilizer and Elevator."***

Aliphatic Resin Lamination Method

❏ ❏ 1. Select ten of the 1/16" x 1/4" x 30" [1.6mm x 6.4mm x 762mm] balsa strips and wet them thoroughly with warm water. Allow the strips to set a few minutes so they can become more pliable.



❏ ❏ 2. Stack five of the strips together. Starting at the middle of the stabilizer center, carefully bend the strips around the bending jigs, holding the strips in place with T-pins. **Do not use any glue.**

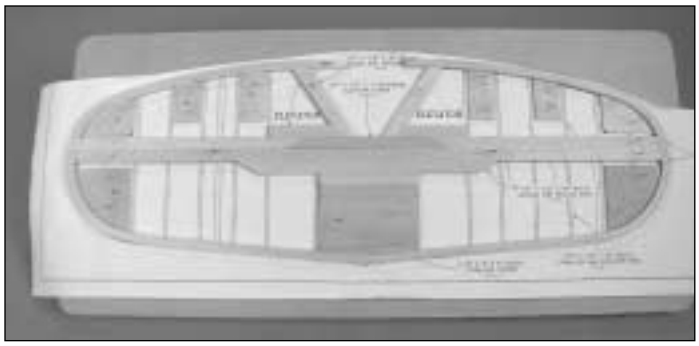
❏ ❏ 3. Trim the strips approximately 1" [25.4mm] past the elevator root.

❏ 4. Return to step 2 and position the second five strips on the other side of the stabilizer.

❏ 5. Allow the wood to dry thoroughly, a couple of hours. This is a good time to skip ahead to ***"Build the Fin and Rudder."***

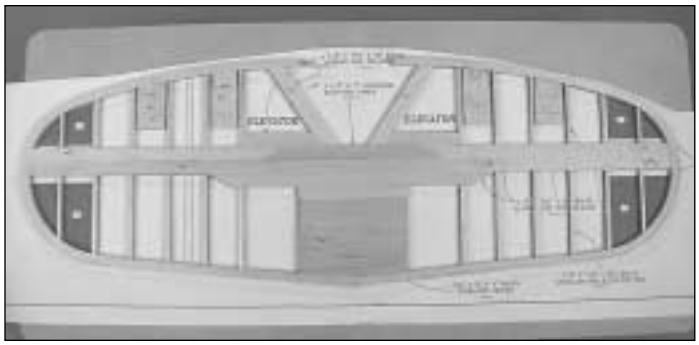
❏ 6. After the wood strips have dried, remove the pins holding the strips in position. The strips should closely hold the shape of the stabilizer.

❏ 7. Use CA to glue the first strip to the front of the stabilizer center, the end of the stab TE and elevator LE and the rudder root.



❏ 8. Apply a bead of aliphatic resin to the next strip. Spread the glue out and position the strip against the first strip. Apply glue to the rest of the strips and pin them in position. Use T-pins to hold the strips tight against each other. Wipe off any excess glue before it dries. Glue all ten strips together, five on each side of the stab/elevator.

Finish the Stabilizer & Elevator

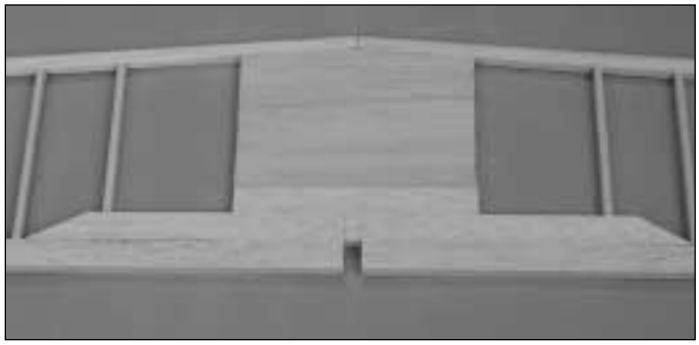


❏ 1. From the 1/8" x 1/4" x 30" [3.2mm x 6.4mm x 762mm] balsa stick, cut and glue **stab** and **elevator ribs** as shown on the plan.

❏ 2. After the glue has cured, unpin the stab/elevator from your building board. Inspect all the glue joints and re-glue if necessary. Use a bar sander or a large sanding block and 220-grit sandpaper to sand the entire top and bottom surface of the stab/elevator flat and even. Be careful while sanding so that you do not over-thin any one particular area of the stab/elevator or gouge the ribs by snagging the sandpaper on them.

❏ 3. Round all edges of the stab and elevator to the shape shown on the cross-section on the plan. **Hint:** Once you have the stab and elevator completely sanded, use a piece of tape to mark the bottom of the stab and elevator to ensure proper assembly later.

❏ 4. Cut the stab outer frame between the elevator LE and the stab TE. Separate the stab from the elevator. Sand the outer frame flush with the LE and TE.

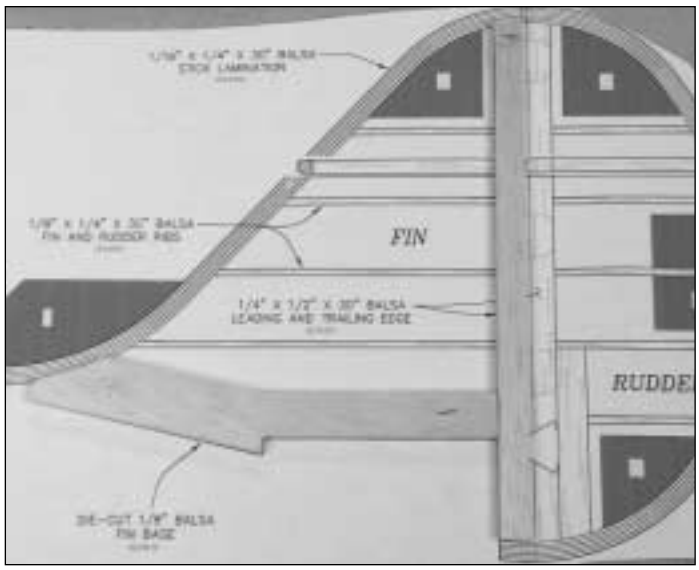


❏ 5. Mark and cut the slot for the fin tail post to pass through the stab TE.

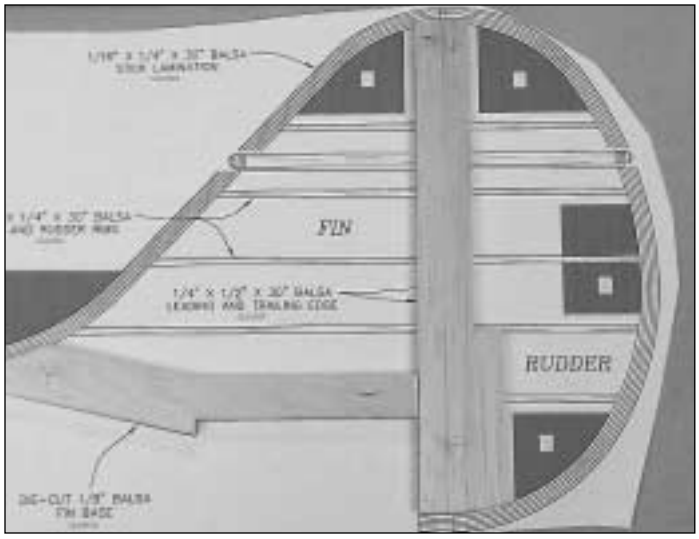
Build the Fin & Rudder

❏ 1. Cover the fin/rudder plan with wax paper or Great Planes Plan Protector so glue will not adhere.

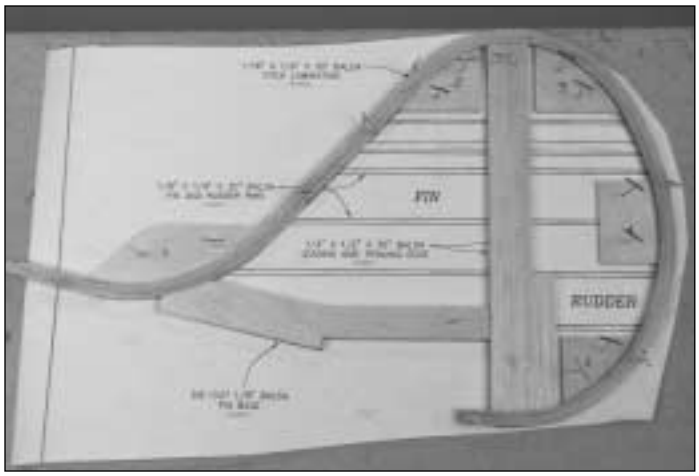
❏ 2. Glue the two die-cut 1/8" [3.2mm] balsa **fin bases** together to make a 1/4" thick base. Pin the fin base in position over the plan.



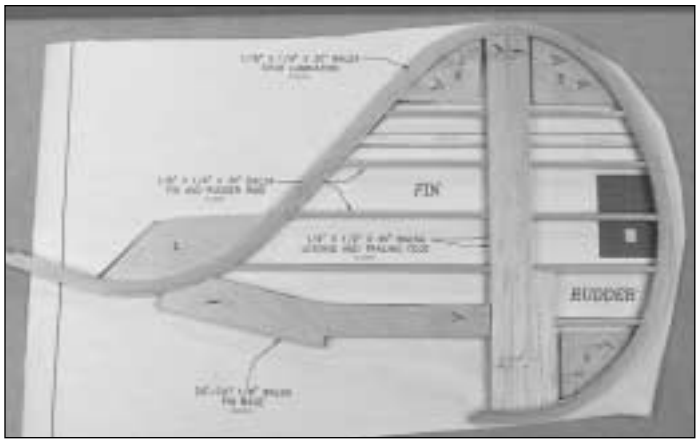
❏ 3. From the 1/4" x 1/2" x 30" [6.4mm x 12.7mm x 762mm] balsa stick, cut and glue the **fin TE** to the fin base.



❏ 4. From the 1/4" x 1/2" x 30" [6.4mm x 12.7mm x 762mm] balsa stick, cut and pin the **rudder LE** over the plan. Cut and glue the rudder **LE doubler** to the back of the rudder LE.



❏ 5. Pin the die-cut 1/8" [3.2mm] balsa bending jigs over the fin/rudder plan. Follow the same procedure used to laminate the stabilizer/elevator to make the fin/rudder lamination using the 5 pieces of 1/16" x 1/4" x 30 [1.6mm x 6.4mm x 762mm] balsa strips.



❏ 6. From the 1/8" x 1/4" x 30" [3.2mm x 6.4mm x 762mm] balsa stick, cut and glue **fin** and **rudder ribs** as shown on the plan.

❏ 7. Unpin the fin/rudder from your building board. Inspect all the glue joints and re-glue if necessary. Use a bar sander or a large sanding block and 220-grit sandpaper to sand both sides of the fin/rudder flat and even. Be careful while sanding so that you do not over-thin any one particular area of the fin/rudder or gouge the ribs by snagging the sandpaper on them.

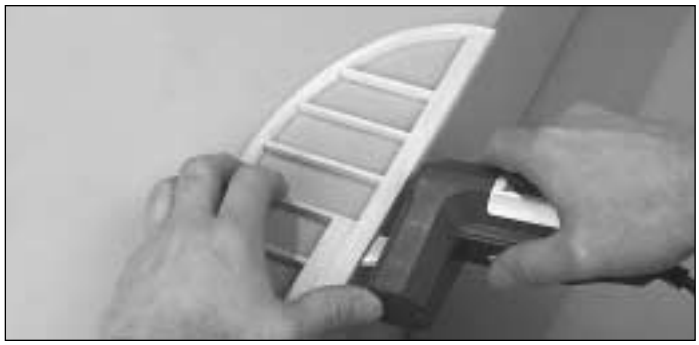
❏ 8. Round all edges of the fin/rudder to the shape shown on the cross-section on the plan.

❏ 9. Cut the outer frame between the rudder LE and the fin TE. Separate the fin from the rudder. Sand the outer frame flush with the LE and TE.

Install the Hinges

❏ 1. Lay the fin and rudder over the plan and lightly mark the hinge locations on the LE of the rudder and the TE of the fin. Repeat the process to mark the hinge locations on the LE of the elevator and the TE of the stab.

❏ 2. We have simplified the task of cutting hinge slots with the introduction of the Great Planes Slot Machine™. This simple electric tool cuts a perfect width slot for CA hinges.

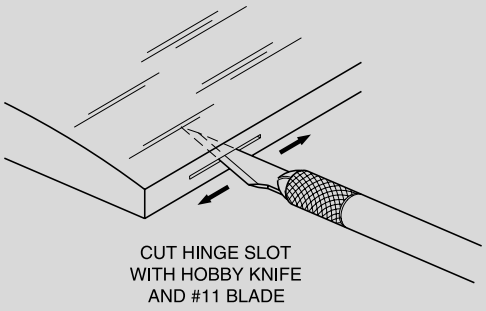


❏ 3. To cut the hinge slot, first locate the centerline of the LE and TE edges using the Great Planes Precision Hinge Marking Tool (GPMR4005). Then place the blades of the Slot Machine onto the wood where you want the slot. Lightly press the teeth into the wood. When you are satisfied with

the location, press the button on the handle and the blades will cut easily into the balsa wood.

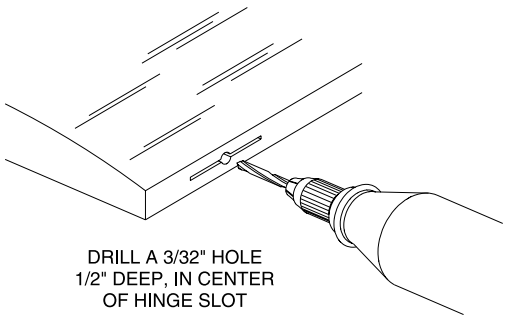
EXPERT TIP

IF YOU DO NOT HAVE A SLOT MACHINE



CUT HINGE SLOT
WITH HOBBY KNIFE
AND #11 BLADE

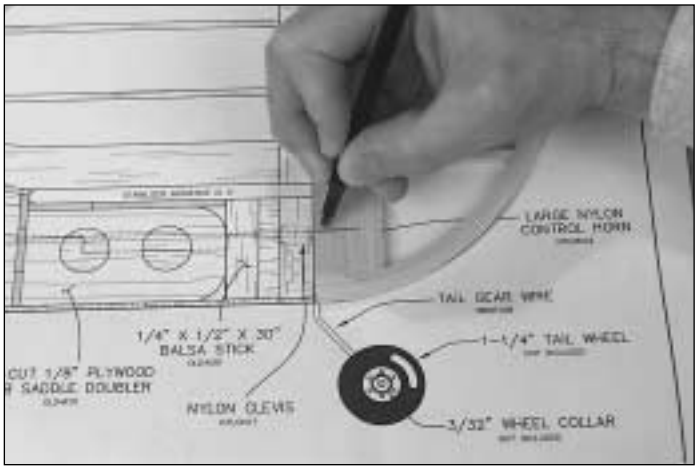
Cut the hinge slot in the rudder, fin, stab and elevator using a Hobby Knife with a #11 blade. Begin by carefully cutting a very shallow slit at the hinge location to accurately establish the hinge slot. Make three or four more passes, going a little deeper each time. As you cut, slide the knife from side to side until the slot has reached the proper depth and width for the hinge.



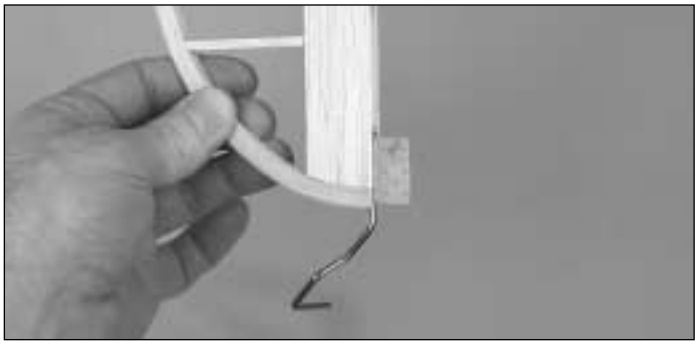
DRILL A 3/32" HOLE
1/2" DEEP, IN CENTER
OF HINGE SLOT

❏ 4. Drill a 3/32" [2.4mm] hole, 1/2" [12.7mm] deep in the center of the hinge slots. The use of a Dremel Rotary Tool with a 3/32" drill bit or carbide cutter will give you a cleaner hole than an electric drill. After drilling the holes, use your hobby knife to clean out the hinge slots.

❏ 5. Cut the 3/4" x 1" [19mm x 25.4mm] hinges for the control surfaces from the supplied 2" x 9" [50.8mm x 228.6mm] **hinge material**. Then, snip off the corners as shown on the wing plan. **Temporarily** join the control surfaces with the hinges, adjusting any hinge slots if necessary so they all align. **Do not glue in the hinges until you are instructed to do so after the airplane is covered.**



❏ 6. Lay the rudder over the fuse plan and mark the location for the tailgear wire.



❏ 7. Drill a 3/32" [2.4mm] hole 3/4" [19mm] deep, at the centerline of the rudder LE, at the mark you made for the tailgear wire. Then, cut a groove for the nylon tailgear bearing. See the following ***Expert Tip***. Test fit the tailgear wire in the rudder.

EXPERT TIP

HOW TO CUT A GROOVE FOR A TAILGEAR WIRE

Use a #11 knife blade to sharpen the inside of a piece of 5/32" [4mm] brass tube. Roll the tube as you sharpen the end.

Use the sharpened tube to carefully gouge the leading edge of the rudder. You'll have to make several passes to make the recess deep enough for the tailgear wire.

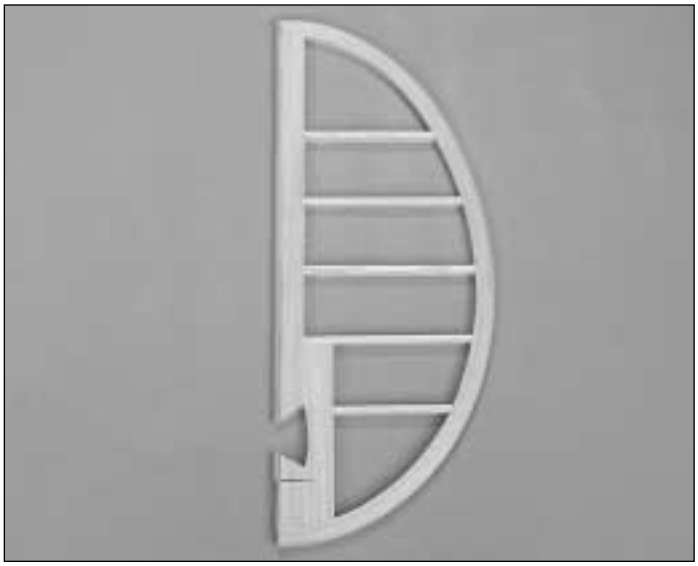
Finish the Tail Surfaces

❏ 1. Remove the tailgear wire from the rudder and place its leading edge on your work surface. Use a pen, laying on the bench, to mark a "bevel to" line on both sides, approximately 3/32" [2.4mm] high.

Note: You may need to adjust the height of the rudder with card stock so your "bevel to" line is not too high.

❏ 2. Using the "bevel to" lines and the centerline as a guide, shape the LE to a "V" shape using a razor plane or the Great Planes Multi-Sander (GPMR6190) with 150-grit sandpaper.

❏ 3. Use the same procedure to bevel the LE of the elevator.



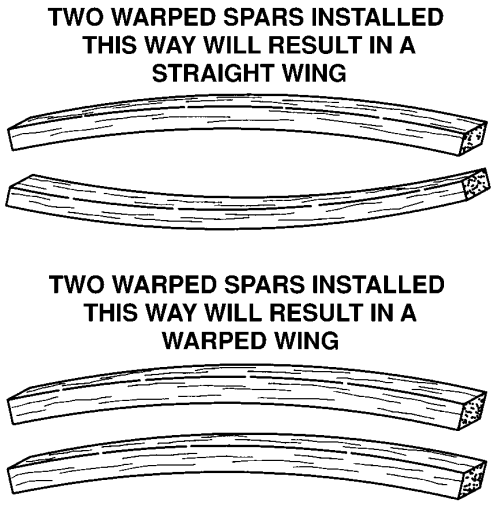
❏ 4. Lay the rudder over the plan and mark the cutout on the LE for the elevator joiner. Use a razor saw or hobby knife to cut the LE for the elevator joiner.

❏ 5. Temporarily attach the rudder to the fin and the elevator to the stab using the CA hinges and set them aside.

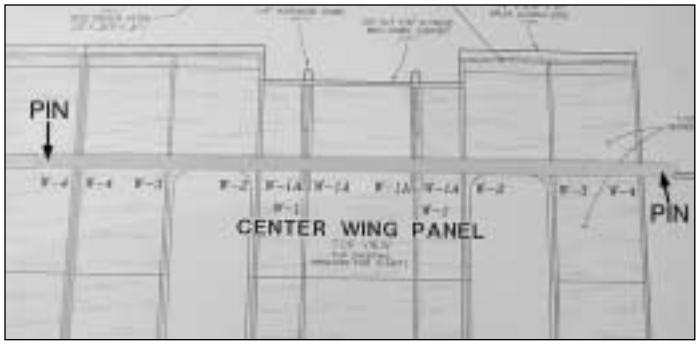
BUILD THE WING

Build the Center Wing Panel

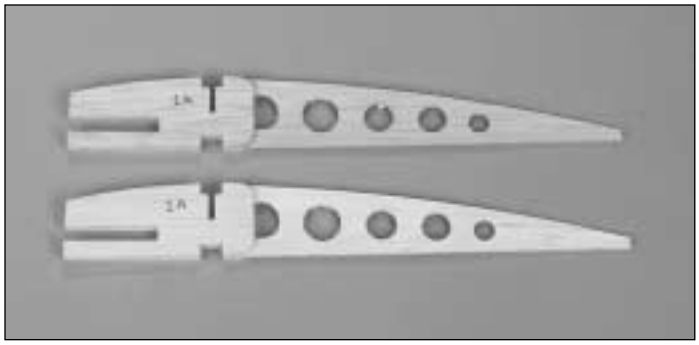
❏ 1. Cover the center wing panel plan from W-4 to W-4 with waxed paper or Great Planes Plan Protector.



❏ 2. Match two of the 3/16" x 3/8" x 18" [4.8mm x 9.5mm x 457.2mm] basswood **main spars** so any warps will counteract each other.



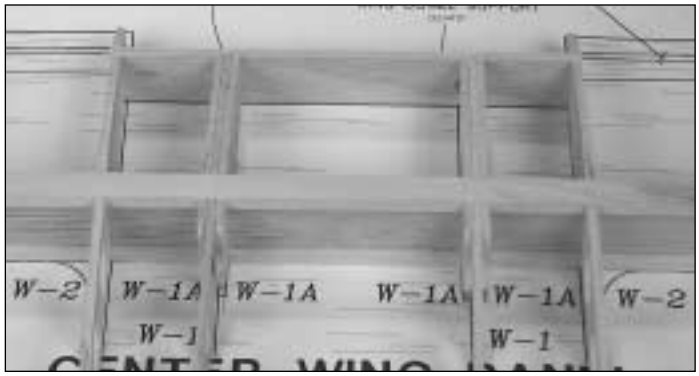
❑ 3. Position one of the main spars over the plan and pin it to the building board. Because the wing uses a center shear web, the main spar can only be pinned outboard of the W4 ribs.



❑ 4. Glue the die-cut 3/32" [2.4mm] balsa **sub ribs W1A** to both sides of the die-cut 3/32" [2.4mm] balsa **ribs W1**.

❑ 5. Position the die-cut 3/32" [2.4mm] balsa **ribs W1** and **W3** and the die-cut 3-ply ribs **W2** and **W4** over the main spar, perpendicular to the building board. Slide the die-cut 1/8" [3.2mm] balsa **center wing panel shear web** over the ribs.

❑ 6. Install the 3/16" x 3/8" x 18" [4.8mm x 9.5mm x 457.2mm] basswood top main spar.

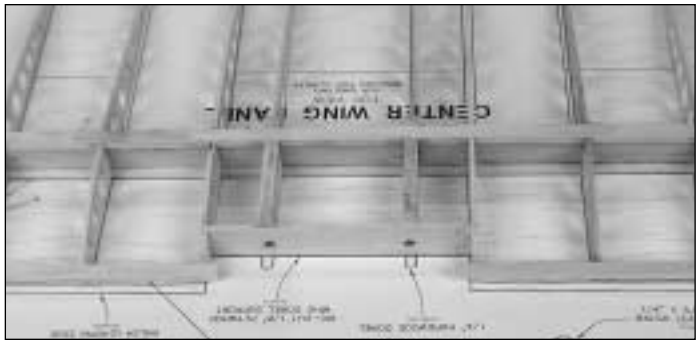


❑ 7. Insert the die-cut 3-ply **wing dowel support** at the front of ribs W2.

❑ 8. Cut one of the 1/4" x 3/4" x 30" balsa **trailing edges** 16-1/2" [419mm] long. Pin the TE in position over the plan.

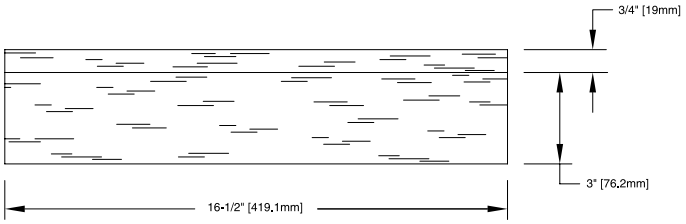
❑ 9. Pin the wing ribs to the building board.

❑ 10. With the ribs and wing spar flat against the building board, use thin CA to glue the bottom main spar and shear web to the ribs. **Do not** glue the top main spar to the shear web or ribs. Before gluing, make sure the shear web is against the front of the notch in ribs W3 and W4 and rib W4 is perpendicular to the building board. Glue the wing dowel support to ribs W2. Then, center the W1 ribs behind the two 1/4" holes and glue them to the wing dowel support. Check that the aft ends of the ribs are flat on the building board. Then, glue the ribs to the TE. Remove the top spar, run a bead of medium CA along the top of the shear web and reinstall the top main spar. Finish gluing the top spar to the ribs.



❑ 11. From the 3/32" x 1/2" x 30" (2.4mm x 12.7mm x 762mm] balsa stick cut two 6" long **sub LE** pieces. Glue the sub LE, centered vertically on the front of ribs W2 through W4.

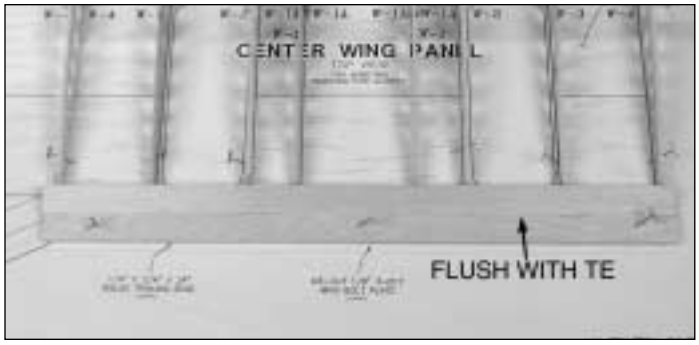
❏ 12. Use a sanding bar with 150-grit sandpaper to sand the top of the sub LE and wing dowel support flush with the top of the ribs.



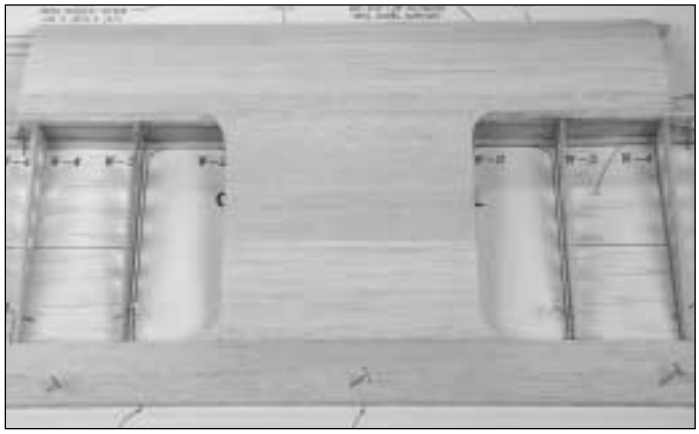
❏ 13. Cut two sheets of 1/16" x 3" x 24" [1.6mm x 76.2mm x 609.6mm] balsa 16-1/2" [419mm] long. From one of the 16-1/2" [419mm] sheets, cut two strips 3/4" [19mm] wide. Glue one of the strips to the edge of the second 16-1/2" [419mm] sheet to make a **forward wing sheet**.

❏ 14. To glue the forward wing sheet to the top of the wing, apply a bead of medium CA to the forward half of the top main spar. Position the wing sheet so that the aft edge of the sheet is centered on the top main spar. When the CA has cured, apply a bead of medium CA to the top of each wing rib, along the sub LE and the wing dowel support. Pull the sheet down, making sure it contacts the surface of each rib and the sub LE. Hold it in place until the CA has cured.

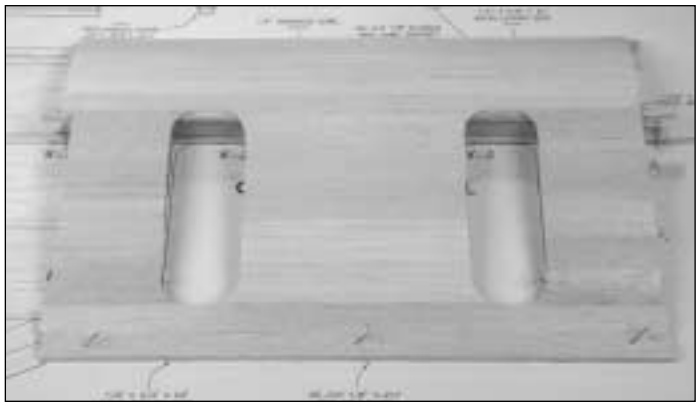
Hint: To help apply even pressure on the sheet while pulling it over the sub LE, we use a 12" [304.8mm] sanding bar with 150-grit sandpaper placed on top of the sheet.



❏ 15. Glue the second 1/16" x 3/4" x 16-1/2" [1.6mm x 19mm x 419mm] balsa strip to the aft edge of the ribs, flush against the forward edge of the balsa TE.



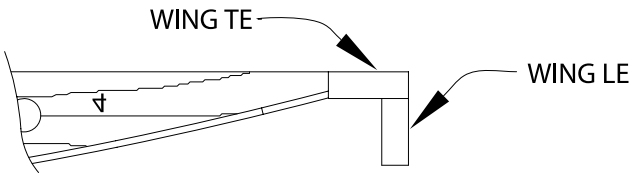
❏ 16. From the remaining 1/16" [1.6mm] balsa sheets cut in step 13, sheet the center-section of the wing.

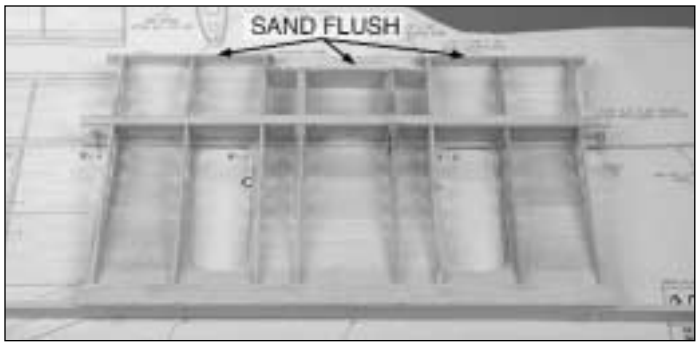


❏ 17. From a third 1/16" x 3" x 24" [1.6mm x 76.2mm x 609.6mm] balsa sheet and sheeting remaining from step 16, cut and glue the center wing outer sheeting.

Sheet the Bottom of the Wing Center-Section

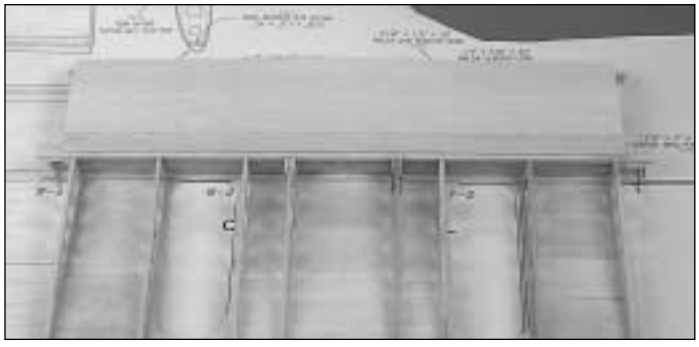
❏ 1. Remove the wing center-section from your building board and check all the glue joints. Sand any excess glue from the bottom. Also, sand the sub LE flush with the bottom of the wing ribs.



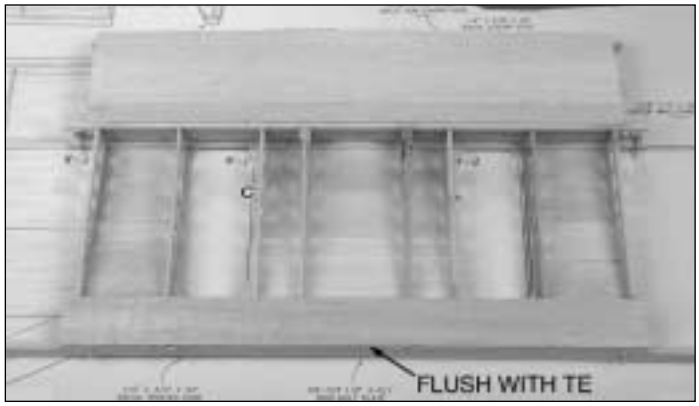


❏ 2. Pin the top wing spar flat against your building board. Position the 1/4" x 5/8" x 30" balsa **wing leading edge** under the TE. **Do not** glue it to the TE. Use T-pins or weight to hold it down against the building board.

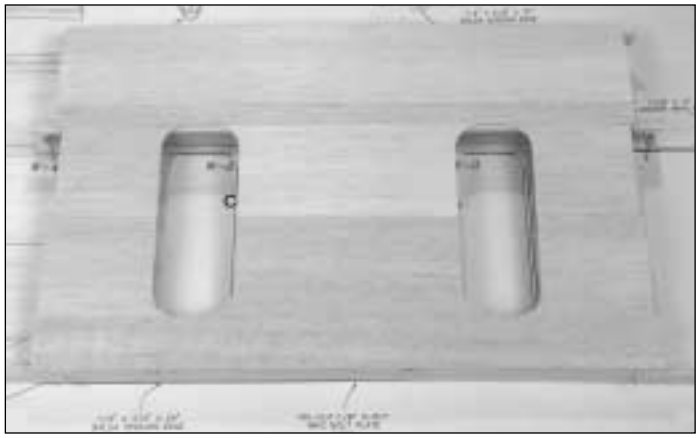
❏ 3. Cut two sheets of 1/16" x 3" x 24" [1.6mm x 76.2mm x 609.6mm] balsa 16-1/2" [419mm] long. From one of the 16-1/2" [419mm] sheets, cut two strips, one 3/4" [19mm] wide and a second one 1-1/2" wide. Glue the 3/4" strip to the edge of the second 16-1/2" [419mm] sheet to make a **forward wing sheet**.



❏ 4. To glue the forward wing sheet to the top of the wing, apply a bead of medium CA to the forward half of the top main spar. Position the wing sheet so that the aft edge of the sheet is centered on the top main spar. When the CA has cured, apply a bead of medium CA to the top of each wing rib, along the sub LE and the wing dowel support. Pull the sheet down, making sure it contacts the surface of each rib and the sub LE. Hold it in place until the CA has cured.

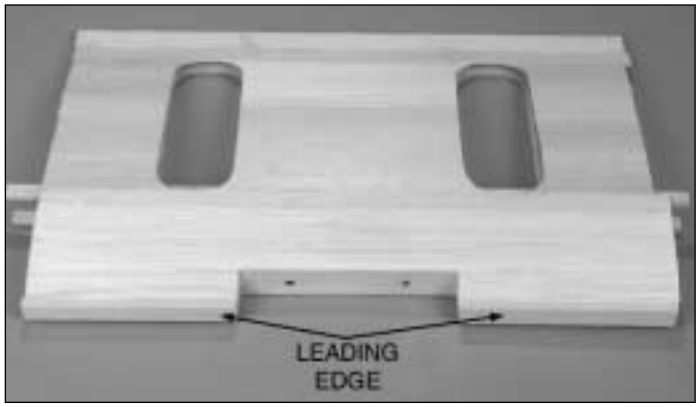


❏ 5. Glue the 1/16" x 1-1/2" x 16-1/2" [1.6mm x 38mm x 419mm] balsa strip to the aft edge of the ribs, flush with the aft edge of the TE.



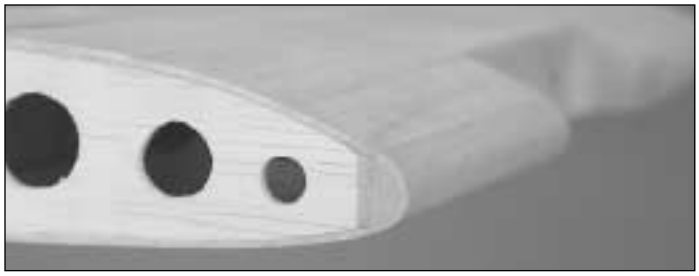
❏ 6. From the remaining 1/16" [1.6mm] balsa sheets cut in step 3 and another 1/16" x 3" x 24" [1.6mm x 76.2mm x 609.6mm] balsa sheet, sheet the center and outer section of the wing.

❏ 7. Remove the wing center-section from your building board. Trim the forward wing sheeting flush with the sub LE.



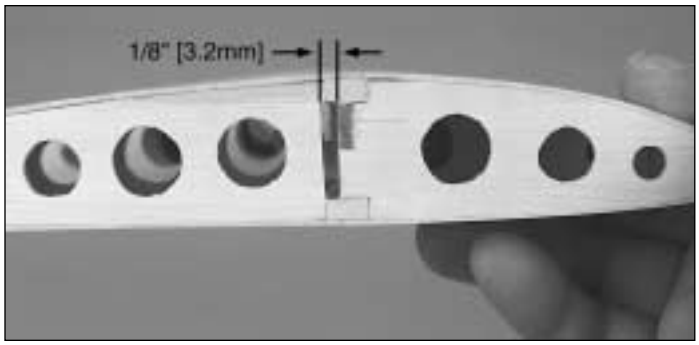
❏ 8. Cut and glue the 1/4" x 5/8" x 30" [6.4mm x 15.9mm x 762mm] balsa **leading edges** to the front of the sub LE. Trim and sand the LE and forward sheeting flush with ribs W2.

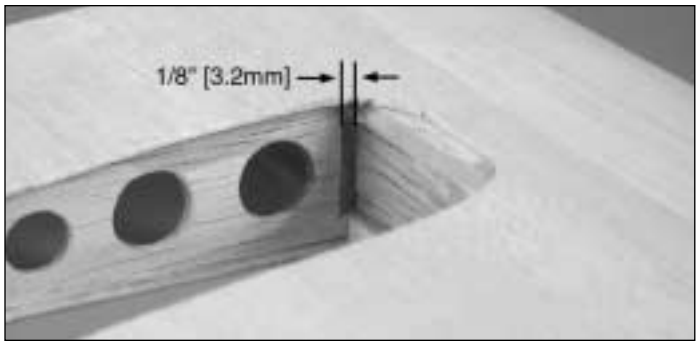
❏ 9. Trim and sand the LE, sub LE, top and bottom sheeting, wing spars and TE flush with ribs W4.

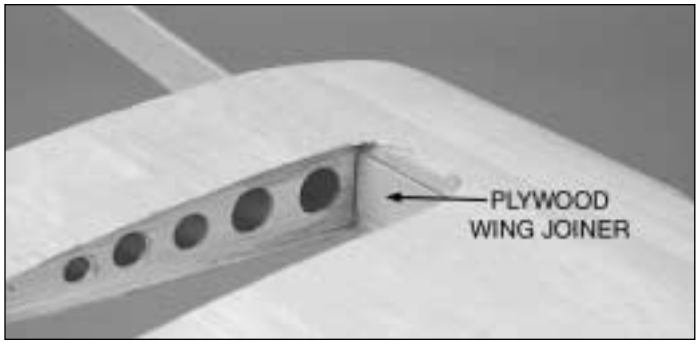


❏ 10. Use a Great Planes Power Plane™ and sanding bar to shape the LE to the shape shown on the wing plan.

❏ 11. Use the Power Plane and sanding bar to shape the TE to the shape shown on the wing plan.







❏ 12. Use a hobby knife to carefully cut a slot in the root ribs W4 and ribs W3 to allow the die-cut 1/8" [3.2mm] plywood **wing joiner** to be inserted. Set the center-section off to the side.

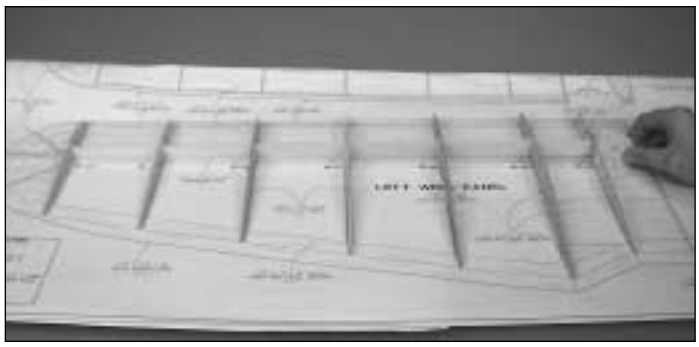
BUILD THE OUTER WING PANELS

Build the Left Wing Panel

❏ ❏ 1. Cover the left wing panel plan from W-4 to the wing tip with waxed paper or Great Planes Plan Protector. **Note:** The outer wing panel will first be assembled without glue. Then, in step 9, the wing panel will be glued together.

❏ ❏ 2. Match two of the 3/16" x 3/8" x 30" [4.8mm x 9.5mm x 762mm] basswood **main spars** so any warps will counteract each other.

❏ ❏ 3. Position one of the main spars over the plan and pin it to the building board. Because the wing uses a center shear web the main spar can only be pinned outboard of the W4 and W10 ribs.

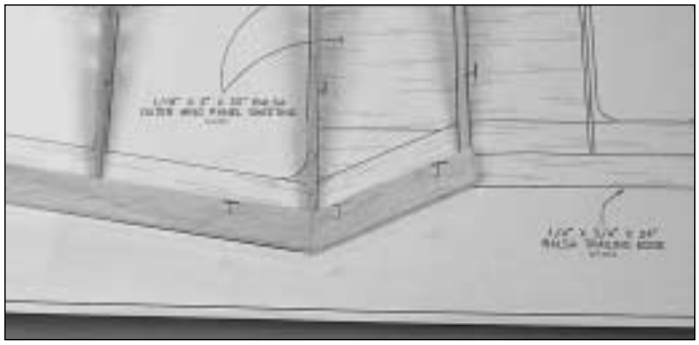


❏ ❏ 4. Position the die-cut 3/32" [2.4mm] balsa **ribs W5** through **W10** and the die-cut 3-ply **rib W4** over the main spar, perpendicular to the building board. Slide the die-cut 1/8" [3.2mm] balsa **outer wing panel shear web** over the ribs. Use the die-cut 3-ply dihedral gauge to set the angle of rib W4.

❏ ❏ 5. Install the 3/16" x 3/8" x 30" [4.8mm x 9.5mm x 762mm] basswood top main spar. Pin the wing ribs in position over the plan, making sure that the bottom of the ribs are against the building board.

❏ ❏ 6. Glue the die-cut 3/32" [2.4mm] balsa **rib doubler W5A** to the aft outboard side of rib W5.

❑ ❑ 7. Carefully trim or sand the TE of the ribs to match the angle of the 1/4" [6.4mm] TE stick.



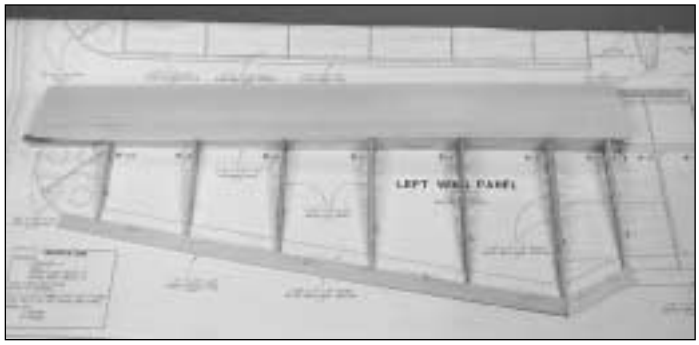
❑ ❑ 8. Cut a 1/4" x 3/4" x 30" [6.4mm x 19mm x 762mm] balsa **trailing edge** 24" [609mm] long. Trim one end of the 24" [609mm] TE to match the angle at rib W5. Pin the TE in position over the plan. From the remaining TE stick, cut the TE to fit between the W4 and W5 ribs.

❑ ❑ 9. With the ribs and wing spar flat against the building board, use thin CA to glue the bottom main spar and shear web to the ribs. **Do not** glue the top main spar to the shear web or ribs. Before gluing, make sure the shear web is against the front of the notch in ribs W4 and W5 and rib W4 is set at the correct angle using the dihedral gauge. Check that the aft end of the ribs and the 1/4" [6.4mm] TE are flat on the building board. Then, glue the ribs to the TE. Remove the top spar, run a bead of medium CA along the top of the shear web and reinstall the top main spar. Finish gluing the top spar to the ribs.

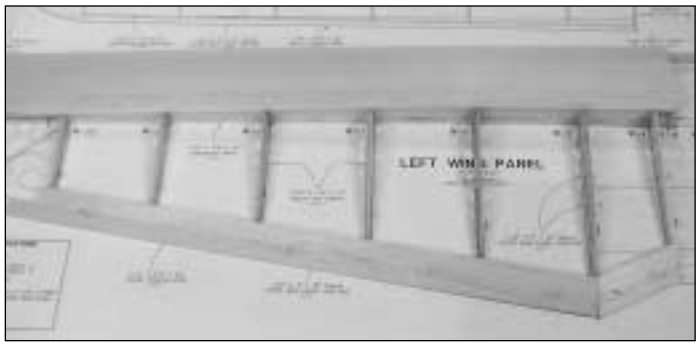
❑ ❑ 10. Glue the 3/32" x 1/2" x 30" [2.4mm x 12.7mm x 762mm] **sub LE** centered on the front of the ribs.

❑ ❑ 11. Use a sanding bar with 150-grit sandpaper to sand the top of the sub LE flush with the top of the ribs and the top of the ribs with the wing spar.

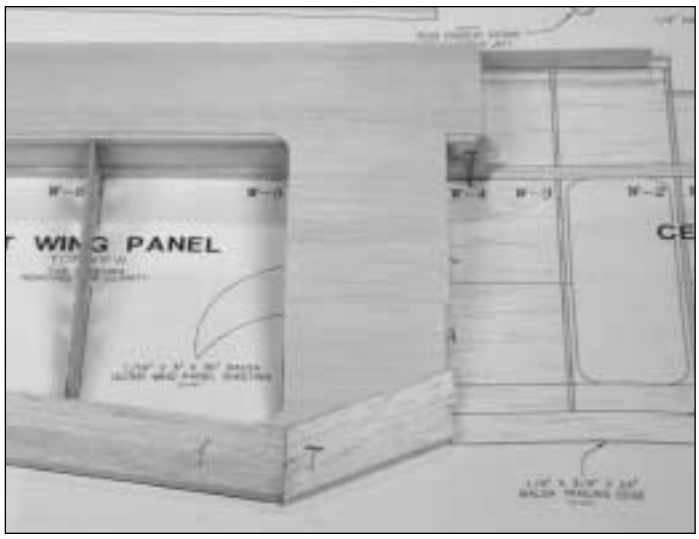
❑ ❑ 12. From one of the 1/16" x 3" x 30" [1.6mm x 76.2mm x 762mm] balsa sheets, cut two strips 3/4" [19mm] wide. Glue one of the strips to the edge of a second 1/16" x 3" x 30" [1.6mm x 76.2mm x 762mm] sheet to make a 3-3/4" [95mm] wide **forward wing sheet**.



❑ ❑ 13. To glue the forward wing sheet to the top of the wing, apply a bead of medium CA to the forward half of the top main spar. Position the wing sheet so that the aft edge of the sheet is centered on the top main spar. When the CA has cured, apply a bead of medium CA to the top of each wing rib, and along the sub LE. Pull the sheet down, making sure it contacts the surface of each rib and the sub LE. Hold it in place until the CA has cured.



❑ ❑ 14. Trim the second 1/16" x 3/4" x 30" [1.6mm x 19mm x 762mm] balsa strip to fit between ribs W5 and W10, against the front of the TE. Glue the strip to the top of the ribs and the front of the TE. Trim and glue the remaining strip between W4 and W5.

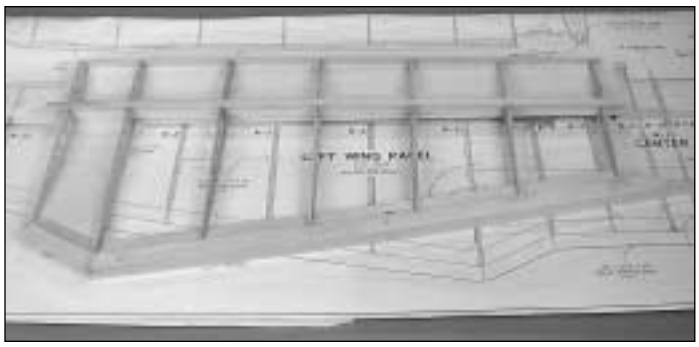


❑ ❑ 15. From a third 1/16" x 3" x 30" [1.6mm x 76.2mm x 762mm] balsa sheet, cut and glue **top center sheeting** from ribs W4 to W5.

❑ ❑ 16. Trim and glue 1/16" x 1/4" x 30" [1.6mm x 6.4mm x 762mm] balsa **cap strips** to the top of ribs W6 through W10.

Sheet the Bottom of the Outer Wing Panel

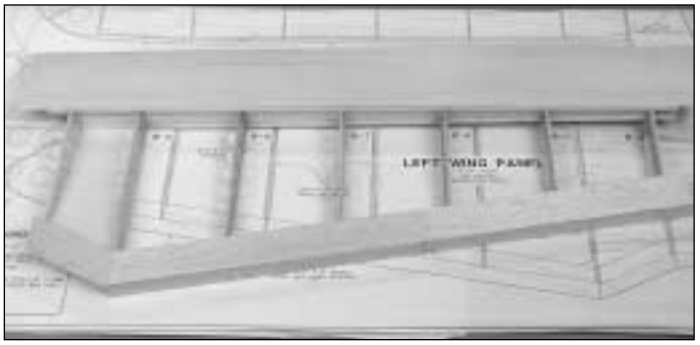
❑ ❑ 1. Remove the outer wing panel from your building board. Sand any excess glue from the bottom. Also, sand the sub LE flush with the bottom of the wing ribs.



❑ ❑ 2. With the wing upside-down, pin the top wing spar, at rib W4, flat against your building board. Position the 1/4" x 5/8" x 30" balsa **wing leading edge** under the TE. **Do not** glue it to the TE. Place a leftover 1/4" x 1/2" [6.4mm x 12.7mm] stick under rib W10 so that the rib is1/4" [6.4mm] off of the building board. Use T-pins or weight to hold the wing in position.

❑ ❑ 3. From one of the 1/16" x 3" x 30" [1.6mm x 76.2mm x 762mm] balsa sheets, cut two strips, one 3/4" [19mm] wide and a second one 1-1/2" [38.1mm] wide. Glue the 3/4" [19mm] wide strip to the edge of a second 1/16" x 3" x 30" [1.6mm x 76.2mm x 762mm] sheet to make a **lower forward wing sheet**.

❑ ❑ 4. To glue the lower forward wing sheet to the bottom of the wing, apply a bead of medium CA to the forward half of the bottom main spar. Position the wing sheet so that the aft edge of the sheet is centered on the bottom main spar. When the CA has cured, apply a bead of medium CA to the bottom of each wing rib and along the sub LE. Pull the sheet down, making sure it contacts the surface of each rib and the sub LE. Hold it in place until the CA has cured.



❑ ❑ 5. Trim the 1/16" x 1-1/2" x 30" [1.6mm x 38mm x 762mm] balsa strip, cut in step 3, to fit along the aft edge of the ribs, from rib W5 to W10, flush with the aft edge of the TE. Trim a second TE strip to fit from W4 to W5. When satisfied with the fit, glue them to the bottom of the ribs and the 1/4" [6.4mm] TE.

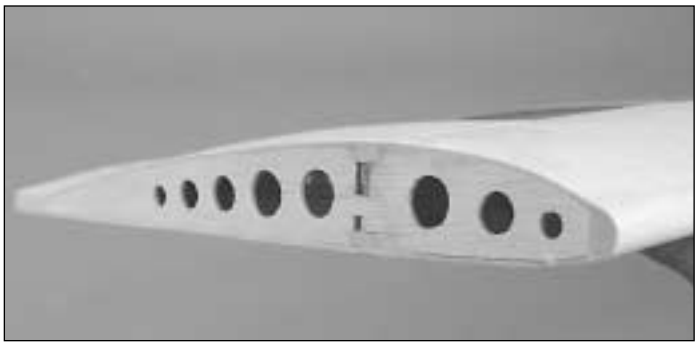
❑ ❑ 6. From the remaining 1/16" [1.6mm] balsa sheet used in step 15, sheet the outer wing panel from rib W4 to W5.

❑ ❑ 7. Trim and glue 1/16" x 1/4" x 30" [1.6mm x 6.4mm x 762mm] balsa cap strips to the bottom of ribs W6 through W10.

❑ ❑ 8. Remove the outer wing panel from your building board. Trim the forward wing sheeting flush with the sub LE.

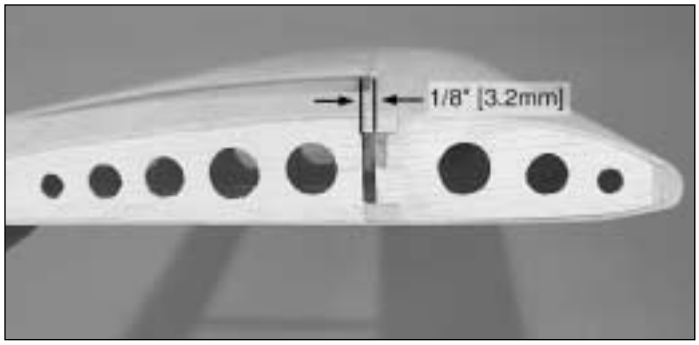
❑ ❑ 9. Glue the 1/4" x 5/8" x 30" [6.4mm x 15.9mm x 762mm] balsa leading edge to the front of the sub LE.

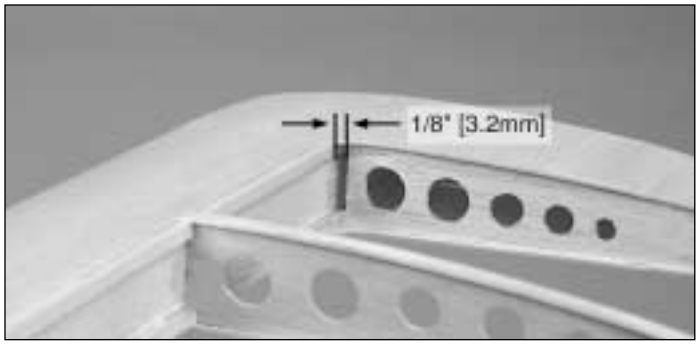
❑ ❑ 10. Trim and sand the LE, sub LE, top and bottom sheeting, wing spars and TE flush with rib W4. Trim the sub LE, top and bottom sheeting and wing spars with rib W10. Leave the excess LE and TE until after the wing tip is installed.



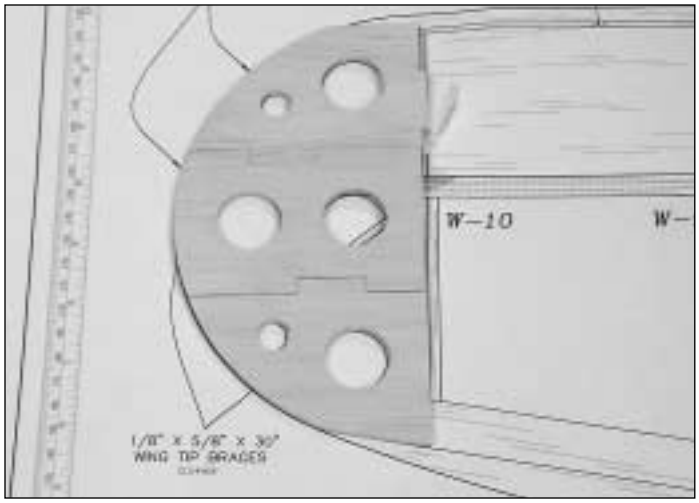
❑ ❑ 11. Use a Great Planes Power Plane and sanding bar to shape the LE to the shape shown on the wing plan.

❑ ❑ 12. Use a razor plane and sanding bar to shape the TE to the shape shown on the wing plan.

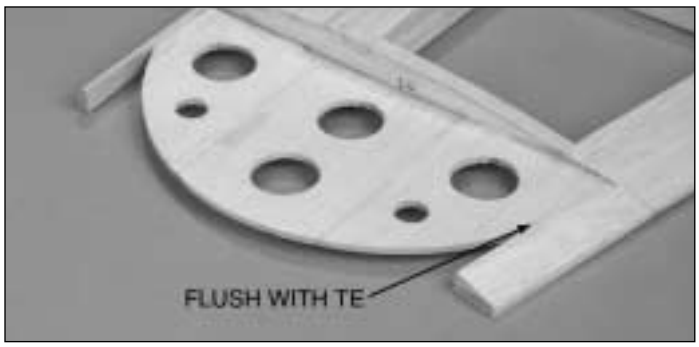




❏ ❏ 13. Using a hobby knife, carefully cut a slot in the root rib W4 and rib W5 to allow the die-cut 1/8" [3.2mm] plywood **wing joiner** to be inserted.

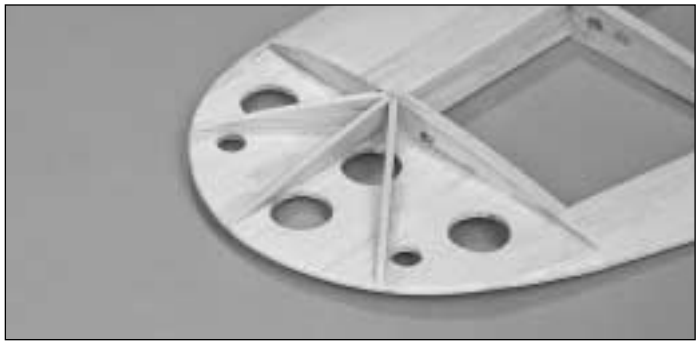


❏ ❏ 14. Glue the 3-piece die-cut 1/8" [3.2mm] balsa **wing tip** together.



❏ ❏ 15. Glue the wing tip perpendicular to rib W10, the LE and the TE. The wing tip should be centered on the LE and flush with the top of the TE.

❏ ❏ 16. From the 1/8" x 5/8" x 30" [3.2mm x 15.9mm x 762mm] balsa stick, cut and glue **wing tip braces** to the top of the wing tip as shown on the plan.

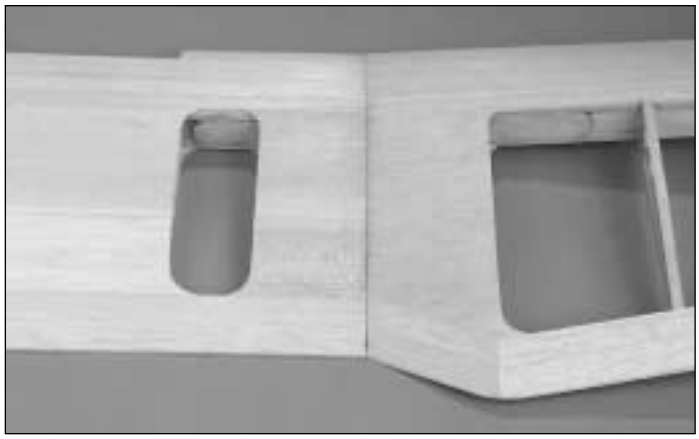


❏ ❏ 17. Use a Power Plane and sanding bar to blend the LE, TE and wing tip braces into the wing tip. Round the edge of the wing tip.

❏ 18. Return to step 1, ***"Build The Left Wing Panel,"*** and build the right wing panel.

Join the Wing Panels

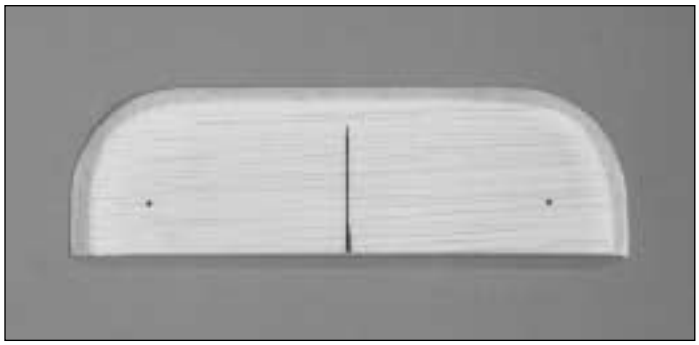
❏ 1. Check the fit of the wing joiners in each wing panel. The longer end of each wing joiner fits in the outer wing panel. Test fit the outer wing panels to the center wing panel. If there is a gap between the wing panels, carefully sand the root ribs until the panels fit tight.



❏ 2. Read this step completely before mixing any epoxy. For ease of construction, we are going to glue the right outer

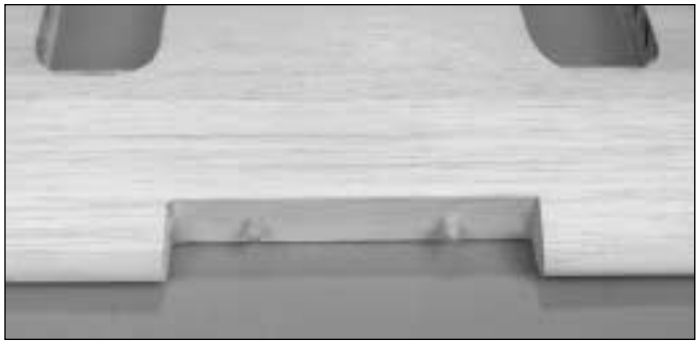
wing panel to the center wing panel first. Apply 30-minute epoxy to the back of the shear web, the wing spars, the edge and front of the wing joiner and the root ribs of the right outer wing panel and the left root rib of the center wing panel. Insert the wing joiner in the center wing panel and slide the outer wing panel over the wing joiner. Wipe off any excess epoxy with a paper towel dampened with denatured alcohol. Hold the panels together with masking tape. Make sure that the wing joiner is tight against the shear webs. Small bar clamps work great for holding the wing joiner tight while the epoxy cures. With the center wing panel flat on your building board, block up the outer wing panel at rib W10, 2-5/8" [66.6mm] from your building board.

❏ 3. Once the epoxy cures, follow the same procedure to glue the left outer wing panel to the center wing panel.



❏ 4. Make a mark at the center of the TE of the center wing panel. Also mark the center of the die-cut 3-ply **wing bolt plate**. Use a sanding bar to bevel the edges as shown.

❏ 5. Use epoxy to glue the wing bolt plate, centered on the top of the wing TE. The aft edge of the plate should be flush with the TE of the wing.



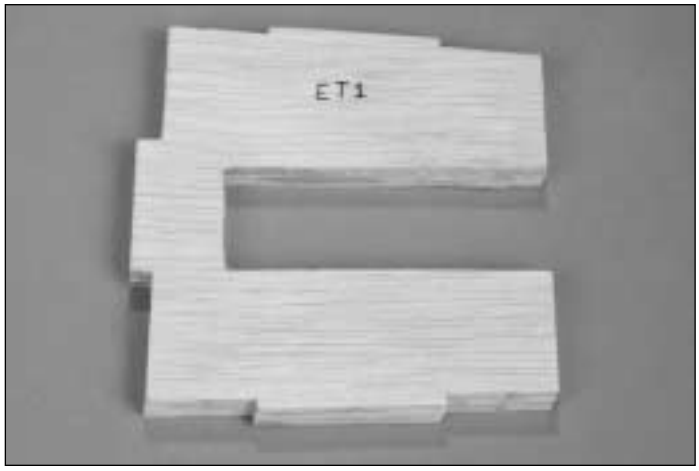
❏ 6. From the 1/4" x 4" [6.4mm x 101.6mm] hardwood dowel, cut two wing dowels 1-7/8" [47.6mm] long. Round both ends of the dowels and test fit them in the wing. They should protrude out from the wing dowel support approximately 3/8" [9.5mm]. If they are difficult to insert into the wing, use a 1/4" [6.4mm] drill to clean out the holes. Do not glue them in until after the wing has been covered.

The wing is now completely assembled. Because the wing will be used when installing the stabilizer, we suggest that you wait until after the fuselage is assembled to final sand the wing.

BUILD THE FUSELAGE

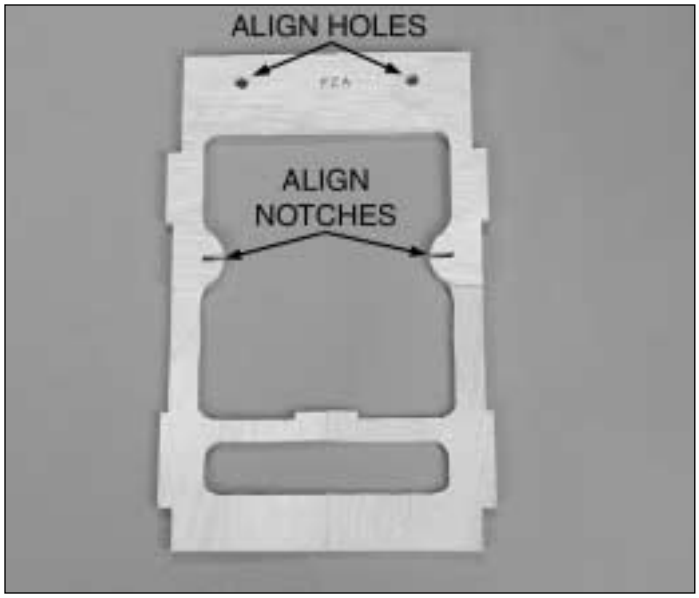
Build the Fuselage Sides

1. Cover the fuselage plan side view with waxed paper or Great Planes Plan Protector. When installing the formers, make sure the embossed lettering is always facing forward.

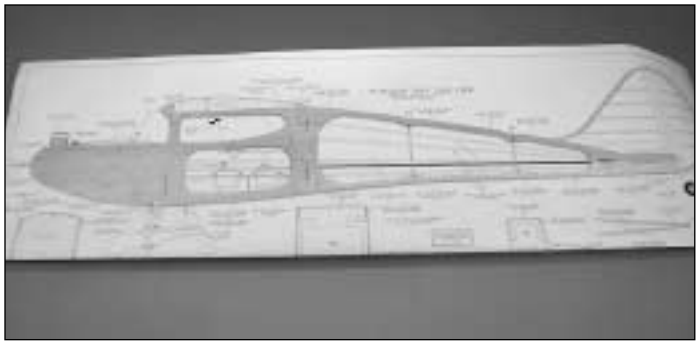


❏ 2. Use epoxy to glue the die-cut 3-ply **engine tray** together. Make sure tray ET2 is glued between ET1 and ET3 and that all the edges are aligned. Wipe off any excess epoxy before it cures.

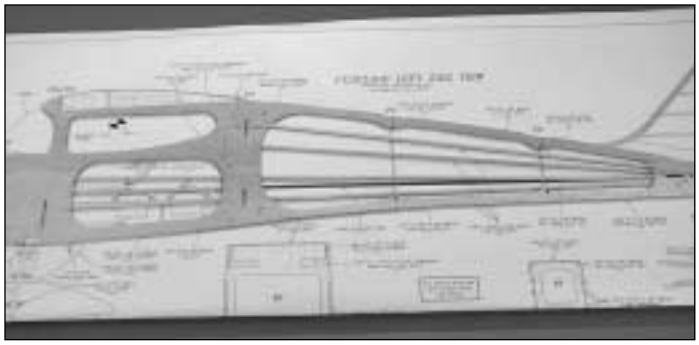
❏ 3. Use epoxy to glue the die-cut 3-ply **firewall F1A** to the front of **F1B**. Make sure all the edges are aligned. Wipe off any excess epoxy before it cures.



❏ 4. Glue the two halves of the die-cut 3-ply **former F2** together. Glue the die-cut 3-ply **former F2A** to the front of former F2. Align the two 1/4" [6.4mm] holes and the two notches. The top of F2 and F2A do not align.



❏ ❏ 5. Position the seven die-cut 1/8" [3.2mm] balsa fuse side pieces over the plan and check their fit. Lightly sand any tabs or slots as needed. Glue the fuse sides together with CA, starting at the front of the fuselage.



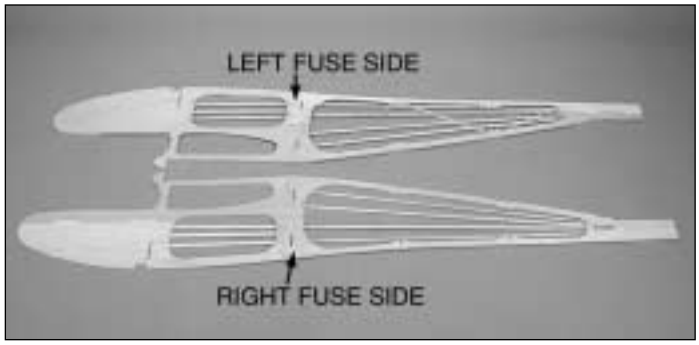
❏ ❏ 6. Cut and glue the four 1/8" x 3/16" x 24" [3.2mm x 4.8mm x 609.6mm] balsa **fuse stringers** to the fuse sides.

❏ ❏ 7. Lightly sand the fuse side to remove any excess glue and smooth out the joints.

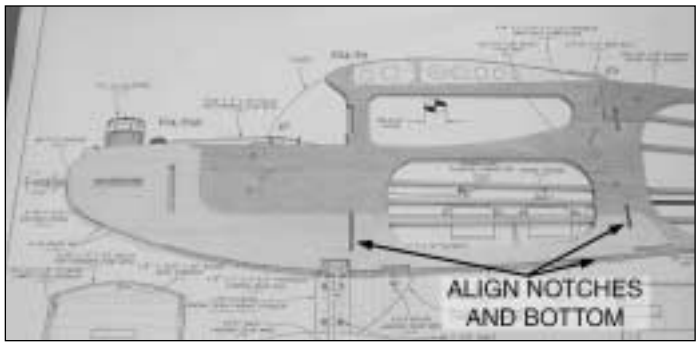
❏ 8. Go back to step 5 and assemble the second fuse side.

❏ 9. Place the two fuse sides together and check that they match up all the way around. If they are not identical, pin them together and use a sanding bar to make them match.

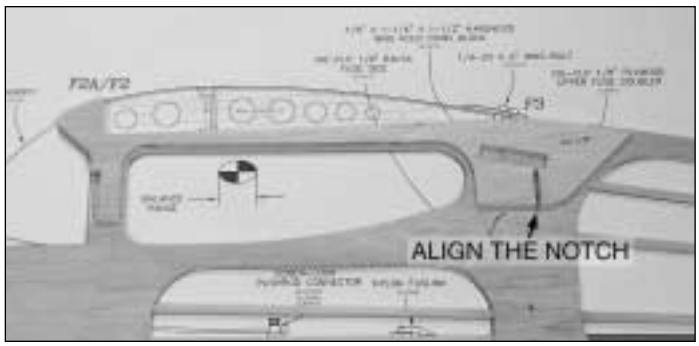
❏ 10. Lightly sand both sides of each fuselage side to remove any excess glue.



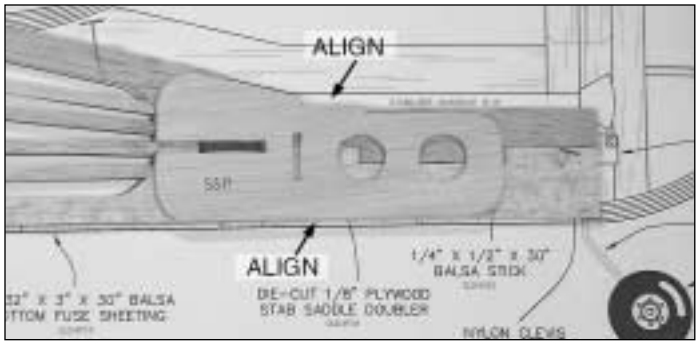
❏ 11. Lay the fuse sides next to each other so they mirror each other. Mark one fuse side **left side** and one **right side**.



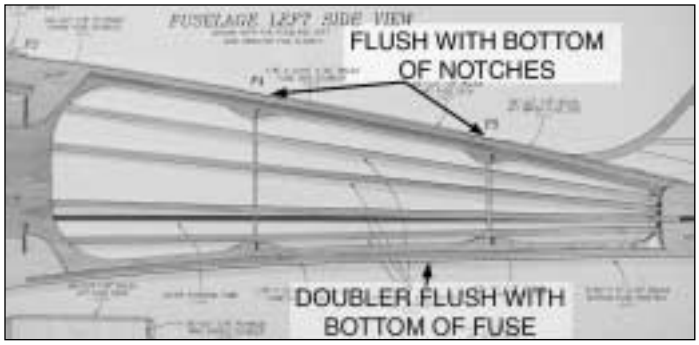
❏ ❏ 12. On the right fuse side, glue the die-cut 3-ply **lower fuse doubler** to the fuse side. Align the notches for formers F2 and F3 and the bottom of the fuselage.



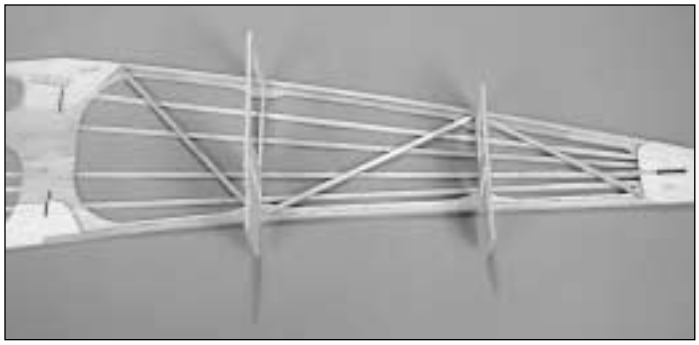
❏ ❏ 13. Glue the die-cut 3-ply **wing saddle doubler (WSD)** to the fuse side. Align the notch for former F3 and the wing saddle.



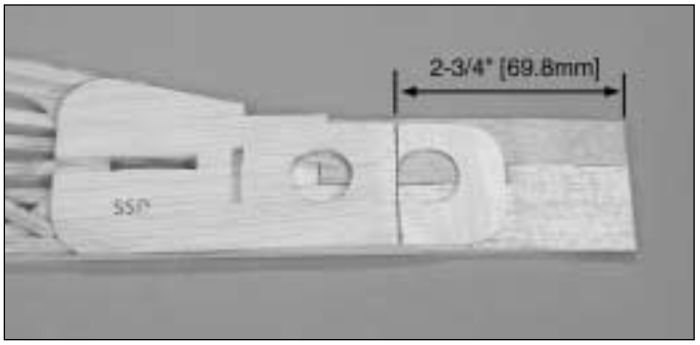
❑ ❑ 14. Glue the die-cut 3-ply **stab saddle doubler (SSD)** to the aft fuse side. Align the stab saddle doubler and the bottom of the fuse.



❑ ❑ 15. Glue the 1/8" x 3/16" x 24" [3.2mm x 4.8mm x 609.6mm] balsa **fuse side doublers** to the top and bottom of the fuse. The bottom fuse doubler is flush with the bottom of the fuse side. The top fuse doubler is flush with the bottom of the aft fuse deck notches.



❑ ❑ 16. Glue the 1/8" x 3/16" x 24" [3.2mm x 4.8mm x 609.6mm] balsa **fuse cross braces** to the fuse side and the stringers. Temporarily position the die-cut 3-ply fuse formers F4 and F5 in the notches of the fuse side. **Do not** glue the formers to the fuse side. They are only to position the cross braces at this time.

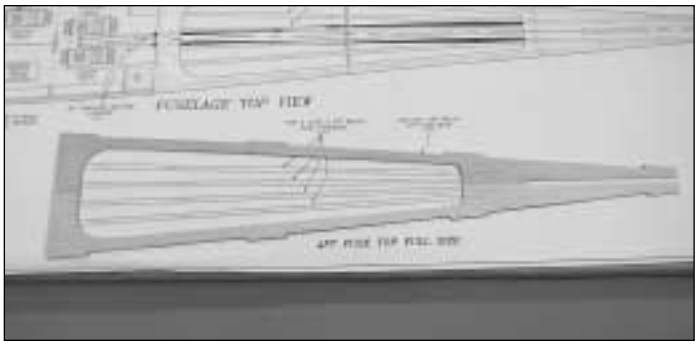


❑ ❑ 17. Draw a line perpendicular to the bottom edge of the fuselage, 2-3/4" [69.8mm] from the aft end. Sand a taper from the line to the aft edge of the fuse. Leave the aft edge approximately 1/32" [.8mm] thick.

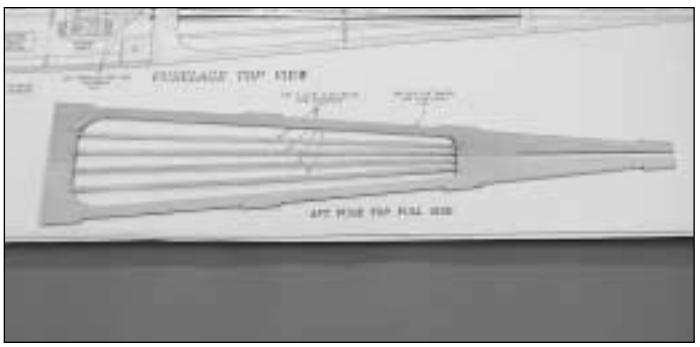
❑ 18. Return to step 12 and install the doublers on the left fuse side.

Assemble the Aft Fuse Top

❑ 1. Cover the Aft Fuse Deck plan, at the bottom of the fuse plan, with waxed paper or Great Planes Plan Protector.



❑ 2. Glue the two die-cut 3/32" balsa **aft fuse deck** halves together over the plan.

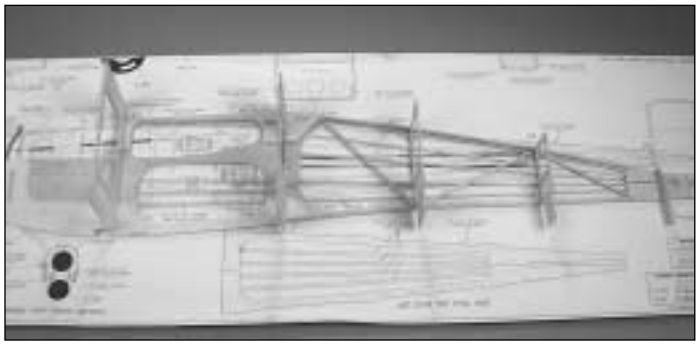


❑ 3. From the 3/32" x 3/16" x 24" [2.4mm x 4.8mm x 609.6mm] balsa stick, cut and glue **stringers** to the aft fuse deck.

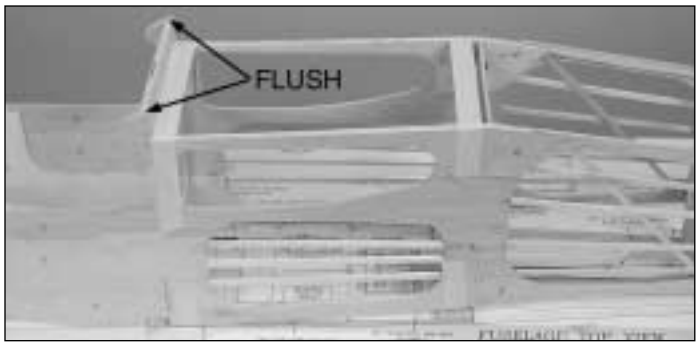
❑ 4. Lightly sand both sides of the aft fuse deck to remove any excess glue.

Assemble the Fuselage

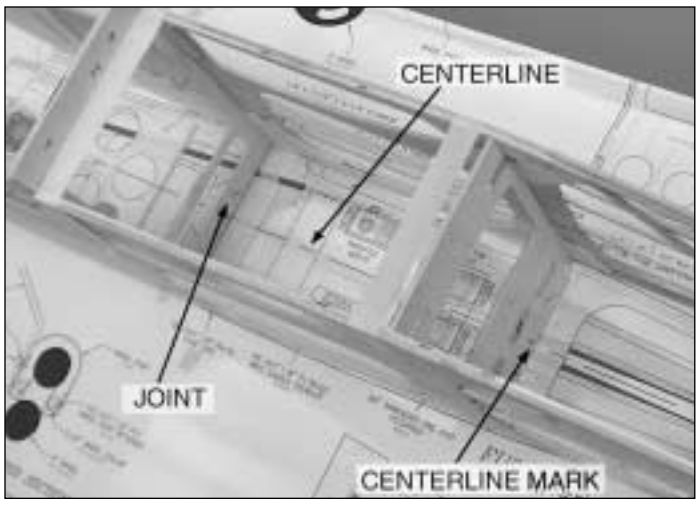
❏ 1. Cover the Fuselage Top View plan with waxed paper or Great Planes Plan Protector.



❏ 2. Lay the right fuse side on your building board. Align the front of the fuse with the front of the fuse plan. Use the plan as a guide to locate the formers. Insert the die-cut 3-ply formers F2 through F6 in the fuse side. **Do not** glue them in yet.



❏ 3. Install the left fuse side on formers F2 and F3. The top of the former F2 must be flush with the top of the fuse side. Use masking tape to hold the fuselage together. Tape the fuse behind F2 and in front of F3. After taping, rotate the fuse upright.



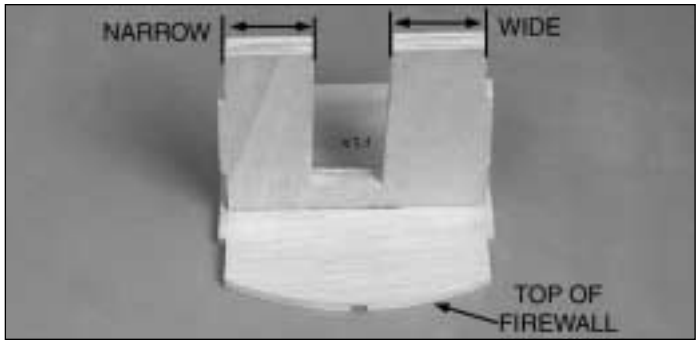
❏ 4. You will notice at the bottom of former F3 is a centerline mark. Darken the mark with a pen. Align this mark with the centerline and the former location on the fuse plan. Pin the former to the plan. Align the center joint in former F2 with the centerline and pin it to the plan.

❏ 5. Pull the fuse sides together at former F4, F5 and F6. Tape the sides together and pin the formers to the building board, aligning the mark at the bottom of each former, with the centerline. Do not put the tape over the top of the fuse. You will need to check fit the aft fuse deck .

❏ 6. Test fit the aft fuse deck to the fuse and tape it into place.

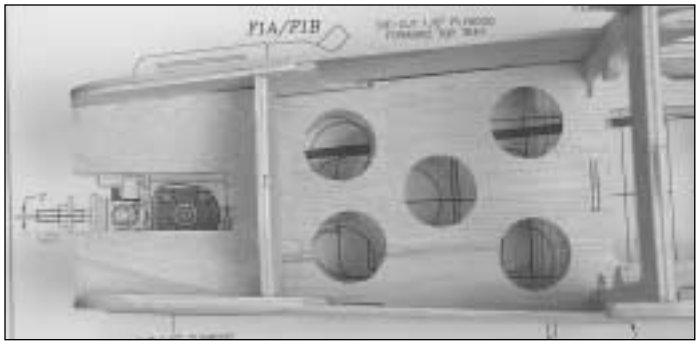
❏ 7. Starting at former F2, use thin and medium CA to glue the fuse sides to the formers. Make sure each former is aligned with the centerline and against the building board. Carefully work your way back to former F6. Once the formers are glued to the fuse sides, glue the aft fuse deck to the formers and fuse sides.

❏ 8. Use 6-minute epoxy to glue the die-cut 3-ply **stabilizer plate** to the fuse sides and the stab saddle doubler.

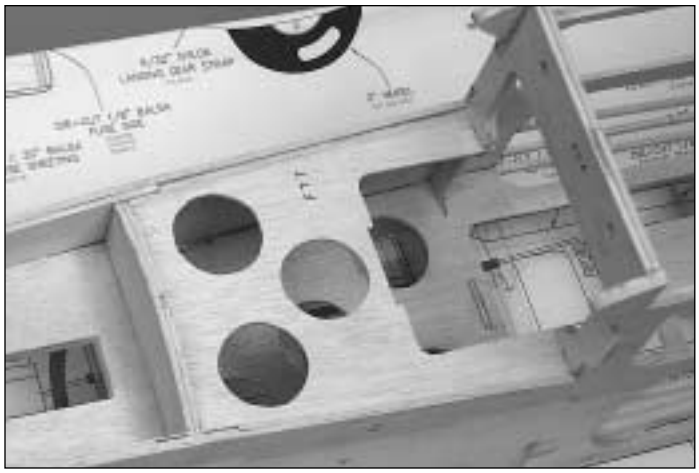


❏ 9. Use 6-minute epoxy to glue the engine tray, perpendicular to the front of the firewall. The front of the firewall is F1A. Note that the wider side of the engine tray is on the right side when viewed from the firewall.

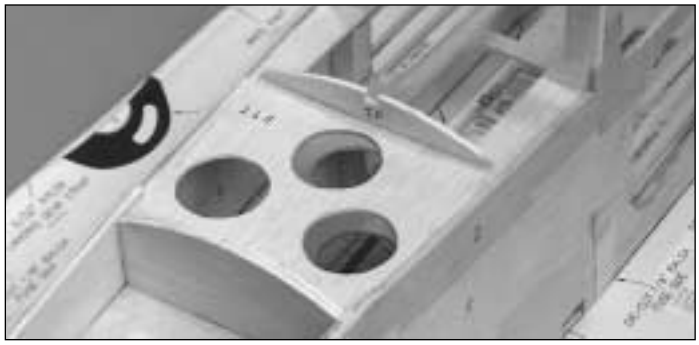
❏ 10. Fit the die-cut 3-ply servo tray in the fuselage. To install the tray in former F2 you will need to insert one side of the servo tray over F2 and slide it down as far as possible. Then, slide the other side of the tray over the former. Do not glue it yet.



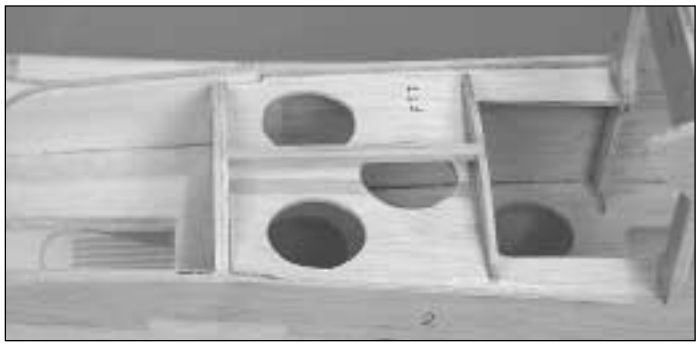
❏ 11. Fit the firewall/engine tray to the front of the fuselage. Make any adjustments so that the fuse sides fit tight against the firewall and engine tray. The servo tray should fit against the back of the firewall. Use 30-minute epoxy to glue the firewall/engine tray to the fuse sides. Use clamps to hold the fuse sides tight against the firewall/engine tray until the epoxy cures. While waiting for the epoxy to cure, use CA to glue the servo tray to the firewall, fuse sides and formers F2 and F3.



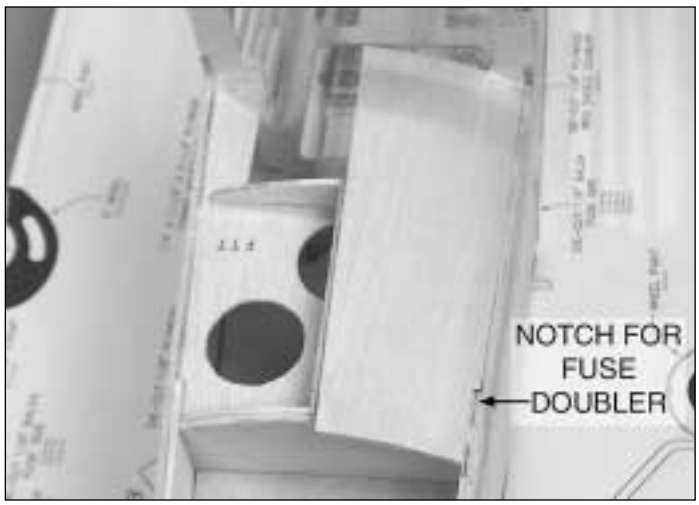
❏ 12. Glue the die-cut 3-ply **forward top tray (FTT)** to the back of the firewall, fuse sides and former F2.



❏ 13. Glue the die-cut 3-ply **instrument panel (IP)** perpendicular to the forward top tray.



❏ 14. From leftover 1/8" x 3/16" [3.2mm x 4.8mm] balsa sticks used for the fuse stringers, glue two **top deck stringers** between the firewall and the instrument panel.



❏ 15. From the 3/32" x 3" x 30" [2.4mm x 76.2mm x 762mm] balsa sheet, cut two **forward top deck sheets** 7" [177.8mm] long. Position the sheet from the firewall to former F2. Mark and cut a notch for the fuse doubler. Reposition the sheet and trim it to the middle of the top deck stringers. When satisfied with the fit, glue the sheeting to the top of the firewall, the inside of the fuse side, the top deck stringers and former F2.

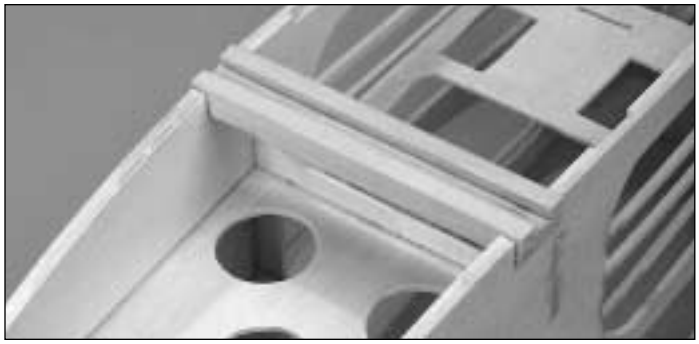
❏ 16. Trim and glue the second sheet to the other side of the top of the forward deck.

❏ 17. Trim the front of the top deck sheets flush with the front of the firewall. Trim the aft end of the sheets so that they curve from former F2 to approximately 1" [25.4mm] aft of the instrument panel.

❏ 18. Test fit the two 3/8" x 1-1/4" x 1-1/2" [9.5mm x 31.7mm x 38.1mm] hardwood **wing hold down blocks** in the notches of former F3 and the fuse sides, sanding as necessary to provide a good fit. When satisfied with the fit, use epoxy to glue the wing hold down blocks to the fuse and former.

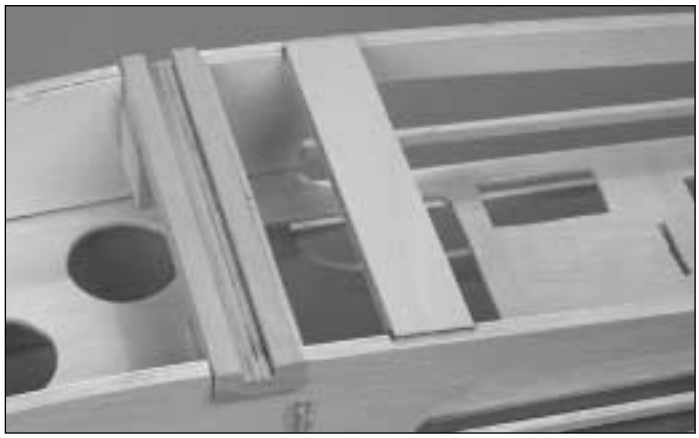
Finish the Bottom of the Fuselage

❏ 1. Unpin and remove the fuselage from your building board. Trim off the building tabs from the bottom of formers F3 through F6. Use a sanding bar to sand the bottom of the fuse and formers smooth.



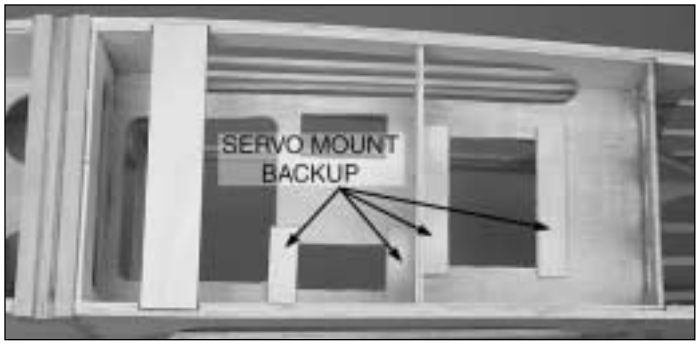
❏ 2. Test fit the hardwood **slotted landing gear rail** in the notches of the fuse side. Place a piece of 3/32" [2.4mm] balsa sheet next to the rail. The rail should be flush with the top of the sheet. If it is not, trim the notch slightly until the rail fits properly. Use 6-minute epoxy to glue the landing gear rail to the fuse side and the front of former F2. Wipe off any excess epoxy. Pay special attention to the underside of the rail where the 1" x 1" x 1" [25.4mm x 25.4mm x 25.4mm] hardwood **torque blocks** will be glued in the next step.

❏ 3. Use 6-minute epoxy to glue the 1" x 1" x 1" [25.4mm x 25.4mm x 25.4mm] hardwood torque blocks to the top of the landing gear rail, fuse side and former F2.



❏ 4. Test fit the 1/4" x 1" x 5-1/4" [6.4mm x 25.4mm x 133.3mm] plywood **fairing mounting plate** in the notch in the 3-ply lower fuse doublers, making sure the 3/32" [2.4mm] sheeting will be flush with the top of the fairing mounting plate. Use 6-minute epoxy to glue the fairing mounting plate to the lower fuse doublers and the fuse sides. Wipe off the excess epoxy before it cures.

❏ 5. Glue the die-cut 3-ply **servo tray support (STS)**, perpendicular to the bottom of the servo tray and to the lower fuse doublers.

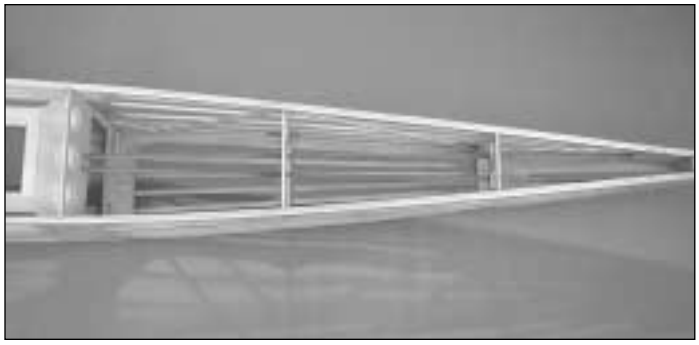


❏ 6. Glue a die-cut 3-ply **servo mount backup** to the bottom of the servo tray at both ends of the opening for the rudder and elevator servo. Determine which side your throttle servo will need to be mounted on. Cut the third servo mount backup in half and glue it to the bottom of the servo tray in front and behind the throttle servo mounting hole.

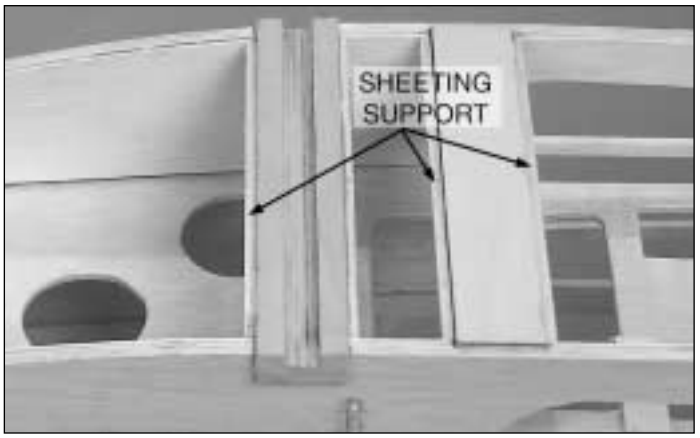
❏ 7. Carefully sand the outside of the 36" [914.4mm] gray **outer pushrod tubes** with coarse sandpaper so that the glue will adhere better.

❏ 8. Use a 3/16" [4.8mm] drill bit to chamfer the front of the pushrod tube exit slot at the aft end of the fuselage. You want the outer pushrod to be as straight as possible when it is inserted through the slot and the holes in the formers.

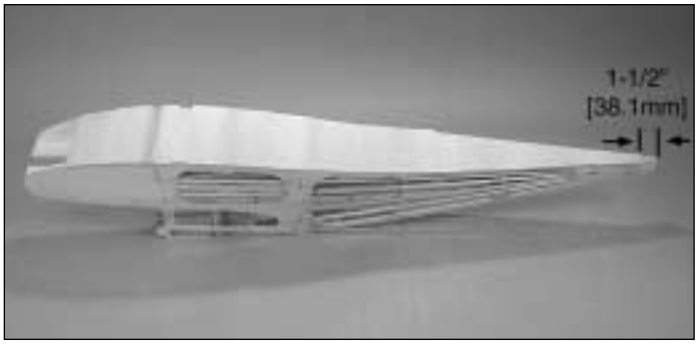
❏ 9. Insert the outer pushrods through the slots and the holes in the formers. Leave approximately 1/4" [6.4mm] of the pushrod tubes protruding from the front of former F3. Glue the tubes to the formers and fuse sides. The slots in the side of the fuse for the pushrod tube exit can be filled with Hobbico® balsa filler or 50/50 mixture of microballoons and epoxy.



❏ 10. After the filler has cured, cut off the pushrod tubes, flush with the fuse side, and use a sanding bar to sand the outer pushrod tubes and filler flush with the side of the fuselage. Save the remaining outer pushrod tube for the throttle outer pushrod tube.



❏ 11. From the leftover balsa stringers, glue sheeting supports, flush with the fuse sides, to the front of the landing gear rail and the front and back of the fairing mounting plate.



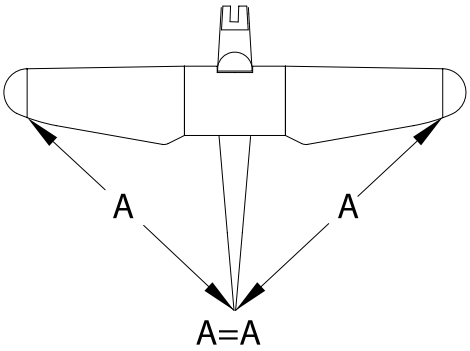
❏ 12. With the fuselage positioned upside-down on your building board, sand the fuse sides and formers flush. Sheet the bottom of the fuse using 3/32" x 3" x 30" [2.4mm x 76.2mm x 762mm] balsa sheet, applied cross-grain, starting at the firewall and proceeding to within 1-1/2" [38.1mm] of the aft end. After the fin is installed the remaining sheeting will be installed.

❏ 13. Fill any small gaps in the fuselage with balsa filler.

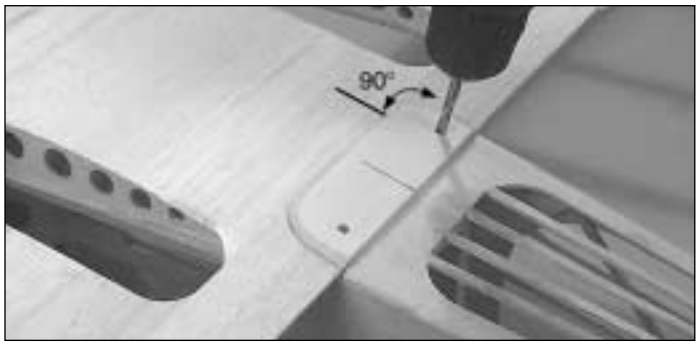
❏ 14. Use a sanding bar to sand the bottom sheeting flush with the side of the fuse. Blend the top deck into the fuse sides. Round the edges between the aft fuse deck and fuse sides and the bottom sheeting and fuse sides. Try to do as much finish sanding now as possible. It is easier to sand now than after the stab and fin are installed.

Mount the Wing on the Fuselage

❏ 1. Position the wing in the wing saddle and visually align it with the fuselage.

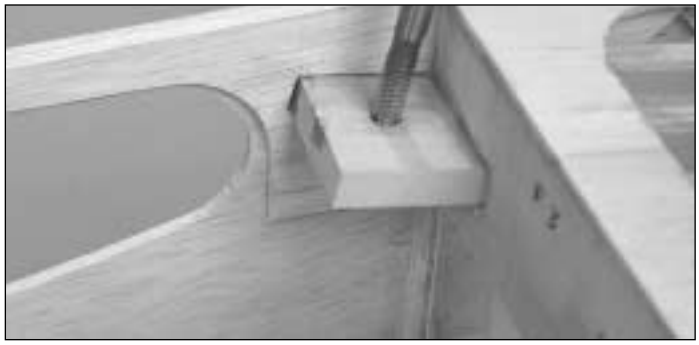


❏ 2. Use a tape measure to measure the distance from the corner of rib W10 to the center of the tail. Then, measure the distance on the other side of the fuselage to check if the distances are the same. Adjust the wing until both distances are equal. When the wing is perfectly aligned, make reference marks on the wing trailing edge and the aft fuse deck to help keep the parts aligned during the next step.



❏ 3. Tape the wing in position so that it cannot move. Use a 13/64" (or #10) [5mm] drill bit to drill a hole through the wing at the two punch marks on the wing bolt plate. Two small 90° triangles will help you to align the drill perpendicular to the top surface of the wing. **Important: Do not allow the wing to shift during this procedure.**

❏ 4. Remove the wing and use a 17/64" [6.7mm] drill bit to enlarge the holes in the **wing only**.

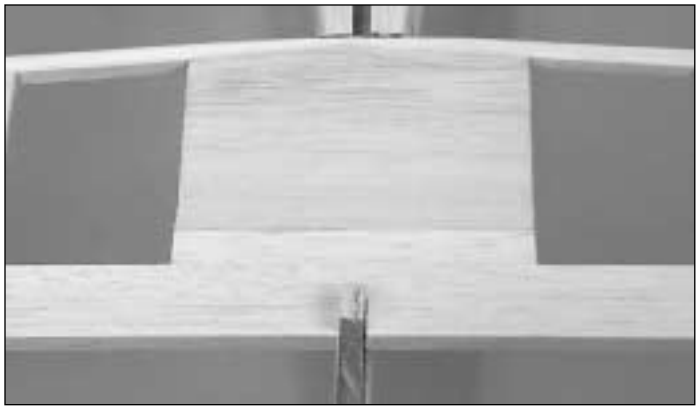


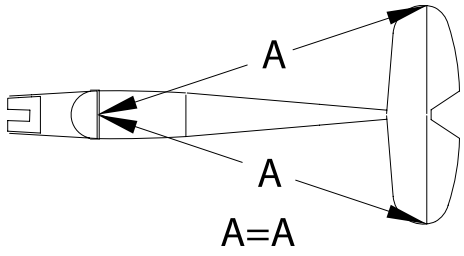
❏ 5. Use a 1/4"-20 tap to cut threads into the wing hold down blocks. After cutting the threads, put a couple of drops of thin CA on the threads in the wing hold down blocks. Allow the CA to cure before threading the tap back through the holes to clean up the threads. Bolt the wing to the fuse with two nylon **1/4"-20 wing bolts**, checking the fit.

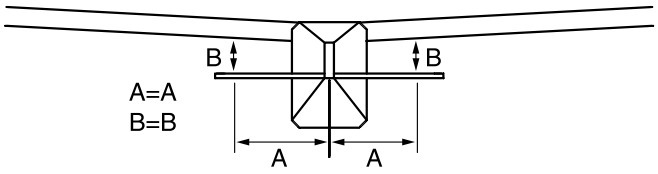
Mount the Stabilizer & Fin

❏ 1. Insert a leftover 1/4" x 1/2" [6.4mm x 12.7mm] balsa stick in the aft end of the fuselage. The edge of the stick should be aligned with the aft end of the fuse and protrude above the stab saddle by 1/2" [12.7mm]. The stick is to align the TE of the stab with the aft end of the fuse.

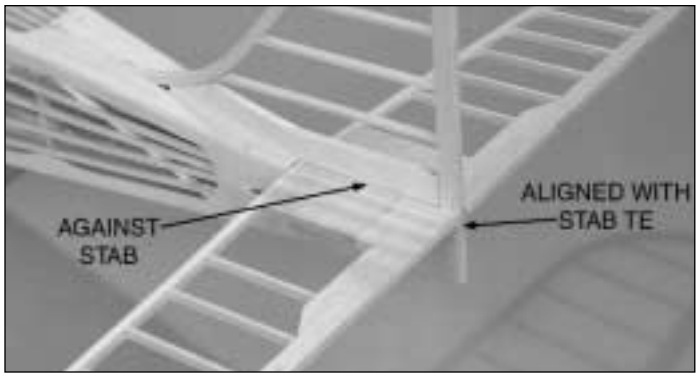
❏ 2. Test fit the stab on the fuse. You may need to sand the front of the stab slightly to allow the stab to fit properly.



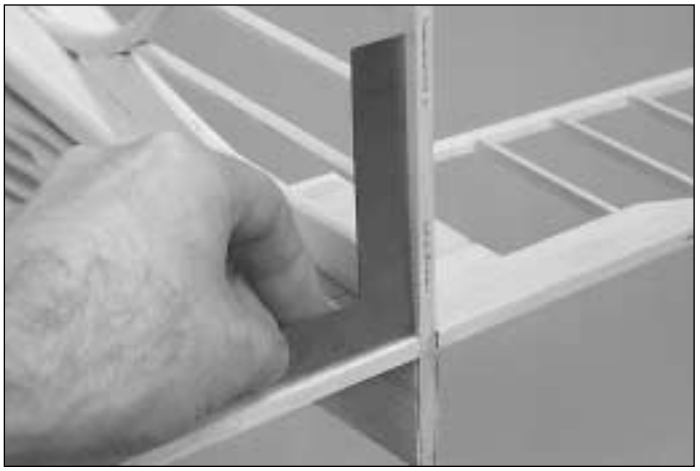




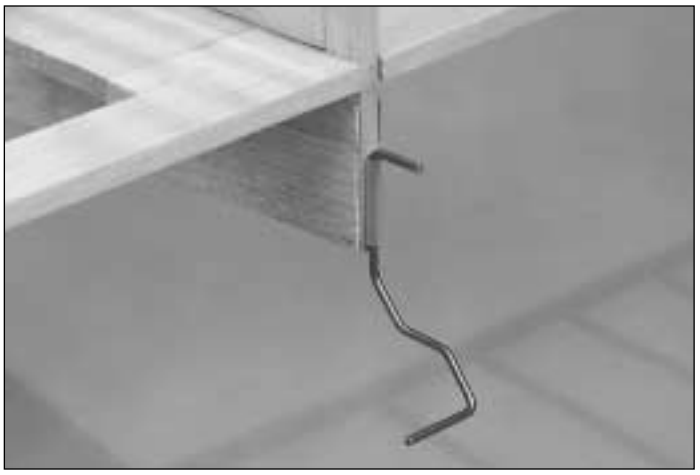
❏ 3. With the wing mounted on the fuse, center the stabilizer on the stab saddle, aligning the center of the LE with the center of the fin slot. Align the stab so that the TE tips are an equal distance from the center of the fuse. From a few feet behind the fuselage, view the stabilizer, checking that the stabilizer is parallel with the wing. If not, remove the stabilizer and sand the saddle slightly. When satisfied with the fit, use 30-minute epoxy to glue the stab to the fuse. **Double-check the stab alignment while the epoxy is curing.**



❏ 4. Remove the stick temporarily installed in step 1 to align the stab with the aft end of the fuse. Set the fin in position on the stab. The fin TE must line up with the stab TE and the fin base must be against the stab. Trim and sand the top of the fin LE so that it is flush with the top of the aft fuse deck.



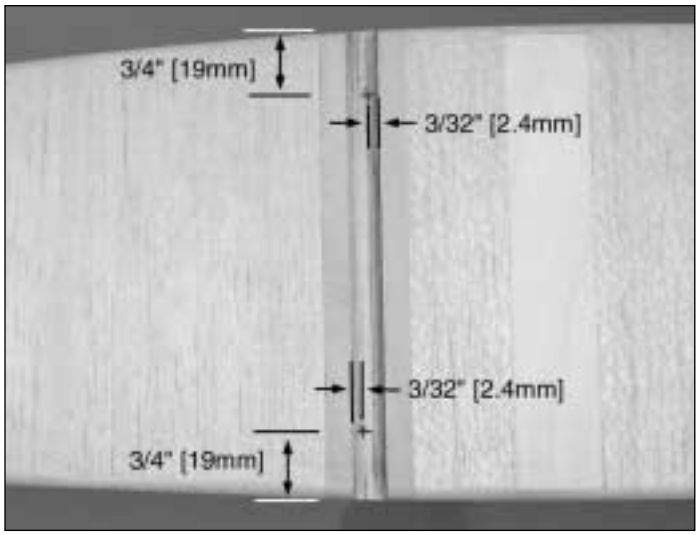
❏ 5. Sight down the fin, checking that it is in line with the centerline of the fuselage. It is very important that the fin be aligned with the centerline of the fuse and perpendicular to the stab. If it is not, the plane will be difficult to trim for straight flight. Use 30-minute epoxy to glue the fin to the stab, aft fuse deck and the aft end of the fuse.



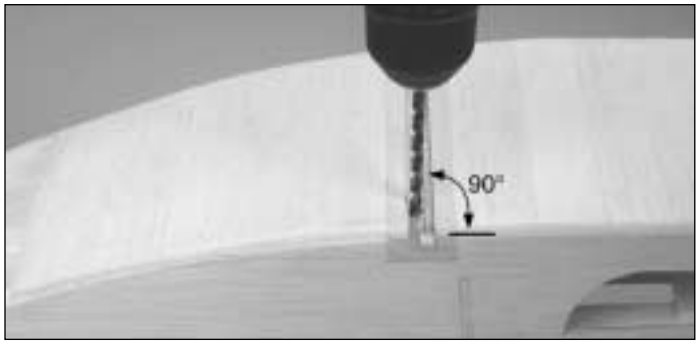
❏ 6. Install the tailgear wire in the rudder and position the rudder on the fin. Mark the location of the tailgear bearing on the TE of the fin. Remove the rudder and cut a slot in the TE for the tailgear bearing.

❏ 7. Remove the tailgear bearing. Trim and sand the fin TE so it is flush with the aft end of the fuselage. Finish sheeting the aft bottom of the fuse with 3/32" [2.4mm] balsa.

Mount the Landing Gear



❑ 1. Turn the fuse upside-down. On one end of the landing gear rail make, in the groove, a mark 3/4" [19mm] in from the fuse side and 3/32" [2.4mm] aft from the forward edge of the landing gear groove. At the other end of the rail, place a mark 3/4" [19mm] in from the fuse side and 3/32" [2.4mm] forward of the aft edge of the groove.

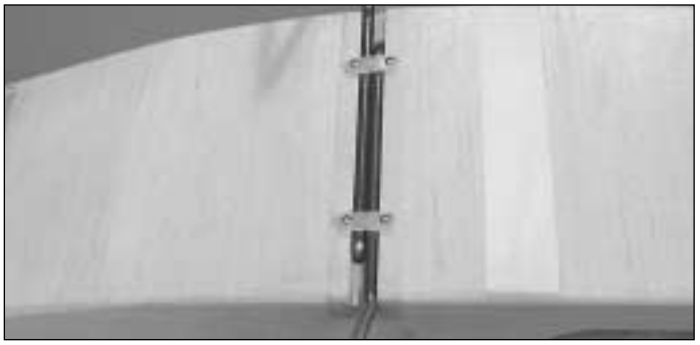


❑ 2. At both marks drill a 3/16" [4.8mm] diameter hole through the landing gear rail and torque block, perpendicular to the rail. Use a hobby knife to round the edge of the hole to allow the main landing gear wire to seat completely.

❑ 3. Insert the 3/16" **main landing gear** in the slot of the landing gear rail.

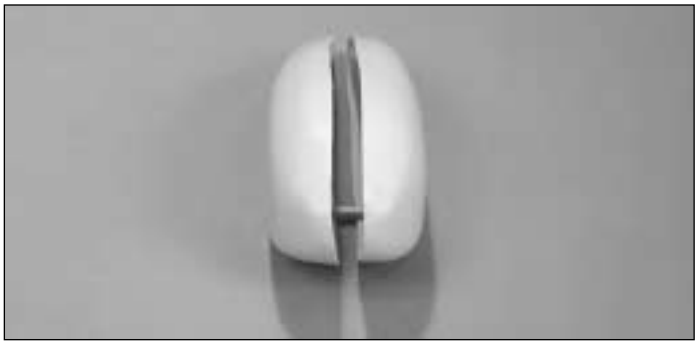
❑ 4. Position the two nylon landing gear straps over the main landing gear as shown on the plan. Mark the screw hole locations on the landing gear rail.

❑ 5. Drill a 1/16" [1.6mm] diameter pilot hole at each mark.



❑ 6. Temporarily secure the main landing gear to the landing gear rail with the landing gear straps and four **#2 x 3/8" screws**.

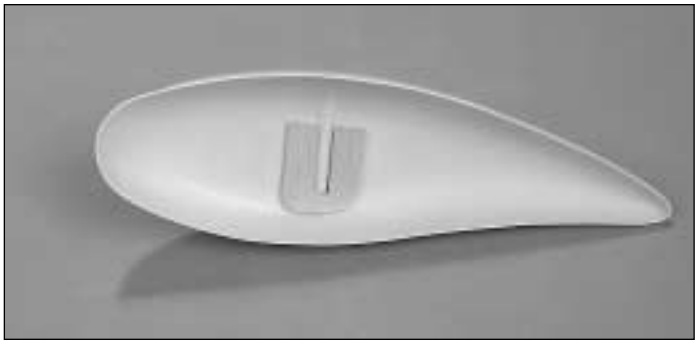
Assemble the Wheel Pants



❑ ❑ 1. Trim one matching set of wheel pant halves along the molded cut lines. You can use a hobby knife to carefully score along the cut lines and flex the plastic until the excess breaks free, or use Hobbico Curved-tip Canopy Scissors to cut along the lines. Save the leftover ABS cut from the pant halves. For now, don't worry about accurately cutting out the opening in each wheel pant half – just cut an approximate opening for the wheel.

❑ ❑ 2. Use your sanding bar to carefully true the edges of the wheel pant halves so that when you glue them together, the seam will be as small and straight as possible. Use 150 or 220-grit sandpaper to remove the flashing and thoroughly roughen the inside of the wheel pant halves.

❑ ❑ 3. Test fit the wheel pant halves together and make adjustments where necessary for the best possible fit.



❑ ❑ 4. Glue the die-cut 3-ply **wheel pant mount** around the indentation on the inside of the wheel pant. Note the wheel pant mount orientation in the photo.

❏ ❏ 5. Use masking tape to join the two wheel pant halves. Carefully spot glue them together in just a few places with thin CA. Start by spot gluing the top, then the front and rear. After the halves are joined, securely glue them along all seams with thin CA.

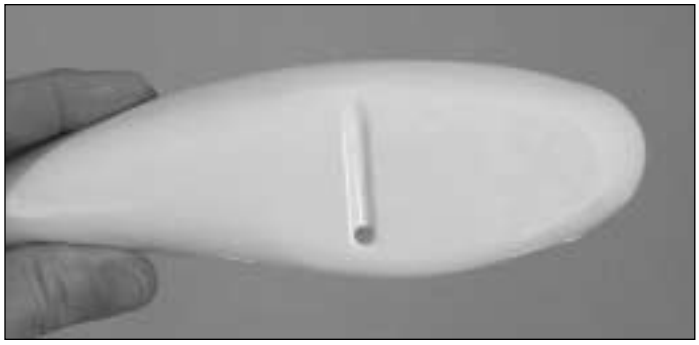
Note: Do not use CA accelerator on the ABS plastic as it may develop cracks and/or keep the paint from adhering.

❏ ❏ 6. From the leftover ABS, trim and glue strips to the inside of the wheel pant along the seams.

❏ ❏ 7. To reinforce the wheel pant, use epoxy to glue fiberglass cloth (not included) over the seam on the inside of the wheel pant.

❏ ❏ 8. Use a hobby knife or a Dremel® Multipro® with a sanding drum to finish cutting the wheel openings.

Note: Make the wheel openings as wide as possible. This will make installing the wheels and wheel collars easier and cause less interference with the wheels upon landing and taking off.



❏ ❏ 9. Drill a 3/16" [4.8mm] hole in the wheel pant at the bottom of the slot for the landing gear wire.

❏ ❏ 10. Slide the wheel pant over the landing gear wire so that the wire is recessed into the slot in the wheel pant. Place a nylon landing gear hump strap centered over the slot in the wheel pant. Mark the mounting holes, remove the strap and drill a 1/16" pilot hole at both marks.

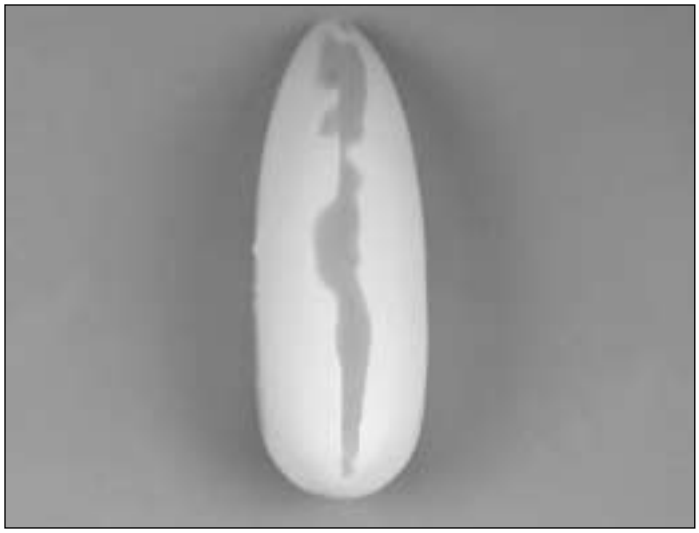
❏ ❏ 11. Drill a 3/16" [4.8mm] hole in the center of the die-cut 3-ply **wheel pant retainer**. Slide the wheel pant retainer over the landing gear (see the following step). Then, securely attach the wheel pant to the landing gear with the nylon landing gear strap and two #2 x 3/8" sheet metal screws. Remove the two screws and apply a drop of thin CA in each hole to harden the screw threads. After the CA has cured, reinstall the screws.

❏ ❏ 12. Adjust the position of the wheel pant so that the axle part of the landing gear is perpendicular to the centerline of the wheel pant. Stand back a few feet from the plane and view the wheel pant from the front and side, making sure it is positioned correctly. When satisfied with the position, use epoxy to glue the wheel pant retainer to the side of the wheel pant. By using epoxy to glue the retainer on, you can readjust the position of the wheel pant before the glue cures.

❏ ❏ 13. After the glue cures, remove the two screws holding the nylon landing gear strap on the wheel pant. Slide the wheel pant partially off of the landing gear. Slide a 3/16" [4.8mm] wheel collar, a 3" [76.2mm] wheel followed by a second 3/16" [4.8mm] wheel collar onto the landing gear. Reattach the wheel pant to the landing gear with the nylon landing gear strap. Refer to the fuse plan for a detailed view of the wheel pant assembly.

❏ ❏ 14. Adjust and tighten the wheel collars on the landing gear so that the wheel rotates freely. To secure the wheel collars on the landing gear, a flat spot should be filed at each wheel collar location and the set screw tightened on the flat.

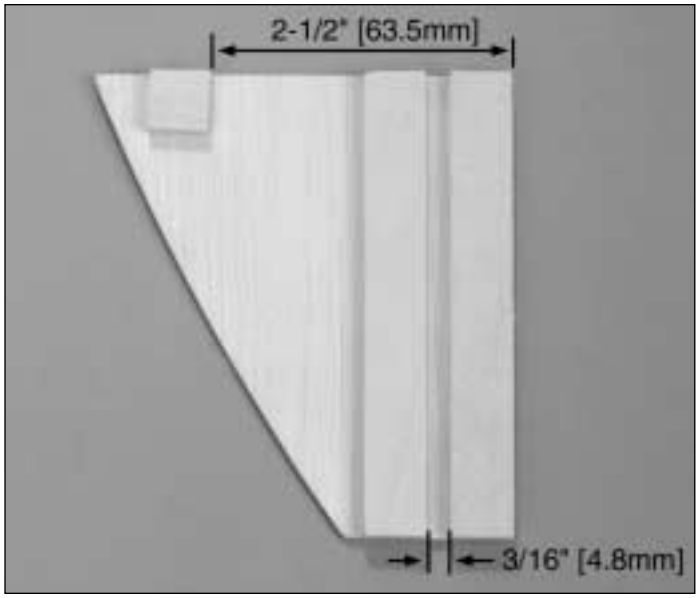
❏ 15. Return to step 1 of ***"Assemble The Wheel Pants"*** and assemble the other wheel pant.



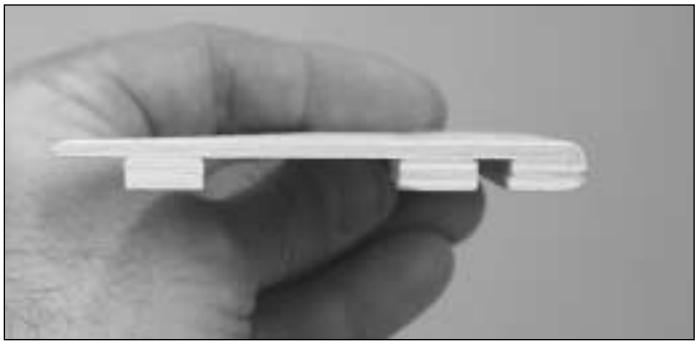
❏ 16. Before painting the wheel pant, fill the seams with filler such as Bondo® Auto Body Filler or an automotive scratch and dent glazing compound. We use Bondo most of the time as it cures quickly and sands easily, but it is normally sold in large quantities. Automotive glazing compound usually comes in small tubes, dries quickly and sands easily, but for proper drying, can only be applied in thin layers.

❏ 17. After the filler cures, wet sand the wheel pants with 400-grit sandpaper to prepare them for primer.

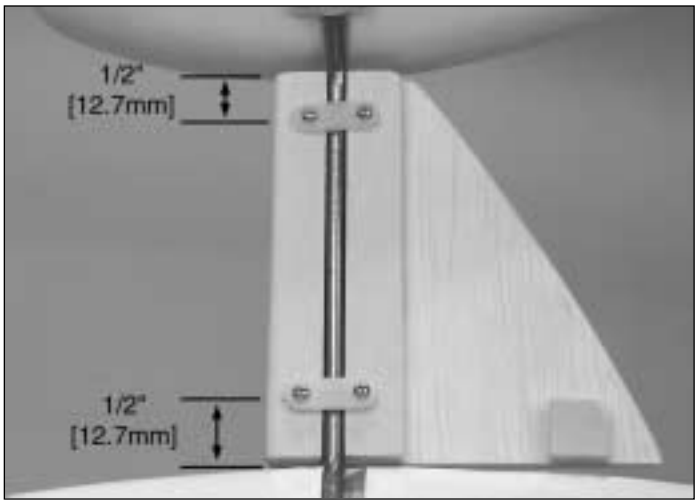
Install the Landing Gear Fairing



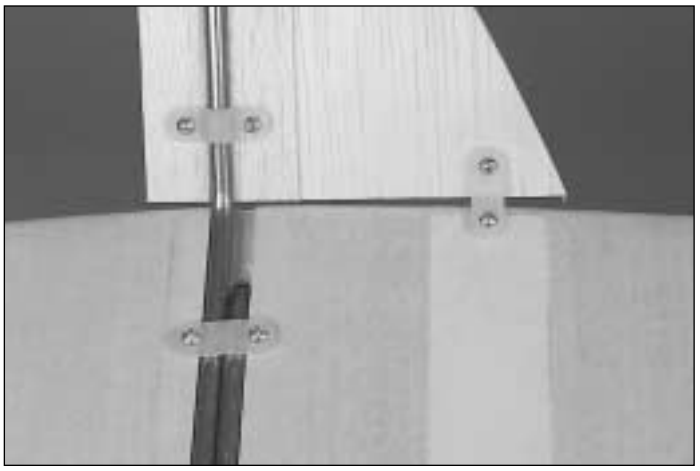
❏ ❏ 1. Glue two of the die-cut 3-ply **fairing doublers**, flush with the long edge of the die-cut 3-ply **landing gear fairing**. Measure over 3/16" [4.8mm] and glue two more fairing doublers. Measure over 2-1/2" [63.5mm] from the long edge and glue two die-cut 3-ply 1/2" [12.7mm] square fairing doublers, flush with the top of the fairing. Sand the doublers flush with the edges of the landing gear fairing.



❏ ❏ 2. Use a sanding bar to round the leading and trailing edge of the fairing.



❏ ❏ 3. Position two nylon flat landing gear straps, approximately 1/2" [12.7mm] from each end of the landing gear fairing. Mark the mounting holes and drill 1/16" [1.6mm] pilot holes at the marks. Attach the straps with #2 x 3/8" screws.



❏ ❏ 4. Take one of the flat nylon straps and bend it slightly in the center to match the angle of the landing gear fairing and fairing mounting plate. Make sure that the fairing is parallel with the side of the fuselage. Mark the mounting holes and drill 1/16" [1.6mm] pilot holes. Attach the strap with #2 x 3/8" screws.

❏ 5. Return to step 1 and install the second landing gear fairing on the other side of landing gear. After the landing gear fairings have been installed, remove the screws and

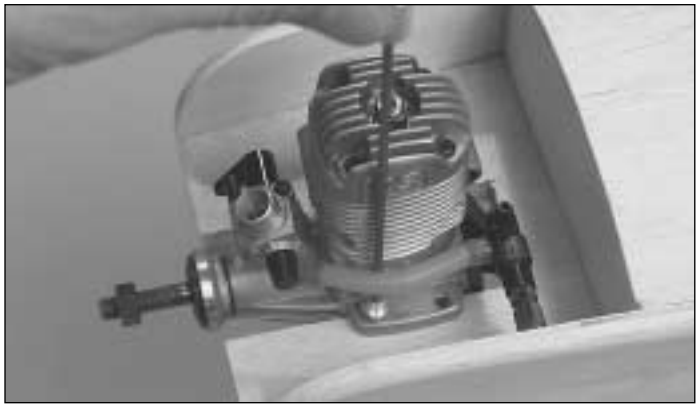
apply a drop of thin CA in each hole to harden the threads in the wood.

❏ 6. Trim the windshield along the cut line. Test fit the windshield on the fuselage and trim it as necessary.

❏ 7. With the windshield temporarily in position, test fit the wing on the fuselage. The gap between the windshield and the wing should be approximately 1/32" to 1/16" [.8mm to 1.6mm]. If it is less, lightly sand the wing until it fits. If it is larger, use leftover balsa to fill the gap.

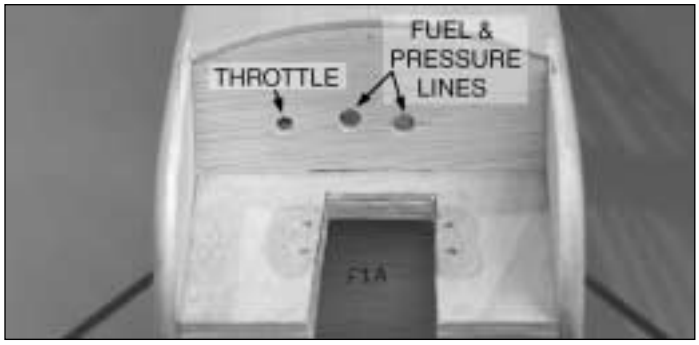
Install the Engine

❏ 1. Test fit your engine to the engine tray. If necessary, widen the mount to accommodate the engine.



❏ 2. Use a Great Planes Dead Center™ Hole Locator (GPMR8130) or something similar to mark the location of the mounting holes onto the engine tray. Make sure that the front of the engine's drive washer is in front of the engine tray. If you will be using a spinner that is recessed for the drive washer, make sure that the back of the spinner is in front of the engine tray.

❏ 3. Drill 1/8" [3.2mm] holes through the engine tray where you marked the holes. Use a **4-40 x 3/4" machine screw** with a **#4 washer** to draw four **4-40 blind nuts** into the holes in the bottom of the engine tray. Use a few drops of CA to permanently glue the blind nuts into position. Harden the top of the engine tray where the engine mounting lugs rest by applying thin CA to the area and allowing it to fully harden before mounting the engine.



❏ 4. Set the engine in position and mark the firewall for the throttle pushrod, inline with the throttle arm. Remove the engine and drill a 3/16" hole at the mark. Also, drill a 7/32" [5.5mm] hole for the fuel line and pressure line to pass through the firewall.

❏ 5. Temporarily mount the engine to the engine tray with four 4-40 x 3/4" machine screws and four #4 washers.

❏ 6. Insert a leftover outer pushrod tube through the 3/16" [4.8mm] hole in the firewall. Glue the outer pushrod tube so that the pushrod extends 1/4" [6.4mm] out of the firewall.

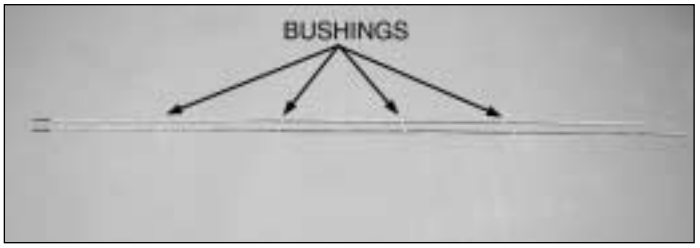
❏ 7. Test fit the muffler on the engine. Most 2-strokes will require an extension to get the muffler out past the fuse side. You may also need to trim the fuse side to clear the muffler.

RADIO INSTALLATION

Mount the Servos

❏ 1. Prepare the servos by installing the rubber grommets and brass eyelets that came with them, on each servo.

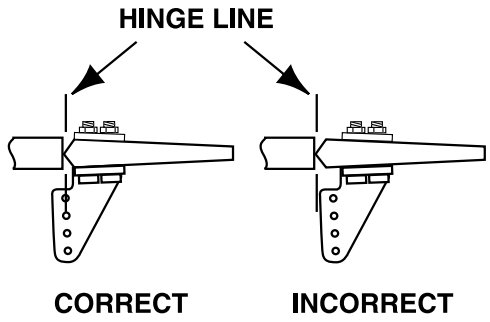
❏ 2. From the 6-1/2" [165mm] **white nylon inner pushrod**, cut eight 1/8" long bushings.



❏ 3. Slide four bushings evenly spaced onto both **2-56 x 36" [914.4mm] pushrods**. Adjust the bushings nearest the ends of the rods so they will not interfere with the ends of the outer pushrod tubes and possibly become jammed during flight. If the bushings slide onto the rods without much resistance, use a drop of thin CA to hold them in position.

Hint: Before installing the bushings, wipe off the pushrods with a paper towel dampened with rubbing alcohol to remove any oil left on the rods during manufacturing.

❑ 4. Thread a nylon clevis approximately 14 turns onto one end of each pushrod. Remove the backing plate from two **large nylon control horns** and connect the horns to the clevises in the outer hole.

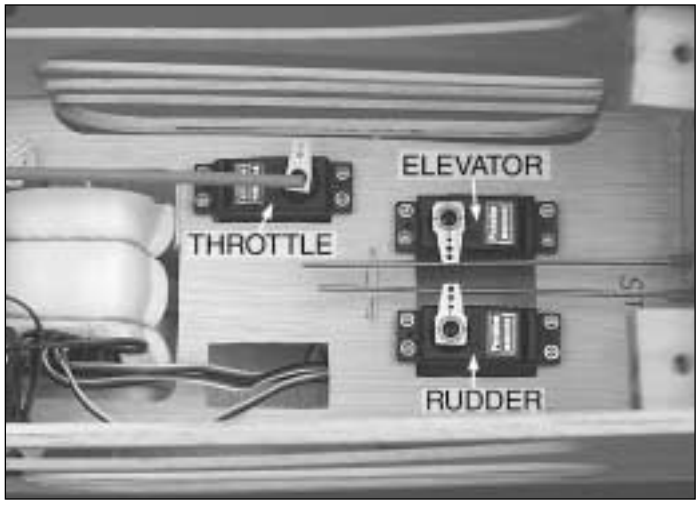


❑ 5. Temporarily install the rudder and elevator on the plane. Insert the pushrods into the outer pushrod tubes. Position the control horns on the elevator and rudder as shown on the plans. Mark the location of the control horn mounting holes and drill 3/32" [2.4mm] holes at the marks. Temporarily mount the control horns to the elevator and rudder with the backing plates and **2-56 x 1/2" machine screws**.

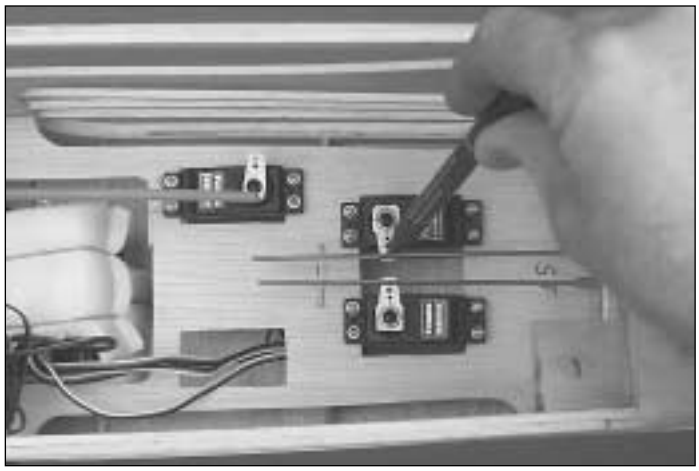
❑ 6. Mount the receiver switch on the side of the fuse, opposite the engine exhaust. We use a Great Planes Switch & Charge Jack Mounting Set (GPMM1000) (not included) on all of our planes. This allows you to check and charge the receiver battery without removing the wing.

❑ 7. Wrap the receiver and receiver battery in 1/4" foam rubber (not included).

❑ 8. Temporarily position the receiver and receiver battery on the fuse bottom. Later, the receiver battery may be moved forward or aft to balance the plane. Plug the receiver battery into the receiver switch. Later, after the location for the receiver battery and receiver have been determined, use sticks to hold them in position so that they cannot shift in flight.



❑ 9. Drill 1/16" [1.6mm] pilot holes and mount the elevator, rudder and throttle servos, using the hardware that came with your radio. When mounting the elevator and rudder servos, align the servo arms with the elevator and rudder pushrods.



❑ 10. With the servos centered and the control surfaces in the neutral position, use a felt-tip pen to mark where the elevator and rudder pushrods cross the mounting holes in the servo arms. **Note:** The servo arms have been painted for clarity.

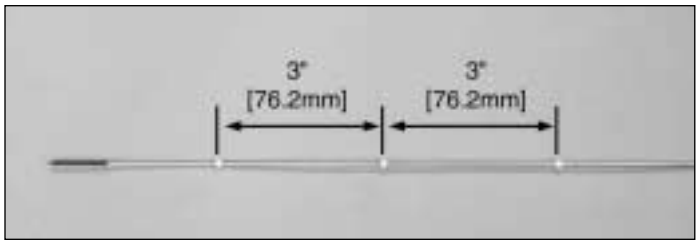
❑ 11. Disconnect the clevises from the control horns. Make a 90° bend at the marks you made. Temporarily install a

nylon FasLink™ on each pushrod and cut the wire so it slightly protrudes out of the FasLink.

Note: If necessary, enlarge the holes in the servo arms with a 5/64" [1.9mm] drill bit (or a #48 drill for precision).

Install the Throttle Pushrod

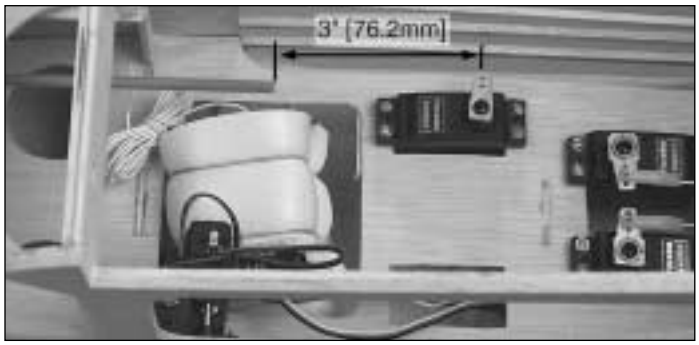
❑ 1. From the 6-1/2" [165mm] white nylon inner pushrod, cut three 1/8" long bushings.



❑ 2. Slide the three bushings onto the **2-56 x 17-1/2" [444.5mm] throttle pushrod** as shown. If the bushings slide onto the rods without much resistance, use a drop of thin CA to hold them in position.

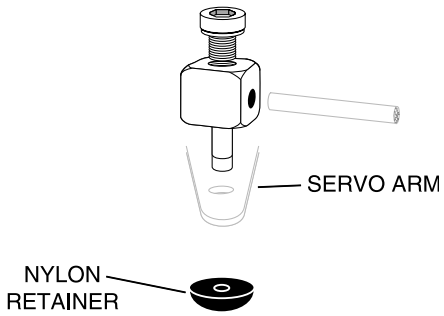
Hint: Before installing the bushings, wipe off the pushrods with a paper towel dampened with rubbing alcohol to remove any oil left on the rods during manufacturing.

❑ 3. Thread a nylon clevis approximately 14 turns onto one end of the pushrod.



❑ 4. Cut the throttle outer pushrod approximately 3" [76.2mm] from the throttle servo arm.

❑ 5. Insert the throttle pushrod into the throttle outer pushrod from the engine compartment. Connect the clevis to the throttle arm.



❑ 6. Remove the throttle servo arm from the throttle servo and install the brass screw-lock pushrod connector on the throttle servo arm and secure it with a nylon retainer.

❑ 7. Slide the screw-lock pushrod connector onto the throttle pushrod. Install the throttle servo arm on the throttle servo. Install the 4-40 x 1/8" [3.2mm] socket head cap screw in the screw-lock pushrod connector and adjust the throttle.

BALANCE THE AIRPLANE LATERALLY

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

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

❑ 1. Temporarily attach the wing to the fuselage.

❑ 2. With the wing level, have an assistant help you lift the model by the engine propeller shaft and the bottom of the fuse under the TE of the fin. Do this several times.

❑ 3. If one wing tip always drops when you lift the model, it means that side is heavy. Balance the airplane by adding weight to the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

FINISHING

Final Sanding

Remove the engine, landing gear, pushrods and control horns. Fill any scuffs and dings with balsa filler or by "expansion." See the ***Expert Tip*** below. After the filler has dried, use progressively finer grades of sandpaper to even and smooth all the edges, seams and surfaces. Sand a radius along the bottom and top edge of the fuse. Remove all the balsa dust from the model with compressed air, a tack cloth or a vacuum with a brush.

EXPERT TIP

Many surface blemishes on a framed model are caused by bumps and balsa chips on the work surface. This type of "ding" is best repaired by applying a drop or two of tap water to the blemish, then running a hot sealing iron over the spot to expand the wood fibers. After the surface has dried, sand the expanded area smooth.

Cover the Model with Top Flite MonoKote® Film

The Old Timer 40 does not require much painting to obtain the scheme shown on the box, as most of the finish is done with Top Flite MonoKote covering. The only painting required is the windshield frame and wheel pants.

The technique we will describe here is how the model pictured on the box was finished.

Cover the model with Top Flite MonoKote film, using the sequence that follows. The use of a Top Flite MonoKote Hot Sock™ on your covering iron will prevent scratching the MonoKote film.

Before you cover the fuselage, first apply 1/4" wide strips of white MonoKote film in the corners where the stab and fin meet the fuselage and each other. Proceed to cover the stab with pre-cut pieces that meet in the corners and overlap the 1/4" strips. **Do not, under any circumstances, attempt to cut the covering on the stab after it has been applied except around the leading and trailing edges and the tips.** Modelers who do this may cut through the covering and into the stab. This will weaken the structure to a point where it may fail during flight.

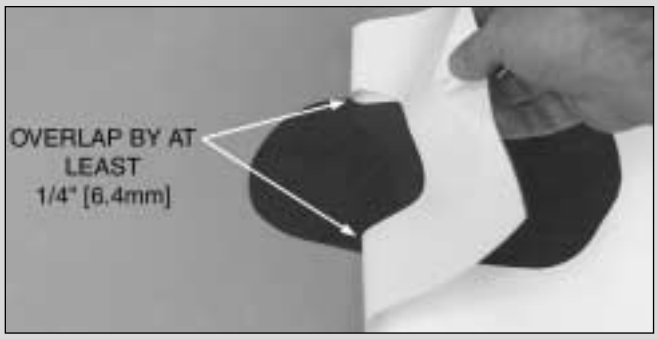
EXPERT TIP

COVERING AN OPEN STRUCTURE WITH MORE THAN ONE COLOR OF MONOKOTE FILM

A problem some modelers have when covering with more than one color of film is that air bubbles can become trapped in the seam between the two pieces of film. This becomes a big problem when covering over an open structure.

The procedure that was used to cover the Old Timer 40 uses a template made from paper for the white and transparent blue covering. The transparent blue template was drawn approximately 1/4" [6.4mm] larger than needed. A piece of transparent blue MonoKote film was laid on a piece of glass that was lightly wetted with a glass cleaner such as Windex®. A squeegee wrapped with a paper towel was used to remove the glass cleaner from under the covering film. The transparent blue film should now be flat on the glass. Tape the template, for the transparent blue film, on top of the film. Use the template as a guide to cut the film.

Follow the same procedure to cut out the white film.



Again, with the transparent blue film flat on the glass, position the white film so that it overlaps the transparent blue film by approximately 1/4" [6.4mm]. With a covering iron set close to high, iron down the seam between the two colors.

Allow the covering to cool for a minute and carefully start lifting one end of the white covering. The two pieces should be connected along the seam. If they are not, increase the heat of the covering iron and repeat the process. It may require more heat than normal for the film to seal caused by the glass absorbing some of the heat.

After removing the film from the glass, position the film on the structure. Use a covering iron to tack the film down every few inches. Then go back and seal the covering to the wood all over.

A heat gun can be used to shrink the covering, but care must be taken to not pull the seams apart.

We used Top Flite MonoKote White (TOPQ0204), Transparent Blue (TOPQ0304), Light Purple (TOPQ0224) and Black (TOPQ0208) to cover our Old Timer 40.

Suggested Covering Sequence

Fuselage and Tail:

❏ 1. 1/4" strips at fin and stab as described
❏ 2. Fin TE, followed by stab TE
❏ 3. Fuselage bottom
❏ 4. Fuselage right side
❏ 5. Fuselage left side
❏ 6. Fuselage top
❏ 7. Stab bottom, followed by top
❏ 8. Fin left side, followed by the right side
❏ 9. Elevator LE
❏ 10. Elevator bottoms, followed by the top
❏ 11. Rudder LE, right side followed by the left side
❏ 12. Die-cut 1/8" 3-ply landing gear fairings

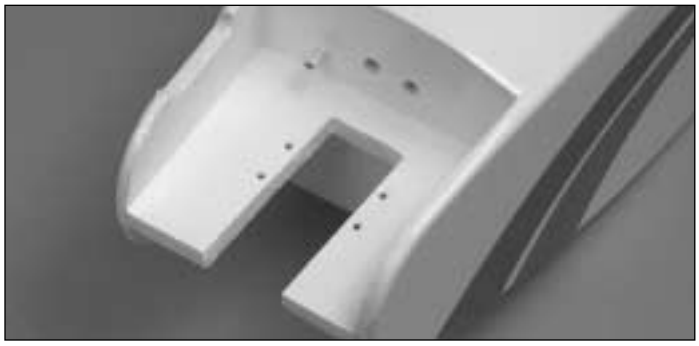
Wing:

❏ 1. Bottom center-section
❏ 2. Bottom right, followed by the left wing panel
❏ 3. Top center-section followed by the right and the left wing panel

Painting Your Model

After the model is covered, use fuelproof model paint, 30-minute epoxy thinned with alcohol or finishing resin to coat areas that may be exposed to raw fuel or exhaust residue such as the firewall, engine tray, wing saddle and fuel tank area. Top Flite LustreKote® is a high quality paint that is fuelproof and perfectly matches Top Flite MonoKote. The paint is well suited to putting a high quality finish on ABS wheel pants, but does have a tendency to curl materials such as styrene and butyrate (windshield and side windows).

Do not paint the clear windshield with LustreKote directly from the can. It can cause the plastic to curl. We recommend Formula-U for painting the clear windshield directly from the can.



We used LustreKote White (TOPR7204), Black (TOPR7208) and Light Purple (TOPR7224) to paint the wheel pants. The inside of the engine compartment was first coated with thinned epoxy and was then brushed with white.

FINAL HOOKUPS & CHECKS

Install the Hinges

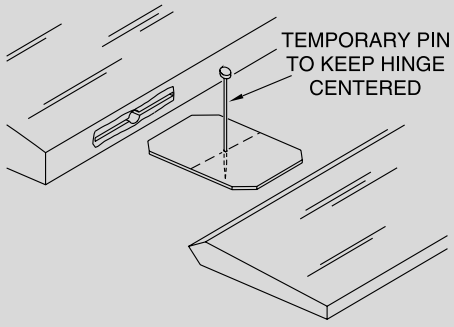
❏ 1. Cut the covering from the hinge slots in the elevator and stab. Also cut the covering from the groove for the tailgear wire.

❏ 2. Reinstall the CA hinges in the elevator without glue.

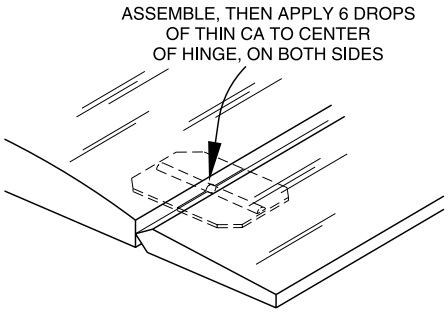
INSTALLING CA HINGES

The hinge material supplied in this kit consists of a 3-layer lamination of mylar and polyester. It is specially made for the purpose of hinging model airplane control surfaces. Properly installed, this type of hinge provides the best combination of strength, durability and ease of installation. We trust even our best show models to these hinges, but it is essential to install them correctly. Please read the following instructions and follow them carefully to obtain the best results. These instructions may be used to effectively install any of the various brands of CA hinges.

The most common mistake made by modelers when installing this type of hinge is not applying a sufficient amount of glue to fully secure the hinge over its entire surface area; or, the hinge slots are very tight, restricting the flow of CA to the back of the hinges. This results in hinges that are only “tack glued” approximately 1/8" to 1/4" into the hinge slots. The following technique has been developed to help ensure thorough and secure gluing.



It is best to leave a very slight hinge gap, rather than closing it up tight, to help prevent the CA from wicking along the hinge line. Make sure the control surfaces will deflect to the recommended throws without binding. If you have cut your hinge slots too deep, the hinges may slide in too far, leaving only a small portion of the hinge in the control surface. To avoid this, you may insert a small pin through the center of each hinge before installing. This pin will keep the hinge centered while you install the control surfaces.

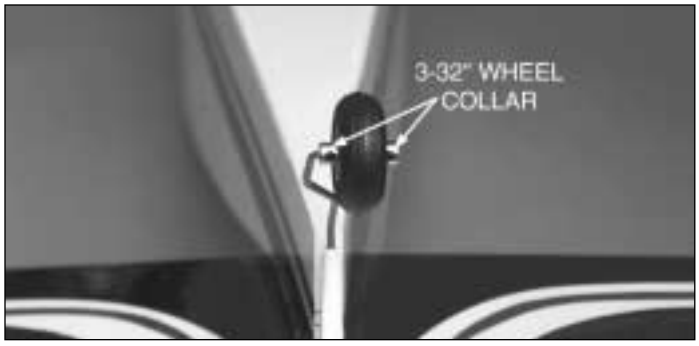


❏ 3. Apply 6 drops of thin CA adhesive to both sides of each hinge. Allow a few seconds between drops for the CA to wick into the slot. Use a paper towel to wipe off any excess CA that may have gotten onto the covering.

❏ 4. Wipe off the nylon tailwheel bearing with a paper towel dampened with rubbing alcohol. Use 6-minute epoxy to glue the tailwheel bearing in the aft end of the fuse. After the epoxy has cured, pack the tailwheel wire hole in the rudder with 6-minute epoxy. Install the rudder with its hinges. Repeat the gluing technique described previously and allow the epoxy to cure.

Hint: Apply a little petroleum jelly to the tail gear wire where it passes through the nylon bearing. This will prevent the wire from being glued to the bearing.

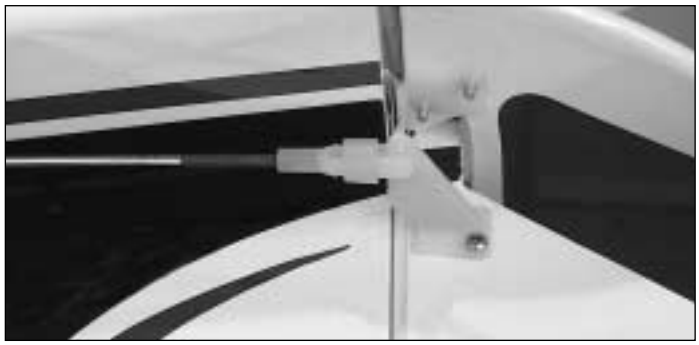
Install the Wheels



❏ 1. Install a 3/32" wheel collar (not included), a 1-1/4" tail wheel (not included) and a second 3/32" wheel collar on the tailwheel wire. Secure the wheel collars to the tailwheel wire with 4-40 set screws (not included). Use thread locking compound on the set screws to prevent them from loosening.

❏ 2. Reinstall the landing gear and landing gear fairing on the fuse and the wheel and wheel pants on the landing gear.

Finish the Model



❏ 1. Reinstall the elevator and rudder control horns. Insert the elevator and rudder pushrods in the appropriate outer pushrods. Slide a **silicone clevis retainer** over the pushrod and reinstall the clevises. If you removed the servos, receiver, receiver battery and receiver switch, reinstall them.

❏ 2. Make a strain relief from a cut-off servo arm and place it on the antenna where the antenna exits the fuse. Route the receiver antenna out of the fuse. Anchor the antenna to the top of the fin with a rubber band and T-pin.

Note: Do not shorten the antenna! Leave any excess trailing behind the model.

❏ 3. Reinstall the engine and throttle pushrod.

❏ 4. Assemble the fuel tank per the manufacturer's instructions. Connect approximately 6" [152.4mm] of fuel tubing to the fuel pick-up fitting and the pressure fitting on the fuel tank. Wrap the fuel tank in 1/4" [6.4mm] foam rubber. As you insert the fuel tank into the fuel tank compartment, route the fuel tubing out of the firewall. Attach the proper fuel tubes to the carburetor and muffler. Position a leftover stick behind the fuel tank and glue it to the fuse sides to hold the fuel tank in position.

❏ 5. The **side windows** are cut from the 5-1/2" x 8-1/2" [139.7mm x 215.9mm] butyrate sheet. Use the template on the fuselage plan as a guide. Then, trim the side windows to fit along the inside of the cabin side. After the windows have been trimmed to fit, glue them in place with canopy glue, such as Pacer Formula 560 Canopy Glue. We do not recommend CA, as it may fog the plastic. Use masking tape to hold it in position while the glue dries.

❏ 6. Lightly sand a strip approximately 1/8" [3.2mm] wide along the inside of the windshield (around the perimeter). **Note:** To avoid sanding more than you want, it is helpful to first apply strips of masking tape on the inside of the windshield, 1/8" [3.2mm] in from the edge.

❏ 7. Hold the windshield in place on the fuselage. Use a fine tip marker to trace the outline of the windshield onto the covering. Remove the windshield and use a sharp #11 blade to cut a 1/8" [3.2mm] strip from the covering just inside the line you drew. A sharp blade is important, so you do not have to use much pressure. It will allow you to cut only the covering and not the underlying wood.

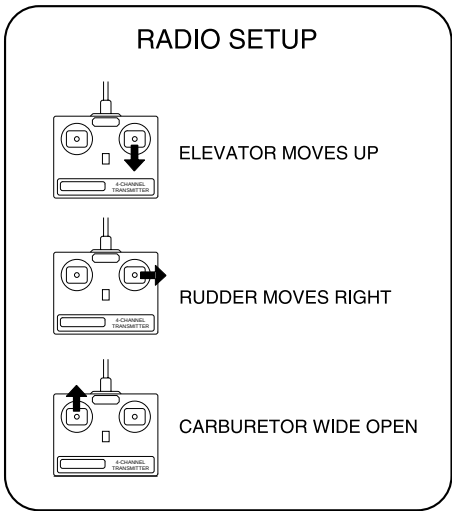
❏ 8. Carefully glue the windshield in place with a canopy safe glue. Wipe off any excess glue before it dries.

GET THE MODEL READY TO FLY

Check the Control Directions

❏ 1. Turn on the transmitter and receiver and center the trims. If necessary, remove the servo arms from the servos and reposition them so they are centered. Reinstall the screws that hold on the servo arms.

❏ 2. With the transmitter and receiver still on, check all the control surfaces to see if they are centered. If necessary, adjust the clevises on the pushrods to center the control surfaces.



❏ 3. Make certain that the control surfaces and the carburetor respond in the correct direction as shown in the diagram. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the control surfaces have remained centered. Adjust if necessary.

Set the Control Throws

Use a Great Planes AccuThrow (or a ruler) to accurately measure and set the control throw of each control surface as indicated in the chart that follows. If your radio does not have dual rates, we recommend setting the throws between the low and high rate settings.

Note: The throws are measured at the **widest part** of the elevators and rudder.

These are the recommended control surface throws:

	High Rate	Low Rate
ELEVATOR:	7/8" [22.2mm] up	11/16" [17.5mm] up
	7/8" [22.2mm] down	11/16" [17.5mm] down
RUDDER:	5/8" [15.9mm] right	7/16" [11.1m] right
	5/8" [15.9mm] left	7/16" [11.1mm] left

IMPORTANT: The Old Timer 40 has been **extensively** flown and tested to arrive at the throws at which it flies best. Flying your model at these throws will provide you with the greatest chance for successful first flights. If, after you have become accustomed to the way the Old Timer 40 flies, you would like to change the throws to suit your taste, that is fine. However, too much control throw could make the model difficult to control, so remember, “more is not always better.”

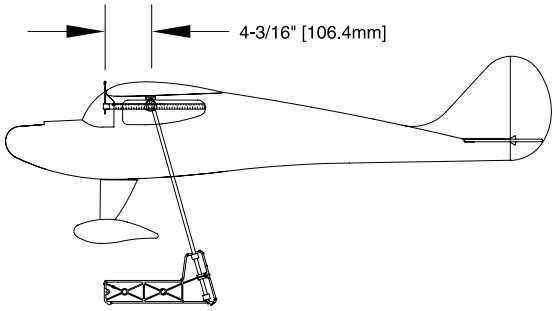
Balance the Model (C.G.)

More than any other factor, the **C.G.** (balance point) can have the **greatest** effect on how a model flies, and may determine whether or not your first flight will be successful. If you value this model and wish to enjoy it for many flights, **DO NOT OVERLOOK THIS IMPORTANT PROCEDURE.** A model that is not properly balanced will be unstable and possibly unflyable.

At this stage the model should be in ready-to-fly condition with all of the systems in place including the engine, landing gear, covering and paint, and the radio system.

❏ 1. Use a felt-tip pen or 1/8"-wide tape to accurately mark the C.G. on the bottom of the wing on both sides of the fuselage. The C.G. is located **4-3/16" [106.4mm] back** from the leading edge of the wing.

This is where your model should balance for your first flights. Later, you may wish to experiment by shifting the C.G. up to **7/16" [11mm] forward or back** to change the flying characteristics. Moving the C.G. forward may improve the smoothness and stability, but it may then require more speed for takeoff and make it more difficult to slow for landing. Moving the C.G. aft makes the model more maneuverable, but could also cause it to become too difficult for you to control. In any case, start at the location we recommend and do not at any time balance your model outside the recommended range.



❏ 2. With the wing attached to the fuselage, all parts of the model installed (ready to fly) and an empty fuel tank, place the model right side-up on a Great Planes CG Machine, or lift it right side-up at the balance point you marked.

❏ 3. If the tail drops, the model is "tail heavy" and the battery pack and/or receiver must be shifted forward or weight must be added to the nose to balance. If the nose drops, the model is "nose heavy" and the battery pack and/or receiver must be shifted aft or weight must be added to the tail to balance. If possible, relocate the battery pack and receiver to minimize or eliminate any additional ballast required. If additional weight is required, nose weight may be easily added by using a "spinner weight" (GPMQ4645 for the 1 oz. weight, or GPMQ4646 for the 2 oz. weight). If spinner weight is not practical or is not enough, use Great Planes (GPMQ4485) "stick-on" lead. A good place to add stick-on nose weight is to the firewall or engine tray. Begin by placing incrementally increasing amounts of weight on the top of the fuse in front of the firewall until the model balances. Once you have determined the amount of weight required, it can be permanently attached. If required, tail weight may be added by cutting open the bottom of the fuse and gluing it permanently inside.

Note: Do not rely upon the adhesive on the back of the lead weight to permanently hold it in place. Over time, fuel and exhaust residue may soften the adhesive and cause the weight to fall off. Use #2 sheet metal screws, RTV silicone or epoxy to permanently hold the weight in place.

❏ 4. **IMPORTANT:** If you found it necessary to add any weight, recheck the C.G. after the weight has been installed.

PREFLIGHT

Identify Your Model

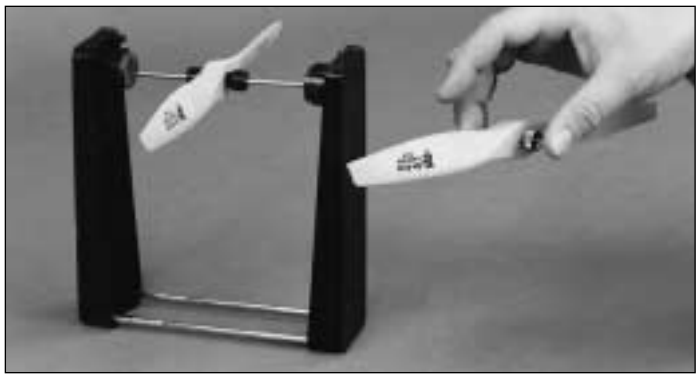
No matter if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is **required** at all AMA R/C club flying sites and AMA sanctioned flying events. Fill out the identification tag **on the decal sheet** and place it on or inside your model.

Charge the Batteries

Follow the battery charging instructions that came with your radio control system to charge the batteries. 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.

Note: Checking the condition of your receiver battery pack is **highly recommended**. All battery packs, whether it's a trusty pack you've just taken out of another model, or a new battery pack you just purchased, should be cycled, noting the discharge capacity. Oftentimes, a weak battery pack can be identified (and a valuable model saved!) by comparing its actual capacity to its rated capacity. Refer to the instructions and recommendations that come with your cycler. If you don't own a battery cycler, perhaps you can have a friend cycle your pack and note the capacity for you.

Balance the Propellers



Carefully balance your propeller and spare propellers before you fly. An unbalanced prop can be the single most significant cause of vibration that can damage your model.

Not only will engine mounting screws and bolts loosen, possibly with disastrous effect, but vibration may also damage your radio receiver and battery. Vibration can also cause your fuel to foam, which will, in turn, cause your engine to run hot or quit.

We use a Top Flite Precision Magnetic Prop Balancer™ (TOPQ5700) in the workshop and keep a Great Planes Fingertip Prop Balancer (GPMQ5000) in our flight box.

Ground Check

If the engine is new, follow the engine manufacturer's instructions to break-in the engine. After break-in, confirm that the engine idles reliably, transitions smoothly and rapidly to full power and maintains full power–indefinitely. After you run the engine on the model, inspect the model closely to make sure all screws remained tight, the hinges are secure, the prop is secure and all pushrods and connectors are secure.

Range Check

Ground check the operational range of your radio before the first flight of the day. 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 an assistant stand by your model and, while you work the controls, tell you what the control surfaces are doing. Repeat this test **with the engine running** at various speeds with an assistant holding the model, using hand signals to show you what is happening. If the control surfaces do not respond correctly, **do not fly!** Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash.

ENGINE SAFETY PRECAUTIONS

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; and remember that engine exhaust gives off a great deal of deadly carbon monoxide. Therefore, **do not run the engine in a closed room or garage.**

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

Use safety glasses when starting or running engines.

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

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

Keep these items away from the prop: loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets into the prop.

Use a "chicken stick" or electric starter to start the engine. Do not use your fingers to flip the propeller. 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 right after operation. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine, causing a fire.

To stop a glow engine, cut off the fuel supply by closing off the fuel line or following the engine manufacturer's recommendations. Do not use hands, fingers or any other body part to try to stop the engine. We setup our models so that the carburetor barrel can be close completely from the transmitter.

AMA SAFETY CODE (excerpt)

Read and abide by the following Academy of Model Aeronautics Official Safety Code:

GENERAL

1. I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously successfully flight tested.

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

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

9. 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 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 flier, 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.

CHECK LIST

During the last few moments of preparation your mind may be elsewhere anticipating the excitement of the first flight. Because of this, you may be more likely to overlook certain checks and procedures that should be performed before the model is flown. To help avoid this, a checklist is provided to make sure these important areas are not overlooked. Many are covered in the instruction manual, so where appropriate, refer to the manual for complete instructions. Be sure to check the items off as they are completed (that's why it's called a *check list!*).

- ❏ 1. Fuelproof all areas exposed to fuel or exhaust residue such as the engine plate, firewall, wing saddle area, etc.
- ❏ 2. Check the C.G. according to the measurements provided in the manual.
- ❏ 3. Be certain the battery and receiver are securely mounted in the fuse. Simply stuffing them into place with foam rubber is not sufficient.
- ❏ 4. Extend your receiver antenna and make sure it has a strain relief inside the fuselage to keep tension off the solder joint inside the receiver.
- ❏ 5. Balance your model *laterally* as explained in the instructions.
- ❏ 6. Use threadlocking compound to secure critical fasteners such as the set screws that secure wheel collars, screws that hold the carburetor arm (if applicable), screw-lock pushrod connectors, etc.
- ❏ 7. Add a drop of oil to the axles so the wheels will turn freely.
- ❏ 8. Make sure all hinges are **securely** glued in place.
- ❏ 9. Reinforce holes for screws with thin CA where appropriate (servo mounting screws, control horn screws, etc.).
- ❏ 10. Confirm that all controls operate in the correct direction and the throws are set up according to the manual.
- ❏ 11. Make sure there are silicone retainers on all the clevises and that all servo arms are secured to the servos with the screws included with your radio.
- ❏ 12. Secure the connection between your battery pack and the on/off switch with vinyl tape, heat shrink tubing or special clips suitable for that purpose.
- ❏ 13. Make sure any servo extension cords you may have used do not interfere with other systems (servo arms, pushrods, etc.).
- ❏ 14. Secure the pressure tap (if used) to the muffler with high temp RTV silicone, thread locking compound or J.B. Weld.
- ❏ 15. Make sure the fuel lines are connected and are not kinked.
- ❏ 16. Use an incidence meter to check the wing for twists and attempt to correct before flying.
- ❏ 17. Balance your propeller (and spare propellers).
- ❏ 18. Tighten the propeller nut and spinner.
- ❏ 19. Place your name, address, AMA number and telephone number on or inside your model.
- ❏ 20. Cycle your receiver battery pack (if necessary) and make sure it is fully charged.
- ❏ 21. If you wish to photograph your model, do so before your first flight.
- ❏ 22. Range check your radio when you get to the flying field.

FLYING

The Old Timer 40 is a great-flying model that flies smoothly and predictably. The Old Timer 40 does not, however, possess the self-recovery characteristics of a primary R/C trainer and should be flown only by experienced R/C pilots.

CAUTION (THIS APPLIES TO ALL R/C AIRPLANES): If, while flying, you notice any unusual sounds, such as a low-pitched "buzz," this may indicate control surface *flutter*. Flutter is the rapid back and forth movement of the control surfaces. 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 may indicate which surface fluttered), and make sure all pushrod linkages are secure and free of play. If the control surface fluttered once, it probably will flutter again under similar circumstances unless you can eliminate the free-play or flexing in the linkages. Here are some things which can cause flutter: Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of pushrod in guide tube caused by tight bends; Poor fit of Z-bend in servo arm; Insufficient glue used when gluing in the elevator joiner wire; Excessive *play* or *backlash* in servo gears; and Insecure servo mounting.

Takeoff

Before you get ready to takeoff, see how the model handles on the ground by doing a few practice runs at **low speeds** on the runway. Hold “up” elevator to keep the tail wheel on the ground. If necessary, adjust the tail wheel so the model will roll straight down the runway. If you need to calm your nerves before the maiden flight, shut the engine down and bring the model back into the pits. Top off the fuel, then check all fasteners and control linkages for peace of mind.

Remember to takeoff into the wind. When you’re ready, point the model straight down the runway, hold a bit of up elevator to keep the tail on the ground to maintain tail wheel steering. Then, gradually advance the throttle. As the model gains speed decrease up elevator, allowing the tail to come off the ground. One of the most important things to remember with a tail dragger is to always be ready to apply **right** rudder to counteract engine torque. Gain as much speed as your runway and flying site will practically allow before gently applying up elevator, lifting the model into the air. At this moment it is likely that you will need to apply more right rudder to counteract engine torque. Be smooth on the elevator stick, allowing the model to establish a **gentle** climb to a safe altitude before turning into the traffic pattern.

Flight

For reassurance and to keep an eye on other traffic, it is a good idea to have an assistant on the flight line with you. Tell him to remind you to throttle back once the plane gets to a comfortable altitude. While full throttle is usually desirable for takeoff, the Old Timer 40 flies great at half throttle on a .40 size engine.

Take it easy with the Old Timer 40 for the first few flights, gradually getting acquainted with it as you gain confidence. Adjust the trims to maintain straight and level flight. After flying around for a while, and while still at a safe altitude with plenty of fuel, practice slow flight and execute practice landing approaches by reducing the throttle to see how the model handles at slower speeds. Add power to see how she climbs as well. Continue to fly around, executing various maneuvers and making mental notes (or having your assistant write them down) of what trim or C.G. changes may be required to fine tune the model so it flies the way you like. Mind your fuel level, but use this first flight to become familiar with your model before landing.

Landing

To initiate a landing approach, lower the throttle while on the downwind leg. Allow the nose of the model to pitch downward to gradually bleed off altitude. Continue to lose altitude, but maintain airspeed by keeping the nose down as you turn onto the crosswind leg. Make your final turn toward the runway (into the wind) keeping the nose down to maintain airspeed and control. Level the attitude when the model reaches the runway threshold, modulating the throttle as necessary to maintain your glide path and airspeed. If you are going to overshoot, smoothly advance the throttle (always ready on the right rudder to counteract torque) and climb out to make another attempt. When you’re ready to make your landing flare and the model is a foot or so off the deck, smoothly increase up elevator until it gently touches down. Once the model is on the runway and has lost flying speed, hold up elevator to place the tail on the ground, regaining tail wheel control.

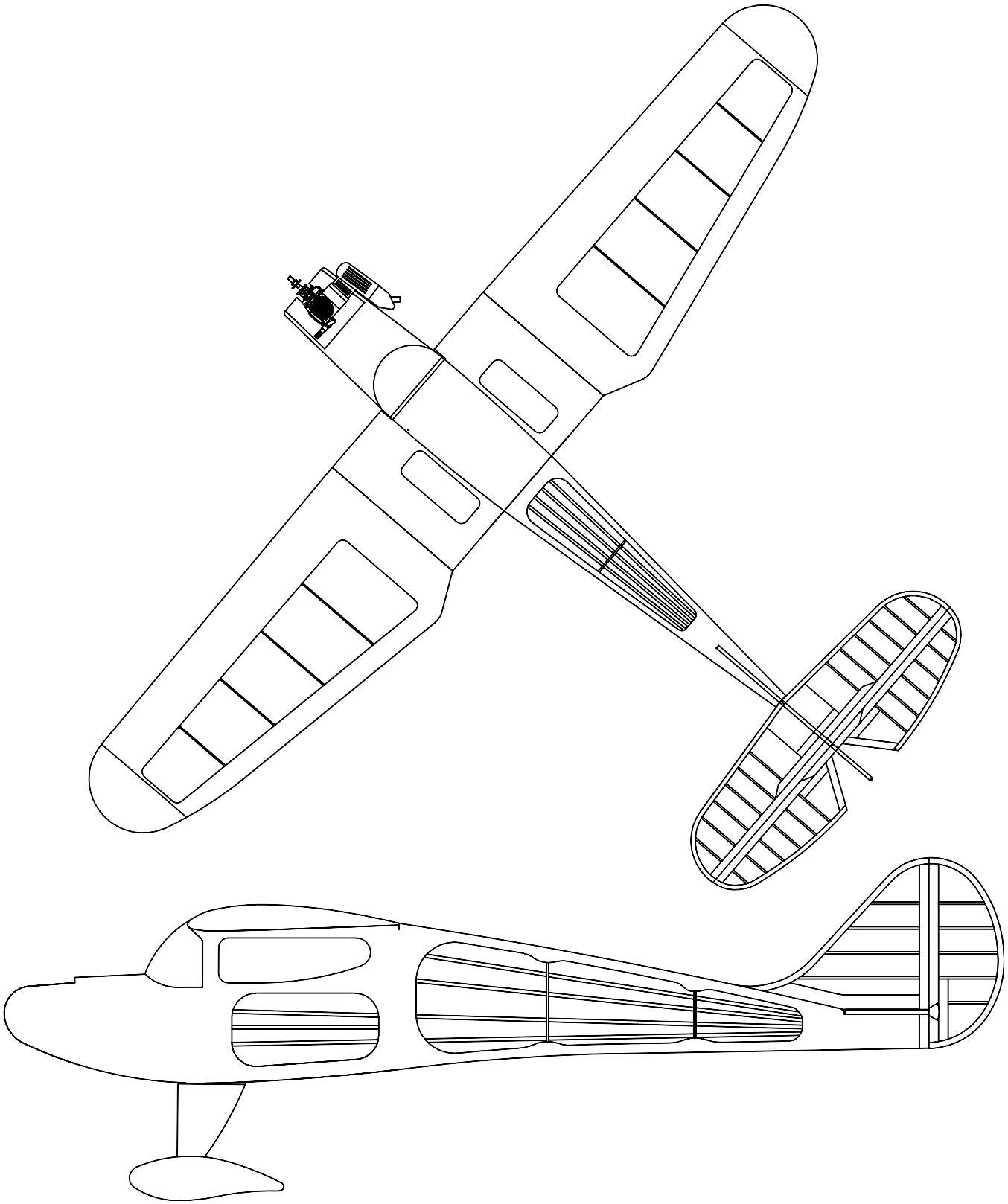
One final note about flying your model. Have a goal or flight plan in mind for **every** flight. This can be learning a new maneuver(s), improving a maneuver(s) you already know, or learning how the model behaves in certain conditions (such as on high or low rates). This is not necessarily to improve your skills *(though it is never a bad idea!)*, but more importantly so you do not surprise yourself by impulsively attempting a maneuver and suddenly finding that you’ve run out of time, altitude or airspeed. Every maneuver should be deliberate, not impulsive. For example, if you’re going to do a loop, check your altitude, mind the wind direction (anticipating rudder corrections that will be required to maintain heading), remember to throttle back at the top, and make certain you are on the desired rates (high/low rates). A flight plan greatly reduces the chances of crashing your model just because of poor planning and impulsive moves. **Remember to think.**

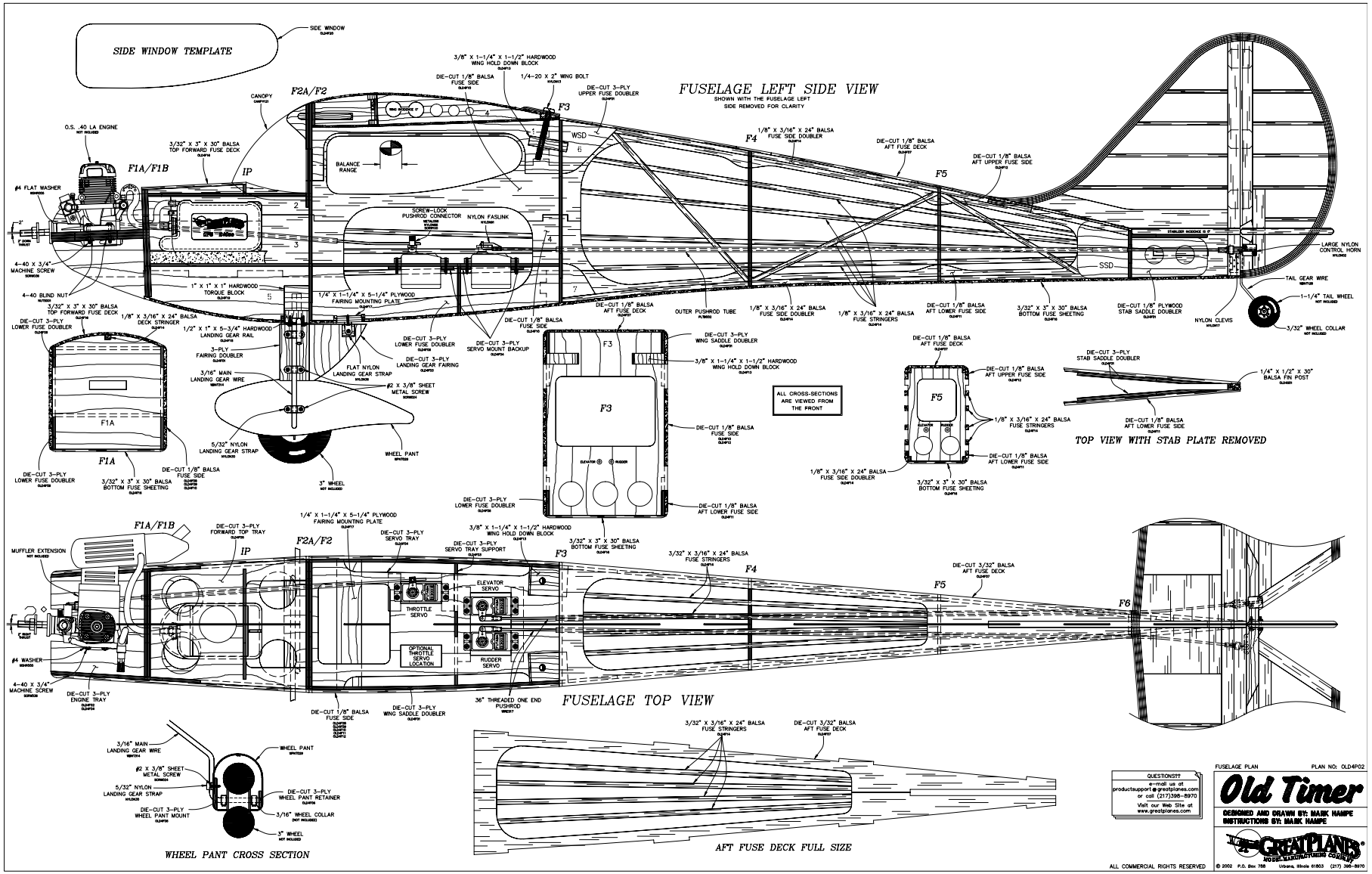
Have a ball! But always stay in control and fly in a safe manner.

GOOD LUCK AND GREAT FLYING!

TWO VIEW DRAWING

Use copies of this page to plan your trim scheme




SIDE WINDOW TEMPLATE
SIDE WINDOW
FUSELAGE LEFT SIDE VIEW
SHOWN WITH THE FUSELAGE LEFT SIDE REMOVED FOR CLARITY
F1A/F1B
F2A/F2
IP
F3
F4
F5
F6
WSD
SSD
BALANCE RANGE
CANOPY
O.S. .40 LA ENGINE
#4 FLAT WASHER
4-40 X 3/4" MACHINE SCREW
4-40 BLIND NUT
1" X 1" HARDWOOD TORQUE BLOCK
3/32" X 3" X 30" BALSA TOP FORWARD FUSE DECK
1/8" X 3/16" X 24" BALSA DECK STRINGER
1/2" X 1" X 5-3/4" HARDWOOD LANDING GEAR RAIL
3-PLY FAIRING DOUBLER
3/16" MAIN LANDING GEAR WIRE
5/32" NYLON LANDING GEAR STRAP
3" WHEEL
WHEEL PANT
#2 X 3/8" SHEET METAL SCREW
FLAT NYLON LANDING GEAR STRAP
DIE-CUT 3-PLY LANDING GEAR FAIRING
1/4" X 1-1/4" X 5-1/4" PLYWOOD FAIRING MOUNTING PLATE
SCREW-LOCK PUSHROD CONNECTOR
NYLON FASLINK
DIE-CUT 3-PLY SERVO MOUNT BACKUP
DIE-CUT 3-PLY LOWER FUSE DOUBLER
DIE-CUT 1/8" BALSA FUSE SIDE
3/8" X 1-1/4" X 1-1/2" HARDWOOD WING HOLD DOWN BLOCK
1/4-20 X 2" WING BOLT
DIE-CUT 3-PLY UPPER FUSE DOUBLER
1/8" X 3/16" X 24" BALSA FUSE SIDE DOUBLER
DIE-CUT 1/8" BALSA AFT FUSE DECK
DIE-CUT 1/8" BALSA AFT UPPER FUSE SIDE
1/8" X 3/16" X 24" BALSA FUSE STRINGERS
DIE-CUT 1/8" BALSA AFT LOWER FUSE SIDE
3/32" X 3" X 30" BALSA BOTTOM FUSE SHEETING
DIE-CUT 1/8" PLYWOOD STAB SADDLE DOUBLER
OUTER PUSHROD TUBE
NYLON CLEVIS
LARGE NYLON CONTROL HORN
TAIL GEAR WIRE
1-1/4" TAIL WHEEL
3/32" WHEEL COLLAR
DIE-CUT 3-PLY WING SADDLE DOUBLER
ALL CROSS-SECTIONS ARE VIEWED FROM THE FRONT
DIE-CUT 3-PLY STAB SADDLE DOUBLER
1/4" X 1/2" X 30" BALSA FIN POST
TOP VIEW WITH STAB PLATE REMOVED
MUFFLER EXTENSION
DIE-CUT 3-PLY FORWARD TOP TRAY
DIE-CUT 3-PLY SERVO TRAY
DIE-CUT 3-PLY SERVO TRAY SUPPORT
DIE-CUT 3-PLY ENGINE TRAY
THROTTLE SERVO
ELEVATOR SERVO
RUDDER SERVO
OPTIONAL THROTTLE SERVO LOCATION
36" THREADED ONE END PUSHROD
DIE-CUT 3/32" BALSA AFT FUSE DECK
FUSELAGE TOP VIEW
3/16" MAIN LANDING GEAR WIRE
#2 X 3/8" SHEET METAL SCREW
5/32" NYLON LANDING GEAR STRAP
DIE-CUT 3-PLY WHEEL PANT RETAINER
DIE-CUT 3-PLY WHEEL PANT MOUNT
3/16" WHEEL COLLAR
WHEEL PANT CROSS SECTION
AFT FUSE DECK FULL SIZE
QUESTIONS?? e-mail us at productsupport@greatplanes.com or call (217)398-8970 Visit our Web Site at www.greatplanes.com
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Old Timer
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INSTRUCTIONS BY: MARK HAMPE
GREAT PLANS
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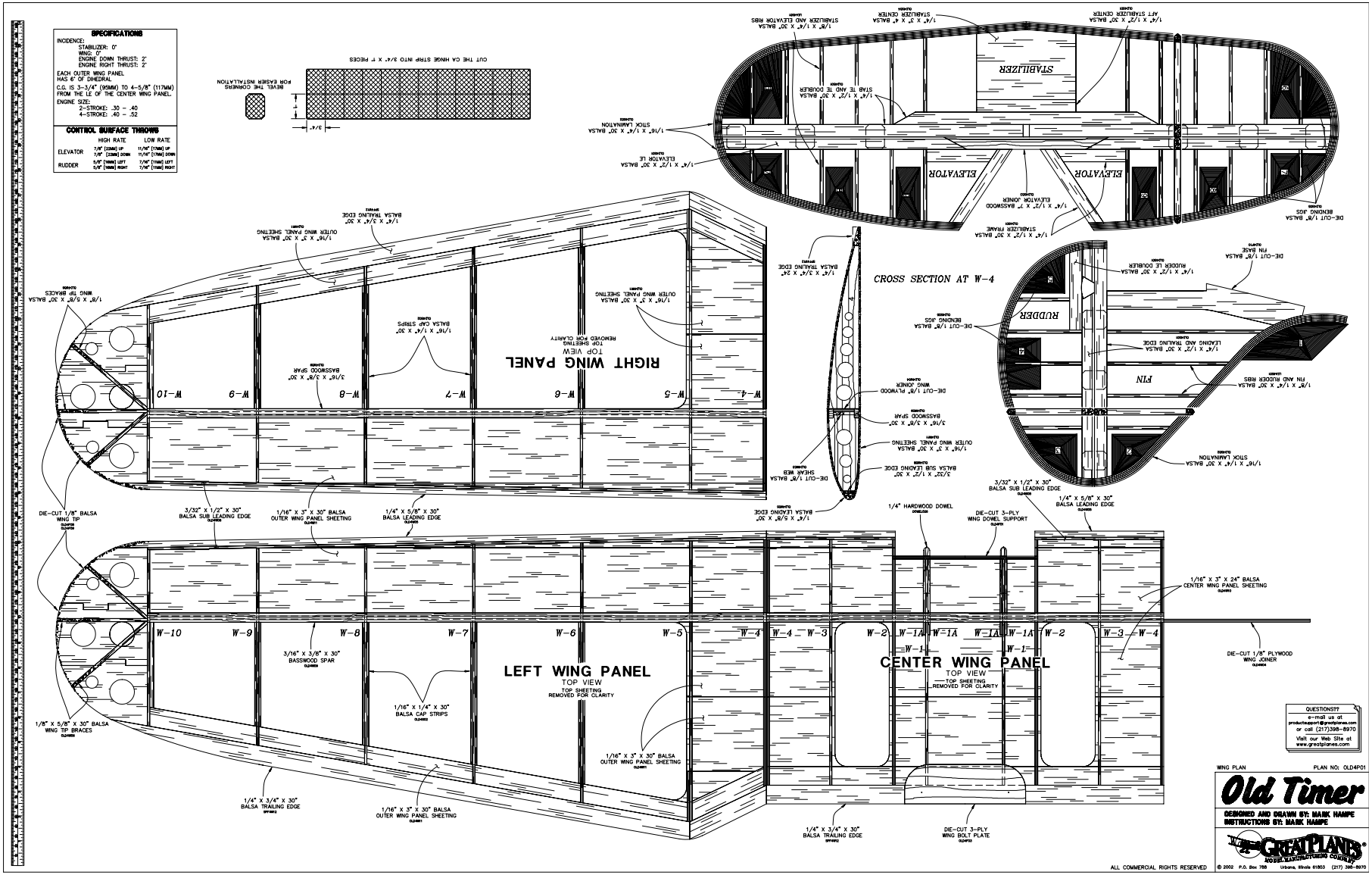
SPECIFICATIONS
INCIDENCE:
STABILIZER: 0°
WING: 0°
ENGINE DOWN THRUST: 2°
ENGINE RIGHT THRUST: 2°
EACH OUTER WING PANEL HAS 6° OF DIHEDRAL
C.G. IS 3-3/4" (95MM) TO 4-5/8" (117MM) FROM THE LE OF THE CENTER WING PANEL.
ENGINE SIZE:
2-STROKE: .30 - .40
4-STROKE: .40 - .52
CONTROL SURFACE THROWS
HIGH RATE
LOW RATE
ELEVATOR
7/8" [22MM] UP
7/8" [22MM] DOWN
11/16" [17MM] UP
11/16" [17MM] DOWN
RUDDER
5/8" [16MM] LEFT
5/8" [16MM] RIGHT
7/16" [11MM] LEFT
7/16" [11MM] RIGHT
CUT THE CA HINGE STRIP INTO 3/4" X 1" PIECES
BEVEL THE CORNERS FOR EASIER INSTALLATION
3/4"
1"
STABILIZER
ELEVATOR
ELEVATOR
RUDDER
FIN
CROSS SECTION AT W-4
RIGHT WING PANEL
TOP VIEW
TOP SHEETING REMOVED FOR CLARITY
LEFT WING PANEL
TOP VIEW
TOP SHEETING REMOVED FOR CLARITY
CENTER WING PANEL
TOP VIEW
TOP SHEETING REMOVED FOR CLARITY
W-1
W-1A
W-2
W-3
W-4
W-5
W-6
W-7
W-8
W-9
W-10
DIE-CUT 1/8" BALSA WING TIP
3/32" X 1/2" X 30" BALSA SUB LEADING EDGE
1/16" X 3" X 30" BALSA OUTER WING PANEL SHEETING
1/4" X 5/8" X 30" BALSA LEADING EDGE
1/8" X 5/8" X 30" BALSA WING TIP BRACES
3/16" X 3/8" X 30" BASSWOOD SPAR
1/16" X 1/4" X 30" BALSA CAP STRIPS
1/4" X 3/4" X 30" BALSA TRAILING EDGE
1/4" HARDWOOD DOWEL
DIE-CUT 3-PLY WING DOWEL SUPPORT
1/16" X 3" X 24" BALSA CENTER WING PANEL SHEETING
DIE-CUT 1/8" PLYWOOD WING JOINER
DIE-CUT 3-PLY WING BOLT PLATE
QUESTIONS??
e-mail us at productsupport@greatplanes.com or call (217)398-8970
Visit our Web Site at www.greatplanes.com
WING PLAN
PLAN NO: OLD4P01
Old Timer
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INSTRUCTIONS BY: MARK HAMPE
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MODEL MANUFACTURING COMPANY
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