



CONTENDER™



Wingspan:
53-1/4" [1353 mm]
Wing Area:
660 sq. in.
[42.6 sq.dm.]
Weight:
6 - 6-1/2 lbs
[2721 - 2948 grams]
Wing Loading:
21 - 23 oz./sq. ft.
[64 - 70 g/sq.dm.]
Fuselage Length:
49-5/8" [1261 mm]
Engine Required:
2-Stroke .40 - .61 or
4-Stroke .52 - .70

WARRANTY.....Top Flite Models guarantees this kit to be free of 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 Top Flite's liability exceed the original cost of the purchased kit. Further, Top Flite reserves the right to change or modify this warranty without notice. In that Top Flite 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 immediately return this kit in new and unused condition to the place of purchase.**

Top Flite Models P.O. Box 788 Urbana, IL 61803

Technical Assistance Call (217)398-8970 www.top-flite.com

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

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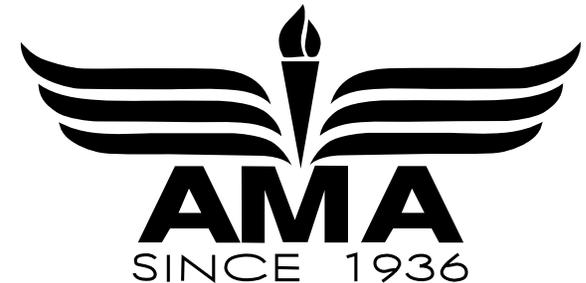
**PROTECT YOUR MODEL,
YOURSELF & OTHERS
FOLLOW THIS IMPORTANT
SAFETY PRECAUTION**

Your Top Flite Contender is not a toy, but a sophisticated working model that functions very much like an actual airplane. Because of its realistic performance, if you do not assemble and operate your Contender correctly, you could possibly injure yourself or spectators and damage property.

To make your R/C modeling experience totally enjoyable, get assistance with assembly and your first flights from an experienced, knowledgeable modeler. You'll learn faster and avoid risking your model before you're truly ready to solo. Your local hobby shop has information about flying clubs in your area whose membership includes qualified instructors.

You can also contact the Academy of Model Aeronautics (AMA), which has more than 2,500 chartered clubs across the country. We recommend you join the AMA which will insure you at AMA club sites and events. AMA Membership is required at chartered club fields where qualified flight instructors are available.

Contact the AMA at the address or toll-free phone number below.



Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302
(800) 435-9262
Fax (765) 741-0057

or via the Internet at: <http://www.modelaircraft.org>

Your Top Flite Gold Edition Contender is intended for scale and general sport flying including mild aerobatics such as loops, stall turns, rolls, etc. Its structure is designed to withstand such stresses. If you intend to use your Contender for more abusive types of flying such as racing or aggressive aerobatics it is your responsibility to reinforce areas of the model that will be subjected to the resulting unusually high stresses.

INTRODUCTION

Congratulations and thank you for purchasing the **Top Flite Gold Edition "Contender."** We are sure you are eager to build and fly your Contender just as we were eager to build and fly our prototypes. The Contender was introduced thirty years ago and there have been so many requests to bring it back that we decided to remanufacture it to today's high quality standards for Top Flite Kits. You should find this kit easy to build and a lot of fun to fly!

Get your other projects off your workbench, say goodbye to your significant other for a while and...keep reading!

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

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

PRECAUTIONS

1. You must build the plane according to the plan and instructions. **Do not alter or modify the model**, as doing so may result in an unsafe or unflyable model. **In a few cases the plan and instructions may differ slightly from the photos. In those instances you should assume the plan and written instructions are correct.**
2. You **must** take time to build **straight, true and strong.**
3. You **must use a proper R/C radio** that is in first class condition, the correct sized engine and correct components (fuel tank, wheels, etc.) throughout your building process.
4. You **must properly install all R/C and other components** so that the model operates properly on the ground and in the air.
5. You **must test the operation of the model before every flight** to insure that all equipment is operating and you must make certain that the model has remained structurally sound.
6. If you are not already an experienced R/C pilot, you must **fly** the model **only with the help** of a competent, experienced R/C pilot.

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

DECISIONS YOU MUST MAKE

Recommended engine size:

.40 to .61 cu. in. [7.5cc to 10cc] **2-stroke**
.52 to .70 cu. in. [8.5cc to 11.5cc] **4-stroke**

Your Top Flite *Gold Edition* "Contender" will perform well with any of the engines within the recommended range. We flew our prototype with the O.S.[®] 40LA and the 60FP™ and both engines had more than ample power.

FLAPS

Your Contender is designed to incorporate a center flap; however, the flap is **optional** and not necessary for an excellent flying experience. Without the flap, the takeoff roll is a bit longer and the landing speed is slightly faster. If you do not wish to build the flap, just disregard those parts of the manual involving operational flap construction.

The flap is not difficult to build and it operates well. The flap adds nicely to the model's flight characteristics. Very minor trim changes were needed for our prototype when the flap was lowered. You will find more information on the use of the flap in the *flying* section.

The flap requires one additional standard servo.

POWER REQUIREMENTS AND PROPELLERS

We did our test flying using Top Flite[®] Power Point[®] Propellers and an OS .60FP engine. With the .60 2-stroke engine the model flew very well. A .61 will provide more power than the model needs, but you will appreciate the extra power when vertical maneuvers are being performed. Initial test flights were with the Power Point 11x7 propeller. As with any model, you may experiment with different propellers to find out what type works best for you.

FLIGHT CHARACTERISTICS

During our flight testing we found no bad characteristics in this airplane. Takeoffs were straightforward with good ground handling. The plane was airborne in approximately 100 feet [30m]. Once the plane is flying it goes exactly where you point it. Depending on how you set up the model, rolls can be very slow or very fast. Power-off stalls were very soft and predictable with only the nose dropping in the stall. There was no tendency for the wing to tip stall. Landings were straightforward with or without the flap. Without the flap you should maintain a bit more airspeed on your approach. With full flap deployment the plane slows very nicely and allows for a very soft landing. If you have never flown with flaps this an excellent model to learn with.

OTHER REQUIRED ITEMS

These are additional items you will need to complete your Contender that are not included with your kit. Order numbers are in parentheses (GPMQ4130). Our exclusive brand is listed where possible: **TOP** is the Top Flite® brand, **GPM** is the Great Planes® brand, and **HCA** is the Hobbico® brand.

4 to 5 Channel radio with 4 to 5 servos

Engine

O.S. Engines

Prop

.40 LA

10 x 6, 10 x 7

.61 FX 2-stroke

11 x 7, 12 x 6

FS .52

11 x 6, 11 x 7

FS .70 Surpass™ 4-stroke

13 x 8

Super Tigre®

Prop

G-51 2-stroke

10 x 7, 11 x 6

G-61 2 stroke

11 x 7, 12 x 6

Propellers appropriate for your engine

(3) 2-1/2" [64mm] Wheels (GPMQ4223)

(1) 8 - 10 oz. [240 - 300cc] Sullivan Flex Tank (SULQ1739 or SULQ1740)

(2) 12" [305mm] Servo Extensions (3 if optional flap is used)

(1) Y-connector

(1) 3 feet [914mm] Medium Silicone Fuel Tubing (GPMQ4131) (12" needed for the model)

(1) 2-1/2" [64mm] Spinner (GPMQ4525)

(1) 1/4" [6mm] (HCAQ1000) Foam Rubber Padding

(2) rolls of Top Flite Super MonoKote® covering

(1) 2" [50mm] 1/6th Scale Pilot

BUILDING SUPPLIES

Here's a checklist of supplies you should have on hand while you're building. Some of these are optional. Use your own experience to decide what you need. We recommend **Great Planes Pro™** CA and Epoxy.

GLUE/FILLER

4 oz. [120g] Thin CA (GPMR6004)

4 oz. [120g] Medium CA+(GPMR6010)

2 oz. [60g] Thick CA- (GPMR6015)

CA Accelerator (GPMR6035)

CA Debonder (GPMR6039)

CA Applicator Tips (HCAR3780)

6-minute epoxy (GPMR6045)

30-minute epoxy (GPMR6047)

4 oz. [120g] Pro Wood Glue (GPMR6161)

Lightweight Hobby Filler (Balsa Color, HCAR3401)

TOOLS

#11 Blades (HCAR0311, 100 qty.)

Single Edge Razor Blades (HCAR0312, 100 qty.)

Razor Plane (MASR1510)

Hobbico Builder's Triangle (HCAR0480)

T-Pins (HCAR5100 (S), HCAR5150 (M), HCAR5200 (L))

1/4-20 Tap and drill (GPMR8105)

6-32 Tap and drill (GPMR8102)

Tap wrench (GPMR8120)

Drill Bits:

1/16" [1.6mm] **5/64"** [2mm]

3/32" [2.4mm] **1/8"** [3.2mm]

5/32" [4.0mm] **11/64"** [4.4mm]

3/16" [4.8mm] **13/64"** [5.2mm]

7/32" [5.6mm] **1/4"** [6.4mm]

17/64" [6.7mm]

Curved Tip Scissors (HCAR0667)

Great Planes Plan Protector (GPMR6167) or wax paper

Masking Tape

Easy-Touch™ Bar Sanders*

Dremel® #178 cutting bit for countersinking screws in the fuel tank hatch. (DRER1178)

RECOMMENDED COVERING TOOLS AND ACCESSORIES

Top Flite Heat Gun (TOPR2000)

Top Flite Trim Seal Tool (TOPR2200)

-and-

Top Flite Sealing Iron (TOPR2100)

Top Flite Hot Sock™ (TOPR2175)

-or-

21st Century® Sealing Iron (COVR2700)

21st Century Cover Sock (COVR2702)

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** (patented) and replaceable **Easy-Touch**

Adhesive-backed Sandpaper. While building the Contender we used two 5-1/2" [140mm] Bar Sanders and two 11" [280mm] Bar Sanders equipped with 80-grit and 150-grit Adhesive-backed Sandpaper. Here's the complete list of Easy-Touch Bar Sanders and Adhesive Backed Sandpaper.

- 5-1/2" [140mm] Bar Sander (GPMR6169)
- 11" [280mm] Bar Sander (GPMR6170)
- 22" [560mm] Bar Sander (GPMR6172)
- 33" [840mm] Bar Sander (GPMR6174)
- 44" [1120mm] Bar Sander (GPMR6176)
- 11" [280mm] Contour Multi-Sander (GPMR6190)

- 12' [300mm] roll of Adhesive-backed sandpaper:
- 80-grit (GPMR6180)
 - 150-grit (GPMR6183)
 - 180-grit (GPMR6184)
 - 220-grit (GPMR6185)

Assortment pack of 5-1/2" [140mm] 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:

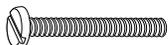
Sheet metal screws are designated by a number and a length.

For example #6 x 3/4" [19.1mm]



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

For example 4-40 x 3/4" [19.1mm]



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 used 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 we will tell you what type of glue to use. Whenever just **epoxy** is specified you may use **either** 30-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.

Occasionally we refer to the *top* or *bottom* of the model or *up* or *down*. To avoid confusion, the top or bottom of the model is as it would be when the airplane is right side up and will be referred to as the top even if the model is upside down during that step, i.e. the top main spar is always the top main spar even if the wing is upside down when you are working on it. Similarly, *move the former up* means move the former toward the top of the fuselage even if the fuselage is upside down when you are working on it.

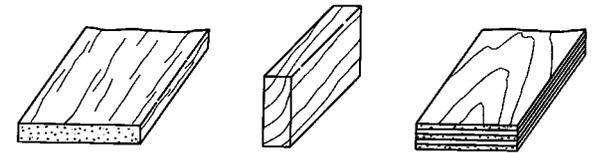
When you get to each step, read that step **completely through to the end** before you begin. Frequently there is important information or a note at the end of the step that you need to know before you start.

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

COMMON ABBREVIATIONS

- | | |
|-------------------|--------------------|
| Deg = degrees | Elev = elevator |
| Fuse = fuselage | " = inches |
| LE = leading edge | Ply = plywood |
| Stab = stabilizer | TE = trailing edge |
| LG = landing gear | mm = millimeters |

TYPES OF WOOD



BALSA

BASSWOOD

PLYWOOD

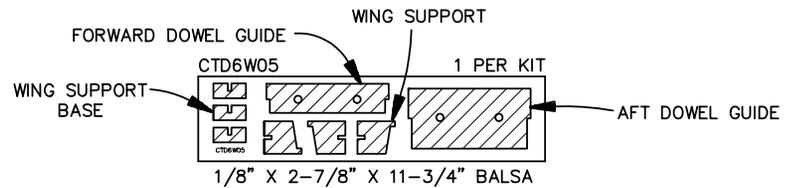
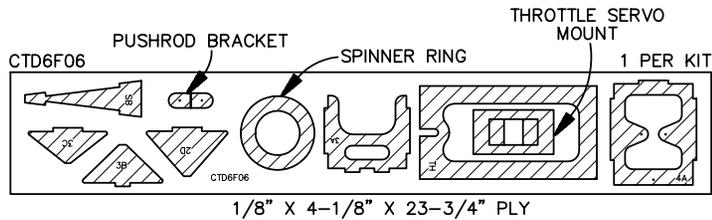
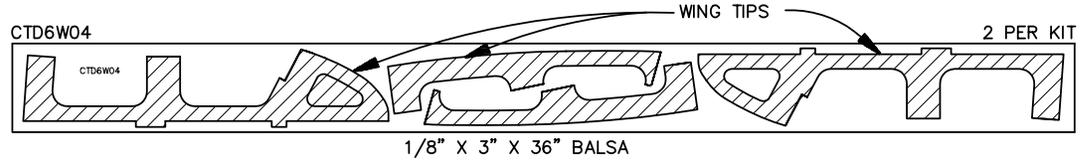
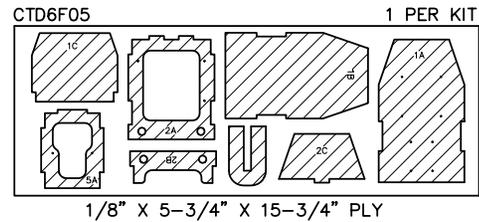
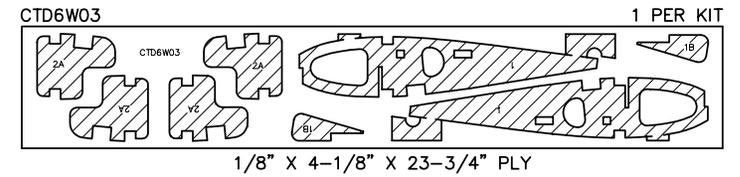
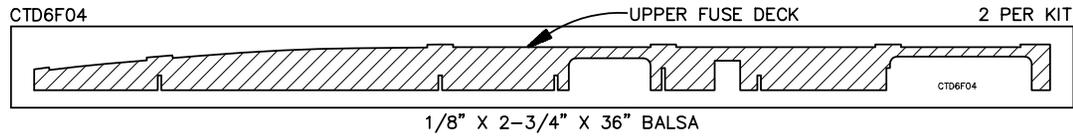
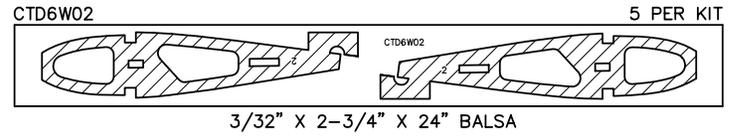
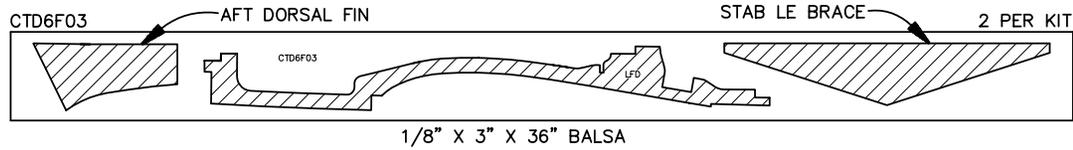
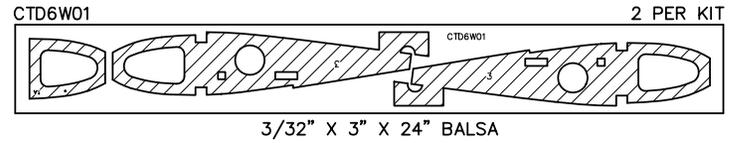
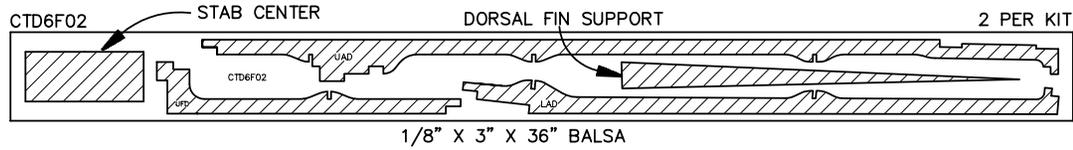
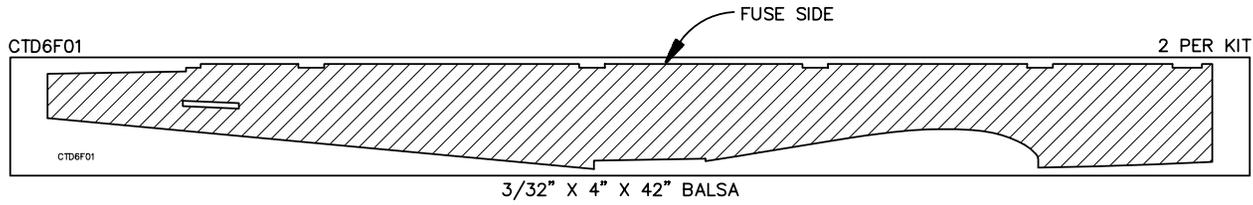
Metric Conversion Chart

1" = 25.4mm (conversion factor)

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

Note: An inch/mm scale is provided on the fuselage plan.

DIE-CUT PATTERNS



GET READY TO BUILD

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

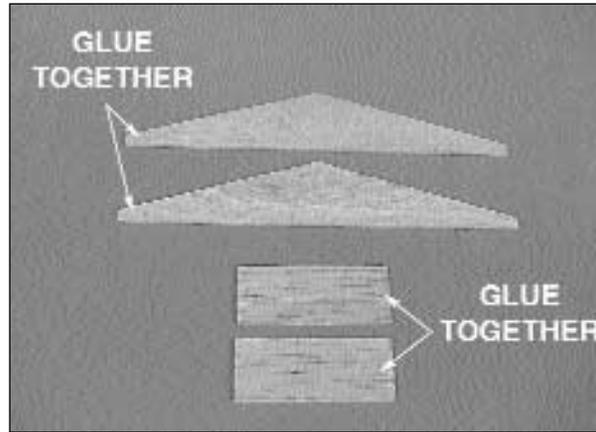
2. Remove all the parts from the box. Use a ballpoint pen (not a felt tip pen) to lightly write the **name** or **size** on each piece so you can identify it later. Use the **die-cut patterns** on page 6, to identify and mark the die-cut parts **before** you remove them from their die sheets. Many of the parts already have numbers stamped on them, but in some cases the number is located alongside the parts or only on the die drawings. You may remove all the die-cut parts from their die sheets now or wait until you need them. If a part is difficult to remove, don't force it out but cut around it with a #11 blade. After you remove the parts from their die sheets, lightly sand the edges to remove slivers or die-cutting irregularities. Save some of the larger leftover pieces of wood.

3. Separate the parts into groups such as **stab**, **fin**, **wing**, and **fuse**. Store smaller parts in zipper-top food storage bags.

BUILD THE TAIL SURFACES

Build the stab

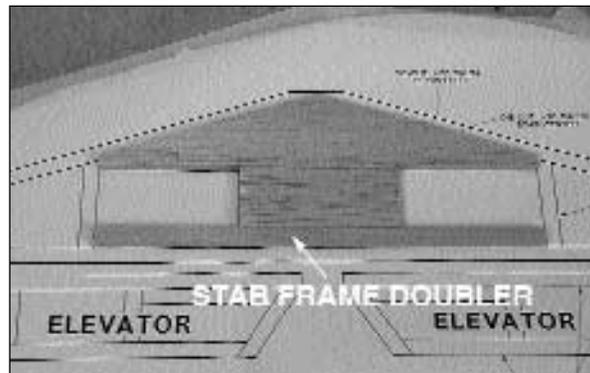
□ 1. Work on a flat surface over the plan. Pin the **stab plan** to the building board and cover the plan with Plan Protector. Refer to the plan to identify the parts and their location. The plan may be cut apart on the dashed lines if space is a problem.



□ 2. Locate and glue the two die-cut 1/8" [3.2mm] balsa **LE braces** together to form one 1/4" LE brace. Locate and glue the two die-cut 1/8" [3.2mm] balsa **stab centers** together to form one 1/4" stab center.

□ 3. Glue the die-cut 1/8" balsa stab center to the LE brace as shown on the plan.

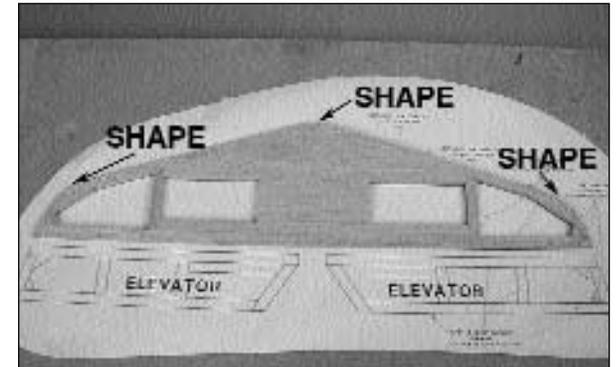
□ 4. Pin the center section to the plan.



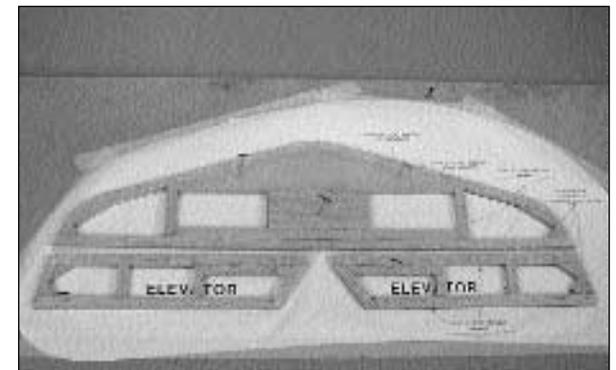
□ 5. Locate the 1/4" x 3/8" x 12" [6.4 x 9.5 x 305mm] basswood **stab brace**. Cut it to a length of 11" then glue it to the aft edge of the stab center in the location shown on the plan.

□ 6. Use two 1/4" x 3/8" x 30" [6.4 x 9.5 x 762mm] **balsa sticks** to make the frame for the stab. Cut the sticks to the length shown on the plan and glue them together to form the stab.

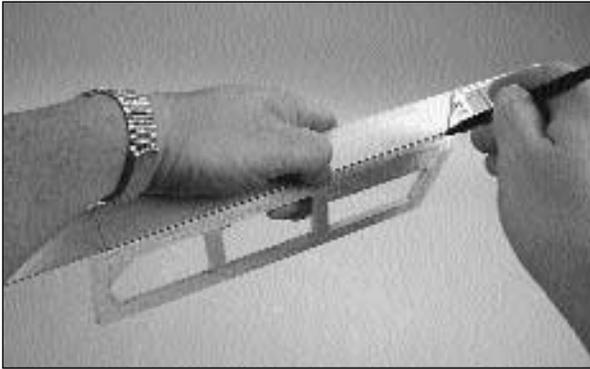
□ 7. Use leftover pieces of the 1/4" x 3/8" x 30" [6.4 x 9.5 x 762mm] balsa sticks to make the 1/4" [6.4mm] balsa gussets. Cut them as shown on the plan and glue them in place.



□ 8. Remove the stab from the plan. Shape the corners and the center LE of the stab assembly as shown on the plan. Pin the stab back to the building board after you have shaped the stab.

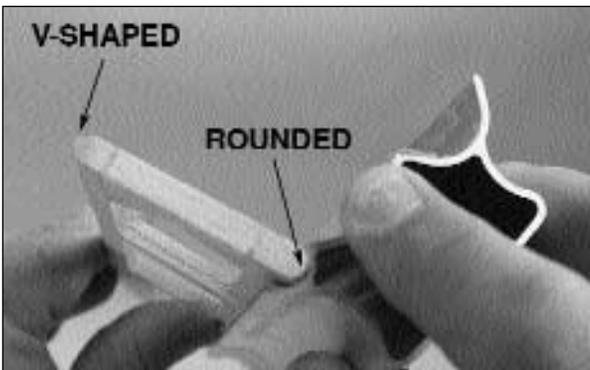


□ □ 9. Use two 1/4" x 3/8" x 30" [6.4 x 9.5 x 762mm] balsa sticks to make the frames for the **elevator**. Cut the sticks to the shape shown on the plan. Glue the sticks together the same way the stab was assembled. Make a left and right elevator.



□ □ 10. Insert a T-pin through the center of the elevator LE near the tip and near the root. Place a straightedge across the T-pins and draw a **centerline** on the elevator LE with a ball point pen. This line is used as a reference when we install the hinges in a later step. Draw a centerline along the TE of the stab the same way.

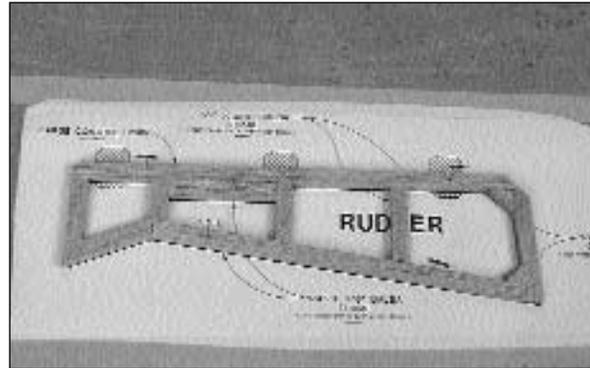
□ □ 11. Shape the LE of the elevator to a "V" as shown on the plan. Use the line you have drawn as a reference when sanding the LE.



□ □ 12. Final sand the stab and elevator. Shape the LE of the stab and the TE of the elevator as shown in the cross-section on the plan. *Hint: The Great Planes Easy Touch Multi-Sander works great for shaping the round LE and TE.*

Build the rudder

□ 1. Work on a flat surface over the plan. Pin the **rudder plan** to the building board and cover the plan with Plan Protector. The plan may be cut apart if space is a problem.



□ 2. Use one 1/4" x 3/8" x 30" [6.4 x 9.5 x 762mm] balsa stick and leftover pieces of 1/4" x 3/8" x 30" [6.4 x 9.5 x 762mm] balsa stick from the stab and elevator to make the frame for the **rudder**. Cut the sticks to the shape shown on the plan. Glue the sticks together the same way the stab and elevator were assembled.

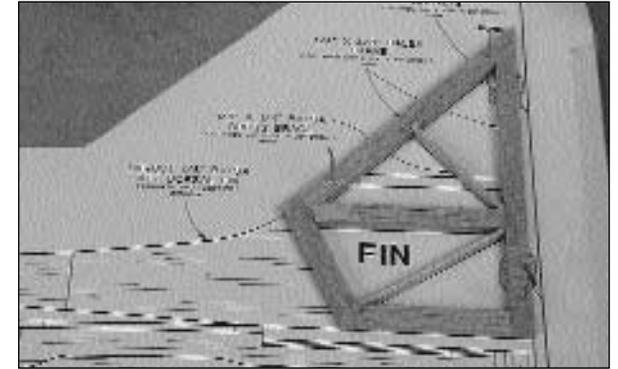
□ 3. Draw a centerline on the rudder LE the same way it was done to the elevator.

□ 4. Final sand the rudder. Shape the LE to a "V" the same way it was done for the elevator and as shown on the plan.

□ 5. Shape the TE, top and bottom of the rudder to the rounded shape shown on the plan.

Build the fin

□ 1. Pin the **fuselage plan** to the building board and cover the plan with Plan Protector.

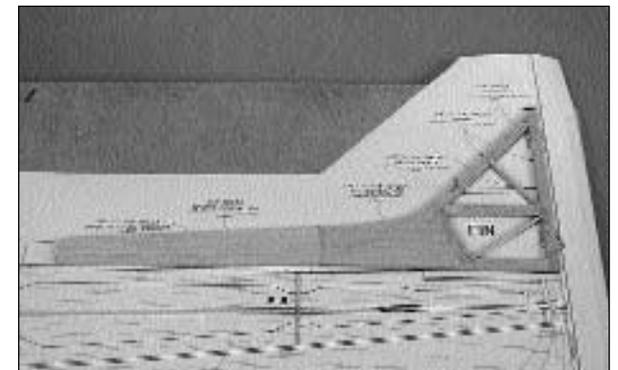


□ 2. Use one 1/4" x 3/8" x 30" [6.4 x 9.5 x 762mm] balsa stick to make the frame of the **fin**. Cut the stick to the lengths shown on the plan. Pin the sticks in place as needed. Glue the sticks together to form the fin.

□ 3. From 1/8" x 1/4" x 30" [3.2 x 6.4 x 762mm] balsa stick, cut the **cross braces** and glue them in place at the location shown on the plan.

□ 4. Glue the two die-cut 1/8" [3.2mm] balsa **aft dorsal fin** halves together, laminating them to make a 1/4" [6.4mm] dorsal fin.

□ 5. From 1/4" x 3" x 24" [6.4 x 76 x 610mm] balsa sheet, cut the **center dorsal fin** to the size and shape shown on the plan.



□ 6. Glue the aft dorsal fin to the fin. Glue the center dorsal fin to the aft dorsal fin. All of these parts must be lying on a flat surface while gluing, to ensure a flat, straight assembly.

- ❑ 7. Remove the assembly from the plan.
- ❑ 8. Final sand the fin assembly. Shape the LE of the fin and the top of the dorsal fin to the shape shown on the plan.
- ❑ 9. Draw a centerline on the TE of the fin in the same manner as was done for the stab.

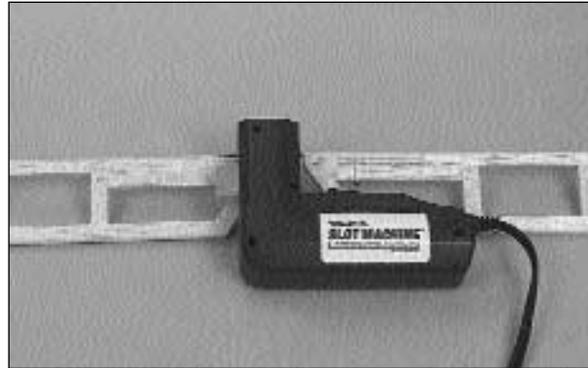
Install the hinges

IMPORTANT NOTES ABOUT CA HINGES

This kit is supplied with a CA hinge material consisting of a 3-layer lamination of Mylar and polyester. It is specially made for hinging model airplane control surfaces. When properly installed, this type of CA hinge provides the best combination of strength, durability and easy installation. We trust all of our Gold Edition warbirds to these hinges, but **it is essential to install them correctly**. Carefully follow the hinging instructions in this manual for the best result.

The most common mistake made by modelers when installing CA hinges is making the hinge slots too tight restricting the flow of CA to the back of the hinges; or not using enough glue to fully secure the hinge over its entire surface area. This results in hinges that are only *tack glued* into the hinge slots. The techniques for cutting the hinge slots and gluing in CA hinges (near the end of the manual) have been developed to ensure thorough and secure gluing.

- ❑ 1. Mark the location of the hinge slots on the elevator halves, stab, fin and rudder where shown on the plan.

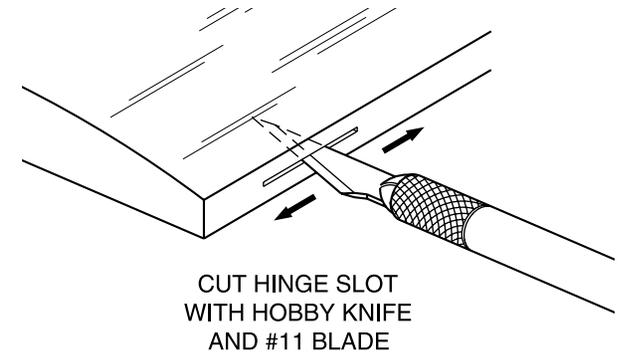


*We have simplified the task of cutting hinge slots with the introduction of the **Great Planes Slot Machine™**. This simple electric tool cuts a perfect width slot for use with CA hinges.*

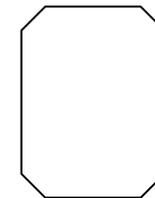
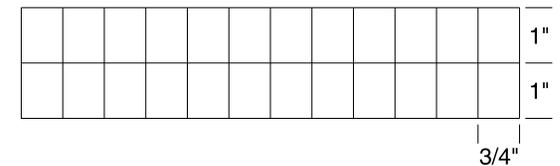


To cut the hinge slot place the blades onto the wood where you want the slot. Lightly press the teeth into the wood. When you are satisfied with the location press the button on the handle and the blades will cut easily into the balsa wood.

If you choose not to purchase a Slot Machine you can make the slots following these instructions.

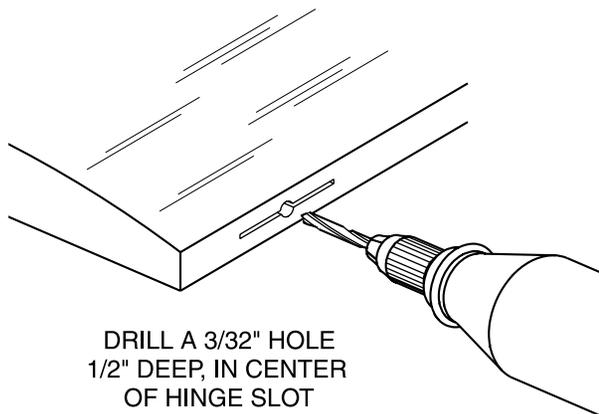


- ❑ 2. Cut the hinge slots in the elevators, stab, fin and rudder along the centerlines you marked earlier with a #11 blade.



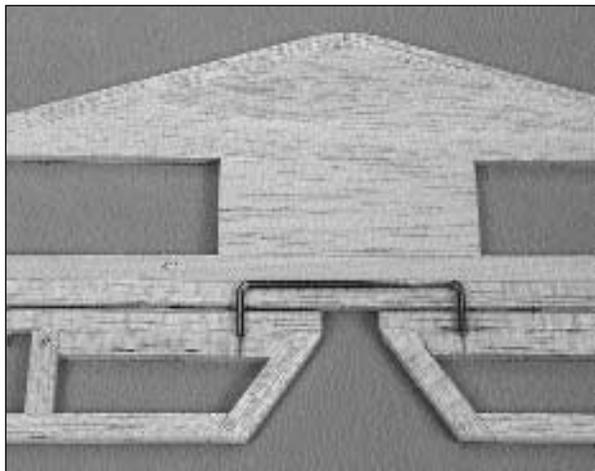
- ❑ 3. Using the sketch above, cut nine hinges from the CA hinge strip supplied with the kit. Snip the corners off so they go into the slots easier. You may cut all nineteen hinges that will be used for the airplane or just cut them as you need them.

- ❑ 4. Test fit the hinges into the slots. If the hinges do not slide into the slots easily, work your knife blade back and forth in the slot a few times to provide more clearance (it is really the back edge of the blade that does the work here in widening the slot).

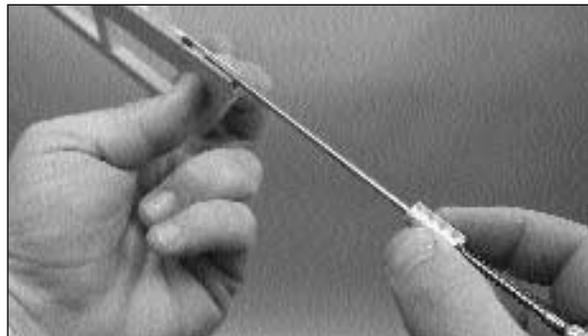


❑ 5. Drill a 3/32" [2.40mm] hole, 1/2" [13mm] deep in the center of the hinge slots. Use a rotary tool with a 3/32" [2.40 mm] drill bit or a carbide cutter for the best results. Re-insert your knife blade to clean out the slot after you drill the hole.

❑ 6. Test fit the elevator halves to the stab with the hinges.



❑ 7. Position the **elevator joiner wire** on the trailing edge of the stab and center it between the elevators. Mark the LE of both elevators where the joiner will enter.



❑ 8. Cut a slot in the leading edge of both elevator halves to accommodate the joiner wire. This can be done easily with the **Great Planes "Groove Tube"**™ as shown in the photograph. *Hint: If you do not have a Groove Tube, use a 5/32" [4mm] brass tube sharpened at one end to cut the slot.*

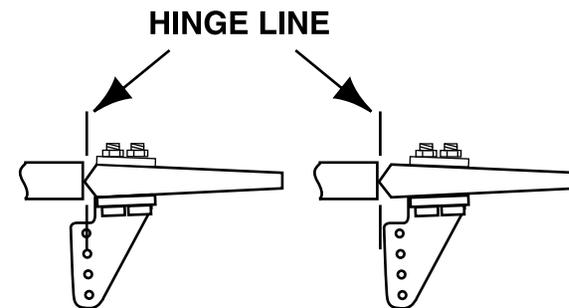
❑ 9. Accurately drill holes in the elevators for the 1/8" joiner wire. Begin by drilling a 1/16" [1.6mm] pilot hole. Then drill the final hole to a depth of 7/8" [22.2mm] with a 9/64" [3.6mm] drill bit. (The hole is drilled slightly oversize to allow for positioning and to create a hard epoxy "sleeve" around the wire).

❑ 10. Roughen the joiner wire with coarse sandpaper, then clean the wire thoroughly with alcohol to remove any oily residue.

❑ 11. **Test fit** the joiner wire into the elevators. Then, glue it in using epoxy. When gluing, lay the elevators on a flat surface with the LE along a straightedge to insure perfect alignment. Cover the top of the joined elevators with a sheet of wax paper. Then, lay a flat, heavy object on top. A telephone book works well. This will insure a true flat elevator assembly when the epoxy cures.

Install the control horns

❑ 1. Place a large **control horn** at the location indicated on the elevator plan and rudder plan. Use a ballpoint pen to mark the location where the holes need to be drilled.



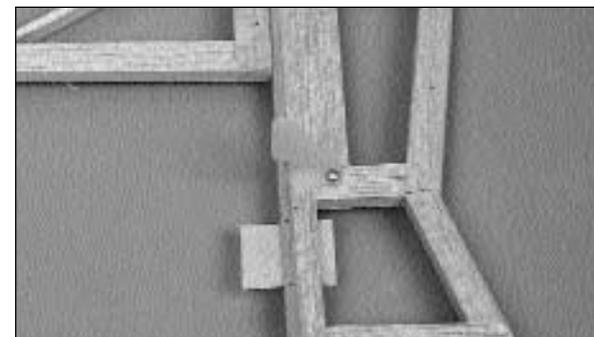
CORRECT

INCORRECT

❑ 2. Check for correct alignment. Drill two 3/32" [2.4mm] holes for the control horn mounting bolts through the rudder .

❑ 3. Repeat step 2 for the right half of the elevator.

❑ 4. Apply a small drop of thin CA in the holes to harden the wood. Redrill the holes after the CA has hardened.



❑ 5. Attach the control horn to the left side of the rudder with two 2-56 x 1/2" [12.7mm] machine screws.

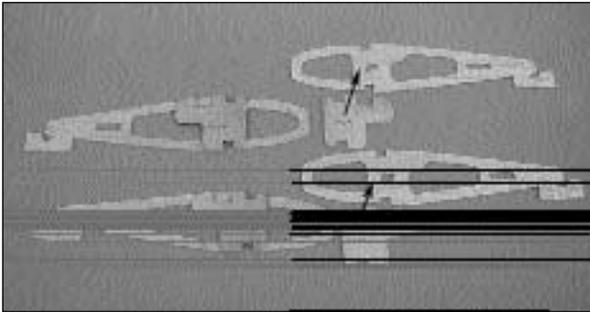
❑ 6. Attach the control horn to the bottom right side of the elevator with two 2-56 x 1/2" [12.7mm] machine screws.

There, that went pretty quick. If your workbench is a mess, clean it off and get ready to move on to the wing!

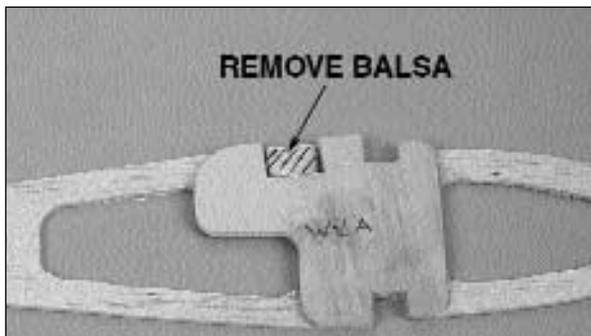
BUILD THE WING

Build the bottom of the wing

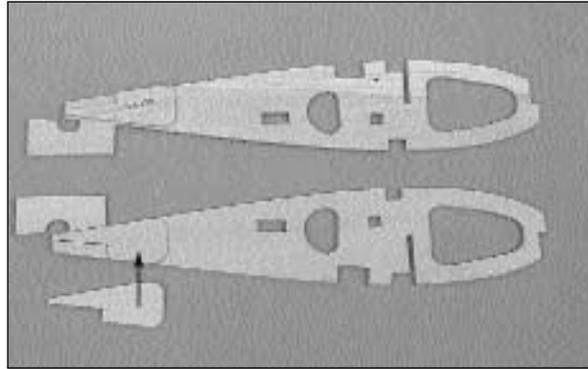
- ❑ 1. Cut the **wing plan** on the dashed line. Tape the two wing plan halves together to form the full plan for the wing.
- ❑ 2. Work on a flat surface over the plan. Pin or tape the wing plan to the building board and cover the plan with Plan Protector.
- ❑ 3. When building the wing it is important to note that the wing is being built **upside-down** over the plan.



- ❑ 4. Locate four die-cut 3/32" [2.4mm] balsa **W-2 ribs** and four die-cut 1/8" [3.2mm] ply **W-2A doublers**. Glue a W-2A doubler to each W-2 rib with 6-minute epoxy. Make sure that you make **two for the left wing** and **two for the right wing**.

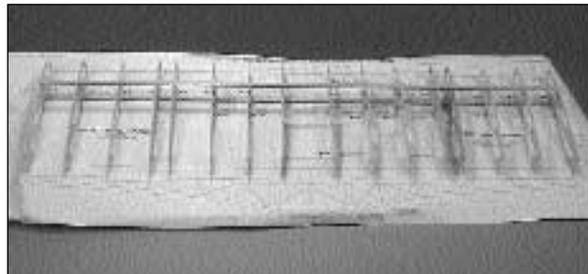
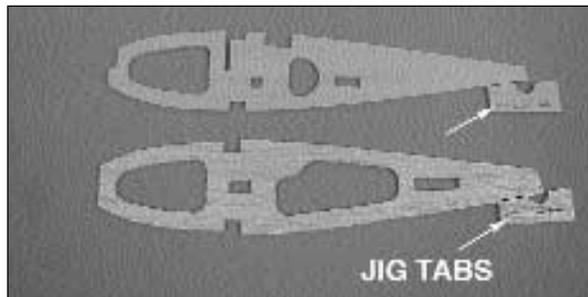


- ❑ 5. After the epoxy has cured, remove the area on W-2 that will hold the landing gear block. Do this on all four of the assemblies that you just glued together.



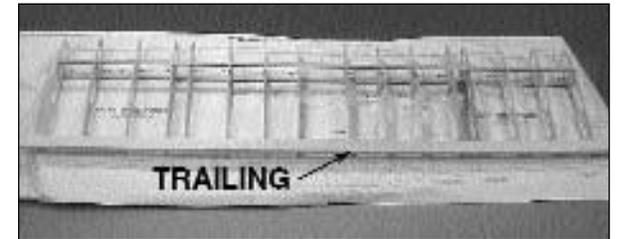
- ❑ 6. Locate two die-cut ply **W-1 ribs** and two die-cut ply **W-1B doublers**. Glue a W-1B doubler to each W-1 rib with 6-minute epoxy. Make sure that you make **one left side** and **one right side** when gluing them together.

- ❑ 7. Cut the two 1/4" x 3/8" x 48" [6.4 x 9.5 x 1220mm] basswood **wing spars** to the length shown on the plan. Pin one of the wing spars to the plan. Make sure that the pins will not be in the way for placing any of the ribs on the spar.

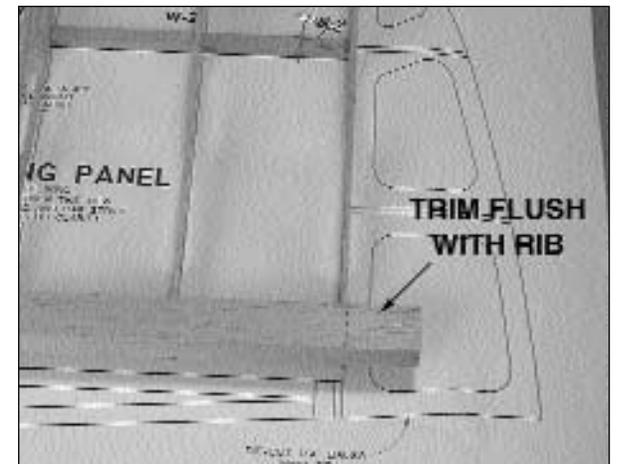


- ❑ 8. Position ribs **W-1, W-2 and W-3** on the wing spar at the locations indicated on the plan. Make

sure when you place the ribs that all of the ribs have the jig tab in contact with the building board. Place the remaining wing spar in position on the bottom of the wing in the notches on the ribs W-1, W-2 and W-3. When positioning the ribs be sure the ribs are perpendicular to the building table. When you are satisfied with the fit glue the ribs to the **bottom wing spar only**. It is **important** to remember you are building the wing upside down. Be sure to glue only the bottom wing spar.



- ❑ 9. Locate two 9/16" x 7/8" x 24" [14.3 x 22.2 x 584mm] balsa **TE sticks**. Glue the two TE sticks together where they will meet at the center of the wing. Test fit the TE on the wing jig tabs. When you are satisfied with the fit glue the TE to the **end of the ribs only! Do not glue the TE to the jig tabs**.

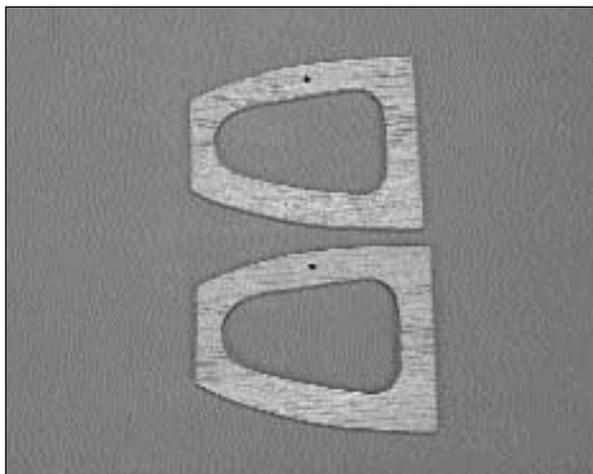


- ❑ 10. Cut off the excess TE material outboard of the tip rib.



□ 11. Locate the die-cut 1/8" [3.2mm] ply **forward dowel guide** and the die-cut 1/8" [3.2mm] ply **aft dowel guide**. Measure the distance between the center of the holes in the forward dowel guide. Draw a centerline on the forward dowel guide.

□ 12. Use 6-minute epoxy to glue the die-cut 1/8" [3.2mm] ply forward dowel guide and the die-cut 1/8" [3.2mm] ply aft dowel guide in place between the two W-1 ribs as shown on the plan. Be sure that the side of the forward dowel guide with the centerline on it is facing the front of the wing.



□ 13. Locate the two die-cut balsa 3/32" [2.4mm] half ribs **W-1A**. There is a pin punch mark on the top of each rib. Glue the two W-1A ribs to each other forming one 3/16" W-1A rib. Make sure that the punch marks are aligned.

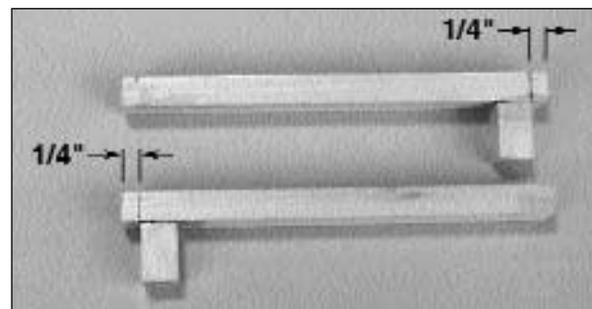
□ 14. Glue the W-1A rib assembly in place between the W-1 ribs in the location shown on the plan. W-1A supports the wing sheeting you will be adding later so make sure it is properly centered. Glue W-1A in position with the side of the rib with the pin punch nearest your building board.

□ □ 15. Locate two 3/32" x 1-1/4" x 30" [2.4 x 32 x 762mm] balsa **sub LE sticks**. Test fit the sub LE against the front of the ribs on the right side of the wing making sure that each rib comes in contact with the sub LE. Sand the front of the ribs as needed. When you are satisfied with the fit, glue the sub LE to the front of the ribs and the front of the forward dowel guide. **Be sure** that the joining of the two sub LE sticks is **directly** over the centerline that you drew on the forward dowel guide.

□ □ 16. Sand the sub LE stick so that it is flush with the wing ribs.

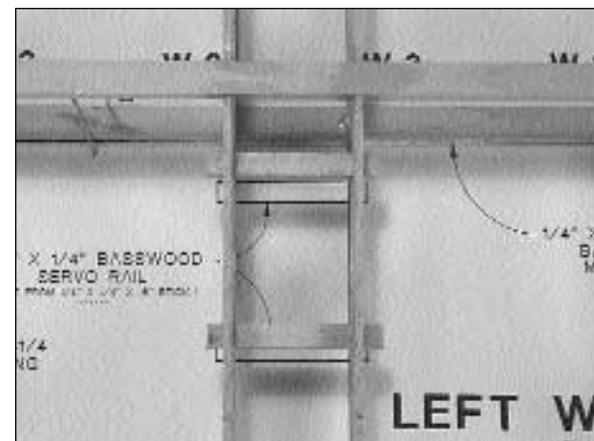
□ 17. Repeat step 15 and 16 for the left side of the wing.

Contender Fun Fact
The original Contender was designed by renowned scale modeler Dave Platt in 1969!



□ □ 18. Locate the two maple landing gear rails and two maple torque blocks. Measure in from the end of

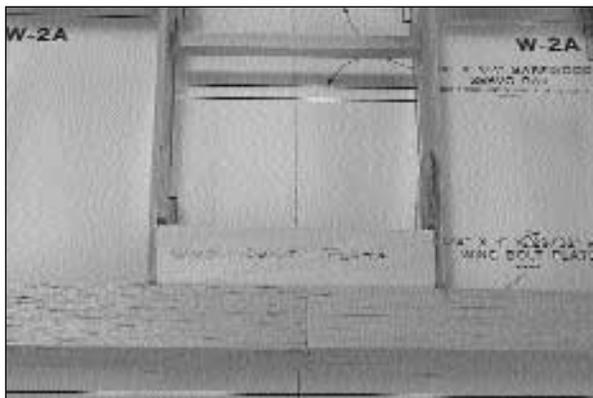
the landing gear rail 1/4" [6.4mm]. Mark a line with a pen. Use 6-minute epoxy to glue a torque block to one of the landing gear rails at the mark you just made. Do the same for the remaining landing gear rail and torque block. Set it aside and allow the epoxy to cure.



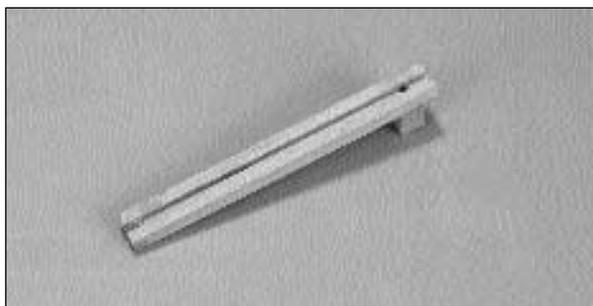
□ □ 19. From the 1/4" x 1/4" x 18" [6.4 x 6.4 x 457mm] basswood stick, cut four 2" [51mm] sticks to be used for the **servo rails**. Glue two rails into the slots in the two W-3 ribs in the left wing. The slot in the aft of rib W-3 is longer than the forward slot. This is to allow you to get exact spacing for your brand of servo. Be sure to position the rear servo rail for your servo. Glue them in place when you are satisfied with the fit.

□ 20. Repeat step 19 for the servo rails in the right wing.

□ 21. If you plan to install the optional flap, (*and if you're not, how come? It really is a lot of fun and adds another dimension to flying the Contender!*) cut two additional 4-1/4" [108.4mm] servo rails from the remainder of the 1/4" x 1/4" x 18" [6.4 x 6.4 x 457mm] basswood stick. These will serve as the servo rails for the flap servo. Install these in the slots between the two W-1 ribs in the same way you did for the aileron servos.



□ 22. Glue the 1/4" x 1" x 3-29/32" [6.4 x 25.4 x 99mm] basswood **wing bolt plate** in place between the W-1 ribs and onto the doublers W-1B with 6-minute epoxy.

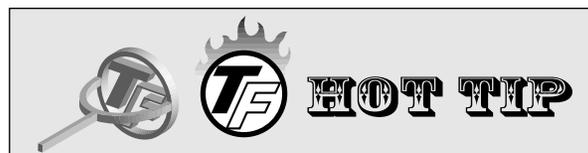


□ □ 23. By now your landing gear rail assembly should have cured. Drill a 5/32" [4mm] hole through both of the landing gear rails and the torque blocks. Drill from the side of the landing gear rail that has the groove. As you drill, make sure you hold the drill at a 90 degree angle to the landing gear rail and that the hole is centered in the torque block.

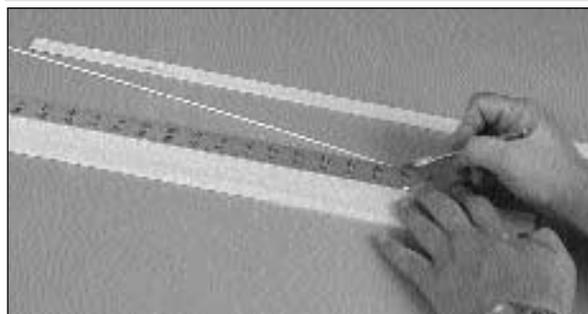
□ □ 24. Use 6-minute epoxy to glue the landing gear rail assembly to the slots in W-1 and W-2. Be sure that you glue the torque block securely to W-1 when gluing the rail in place. Do this for both sides of the wing.

□ 25. Locate one of the 3/32" x 3" x 24" [2.4 x 76 x 610mm] balsa wing sheets. Cut it into four pieces 3/32" x 3/4" x 24" [2.4 x 19.1 x 610mm].

□ 26. See the Hot Tip that follows, then glue one of the 3/32" x 3" x 24" [2.4 x 76 x 610mm] balsa sheets to one of the 3/32" x 3/4" x 24" [2.4 x 19.1 x 610mm] balsa sheets to make one 3-3/4" [95mm] sheet. Make four sheets for the top and bottom **LE wing sheeting**.



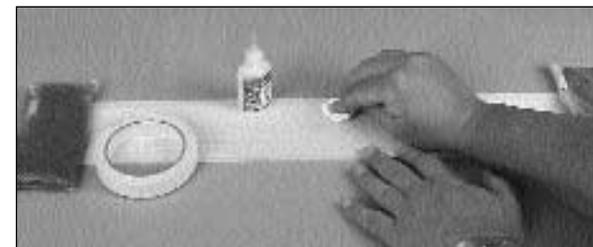
WING SHEETING



A. Use a metal straightedge as a guide to trim one edge of both sheets.



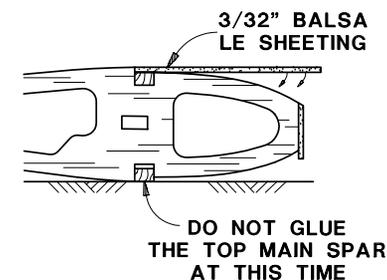
B. Use masking tape to tightly tape the two sheets together joining the trimmed edges.



C. Turn the sheet over and apply weights on top of the sheet to hold it flat. Apply thin CA sparingly to the seam between the two pieces, quickly wiping away excess CA with a paper towel as you proceed.

D. Turn the sheet over and remove the masking tape, then apply thin CA to the seam the same way you did for the other side.

E. Sand the sheet flat and smooth with your bar sander and 150 grit sandpaper.



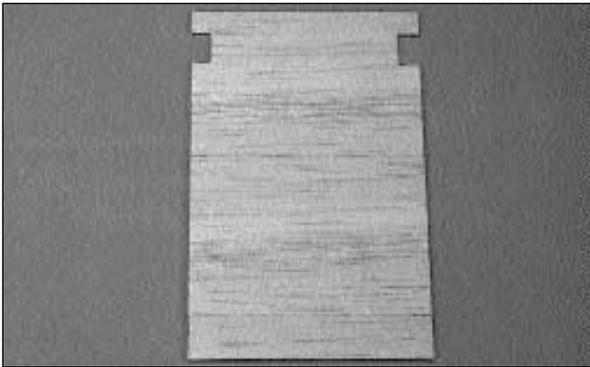
□ □ 27. Test fit the wing skin sheeting. The sheeting should join at the center of the rib W-1A and be against the notch in the rib. Glue the wing skin sheeting in place on top of the spar and against the notch in the rib. When the glue has cured apply a bead of glue to the top of each rib and along the sub LE. Pull

the sheeting down making sure it contacts the surface of each rib and the sub LE. Hold it in place until the glue has cured.

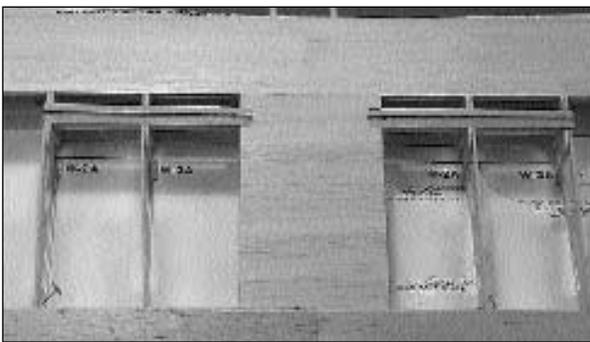
□ □ 28. Trim the sheeting flush to the wing sub LE.

□ 29. Repeat steps 27 and 28 for the other side of the wing. Be sure that you glue the sheeting securely at the center of the wing where the sheeting comes together.

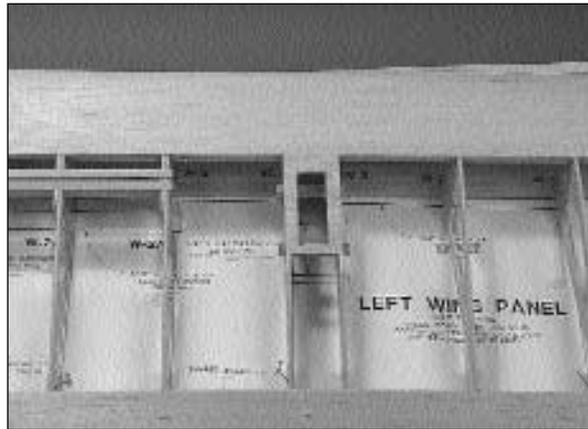
□ 30. From one 3/32" x 3" x 30 [2.4 x 76 x 762mm] balsa sheet cut three pieces 3" x 4-5/16" [76 x 110mm]. Edge glue the three pieces in the same way that was done for the LE sheeting.



□ 31. Cut the **bottom center sheeting template** from the plan. Trace the pattern onto the balsa sheets that were just glued together. Cut the balsa sheet to match.



□ 32. Test fit the balsa sheeting to the center of the bottom of the wing between the W-1 ribs. When you are satisfied with the fit, glue it in place.



□ 33. From the leftover 3/32" x 3" x 30" [2.4 x 76 x 762mm] balsa sheet, cut two 3" x 1-3/4" [76 x 44mm] sheets to be used as the sheeting around the aileron servos. Fit the sheets and glue them in place.

□ 34. Cut an opening in the aileron sheeting to accommodate the size of your particular brand of servo.

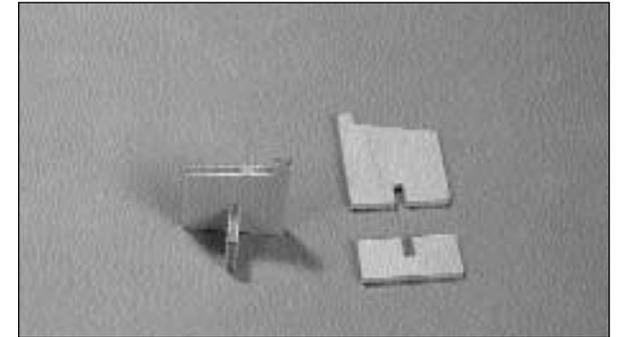


□ 35. Use a razor plane to shape the 9/16" x 7/8" [14.3 x 22.2mm] TE that you glued in place in step 9. Shape the TE to match the airfoil of the ribs.

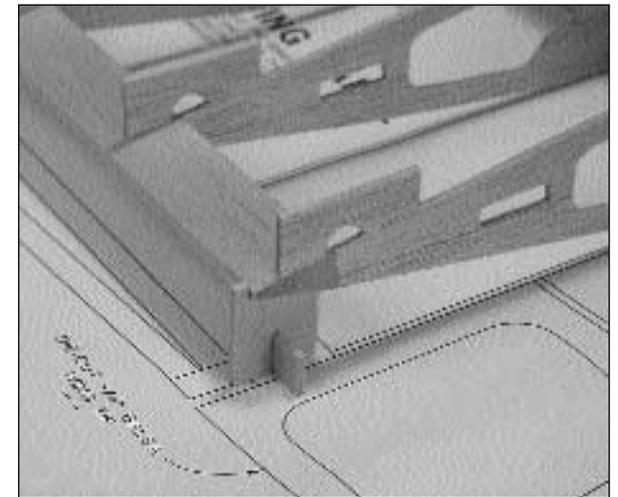
□ 36. Sand the entire bottom of the wing.

Build the top of the wing

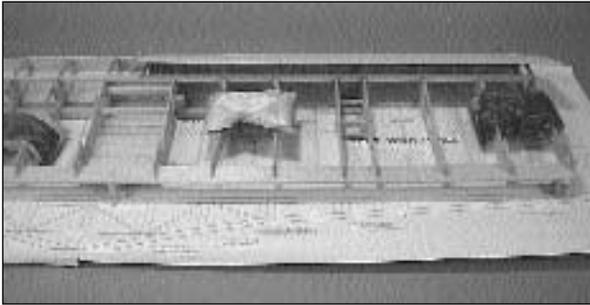
□ 1. Remove the wing from the building board. Turn the wing over and place it over the plan and we'll finish the wing construction.



□ 2. Locate the die-cut 1/8" [3.2mm] ply **wing support** and **base**. Slide the base into the wing support and glue them together. Make three assemblies



□ 3. Place a wing support under the center rib, the left tip rib and the right tip rib. These will support the wing on the workbench while sheeting and sanding the top of the wing. Apply a couple of weighted bags on the wing to hold it firmly on the workbench.

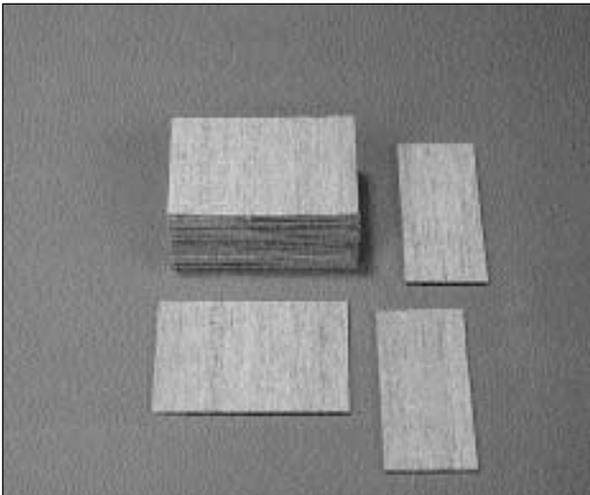


□ 4. Fully seat the top wing spar in the rib notches and glue in place. The jig tabs on ribs W-1 must be sanded off prior to sheeting.

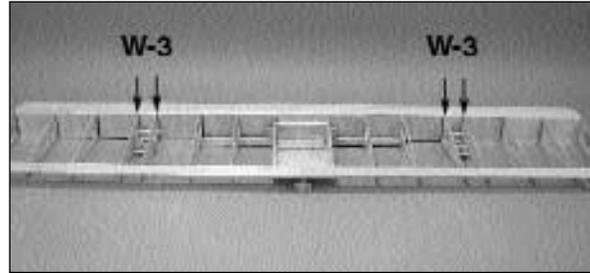
□ 5. Sheet the LE of the wing in the same way you did the sheeting on the bottom of the wing. Sheet both the left and right side of the wing.

□ 6. Trim the sheeting flush to the wing sub LE.

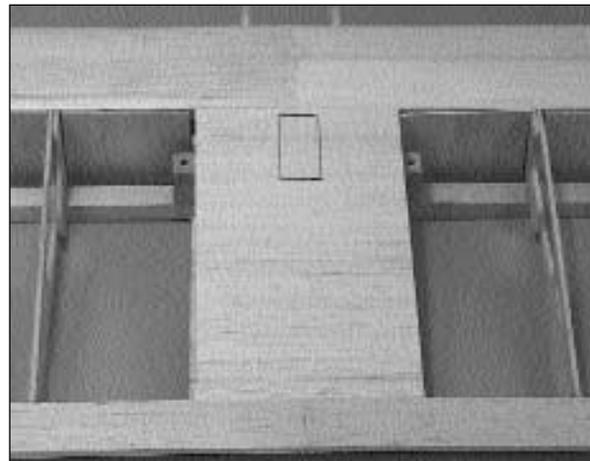
□ 7. Cut the jig tabs from the ribs. Lightly sand the ribs even with the trailing edge. Make sure when you cut them off that you maintain the airfoil of the rib.



□ 8. Cut fourteen 3" x 2-1/8" [76 x 54.2mm] balsa shear webs from leftover 3/32" x 3" x 30" [2.4 x 76 x 762mm] balsa sheet. Cut two 2-1/8" x 1-1/2" [54.2 x 38mm] balsa shear webs.



□ 9. Glue one of the 1-1/2" x 2-1/8" [38 x 54.2mm] balsa shear webs in place between the W-3 ribs for both wing halves. Glue the 2-1/8" x 3" [54.2 x 76mm] balsa shear webs between each of the remaining ribs. The shear webs will need to be trimmed slightly on the W-2 ribs that have the ply doublers. At the center of the wing use two shear webs and trim them to fit the center section.

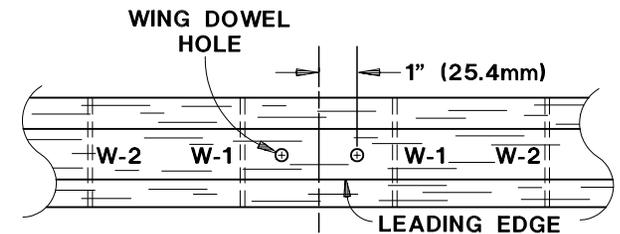


□ 10. From the leftover 3/32" x 3" x 30" [2.4 x 76 x 762mm] balsa, sheet the center section of the wing. If you will be installing the optional flap, mark the servo location and cut the opening for it.

□ 11. Sand the entire top of the wing.

□ 12. Locate the two 1/2" x 1-1/4" x 24" [12.7 x 32 x 610mm] balsa **LE sticks**. Glue them to the front of the balsa sub LE. Be sure the LE sticks are joined directly over the joint of the sub LE stick. Trim the end of the LE flush with the tip rib.

□ 13. Use a razor plane to shape the wing LE to the shape shown on the plan. Sand the wing LE to its final shape.



□ 14. Measure over 1" from each side of the leading edge joint and mark it with a pen. Be sure the mark is centered on the LE.

□ 15. On the marks that you have made, push a T-pin through the balsa LE, sub LE and the forward dowel guide. The pin should be centered in the hole in the forward dowel guide.

□ 16. Using the pin holes in the LE as a reference, drill a 1/8" pilot hole through the LE. Check to make sure the hole is centered in the hole of the forward dowel guide. Then drill a 1/4" [6.4mm] hole through the LE. It will line up perfectly with the holes in the forward dowel guide.

□ 17. Locate two 1/4" x 4" [6.4 x 25.4mm] hardwood wing dowels. Round one end of each dowel as shown on the plan. Slightly round the other end for ease of insertion.

□ 18. Apply 30-minute epoxy to the holes in the forward and aft dowel guide. Slide one dowel into each hole, making sure that the rounded end protrudes through the LE and that the other goes all the way through both dowel guides.

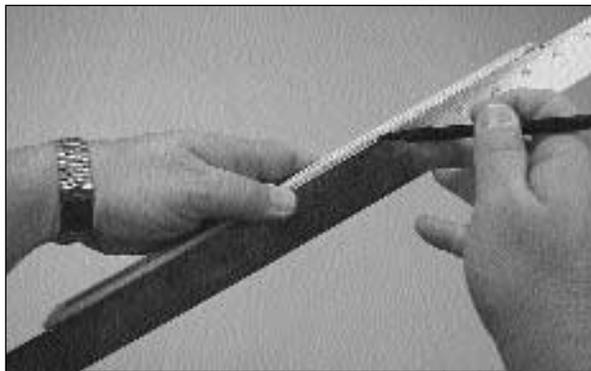
Contender Fun Fact

In the 1970's the Contender was one of the "must have" models. It was extremely popular as a sport plane and was particularly well suited as a fun fly contest airplane.

Build the ailerons

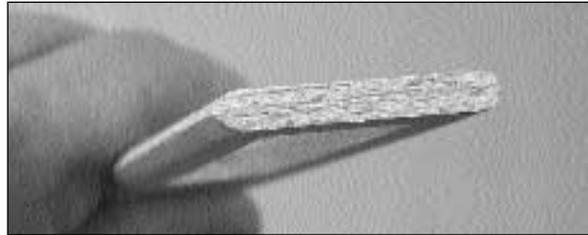


□ □ 1. Locate a 1/4" x 3/8" x 30 [6.4 x 9.5 x 762mm] balsa stick. Using the plan as a guide, cut the stick as shown on the plan and glue the pieces together to make the aileron.



□ □ 2. Remove the aileron from the plan. Make a mark at the center of the aileron at each end and place a T-pin at each mark. Place a straightedge along the aileron LE at the pins and draw a centerline on the aileron LE.

□ □ 3. Mark the location of the hinges and cut the hinge slots using the same technique used for the elevator and the rudder.



□ □ 4. Shape the LE to a "V" and round the TE as shown on the plan.

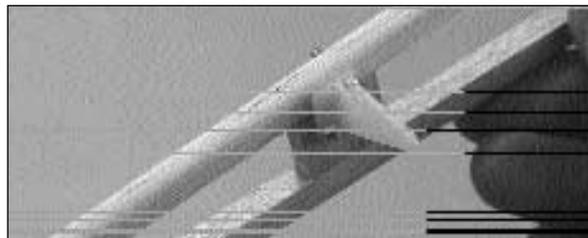
□ □ 5. Repeat steps 1 - 4 for the other aileron.

Install the aileron control horns

□ □ 1. Place a large **control horn** on the bottom of the right aileron as indicated on the aileron plan. Use a ballpoint pen to mark the location where the holes need to be drilled.

□ □ 2. Drill two 3/32" [2.4mm] holes for the control horn mounting bolts through the right aileron.

□ □ 3. Apply a small drop of thin CA in the hole to harden the wood. Redrill the hole after the glue cures.

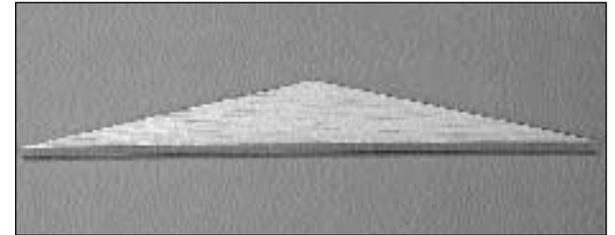


□ □ 4. Attach the control horn to the right aileron with two 2-56 x 1/2" [12.7mm] machine screws.

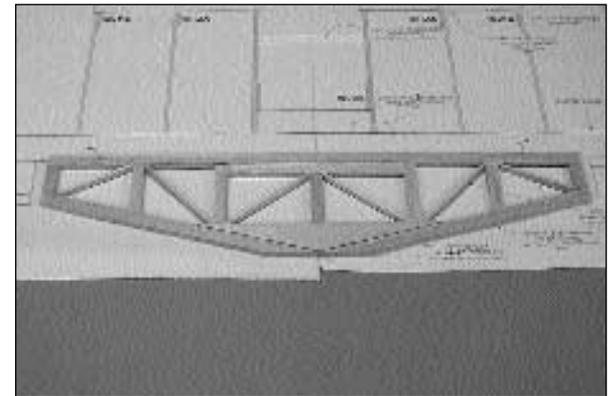
□ □ 5. Repeat steps 1 through 4 for the left aileron.

Build the flap

□ 1. You must build the flap regardless of whether you are going to have it operational or fixed. The construction steps are the same.



□ 2. From 1/4" x 3" x 30" [6.4 x 76 x 762mm] balsa sheet, cut the 1/4" [6.4mm] balsa **flap TE doubler** as shown on the plan. Pin it in place on the plan.



□ 3. Build the **flap frame** from 1/4" x 3/8" x 30" [6.4 x 9.5 x 762mm] balsa sticks. Cut the sticks and glue them in place as shown on the plan.

□ 4. Cut the 1/8" x 1/4" [3.2 x 6.4mm] balsa **flap diagonal braces** as shown on the plan. When satisfied with the fit glue them in place.

□ 5. Sand both sides of the flap.

□ 6. Round the flap TE as shown on the flap cross section.

Perform step 7 only if you are NOT going to have a functional flap.

❑ 7. Glue the flap in position in the center of the wing at the location shown on the plan.

Steps 8 - 12 are for building the functional flap.

❑ 8. Draw a centerline on the leading edge of the flap the same way it was done for the aileron.

❑ 9. Mark the location for the hinges and cut the hinge slots.

❑ 10. Using the centerline as a reference taper the LE to a "V" as shown on the flap cross-section.

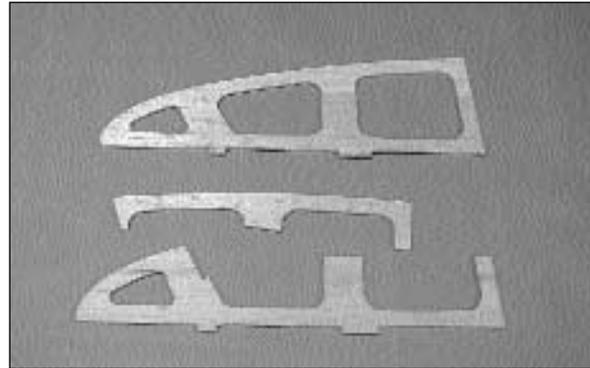
❑ 11. Mark the location for the flap hinges on the wing TE and cut the hinge slots.

❑ 12. Install the control horn on the top of the flap as shown on the plan. Use the same installation method used on the aileron.

Contender Fun Fact

When the Contender was originally introduced it was advertised as "Buildable in 8 hours" and the instructions consisted of 12 sketches. We are not so sure about the 8 hours but we are sure you will like this expanded construction manual.

Build the wing tips



❑ 1. Locate the 1/8" [3.2mm] die-cut balsa **wing tip** parts. Each wing tip consists of two halves. Glue the left and right halves together. Do this to make four wing tips.

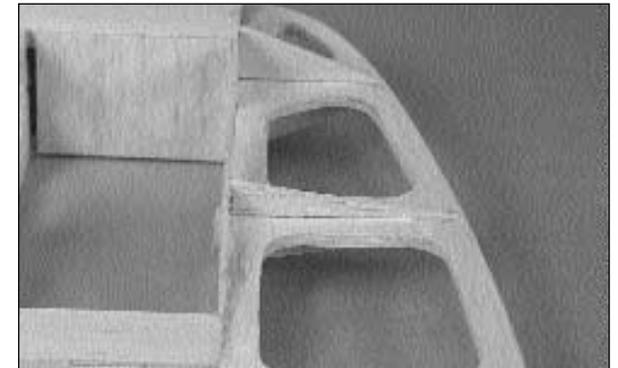
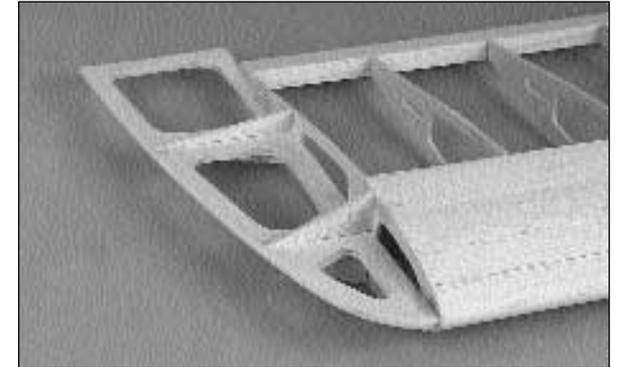
❑ 2. Glue two wing tip assemblies together to make one 1/4" [6.4mm] wing tip. Do the same for the other wing tip.

❑ 3. Sand the wing tip edges round just as you did for the TE of the aileron.

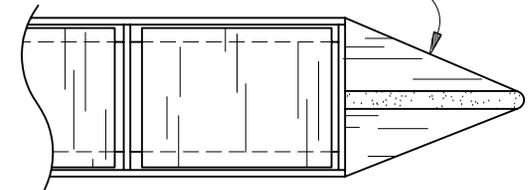
Before we can continue, you'll need to decide which wing tip shape you wish to use on your Contender. The standard tip is the original "nostalgia" tip shape and the model performs quite nicely with this tip. The optional tip shape was evolved onto the original Contender design to make its handling even better, particularly eliminating a "roll coupling from rudder". With the optional wing tips, your model will just yaw upon rudder application, without the need to use opposite aileron to correct a roll couple. Additionally, your Contender will have even better slow speed handling, without any loss of aerobatic performance. Note that the model flew excellently in both configurations and the decision to install or not to install the optional tips is not a crucial one for basic flight handling.

Standard wing tip

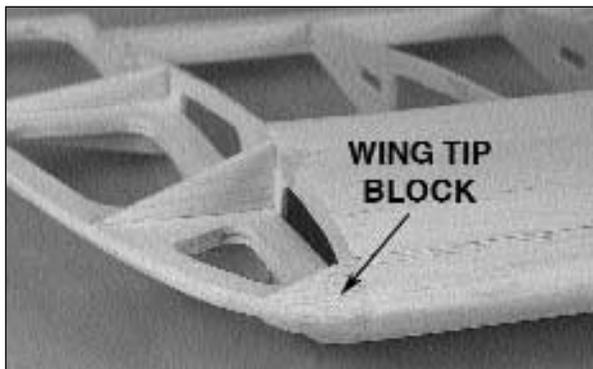
❑ 1. Glue the wing tip into the slots in the tip ribs of the wing. Make sure the wing tip is aligned at the center of the wing LE and TE.



STANDARD WING TIP BRACE



❑ 2. Locate the 1/8" x 1-3/8" x 30" [3.2 x 34.9 x 762mm] balsa sheet and cut four **wing tip braces** for each wing tip. Use the above sketch and photos as a guide when cutting the braces. Position the braces as shown on the plan then glue them in place when you are satisfied with the fit.



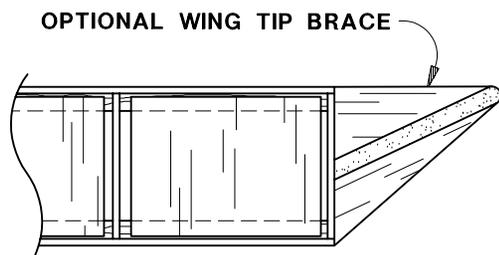
□ □ 3. From the 1/2" x 1/2" x 6" [12.7 x 12.7 x 152mm] balsa stick, cut two **wing tip blocks** and glue them in position as shown on the plan. One block is glued on each side of the wing tip.

□ □ 4. Sand the wing tip blocks to shape.

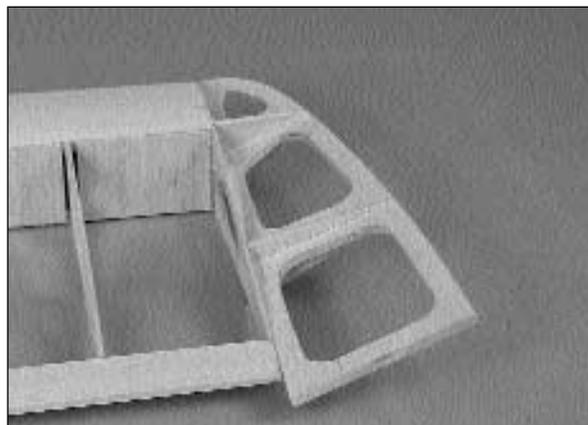
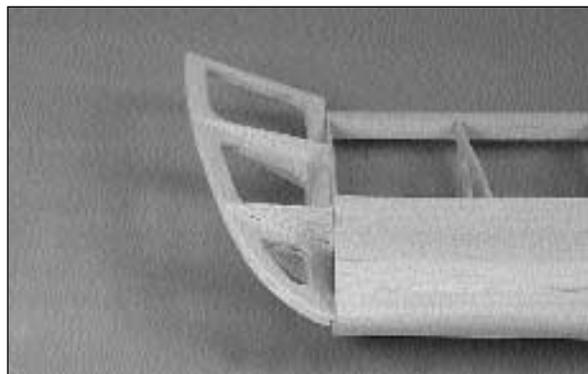
□ □ 5. Repeat steps 1 - 4 for the other wing tip.

Optional wing tip

□ □ 1. Test fit the wing tip into the slots in the tip rib. Make sure there is enough room in the slots for the wing tip to be slanted upward approximately 40 degrees.



□ □ 2. On the wing plan, locate the templates for the four **optional wing tip braces**. Cut one of each brace from the 1/8" x 1-3/8" x 30" [3.2 x 34.9 x 762mm] balsa sheet.



□ □ 3. Use the braces as a gauge to set the wing tip angle and glue the wing tip in position.

□ □ 4. Glue the braces in position as shown on the plan and in the above photographs. Two braces are located on each side of the wing tip.

□ □ 5. From the 1/2" x 1/2" x 6" [12.7 x 12.7 x 152mm] balsa stick cut two **wing tip blocks** and glue them in position as shown on the plan. One block is glued on each side of the wing tip.

□ □ 6. Sand the wing tip blocks to shape.

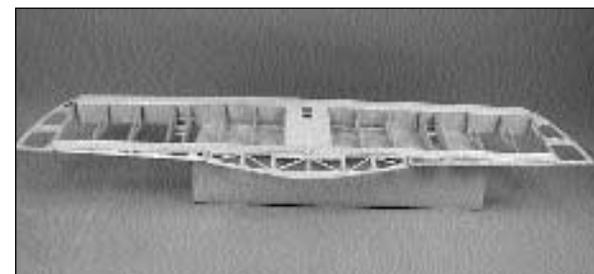
□ □ 7. Repeat steps 1 - 6 for the other wing tip.

Install the aileron and flap hinges

□ 1. If you have been following the instructions you should already have the hinge slots located in the leading edge of the ailerons and flap. Hold the aileron in place on the wing and mark the location where the hinge slots need to be cut into the wing TE. Do this for both aileron locations.

□ 2. If you are making the functional flap, hold the flap in place and mark the location where the hinge slots need to be cut into the wing TE.

□ 3. Cut all of the aileron and flap slots into the TE of the wing.



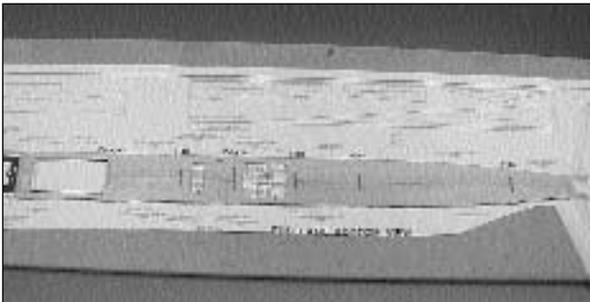
□ 4. Place all of the control surfaces in place with the hinges to make sure that everything is properly positioned. When you are satisfied that everything fits, remove the control surfaces from the wing. Final hinge installation will be done after the covering has been completed.

BUILD THE FUSELAGE

Frame the fuselage

As we go through the next few steps it is important to note that we are building the fuse **upside-down** over the plan.

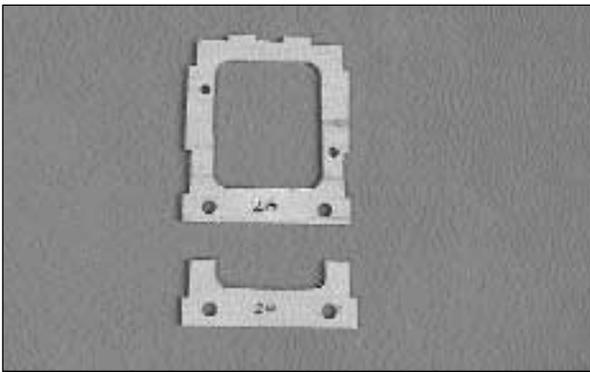
□ 1. Work on a flat surface over the plan. Pin or tape the **fuselage plan** to the building board and cover the plan with Plan Protector.



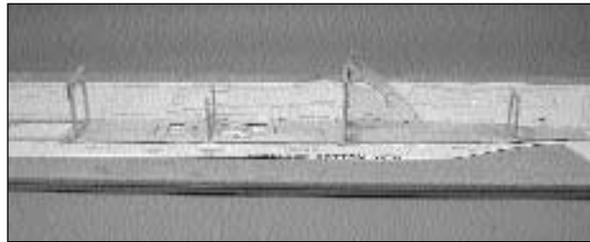
□ 2. Locate the two die-cut 1/8" [3.2mm] balsa **upper fuse deck** halves. Glue them together and then pin them over the fuselage bottom view.



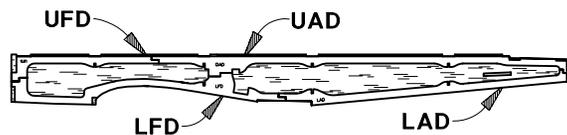
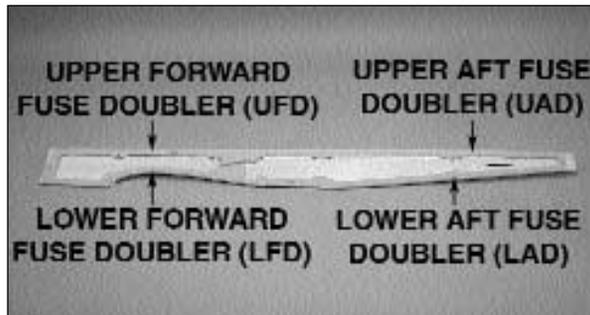
□ 3. Drill a 3/16" [4.8mm] hole in the punch marks on formers **F-2A, F-2B, F-4A** and **F-5A**. These will accommodate the pushrod installation as we build the fuse.



□ 4. Locate the 1/8" [3.2mm] die-cut ply former **F-2A** and **F-2B**. Use 6-minute epoxy to glue **F-2B** to **F-2A**, aligning the 1/4 holes in the formers.

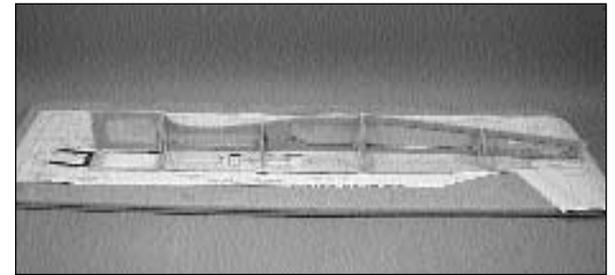


□ 5. Test fit formers **F-2A, F-3A, F-4A** and **F-5A** into the slots in the upper fuse deck with the lettering facing forward. Use a small triangle to make sure the formers are perpendicular to the upper fuse deck, then glue the formers in place.

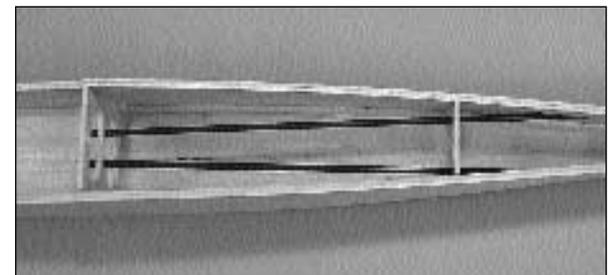


□ □ 6. Locate the die-cut 1/8" [3.2mm] balsa **lower aft fuse doubler (LAD), upper aft fuse doubler (UAD), lower fuse doubler (LFD)** and the **upper forward fuse doubler (UFD)**. Glue them in place on the die-cut 3/32" [2.4mm] balsa **fuselage side**. The doublers should be positioned so the tabs on the front of the doublers are flush with the fuse front. Be sure when you glue the doublers to the fuselage side that you make a **left and right** fuselage side.

□ 7. Repeat step 6 for the other fuselage side.



□ 8. Glue the left fuselage side in place on the upper fuse deck and to each of the fuselage formers. Do the same for the right side of the fuselage.

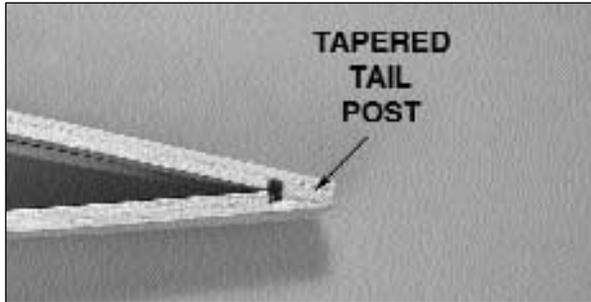


□ 9. Use some 120-grit sandpaper to roughen the plastic **outer pushrod tubes** where they will come in contact with the fuselage formers and the slot in the side of the fuselage. Working from the open fuse bottom, route the tubes through the **F-4A, F5A** and the fuse sides. Make sure both pushrod guides extend 1/2" as shown. The tubes should also protrude at least 1" from the fuse side exits. Glue both pushrod guides to each former and the fuse side.



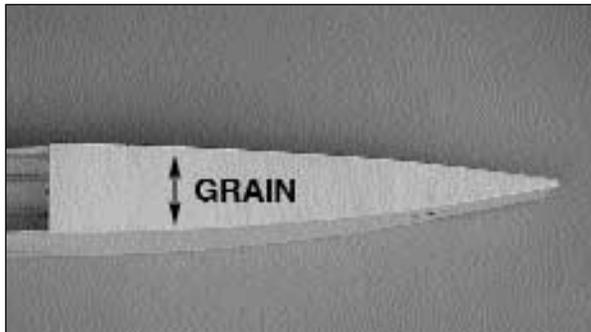
□ 10. Fill any gaps around the outer pushrod guide tubes with a lightweight filler such as Hobbico

HobbyLite™. Allow the filler to completely harden. Trim the protruding pushrod guide tube to within 1/8" from the fuse side. Then with a sanding block and 150-grit sandpaper, sand the pushrod guide tube and filler material flush with the fuse side.



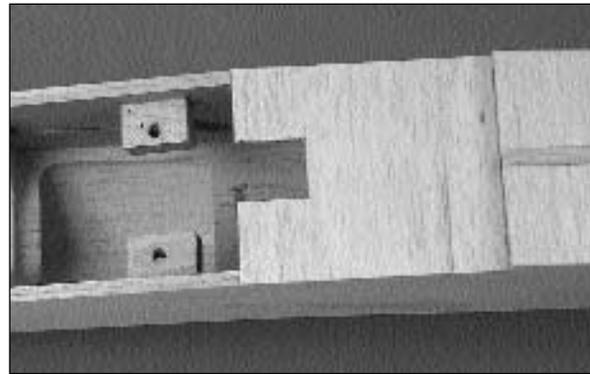
□ 11. Locate the 2" [51mm] long balsa **tapered tail post** and glue it in place at the end of the fuselage. Sand it flush with the top and bottom of the fuse. Sand the edges of the fuse bottom to be flush with the fuse sides.

□ 12. Remove the pins holding the fuselage to the building board.



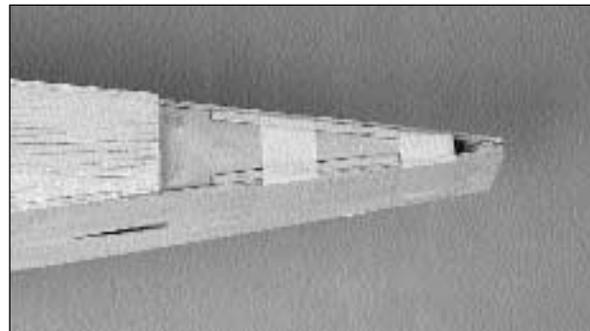
□ 13. Sand the bottom of the fuse smooth. Using 3/32" x 3" x 30" [2.4 x 76 x 762mm] balsa, cut and glue the sheets to the bottom of the fuselage. Cut the balsa so that the grain of the sheeting is running across the fuselage as shown on the plan cross-sections. When you have finished gluing the sheeting in place, sand it flush with the fuse sides.

□ 14. Edge glue two pieces of 3/32" [2.4mm] balsa and cut it to fit the area where the flap rests on the fuselage bottom. Do this even if you are not installing the functional flap.

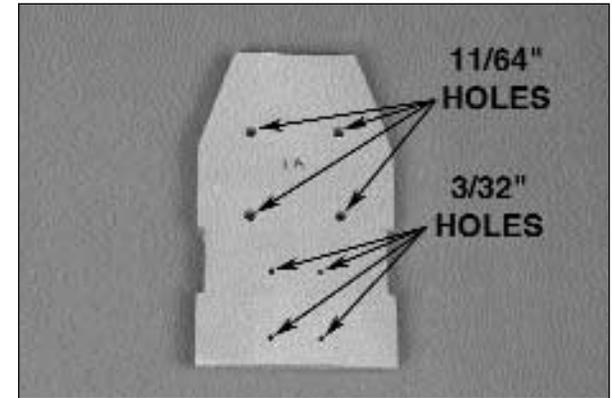


□ 15. If you are installing the functional flap, cut a 3/4" x 1" [19.1 x 25.4mm] slot in the center of the sheeting. This will allow proper clearance for the flap control horn to pass through the sheeting when the flap is deployed.

□ 16. Locate the die-cut 1/8" [3.2mm] ply formers **F-1A, F-1B** and **F-1C**. Use 6-minute epoxy to glue F-1A and F-1B together. Glue F-1C to the back of F-1B, locating the top of F-1C 3/4" from the top of F-1A/F-1B assembly. Set the assembly aside to cure.

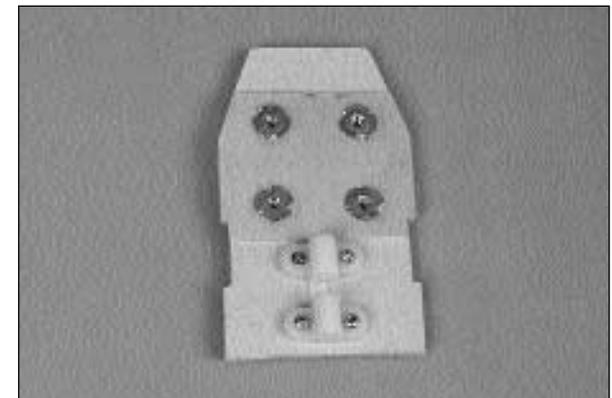


□ 17. Locate the die-cut 1/8" [3.2mm] ply **stabilizer base**. Use 6-minute epoxy to glue it in place at the rear of the fuselage. Use masking tape to hold it in place while the epoxy cures.



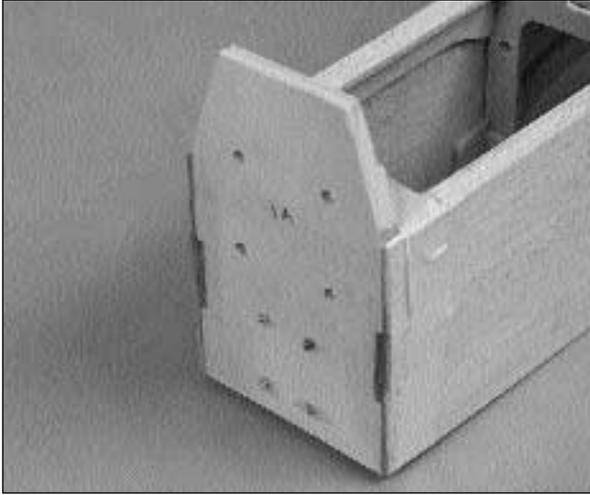
□ 18. Drill four 11/64" [4.4mm] diameter holes at the punch marks on the upper half of the firewall assembly to accommodate the engine mount blind nuts.

□ 19. Drill four 3/32" [2.4mm] holes at the punch marks on the lower half of the firewall assembly to attach the nose gear mount.



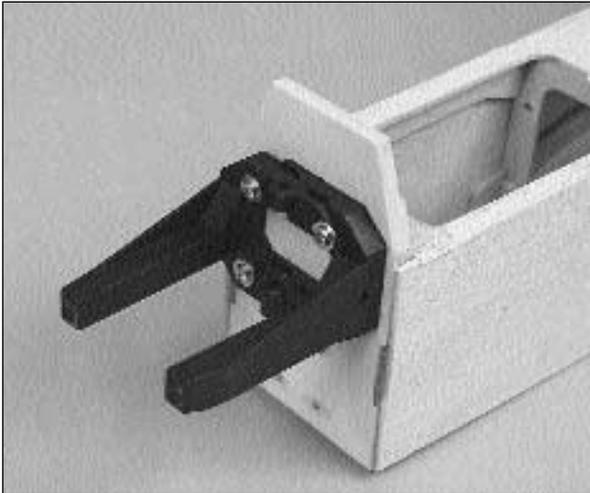
□ 20. On the back side of the firewall, install four 6-32 blind nuts in the 11/64" [4.4mm] diameter holes you drilled. Wick some thin CA under the blind nuts to help secure them to the firewall.

□ 21. Use #4 x 1/2" [12.7mm] sheet metal screws to secure the nose gear mount to the back of the firewall.

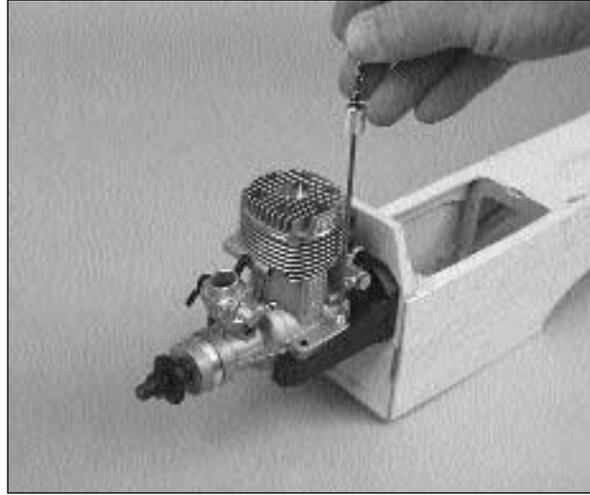


□ 22. Use 30-minute epoxy to glue the firewall in position on the front of the fuselage.

□ 23. Locate a 1/4" x 1/4" x 18" [6.4 x 6.4 x 457mm] basswood stick. Cut the sticks to fit along the firewall and fuselage side as shown on the plan. Epoxy them in place.



□ 24. Locate the **engine mount** and secure it to the firewall with 6-32 bolts and #6 washers. Be sure that the mount is centered on the firewall. Adjust the mount to fit your engine.



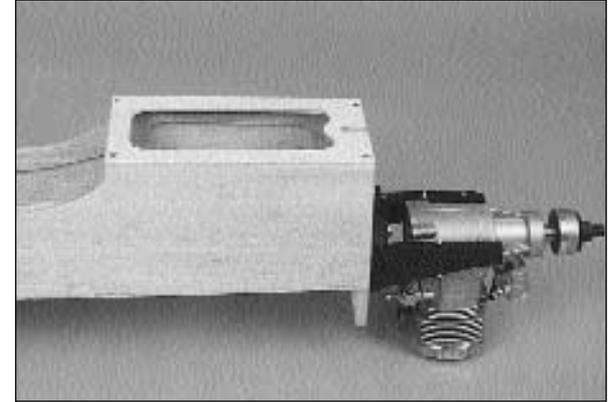
□ 25. Position the engine on the engine mount at the location shown on the plan. Mark the mounting hole locations.

Hint: The Great Planes Dead Center™ tool works great for doing this.

□ 26. Based on the engine you have chosen to put in the airplane, decide on a location for your fuel line, vent line and throttle pushrod to pass through the firewall. Mark the locations, then remove the engine from the mount. Drill a 7/32" hole in the firewall for the fuel and vent line and a 3/16" hole for the throttle pushrod. This would be a good time to install the outer pushrod tube for the throttle.

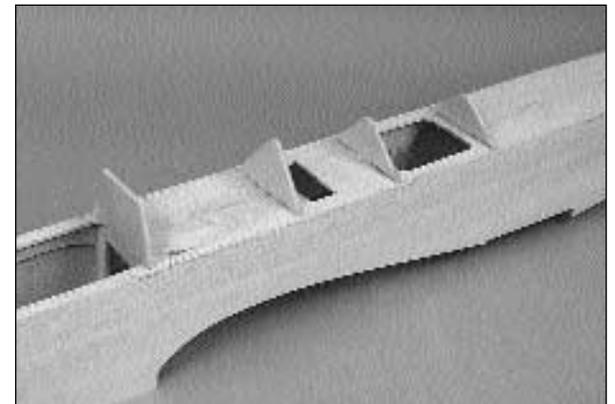
□ 27. Drill 1/8" [3.2mm] pilot holes through the marks you made on the rails of the engine mount. Secure the engine to the mount with four #8 x 1" [25.4mm] sheet metal screws.

□ 28. Install the fuel tank and foam rubber as shown on the plan. Cut some of the leftover 1/4" [6.4mm] balsa sheet into two 1/4" x 1/4" x 3" [6.4 x 6.4 x 76mm] balsa sticks. After positioning the two sticks to secure the tank, glue the sticks in place.

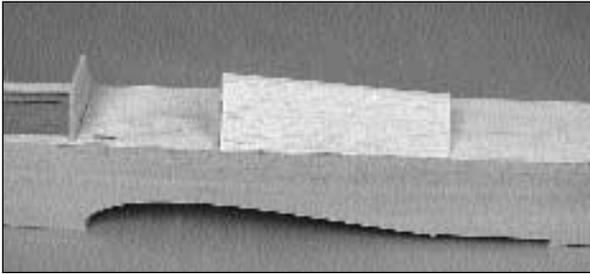


□ 29. Position the die-cut 1/8" [3.2mm] ply **fuel tank hatch** on the bottom of the fuselage. Drill a 1/16" [1.6mm] hole in each corner of the hatch making sure that the holes go into the firewall and F-2. Remove the hatch, then place a drop of thin CA in each of the holes in the firewall and F-2 to make the holes more durable.

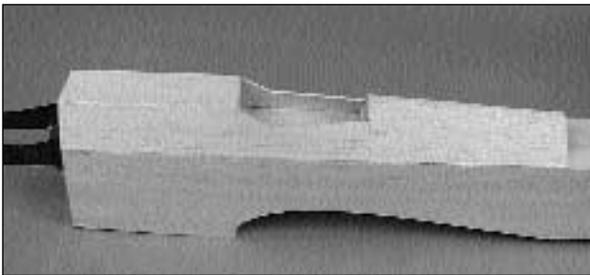
□ 30. Drill 3/32" [2.4mm] clearance holes in the **hatch only**. Use a Dremel #178 bit to countersink the clearance holes. Attach the hatch with four #2 flat head wood screws.



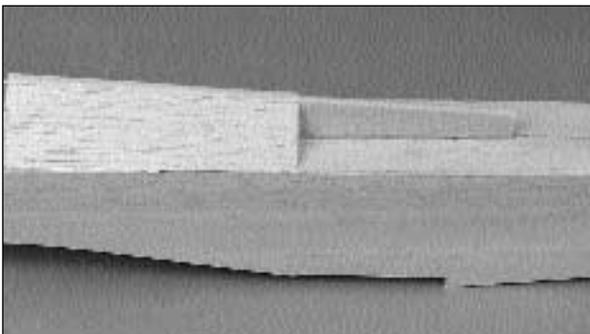
□ 31. Glue formers **F-2C, F-2D, F-3B** and **F-3C** in the slots in the top of the fuselage.



□ 32. Sheet the area between F-2D and F-3C with 3/32" x 3" x 30 [2.4 x 76 x 762mm] balsa sheet. Sheet both sides first and sand them flush with the top of the former, then sheet the top of the former.

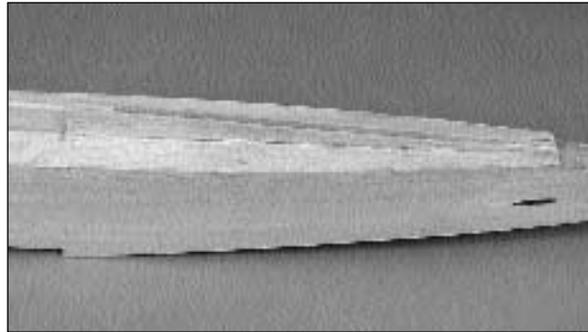


□ 33. Cut the **forward deck sheeting template** from the plan. Cut two forward deck sheets from 3/32" x 3" x 30 [2.4 x 76 x 762mm] balsa sheet. Place the sheet in position from the firewall up to F-2D. When you are satisfied with the fit, glue the forward deck sheeting in place on both sides of the fuselage. Sand the sheeting flush with the top of the formers, then sheet the top with 3/32" [2.4mm] balsa.



□ 34. From 1/4" x 3" x 24" [6.4 x 76 x 610mm] balsa sheet, cut the **forward dorsal fin** using the template

on the plan as a pattern. Place the forward dorsal fin in position behind F-3C. Place the fin assembly in place on top of the fuselage. Make any adjustments needed to the forward dorsal fin to get a good fit to the fin. When you are satisfied with the fit glue the **forward** dorsal fin in place.

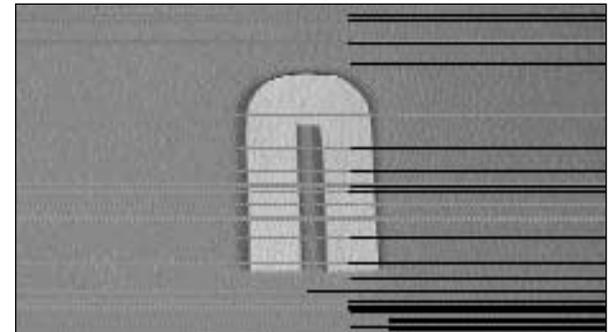


□ 35. Locate the two 1/8" [3.2mm] die-cut **balsa dorsal fin supports**. The fin supports are die-cut except at the very end of the support. Use a hobby knife to finish the cut. These parts support the fin assembly. It is important that when they are in place the supports are exactly 1/4" [6.4mm] apart. Use either the fin assembly or leftover 1/4" [6.4mm] balsa to align and mark the exact position for the fin supports. Glue the fin supports in position. **Do not** glue the fin in position. (The fin is not glued in place until after it has been covered) Note: Refer to the photo at step 2 of "Mount the stab."

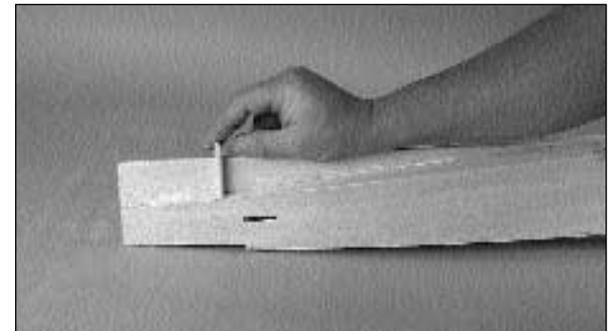


□ 36. After the supports are glued in place, slide the fin assembly between the fin supports. Sand the fin

support to match the dorsal fin, as shown in the above photo. Sand the fin supports to the shape as shown in the cross-section at former F-5.



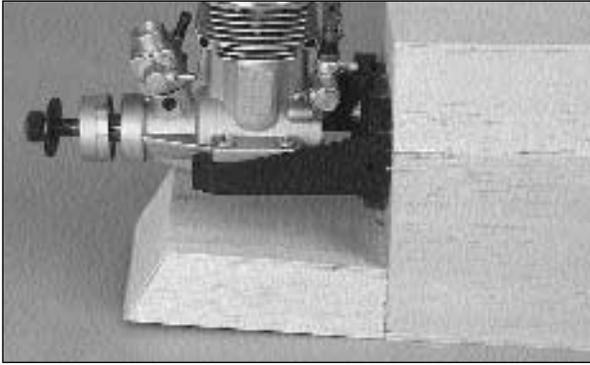
□ 37. Locate the die-cut 1/8" [3.2mm] ply **lower fin guide**. This tool will be used to hold the lower fin perpendicular to the fuselage in the next step.



□ 38. Center the **lower fin** on the bottom of the fuselage. Use the lower fin guide to assure that the lower fin is perpendicular to the bottom of the fuselage. When you are satisfied with the fit, glue the lower fin to the fuselage.

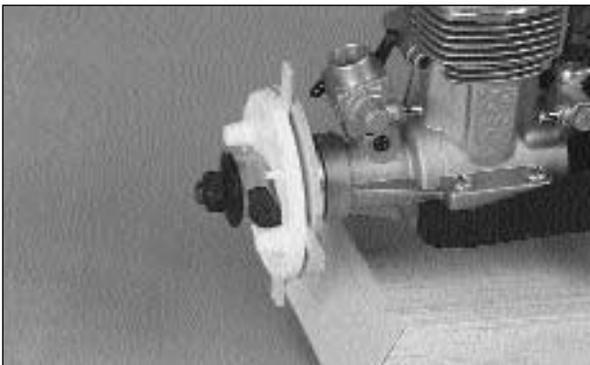
Make the cowl

- ❑ 1. Screw the engine to the engine mount before you perform the next few steps.



- ❑ 2. Cut the 1-1/4" x 3-1/4" x 4-1/2" [32 x 83 x 114.7mm] balsa **cowl bottom** to the shape shown on the plan. Test fit it to the firewall at the location shown on the plan. When you are satisfied with the fit, **tack glue** the block onto the firewall. You will remove this block later.

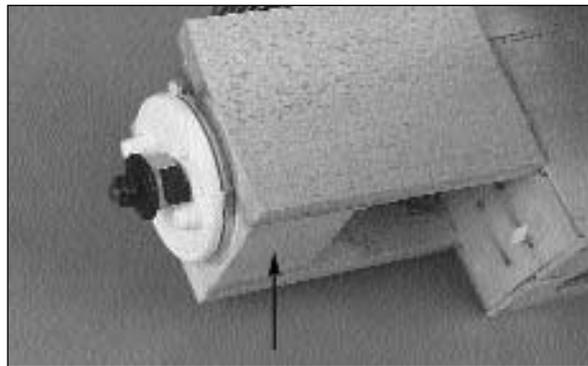
- ❑ 3. Place the 1/8" [3.2mm] ply die-cut **spinner ring** over the engine. Mount the spinner (*not included with the kit*) onto the prop shaft.



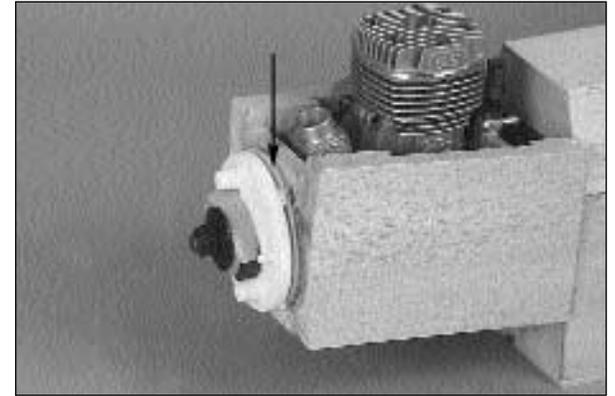
- ❑ 4. Use leftover 3/32" [2.4mm] balsa to make spacers. Tack glue the spacers on the back of the spinner and the front of the spinner ring. This will assure proper placement of the spinner when the cowl assembly is finished.



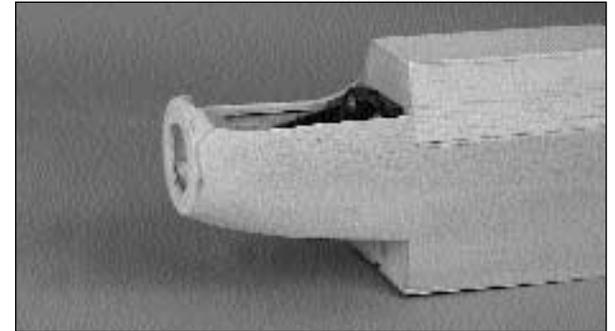
- ❑ 5. From the 1/2" x 3" x 15" [12.7 x 76 x 381mm] balsa block cut two balsa **cowl sides**. Fit them between the firewall and the spinner ring. The cowl sides should make contact with the inside of the spinner ring. **Note:** Depending on the engine you chose for the model, you may find that you are going to have to remove some balsa from the inside of the cowl sides. When we installed the .46 engine the cowl sides required no removal of balsa. With the .61 FX we found we removed a substantial amount of balsa from the inside of the cowl sides. Remove balsa from the inside of the cowl sides as needed for your engine. When you are satisfied with the fit, glue the cowl sides to the firewall and the spinner ring. **Do not** glue the sides to the cowl bottom.



- ❑ 6. After you have glued the cowl sides in position, remove the cowl bottom that was tack glued in position in step 2. Glue a filler block made from leftover 1/2" [12.7mm] balsa on the bottom of the cowl sides as shown on the plan.



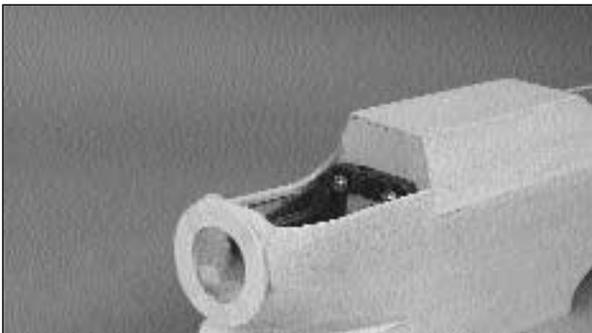
- ❑ 7. Glue a filler block made from leftover 1/2" [12.7mm] balsa between the top of the cowl sides as shown on the plan.



- ❑ 8. Use a razor plane to shape the cowl. Sand the cowl to achieve the final shape.

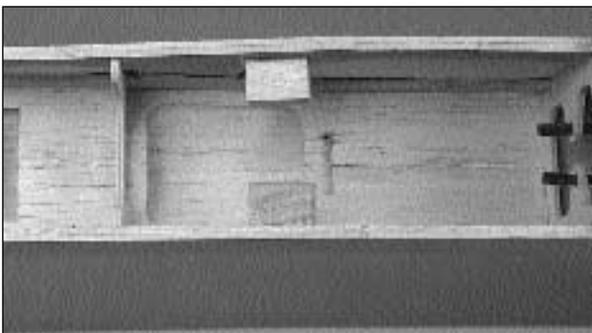


- ❑ 9. Shape the balsa cowl bottom as shown in the photograph. The cross-section of former F-1 also shows the shape of the front of the cowl bottom.



- ❑ 10. After you have finished the final shaping and sanding, glue the cowl bottom in place.

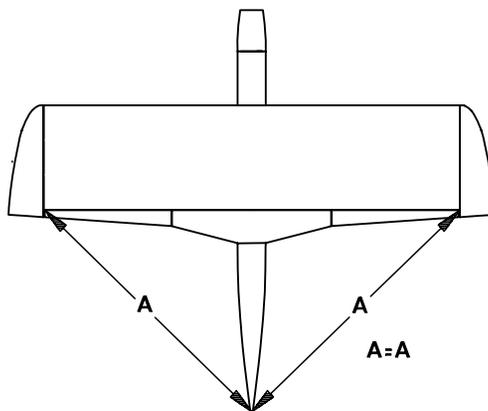
Mount the wing



- ❑ 1. Locate the 1/2" x 3/4" x 1" [12.7 x 19.1 x 25.4mm] maple **wing mounting blocks**. Test fit them into the notches in the fuse doubler. Glue them in place with 6-minute epoxy. Spread a fillet of epoxy around the blocks for a secure bond.

(While you're waiting for the epoxy to cure, jump ahead to page 27, "Prepare the canopy." By the time you are finished cutting and fitting the canopy the glue should be cured well enough to move on to the next step.)

- ❑ 2. Position the wing in the saddle. If any minor sanding needs to be done to get a good fit between the fuselage and the wing do it now.



- ❑ 3. Insert a T-pin in the center of the fuse at the back of the airplane. Place a **Hobbico Retractable Fabric Tape Measure (HCAR0478)** (or any suitable measuring device) over the T-pin and measure the distance from the pin to the left tip rib of the wing and then to the right tip rib of the wing. Adjust the wing until the distance from the pin is the same on both sides.

- ❑ 4. With the plan as your guide, mark the drilling location for the wing bolts on the wing bolt plate.

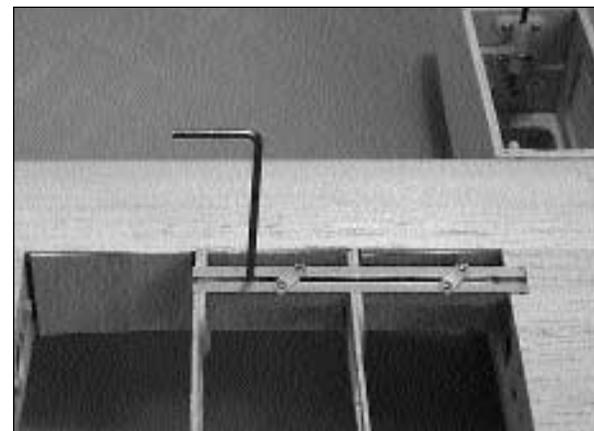
- ❑ 5. When the wing is properly positioned, drill a 1/8" [3.2mm] pilot hole through the locations where the wing bolts will go. Be sure you drill through the wing bolt plate and the two maple blocks. Try to drill straight in, perpendicular to the wing bolt plate.

- ❑ 6. Remove the wing and drill a 17/64"[6.7mm] clearance hole through each of the pilot holes you have drilled in the wing.

- ❑ 7. Use a #10 drill bit (or 13/64") [5.2mm] to drill through each of the pilot holes in the two maple blocks.

- ❑ 8. Use a 1/4-20 tap to tap the threads in the maple wing blocks. After you have the holes tapped, put a couple of drops of thin CA on the threads to strengthen them. Once the glue has cured, retap the holes to clean out any excess glue.

Install the landing gear

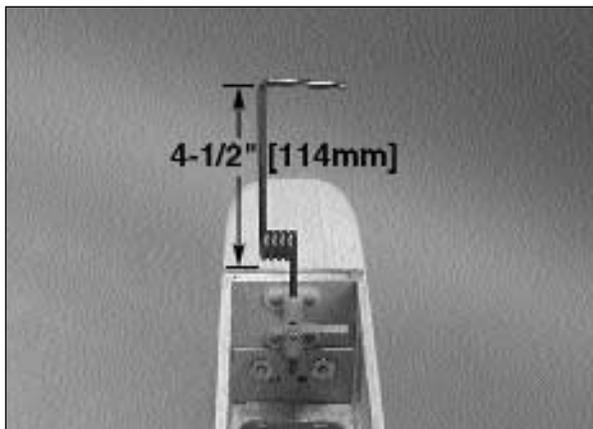


- ❑ 1. Install the 5/32" [4mm] main landing gear in the holes in the landing gear rail. Secure them in place with the nylon **landing gear straps**. Place the straps in position as shown on the plan then drill a 1/16" [1.6mm] hole in the landing gear rails where the straps will be located. Screw the straps in place with #2 x 1/2" [12.7mm] sheet metal screws.



- ❑ 2. Locate the **nylon steering arm**. Shorten the steering arm as shown in the sketch.

- ❑ 3. Insert the 5-32" [4mm] wheel collar into the steering arm. Screw the 6-32 x 1/4" [6.4mm] socket head cap screw into the steering arm assembly.

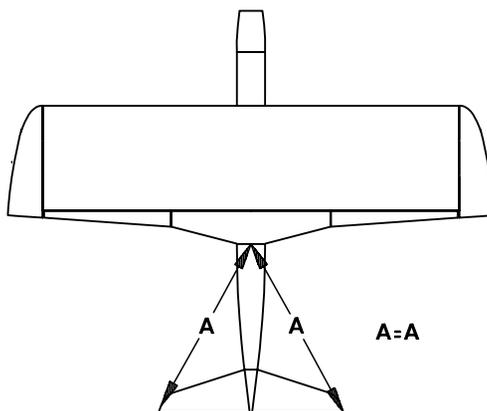


❑ 4. Remove the fuel tank hatch, then place the steering arm assembly between the nose gear mounts on the firewall. Insert the 5/32" [4mm] wire nose gear through the nose gear mount and the steering arm assembly. Measure the length of the nose gear from the bottom edge of the firewall to the center of the axle as shown. This measurement should be 4-1/2" [114mm]. Tighten the screw on the steering arm tight enough to leave a mark on the nose gear wire. Remove the nose gear from the mount.

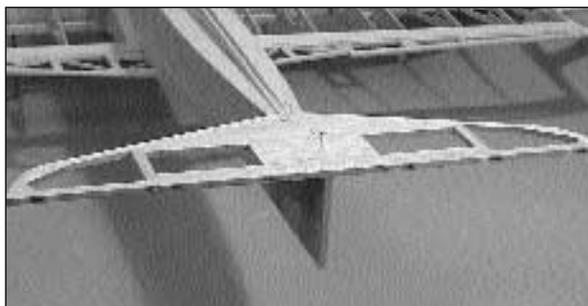
❑ 5. The reason for marking the nose gear wire in the previous step is so you can locate the spot for a flat on the wire. With the mark facing up, clamp the nose gear in a vise and use the side of a flat file to make a flat spot at the mark.

❑ 6. Reassemble the nose gear and install it into the mount. Make sure the steering arm screw is directly over the flat and tighten.

Mount the stab



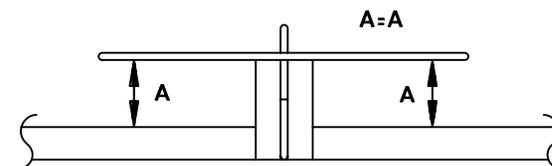
❑ 1. Position the stab on the stab saddle. Measure the distance from the stab tips to the center of the fuselage at F-4A as shown in the sketch. This will assure proper alignment in relation to the wing.



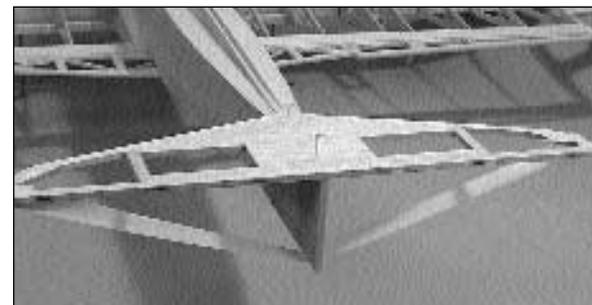
❑ 2. When the stab is in proper position insert a couple of T-pins through the stab and the stab base. This will make it easy to place the stab back in the proper location when the applying the glue.

❑ 3. Check to make sure that the stab is parallel with the wing (see sketch at step 5). Make any adjustments to the stab saddle to assure the stab is parallel with the wing.

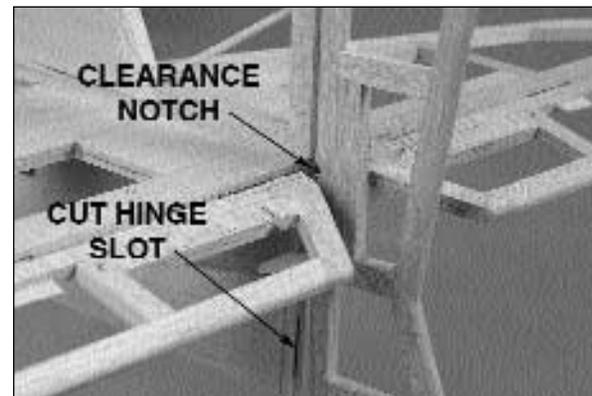
❑ 4. Remove the stab from the saddle but leave the T-pins in place in the stab. Apply epoxy to the stab saddle, then put the stab back in position using the pins as guides.



❑ 5. Before the glue cures make sure that you align the stab to be parallel with the wing as shown in the sketch.



❑ 6. Hold the stab in position with masking tape while the glue cures.



❑ 7. After the glue has cured install the elevator, fin and rudder. Mark the location where the rudder touches the elevator joiner wire. Cut a clearance notch on the LE of the rudder for the joiner wire.

❑ 8. Mark the location on the fuselage for the lower rudder hinge and cut the hinge slot.

INSTALL THE SERVOS AND PUSHRODS

Make the pushrods

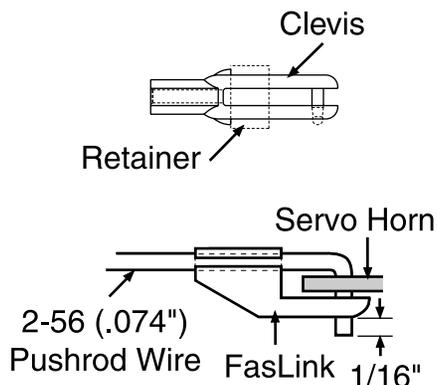


- ❑ 1. Locate the die-cut 1/8" [3.2mm] ply pushrod brackets. Drill a 3/16" [4.8mm] hole through each punch mark.
- ❑ 2. Glue the pushrod brackets to the fuselage sides at the locations shown on the plan.
- ❑ 3. Install the plastic outer pushrod tube in the front half of the fuselage for the steering pushrod as shown on the plan. You may need to remove the fuel tank to get the tube in place.
- ❑ 4. Locate three 2-56 x 36" [914mm] threaded rods. These will be used for the nose gear steering, the rudder and the elevator.

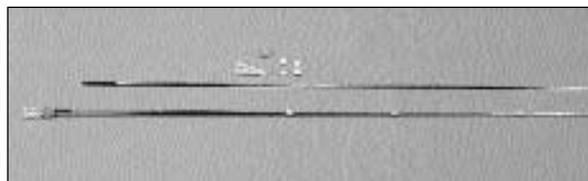
Install the servos in the fuselage

NOTE: Before marking any of the pushrods, connect the servos to the receiver and electronically center each servo.

- ❑ 1. Glue the die-cut 1/8" [3.2mm] ply **throttle servo mount** in place in the fuselage as indicated on the plan.
- ❑ 2. Glue two 1/4" x 1/4" [6.4 x 6.4mm] basswood **servo rails** in place as shown on the plan. The rear rail is glued to the notches in the fuselage doubler. The forward rail is glued to former F-3A.
- ❑ 3. Mount the servos to the rails and the plywood mount as shown on the plan.



- ❑ 4. Slide a silicone retainer onto the rear end of a nylon clevis. Thread the clevis 14 turns onto a 36" wire pushrod (threaded on one end). Slide the pushrod into the elevator pushrod tube until the clevis pin is even with the holes in the elevator control horn. Connect the clevis to the control horn.
- ❑ 5. Assemble a second wire pushrod for the rudder pushrod tube.
- ❑ 6. With the elevator and rudder pushrods connected to the control horns and the elevator and rudder centered, mark the pushrod wires where they align with the servo arms. Remove the pushrods, then trim them about 1" forward of the marks.

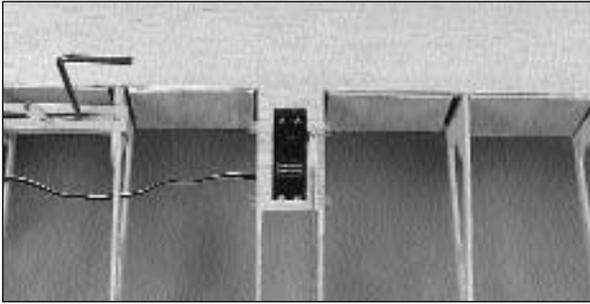


- ❑ 7. Cut ten 1/8" [3.2mm] long pieces from the 12" [305mm] plastic inner pushrod. Slide five bushings onto each pushrod, spreading them out about 2-1/2" apart, from the servo and the end of the pushrod. If the bushings are tight and difficult to slide on, cut them to a shorter length. Check the fit of both pushrods. When you are satisfied with the fit, apply a small drop of thin CA to each bushing to keep them in place on the pushrod. Do not reinstall the pushrods into the tubes until the CA has **completely** cured.

- ❑ 8. Enlarge one outside hole in the elevator and rudder servo arms with a 5/64" bit. Make a 90 degree bend in each of the pushrods at the point that you marked. Cut off the excess wire, leaving about 3/8" after the bend. Remove the clevises, then insert the pushrods all the way into the tubes from the servo end. Reattach the clevises and silicone retainers. Poke the upturned wires through the servo horns and secure them in position with nylon FasLinks™.
- ❑ 9. Locate the .074" x 1" [1.8 x 25.4mm] threaded wire. Screw it into one end of the remaining inner plastic pushrod. Slide a silicone retainer onto the end of a nylon clevis. Screw the nylon clevis onto the threaded wire.
- ❑ 10. Slide the inner plastic pushrod into the throttle pushrod tube. Insert it from the firewall back into the fuselage. Attach the clevis to the throttle arm and fully close the throttle. Position the throttle servo so that it would be in the position that will fully close the throttle.
- ❑ 11. Cut the inner plastic pushrod tube 2" from the throttle servo. Remove the throttle pushrod from the plastic pushrod tube.
- ❑ 12. Screw the .074" x 4" [1.8 x 102mm] wire (threaded one end) onto the end of the plastic inner pushrod tube. Reinsert the pushrod into the throttle pushrod tube.
- ❑ 13. With the throttle pushrod connected to the throttle arm and the servo positioned to close the throttle, mark the pushrod wire where it aligns with the servo arm. Remove the pushrods, then trim them about 1" past the mark.
- ❑ 14. Enlarge one outside hole in the throttle servo arm with a 5/64" bit. Make a 90 degree bend in the pushrod at the point that you marked. Cut off the excess wire, leaving about 3/8" after the bend. Remove the clevis, then insert the pushrods all the way into the tubes from the servo end. Reattach the clevis and silicone retainer. Insert the upturned wire through the servo horn and secure it in position with nylon FasLinks.
- ❑ 15. Repeat step 14 for the steering pushrod.

Install the aileron servos

❑ 1. Install both aileron servos in the servo bays with four servo screws (included with your radio system). Note that we routed the the servo wires out beside the flap servo bay.

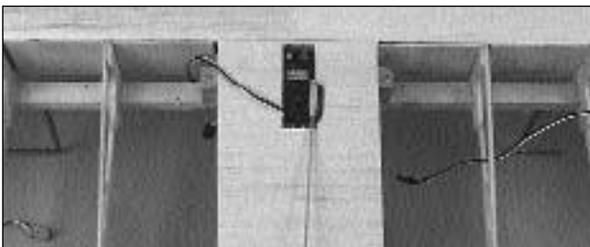


❑ ❶ 2. Locate a 2-56 x 12" [305mm] threaded rod. Attach a clevis and a silicone clevis keeper to the threaded end of the rod. Center the ailerons, then mark the pushrods at the point where they meet the holes in the servo arm. Make a 90 degree bend in the wires. Enlarge the servo horn holes with a 5/64" drill bit. Insert the bent wire pushrods onto the servo horn, then secure them with Faslink pushrod keepers.

❑ 3. Repeat step 2 for the other aileron servo.

Install the flap servo (optional)

❑ 1. If you have chosen to have the functional flap, mount the servo in the servo bay in the center of the wing with four servo screws. Use the transmitter to set the servo arm in the "up" position.



❑ 2. Locate a 2-56 x 12" [305mm] threaded rod. Attach a clevis and a silicone clevis retainer to the

threaded end of the rod. Put the flap in the up position, then mark the pushrod at the point where it meets the hole in the servo arm. Make a 90 degree bend in the wire. Enlarge the servo horn hole with a 5/64" drill bit. Insert the bent wire pushrod onto the servo horn, then secure it with Faslink pushrod keepers.

Install the battery, receiver and switch

❑ 1. Installing the receiver and the battery as shown on the plan should work for most applications. We found in the case of the airplane with a .61 engine that it was nose heavy. With the .46 engine it balanced close to the C.G. We recommend that you check the balance of your airplane before locating the battery and receiver.



❑ 2. The battery switch harness is easily installed through the side of the fuselage with the **Great Planes Switch and Charge Jack Mounting Set** (GPMM1000). Follow the mounting instructions included with the set. (*The mounting set is not included in this kit*)

Prepare the canopy

❑ 1. Use a sharp scissor to cut out the canopy.

❑ 2. Test fit the canopy to the fuselage.

❑ 3. Mask the canopy for painting with Great Planes Flexible masking tape. Mask it along the canopy

frame lines. An alternative to masking tape is to use Hobbico **Master Mask™** (HCAR3410). Simply brush it on, wait for it to dry then cut away the film from the area you want to paint.

❑ 4. Spray paint the canopy frame using the instructions that follow.

Painting Butyrate Canopies with Top Flite LustreKote®.

Top Flite LustreKote is a high quality, fuel proof paint that perfectly matches Top Flite MonoKote. The paint is well suited to putting a high quality finish on ABS but does have a tendency to curl materials such as styrene and butyrate.

Do not paint the clear butyrate canopy or styrene with LustreKote directly from the can, it can cause the plastic to curl. We recommend Formula-U for painting the clear canopy directly from the can or the following procedure can be used for successful results with LustreKote.

The following procedure allows you to airbrush LustreKote with good results. The recommended procedure requires that the paint be sprayed into a jar or plastic mixing cup.

This is best done by spraying the paint through a small brass tube or straw into the jar. For best results spray no more than ½ oz. of paint into the jar at a time. As the propellant "boils off" it will cause the paint to foam slightly. Leave the paint in the open container, stirring every 15 minutes until no more foam appears on the surface of the paint and the paint has warmed to room temperature. This allows the propellant and some of the thinner to evaporate out of the paint. Depending on the amount of paint in the jar, this process may take about 1 hour.

After allowing the propellant to boil off, use an airbrush to spray paint the canopy. If the paint is too thick to spray properly, it can be thinned with a small amount of lacquer thinner. Do not thin with more than 40% thinner. In general about 10% thinner will adequately thin the paint for airbrushing. The paint can also be brushed on, but brushing will not produce the high quality finish of spraying.

If you have any doubt about the material you are painting we suggest that you try painting on a small piece of leftover material to be sure that you are satisfied with the end result.

FINISHING

Balance the airplane laterally

- ❑ 1. Before balancing the airplane make sure you have the engine and all of the radio equipment installed.
- ❑ 2. Mount the wing.
- ❑ 3. With the wing level, carefully lift the model by the spinner and the lower fin at the aft end of the fuselage (this may require two people). Do this several times.
- ❑ 4. If one wing always drops when you lift the model, that side is heavy. Balance the airplane by gluing weight inside the other wing tip. Glue the weight in place with epoxy. An airplane that has been laterally balanced will track better in most maneuvers.

Prepare the model for covering

- ❑ 1. At this stage, there shouldn't be much left to do. We've installed the radio system. All the hinge slots are cut and the control surfaces are all temporarily connected and the engine is mounted. Now is a good time to remove the engine and fuelproof the engine compartment. For fuelproofing, we recommend any kind of fuelproof model airplane paint or brushing

6-minute epoxy thinned with alcohol into the engine compartment. **Note:** You should always fuelproof the model before you cover it. Otherwise, some types of paint may soak through the wood and cause blemishes that may show through the covering.

- ❑ 2. Inspect all surfaces for uneven glue joints and seams that require filler. Apply filler where needed. Many small dents or scratches in balsa can be repaired by applying a few drops of water or moistening the area with a wet tissue. This will swell the wood so you can sand it when it dries.
- ❑ 3. Final sand your entire model with progressively finer grits of sandpaper, finishing with 320 or 400-grit sandpaper.
- ❑ 4. Use a large brush, compressed air or a **Top Flite Tack Cloth** (TOPR2185) to remove dust from the model.

Cover your model with MonoKote

It is assumed that you are an intermediate modeler, so we won't go into many details on covering techniques, but here are some tips you should consider:

1. DO NOT attempt to cut the covering material after it has been applied to the fin and stab, except around the leading and trailing edges. Modelers who do this often cut through the covering and part-way into the balsa stab. This can weaken the stab to the point where it may fail in flight!
2. Use a Top Flite Hot Sock™ for your Top Flite covering iron to minimize dents in the wood from your covering iron. You'll probably go through one or two socks by the time you finish covering your Contender. The Top Flite MonoKote Trim Seal Tool is highly recommended for this model.
3. Some modelers have three irons going at once: one on high heat without a Hot Sock for stretching the covering around curves like wing tips; one on

medium heat with a Hot Sock for bonding the covering to large sheeted areas like the wing ; and a Trim Iron for small areas.

4. Areas that require an extraordinary amount of shrinking (such as the bottom of the fuse at the front) can be successfully shrunk tight with a heat gun. Use a glove to avoid burning you fingers.
5. When covering smaller parts with square edges such as the elevators and ailerons, cover the ends first with separate pieces of covering. Then, all you have to do is wrap the covering around the top and bottom and iron it down.
6. One method we like to use is to "pre-cut" the covering when possible to accurately fit the part, leaving "handles" in curved areas like the dorsal fin and the tip of the wing. Cover the main surface of the part and the straight lines of the leading and trailing edges first. Hold onto the handles as you heat the covering and wrap it around. Cut the handles off when you're done. You can use this method for the wing and stab too.

Covering sequence

Fuse

- ❑ 1. Cover the cowl in pieces. One for the left side of the lower 1/2 of the scoop, one for the right side of the lower 1/2 of the scoop and one for the front of the scoop. Cut another piece for the left side upper half of the cowl and one for the right side upper half of the cowl.
- ❑ 2. Aft fuse bottom
- ❑ 3. Forward fuse bottom
- ❑ 4. One fuse side, then the other (with the two halves joining in the middle of the top)
- ❑ 5. Bottom, then top of elevators
- ❑ 6. Rudder
- ❑ 7. Stab bottoms, then stab tops
- ❑ 8. Fin

Wing

- 1. Bottom left wing tip
- 2. Top left wing tip
- 3. Bottom right wing tip
- 4. Top right wing tip
- 5. Bottom of the wing (one piece)
- 6. Top, one side
- 8. Top, other side
- 9. Bottom, then top of ailerons
- 10. Bottom and top of the flap

Join the control surfaces

After the model has been covered it is time to join the control surfaces. (Read "Important notes about CA hinges" on page 9.)

- 1. Start with the stab and elevators. Remove a small strip of covering from the hinge slots.
- 2. Fit the hinges in the stab or elevators only (without glue).
- 3. Join the elevators to the stab with the hinges.
- 4. Cut a paper towel into approximately 2" [51mm] squares. Add six drops of thin CA to the center of the hinges on both the top and bottom. The tunnels you drilled will wick the CA into the entire hinge surface. Use the paper towel squares to absorb excess CA from the hinge gap before it cures.
- 5. Locate the covered fin assembly. Cut a small amount of the covering away from the bottom of the fin so that you will have some exposed wood. Glue the fin assembly between the dorsal fin supports.
- 6. Use the same hinging method to join the rudder to the fin and the ailerons and flap to the wing.
- 7. Reinstall all the pushrods and mount the control horns to the ailerons and flap. Reinstall any hardware and other components you may not already have in place such as the engine and muffler, fuel tank, servos, on/off switch, fuel filler

valve, etc.

FINISHING TOUCHES

Decals

- 1. Study the photos on the box to decide where to place the decals.
- 2. Thoroughly clean your airplane before you apply the decals.
- 3. Trim the decals as close as practical and carefully apply them to your model. You can float the decals into position by first applying soapy water to the model's surface (just a teaspoon of dish detergent to a quart of water), then squeegeeing out the water and soap with a piece of soft balsa or a credit card wrapped with a tissue. Blot the surface dry and let the decal adhesive cure for at least 12 hours before running the engine.

Panel lines

Though the Contender is not a scale model, panel lines really finish the job and set your model apart from others (besides, they tend to distract the eye from any building imperfections and uneven surfaces—not that your model has any). Study the photos on the box and decide which panel lines to add. There are two methods for adding panel lines. The first method is to use a Top Flite Panel Line Pen (TOPQ2510) with a flexible straightedge. Apply a few strips of masking tape to the back of your straightedge about 1/8" [3.2mm] from the edge to raise it off the surface so the ink won't bleed underneath. Place the straightedge directly on your model and use it as a guide to mark your panel lines. Use the Top Flite Scale Template (TOPR2187) for rivets, hatches, fuel caps and other details. You can make your own templates from thin plastic or cardboard for special areas like hatches. Some cleaners will remove the ink lines, so test your cleaner on the ink before spraying the cleaner on your model. The inked-on panel lines stay well but have to be "freshened up" from time to

time due to spilled fuel or exhaust residue.

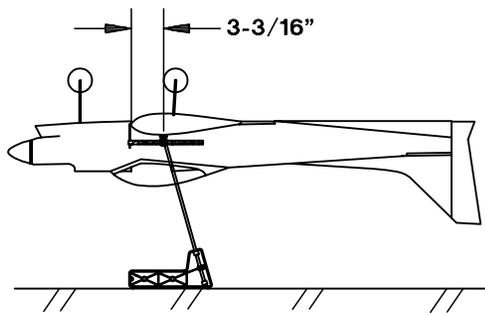
The second method for applying panel lines is to use a **Top Flite SmartStripe™** (TOPR2400) to cut narrow strips of MonoKote film. Iron the panel lines in position. Black or Charcoal MonoKote film is recommended.

GET YOUR MODEL READY TO FLY

Balance your model

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

- 1. Accurately mark the balance point on the top of the wing on both sides of the fuselage. The balance point is shown on the plan (CG) and is located 3-3/16" [80.8mm] back from the leading edge of the wing as shown in the sketch and on the plan. This is the balance point at which your model should be balanced for your first flights. Later, you may experiment by shifting the balance up to 3/8" [10mm] forward or back to change the flying characteristics. If you move the balance point forward it may improve the smoothness and tracking, but your Contender may then require more speed for takeoff and become more difficult to slow and flare for landing. If you move the balance aft it may make your Contender more agile with a lighter feel and allow you to perform more aerobatic maneuvers. In any case, please start at the location we recommend and do not at any time balance your model outside the recommended range.
- 2. All components should be in the model and it should be ready to fly when balancing the model, however the fuel tank should be empty.



□ 3. With the wing attached to the fuselage and an empty fuel tank, lift the model at the balance point or place it on your C.G. Machine™ (shown in the sketch). If the tail drops, the model is tail heavy and you must relocate your battery pack or other components forward or add weight to the nose. If the nose drops, it is nose heavy and you must relocate your battery pack or other components aft or add weight to the tail. In order to save weight, relocate your battery pack and/or receiver or other components before you add additional weight to arrive at the correct C.G. Nose weight may be easily added by using a Great Planes spinner weight or gluing lead weight to the back of the firewall. Tail weight may be added by using Great Planes (GPMQ4485) “stick-on” lead weights. Later if the balance proves to be OK, you can open the fuse bottom and glue these in permanently.

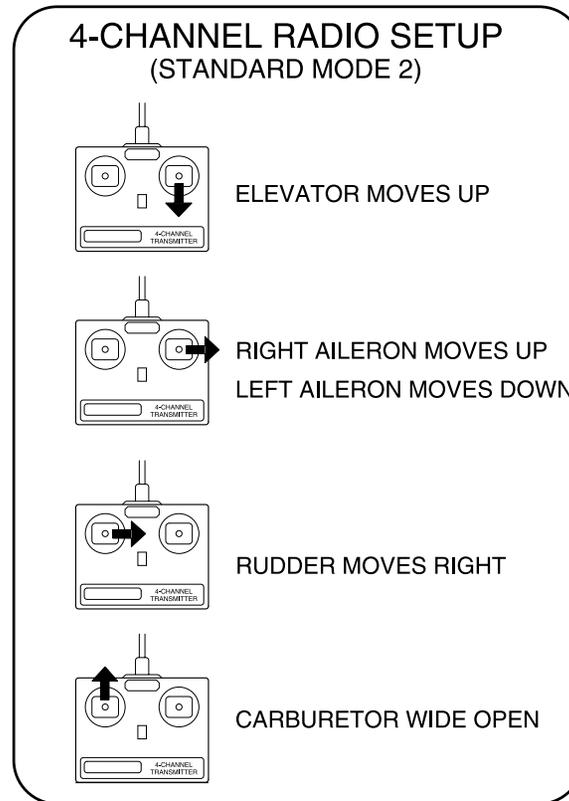
Note: The amount of weight required will depend on the engine, density of the wood provided and how heavily or lightly the tail was built.

Final hookups and checks

□ 1. Take the servo arms off the servos, turn on the transmitter and center all the trims. Reinstall all the servo arms and secure them with the screws.

□ 2. Double-check all the servos and make sure the servo arms are secure and all the clevises have a silicone retainer.

□ 3. Make sure the control surfaces move in the proper direction as illustrated in the following sketch.



□ 4. Adjust your pushrod hookups and set up your radio to provide the control surface movements as follows. Use a ruler or a **Great Planes AccuThrow™ Control Surface Deflection Meter** (GPMR2405) to measure the throws.

The balance point and control surface throws listed in this manual are the ones at which the Contender flies best. Set up your aircraft to those specifications. If, after a few flights, you would like to adjust the throws or C.G. to suit your tastes, that is fine.

Too much control surface throw can make your model difficult to control or force it into a stall, so remember... More is not better.

Control Surface Throws

This is what we recommend starting with when setting up your airplane. After you have flown it a few times feel free to make adjustments to fit your personal flying style.

	Low Rate	High Rate
Aileron	3/8" up 3/8" down [9.5mm]	5/8" up 5/8" down [15.9mm]
(Aileron rate should be measured at the inboard end of the aileron)		
Elevator	3/16" up 3/16" down [4.8mm]	5/16" up 5/16" down [7.9mm]
Rudder	5/8" left 5/8" right [15.9mm]	1" left 1" right [25.4mm]
Flap	1-3/4" down [44mm]	

PREFLIGHT

Identify your model

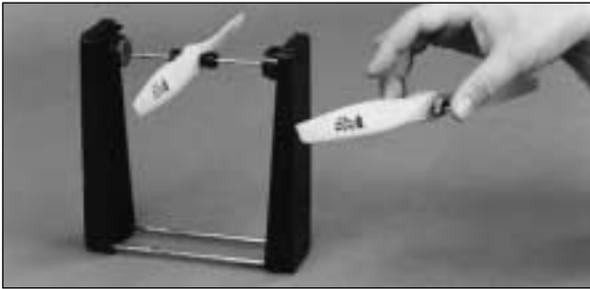
Regardless if you fly at an AMA sanctioned R/C club site or if you fly somewhere on your own, you should always have your name, address, telephone number and AMA number on or inside your model. It is required at all AMA R/C club flying sites and AMA sanctioned flying events.

Charge the batteries

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

Balance the propeller

Carefully balance your propeller before you fly. An unbalanced prop is 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 the fuel to foam, which will, in turn, cause the 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 your model

If you are not thoroughly familiar with the operation of R/C models, ask an experienced modeler to inspect your radio installation and control surface set-up. Follow the engine manufacturer's instructions to break-in your engine. After you run the engine on your model, inspect your model closely to make sure all screws remain tight and your pushrods and connectors are secure.

Range check your radio

Ground check the 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 in your battery pack, or a damaged receiver crystal from a previous crash.

ENGINE SAFETY PRECAUTIONS

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

Store model fuel in a safe place away from high heat, sparks or flames. Do not smoke near the engine or fuel as it is very flammable. Engine exhaust gives off a great deal of deadly carbon monoxide so do not run the engine in a closed room or garage.

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

Always use safety glasses when you operating model engines.

Do not run the engine near loose gravel or sand; the propeller may throw loose material in your face or eyes.

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

Always be aware and very conscious of hand movements and be deliberate in your reach for the needle valve, glow plug clip, or other items near a spinning propeller.

Keep loose clothing, shirt sleeves, ties, scarfs, long hair or loose objects away from the prop. Be conscious of pencils, screw drivers or other objects that may fall out of your shirt or jacket pockets.

Use a chicken stick or electric starter and follow the instructions to start your engine.

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

Ask an assistant to hold the model from the rear while you start the engines and operate the controls.

Make all engine adjustments from behind the rotating propeller.

The engine gets hot! Do not touch the engine during or immediately after you operate it. Make sure fuel lines are in good condition so fuel will not leak onto a hot engine and cause a fire.

To stop the engine, close the carburetor barrel (rotor) or pinch the fuel line to discontinue the fuel flow. Do not use your hands, fingers or any body part to stop the engine. Never throw anything into the prop of a running engine.

AMA SAFETY CODE (excerpts)

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 [120m] within 3 miles [4.8km] 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.

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

5. 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.

FLYING

Takeoff

Take-offs with this airplane are docile and predictable. Accelerate slowly and steer the plane down the centerline. When the plane has sufficient ground speed add a small amount of elevator until the plane leaves the runway.

Flight

The flight characteristics of this plane are very good at all ranges of the flight envelope. Slow speed flight is stable and shows no sign of tip stalling. Stalls are gentle with the nose dropping straight ahead. The roll rate at the low rate is very predictable. Rolling at the high end of the recommended aileron throw will provide a much faster roll rate. As you get used to the plane in the first flight we think you will agree that the plane is stable, predictable and a joy to fly.

If you have installed the flap option we recommend that you get some altitude, decrease the throttle and add the flap. Do some slow flying with the flap down. When power is reduced you should see very little ballooning of the airplane. Flying with flaps should prove to be quite simple even if this is your first airplane with flaps.

Our prototype was powered with the O.S. .40 LA and the .61 FX. These power plants proved to have plenty of power for all maneuvers including loops and hammerheads.

Landing

The sink rate on this airplane is fairly slow, so don't expect it to drop out of the sky when you pull back on the power. We recommend that you make your approach from an altitude that would be typical for most sport airplanes. Reduce the power as you approach the runway threshold then pull off all the power and flair the plane to touchdown.

If you have installed the flap we recommend a slightly different approach for landing. Set your landing approach a little higher than normal, deploy the flap, point the nose at the runway and maintain that approach until you are over the runway. Pull the power off and flair to touch down. With the flaps you will find that the plane comes in very slowly. Be careful not raise the flap during an approach. This could cause an abrupt loss of altitude.

Have a ball! But always stay in control and fly in a safe manner. GOOD LUCK AND GREAT FLYING!

We hope you enjoyed building the Contender. Top Flite has a number of other outstanding .60 size Gold Edition kits. As your next project try the Top Flite Cessna 182 Skylane.



TOPA0300

Top Flite Cessna 182 Skylane

Wingspan: 81 in

Wing Area: 906 sq in

Weight: 10-12 lb

Fuselage Length: 64.4 in

Requires: 2-stroke .61-.91 or 4-stroke .91-1.20 engine, 4-6 channel radio with 5-7 servos & 4+ rolls MonoKote

Among the Gold Edition Cessna's many impressive features, these stand out: It's BIG—the wing spans an IMAA-legal 81". It's accurate—even including ABS plastic strips for control surface corrugation. And though it's not a "quick" building project, it's a lot easier than you'd think! The CAD-engineered, interlocking parts align themselves. Pushrod routing is marked on the fuselage formers to conceal control rods inside the sidewalls. Formed plastic fairings provide smooth lines where the preshaped wood struts join the wing and fuselage. Fairings are also included for the heavy-duty aluminum landing gear.

Top Flite supplies decals and many precision-formed ABS parts, such as wheel pants and cowling (with bowls and clear lenses ready for optional working landing lights).