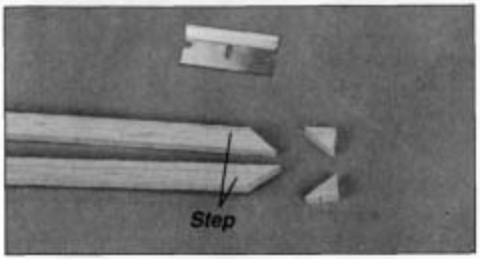
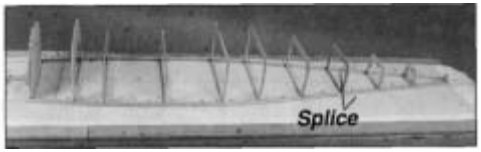
BUILD THE BOTTOM OF THE FUSELAGE



❑ 1. Cut a 45 degree angle at the aft end of two 1/4" x 3/8" x 36" stepped balsa **side stringers** so you can *splice* them onto another stringer later.

❑ 2. Pin the stringers over their location on the plan so the ***step*** is on the bottom and faces the outside of the fuselage. The front end of the stringers should align with the **dashed lines** near the front and extend past the firewall by 1/8". Use plenty of T-pins to hold the stringers down so they conform to the curvature of the plan.

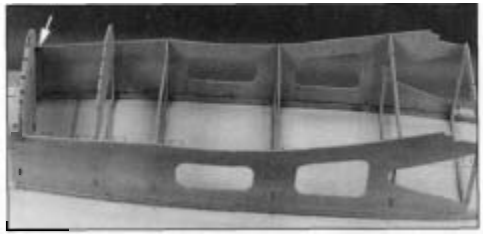
❑ 3. Cut another 1/4" x 3/8" x 36" stepped balsa side stringer in half. Bevel one end of both stringers **to match the angles you cut on the stringers already pinned to the plan.** Pin the stringers to the plan and glue them to the front stringers with thin CA. Trim the ends so they extend past former F11 by approximately 1/8". You can see the *splice* in the following photo.



❑ 4. Position but do not glue formers **F1** through **F11** on the side stringers so the embossed names on the formers face forward. *Are your* 3/76" *pushrod holes drilled?*

❑ 5. Glue formers F2 through F11 to the side stringers, holding them vertical with a 90 degree triangle. Don't be concerned about formers that are slightly warped or twisted–that is normal. You will be able to straighten these formers when you glue the 3/16" stringers to them.

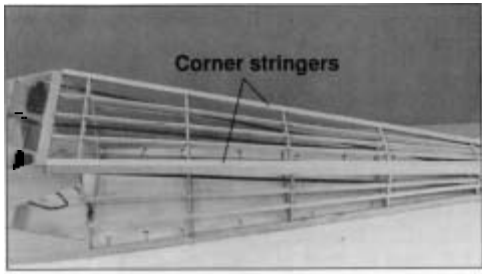
❑ 6. Glue the firewall to the side stringers using the die-cut 1/8" plywood **firewall angle gauge** to hold the firewall at the correct angle.

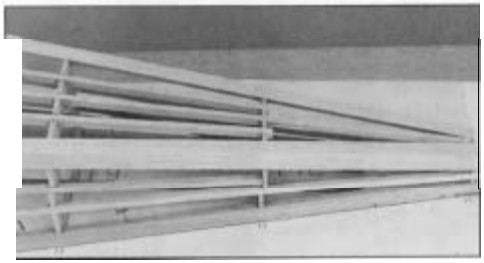


❑ 7. Test fit, then glue the die-cut 1/8" plywood **fuse side doublers** to formers F2 through F6 only and to the side stringers. **Do not** glue the doublers to the firewall until the next step. You may have to reposition some of your T-pins so they do not interfere with the side doublers. Use your 90" triangle to hold the formers vertical while you glue the doublers to them.

❑ ***8.*** Glue the fuse side doublers to the firewall with 30-minute epoxy using the firewall angle gauge to make sure the firewall is set at the correct angle. Use a large C-clamp or masking tape to securely hold the doublers to the firewall until the epoxy fully cures. Cut one 3" long piece from each of the (2) 1/2" x 36" balsa tri stock pieces. Shape the pieces so they fit between the firewall and the fuse sides on both the left and right sides behind the firewall. Glue them in place with 30-minute epoxy.

❑ 9. Locate two of the 24" pushrod tubes. Sand the outside of the tubes so glue will stick. Slide them through the holes in formers F6 through F10 so they extend forward of former F6 by Do not glue the pushrod tubes in place until instructed to do so.





Refer to these photos for the next four steps. Disregard the servos.

10. Glue the 3/16" x 1/2" x 9-7/8" balsa bottom **fuse sheeting support** in position. Sand the ends even with the fuse side doublers. Cut and fit, but **do not glue,** the aft bottom fuse stringers from seven 3/16" x 3/16" x 36" balsa sticks to fit in the notches of the formers as shown on the plan and in the photo. Save the leftover pieces. The three bottom stringers extend to the sheeting support. You can see the stringers in the photo at step 5 page 38.

11. Glue the fronts of the three bottom stringers to the sheeting support, then use your 90 degree triangle to hold each former at the correct angle and glue the bottom stringers to the formers.

❑ 12. Glue the 3/16" x 3/16" side stringers and pushrod guide tubes to the formers.

❑ 13. Cut the bottom **corner stringers** to fit on the formers where shown on the plan from two 1/2" x 36" balsa triangle sticks. Glue the corner stringers in place.

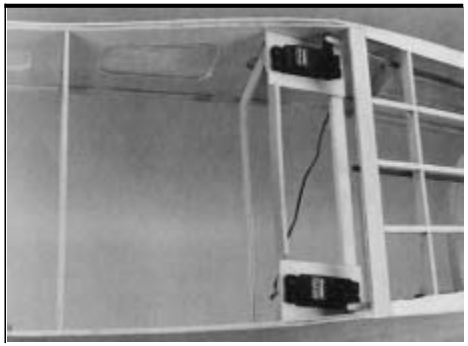
MOUNT THE SERVOS

❑ 1. **Optional:** For routing your receiver antenna out the back of the fuselage, cut a third 3/16" outer pushrod guide tube (not included) to a length of 21". Roughen the outside of the tube with coarse sandpaper (so glue will stick) and slide the tube through the holes in the bottom of the formers until the front extends past former F7 by approximately 1/2". Glue the tube to the formers (this tube is visible in the photo at step 5).

❑ 2. Test fit your servos in the **aft servo trays** (or **ruddervator/elevator** servo trays) to make sure they fit. Glue a servo tray **doubler** to the bottom of the **front** of both trays.

❑ 3. Cut an **aft servo tray rail** from a 1/4" x 3/8" x 36" basswood stick to fit between the fuse sides approximately 1-7/8" aft of former F5 where shown on the plan. It will be helpful if you cut the rail to a length that will provide a *friction fit* between the fuse side doublers so it will temporarily stay in position without using glue. Position the aft servo tray rail between the fuse sides.

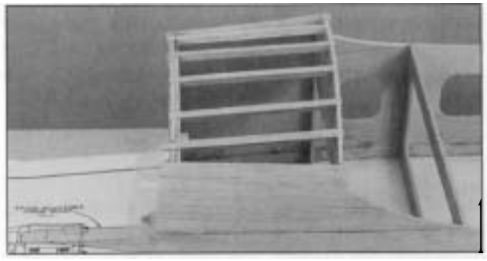
❑ 4. Position your servos into the servo trays and place the trays on the rail and former F5. Temporarily thread two nylon clevises just a few turns onto two 36" one-end threaded pushrods. Install the pushrods into the pushrod guide tubes and connect the clevises to servo arms on your servos.



❑ 5. Position the rail and the servo trays so the servo arms align with the pushrods. Glue the rail and servo trays to former F5 and the fuse sides in this position. Drill 1/16" holes in the servo trays and mount the servos with the screws that came with your radio.

FINISH FRAMING THE FUSE

❑ 1. Refer to the photo in the following step and test fit a die-cut 1/8" balsa **forward fuse doubler** on the right side of the fuse. The front edge of the forward fuse doubler should align with the front edge of the fuse side doubler. Wet the outer surface of the doubler and glue it in place. Be sure that former F2 remains square and flat.



2. Glue the other forward fuse doubler to the left side of the fuselage. Use 3/16" x 3/16" balsa sticks leftover from the aft bottom stringers to make the **forward bottom stringers** that fit in the notches of the firewall and F2. Glue the stringers in place.

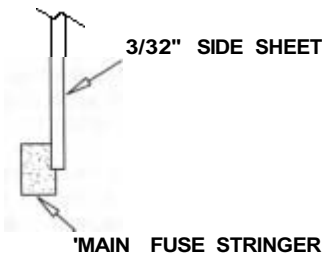
❑ 3. Sand the stringers even with the formers. Sand the fronts of the triangle corner stringers so they blend to the ply side doublers and the bottom sheeting support.

❑ 4. One at a time, remove the T-pins in the main side stringers aft of former F6. Replace them at an angle from the outside so they will not interfere with the side sheeting.

Beech Fact: Walter H. Beech died of a heart attack late in 1950 at the age of 53. During this time the military was evaluating the **YT-34** prototypes for use as a trainer.

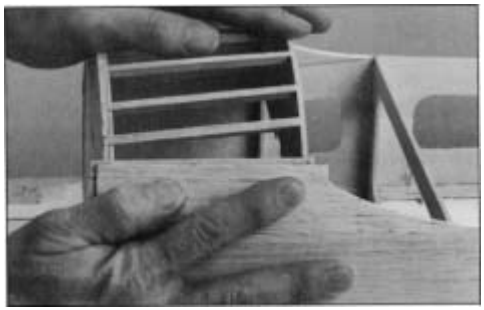
SHEET THE FUSELAGE SIDES

❑ ❑ 1. Glue two 3/32" x 3" x 48" balsa sheets together to make a 6" x 48" **fuse side sheet.** After the glue is dry, sand the sheets so they are flat, even and smooth.



❑ ❑ 2. True one edge of the fuse side sheet. Hold the side sheet on the right fuse side and mark the wing saddle and corner stringer on the sheet. Trim the sheet about 3/16" outside of the lines.

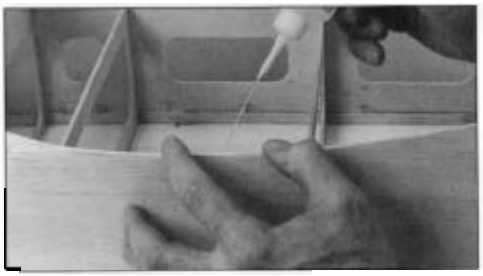
Note: The side sheet will not reach all the way back to the end of the fuselage. We will instruct you to add a piece of leftover 3/32" balsa to the rear later.



❑ ❑ 3. Reposition the side sheet on the fuse. Mark and trim the front bottom of the side sheet 1/8" above the bottom of the balsa front fuse doubler.

❑ ❑ 4 . Test fit the side sheet and make any further adjustments necessary for a good fit.

❑ ❑ 5. Apply a bead of medium CA to the *ledge* portion of the side stringer from the firewall to former F6. Working quickly, position the side sheet on the ledge of the side stringer and press it into position where you have applied the glue. After the CA dries apply thin CA to the side stringer and side sheet aft of former F6 from inside the fuse. A long CA applicator tip, such as the Pacer Z-Ends" with a Teflon@tube, helps you apply the CA just where you need it.



❑ ❑ 6. A little section at a time, carefully pry the fuse side from the fuse side doubler and apply thin or medium CA between the two. Quickly press them together. Do this until the fuse side is thoroughly glued to the side doubler.

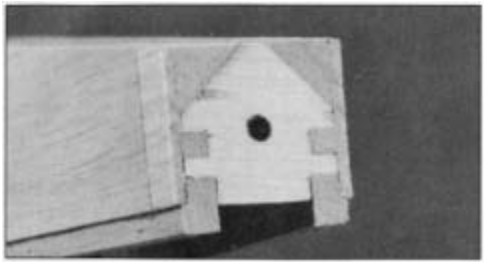
❑ ❑ 7. Glue the fuse side to the side stringers with thin CA and hold them together until the CA cures.

*You can really see how the bottom half of the fuse will remain straight, true and flat **(as** flat as your building board) when you remove it from your building board!*

❑ 8. Return to step 1 and glue another side sheet to the left fuse side the same way.

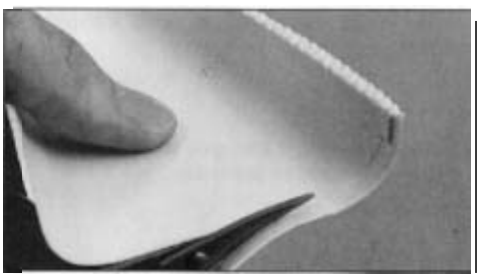
❑ 9. Add pieces of leftover 3/32" balsa to extend the side sheets to the end of the fuselage. See the photo at step 11.

❑ 10. Remove the T-pins and lift the fuselage from your building board. Reinforce glue joints you couldn't reach earlier or those that don't look strong.



❑ 11. Trim, then sand the fuselage side sheeting and stringers that extend aft of former F11 so they are flush.

GLUE THE TAIL CONE TOGETHER



❑ 1. Cut both formed ABS **tail cone halves** along the cutlines. The cutlines can be most easily seen from the inside. We highly recommend a pair of curved Kyosho Lexan Scissors because you can cut straight lines or small tight curves easily and accurately. You could also use a small pair of regular scissors or *score* the plastic along the cutlines with a hobby knife and flex the plastic until the excess breaks free.

❑ 2. True the edges of both tail cone halves with coarse sandpaper and a bar sander. Thoroughly sand the mating surfaces so glue will stick. Carefully glue the tail cone halves together with thin CA. Use just a few drops at a time.

Note: Do not use CA accelerator on any of the ABS plastic. Accelerator may cause the plastic to develop cracks over time and prevent some types of paint from sticking.

❑ 3. Trim the clear plastic **tail lens** to fit on the end of the tail cone. Do not glue the tail lens in place until after you paint the tail cone.

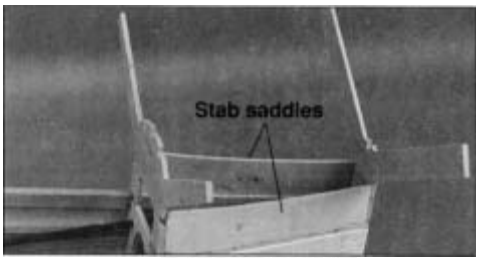
❑ 4. If you are installing a tail navigation light, make an **aft tail cone former** from a piece of leftover ABS plastic and glue it to the rear of the tail cone. Drill a 5/32" hole in the rear of the tail cone for the tail light lens included with the lighting kit. Test fit the tail light.

V-TAIL INSTRUCTIONS

If you are building the straight tail, Skip to *Mount the Sfraight Tail Stab and Fin* on page 45.

MOUNT THE V-TAIL STAB

Note: Build accurately during the next few steps. The stab saddle and the aft formers align the stab and set the incidence, which will greatly affect the way your model flies.



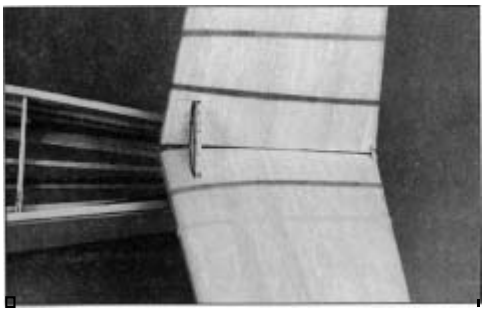
Refer to this photo for the following three steps.

❑ V1. Glue the die-cut 1/8" plywood **aft upper former F11AV** to the aft bottom former F11. Make sure F11AV **accurately** aligns with F11.

❑ V2. Glue the die-cut 1/8" plywood **V-tail stab saddles** to the top of the main side stringers and F11AV. The angle of the aft edge of the stab saddle sets the angle of F11AV (which is 90').

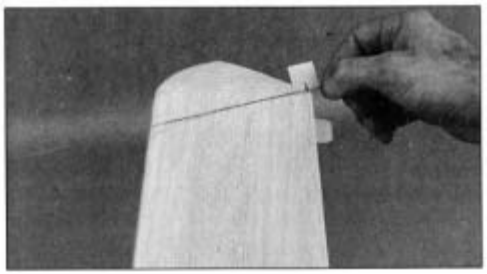
❑ V3. Glue the die-cut 1/8" plywood former **FIOAV** to the top of F10 and the front edge of the stab saddles. F1OAV may be slightly aft of F10.

❑ V4. Test fit the stab halves on the fuse by sliding them onto the *joiner* portion of former FIOAV. Bevel the ends of the stabs as necessary so they fit all the way onto former F1OAV. Bevel the top, inner edge of the stab saddles to match the angle of the stabs but **do not change the incidence angle.** The ends of former F11AV should contact the inboard ends of the stab

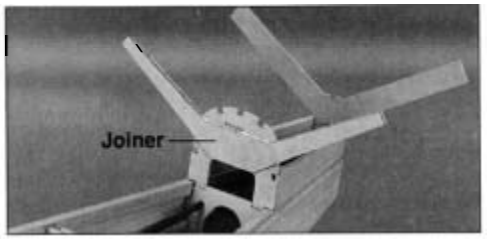


❑ V5. Remove the stab halves. Temporarily position the die-cut 1/16" plywood **V-tail LE doubler** on the front of former FlOAV and test fit the stab again. Make adjustments if necessary so the stab aligns the same as it did in the previous step. Use **#64** rubber bands to temporarily hold the stabs to F11AV.

❑ V6. Insert a T-pin in the **center** of the top of the firewall.

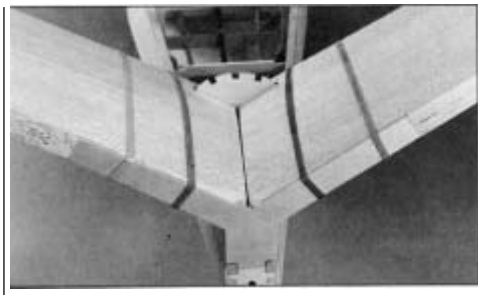


❑ V7. Tie a loop on one end of a 54" piece of string and connect it to the T-pin in the top of the firewall. Put a piece of masking tape with an arrow on it near the other end of the string. Slide the tape along the string and align the arrow with the corner of one of the stab halves. Swing the tape over to other corner on the other stab half. Shift the stab halves and slide the tape along the string until the arrow aligns with the corners on both stab halves. Once you have confirmed that the stabs will align, remove them from the fuselage.



❑ V8. Glue the 1/16" plywood V-tail LE doubler to the front of former F1OAV with 30-minute epoxy. *Study the next three steps before you proceed. Then work quickly and carefully.*

❑ V9. Mix enough 30-minute epoxy to thoroughly coat both sides of the *joiners* on former F1OAV and the insides of the stab halves where they contact the *joiners.* You may add some Great Planes Milled Fiberglass to the epoxy to thicken it and add strength.



❑ V10. Coat both sides of the forward V-tail LE doublers, the front of the rear joiners, the tops of the saddles, the insides of the stab halves where they contact the joiners and the TE of the stabs where they contact the joiners with epoxy. Slide the stab halves into position and use rubber bands to hold them in place. Use the pin and string to align the stab halves and, if necessary, use T-pins or masking tape to hold them in position. Apply a fillet of epoxy where both stab halves meet. Wipe away excess epoxy before it cures and do not disturb the model until the epoxy is fully cured.

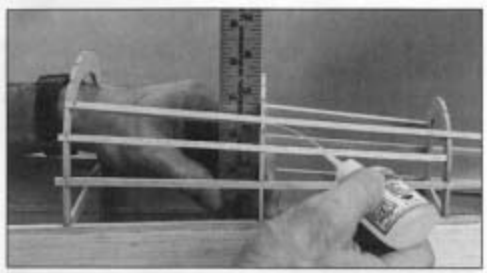
❑ V11. Turn the fuselage over and inspect the glue joints that hold the stab in place. If necessary, add 30-minute epoxy to joints that may not have received enough.

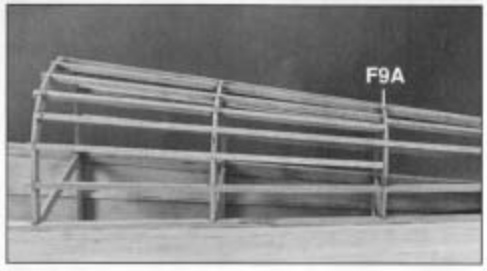
❑ V12. After the epoxy fully cures, sand the joiner portion of flush with the top and bottom of the stabs. Add balsa filler if needed. Sand the filler so it is smooth and matches the contour of the stab sheeting.

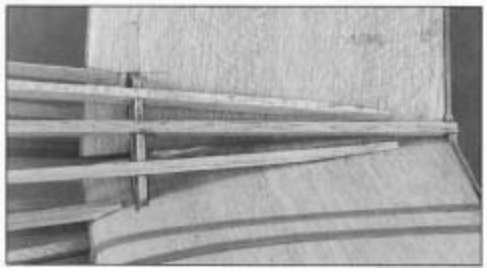
Beech Fact: In the April, 1959 issue of *Fortune Magazine,* the Beechcraft Bonanza was included in the *100 best designs list.* The only other aircraft included in the list was another world famous airplane the Douglas DC-3.

BUILD THE TURTLE DECK

❑ V1. Glue formers **F7A, F8A** and **F9A** to the tops of their respective formers.







❑ V2. Cut the **turtle deck stringers** from six 3/16"x 3/16"x 36" balsa sticks. Trim the aft edge of the stringers that contact the stab so they fit the sheeting. Glue the stringers into the notches of the formers as shown on the fuselage plan and in the photo. Note the arrangement of the stringers at F9A. **Important:** Align the formers with a straightedge as you glue them to the stringers.

❑ V3. Sand the stringers and formers so that they will blend.

❑ ❑ V4. The turtle deck is sheeted with four 1/16" balsa sheets-one sheet on the *bottom* of each side of the turtle deck and one sheet on the *fop* of each side of the turtle deck. Examine the four 1/16 x 3" x *24"* balsa sheets and set the two softest sheets aside to be used for the tops.

❑ ❑ V5. Follow the **Hot Tip** that follows and make the skin for the bottom of the left turtle deck side from one of the 1/16"balsa sheets you selected for the bottom. Use the **bottom turtle deck sheet pattern** on the plan to cut the sheet to the approximate shape.

HOT TIP

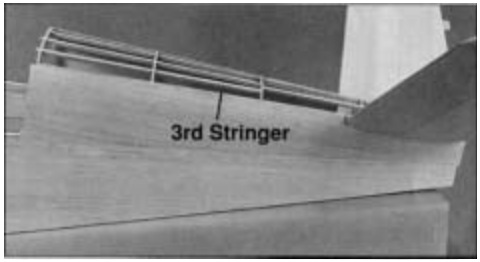
How to use the patterns to make the turtle deck skins

Cut the pattern from the plan. Spray the back of the pattern and **one** of the sheets with 3M 75 Repositionable Spray Adhesive. Press the sheets together and press the pattern onto one of the sheets. Cut the skins along the lines with a sharp #11 blade.

❑ ❑ V6. Test fit the bottom turtle deck sheet and trim where needed. The top edge of the sheet *ends* in the center of the third stringer. If necessary, wet the sheet with a 50/50 solution of alcohol and water so it will bend easier.

Hint: The best way to accurately cut the sheet to fit your model is with careful test fitting, close observation, and removing only **small amounts** of material at a time. When done this way, you will be rewarded with a great looking model even *before* you cover it. Then, sheeting will be your favorite part!

❑ ❑ V7. Glue the bottom turtle deck sheet to the stringers, formers and stab.



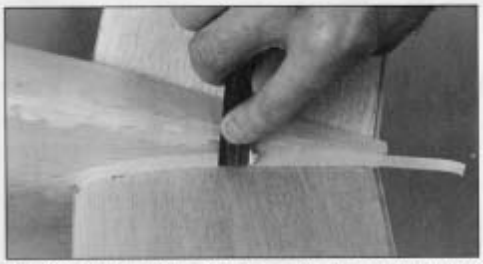
❑ ❑ V8. Fill in the small *wedge* between the bottom turtle deck sheet and the fuse side with a leftover piece of 1/16"balsa.

❑ V9. Sheet the bottom of the turtle deck on the other side the same way.

❑ ❑ V10. Make a **top turtle deck sheet** for the left side of the turtle deck with the **top turtle deck pattern** on the plan and one of the soft 1/16"x 3" x 24" balsa sheets you set aside. Test fit the sheet to the turtle deck and trim where needed.

❑ ❑ V11. Glue the top turtle deck sheet to the turtle deck. Use a paint brush to **liberally** apply a 50/50 mixture of alcohol and water to the sheet (especially from the leading edge of the stab to the end of the sheet). Be patient, bend the sheet a little at a time, and keep applying water and alcohol.

❑ ❑ V12. Sheet the other side of the turtle deck the same way. Fill in the space between the two turtle deck sheets on top near former F7A with a leftover piece of 1/16 balsa.



❑ ❑ V13. Apply hobby filler where needed. Use masking tape to keep filler off the sheeting where it isn't needed. Do not build up a fillet.

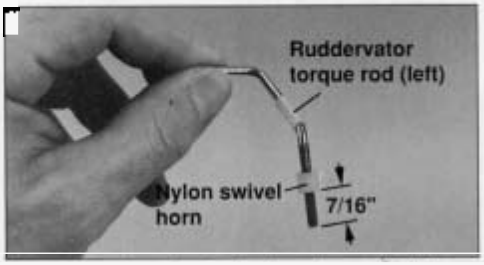
❑ ❑ V14. Trim, then sand the turtle deck sheeting so it is flush with former F7A and F11A. The sheeting at the front should be even with F7A where it meets the *step* on the side stringer.

IMPORTANT NOTE: Some modelers prefer to *sand as they build* instead of waiting until the very end. If you prefer to do a little sanding now to even the turtle deck sheeting with the fuse sides, you may do so but **do not excessively thin** the 1/16" turtle deck sheeting because the ABS **tail cone** and ABS **cabin** have yet to be fitted and must match the sheeting.

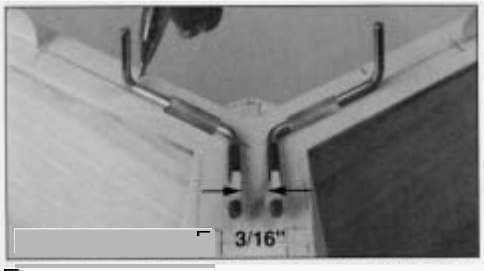
It's beginning to look like a Bonanza, isn't it!

HOOK UP THE RUDDERVATORS

❑ **V1.** Cut the remaining two hinge slots on the TE of the stabilizers. Test fit the ruddervators to the stab with the hinges.

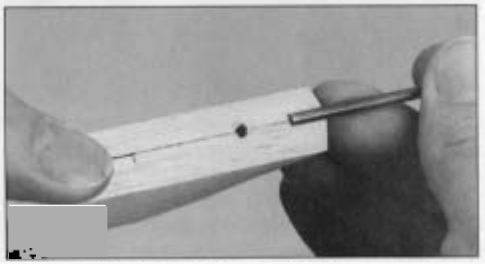


❑ V2. Tap threads into both nylon **swivel** horns with a 6-32 tap. Thread one of the swivel horns onto one of the **ruddervator torque rods** so the bottom of the swivel is 7/16" from the end of the torque rod. Thread the other swivel horn onto the other ruddervator torque rod the same amount. Compare the two torque rods and make sure both swivels are threaded on **the same amount.**



❑ V3. Use a straightedge and a ballpoint pen to *extend* the centerlines on the stab TE until they meet in the center of F11A. Position the torque rods on the centerlines **so** the swivels are 3/16" apart. Accurately mark the location of the *arm* portion of the torque rods (that fit into the ruddervators) on the TE of the stab.

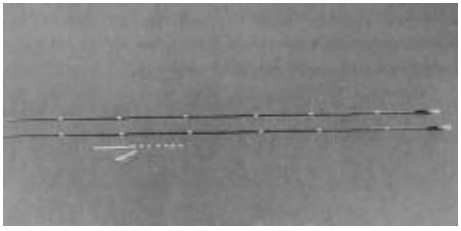
❑ **V4.** Remove the torque rods and fit the ruddervators to the stab with the hinges. Transfer the marks to the LE of the ruddervators.



❑ V5. Drill a 1/8" hole in the **center** of the leading edge of the ruddervators at the marks you made. Cut a groove in the LE's to accommodate the torque rods. Test fit the ruddervators to the stab with the torque rods.

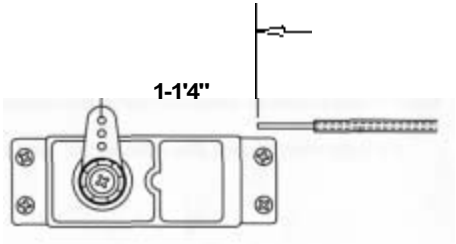
Hint: Use a 1/8" brass tube sharpened at one end to cut the grooves for the torque rods.

❑ V6. Cut away former Fl IAV so the torque rods can move back and forth. Reposition the ruddervators with the torque rods and make sure they do not interfere with former F11AV. It should look something like the photo when you're done.



❑ V7. Cut 7"frOm the non-threaded end of a ,074" x 36" **pushrod wire.** Clean residual oil from the wire with a cloth dampened with alcohol or other solvent. Cut six 1/4" long **bushings** from the white inner pushrod tube, then slide the bushings evenly spaced onto the wire. Make sure the bushings at the ends of the wire will not protrude from the guide tube or the control could become stuck during flight. If the bushings slide onto the wire easily, hold them in place with a drop of thin CA. Make sure the CA cures before you proceed so you do not inadvertently glue the pushrods into the guide tubes! Slide a silicone **retainer** onto a nylon **clevis** and thread the clevis onto the wire about 15 full turns. Make a second pushrod the same way.

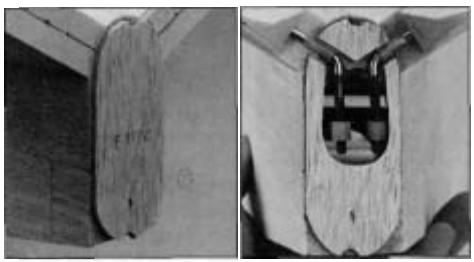
❑ V8. Install the pushrods in the guide tubes. Temporarily connect the clevises to the torque rods and fit the ruddervators to the stab. Place a servo arm on your ruddervator servos.



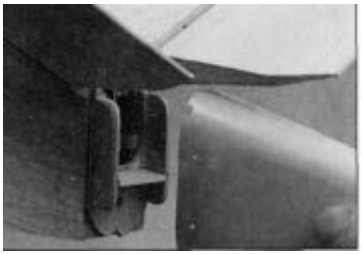
❑ V9. With the servos centered and the ruddervators neutral, use a felt tip pen to mark the pushrods exactly 1-1/4 from the holes in the servo arms. Remove the pushrods from the fuselage. Cut them at the marks you made.

❑ V10. Silver solder a **threaded coupler** onto each wire pushrod. Reinsert the pushrods into the fuselage and thread a nylon clevis onto the couplers. Temporarily connect the pushrods to the servos and ruddervators. Adjust the length of the pushrods if necessary by turning the clevises in or out.

FIT THE TAIL CONE



❑ V1. Glue the die-cut 1/8" balsa tail **cone former** (FIITC) on the end of the fuselage. Remove material as needed to clear the torque rods and pushrods.



❑ V2. Glue the die-cut 1/8" plywood tail **cone mounts** to the tail cone former. Cut U-shaped notches in the **top** of the tail cone to clear the torque rods. Fit the tail cone on the aft end of the fuse and fasten it to the mounts with four #2 x 3/8" screws. **Make sure the screws do not interfere with the ruddervator torque rods.**

❑ V3. After you have fitted the tail cone, skip to ***Sheet the bottom of the fuserage*** on page 50.

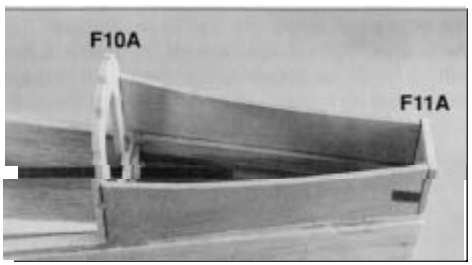
Beech Fact: The F33A, it turns out, is one of the most confusing Bonanzas. This is because there were two versions built. The F33 produced in 1970 was the *short cabin* and the produced in 1971 was the *long cabin* (and is the subject of our Top Flite Gold Edition straight tail). The additional 19 inches of the cabin on the ***33A*** matched the baggage space formerly available only on the V-tail. With this additional new-found cabin space other options, such as six place seating and a larger cargo door, were available. Price of the 33A was $41,600 (back then).

STRAIGHT TAIL INSTRUCTIONS

MOUNT THE STAB AND FIN

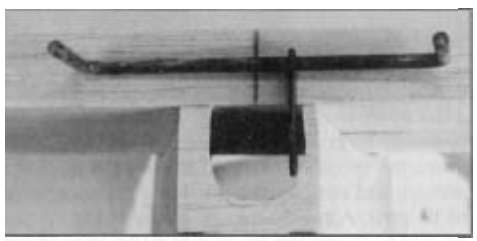
❑ ST1. Glue the die-cut 118" balsa **aft upper former F11A** to former F11.

❑ ST2. Securely glue the die-cut 1/8" plywood **straight tail stab saddles** to the top of the main fuse side stringer and F11A.

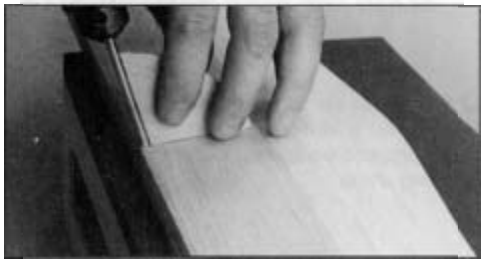


❑ ST3. Glue the die-cut 118" plywood upper former **FIOA** to the top of former F10. Glue the front of the stab saddles to F1OA.

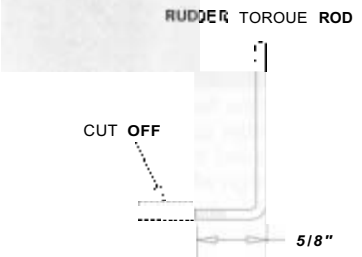
❑ ST4. Use a bar sander with 80-grit sandpaper to sand the front of the stab so the TE will align with F11A.



❑ ST5. Use a hobby knife or a Multi-Pro with a sanding drum to cut F11A to clear the horn on the elevator joiner wire and the rudder torque rod.



❑ ST6. Mark the **center** of the stab 1/8 from the TE. Use the die-cut 1/8" plywood **rudder torque rod drill guide** to drill a 3/16" hole through the center of the stab at the mark. Make sure you drill from the **top** of the stab. **Hint:** A 6" piece of 3/16 brass tube sharDened at one end cuts a clean hole.



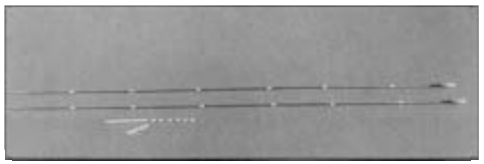
❑ ST7. Cut the threaded end of the **rudder torque rod** so the threads extend 5/8" as in the sketch. Tap threads in the ,nylon **swivel horn** with a 6-32 tap. Thread it onto the rudder torque rod until it is even with the end.

❑ ST8. Insert the rudder torque rod through the hole from the bottom of the stab. You'll have to force it a little because of the bend in the wire.

Beech Quote: "The Beechcraft Bonanza is a masterpiece of engineering; it's an airplane that constitutes a modern miracle of aeronautical design; and in our opinion, marks a new milestone in the progress of aviation."

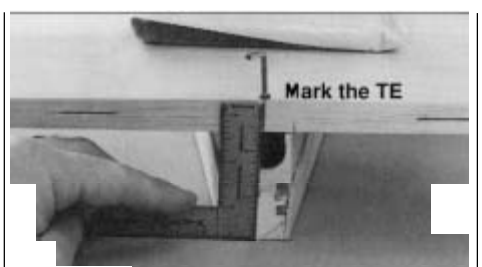
–Walter H. Beech
August 1, 1946

CENTER THE STAB



❑ ST1. Cut 7" from the non-threaded end of a ,074" x 36" **pushrod wire.** Clean residual oil from the wire with a cloth dampened with alcohol or other solvent. Cut six 1/4" long **bushings** from the white inner pushrod tube, then slide the bushings evenly spaced onto the wire. Make sure the bushings at the ends of the wire will not protrude from the guide tube or the control could become stuck during flight. If the bushings slide onto the wire easily, hold them in place with a drop of thin CA. Make sure the CA cures before you proceed so you do not inadvertently glue the pushrods into the guide tubes! Slide a silicone **retainer** onto a nylon **clevis** and thread the clevis onto the wire about 15 full turns. Make a second pushrod the same way.

❑ ST2. Connect one of the pushrods to the nylon swivel horn on the rudder torque rod and slide the pushrod into the rudder pushrod guide tube in the fuselage. Position the stab on the stab saddle. Place a weight on top of the stab to hold it in place.



ST3. Align the TE of the stab with the center of former F1 1. Mark the TE of the stab above the stab saddles.

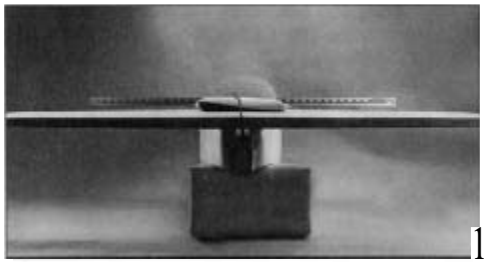
❑ ST4. Insert a T-pin in the **center** of the top of the firewall.

❑ ST5. Tie a loop on one end of a 54" piece of string and connect it to the T-pin in the top of the firewall. Put a piece of masking tape with an arrow on it near the other end of the string. Slide the tape along the string and align the arrow with the corner of one of the stab halves. Swing the tape over to the other corner on the other side of the stab. Shift the stab and slide the tape along the string until the arrow aligns with both corners of the stab.

❑ ST6. Mark the LE of the stab where it aligns with former F1OA.

ALIGN THE STAB HORIZONTALLY

❑ STI. Place two clothespins on the top of former F4 and rest a straightedge on the top of the fuse sides, propped up against the clothespins. See the following photo.

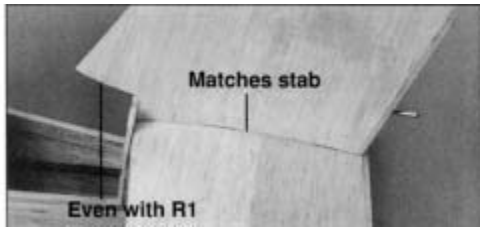


❑ ST2. Stand behind the fuselage and view the stab and the straightedge to see if they align. If necessary, carefully sand one side of the stab saddle so the stab will align with the straightedge.

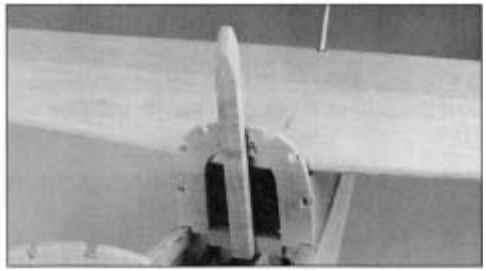
❑ ST3. Move the rudder pushrod wire back and forth to make sure the clevis and horn do not interfere with the fuse sides and the rudder torque rod can move freely. If necessary, adjust the pushrod wire or the *clearance slot* in the stab saddle. **There must not be any possibility of binding here.**

❑ **ST4.** Use 30-minute epoxy to glue the stab to the saddle. Place the stab on the saddle so the marks you made earlier align. Before the epoxy cures, confirm alignment once more using the *pin and string* technique. Do not proceed until the epoxy has fully cured.

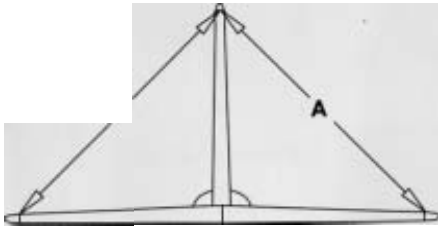
MOUNT THE FIN



❑ STI. Trim the sheeting on the bottom of the fin until it matches the top of the stab. Make sure you trim both sides evenly so the fin sits vertical. Trim the fin sheeting in front of former F1OA so it is even with fin rib R1 as shown in the photo. R1 of the fin should rest on former F10 and the rear of the stab.

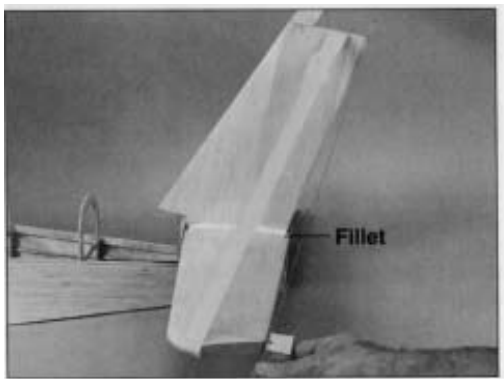


❑ ST2. With the fin on the stab, place the basswood fin post on the front of F1OA and slide it up into the fin until it hits the LE. Hold the fin post in position and remove the fin. Mark the location of the fin post. Apply 30-minute epoxy to the fin post and FIOA. Clamp the fin post to FIOA aligned with the marks you made. **Be certain the fin post is vertical and is centered on former FIOA.** The fin post aligns the front of the fin with the fuselage.



A=A

❑ ST3. After the epoxy cures, position the fin on the fin post and confirm that the fin remains vertical. Make adjustments if necessary. Use the *pin and string* technique or a ruler to measure the distance between the tip of the fin and the stab tips.



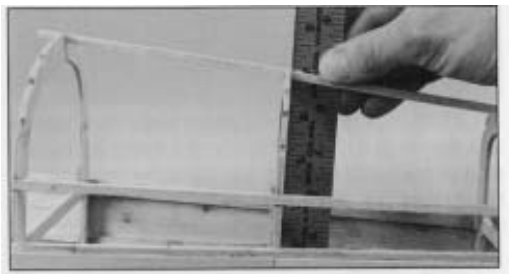
❑ ST4. Glue the top of the fin post to the inside of the fin with 30-minute epoxy and milled fiberglass or microballoons (so all the epoxy won't run down to the bottom of the fin). Glue the base of the fin and fin sheeting to the stab with 30-minute epoxy. Make sure the TE of the fin is **centered** over former F11. Apply a small fillet of epoxy between the stab and the fin sheeting. Use masking tape to hold the fin until the epoxy is fully cured.

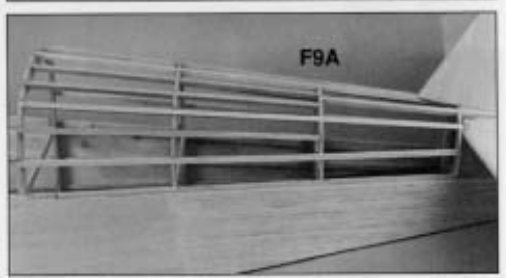
itor and temporarily hook up the pushrods. Make sure you can move the controls without any interference or binding. Make adjustments if necessary.

The twin engine Model 18 was being produced for the military in a variety of configurations. But as unpatriotic as it may have seemed at the time, one had to think ahead to postwar years. The twin would certainly continue but the Model 17 Staggerwing was a question mark–the biplane was on its way out. The trend was continuing toward all metal, light planes (started by Luscombe as early as 1934). **At** Beechcraft, design work on a new model was to be done on a voluntary, overtime basis. After much careful study of the market to find out what type of plane to build, and after hours of design, wind tunnel and static testing, on December 22, 1945, the first Bonanza was on its maiden voyage ilown by test pilot Vern Carstens.

BUILD THE TURTLE DECK

❑ ❑ ST1. Glue formers **F7A, F8A** and **F9A** to the tops of their respective formers.



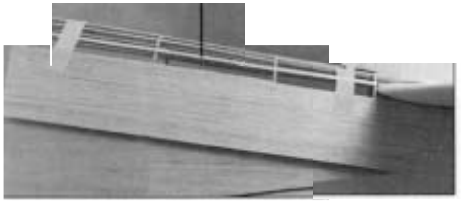


❑ ❑ ST2. Cut the **turtle deck stringers** from seven 3/16" **x** 3/16" **x** 30" balsa sticks. Glue the stringers into the notches of the formers as shown on the fuselage plan and in the photo. Note the arrangement of the stringers at F9A.

Important: Align the formers with a straightedge as you glue the stringers to them.

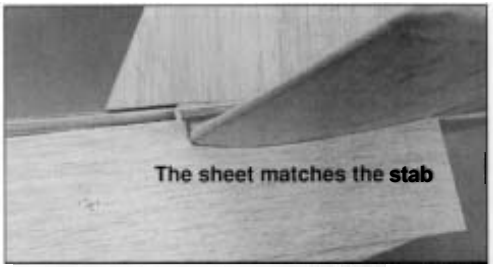
❑ ❑ ST3. Sand the stringers and formers so they blend together.

❑ ❑ ST4. The turtle deck is sheeted with four 1/16" balsa sheets – one sheet on the bottom of each side of the turtle deck and one sheet on the top of each side of the turtle deck. Examine the four 1/16" x 3 x 2 4 balsa sheets and set the two softest sheets aside to be used for the top.



❑ ❑ ST5. Cut one of the bottom turtle deck sheets to a length of 21-1/2". Position the sheet on the left side of the turtle deck so the top edge contacts the bottom of the stab and is parallel to the third stringer from the bottom as shown in the photo.

❑ ❑ ST6. Use a ballpoint pen to mark the bottom of the stab onto the sheet. Remove the sheet and cut along the line you marked.

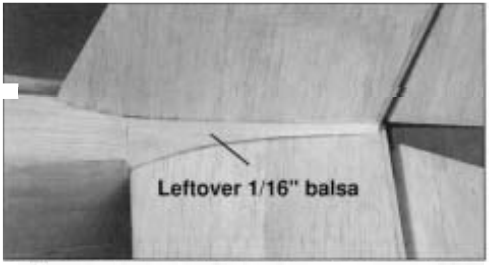


❑ ❑ ST7. Reposition the sheet. Mark and cut it along the line. Do this until the sheet accurately matches the bottom of the stab.

❑ ❑ ST8. Fill in the small *wedge* between the turtle deck side sheet and the fuse side with a leftover piece of 1/16" balsa. See the following photo.

❑ ❑ ST9. Trim the top of the sheet so it *ends* in the center of the third stringer. Trim the bottom of the sheet so it matches the top of the fuse side. Glue the sheet in position.

❑ ❑ ST10. Trim another 1/16" **x** 3" **x** 24" balsa sheet to fit between the bottom turtle deck sheet and the top, **center** stringer. Trim the aft end of the sheet so it fits the fin and ends at former FIOA. Glue the sheet in position. Make a *wedge* from a 1/16 leftover piece of balsa to fit between the two turtle deck sheets in the front.



❑ ❑ STI 1. Fill most of the space between the fin and the stab with a leftover piece of 1/16" balsa.

❑ ST12. Sheet the right side of the turtle deck the same way. Add the *partial fillet* between the fin and the stab.

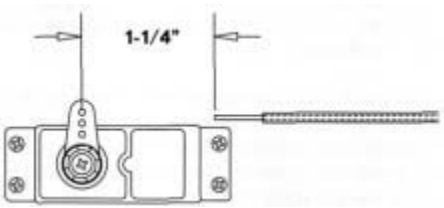
❑ ST13. Trim, then sand the turtle deck sheeting so it is flush with former F7A and A. The sheeting at the front should be even with F7A where it meets the *ledge* on the side stringer.

IMPORTANT NOTE: Some modelers prefer to *sand as they build* instead of waiting until the very end. If you prefer to do a little sanding now to even the turtle deck sheeting with the fuse sides, you may do so but **do not over-thin** the 1/16 turtle deck sheeting because the ABS **tail cone** and ABS **cabin** have yet to be fitted and must match the sheeting.

HOOK UP THE RUDDER AND ELEVATOR

Note: As on the full size Beechcraft, the elevators and rudder can touch, but the rudder throw will be set so that this does not happen during flight.

❑ ST1. Install the pushrods in the guide tubes. Temporarily connect the clevises to the rudder control horn and fit the rudder and elevator in place.

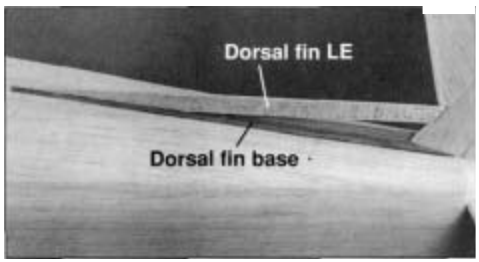


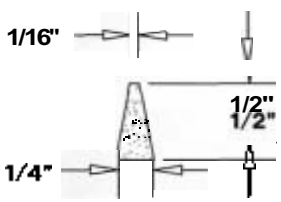
❑ ST2. Place a servo arm on your rudder and elevator servos. With the servos centered and the rudder and elevators neutral, use a felt-tip pen to mark the pushrods exactly 1-1/4" from the holes in the servo arms. Remove the pushrods from the fuselage. Cut them at the marks you made.

❑ ST3. Silver solder a **threaded coupler** onto each wire pushrod. Reinsert the pushrods into the fuselage and thread a nylon clevis onto the couplers. Temporarily connect the pushrods to the servos and rudder and elevator. Adjust the length of the pushrods if necessary by turning the clevises in or out.

BUILD THE DORSAL FIN

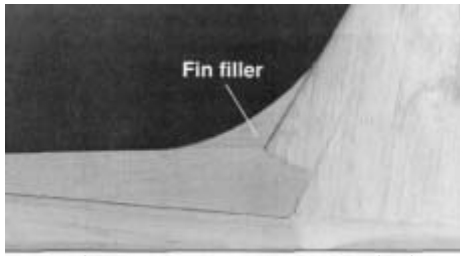
❑ ST1. Use the pattern on the plan to make the **dorsal fin base** from leftover 1/16" balsa. Glue the dorsal fin base to the top of the turtle deck. Make sure the front of the base is **centered** on the fuse centerline.





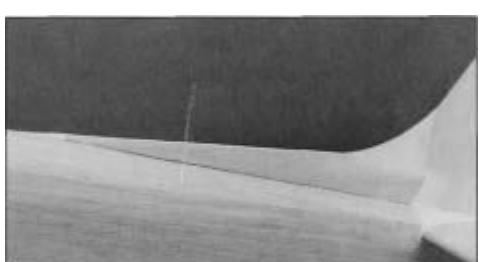
❑ ST2. Cut the 15" tapered balsa **dorsal tin LE** to the shape shown on the plan. Glue the dorsal fin LE to the fin LE and the dorsal fin brace.

❑ ST3. Make two **dorsal** fin sheets from leftover 1/16" balsa sheeting and pattern on the plan. Test fit and glue one of the sheets to the turtle deck and dorsal fin base. Wet the sheet and glue it to the dorsal fin LE. Make sure you do not pull the dorsal fin LE off to one side when you glue the sheet to it. Glue the other dorsal fin sheet in position.



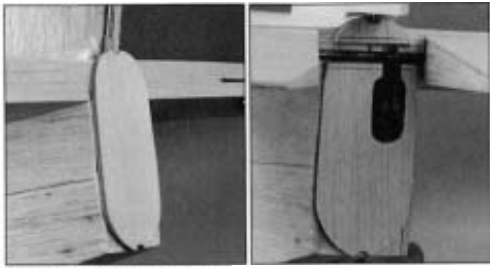
❑ ST4. Glue the 1/16" die-cut plywood **fin filler** to the dorsal fin and fin.

❑ ST5. Apply Hobbylite filler to the dorsal fin and fin filler to blend them to the fin. Apply filler to the front of the dorsal fin to complete the taper and blend it to the turtle deck. Do not apply all the filler in one application but build up thin layers, allowing each layer to fully dry before you apply the next.



❑ ST6. Sand the fillet, blending the dorsal fin, fin filler and fin into one smooth contour.

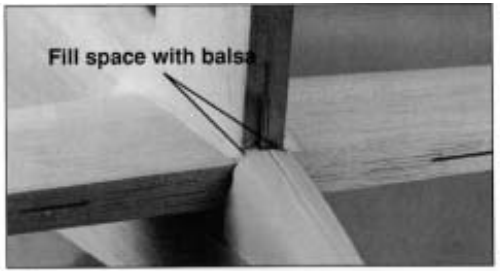
FIT THE TAIL CONE



❑ ST1. Glue the die-cut 1/8" balsa tail cone former (F11TC) on the end of the fuselage. Remove material as needed to clear the torque rods and pushrods. There must be no possibility of binding here.

❑ ST2. Refer to the photo at step **V2** on page 44. It shows the V-tail but the straight tail is the same. Glue the die-cut 1/8" plywood tail cone mounts to the tail cone former. Cut round notches in the tail cone to clear the joiner wire. Fit the tail cone on the aft end of the fuse and fasten it to the mounts with four #2 x 3/8" screws. Make sure the screws do not interfere with the elevator torque rod.

❑ ST3. Remove the elevators and joiner wire. Mount the tail cone to the fuselage.

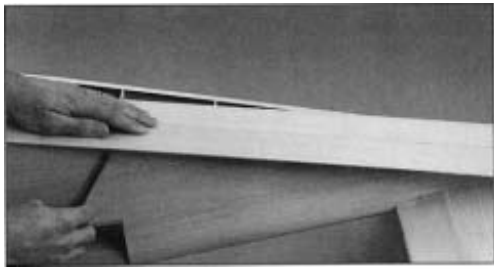


❑ ST4. Fill the small space between the top of the tail cone and the TE of the rudder with leftover balsa. Use lightweight hobby filler to blend the fin to the stab and the tail cone to the fin.

SHEET THE BOTTOM OF THE FUSELAGE

❑ 1. If you are going to hook up working lights, now is a convenient time to route the wire for the light in the tail. Route the wire through the formers. Glue the wire to the formers with rubber cement or a drop of CA so they don't rattle around. Allow enough wire to extend past former F11 **so** it will extend about 2" past the back of the tail cone.

❑ 2. Cut a 3/32" x 3" x 30" balsa sheet to a length of 28. True both edges of the sheet with a hobby knife and a straightedge. Pin the sheet to the bottom of the fuselage in the 'center so the end butts against the front edge of the tail cone.

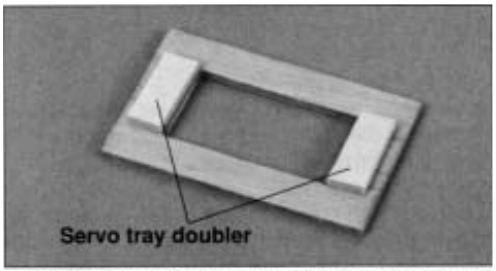


❑ 3. True both edges of another 3/32" x 3" x 30" balsa sheet. Position the sheet on the bottom of the fuselage next to the center sheet. Use a ballpoint pen to mark the side of the fuselage onto the sheet. Cut the sheet along the line you drew. Do the same with the remainder of the sheet on the other side of the fuselage.

❑ **4.** Glue the three bottom sheets together. After the glue dries, sand the fuselage bottom sheet so it is flat and the edges are even. Sand the bottom at the formers and stringers so that they are even and flat. Glue the fuselage bottom sheet to the bottom of the fuselage.

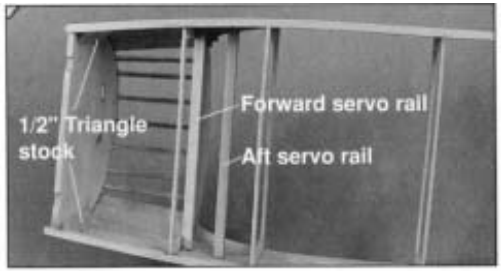
❑ *5.* Shape the bottom ***corners*** of the fuselage as shown in the cross sections on the plan so they blend with the tail cone at the rear.

MOUNT THE ENGINE



❑ 1. Glue the die-cut 1/8" plywood servo tray doublers to the bottom of both die-cut 118" plywood forward servo trays. Mount your throttle servo to one tray and your nose wheel steering servo to the other tray.

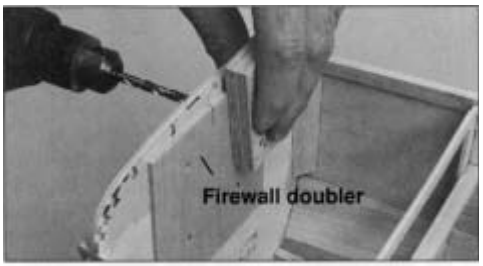
❑ 2. Cut a 8-3/4" ***forward*** **servo** rail from a 1/4" x 3/8" x 36" basswood stick to fit between the fuselage sides behind former F2. Test fit, then glue the servo rail to the fuse sides and former F2 1-7/8" below the top edge of F2.

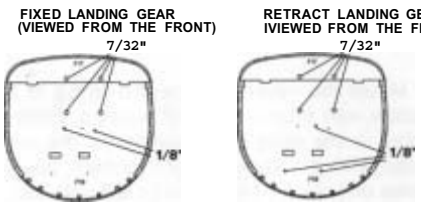


❑ 3. Cut a 8-13/16" ***aft*** servo rail to fit between the fuselage side doublers *7/8"* aft of the forward servo rail. Place the throttle and nose wheel steering servo and tray between the rails. Adjust the position of the aft rail to fit your servos. Glue the aft servo rail in place. Do not glue the servo trays in place until instructed to do so.

❑ 4. Glue the FIT/FIDT assembly to the top of the firewall. Use a straightedge to make sure they align.

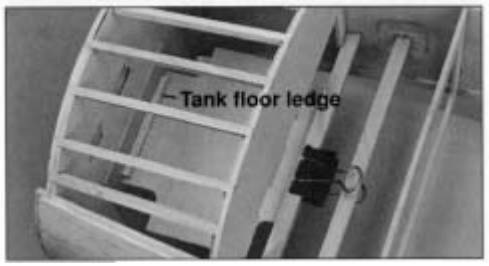
❑ *5*. Glue the die-cut 1/8" plywood **firewall doubler** to the back of the firewall, centered on the engine mount punch marks, 1/8" below the notch in the center of F1DT as shown on the plan.





❑ 6. Drill the correct size holes through the punch marks on the front of the firewall as shown in the sketches above. Tightly hold a **thick** block of wood on the back so the drill does not split the wood when it comes through.

❑ 7. Press four 8-32 blind nuts into the holes on the back of the firewall. Use an 8-32 x 1-1/2" socket head cap screw with some large washers to *draw* the blind nuts into the wood. Wick thin CA around the back of the blind nuts to permanently hold them in place.

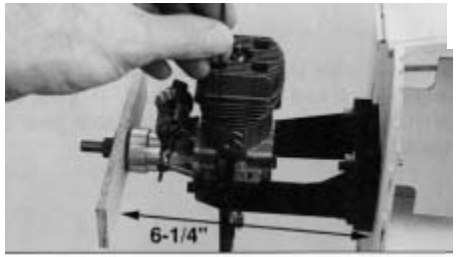


❑ 8. Temporarily clamp the die-cut 1/8" plywood **tank floor** to the forward servo rail so it is centered on the back of the firewall doubler. Turn the fuselage over and push the tank floor up until it contacts the edge of the bottom blind nuts. Glue a 3/16" x 3/16" **x** 3" balsa stick to the back of the firewall under the tank floor to serve as a **forward tank floor *ledge.*** Do not glue the tank floor to the ledge until instructed to do so.

❑ 9. If you have not already done so, sand the fuselage side doublers and fuselage sides so they are flush with the front of the firewall.

❑ 10. Cut the ***spacer bar*** off both **engine mount** halves and trim off any *flashing* so they easily fit together. Loosely bolt your engine mount to the firewall with four 8/32 x 1-1/4" socket head cap screws, **#8** lock washers and flat washers. Adjust the mount so your engine will fit. Tighten the screws to securely hold the mount to the firewall. Use small clamps to hold your engine to the mount so the front of the drive washer (or the back plate of your spinner) is 6-1/4 from the firewall. Mount a flat wood stick or the back plate of your spinner to the engine so you can measure the distance.

Beech Fact: In addition to the aforementioned benefits the V-tail offers, others include lower manufacturing costs through fewer parts, fewer parts for Beech dealers to stock, reduced damage from debris thrown from the prop and wheels, and spin recovery superior to that of an airplane with a conventional tail.



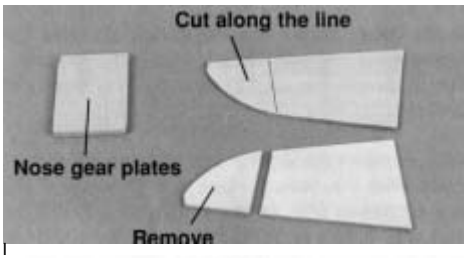
❑ 11. Mark the engine mounting bolt holes on the mount. **Hint:** Mark the holes with a wire rod sharpened at one end. Heat the tip of the rod with a torch to dimple the engine mount in the **center** of the holes.

❑ 12. Remove the engine from the mount and the mount from the firewall. Use a drill press, if you have access to one, or use a hand drill to drill the holes with a #29 or 9/64 drill bit for 8-32 screws. Tap 8-32 threads into the mount. Screw the mount back onto the firewall. Screw the engine to the mount with 8-32 x 1" screws to see how it fits.

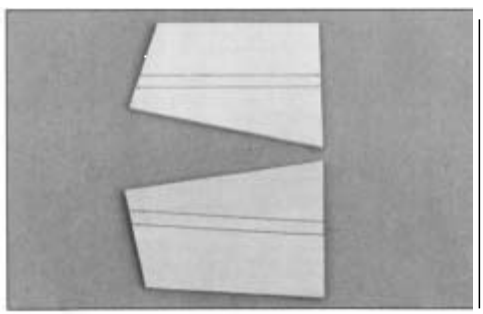
MOUNT THE NOSE LANDING GEAR

Continue with these instructions if you are installing fixed landing gear. If you are installing retracts, skip to *Retractable gear* on page 53.

Fixed gear

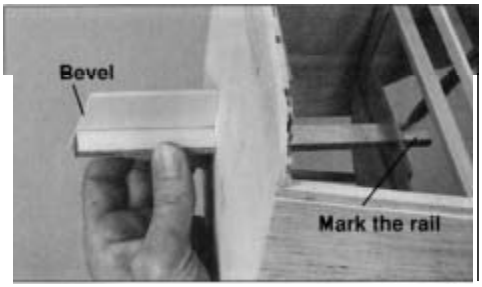


❑ F1. Draw a line connecting the punch marks on both die-cut 1/8" plywood nose **landing gear braces.** Cut the braces off at the line. Glue the two die-cut 1/8" plywood **nose gear plates** together.

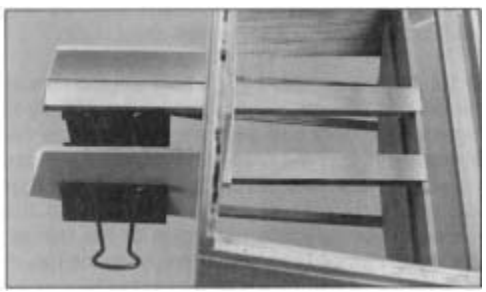


❑ F2. Place the braces over their location on the plan. Mark the location of the 1/4" plywood landing gear rails onto the braces.

❑ F3. Remove the engine mount from the firewall.

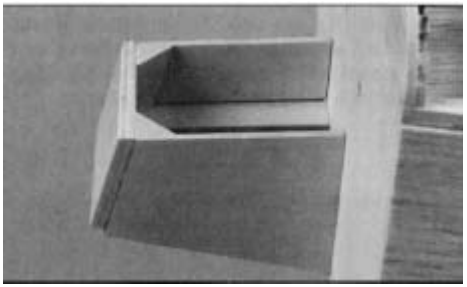


❑ F4. Cut a bevel on the end of the 1/4" x 9/16" x 9" plywood **landing gear rails** to match the angle on the end of the braces. Test fit a rail through the right side of the firewall and in the notch in former F2. Position the right brace and align the front of the rail with the front of the brace. Mark the rail 1/8" aft of former F2. Remove the rail and cut it at the mark. Mark the other rail in the same manner.



❑ F5. Use 30-minute epoxy to simultaneously glue the rails to the firewall and former F2, and the rail braces to the rails and the firewall. Make sure the front of the rails are even with the front of the braces.

❑ F6. Drill 1/8" holes through the punch marks in the nose gear plate. Press four 4-40 blind nuts into the holes in the plate, and secure them with thin CA.

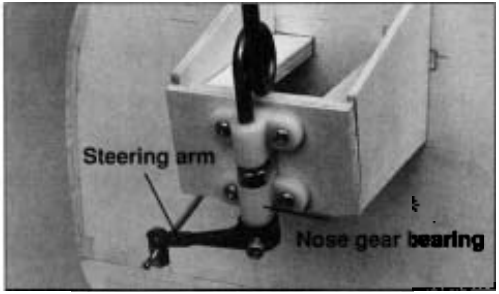


❑ F7. Position the nose gear plate on the front of the braces. Trim the rails so the blind nuts do not interfere. Use 30-minute epoxy to glue the nose gear plate to the rails and rail braces. Hold the plate in position with masking tape until the epoxy is fully cured. Add balsa triangle **braces** as shown on the plan cut from leftover fuse corner stringers. See the photo at step 11.

❑ F8. Mount the nylon **nose gear bearing** to the nose plate with four 4-40 x 1/2" screws. Enlarge the holes in the nose gear bearing for the nose gear strut with a #10 drill bit (if you don't have a numbered drill set, an 11/64" drill bit will work too).

❑ F9. Enlarge the outer hole in the black, nylon **steering arm** with a # 41 drill bit or a hobby knife. Mount the heavy duty **Screw-Lock connector** to the steering arm with the **one-way star washer.** Mount the 3/16 **nose gear wire** to the nose gear bearing with a 3/16" **wheel collar** and **set screw** and the steering arm and a 6-32 x 1/4" socket head cap screws as shown on the plan. Notice that the steering arm is slightly off center when the nose gear is centered.

❑ FIO. Temporarily fit your nose steering servo and tray on the forward servo rails. Fit a servo arm to your servo.



❑ F11. Thread a 4-40 **hex nut** followed by a 4-40 metal **clevis** onto a .095 x 12" **nose steering pushrod.** Connect the clevis to the servo. Connect the other end of the pushrod to the Screw-Lock connector in the steering arm. Cut the pushrod about 1/4" past the connector. Make a slight bend in the pushrod near the Screw-Lock connector so it aligns with the hole in the connector. Temporarily secure the pushrod to the connector with a **set screw.**

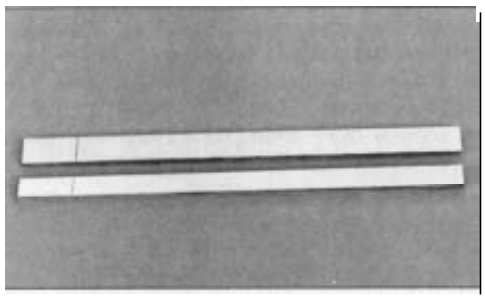
❑ F12. Securely glue the nose steering servo tray to the servo rails. Make sure your servo is centered, and tighten up the 4-40 jam nut on the clevis with a drop of thread lock for extra security. File **small** flat spots in the nose gear strut to securely hold the set screws.

That was easy wasn't it? Now hook up the throttle. It's just as easy! Skip to ***Hook Up The Throttle*** *on page 55.*

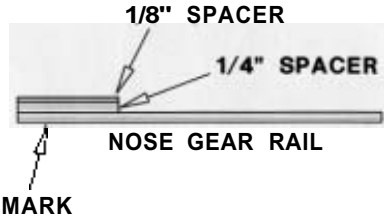
Beech Fact: Nearly 10,000 V-tail Bonanzas have been manufactured and over 1,800 of its straight tailed cousins have been manufactured. A very large percentage are still flying today. Experts cite many factors contributing to the Bonanza's success including Walter Beeches' reputation, the Bonanza's *built to last forever* design and appearance, new *Class-A* tooling ordered before the Bonanza went into production^ and its all-around performance.

Retractable nose gear

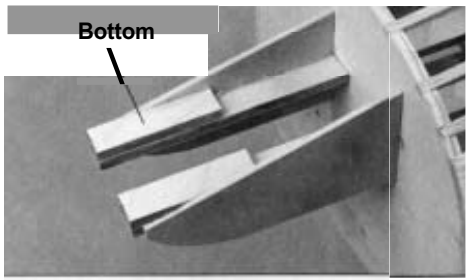
Note: While there are other retractable nose gear units that may work in the Top Flite Gold Edition Beechcraft, the Robart 631 is shown in this manual because it rotates 105 and is designed specifically for this model. A 90 unit would work but the mounting position would have to be raised and the rails would have to be slanted upward toward the front of the model in order to achieve the scale appearance of the full size Beechcraft. These modifications are up to you.



❑ R1. If you're using the Robart 631 nose gear retract, mark a line 7-7/8" from one end of both 1/4" x 9/16" x 9" plywood **landing gear rails.** This will position the *pivot point* of the 631 nose gear 7-7/8" from the aft edge of F2.

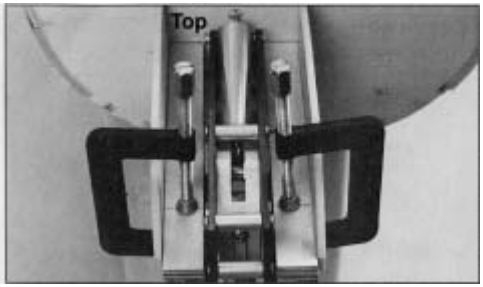


❑ R2. Glue one 114 x 9/16 x 2-1/4 plywood **rail spacer** and one 1/8" x 9/16" x 2-1/4" plywood **rail spacer** on the end of both rails that you made the mark on, but on the other side of the rail.



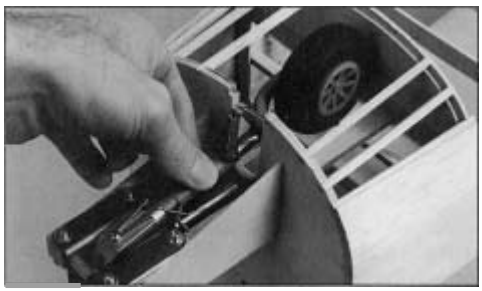
❑ R3. Temporarily place the landing gear rails

❑ R4. Use 30-minute epoxy to glue the rails to the firewall and former F2 and the die-cut 1/8" plywood **landing gear braces** to the rails and the firewall.



❑ R5. Use small clamps to hold the nose gear to the rails so the pivot point (on the Robart 631's) aligns with the marks you made on the top of the rails. Mark the locations of the mounting holes on the landing gear rails.

❑ R6. Remove the landing gear and drill 5/32" holes at the marks you made. Temporarily mount your landing gear with 6-32 x 3/4 screws and blind nuts (not included).



❑ R7. Remove the two 3/16" stringers that interfere with the wheel and strut. Use a Dremel Tool or a razor saw to cut the firewall to accommodate the strut. Retract the nose gear and make sure it does not interfere with the firewall.

Note: Adjust the **centering spring** on your retracts so the nose wheel is neutral and make sure the nose wheel is centered on the strut. On the Robart 631 strut we inserted two #8 washers between the wheel and the strut to center the wheel. The nose wheel **must** be **neutral** and **centered** to fit between the rails when retracted.

Hint: File or sand a slight bevel to the bottom edges of the rails to guide the nose wheel, in case

❑ R8. If you have your air pump and some quick disconnects handy, temporarily connect them to your nose gear air cylinder and actuate the nose gear with the air pump. This will give you a good indication of any problem areas that you can correct now.

❑ R9. Cut 3/16" off the aft edge of the die-cut 1/8" plywood **nose steering servo tray.** Mount your nose steering servo to the servo tray so the output shaft is on the **left** side of the servo tray as shown on the plan. See the photo at step R11. Note that the servo is *offset* toward the aft edge of the servo

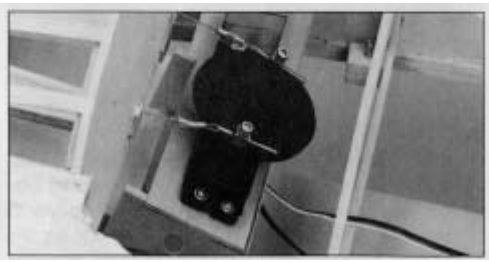
❑ R10. If you would like to mount your air control valve in the same location as in our prototype, drill a 1/2" hole in the die-cut 118" plywood **right nose steering servo tray mount** at the punch mark.

❑ R11. Test fit the servo tray (with the servo) in the die-cut 1/8" plywood **servo tray mounts** and fit the assembly in the servo rails. Position the mounts and the tray so the output shaft of the servo is centered between the 1/8" holes in former F2. Glue the servo tray and the mounts in this position.

❑ R12. Cut two 4-5/8" pieces from the white nose steering cable inner pushrod guide tube and slide the pieces through the holes in the firewall and former F2. Glue the tubes to the firewall and F2.

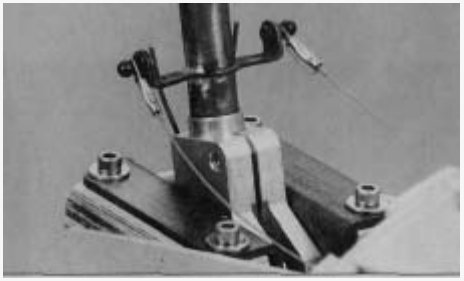
CONNECT THE NOSE STEERING PULL-PULL

Several pull-pull steering cable systems are available that will work in your Bonanza. We selected the Sonictronics #121 *Pro-Control* Cable System.



❑ R1. Enlarge the hole in two Screw-Lock pushrod connectors with a #46 or 5/64" drill bit. Mount the screw-lock connectors to a large servo arm and fasten each with a nylon retainer. Connect one end of a 14" long pull-pull cable to a threaded rod included with the pull-pull steering set using the

swage to secure the cable. Fit the threaded rod into one of the Screw-Lock connectors and temporarily lock it down with a 4-40 x 118" socket head screw. Connect another piece of cable to the other Screw-Lock connector the same way, then thread the cable through the guide tubes toward the nose gear strut.



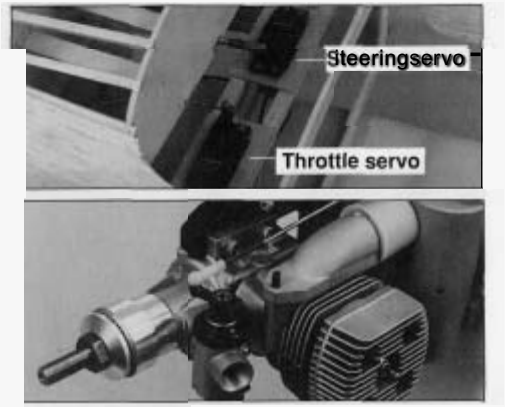
❑ R2. Install a 0-80 threaded ball link ball (not included) onto the arm on both sides of the nose wheel strut with a 0-80 nut. Connect the other end of both cables to the threaded ball links with the swages. Tighten the loop in the cable just enough so it will not come off the ball. Crimp the swages. Temporarily hook up the steering servo to your radio system and test the movement. Adjust the tension on the cables or make other adjustments if needed.

Note: If your nose gear steering arms did not come bent 90" as shown, do so now.

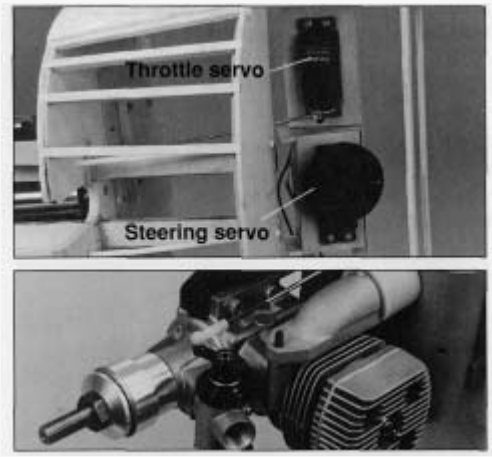
FINISH CONSTRUCTION

HOOK UP THE THROTTLE

❑ 1. Mount your engine mount and engine to the firewall. Mount your muffler to make sure your throttle pushrod will not interfere.



This is the throttle servo location for fixed gear,

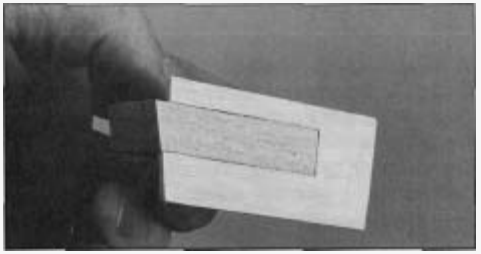


This is the throttle servo location for retractable gear.

❑ 2. Place your throttle servo tray with the servo in the rails. Connect the ,074" x 12" **throttle pushrod** to your servo with a small, brass **Screw-Lock connector.** Connect the other end of the throttle pushrod to the engine with a nylon **ball socket** and a 0-80 **threaded ball** and 0-80 **nut.** Use a drop of thread lock on the nut. Glue the throttle servo tray to the rails.

MOUNT THE WING TO THE FUSE

Remember the wing? Go get it so you can mount it to the fuse.



❑ 1. Bevel the end of both 1/2" x 1" x 2-1/4" maple **wing bolt blocks** so they match the angle of the die-cut 1/8" plywood **wing bolt block holder.**

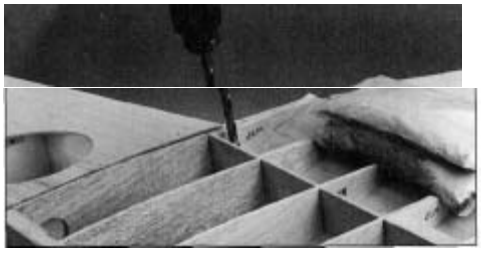
❑ 2. Use 30-minute epoxy to glue the wing bolt blocks and holders in the fuse where shown on the plan. See the photo at step **8.**

❑ 3. Place the wing in the wing saddle on the fuse. Observe *high spots* in the saddle of the **balsa** fuse sides that prevent the wing from fitting. Remove the wing and sand the high spots so the wing matches the fuse as accurately as possible. Do not sand the ply fuse side doublers.

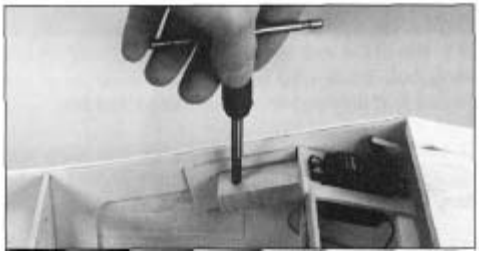
❑ 4. Remember the *pin and string method* you used to align the stab? Get your string out and stick a T-pin in the center of the bottom, middle stringer just ahead of the tail cone.

❑❑ 5. Use the arrow on the tape to align the wing with the fuse the same way you did the stab.

❑❑ 6. Once you have the wing aligned, place weights over the center section to keep it from shifting during the next few steps. Keep your string handy so you can recheck alignment as you proceed.



❑ ❑ 7. Drill through **only one** wing bolt plate, the top sheeting and the wing bolt block on one side of the wing with a #7 drill. Keep the drill bit perpendicular to the wing bolt plate as you drill so the head of the wing bolt will rest flat.



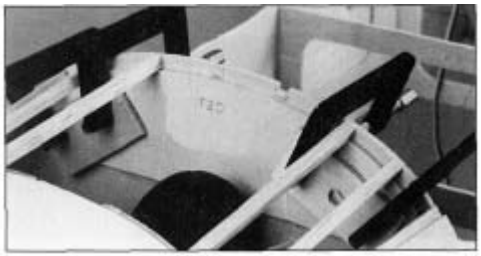
❑ ❑ 8. Remove the wing and tap threads into the wing bolt block with a 1/4-20 tap. Enlarge the hole in the wing bolt plate and the top sheeting with a round file or a 17/64 drill. Replace the wing on the fuselage and bolt it down with the one 1/4" nylon wing bolt.

❑ 9. **Replace the #7 drill bit in your drill.** Repeat steps **5,** 6, 7 and 8.

❑ 10. Bolt the wing to your fuselage and leave the wing bolts barely snug. Realign the wing.

❑ 11. Drill 1/4" holes through the 1/8" x 1" x 2" plywood **wing dowel plates. Slightly** enlarge the holes with a round file or a piece of sandpaper wrapped around something round such as a pen or a piece of brass tube. This will allow you to plug the wing into the fuselage without too much resistance.

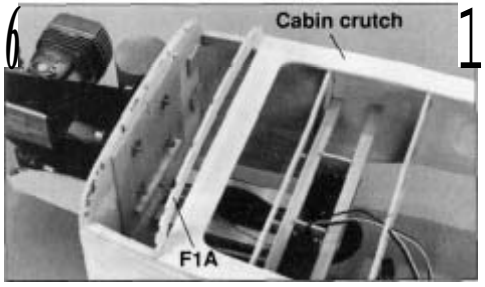
❑ 12. Spread a thin film of 30-minute epoxy on one side of both wing dowel plates and fit them over the dowels protruding through former F2D inside the fuse. Accurately mark the location of the plates on F2D.



❑ 13. Remove the wing. Clamp the wing dowel plates to F2D with C-clamps. Wipe excess epoxy from the holes if any is present.

SHEET THE FORWARD DECK AND BOTTOM

❑ 1. Assemble your fuel tank. Position the tank floor and the tank in the fuselage and determine where to drill the holes for the fuel lines. Drill the holes with a 1/4 drill (or 15/64" drill for a better fit).



❑ 2. Remove the tank and tank floor. Position the die-cut 1/8" plywood **cabin crutch** on the fuse main side stringers so the aft edge contacts former F7A. Position the die-cut 1/8" plywood former **F1A** on the fuse main side stringer so it contacts the crutch. Glue F1A **to the side stringers only.** Remove the crutch.

❑ 3. Cut the stringers from pieces of leftover 3/16" x 3/16" balsa to fit from F1A to the firewall. Glue the stringers in position while using a 90 degree triangle to hold F1A perpendicular to the top of the stringers.

❑ 4. Place 1/4" foam rubber on the tank floor. Test fit your fuel tank with **#32 rubber bands** included with this kit. **Note:** Rubber bands deteriorate over time, so you should replace them at least once a year.

❑ 5. Sheet the forward fuse deck with leftover 3/32" balsa. After you glue the sheeting in position, sand the front even with the firewall. Sand the back even with F1A, but do not sand the rest of the sheeting until you fit the cabin.

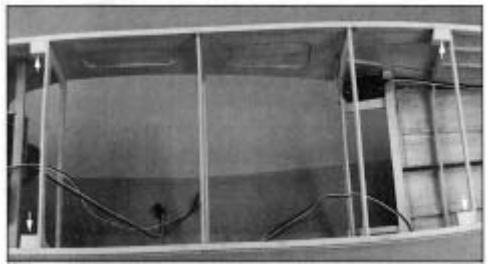
☐ 6. If you're installing retracts, turn the fuselage over and build a small *framework* from leftover balsa to support the sheeting around the nose wheel cutout.

❑ 7. Use leftover 1/16" balsa sheeting to seal the area around the nose gear between F1 and F2. This will prevent fuel and exhaust residue from entering the fuselage.

☐ 8. Use leftover 3/32" balsa to sheet the bottom forward fuse, aft of the cowl. Cut the wheel well for the nose wheel and strut if you are installing retracts.

❑ 9. Remove the tank and foam rubber. Coat the inside of the fuselage between the firewall and former F2 including the back of the firewall with fuel proof paint, epoxy or finishing resin.

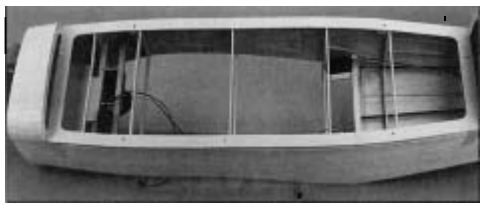
FIT THE CABIN TOP



❑ 1. Bevel one end of four 1/2" x 1/2" x *5/8"* basswood blocks so they fit between the fuse main side stringers and formers F3 and F6 where shown on the plan. Glue the blocks in position.

❑ 2. If your fuel tank is in the fuse, remove it for now.

❑ 3. Place the die-cut 1/8 plywood **cabin crutch** on the fuselage so it is centered and the edges slightly extend past the side stringers. Use masking tape to hold the cabin crutch to the fuselage.



❑ 4. Drill four 1/16" holes through the crutch into the center of the blocks you glued to the fuse. After you drill each hole, temporarily hold the crutch to the fuse with a #2 x 1/2" screw.

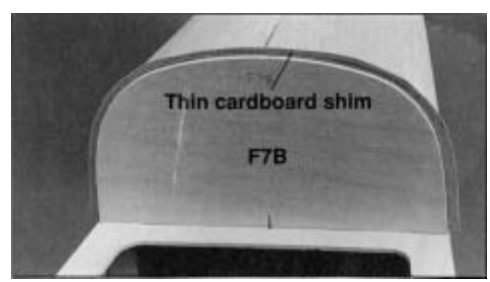
❑ 5. Use a ballpoint pen to mark areas of the crutch that need to be sanded for a perfect fit to the fuse main side stringers. Remove the crutch, sand the edges, and screw it back onto the fuse. A little at a time, mark, then trim the crutch until it accurately fits the fuse main side stringers.

❑ 6. Use scissors to cut the molded ABS **cabin top** along the cutlines (which are most visible from inside the cabin top). The cabin top will be slightly oversize to allow you to trim it for an exact fit to your model. Use a felt tip pen to mark the molded-in center marks at the front and aft edges of the cabin top so they will be easier to see while fitting. Do not trim the cabin top to fit your fuse until instructed to do so.

❑ 7. Lightly mark the center of the front fuse sheeting over former F2A (over the center stringer). Mark the center of the turtle deck sheeting over former F7A (over the center stringer).

❑ 8. Position the die-cut 1/8" plywood **aft cabin former F7B** on top of the crutch so it contacts former F7A. Lightly sand the edges of F7B so there is approximately a 1/16" difference between F7B and F7A to accommodate the cabin top.

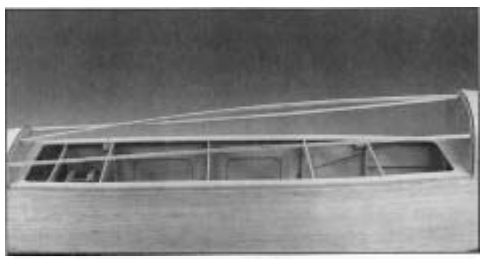
❑ 9. Test fit and shape the die-cut 1/8" plywood **forward cabin former F2B** to former F2A the same way.



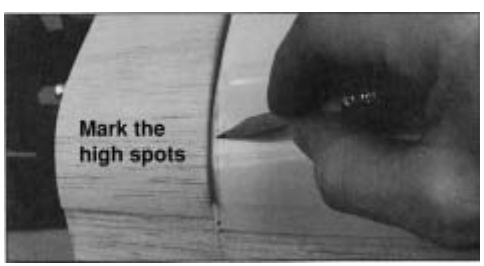
❑ 10. Reposition the aft cabin former on top of the crutch. Place a piece of thin cardboard between the

aft cabin former and F7A. The thickness of the cardboard should be approximately 1/64" or .015". This is to provide a little clearance for painting and covering. Trace the outline of F7A onto the piece of cardboard. Cut approximately 1/4" outside of the line you drew. Reposition the cardboard shim and glue the aft cabin former to the crutch with the shim in place.

❑ 11. Make a shim and glue the front cabin former to the crutch the same way.

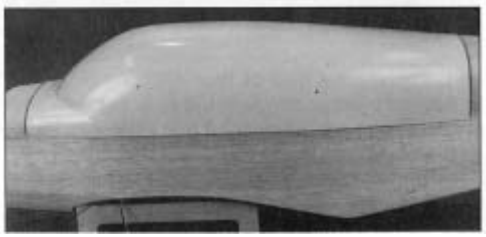


❑ 12. Temporarily position some balsa sticks between the front and aft cabin formers to make sure they and the shims tightly contact the fuse. You are going to fit the cabin top to the shims so the more accurately they fit the fuse, the more accurately your cabin top will fit the fuse.



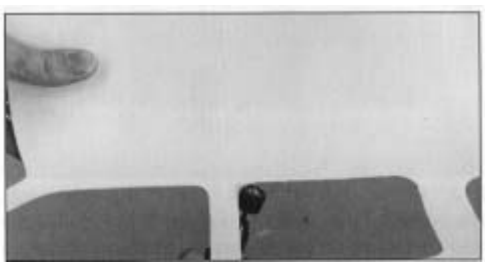
❑ 13. Position the cabin top on the fuse so the front contacts the cardboard shim and the centerline on the cabin top aligns with the centerline on the fuse. Use a lead pencil to mark areas of the front of the cabin top that need to be sanded for a perfect fit. **Carefully and lightly** sand the areas you marked, erase the pencil marks, and reposition the cabin top. Continue to mark, sand and fit the cabin top until the front fits well.

❑ 14. Perform the same procedure to the aft edge of the rear of the cabin top until it fits the rear cardboard shim and the cabin top drops into place.



❑ 15. With the cabin top on the fuse, make your pencil marks where the bottom needs to be trimmed. Sand the bottom edges of the cabin top until it fits.

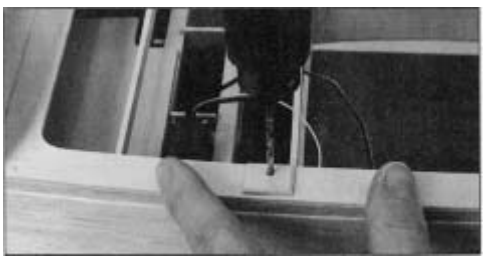
❑ 16. Thoroughly roughen the entire inside of the cabin top with 220-grit sandpaper so glue and paint will stick.



❑ 17. Use a Dremel tool with a carbide cutter or a similar type of rotary tool, or small scissors to cut the window openings along the cutlines inside the cabin top. The window outlines in the cabin top are about 1/16 smaller than the windows themselves. This will allow you to accurately fit the windows later, but do not enlarge the openings yet – just roughlycut them along the cutlines for now.

MOUNT THE CABIN TOP

❑ 1. Remove the screws that temporarily hold the crutch to the fuse. Glue four pieces of 3/4" x 3/4" leftover 1/8" plywood to the crutch over the holes. Using the holes in the crutch as a guide, drill 1/16" holes up through the 1/8" ply pieces you just glued on. Temporarily screw the crutch to the fuse with the screws.

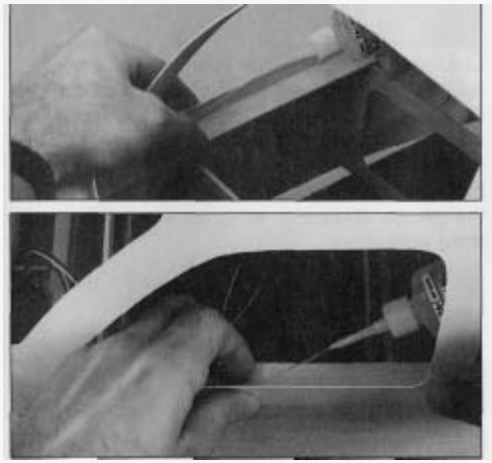


❑ 2. One at a time, remove a screw, and enlarge the hole through the crutch and the blocks in the fuse with a 1/8" drill. After you drill each hole temporarily insert a 4-40 x 3/4" Phillips head screw to hold the crutch in alignment as you drill the rest of the holes.

❑ 3. Remove the crutch from the fuse and press 4-40 blind nuts into the holes in the top of the crutch. Glue them with a little thin CA.

❑ 4. **Lightly** spray the edges of the crutch and crutch formers F7B and F2B with CA accelerator. Place the crutch on the fuse with the cardboard shims. Slip a piece of wax paper between the shim and crutch formers at the back and front of the crutch. Fasten the crutch to the fuse sides with four

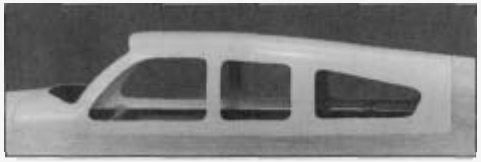
4-40 x 3/4" cap screws and washers accessible from inside the bottom of the fuse (we use a long Great Planes 3/32" Hexdriver Ball Wrench, GPMR8002). Position the cabin top on the crutch. Tape the cabin top to the fuse sides.



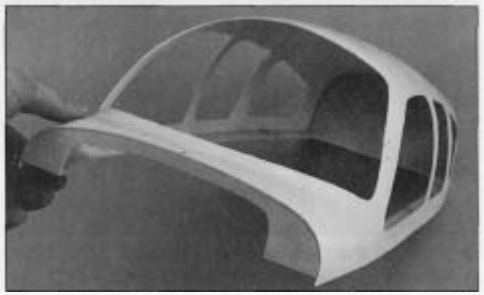
❑ 5. Make sure you have a CA applicator on your medium CA bottle. A little section at a time, simultaneously press the side of the cabin top down and to the side and glue the cabin top to the crutch with a small fillet of medium CA. Do only a small section at a time, making sure the crutch is pressed down to the fuse main side stringer as you glue. You should be able to reach all areas of the crutch through the window cutouts. Since you pre-primed the crutch with CA accelerator, you should have to hold the parts together for only a few seconds. Glue both sides of the cabin top to the crutch.

Note: Do not build up a large fillet of CA between the top of the crutch and the cabin sides. Be careful not to glue the cabin sides or the crutch to the fuse main side stringer. This should not be a problem if you do not use too much CA.

❑ 6. Glue the cabin top to the front and aft cabin formers. **Hint:** It will be easier to glue the cabin formers to the cabin top if you **carefully** place the fuselage on its nose and on its tail cone.



❑ 7. Remove the cabin top and add medium CA to areas you couldn't reach before. Fasten the cabin top to the fuse and lightly sand the fuse to match the cabin top.



❑ 8. Cut the front cabin former and the crutch to accommodate the fuel tank.

FIT THE WIND0WS

Note: The windows are **individually** cut and glued to the inside of the cabin top.

❑ 1. Cut each of the molded clear plastic **windows** along the cutlines which are approximately 1/8" outside of the raised edges. Sand the edges smooth and even with 220-grit sandpaper. Use care not to scratch the windows.

❑ 2. Fit the **bottom** of one of the windows in the **bottom** of the matching window opening in the cabin top. Observe how much the **top, front and aft edges** of the window openings must be trimmed so the window will fit the rest of the way in. Remove the window and use a rotary tool with a sanding drum or sandpaper wrapped around a dowel to enlarge **only** the top, front and aft edges of the window opening until the window accurately fits. **Do not** trim the bottom edge of the window cutouts so the windows remain in line.

❑ 3. Fit the rest of the windows the same way.

Beech Fact: Walter H. Beech and Olive Ann Mellor first met at the Kansas based Travel Air Co. in the late 1920's. Thete, Walter served as president and Olive was the office manager. They married in 1930. In 1932, with two other business associates, Walter and Olive formed the Beech Aircraft Co., whose first plane into production was the Model 17R negative-stagger wing biplane which later became known as the Beech Staggerwing.

SHEET THE BOTTOM OF THE WING CENTER SECTION

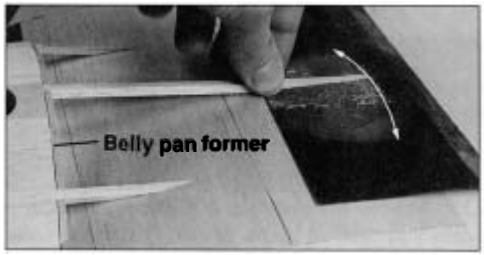
❑ 1. Install your servo extension cords, "Y" connectors and air lines if you are installing retracts. The servo extension cords don't have to be connected to the servos and the air lines don't have to be connected to the retracts but they should be installed so you can finish the sheeting. Plan this carefully. Be certain you have connected both aileron extension cords into the same "Y" connector and both flap extension cords into the same "Y" connector. Give yourself plenty of slack on the wires and air lines so you will be able connect everything after you cover your model.

❑ 2. Sheet the bottom of the wing center section with two 3/32" x 3" x 30" balsa sheets and leftover 3/32" balsa if needed. Before you glue the sheet that goes over the wing bolts, first cut two 1" lengths from the 9/16" diameter x 8" **cardboard tube.** Glue that sheet in position with the cardboard tubes. Glue the cardboard tubes to the sheeting and wing bolt plates. After the glue dries, cut and sand the tubes flush with the sheeting.

Hint: Temporarily fit the flaps to the wing and cut the ends of the bottom aft sheet to provide the correct spacing at the ends of the flaps.

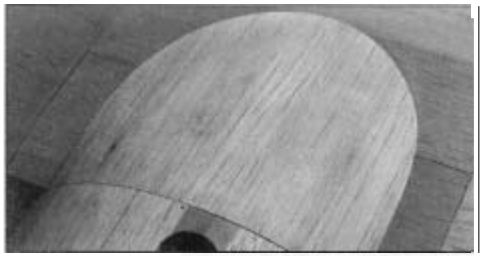
MAKE THE BELLY PAN

❑ 1. Bolt the wing to the fuselage. Place the die-cut 1/8" plywood **belly pan former F2W** on the front of the wing so it is resting against fuse former F2. Trim the bottom of F2W so it sits 3/32" below the bottom fuselage sheeting (to accommodate the belly pan sheeting). Carefully glue F2W to **only the wing.**

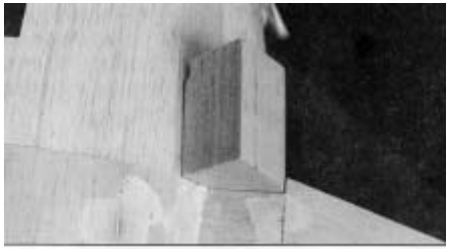


❑ 2. From a 3/16" x 3/16" x 30" balsa stick, cut one 6-1/2" piece, two 4-3/4" pieces and two 2-1/4" pieces to make the **belly pan stringers.** Sand one end of the stringers so they conform to the shape of the bottom of the wing. Glue them in position.

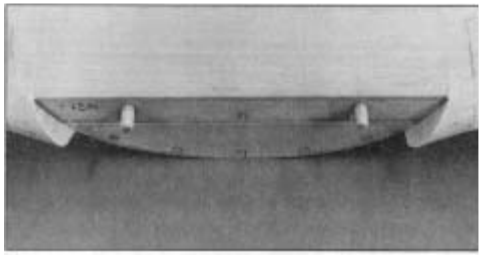
Hint: Place a piece of sandpaper on the bottom of the wing and move the stringers back and forth, sanding them to the correct shape.



❑ 3. Sheet the belly pan with leftover 3/32" balsa sheeting. *Feather* the edges with lightweight hobby filler. After the filler dries, remove the wing and sand the belly pan to blend with the fuse.



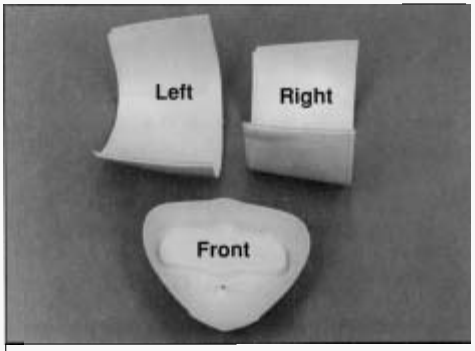
❑ 4. With the wing off the fuse, sand one of the 1" x 1-3/4" x 2" **wing fairing blocks** to match the curvature of the right side of the fuse at the leading edge of the wing. Bolt the wing to the fuse. Sand the side and rear of the wing fairing block so it fits between the wing and the fuse as shown in the photo. Glue the wing fairing block **to the wing only.**

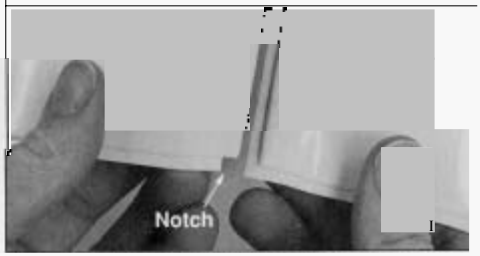


❑ 5. Remove the wing and sand the wing fairing block to match the shape of the **top** of the wing. The fairing block extends below the bottom sheeting, so blend it to the belly pan and the bottom of the wing with filler. Shape and fit the other fairing block the same way.

❑ 6. Use lightweight hobby filler to blend the belly pan to the wing and sand it smooth after it dries.

BUILD AND FIT THE COWL TO THE FUSELAGE

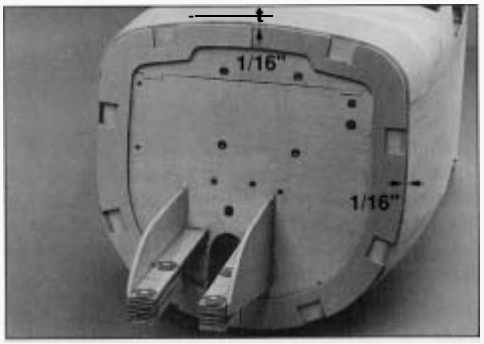




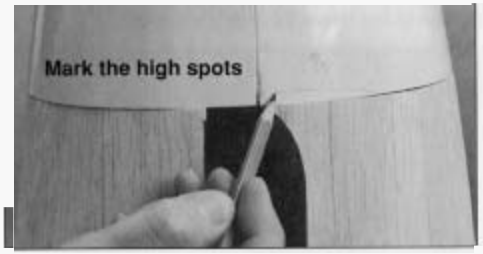
❑ 1. Cut the molded ABS **cowl** left side, right side, and front along the cutlines (seen from the inside). Cut a *notch* in the top of the right cowl half and the bottom of the left cowl half so the lap joints do not interfere. On the **aft** edges of the right and left cowl sides, cut about 1/8" aft of the cutlines. This gives you a little extra material to work with so you can accurately fit the cowl to the fuse. Cut the openings in the front of the cowl. If you have one, use a rotary hand tool with a cutting burr followed by a sanding drum. Sand the edges so they are straight and even.

❑ 2. Thoroughly sand all areas that are to be glued, including a 1/2" strip along the inside edges of the cowl, so the fiberglass reinforcement tape will stick.

❑ 3. Tape the cowl together with masking tape. Test fit the cowl to the fuse. Glue the seams with thin CA.

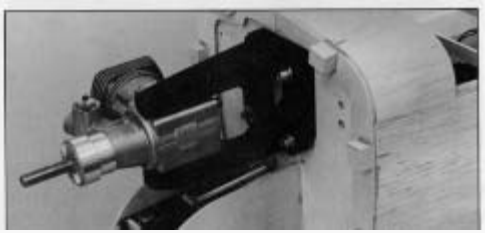


❑ 4. Test fit the die-cut 1/8" plywood **cowl** rings on the firewall. If necessary, sand the edges of the cowl rings so they are inset from the edges of the balsa fuselage sides approximately 1/16". Glue the cowl rings to the firewall.



❑ 5. With the engine mounted, fit the cowl to the fuselage. Mark the *high spots* on the aft edge of the cowl where you need to remove material so it accurately fits the fuselage and aligns with the backplate of your spinner. At first the cowl will be too long but as you *zero-in* on the fit, place the backplate of your spinner on your engine to help you align the front of the cowl. This is a *cut-and-fit* procedure that takes a little time, but it's one of those areas where you can really show your craftsmanship. Take your time and remove small amounts of material at a time.

Note: If the head of the engine, the needle valve or carburetor interferes with the cowl, remove them for the time being.



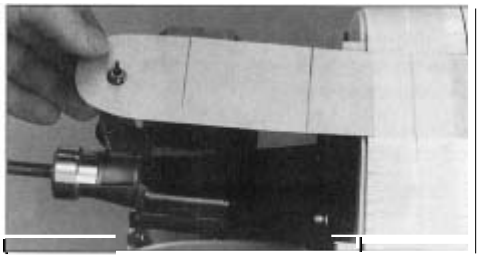
❑ 6. Test fit eight 1/2" x 1/2" x *5/8"* maple **cowl** mount **blocks** in the notches in the cowl ring. Sand the blocks so they match the shape of the cowl. Glue them in place. Mark the center of each cowl mount block on the fuselage. Test fit the cowl to the fuselage to make sure none of the blocks interferes with the cowl.

❑ 7. Securely tape the cowl to the fuselage. Using the marks as a guide, drill 1/16" holes through the cowl and the cowl mount blocks 1/4" in front of the aft edge of the cowl. Hint: After you drill each hole, screw in a #2 x 3/8" screw to keep the cowl accurately aligned as you proceed.

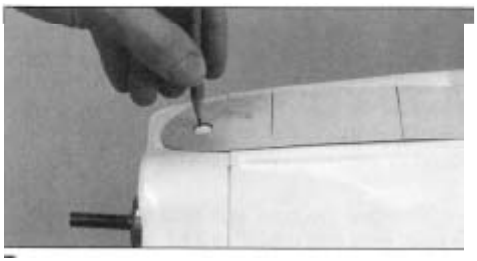
❑ 8. Remove the cowl and enlarge the holes in the **cowl** only with a 3/32" drill bit.

❑ 9. Test fit the cowl to see how it fits. Use #2 x 3/8" screws to hold it in place.

❑ 10. If you have fixed landing gear, cut a slot in the bottom of the cowl to clear the landing gear wire. If you have retractable landing gear, remove whatever material is necessary so the retractable nose strut and steering arm will clear the cowl.

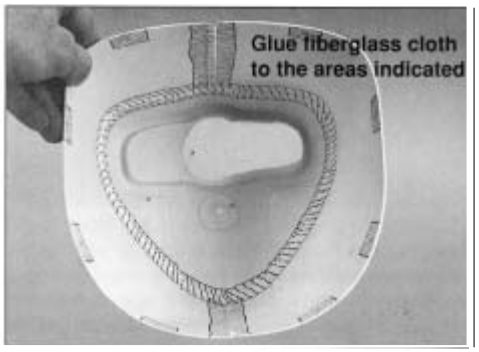


❑ 11. Remove the cowl and make a template out of thin cardboard to locate the needle valve.



❑ 13. Remove the cowl and cut the hole for the needle valve. Start with a small hole. Mount the cowl to the fuselage and check your accuracy. Enlarge the hole while you simultaneously change its position if necessary.

❑ 14. Use the same template method to make holes for the glow plug, exhaust, fueling system and engine head if necessary. The location for the fuel filler valve and retract fill valve are up to you, but we have provided die-cut 1/8" plywood **mounting brackets** for these items. The head on the SuperTigre *.75 barely* contacted the cowl in one area, so we just ground away that small portion of the fins without any ill effect.



❑ 15. Make sure you have thoroughly sanded the inside seams of the fuselage. Use 30-minute epoxy to glue 1" wide **fiberglass cloth** over all the seams inside the cowl. Add 1" squares of glass cloth inside of the cowl over the holes for the cowl mount screws. Redrill the holes after the epoxy cures.

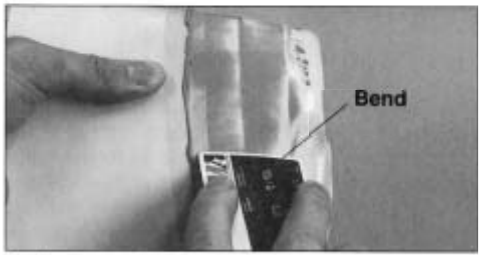
❑ 16. Fill the seams in the cowl with Bondo filler. There are other fillers that you can use, but we have found that Bondo works the best. Squadron Green or White putty also works well but it takes longer to dry and shrinks. You could use Squadron putty for smaller parts like the tail cone.

Here are some tips for applying the Bondo to your cowl:

1. **Thoroughly** roughen all seams and other areas with 150-grit sandpaper where you will apply Bondo.

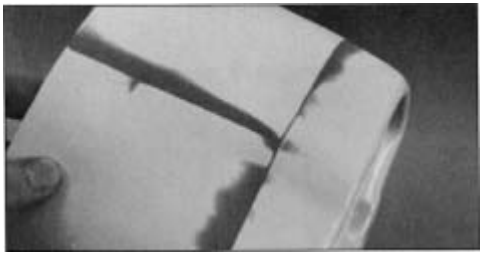
2. Mix the Bondo **thoroughly** but **rapidly** to allow as much time as possible to apply it.

3. Bondo cures within a few minutes, so mix only enough to fill one seam at a time.



4. Use an expired credit card or a piece of plastic as a *spatula* to apply Bondo. Bend your spatula to build up a slight moundover the seam.

5. Apply only enough Bondo to fill the seams and uneven edges. It's easier to apply a second coat than it is to sand *gobs* of it off.



6. Wet-sanding is best. Start with 150-grit sandpaper. Transition to finer grits as you proceed and finish with 400-grit sandpaper. When you're done, your cowl should look something like the one in the photo–just enough Bondo left to fill in the low spots near the seams.

Note: Refer to the **cowl flaps** on the side view of the fuse plan. If you are installing retracts, the cutout in the bottom of the cowl for the nose wheel will be large enough to allow an adequate air exit for cooling the engine. In this case the cowl flaps are optional. If you are installing fixed gear you will have to build either the **aft** or **forward** cowl flaps to allow adequate air exit. The aft cowl flaps are cut in the bottom of the fuse and are in the scale location. If you add the aft cowl flaps you will have to cut holes in the firewall to allow the air to exit through the aft cowl flaps. The forward cowl flaps are cut in the cowl and are not in the scale location, but are easier to build.

You've come a long way. This is the end of the construction portion of the model so there's no more woodwork. It's all just details and other last minute stuff before your Bonanza will be ready to paint and cover!

FINISHING

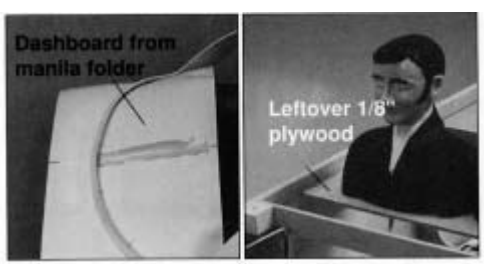
FUELPROOFING

You may fuelproof your model before or after you cover it. Fuelproof all areas that may be exposed to fuel or engine exhaust such as the wheel wells, wing bolt recesses in the wing, the firewall, fuel tank compartment, the front of the belly pan and former F2 in the fuse, etc. Use thinned 30-minute epoxy, finishing resin or fuelproof model paint.

Note: Fuelproof the wheel wells and flap wells **before** you cover the wing. Otherwise, the paint may soak through the balsa and add blemishes to your covering.

CABIN DETAILS

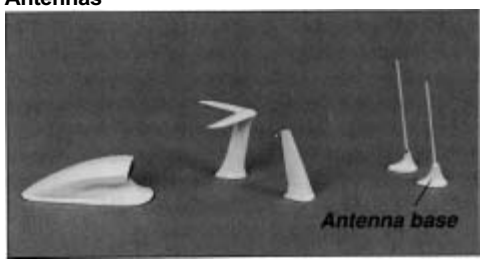
❑ 1. If you have decided to install the Top Flite Beechcraft Bonanza Scale Interior Kit, you may do so at any time, but some *fitting and maneuvering* is required *so* we recommend you install it before you cover and paint your model. It is not necessary to permanently install the interior kit at this time, but you should at least fit it and prepare it for painting. Refer to the installation instructions included with the Scale Interior Kit.



❑ 2. Make sure your windows are fitted **before** you perform this step. If you're not going to install the full Cabin Interior, glue the die-cut 1/8" plywood **instrument panel** to the crutch where shown on the plan. Use the **glareshield template** on the plan to make the **glareshield** from thin cardboard such as a manila folder. Lightly spray the glareshield with CA accelerator. Glue it to the instrument panel and the cabin top. Add whatever other details you would like to the cockpit and mount your pilots to a piece of leftover 1/8" plywood glued between the fuselage sides.

SCALE DETAILS

Antennas



This is the fun part (if you're not staying up late rushing to get your model finished for competition). There are many scale details you can add to your Bonanza that will really bring it to life. We added the antennas and the air scoop as shown on the plans. The air scoop is the only one of these that is included with your kit and is molded in two halves. Build the air scoop the same as the cowl and tail cone. The antenna *bases* were carved from wood, then primed and painted white. Use maple, basswood, or a similar dense grain hardwood. Drill a 1/16" hole for antennas made from 1/16" brass tubes. When your scale details are finished, mount them to your model with double-sided tape, or 1/16" double-sided foam tape, or rubber cement. We recommend that you do not *permanently* mount the antennas to your model, so you can replace or repair them in case of hanger rash.

Cowl

The *louvers* are molded into the cowl. You can cut the louvers out or just paint them black.

Scale Lighting

We've provided details for how to mount your wing tip lights while you were building the wing. The rest of the wire routing and hookups are easy because everything else is open and accessible. Fit the rest

of the wiring and lights. **Temporarily** mount the circuit boards and the battery holders, so you can relocate them in case you need to adjust the C.G. Follow the instructions that come with the lighting kit to hook up and operate your lights.

FINAL SANDING

Nearly all imperfections in your wood structure will show through the covering. Make one last check of the entire structure. Repair dings or scratches with filler. Sand all surfaces with progressively finer grits of sandpaper.

COVER YOUR MODEL WITH MONOKOTE FILM

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

1. Most importantly, **NEVER CUT THE COVERING DIRECTLY ON THE SHEETING.** The Bonanza depends greatly upon the sheeting for its strength. Modelers who do this tend to cut into the sheeting and this will weaken the structure.

2. Remove all dust from the structure with a vacuum with a brush attachment, compressed air or a Top Flite Tack Cloth.

3. Use a Top Flite Hot Sock to minimize dents in the wood from the iron.

4. Some modelers have three irons going at once: one on high heat without a Hot Sock for stretching the covering around curves like wingtips; one on medium heat with a Hot Sock for bonding the covering to large sheeted areas like the wing and stab; and a Trim Iron for small areas.

5. When you cover large sheeted surfaces such as the wing, bond the covering in the middle and work outward pushing out air as you proceed. Do not move the iron in a circular motion but move it span-wise with the grain of the wood.

6. When you cover smaller parts with square edges such as the elevators and ailerons, cover the ends with separate pieces first. Then all you have to do is wrap the covering around the top and bottom and iron it down.

7. When you cover sharp junctions like where the stab meets the fuse, cut narrow strips of covering (3/8" to 1/2" and apply them in the corners **before** you cover the major surfaces. The larger pieces of covering will overlap the smaller pieces. This technique also eliminates the need to cut the covering after it has been applied.

Recommended Covering Sequence:

Fuselage
1. Tail junction strips as described above
2. Stab bottoms, then tops
3. Fin (if straight tail) right, then left side
4. Fuse bottom aft, then front
5. Fuse sides
6. Turtle deck (may be done in one or two pieces)
7. Front deck aft of cowl

Wing
1. Hidden areas and *corners* such the TE in the flap and aileron area
2. Bottom of center section
3. Bottom of one, then the other outer panel including the wing tips
4. Top of the center section
5. Top of one, then the other outer panel including the wing tips

Control Surfaces
1. Ends, bottoms, then tops of elevators, flaps and ailerons
2. End and bottom of tip, then one side, then the other side of the rudder (if straight tail)
3. Flap and aileron servo hatch covers

PAINTING

At this stage all your plastic pieces should have the seams filled with Bondo or putty. Spray all the molded plastic parts and scale accessories with at least one coat of primer. We used Top Flite LustreKote on just about everything that needed to be painted. Wet-sand between coats with 400-grit sandpaper. Use Great Planes 1/8" EZ-Mask Flexible Masking Tape (GPMRI000) for masking fine lines, Kyosho Masking Cover Sheet (KYOR1040) for quickly masking large areas, a Top Flite Tack Cloth (TOPR2185) to remove dust just before paining, and LustreKote paint for a MonoKote matching finish.

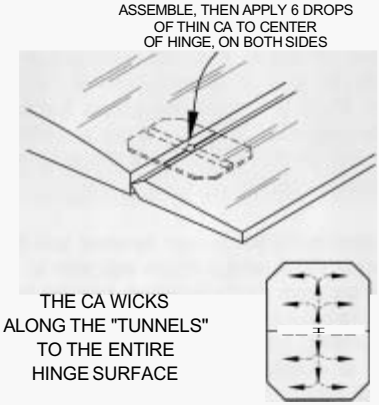
For painting the pilots we recommend acrylic water base paints such as the types found in craft stores. This type of paint looks great on a pilot because it is not glossy, and best of all, it cleans up with water.

We recommend gluing the clear plastic wing tip lenses to your wing before you cover or paint them. We used strips of Top Flite MonoKote Trim Sheets to cover the clear wing tip lenses. Part of the wing tips are to remain clear.

JOIN THE CONTROL SURFACES (HINGING)

These instructions mention the V-tail which uses two torque rods instead of a single joiner wire as used on the straight-tail. If you're building the straight tail, follow these instructions except where the torque rods are mentioned.

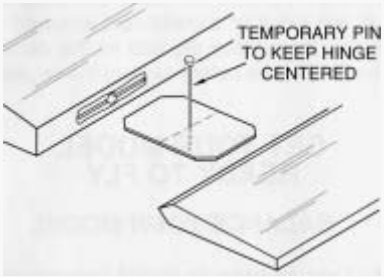
❑ 1. Start with the stab and elevators. Remove a small strip of covering from the hinge slots. For the V-tail, remove a small strip of covering where the plastic bearing tubes contact the TE.



Q2. Drill a 3/32" hole 1/2" deep in the center of the hinge slots on the stab and elevators. A high speed Dremel Tool@with a cutting burr works best for this, but you can use a drill or a sharpened brass tube instead.

❑ 3. If you are building the V-tail, use coarse sandpaper to roughen the part of the torque rods that will be inserted into the ruddervators and the plastic bearing tubes. If you are building the straight-tail, roughen the joiner wire. Use a toothpick to dab a small amount of petroleum jelly on the ends of the V-tail plastic bearing tubes to keep epoxy out.

❑ **4.** Fit the hinges in only the stab or elevators (without glue). Fill the torque rod holes in the elevators with 30-minute epoxy. Install the torque rods in the elevators. Wipe away excess epoxy with a cloth dampened with alcohol.



❑ 5. Join the elevators to the stab with the hinges. If necessary, insert a pin in the center of the hinges to keep them centered in the elevator and stab. Make sure there is approximately a 1/64" gap between the elevators and the stab so you do not glue them together.

❑ 6. Cut a paper towel into 2" squares. Add six drops of thin CA to the center of the hinges on **both the top and bottom.** Use the paper towel squares to absorb excess CA from the hinge gap before it cures.

Do not use CA accelerator on any of the hinges and do not glue the hinges with anything but thin CA. Do not attempt to glue one half of the hinge at a time. The hinges will not be properly secured and could come out while the model is in flight.

❑ 7. Glue the bearing tubes to the TE with a dab of 30-minute epoxy.

❑ ❑ ***8.*** Use the same hinging method to join the rudder to the fin (if building the straight tail) and the ailerons to the wing.

❑ ❑ 9. Thoroughly roughen the flap hinges with coarse sandpaper. Mix enough 30-minute epoxy to do one flap at a time. Use a piece of leftover wire to thoroughly coat the holes in one of the flaps and the holes in the wing with the epoxy. Coat one side of the flap hinges with epoxy and insert them into the wing. Coat the other side of the hinges with epoxy and join the flap. Wipe away excess epoxy before it cures.

❑ ❑ 10. Position the flap and the hinges so the flap is centered and fits the wing. Tape the flap in place until the epoxy is fully cured.

❑ 11. Join the other flap to the wing the same way.

❑ 12. Reinstall any pushrods you may have disconnected while covering, and mount the control horns to the ailerons.

GLUE IN THE WINDOWS

❑ 1. Use a special canopy glue such as J & Z Products *Z RC/56* (JOZR5007) to glue the windows to the cabin top. This kind of glue is formulated for plastic and dries clear. Wipe away excess glue with a tissue dampened with water before it dries. Use masking tape to hold the windows to the inside of the cabin top until the glue is dry. If you decide to use CA, use medium CA (not thin). Use it **sparingly** and **do not** use accelerator.

❑ 2. Trim the clear plastic **tail lens** to fit the tail cone.

MAKE DOOR AND HATCH OUTLINES

Use a Top Flite Panel Line Pen to draw the door and baggage compartment hatch outlines or use a Smart Stripe™ to cut narrow strips of MonoKote Film and iron them on. If you use the Panel Line Pen, use a straightedge with a few pieces of masking tape stuck to the underside of the straightedge to keep the ink from *wicking* underneath it. Use the Top Flite Scale Template for rivets, hatches, fuel caps and other details. Some cleaners will remove the ink lines so test your cleaner before you spray it on your model. You can remove mistakes with alcohol. You'll need to touch up some of the lines from time to time because they fade with lots of handling and fuel spillage.

HOT TIP

Use the plans to make templates of the doors and the luggage hatch from a clear butyrate plastic sheet. Sand the edges of the templates with 320-grit sandpaper. Stick a few layers of masking tape to the bottom of the templates near the edges to raise it off the surface. This will prevent the ink from *wicking* underneath. Cut a hole in the center of the templates so you can tape them in position without the tape extending over the edges. Position the templates on the fuse. Trace the outlines with a Top Flite Panel Line Pen.

APPLY THE DECALS

The decal sheet does not give you everything you need to completely trim your model, but it does provide most of the intricate detailing and difficult items.

1. Study your documentation package and the photos on the box to decide where to place the decals.

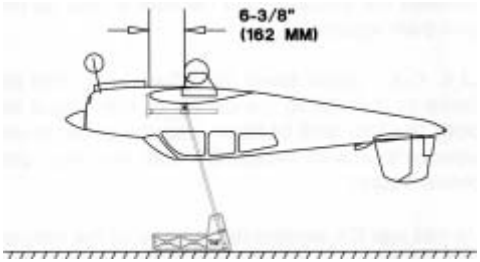
2. Thoroughly clean your airplane before applying decals.

3. Cut out the decals and carefully apply them to your model. You can *float* the decals into position by first applying soapy water (just a teaspoon of dish detergent to a quart of water) to the model's surface. ***Squeegy*** *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 cure for at least 12 hours before running the engine.

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. See the **Hot Tip** that follows to 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 **6-3/8" (162 mm) back from the leading edge at the wing root** as shown in the sketch and on the plans. 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 1/2" forward or 1/4" back to change the flying characteristics. If you move the balance point **forward** it may improve the smoothness and tracking, but your Bonanza may then require more speed for takeoff and become more difficult to slow down for landing. If you move the balance **aft** it may make the Bonanza more agile with a lighter *feel* and allow you to slow the model more for landing. In any case, **please start at the location we recommend and do not at any time balance your model outside the recommended range.**

HOT TIP

How to mark the balance point. The balance point is measured from the **center leading edge.** Since the center section of the wing is not visible when the wing is on the fuse, you need to mark the balance point outward a few inches so you can see where to lift the wing when it's bolted to the fuse. To do this, mark the balance point with a felt-tip pen or tape on **both ends** of the center section. Place a straightedge across the marks. Mark the balance point along the straightedge further out on the wing. Mount the wing to the fuselage.

❑ 2. Temporarily place your receiver and battery pack inside the fuselage where you plan to mount them, or lay them on the fuselage over the location you plan to mount them. This is so you can change the mounting location of the battery pack or receiver to change the C.G. without adding any additional nose or tail weight. You can do the same with lighting system components as well (if you are installing the lighting package). Otherwise, all other components should be in the model and it should be in a ready-to-fly condition with the fuel tank **empty.**

❑ 3. With the wing attached to the fuselage, lift the model at the balance point. We use the Great Planes C.G. Machine™ (shown in the sketch) for this. If the tail drops, the model is tail heavy and you must shift your battery pack or other components forward or add weight to the nose. If the nose drops, it is nose heavy and you must shift 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. You may easily install nose weight by using a spinner weight or gluing lead weights to the firewall. You may add tail weight by sticking on Great Planes (GPMQ4485) stick-on lead weights on the bottom of the fuselage under the tail. Later, if the balance proves to be OK, you can open the fuse bottom and glue these in permanently. Never stick weights to the cowl because it is not designed to support weight.

BALANCE THE AIRPLANE LATERALLY

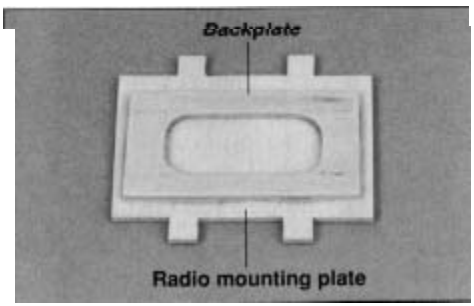
❑ 1. Mount your wing.

❑ 2. With the wing level, **carefully** lift the model by the engine propeller shaft and the fin or tail cone (this may require two people). Do this several times.

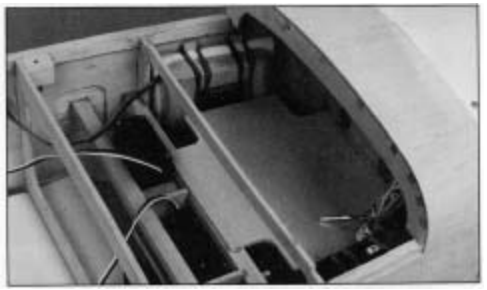
❑ 3. If one wing always drops when you lift the model, that side is heavy. Balance the airplane by gluing weight inside the other wing tip. **An airplane that has been laterally balanced will track better in loops and other maneuvers.**

INSTALL YOUR RECEIVER, BATERY PACK AND RETRACT COMPONENTS

The location of your receiver and battery pack may be determined by the C.G. On our prototypes we mounted the battery pack and receiver nearly as far forward as possible. With this arrangement, no additional ballast was required to achieve the recommended C.G. If this is where you wish to mount your battery pack and receiver, you may use the **mounting plates** provided with this kit or fashion your own method to secure your battery pack and receiver.



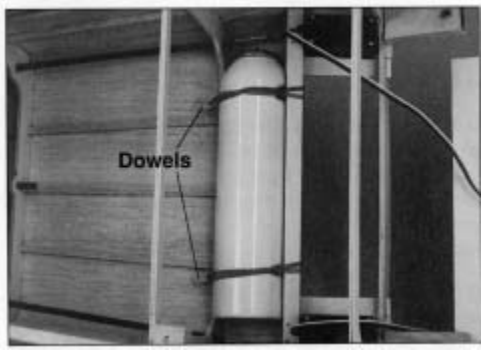
❑ 1. **Securely** glue a die-cut 1/8" plywood **plate back** to the die-cut 1/8" plywood **radio mounting plate.**



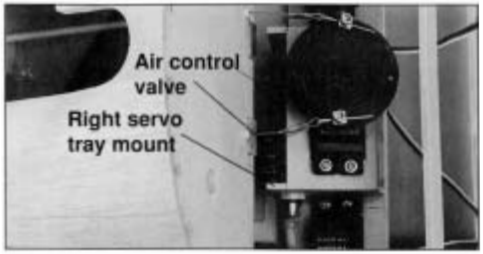
❑ 2. Secure your battery pack to the mounting plate with a few rubber bands and 1/4" thick foam rubber in between. Test fit the battery pack and mounting plate in the front of the fuse as shown in the photo. **Securely** glue the mounting plate to the fuse side doubler.

❑ 3. Install your receiver the same way. Route your receiver antenna through the antenna tube.

Note: If in the future you have to remove, then reinstall your receiver or battery pack, first hook the rubber bands to the tabs on the mounting plate. Next, stretch the rubber bands and slide your battery pack and receiver underneath.



❑ 4. Cut the two 1/8" x 1" dowels to a length of 3/4". Glue the dowels into the holes you drilled in the bottom of former **F6.** Cut the aft edges of the servo trays so they are even with the servo rails. Temporarily strap the air tank in place using two rubber bands.



❑ 5. Mount your air control valve and servo. On our prototype we mounted the air control valve to the right nose steering servo tray. Mount yours the same way or find an alternate location. Mount the servo to two rails made from leftover 1/4" x 3/8" basswood. **Note:** It will be easier to connect your air lines to the air control valve **before** you mount the air control valve in the airplane.

❑ 6. Mount your on/off switch and charge jack in a location where it will not get covered with engine exhaust residue.

❑ 7. Connect your battery pack, receiver, switch and servos. Connect the air lines to your air tank with a "T" fitting connected to your air fill valve. If you are installing the Cabin Interior, route the air lines and servo cords through notches in the formers.

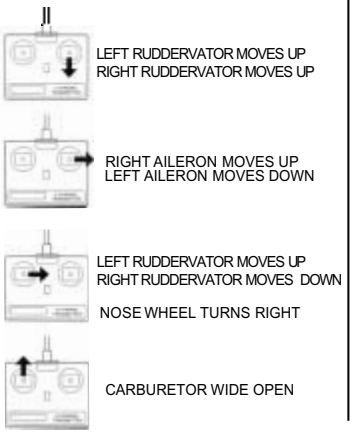
❑ 8. Recheck the C.G.

❑ 9. If you haven't already centered your servos, take the servo arms off all the servos and turn on your transmitter and receiver (this is most important for the flaps). Center the trims and put the servo arms back on your servos and secure them with the screw.

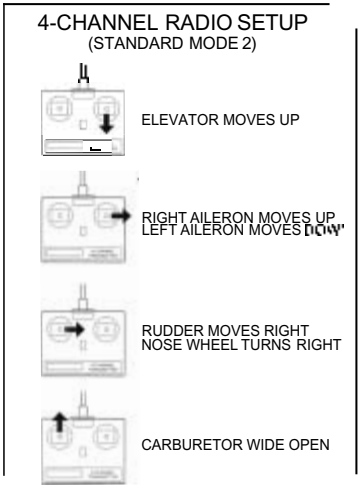
❑ 10. While you're at it, double-check all the servos and make the servo arms are secured and make sure all the clevises have a **silicone retainers.**

❑ 11. Make sure the control surfaces move in the proper direction as illustrated in the following sketches.

4-CHANNEL RADIO SETUP
(STANDARD MODE 2, V-TAIL SETUP)



4-CHANNEL RADIO SETUP
(STANDARD MODE 2)



❑ 12. Adjust your pushrod hookups and set up your radio to provide the control surface movements as follows.

V-TAIL CONTROL SURFACE THROWS

These control surface throws are for the **V-tail** model only. We recommend the following control surface throws:

NOTE: Throws are measured at the **widest part** of the control surface.

	High Rate	Low Rate
ELEVATOR:	15/16" up 15/16" down	518" up 5/8" down
AILERONS:	3/4" up 3/4" down	1/2" up 1/2" down
FLAPS:	**Takeoff** 1" down	**Landing** 2" down

	Right Elevator	Left Elevator
RIGHT RUDDER:*	1/4" down	1/4" up
LEFT RUDDER:*	3/4" up	1/2" down

*This is the amount of elevator throw with ruddet input only.

Caution: Use care when you assemble your Bonanza at the flying field. **DO NOT** lay the fuselage upside down resting on the cabin top, as this could cause the windows to loosen.

STRAIGHT TAIL CONTROL SURFACE THROWS:

These control surface throws are for the **straight tail** model only. We recommend the following :ontrol surface throws:

NOTE: Throws are measured at the **widest part** Df the control surface.

	High Rate	Low Rate
ELEVATOR:	11/16" up	9/16" up
	11/16" down	9/16" down
RUDDER:	1" right	3/4"right
	1" left	*314"* left
AILERONS:	3/4"up	1/2" up
	314" down	112" down
FLAPS:	**Takeoff**	**Landing**
	1-· down	2" down

NOTE: This applies to both the V-tail and straight tail.

TRIM MIXING: If your transmitter has flap to Elevator mixing, we recommend mixing 1/32" of **down** elevator at half flaps and 1/16" of **down** elevator at full flaps. This will keep the nose level when the flaps are deployed.

The surface throws and balance point listed in this manual are the ones at which the Bonanza flies best. Set up your aircraft to those specifications. If, after a few flights, you would like to adjust the throws to suit your tastes, that is fine. The Bonanza has large elevators and does not require much throw. Too much throw can force it into a stall, so remember... *More* is not better.

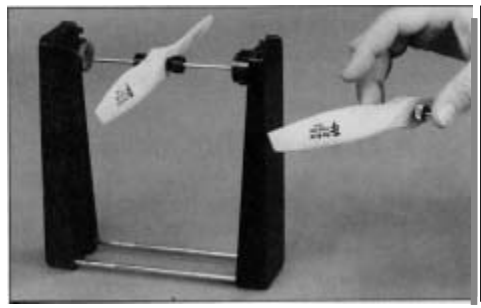
PREFLIGHT

CHARGE YOUR BATTERIES

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

BALANCE YOUR PROPELLERS

Carefully balance your propellers 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 your fuel to foam, which will, in turn, cause your engine to run hot or quit.



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

FIND A SAFE PLACE TO FLY

The best place to fly your model is an AMA chartered R/C club flying field. Contact the AMA (their address is on page 3) or your hobby shop dealer for the club in your area and join it. Club fields are intended for R/C flying, making your outing safer and more enjoyable. The AMA also provides insurance in case of a flying accident. If an RIC flying field is not available, find a large, grassy area at least six miles from buildings, streets, and other RIC activities. A schoolyard is usually not an acceptable area because of people, power lines and possible radio interference.

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 learn to operate engines.

Use safety glasses when you operate 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 engine 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 (or any body ekes') hands, fingers or any body part to stop the engine. Never throw anything into the prop of a running engine.

FLYING

The Top Flite Beechcraft Bonanza is a great flying sport scale airplane that flies smoothly and predictably, yet is highly maneuverable. Compared to other scale models, its flight characteristics are docile and forgiving. The Bonanza also has excellent slow speed flight characteristics. It does not, however, have the self-recovery characteristics of a primary R/C trainer; therefore, you must either have mastered the basics of R/C flying or obtained the assistance of a competent R/C pilot to help you until you are able to safely and competently pilot the model by yourself.

FUEL MIXTURE ADJUSTMENT

A fully cowled engine may run at a higher temperature than an un-cowled engine. For this reason, the fuel mixture should be richened so the engine runs at about 200 rpm below peak speed. By running the engine slightly rich, you will help prevent dead stick landings caused by overheating.

TAKEOFF

If you have dual rates on your transmitter, set the switches to "high rate" for takeoff, especially when taking off in a crosswind. Although this model has good low speed characteristics, you should always build up as much speed as your runway will permit before lifting off. This will give you a safety margin in case of a "flame-out." Use as much of the available runway as possible and practical. When the plane has sufficient flying speed, lift off by smoothly applying up elevator (don't "jerk" it off into a steep climb!), and climb out gradually. Do not use flaps for your initial takeoff. After you have the feel of the Bonanza, takeoffs may be made with the flaps set at 50%. Never use 100% flaps for takeoff ,ecause of the high drag.

1.20 4-STROKE NOTE: If you have installed a 1.20 **4**-stroke engine, you must manage the throttle on takeoff and throughout the flight! Use slightly more than half throttle for your first few takeoffs and be ready to apply right rudder to counteract torque as you increase power. Add power gradually until you become familiar with the Bonanza's flight characteristics.

FLIGHT

We recommend that you take it easy with your Bonanza for the first several flights, gradually *getting acquainted* with this realistic model as your engine gets fully broken-in. Add and practice one maneuver at a time, learning how she behaves in each. For ultra-smooth flying and normal maneuvers, we recommend using the low rate settings as listed on page 68 & 69. High rate elevator may be required for crisp snap rolls and spins. With a 1.20 engine the Bonanza really scoots along, so you should manage the throttle when performing high "G" diving maneuvers such as split-esses and loops.

CAUTION (THIS APPLIES TO *ALL* R/C AIRPLANES): If, while flying, you notice any unusual sounds, such as a low-pitched "buzz," this may indicate control surface *flutter*. Because flutter can quickly destroy components of your airplane, any time you detect flutter you must **immediately** cut the throttle and land the airplane! Check all servo grommets for deterioration (this may indicate which surface fluttered), and make sure all pushrod linkages are secure and free of play. If the control surface fluttered once, it probably will flutter again under similar circumstances unless you can eliminate the free-play or flexing in the linkages. Here are some things which can result in flutter: Excessive hinge gap; Not mounting control horns solidly; Poor fit of clevis pin in horn; Side-play of pushrod in guide tube caused by tight bends; Poor fit of Z-bend in servo arm; Insufficient glue used when gluing in the elevator joiner wire; Excessive *play* or *backlash* in servo gears; and Insecure servo mounting.

LANDING

When it's time to land, fly a normal landing pattern and approach. The Bonanza may bleed off airspeed more rapidly than the sport planes you are used to, but it still tends to *float* once it enters *ground effect.* For this reason, be prepared to add a little power during approach and touchdown. For your first landings, plan to land slightly faster than stall speed and flare a few inches off the runway onto the main wheels.

FLAPS

Full flaps make the Bonanza very steady in the landing pattern. Just carry a little extra power to make up for the increased drag. This drag allows you to make shorter, steeper approaches. Touch down with a slightly nose-high attitude to avoid letting the nose gear contact the runway first. You can execute touch-and-go's and slow flyby's with full flaps, but be ready to use a little more *up* elevator. You should use only *half* flaps for taking off and climbing because the plane will accelerate and climb much better than it would with full flaps. If you have to attempt a *go-around,* your first priority should be to smoothly apply power and establish a steady climb. After you reach a safe altitude, reduce flaps, and then make your turn to get back into the landing pattern.

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

GOOD LUCK AND GREAT FLYING!

TOP FLITE

THIS MODEL BELONGS TO:

NAME

ADDRESS

CITY STATE ZIP

PHONE #

AMA # SFA #

Cut this placard out, fill it out and place it inside your model.

If you enjoyed building the Top Flite Beechcraft Bonanza, try one of these other outstanding .60 size Gold Edition kits as your next project:

Cessna 182 Skylane (TOPA0300)
81" Wingspan, 10-12 Lbs.

F4U Corsair (TOPA0100)
62" Wingspan, 7–9.5 Lbs.

P-47D Thunderbolt (TOPA0135)
63" Wingspan, 8.5-10.5 Lbs.

TWO-VIEW DRAWING
Use this layout for planning your trim scheme.