EXTRA 325
BUILDING INSTRUCTIONS

To most R/C modelers, the Extra Aerobatic airplanes should need no introduction. It has been around for a number of years in a variety of forms from full kits to ARF's, Giant scale to .40 size. With the design presented here we have set out to provide performance similar to that available in the larger models, but in a .25 powered airplane; hence the name Extra 3.25.

Because some sport airplanes get a little "squirrelly", as their dimensions shrink, we have chosen to use the modified airfoil to tame the flying characteristics down to the level of the average sport flier. The absence of dihedral, other than that created by the taper of the wing itself, makes the model neutral stable with little or no trainer-like self righting characteristics. This makes it quite aerobatic even with the lifting airfoil. Building this model is quite easy and can be accomplished by anyone with average building experience. **This is not a trainer** and you should feel comfortable flying a 4-channel, aileron-equipped model in order to successfully fly it.

All of the parts on the sheet wood are laser cut. They are very easy to remove by cutting the micro-joints that retain them. Do not try to pop them out but instead, cut each micro-joint until the part falls free. In very few cases the laser may not have cut all the way through. Simply free the part by cutting over the line with a razor or X-Acto knife. Lightly scrape the surfaces that are mated (to be glued) with a razor or fine sandpaper to remove the charred dust. We recommend and have had good results using Zap (Pacer) thick and thin CA as well as Pacer epoxies.

Before starting to build we urge you to read through these instructions while reviewing the plans. They contain important instructions and warnings concerning the assembly and use of this model. Some building tips have been included along the way to help you out. Or, if you have your own way of building, then go ahead and mess it up. At least read what we have to say then make your own conclusions.

WING CONSTRUCTION

Building the wing is straight forward however, there are some sequential steps that need to be followed in order to be successful. Before starting make sure you have all the necessary parts and material on hand. Use either white glue or thick CA for general construction and thin CA when called for. Use 5 - min. epoxy when joining the wing panels together.

1. Spread out the plans on a flat surface and lay a piece of wax paper over the entire wing. You can build both wing panels at the same time or just one. It's your choice but we'll just talk about one panel. The other is constructed in the same manner.

2. Locate four 1/16" x 3" x 24" balsa sheets. With one sheet laid out before you, measure up 1-1/2" on one end and trim off, from that mark, to the opposite end upper corner using a straight edge. Now trim the other three pieces. These pieces will be used for leading edge sheeting.

3. Pin down one of the sheets down on the plans with the 3" end on the wing center line. Make sure the end is square. Don't be confused and lay the long edge on the far side of the vertical webbing line shown.

4. Locate the 1/16" x 1/4" x 24" balsa rib capping. Glue and pin down each one where shown. Cut them a little longer than necessary at the trailing edge. They will all be trimmed off at one time, later.

5. Cut a piece of 1/16" x 3" sheet 3" long. Edge glue another 1/16" x 3/4" x 3" piece to it. This will be the lower aft center section sheeting. Pin it down on the plans with the top edge even with the front edge of **WJ3.** The rib capping and the piece you just installed should all be longer than necessary. Cut and fit in another piece of 1/16" sheet, as shown, on one side of the servo cutout.

6. Carefully align a straight edge on the front edge of the trailing edge. Using it as a guide, trim off the rib capping and lower center section sheeting.

7. Locate the 3/8" x 1-1/2" x 24" trailing edge stock. Trim off one end at 9 degrees. This should match with the wing center line when laid over the plans. Now apply glue to the ends of the capping and center section sheet and pin down trailing edge making sure that one end is on the wing center line.

8. Locate and glue in **W6**, servo pushrod fairing. Find the four 3/16" x 3/16" x 24" wing spars. Temporarily pin one down (do not glue to sheeting) with one edge even with the sheeting edge and the end flush with the wing center line.

9. Find sheet 5 and 6 and cut out all the ribs. Remember, we said don't try to pop them out but cut the micro-joints on each to free them from the sheet. Lightly sand the edges of each one.

10. Beginning at the tip, apply glue from the spar notch, aft along the bottom edge, and end of each rib as it is installed over the capping. Remove some pins from the spar, allowing it to float, as each rib is installed and pushed against the trailing edge. This will allow a snug rib fit and take care of some of the building tolerance usually present. Pin each rib down making sure it is square with the building board. If centered on the capping properly, things should fit pretty close without much spar shifting. Install ribs **R9** to **R2** and include **LH and RH R1B**. (the engraved line should be on the inside).

11. Now pin down the spar securely against the sheeting and apply thin CA along it. Be careful not to overdo it.

12. Install and glue in the upper spar making sure the root end is flush with centerline. Use a square to align it. Using 1/16" x 3" sheet, install the vertical webbing in each rib bay and trim it flush with the top edge of the upper spar. The ribs are on 3" centers so some trimming is necessary. No webbing is required in the last tip bay.

13. Carefully lift the forward sheeting up with your fingers, against each rib, and apply thin CA, hold in place until cured. Use kicker to speed it up. Do this to each rib separately until all have been glued. **Make sure the sheeting is against the rib edge**. Support the top surface with your thumb so as not to lift the structure from the board.

14. Install the top sheeting with the long edge even with the back edge of the spar and end flush with the wing center line. Again, use a square to check. **Apply glue along the top edge of the spar only.**

15. Glue the top rib capping on each rib, carefully centering it. The top center section sheeting will not be installed until after the wing panels are joined.

16. When the glue on the wing panel is completely cured remove it from the building board. **At each rib** pull the top sheeting down to conform to the airfoil, holding with your fingers, apply thin CA, and hold until cured. A shot of kicker will help speed things up. Now trim the upper and lower sheeting off flush with the ends of the ribs. Use a long sanding stick to keep a flat surface.

17. Locate the 5/16" x 5/8" x 24" leading edge and glue in place using masking tape to hold it until cured. Trim off the tip and sand everything flush. Locate **T1** and glue in place. Rough shape the leading edge to the configuration shown on the plans.

18. Find **W1** and note the line engraved on one end. When installing, align the line flush with **R5** surface. This will place the bellcrank hole the proper distance from the rib. Now glue in place. The bellcrank hardware can be installed later if desired.

19. Turn the wing over (top side down) and layout the notch at the forward end of the root. It is 2-1/4" over from the center line and 1-1/16" from the backside of the wing spar. Carefully cut the notch out preferably with a band saw by laying the top of the wing on the table with the trailing edge blocked up approx. 1" to keep it level.

20. Locate and install the gussets **W2** and **W3** where shown on the plans This completes the wing panel. The next step will be to join the panels. If you haven't built the other panel, do so now.

JOINING THE WING PANELS

Joining the wing panels is somewhat different than you are used to. Both panels are joined up-side-down on a flat surface. The reason for this is to allow the taper in the wing to act as dihedral on the bottom side. The top of the wing is flat with no dihedral.

1. Turn one panel over (top-side-down) on a flat surface and pin a 1" block close to the end root rib to keep the wing approx. level with the building surface. If you own a large disk sander you have it made however, it can be done at the edge of the work bench with a little patience. Place the wing panel near the edge of the workbench. Using the edge of the bench as a guide, hold the panel and lightly sand the required angle with sand paper mounted on a large flat block. Sand just to the lower wing sheeting edge (the center line) and no more, leaving the lower sheeting edge in tack.

2. Locate **WJ2** and slide in place in front of the spars on one panel. Now trial fit the other panel to be sure the surfaces mate. You may find it necessary to take a little off the ends of **WJ2** to accomplish this. When satisfied lay down a piece of wax paper on the workbench. Using 5-min. epoxy glue **WJ2** into one panel. Note, the center line engraved on **WJ2** should fall on the edge of the sheeting, top and bottom.

3. When cured, spread epoxy on the other mating surfaces and lay the panels, top side down, on the wax paper. Use pins where necessary to hold them together. Block up the trailing edge again with the 1" block and **weight the panels on the spars only** to hold everything in place.

4. Locate **WJ3** and glue in place at the back edges of ribs **R1B**. Find the two **R1A's** and glue them in place. These will have to be slipped in place between the sheeting so make sure they are located properly. Use **WJ1** to gage the distance between them. You may find this somewhat frustrating. Glue in the two **R1's** at the center of the wing.

5. Laminate 5 **W7's** to make a block (two will be required) 5/8" thick. Locate and glue in place where shown on the plans. Now glue in **WJ1** in between the top and bottom sheeting and against the blocks. The holes in **WJ1** and **WJ2** are screwdriver clearance holes to enable drilling and installing the servo mounting screws.

6. Add the 1/16" sheeting on the top side from the forward edge of **WJ3** back to the trailing edge. A small piece will have to be added at the lower end. Note: Do not add the sheeting on either side of the servo well until the servo has been mounted with pushrod hardware in place. It will be easier to get at the pushrods.

7. Locate the 5/16" x 5/16" wood supplied and cut off two 1-1/8" lengths. Note the engraved line on ribs R1B. Centrally locate and epoxy one piece to the back side of the line on each rib. **Note: This rail location will work for a Futaba or JR standard servo however, if you are using different servos some adjustment will have to be made to keep the pushrod lined up with the rib clearance holes and bellcrank.**

8. Layout the ailerons on both wings. Cut them out of the wing with a band saw or if you are so inclined, use a sharp X-Acto knife. Measure 8-1/16" back from the wing notch face and cut off the flat parallel with the wing notch face on the trailing edge at the center section. Locate **W1** and glue in place noting the center line and back edge even with the trailing edge. The small holes are the wing hold down bolt locations which will be drilled later. Locate the two **W5's** and glue in place flush with the end of **W4.** These have a two fold purpose. They retain the canopy and keep it centered.

9. Shape the leading edge of each aileron as shown on the plans and locate the hinge slots where shown on the plans. Now slot the wing trailing edge and aileron leading edge at each location on the center line. This can best be done with a Du-Bro Hinge Slotter Kit No. 660. Trial fit the ailerons with the hinges to make sure of a good fit.

10. Install the aileron control horns aligning them with the bellcrank. Install the Z-bends in the bellcrank before mounting it. Locate the head of the pivot bolt of the bellcrank on the bottom side. Use the washer and nut on the top side. Trim off the top side end of the bolt if desirable. Drill out the outer hole on each bellcrank arm with a #43 drill bit. The threaded rod material will fit perfectly. Form the pushrods Z-bends using the material as stated on the plans. We specify Z-bends because they don't come off. Once the aileron output arm fitting and pushrods are adjusted to satisfaction, add the 1/16" sheet on either side of the servo opening.

11. The wing is now complete and ready for final sanding and covering. The front wing holding dowels will be located later after the fuselage is constructed.

FUSELAGE CONSTRUCTION

The fuselage is built-up completely. Assembly will proceed quite fast with the accurate laser cut parts. Remove all the necessary parts from the balsa and lite-ply sheets. Nothing will be built on the plans but, keep them handy for part location. Use thick CA and 5-min. epoxy for assembly where called for.

1. Locate the fuselage sides, **FS1A** and **FS1B**. You should have two of each. Lightly sand the edges of the mating finger joints to get rid of the charred dust. Lay down a small piece of wax paper to keep the glue from sticking to the work bench. Using either thick CA or 5-min. epoxy, join **FS1A** to **FS1B** to form a side. Weight them down until cured.

2. Lay the sides out on the workbench, opposite hand, and locate the 2 **FS3** doublers. Align and glue in place, on both the sides, with the small notch in the aft end in line with **F3** location.

3. Lay out one side and weight it down, with the doubler facing up, and locate former's **F1** and **F2**. Glue **F1** in the notch at the front. Use a square to ensure perpendicularly. Now glue on **F2** former. Again, make sure it is perpendicular. Keeping the former's vertical is very important in producing a symmetrical fuselage. Let the glue on these former's cure fully.

4. Find **FS2** and glue one in next to the side. This will help to stiffen the former's to hold the steady for the next step. **Keep the back edge flush with F2.**

5. Now install the opposite side in the former **F1** and **F2** tabs and glue in place. Make sure it is firmly in the tabs and weight it down. When cured, pull the tail end sides together keeping them even and of the same length. Apply glue along the back edge and pin or tape in place. Allow to dry.

6. Locate **F3**, apply glue, and slip it into its respective slots between the fuselage sides. Allow to cure. Likewise, install former's **F4** and **F5**. Find the short piece of 5/16" x 1-1/2" x 2" TE stock and cut off a length of 1-3/4". Trim off 3/4" from the thin end keeping the thicker side. Increase the taper on both sides, equally, to fit as a tail post. Glue in place. Now glue in the other **FS2 keeping the back edge flush with F2.**

7. Install and glue in the 3/16" x 3/16" stringers between **F1** and **F2**. Now install and glue in the stringers on the turtledeck. It will be necessary to chamfer, slightly, the two lower notches on F3, both sides, to accept the stringer. There are no notches in **F5**. Glue the stringers against it spacing them evenly. Trim off even with all former's.

8. Locate **LG1** and epoxy in place. Glue on **FB1** at the forward edge of **LG1**. Using the mounting surface of the formed landing gear as a gage, locate centrally and glue on **FB2. Keep it vertical.**

9. Now is the time to sheet the bottom of the fuselage. Locate the **3/32" x 3 x 24"** balsa sheet and tape one end to the edge of **FB2**. Pin the sheet back at the tail, turn over the fuselage and mark the configuration of both sides. Remove the sheet and trim off to the line. Apply glue to the bottom edge of the former's and the tail end. Make sure the sheet is up against each former.

10 Next, with a sanding block, sand the chamfer on each side until you attain a flat surface on the bottom and sides. All the way back to the tail end. Locate the two **3/32" x 1-1/2" x 24 "** pieces. Glue one on each side. Use thick CA and it will stick quickly. Trim and sand the sides and bottom flush with the sheeting just installed.

11. Now sheet the bottom forward part of the fuselage in the same manner. Sand flush with the former's on each end. Locate the two **B1's** and epoxy in place where shown. It will be necessary to sand the back edges to mate with **F3.** Cut two lengths of **3/8" tri-stock,** 2" long and epoxy them in on both sides at the juncture of **LG1** and **FS2** for added support.

12. Locate **MB1** and **MB2** and epoxy in place. When cured, sand **MB1** flush with the rest of the surface. Cut, fit and epoxy in the 1/4" tri-stock to reinforce the firewall making sure all the outer surfaces are flush. When cured, block sand to make a level gluing surface.

13. Place the wing in the fuselage with the wing notch firmly in place. Make sure it is centered at the trailing edge. Now pin and tape securely in place. Note the 5/16" dia. holes in **F1**. Using a long 1/4" drill bit, slide it thru this hole and match drill the wing dowel hole in **F2,** thru **WJ1** and into the servo opening. Now do the other one. Remove the wing and temporarily install the two wing dowels (chamfer the ends)

allowing them to protrude about 1/4". Re-mount the wing, drill and tap **B1** for the the **10-32** nylon wing hold down bolts at the location holes provided. A clearance hole for the bolts is required in the wing.

14. Find the firewall, layout the engine mount holes for the blind nuts. Locate the thrust line from the plans and center it, side to side. It is much easier to do this before it is epoxied in place. Note that it is a little wider than the side mounts but, fits just right, top and bottom. We made it square so you wouldn't get mixed up. Allow 1/16" to overhang on each side. Do not epoxy in place until the canopy dowel holes are drilled, making it easier to look through the front and locate the holes in **F2.**

15. This completes the fuselage up to the point of adding the servo tray and canopy assembly. By now it ought to be look'in good!

SERVO TRAY ASSEMBLY

Mounting the servos in the Extra 3.25 is a little different than you are probably used to. We had to lay them on their sides due to space limitation. However our design does package them nicely and permit easy removal of the tray itself when necessary.

1. Locate **ST1**, **ST2**, **ST3**, and **ST4.** Cut 6 lengths of 5/16" x 5/16" hardwood 1" long and square off the ends. Lay down a small piece of wax paper, place **ST1** on it. Epoxy or CA in the 6 hardwood pieces into the square holes. Hopefully the tolerance on the wood will be close enough for a snug fit in the holes. **Make sure they are perpendicular with the tray.**

2. Now glue on **ST2** and **ST3** supports. Place the servo tray in the fuselage with the tongue, on the tray, in the notch at the bottom of **F3**. Mark the location of the forward end, on the bottom of the fuselage. Locate **FB3** and epoxy in place with its forward edge on the location just marked. Cut 2 lengths of 5/16" x 5/16" hardwood 1/2" long and epoxy them to **FB3**, centered, below the mounting holes in servo tray. When cured place the tray in the fuselage again, making sure the tongue is in the notch as far as it will go. Tape the forward end to **FB3**. Now glue **ST4**, to **F3**, with the edge against the servo tray tongue. This will form a slot to retain the back end of the servo tray. A snug fit is required. Now drill the two #4 mounting screw holes at the forward end.

3. The servos can be mounted at this time if you desire. We have shown Futaba S-148 servos. If you have a different servo size, check the fit and modify as needed to mount it. With the servo tray complete, place a piece of 1/16" sheet balsa on the tray below a servo mount to act as a shim to provide a space between the servo and tray. Place a servo against the mounting rails, down against the shim, and scribe the mounting holes on the rails. Remove the servo and drill four 3/32" holes. Preferably with a drill press if possible. Now mount the servo as shown on the plans. Note: the two aft servos are mounted with bolts and lock nuts. The throttle servo can be mounted with #2 servo mounting screws, the standard method. Set the servo tray aside until final assembly.

CANOPY ASSEMBLY

1. Mount the wing on the fuselage and install the two wing hold down bolts. Place a small piece of wax paper where the wing meets **F2** and also at the wing trailing edge and **F3.** Find **C1**, (there are 2 in kit, only one req'd), centrally locate and tape it to **F2**. It should be slightly smaller allowing for the canopy thickness. Now locate **C2** against **F3** in the same manner.

2. Locate the two **C3's** and glue them into the notches on either side of **C1** and **C2**. Install the 4 **C4** gussets and glue them in the four corners. Before sheeting the top of the frame, it is a good idea to glue on the 2 canopy retaining tabs **W5** on the wing next to the rail on either side. Reinforce them on the inside with a short piece of 3/8" tri-stock. The tabs serve two purposes: they retain the back end of the canopy and help to center it.

3. Now sheet the frame with thick CA using 1/16" x 3" balsa and sand the ends flush with the side rails. Find the canopy and prepare it for installation. Note the trim lines around it. Rough cut it out with a pair of scissors, then trim it closer with a Dremel motor and sanding drum. Finally smooth it up by hand sanding the edges. The canopy should fit very close but may need some trimming here and there.

4. With the wing mounted, mount the canopy and tape it in place. Match drill the holes for the dowels that retain the canopy, at the forward end, from former **F2.** Access holes are located in **F1** for this purpose. Use a long 3/16" drill, accomplish this the same way you did the wing dowels. After drilling, cover the four holes in **F1** with a small square of 1/16" balsa. Cut two lengths of 3/16" dowel, as shown on the plans, and glue them in place. Now locate and drill the retaining holes in **W5,** on either side of the canopy at the trailing edge of the wing, using the fasteners specified on the plans. When satisfied with the fit, prepare the canopy for painting. Note the paint line shown on the plans. Before gluing on the canopy you might want to add a pilot and instrument panel. We recommend gluing on the canopy with Formula 560 canopy glue by Pacer.

TAIL ASSEMBLY

The tail surfaces are all sheet balsa and will built up quite fast. Finishing them will take more time.

1. Starting with the stab and elevator, locate **S1**, **S2**, and the two **S3's**. Edge glue **S1** to **S2** making sure the adjoining surfaces are even. Spread the plans out and lay a piece of wax paper over the elevator. Pin down the two elevators on the plans. Cut and fit in a piece of **3/16" dowel** between them and with 5-min. epoxy. Thicken the epoxy with micro-balloons filler. It will not run as much and will be easier to sand. Shape the leading edge of the elevators, locate and prepare hinge mounting, but do not glue them in until covering is complete.

2. Build the fin and rudder. Locate **VS1**, **VS2**, **RUD 1**, **RUD 2,** and **RUD 3**. Edge glue, with thick CA, **VS2** to **VS1**. Likewise glue **R2** to **R1,** (there are 2 **R1's** in kit, only 1 is req'd) and **R3** to **R1**. It is not necessary to pin them down to the plans. Block sand the parts and locate and prepare the hinge mounting.

3. Building the tail fairing blocks is a simple matter with excellent results when we show you how. Find the **1" x 1" x 16"** block of balsa. Cut two lengths **4-3/8"**. Locate **TB1** and **TB2.** These parts will be used to simulate the stab and fin. Place the **TB1** piece between the two 1" square blocks and **TB2** on the bottom. Tack glue, very sparingly, these parts together. Just enough to keep them in place as you will want to cut them apart when finished.

4. Lay the block on the end of the fuselage behind and against **F5**. Center it and tape in place. **Make sure the center of the TB1, representing the fin, is centered on the fuselage.** Trace off the fuselage configuration with a pencil. Remove and saw off each side to the line. Trace the fuselage configuration from the side view on the plans and transfer to the block. Cut off the excess material.

5. Tack glue the rough shaped block in place, on the fuselage, and shape to fit the fuselage. **Make sure the center of the 3/16" material, representing the fin, is centered on the fuselage.** When completed, cut away from the fuselage and the tack glue places holding the two fairing pieces. **TB1** and **TB2** will not be used. The two fairing blocks will fit perfectly when placed up against the fin and stab. They can be covered separately and glued in place at final assembly.

COWL ASSEMBLY

Fitting a cowl, with proper cutouts around the engine is always a pain however, if you do it carefully and plan, things will go a little easier. The cowl length has been cut to a length allowing you to fit it with your particular engine depending where you mount it on the engine mount. The engine location from the firewall is the determining factor in getting a proper fit between cowl and spinner.

1. Mount the engine on the mounts as shown on the plans. Now mount it to the firewall. Carefully measure from the spinner back plate to the firewall and subtract 1/16". Place the cowl, nose up, on a flat surface and tape a straight piece of wood across the nose. Measure the distance down from the lower edge and mark. Scribe the line all the way around the back edge. Now trim off the back edge of the cowl , all the way around, to this dimension.

2. Next cut a 1-1/2" diameter hole in the cowl nose to clear the engine crankshaft. You can also cut out a small air vent hole on either side to help with the engine cooling. Cut out a clearance hole for the muffler pipes in the bottom. The engine head will stick through the cowl. Measure carefully and cut a hole for it and a hole access for the needle valve.

3. Cut three block from the 5/16" sq. stock, 3/4" long, and epoxy them to the firewall at the locations shown on the plans. Offset them from the surface by the thickness of the cowl so it will be flush with the configuration of the fuselage. The blocks should be tapered slightly so the cowl will rest flat on them. Now locate and drill the three mounting holes. Fasten the cowl in place, check the fit, and trim where necessary.

LANDING GEAR AND WHEEL PANTS

The landing gear is preformed however, you will still need to do some work on it. Mounting holes to fasten it to the fuselage will have to be located and drilled. Also, wheel pant retaining holes must be located and drilled in each strut.

1. Note the top view on the plans. Locate the mounting hole locations on the formed landing gear and drill a clearance hole for a #8 screw using a no. 19 (.166) drill. Note: we suggest using sheet metal screws to retain the gear to the fuselage. They will more than likely, in the event of a crash, pull out rather than tear out the bottom of the fuselage. However, you can use blind nuts and bolts if you desire.

2. Lay the landing gear aside temporarily and locate the ABS wheel pants. You should have a RH and a LH assembly when completed. Lightly block sand the adjoining surfaces on each part. Match each half with each other and temporarily tape together. When you are satisfied with alignment use thin CA glue to bond them together removing the tape where and when necessary.

3. Cut out an opening in each to clear the wheel size. Center it with the flat spot where the gear legs rests. Layout out carefully and use a Dremel motor with a drum sander to remove the material. A smaller burring bit will help put a smaller radius in the corners.

4. Locate the two **WP1's**. Round off the bottom edge of each on one side with sand paper. Using thick CA install **WP1**, with the rounded off bottom edge to the inside, and centrally locate it on the flat spot. When cured, carefully remove the plastic material inside of the slot flush with **WP1.** Remember, you want a snug fit. Now do the other wheel pant.

5. Install the wheel axles called for on each strut. When tightening them in place, make sure the flat side of the hex is vertical. **The slot in the wheel pant must fit over the flats on the hex.** Trim off each axle to 1" in length with a Dremel cut-off wheel.

6. Next, drill a 1/8" dia hole in each strut, 7/16" up from the center of the existing 1/4" hole. These holes will be used to fasten the pant to the strut. Hold a wheel pant in position on the strut and mark the center location of the 1/8" dia. hole in the strut on the pant. Now drill a 11/64" dia. hole at this location and install a #4 blind nut. Secure it with thick CA. Now do the other pant.

7. Before mounting the wheels, slide three #6 flat washers on an axle. Now slide on the wheel and secure it with a 1/8" wheel collar. The wheel pants can be mounted or dismounted without removing the wheels. That's the beauty of this arrangement. The down side is, if the bolt comes loose and falls out, you can lose a pants! Hmmmmm. Use a lock washer under the bolt head to prevent this from happening.

FINAL ASSEMBLY

It is a good idea to have everything fitted and mounted before covering and painting. Then disassemble, cover, finish, and trim. Re-assemble the parts and you are done. Following this practice will assure you of good organization and completeness.

1. Makeup the tail wheel strut assy. Looking at the plans make the 90 degree bend in the wire first, slip on the nylon bearing from the opposite end, slide on a 1/16" wheel collar, and then finish forming the strut. Fasten the wheel to the axle with a 1/16" wheel collar.

2. Mount the servo tray in the fuselage. If you haven't already installed the servos see **Servo Tray Assembly on page 6.** Makeup the pushrods with the hardware called for on the plans using the 1/4" balsa or 1/4" dowel. Balsa is lighter. The pushrod lengths can be made over the plans. Bind the threaded rods to the balsa pushrod with thread and glue with thin CA. There are many ways to do this, we have shown you the basic way. Route the throttle pushrod, with the hardware called for, making sure it moves freely. The receiver batteries, receiver, fuel tank and battery switch can be installed when all of the parts are re-installed after finishing.

3. When installing the airborne equipment, wrap the receiver in foam, to protect it, and place just behind **F2.** Wrap the batteries in foam and place them under the fuel tank or as close to the center of gravity as possible. Using foam, place the fuel tank in the position shown. The batteries may be shifted forward or aft to balance the model properly.

4. Locate the rest of the 1" x 1" balsa block. Cut a piece and shape it to fit the slot in the fuselage under the landing gear. Dig small holes in it at each of the screw head location for a flush fit. It should be covered or painted before gluing in place. Use minimal amout of glue so it can easily be remove in case it is necessary to remove the landing gear.

FINISHING

We recommend you cover your model with a film covering in order to keep it light. Use Formula U, K&B Superpoxy, Hobbypoxy, Perfect Paint, Coverite 21st Century or MonoKote LustreKote paint over the ABS plastic. Do not try to mix different paints and thinners together and by all means test a small piece first before using any other paint not listed. Let your imagination run a little on the color scheme or copy some well known design you have seen and liked.

BEFORE FLYING

Before the first flight, and to ensure some longevity in your Extra 3.25, you will do well to check out a few things before heading to the flying field.

1. Balance the Extra 3.25 at the indicated CG point shown on the plans with the fuel tank empty. Depending on your type of flying you may want to adjust it forward or aft some.

2. Check the control surface travels. We have given you a starting point however, they need to be fine tuned to meet your flying needs.

3. Run the engine and check the idle. Have it ready so you don't encounter any problems at the field.

4. Turn on the radio with the engine running to make sure there are no intermittent glitches. Give it a good range check.

5. Check all hardware to be sure it is secure. There is nothing worse than losing an airplane on the first flight because of a lose nut or clevis.

6. Hopefully by now you are ready. We know you will be thrilled with the first flight of your Extra 325 and that it was most successful. From now on, cut up the sky - Happy Fly'in!

HARDWARE AND MATERIAL LIST FOR EXTRA 3.25

GENERAL

1. 4 channel radio
2. engine - (.25 preferred) Hayes engine mount to suit)
3. Muffler - Slimline Pitts Style
4. fuel tank - 4 oz Du-Bro no. 404
5. propeller - suitable size to fit engine
6. fuel line
7. 2" spinner - Tru-Turn
8. covering, paint and trim - your choice

9. 2" dia.- Du-Bro 2.00L wheels
10. Ca, thin and thick glue, 5 min epoxy.

FUSELAGE

1. Mounting bolt set, Du-Bro no. 129 (engine mount)
2. Button head screw, Du-Bro no. 530 (5) (cowl and canopy retainers)
3. Button head screws, Du-Bro no. 533 (3) (landing gear mounting)
4. #4 Blind Nut, Du-Bro no. 135 (3) (wheel pant retainer)
5. Steel Axle, Du-Bro no. 246 (landing gear)
6. 1/8" Wheel Collar, Du-Bro no. 139
7. #6 flat washers, Du-Bro no. 325 (6) (landing gear axle)
8. #4 x 3/8" bolt, (2) (wheel pants retainer)
9. Mounting Bolt Set, Du-Bro no. 175 (2) (servo retaining bolts)
10. Threaded Rod, Du-Bro no. 143 (4) (rudder and elevator pushrod)
11. #4 X 3/8" sht. mtl. screw (2) (servo board retainer)
12. Nylon Kwik-Link, Du-Bro no. 122 (4) (rudder and elevator pushrods)
13. 1/4" x 24" balsa or 1/4" dowel (rudder and elevator pushrods)
14. Throttle Pushrod, Du-Bro no. 165
15. Nylon washer, Du-Bro no. 636 (5) (cowl and canopy)

WING

1. Nylon Hinges, Du-Bro no. 117 (6) (aileron hinge)
2. Threaded Rod, Du-Bro no. 172 (4) (aileron pushrods)
3. Bellcrank assembly, Du-Bro no. 167 (ailerons)
4. Aileron Connector, Du-Bro no. 183 (aileron servo)
5. Control Horn, Sullivan no. 555 (2) (ailerons)
6. Nylon Kwik-Link, Du-Bro no. 122 (2) (aileron pushrod)
7. #10 x 32 Nylon Bolt, (2) (wing retainer)

TAIL

1. Nylon Hinges, Du-Bro no. 117 (7) (rudder and elevator)
2. Control Horn, Sullivan no. 555 (2) (rudder and elevator)
3. 1/16" x 6" Music Wire (tail wheel strut)
4. 1/16" Wheel Collar, Du-Bro no.137 (2) (tail wheel)
5. 3/4" dia. Tail Wheel

MATERIAL LIST EXTRA 3.25

1) Canopy
(1) Cowl
(2) Wheel pant (LH/RH)
(1) Landing gear (formed aluminum)

FUSELAGE (laser cut parts)

(1) Firewall (2) WP1 (sht. 1B)
(1) F1 (sht. 1B) (2) B1
(1) F2 (sht. 1B)

CANOPY PARTS

(1) C1 (sht. 3) (2 in kit, 1 reqd)

(1) F3 (sht. 1B)
(1) F4 (sht. 1B)
(1) F5 (sht. 1B)
(2) FS1A (sht. 2)
(2) FS1B (sht. 3)
(2) FS2 (sht. 1A)
(2) FS3 (sht. 1A)
(3) FB1,FB2,FB3 (sht. 1A and 1B)
(1) MB1 (sht. 1A)
(1) MB2 (sht. 1A)
(1) LG1

(1) C2 (sht. 7)
(2) C3 (sht. 3)
(4) C4 (sht. 2)

SERVO TRAY PARTS

(1) ST1 (sht. 1B)
(2) ST2 (sht. 1A)
(1) ST3 (sht. 1A)
(1) ST4 (sht. 1A)

STICK AND SHEET WOOD

(4) 3/16" x 3/16" x 24" balsa (fuselage stringers)
(1) 3/32" x 3" x 24" sheet balsa (fuselage bottom)
(1) 3/32" x 3" x 15" sheet balsa (fuselage top and bottom)
(2) 3/32" x 1-1/2" x 24" sheet (fuselage bottom)
(1) 5/16" x 1-1/2" x 2" TE stock (tail post)
(1) 5/16" x 5/16" x 12" hardwood (servo mount/cowl block)
(1) 1" x 1" x 16" balsa block (tail fairing/landing gear block)
(1) 3/8" x 15" Tri-stock (firewall/landing gear bracing)
(1) 1/4" x 3" dowel (wing hold down)

TAIL (laser cut parts)

(1) S1 (sht. 4)
(1) S2 (sht. 4A)
(2) S3 (sht. 4A)
(1) VS1 (sht. 4B)
(1) VS2 (sht. 4B)
(1) RUD 1 (sht. 4B)
(1) RUD 2 (sht. 4B)
(1) RUD 3 (sht. 4B)
(1) 3/16" x 8" dowel (joiner and canopy hold down)

WING PARTS (laser cut)

(1) R1 (sht. 3) (2 in kit, 1 req)
(2) R1A (sht. 3)
(2) R1B (sht. 1B)
(2) R2 (sht. 4)
(2) R3 (sht 4)
(2) R4 (sht. 5)
(2) R5 (sht. 5)
(2) R6 (sht. 5)
(2) R7 (sht. 4)
(2) R8 (sht. 5)
(2) R9 (sht. 5)
(2) T1 (sht. 3)
(2) W1 (sht. 1B)
(4) W2 (sht. 2)
(2) W3 (sht. 2)
(1) W4 (sht. 1A)
(2) W5 (sht. 1B)
(2) W6 (sht. 5)
(10) W7 (sht. 2)
(1) WJ1 (sht. 1A)
(1) WJ2 (sht. 1A)
(1) WJ3 (sht. 1A)

STICK AND SHEET WOOD

(2) 5/16" x 5/8" x 24" balsa (leading edge)
(4) 3/16" x 3/16" x 24" balsa (wing spars)
(2) 5/16" x 1-1/2" x 24" TE stock (wing trailing edge)
(1) 1/4" SQ. x 12" balsa (hinge backup)
(6) 1/16" x 3" x 24" sheet (wing sheeting, spar webbing canopy base)
(5) 1/16" x 1/4" x 24" balsa (rib capping)