

AG Wagon ARF

CESSNA 188



SPECIFICATIONS:

WING SPAN 97"
LENGTH 62"
WING AREA 1256 sq. in.
COWL 9"x9"x9"
FLYING WEIGHT 14-15 lbs.
RECOMMENDED ENGINES
90-160 2-stroke glow
120-270 4-stroke glow
23-40cc gas
REQUIRED 5 channel radio & 7 servos

FEATURES:

- 1/5 Scale ARF
- Light-weight Laser-cut ply and balsa construction
- Aluminum wing tube
- Expertly covered in brilliant colors
- Corrugated finish on all control surfaces
- Painted fiberglass cowl
- Formed tinted & painted canopy
- Aluminum landing gear
- Large wheels
- Scale wings struts
- Working flaps
- Complete hardware
- Detailed online assembly manual

RCGUYS.COM

WARNING

This radio controlled model is NOT a toy and NOT intended for persons under 16 years old. Keep this kit out of reach of younger children, as it contains parts that could be dangerous. A radio controlled model is capable of causing serious bodily injury and property damage. It is the owners responsibility to assemble the aircraft correctly and properly install the engine, radio and all other equipment. Test fly your finished model in the presence of and with the assistance of an experienced RC flyer. Your model must always be operated and flown using great care and common sense, as well as in accordance with the safety code of the AMA or MAAC. We suggest you join the MAAC and become properly insured prior to flying this model. Also, contact your local hobby dealer to find an instructor in your area. The Federal Communications Commission requires that you use only this radio frequencies specified for Model Aircraft. Do not at any time fly this model while under the influences of drugs or alcohol.

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Parts You Will Need To Complete Kit

- 1 - Rudder Servo (minimum 70 oz. torque) and mounting hardware
- 1 - Large Rudder Servo Arm
- 1 - Elevator Servo (minimum 70 oz. torque) and mounting hardware
- 2 - Aileron Servos (minimum 70 oz. torque) and mounting hardware
- 2 - Flap Servos (minimum 50 oz. torque) and mounting hardware
- 1 - Throttle Servo (minimum 40 oz. torque) and mounting hardware
- 1 - 36 inch Elevator Servo Extension
- 2 - 18 inch Aileron Servo Extensions
- 2 - "Y" Extensions for Flaps and Ailerons
- 1 - 3 inches 1/8 inch Heat Shrink Tubing
- 1 - 3 inches 5/8 inch Heat Shrink Tubing
- 1 - Engine 2.5 to 4.0 hp: 90-160 2-stroke glow
120-270 4-stroke glow
23-40cc gas
- 1 - Radio Transmitter (minimum 5-6 channels)
- 1 - Receiver
- 1 - Receiver Battery
- 1 - Switch Harness
- 1 - 3 1/2 inch Aluminum Spinner

NOTES: *Loctite everything that doesn't need to be removed or adjusted often.*

Test fit all T-Nuts (Blind Nuts) to allow bolts to be easily started by hand and avoid cross threads. A striped T-Nut can be difficult to replace.

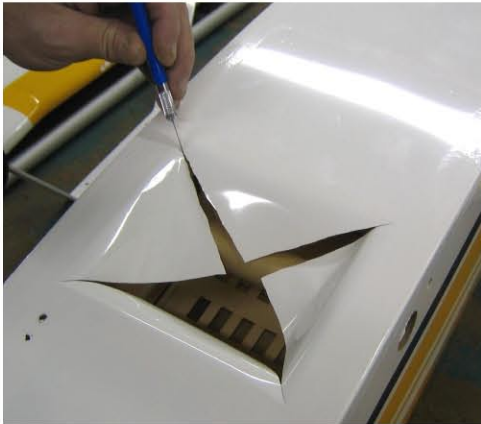
Bottom Fuselage Hatch – for Small Canopy

This instruction is for installation of only the older version of Canopy which is smaller.

Collect these parts:

- 1 - Pre-Covered Hatch Cover
- 4 - Wood Screws
- 1 - Fuselage

Note: This step may already be done on your model.



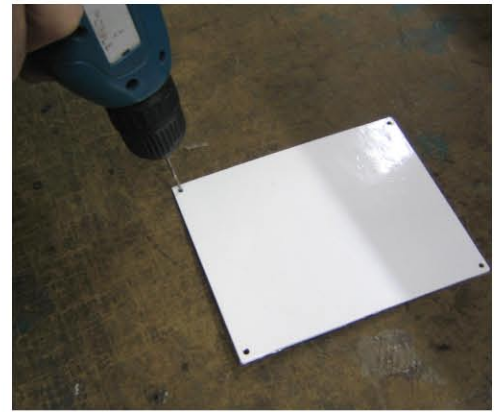
Use a sharp X-Acto Knife to cut the Covering from corner to corner in the first panel on the bottom of the fuselage.

Use a heated Sealing Iron to stick the Covering around the inside edges to prevent oil residue from the fuel from getting under the Covering.



Trim off the excess Covering with a sharp X-Acto Knife.

Drill $3/32$ inch diameter holes in each corner of the Hatch Cover, $3/16$ inch from each side.



Place the Hatch Cover in position and mark the location of the 4 holes with a pen or pencil.

Drill where you have marked with a $1/16$ inch Drill Bit.



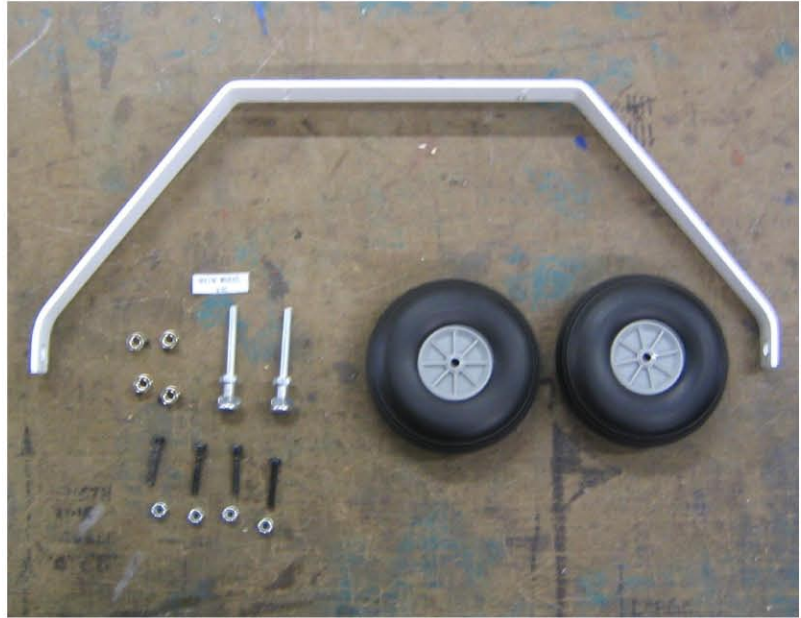
Leave the Hatch Cover off for the rest of the assembly.

TIP: Add a drop of Thin CA Glue to each hole to strengthen the wood.

Main Landing Gear

Collect these parts:

- 1 - Landing Gear
- 2 - Wheel Axles
- 2 - Axle Nylock Nuts
- 2 - Axle Lock Collars
- 4 - 8-32 x1 inch Socket Head Bolts
- 4 - 8-32 Nylock Nuts



Secure the 2 Axles to the Main Landing Gear using the Axle Nylock Nuts.

Note: Do not tighten the Axle Nut too much or it could pull the Axle apart.

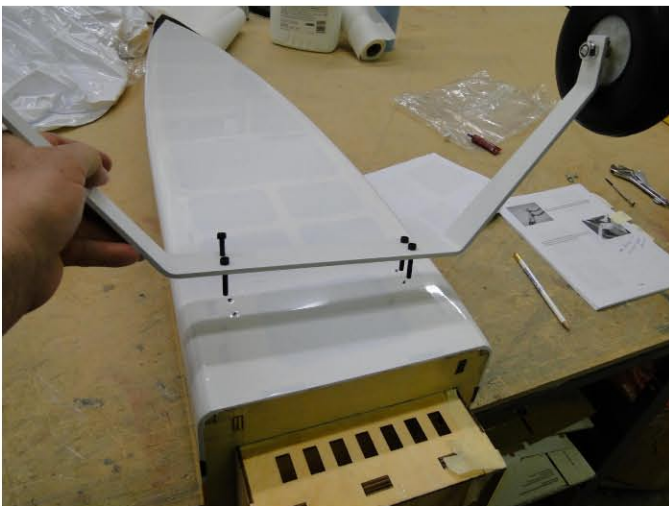


Slide on the Wheel and an Axle Collar and tighten the Collar Set Screw so the Wheel spins freely.

TIP: It is recommended to use Locktite or grind a flat spot on the Axle to attach the Wheels more securely.



***TIP:** You may have to remove burrs from the Axle using a Dremil Tool so that the Lock Collars will easily slide over the Axle Shaft.*



Bolt the Main Landing Gear to the Fuselage with (4) 8x32 bolts and Nylock Nuts.

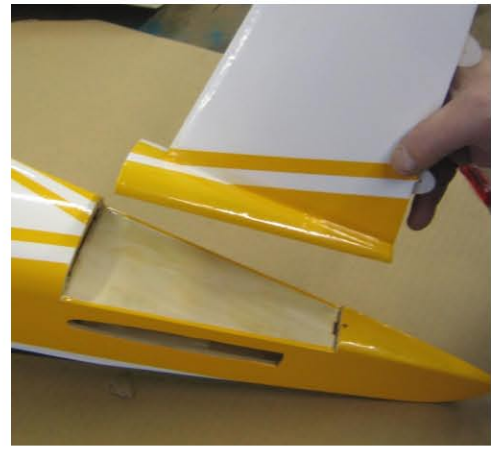
Reaching inside the Fuselage to start the Nylock Nuts will be easier if you devise a tool to hold them while driving the Bolts from the bottom side.



Vertical Fin

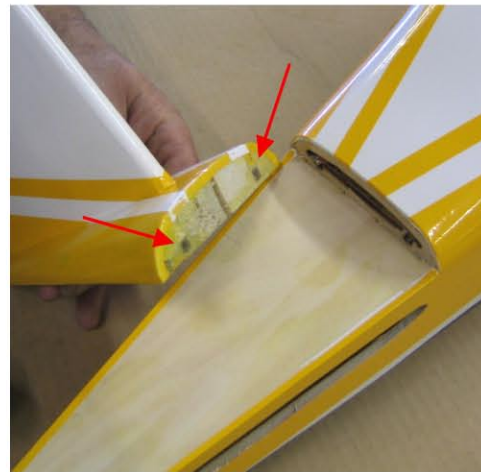
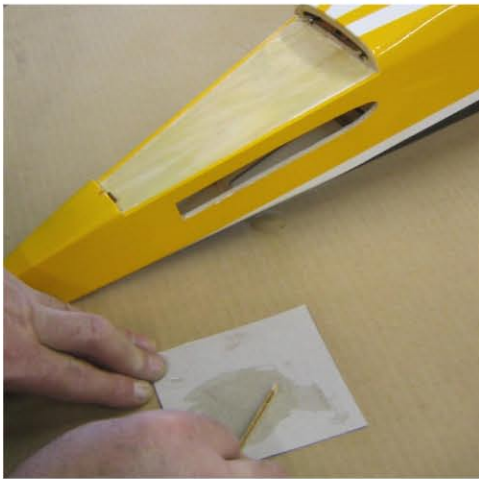
Collect these parts:

- 1 - Vertical Fin
- 1 - Fuselage



Attach the Vertical Fin with Epoxy Glue. 5 Minute Epoxy would be best but anything up to 30 Minute Epoxy will be suitable.

Be careful not to get glue in the holes for the Pull-Pull Rudder Cables.



TIP: For extra strength you could install the Horizontal Stab before the Vertical Fin and cut a hole in the platform of where you are attaching the Vertical Fin to apply glue to the inside the Fuselage at the edges of the Horizontal Stabilizer.



Use a T-Square to position the Vertical Fin at 90 degrees to the bottom of the Fuselage. You may want to tape it in place until it dries.

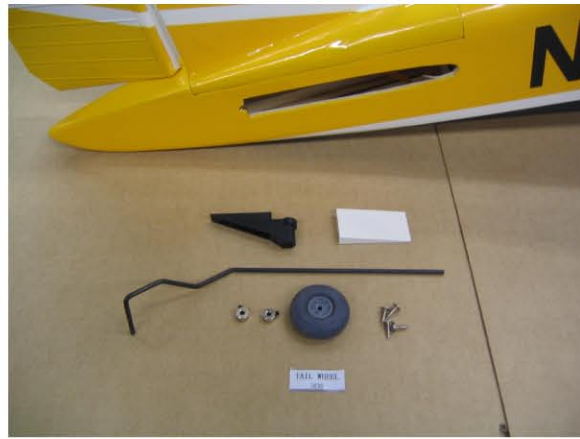
TIP: Wipe away any excess Epoxy with Isopropyl Alcohol (Rubbing Alcohol) before it hardens.

TIP: If you used Canopy Glue to make a nice finish of the cracks between parts smears can be removed with Goo Gone.

Tail Wheel

Collect these parts:

- 1 - 1-1/2 inch Tail Wheel
- 1 - Tail Wheel Arm
- 1 - Tail Wheel Bracket
- 2 - Lock Collars
- 3 - Wood Screws
- 1 - Wooden Wedge
- 1 - Fuselage



Slide one Lock Collar over horizontal Axle portion of Tail Wheel Arm. Then slide on the Tail Wheel. Position the Wheel so it is in line with the vertical portion of the Tail Wheel Arm. Tighten the Set Screw in the first Lock Collar with it pressed up against the Wheel. This may be already done for you at the factory.

TIP: You may have to remove burrs from the Axle using a rotary tool so that the Lock Collars will easily slide over the Axle Shaft.

Slide on the 2nd Lock Collar up against the Tail Wheel and tighten the Set Screw allowing the Wheel to turn freely.



Find the 1/8 inch hole at the rear of the Vertical Fin and the matching hole on the bottom of the Fuselage. Punch a hole in the Covering and push the Tail Wheel Arm through from the bottom.

Cut Covering and attach Wooden Wedge with Epoxy Glue.

Position the Tail Wheel Bracket over the hole on the bottom of the Fuselage and secure with the 3 Wood Screws.



TIP: Remove the screws and add a drop of Thin CA Glue to each hole and re-attach the Tail Wheel Bracket. This will help harden the Balsa and stop the Wood Screws from loosening.

Rudder

Collect these parts:

- 1 - Tail Wheel Assembly
- 1 - Rudder
- 1 - Fuselage

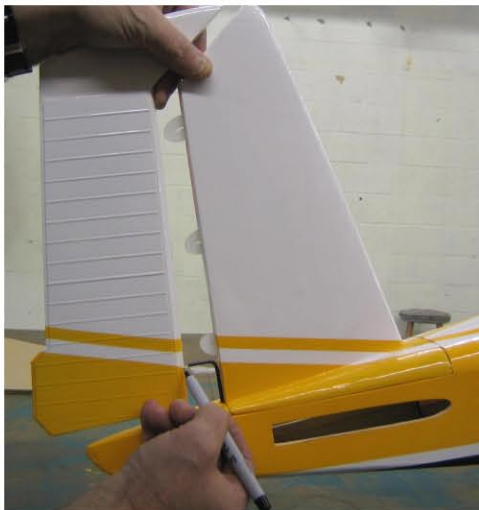
If you decide to install the optional Control Surface Corrugations (ailerons, flaps, etc) cut away all but 1/8" of the covering under each corrugated piece being installed. We recommend a thin layer of "Gorilla Glue" or similar adhesive product like 777 Spray Glue to attach the plastic corrugated pieces. Do this for each piece before installing Control Surfaces.



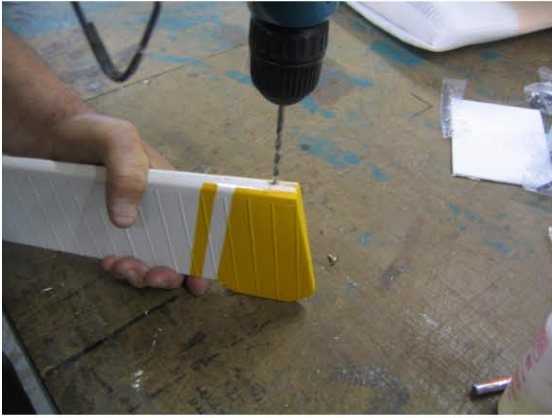
Insert the completed Tail Wheel Assembly through the Tail Wheel Bracket as far as it will go. Use a pair of Vise Grips and Pliers to bend the portion of the Tail Wheel Arm coming through the top of the Fuselage about 1 inch above the Fuselage.

TIP: Turn the Tail Wheel 90 degrees to make it easier to grasp the wire.

Bend the Tail Wheel Arm 90 degrees.

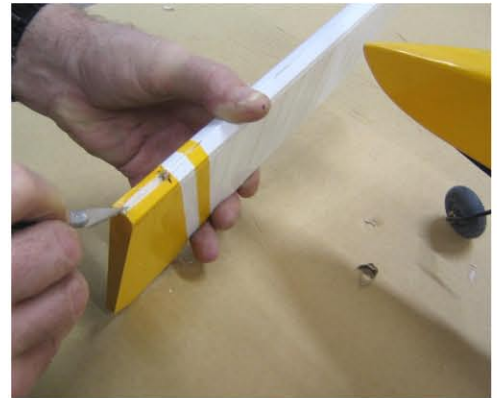


Position the Rudder so there is a 1/16 inch gap where the top edge of the Rudder meets the Vertical Fin. Mark the location of the Tail Wheel Arm.

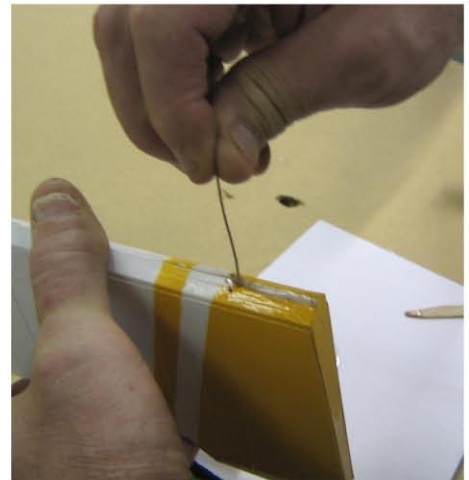
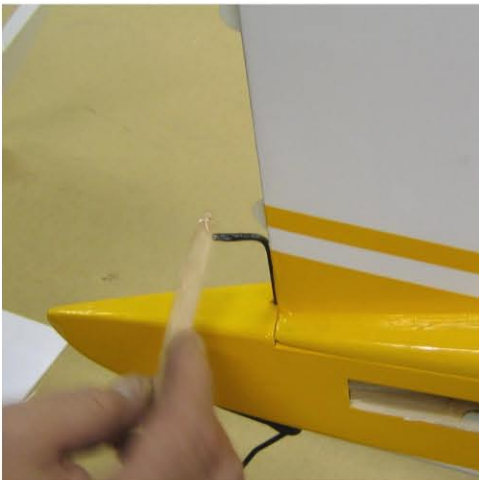


Drill 5/32 inch hole in the Rudder at the marked location.

Use a sharp X-Acto Knife to remove the Covering and carve some of the Balsa on the Rudder where the Tail Wheel Arm will fit.



Test fit the Tail Wheel Arm and Rudder so that you still have the 1/16 inch gap where the top edge of the Rudder meets the Vertical Fin. Use Epoxy Glue to attach the Tail Wheel Arm. Be careful that the Epoxy sticks the Tail Wheel Arm to the Rudder and not the Vertical Fin. Wipe away any excess Epoxy with Isopropyl Alcohol (Rubbing Alcohol) before it hardens.



TIP: Use Epoxy Glue with a longer set time (12 to 30 minute) for more working time to get the Rudder Hinges in the proper position before the Epoxy hardens.

When the Epoxy has hardens use Thin CA Glue to secure the Hinges into the Rudder. The Glue will wick through the Hinge material to bond the Hinge deep inside the Balsa Wood Rudder and Vertical Fin.

Rudder Extension

Collect these parts:

- 1 - Fiberglass Rudder Extension
- 1 - Fuselage

Position the Rudder Extension in front of the Rudder and mark the outline on the Fuselage and both sides of the Rudder with a pencil.



Cut away the Covering on the Fuselage and Rudder about 1/16 inch inside the lines. Be careful not to cut the Balsa but you can roughen up the Balsa (scratch with X-Acto) to make a better bond.

TIP: Use a small amount of heat from a sealing iron or heat gun when removing any covering.

Use Epoxy to attach the Rudder Extension. Use tape and a big C-Clamp and a couple of scrap pieces of wood to hold the Rudder Extension in position until the Epoxy hardens. Wipe away any excess Epoxy with Isopropyl Alcohol (Rubbing Alcohol).

TIP: Run a bead of Canopy Glue (dries clear) along the base of the Extension to cover the crack in the joint. Smears can be removed with Goo Gone.



Horizontal Stabilizer

Collect these parts:

- 1 - Fuselage
- 1 - Horizontal Stabilizer
- 1 - Elevator Joiner

Cut away the Covering over the hole in both sides of the Fuselage and test fit the Horizontal Stabilizer for any necessary trimming so it fits snugly and square with the bottom of the Fuselage.

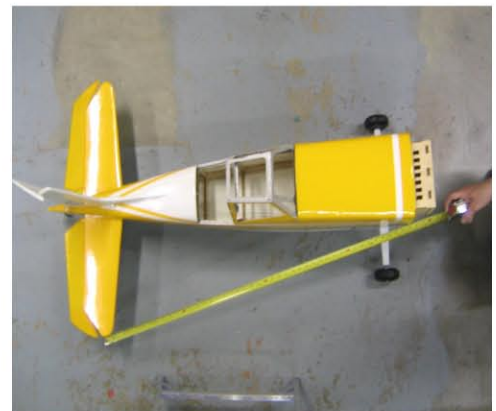


Remove the Elevators and Hinges from the Horizontal Stabilizer and set them aside. Insert the Elevator Joiner into the opening in the Fuselage and then slide the Horizontal Stabilizer through so that the same amount sticks out both sides (use Ruler). Mark the Stabilizer at the edge of the Fuselage on both sides with a pencil. Use a sharp X-Acto Knife to cut away the Covering on both sides of the Stabilizer about 1/16 inch inside the lines. Be careful not to cut the Balsa but you can roughen up the Balsa (scratch with X-Acto) to make a better bond. Use a slower bonding Epoxy (like 15 to 30 minute) to attach the Stabilizer to give yourself more time to adjust and clean up.

Note: If you plan to use 2 Elevator Servos you won't need to install the Elevator Joiner.

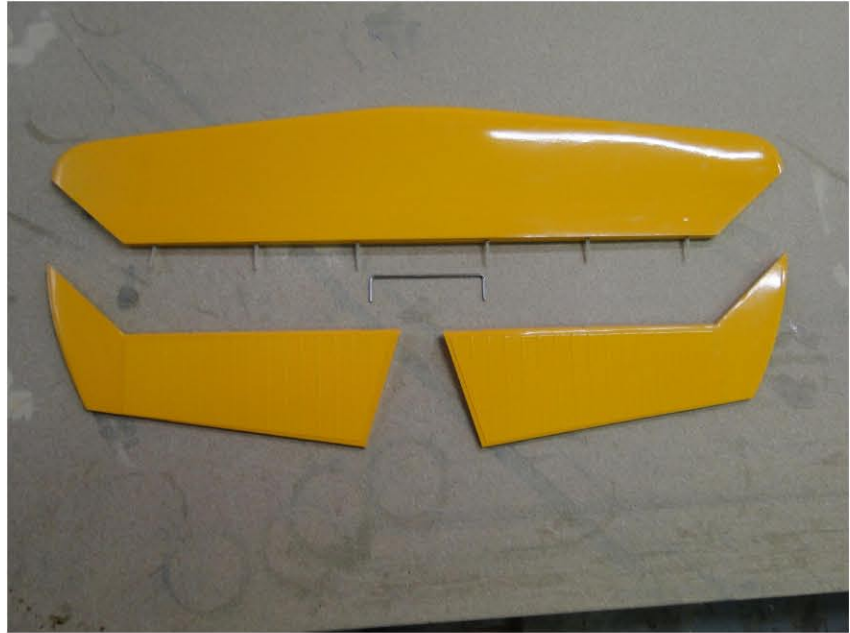
Use a Tape Measure or a String to make sure the Stabilizer is square with the center line of the Fuselage, measuring from each tip of the Stabilizer to the front edge of the Fuselage. Wipe away any excess Epoxy with Isopropyl Alcohol (Rubbing Alcohol).

TIP: Use a bead of Canopy Glue along the base of the joint like before.



Elevators

If you decide to install the optional Control Surface Corrugations repeat the instructions from before.



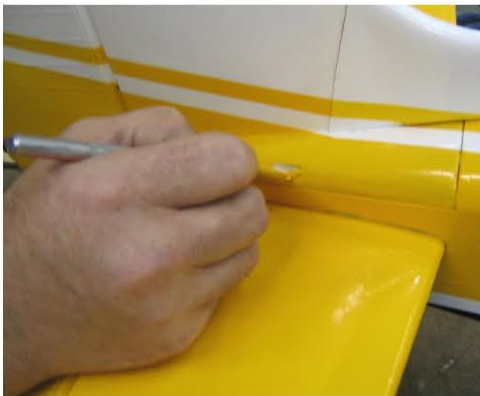
Position the Elevator halves so there is a 1/16 inch gap at the outer edges of the Stabilizer. Mark the location of the Elevator Joiner on each Elevator and drill 5/32 inch holes at the marked locations. Test fit the elevator halves. If they are not in alignment remove and bend the elevator joiner. Use Epoxy Glue to attach the Stabilizer Joiner like you did for the Tail Wheel Arm into the Rudder and then glue the Elevator Hinges also using Epoxy.



Rudder Controls

Collect these parts:

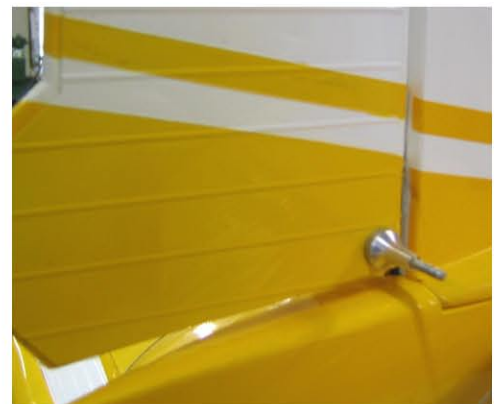
- 1 - Rudder Servo (minimum 70 oz. torque)
- 1 - Large Servo Arm
- 1 - Wire Cable
- 4 - Cable Crimp Fittings
- 2 - Clevises
- 2 - Threaded Couplers
- 2 - Threaded Coupler Nuts
- 2 - Trumpet Bases
- 1 - Trumpet Screw
- 2 - Control Horns
- 1 - Fuselage



Use a sharp X-Acto Knife to remove the Covering from both sides of the Fuselage where the Rudder Pull-Pull Cables exit.

The Rudder has 2 Trumpet Bases that screw together through the Rudder. Position the Trumpet Base at the edge of the Rudder beveled edge and 1/2 inch from the bottom of the Rudder and mark where to drill a 5/32 inch hole through the Rudder. Install the 2 Trumpet Bases with the Trumpet Screw. **Do not over tighten.**

TIP: Strengthen the holes by applying a few drops of thin CA glue in both holes to reduce the amount of Balsa compression.



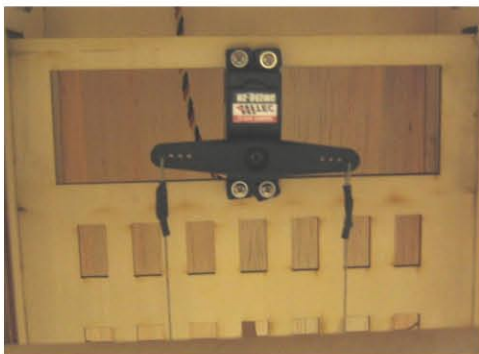
Cut the Cable into 2 equal lengths and thread the Cable through these new uncovered holes in the rear of the Fuselage. Thread one Crimp Fitting over the end of one Cable, then thread the Cable through the outer hole in the your Large Rudder Servo Arm. Fold back the Cable 1 inch and slide the Crimp Fitting over the Cable end. When satisfied with the fit, crimp the fitting. Repeat for the other end of the Servo Arm with the other Cable.



TIP: Use a 3/4 inch piece of 1/8 inch shrink tubing to cover the sharp end of the Cable sticking out of the crimped Joint at both ends of the Cable. You will have to slide this on Cable in advance.

The Servo Tray is accessed through the bottom hatch, so they are mounted upside down.

If you are installing 1 or 2 Elevator Servos in the Rear of the Fuselage install the Rudder Servo in the center position of the Servo Tray inside the Fuselage using the hardware supplied with your Servo and attach the Large Servo Arm with the Cables attached. It is recommended to mount the Elevator Servo beside the Rudder Servo on the Servo Tray and use a Pushrod for the Elevator if your Engine weighs below 3.5 lbs.





Install the Horns, Clevises and Threaded Couplers on the Trumpet Bases on the Rudder.

With the Rudder Servo Arm in the middle/neutral position and the Rudder in the neutral position (hold in position with Masking Tape), thread a Crimp Fitting over both ends of the Cable and through Threaded Couplers as you did on the Servo Arm. Pull both Cables snug, fold them over and slide the Crimp Fitting into position.

TIP: An extra loop of the Cable through the Crimp Fitting will make the connection stronger.



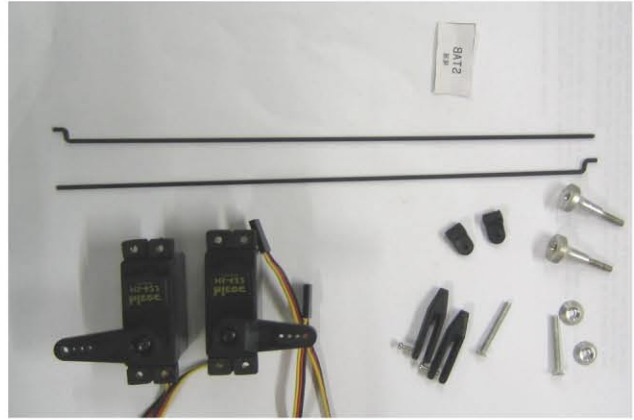
When satisfied with the lengths, carefully crimp the Cable fittings and trim the excess Cable.

Note: You can adjust the lengths of the Cable later with the Threaded Couplers.

Elevator Controls

Collect these parts:

- 1 - Elevator Servo (minimum 70 oz. torque) and mounting hardware
- 1 - 36 inch Servo Extensions
- 1 - Threaded Push Rod (longest one)
- 1 - Trumpet Base
- 1 - Trumpet Washer
- 1 - Trumpet Screw
- 1 - Control Horn
- 1 - Clevis
- 1 - Fuselage



Note: Additional hardware has been included if you want to use 2 Elevator Servos in the rear of the Fuselage. (Do not use the Elevator Joiner).

As mentioned earlier if your Engine weighs below 3.5 lbs it is recommended to mount the Elevator Servo on the Servo Tray and use a Pushrod for the Elevator. Long Carbon Rods and End caps have been included. This will minimize the weight needed to add to the nose to balance properly.



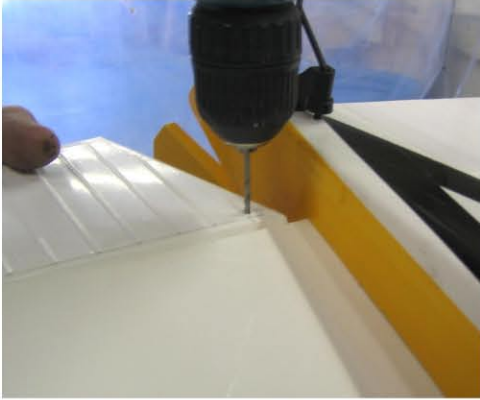
If installing the Servos in the rear of the Fuselage find the location for the Elevator Servo(s) and use a sharp X-Acto Knife to cut the Covering, from corner to corner. Seal and trim the Covering the same as you did for the Fuselage Hatch Cover

Attach a 36 inch Servos Extension to the Elevator Servo.

TIP: Use a 1-1/4 inch piece of 5/8 inch wide shrink tubing over the connection to help prevent it coming apart.

Position the Elevator Servo in the Fuselage and pre-drill the holes using a 1/16 inch Drill Bit. Use the hardware supplied with your Servo for final installation.





Position the Trumpet Base at the edge of the Elevator beveled edge and 1/2 inch from the edge closest to the Rudder. Mark the spot and drill a 3/32 inch diameter hole through the Elevator. Install the Trumpet Base with the Trumpet Screw and Washer on the other side of the Elevator. **Do not over tighten.**

TIP: Strengthen the holes by applying a few drops of thin CA glue in both holes to reduce the amount of Balsa compression.



Install the Control Horn and Clevis on the Trumpet Base as you did for the Rudder. Thread the Elevator Push Rod into the Clevis and make a “Z Bend” in the other end to install through your Elevator Servo Arm.



The installation of the Control Horn and Clevis on the Trumpet Base is the same if you are using an Elevator Pushrod.

Small Canopy with Optional Side Door

Collect these parts:

- 1 - Canopy
- 1 - Side Door with Hinges
- 6 - Small Wood Screws
- 2 - White & Yellow Vinyl Trim
- 1 - Fuselage

This instruction is for installation of only the older version of Canopy which is smaller.



NOTE: *The canopy can be installed without the Side Door and you save the work of making cuts in the Canopy.*



If you are installing the Side Door, position it on the inside of the Canopy with the bottom corner of the window cutout of the Door matching the window painted on the Canopy. Mark the outside edge of the door with a pencil or fine tip marker.

Note: *Put a piece of cardboard under the Canopy so it doesn't get scratched.*

Carefully cut 1/16 inch outside the marked lines with a sharp X-Acto Knife. The Vinyl Trim will cover any small paint chips.



Set the Side Door into place and position the Canopy to see if you need to trim the opening any larger. Once satisfied, tape the Canopy in place so that it lies flat against the Fuselage. Using a marker, carefully mark where the screws will go, 2 on the side with the opening, 3 on the other side and the center of the front and back of the Canopy. Try to mark the side holes over locations with plywood underneath. Drill a 3/32 inch hole at each mark just through the Canopy plastic and then 1/16 inch holes through into the Fuselage at the same points.

TIP: *Strengthen holes in the Fuselage by applying a few drops of Thin CA Glue. Remove Canopy to do this*

Secure the Canopy to the Fuselage using the 6 Wood Screws supplied. You may also use Canopy Glue, especially along the front edge that sits on the Fuselage. Then carefully remove the tape.

Note: *Do not over tighten the screws.*

TIP: Use some scrap light plywood to make small $\frac{3}{4}$ " square back plates and glue them on the inside of the Fuselage walls where screws go through balsa sheeting (like the canopy) to add reinforcement.



Colored Vinyl Trim ($\frac{3}{4}$ inch wide) has been included to stick around the Side Door opening to close the gap between the Fuselage and Canopy and to cover up any chipped paint. First clean the inside of the door frame to help it bond better. Then draw a fine line with a sharp X-Acto Knife $\frac{1}{8}$ to $\frac{1}{4}$ inch around the Door opening and peel away the paint.

If the paint won't peel scratch away some of it with your X-Acto Knife so the Vinyl Trim will stick better.



Apply the Vinyl Trim overlapping the untouched paint by $\frac{1}{16}$ inch and folding into the Door opening. Trim to fit.



Use Epoxy Glue to mount the Hinges into the Side Door frame. Check for proper direction of the Hinge movement. When dry, trial fit the Door on the Fuselage before glueing the Hinges into the Fuselage with Epoxy Glue.

TIP: Use a small drop of light oil on the Hinge Joint so that the glue does not get in and prevent it from working smoothly.

Using CA Glue or Canopy Glue, carefully add a small bead of glue to the inside edges of the Window Frame.



Press the window into the Window Frame. Be careful not to get any glue on your fingers or the windows. If using Canopy Glue you should tape into place while the Glue dries.



Large Canopy

The new Large Canopy will provide you with more access to the Fuel Tank and Radio Gear and to the Wing Bolts.

Test fit to see that everything is aligned and seated properly.

The plywood Canopy Hold Down Tabs have been pre-drilled with Blind Nuts installed.

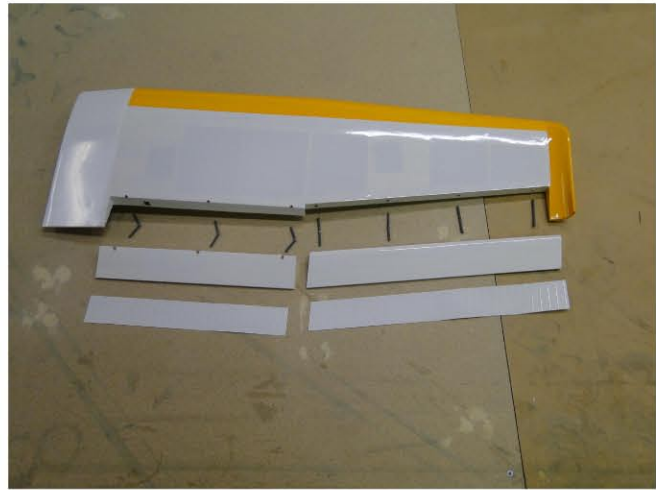
With the Canopy in place, poke a hole in the Fuselage covering at the location of each Blind Nut. Use supplied 4-40 Socket Head Bolts to hold the Canopy closed..



Aileron & Flap Hinges

Collect these parts:

- 2 - Wings
- 2 - Ailerons
- 2 - Flaps



If you decide to install the optional Control Surface Corrugations repeat the instructions from before.

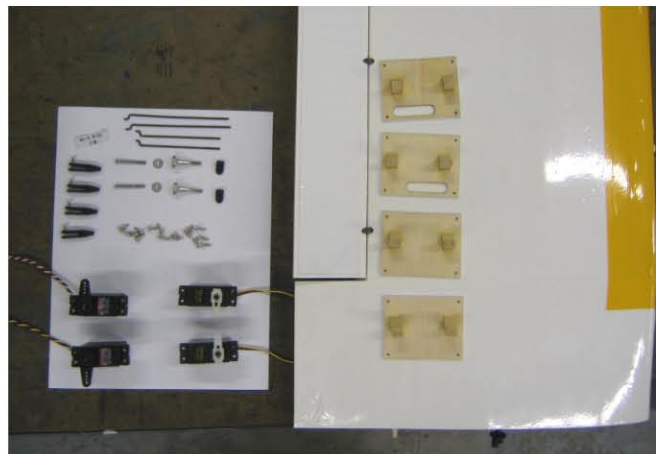
The Ailerons and Flaps come with Hinges pre-installed but not glued permanently. Test fit so that you have 1/16 inch spacing between the Flap and Aileron and Flap and Wing Root. Use Epoxy Glue on the Flap Hinges and Thin CA Glue on the Aileron Hinges as you have done before. Remember to make sure they are moving in the proper direction.

TIP: Use a small drop of light oil on the Hinge Joint so that the glue does not get in and prevent it from working smoothly.

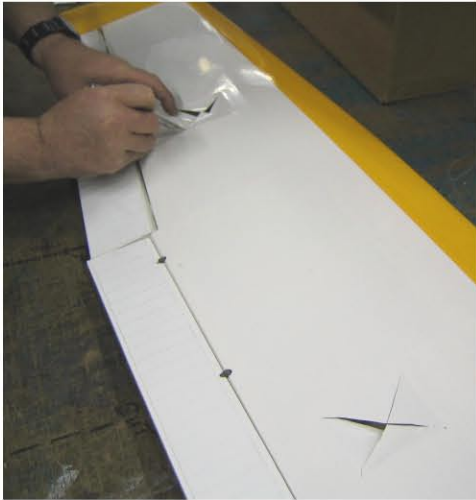
Aileron & Flap Controls

Collect these parts:

- 2 - Aileron Servos (minimum 70 oz. torque) and mounting hardware
- 2 - Flap Servos (minimum 50 oz. torque) and mounting hardware
- 2 - 18 inch Aileron Servo Extensions
- 2 - Aileron Servo Hatch Covers (with slots)
- 2 - Flap Servo Hatch Covers (without slots)
- 16 - Small Wood Screws
- 4 - Threaded Push Rods
- 2 - Trumpet Bases
- 2 - Trumpet Washers
- 2 - Trumpet Screws
- 2 - Control Horns
- 2 - Clevises



Locate and cut holes in the Covering on both sides of the Fuselage for the Wing Tube (1 inch), Wing Bolt (1/4 inch), Servo Leads (9/16 inch) and Dowel (1/4 inch).



Find the openings for the Aileron and Flap Servos on the bottom of both Wings and use a sharp X-Acto Knife to cut the Covering, from corner to corner. Seal and trim the Covering the same as you have done before.

Use a sharp X-Acto Knife to cut the slots for the Push Rods in the 2 Aileron Servo Hatch Covers. The Flap Hatch Covers do not have cut outs. The screw holes in the Covers and Wing are pre-drilled. You just need to poke a hole in the Covering.

Note: Add a gusset of Epoxy Glue around the base of each Servo Mounting Post for extra strength.



Position the Aileron Servos so the Servo Arm exits the middle of the Hatch cut out. Pre-drill the holes in the Mounting Posts with a 1/16 inch Drill Bit. Attach Servos to the Hatch Cover Mounting Posts using the hardware supplied with your Servos. Do the same for the Flap Servos.



Attach an 18 inch Servo Extension to each Aileron Servo. Using a light string, tie a nut or small weigh to one end and drop it through the Wing Rib opening until it appears in the Aileron Hatch opening. Tape or tie the string to the Servo Lead and carefully pull it through the wing. You may be able to get the Flap Servo lead through the Wing without tying a weight.

TIP: Use a 1-1/4 inch piece of 5/8 inch wide shrink tubing over the Servo Extension connection to prevent it coming apart.

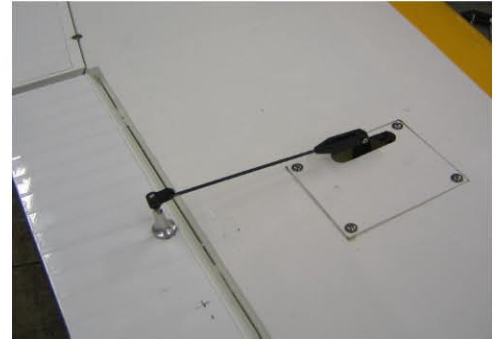


Secure both Aileron Servo and Hatch assemblies to the wing using 4 Small Wood Screws. The Servo Arms are on opposite sides of the Hatch Covers. Then position the Trumpet Base at the beveled edge of the Aileron and align with the Aileron Push Rod and mark the location. Drill a 3/32 inch diameter hole on these marks.

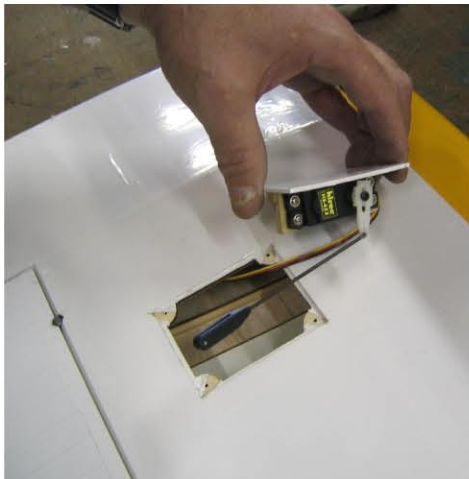
TIP: Strengthen the holes by applying a few drops of thin CA glue in both holes to reduce the amount of Balsa compression.

Install the Trumpet Base with the Trumpet Screw and Washer on the other side of the Elevator. **Do not over tighten.**

Install the Control Horn and Clevis on the Trumpet Base as you did for the Rudder. Thread the Aileron Push Rod into the Clevis and make a “Z Bend” in the other end to install through your Aileron Servo Arm.



Attach a Clevis to each Flap Push Rods and connect to each Flap Servo Arm with a “Z” bend. Position the Hatch Covers so the Push Rods goes through the hole in the trailing edge of the Wing and connects with the Flap Control Horn (already installed). Secure both Flap Servo and Hatch assembly to the wing using 4 Small Wood Screws.



Wing Struts & Fairings

Collect these parts:

- 2 - Wings
- 2 - ¼ x 20 Nylon Wing Bolts
- 1 - 30" x 1 inch Aluminum Wing Tube
- 2 - Aluminum Wing Struts
- 2 - Upper Strut Cuffs
- 2 - Middle Wing Fairings
- 2 - Wing Root Fairings
- 4 - 6-32 x 5/8 inch Socket Head Bolts
- 1 - Fuselage



Slide the Wing Tube through the 1 inch diameter opening in the Fuselage. If the Wing Tube is excessively tight you can use 600 Grit Sandpaper to make it fit easier.

TIP: Cut the Wing Bolts to 1-1/2" to save some time installing and removing the wings at the flying field.

Slide the Wings onto the Wing Tube against the Fuselage and secure using the Wing Bolts. **Be careful not to crush the Servo Extensions between the Wing and Fuselage.** You will notice a wooden dowel on the Fuselage to align the Wings in the proper position.

TIP: Add a drop of CA on the Wooden Dowel and where it attaches to the Wing for more strength.

Locate the pre-installed Blind Nuts in the top surface of the Wings about 20 inches from the root and 3-5/8 inches from the leading edge. Poke a hole in the Covering at this location. Similarly find the Blind Nuts already installed on the Fuselage, 3-7/8 inches from the Firewall.

TIP: You could use a magnet to help find these hidden fasteners.



With the Wing Strut airfoil facing forward, bolt the end of the Wing Strut through the pre-drilled hole into the Wing using a 6-32 x 5/8 inch Socket Head Bolt. Mark where to drill a 9/64 inch hole in the other end of the Strut at the pre-installed Blind Nut in the Fuselage. This may be already done at the factory.

You may have to make a slight bend (about 15 degrees) one inch from the end to match the angle of the wing.

TIP: Wrapping the strut with a cloth will help stop the paint from chipping off.



Loosen the Socket Head Bolt in the Wing and slide the Middle Wing Fairing over the Strut and position it on the Wing. Mark where to drill a ¼ inch hole above the pre-installed Blind Nut in the Wing.



Trace around each Middle Wing Fairing with a pencil on the Wing and remove the Covering where the Fairing makes contact with the leading edge of the wing sheeting. Use an X-Acto Knife like you have done before. Be careful not to cut the Balsa but you can roughen up the Balsa (scratch with X-Acto) and plastic Fairing (use Sandpaper) to make a better bond. Attach the Fairings with Epoxy Glue and tape into position until they dry.

TIP: A couple of screw on the rear edge of the fairing (top and bottom) will help secure this part.



Fasten the other end of the Struts in place with a 6-32 x 5/8 inch Socket Head Bolt. Tape a piece of heavy paper over the top bolt and mark the location of the Bolt. Slide the Strut Cuffs to rest against the Fuselage (under the paper) and mark the location on the Cuffs where to drill a ¼ inch hole.

Note: You may have to trim the opening in the Cuffs with a Dremel Tool to fit over the Struts.

Re-fasten the Strut Cuff to check the accuracy of the fit.



Use Silicone or Hot Glue to hold the Cuff in position on the end of the Strut.



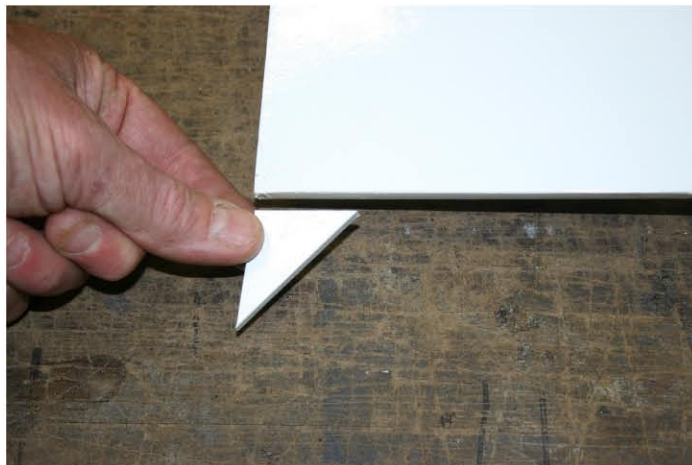
Slide the Wing Root Fairing over the leading edge of each Wing and push it up against the Fuselage.

Note: You may have to trim the plywood end caps with a Dremel for the Fairings to fit snug.

Trace around the Wing Root Fairing with a pencil on the Wing and remove the Covering like the other Fairings and attach with Epoxy Glue.



Glue on Trailing Edge Wing Fillets with epoxy glue or ca glue. You will have to cut away the covering where the two pieces make contact.



Fuel Tank

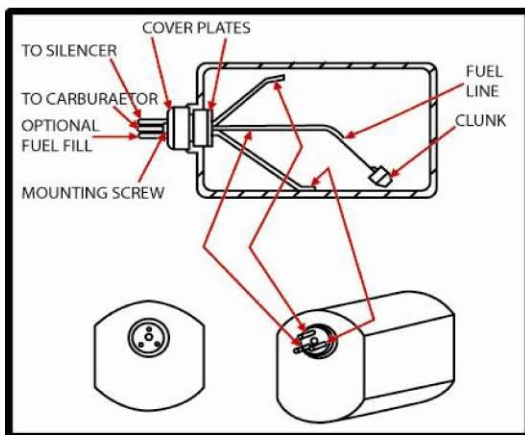
Collect these parts:

- 1 - Fuel Tank Assembly
- 1 - Fuselage



Using the supplied hardware, assemble the Fuel Tank. Carefully, bend the metal tubing to avoid kinking. You might need to use a larger size Fuel Tubing for your engine.

Note: Remember to mark which tube is for what purpose for connecting properly to the Engine later.



Note: Your model airplane is supplied with a Glow fuel tank and hardware kit. If you plan to use a gas engine you will have to change the stopper and Fuel Lines.



The Tank sits inside the Fuselage between the Servo Tray and the front of the Engine Box.



There are many Tank mounting choices but the easiest is to attach Velcro to the top of the Tank, attach Velcro on the inside ceiling of the Fuselage, strap through the vent holes in the front of the Fuselage (we used a Velcro strap) with the Fuel Lines going through the pre-drilled hole in the Engine Box.

Note: To reduce fuel foaming you can wrap the Fuel Tank in Foam.

Engine Pre-Installation

Collect the following parts:

- Engine Mounting Hardware:
 - 2 Engine Mounting Rails
 - 2 Engine Mounting Rail Adjusters
 - 4 pcs 8-32x1-1/4 inch Engine Bolts
 - 4 pcs 8-32 T Nuts
 - 4 pcs 8-32x1 inch Mounting Bolts
 - 4 Flat Washers
 - 8 Lock Washers
 - 4 pcs 8-32 Lock Nuts
- Fuselage
- Engine 2.5 to 4.0 hp: 90-160 2-stroke glow
120-270 4-stroke glow
23-40cc gas



The firewall has some right thrust built in.

Set your Engine in the Motor Mount and measure the depth needed inside the Cowl. Allow enough space for the Carburetor if it is at the rear of the Engine.

Set the Cowl on the Fuselage with an overlap between 1/8 inch and 1/2 inch. Measure the depth of the Cowl from the Engine Box allowing 1/16 inch to 1/8 inch clearance for the propeller. Mark the rear edge of the Cowl with masking tape.

Since the Cowl is 9 inches long and the Engine Box is 2-3/8 inches you could fit an Engine up to 6-9/16 inches long (firewall to back of prop). Any longer and you would have to cut back the Engine Box.

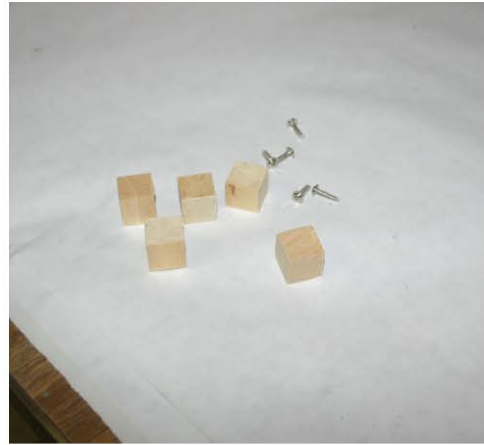
Use these measurements to determine the position of your Engine on the Engine Mount. Some Engine designs may require Stand-Offs if it won't fit in the supplied Engine Mount.



Cowl

Collect these parts:

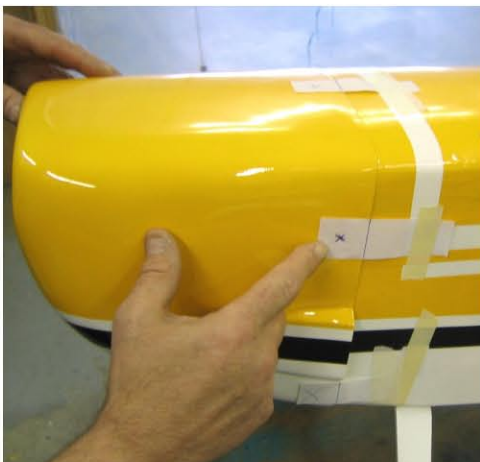
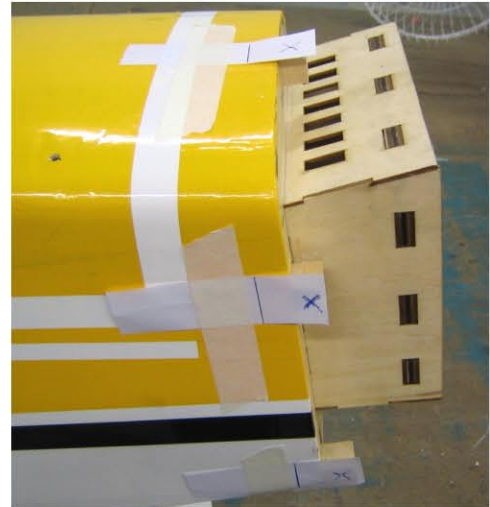
- 1 - Fiberglass Cowl
- 5 - Hardwood Blocks
- 5 - Wood Screws
- 1 - Fuselage



Use Epoxy Glue to attach the 5 Hardwood Blocks around the edges of the Fuselage Firewall, 2 on each side and 1 on top. Locate the 2 lower Blocks so they miss the raised section on the lower sides of the Cowl.

TIP: Roughen the firewall and blocks (scratch with X-Acto) to ensure a better bond.

Tape down 5 pieces of heavy paper and mark the middle location of each Block and a mark for the back edge of the Cowl.



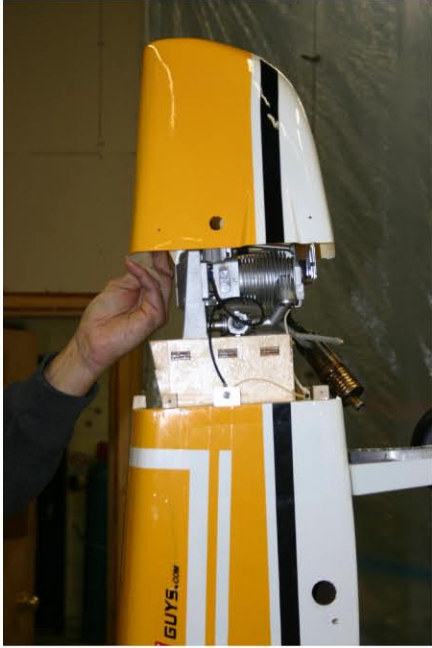
Slide the Cowl on the Fuselage under the pieces of paper up to the tape mark you made before and tape the Cowl securely.

When satisfied with the position, drill $\frac{3}{32}$ inch diameter holes through the marks on the heavy paper strips just into the Cowl and then $\frac{1}{16}$ inch holes into the Hardwood Blocks beneath.

Engine

Collect the following parts:

- Engine Mounting Hardware
- Fuselage
- Your Engine, Propeller, Spinner



Your Engine will have to be positioned on the Engine Box so that the prop shaft exits the centre of the Cowl opening. It works best to stand up the fuselage. It can be held that way in a work bench or with the landing gear supported by a step ladder.

Then position the cowl so the stripes line up with the fuselage, mark the position of the cowl with tape and gently remove it and mark the position of the engine on the firewall.

Mark and drill holes in Engine Box and install the T Nuts. Use Loctite to prevent loosening of the fasteners. Installing some engines may require cutting away some of the Engine Box or Fuselage. It is recommended to reinforce any cut outs and for larger engines. Cut out the necessary holes in the cowl for the proper Engine cooling using a Dremel Tool.

We recommend locating the Throttle Servo on either side of the Rudder Servo on the Servo Tray. Locate where the Throttle Push Rod will exit the Firewall or Engine Box, mark it and drill a large enough hole. You may want to also install a linkage to operate the engine choke if your Engine is so equipped.

Re-mount the Cowl and the proper size Propeller for your engine. We recommend using a 3-1/2 inch Aluminum Spinner.

Radio Set Up

Note: *The C of G is on the Main Wing Spar, 4-3/8 inches from the Wing's Leading Edge (not the Fairing) nearest the Fuselage.*

TIP: *To balance properly you might have to move batteries forward and add hose weight for the lighter gas engines (below 3.5 lbs) and especially glow engines.*

It is recommended to use Foam Rubber and plastic Electrical Straps to secure your Receiver and Battery in place. The location will depend on the balance point of your airplane and will determine the best position to mount your Switch Harness.

You will need Y Servo Extensions to connect the 2 Aileron Servo Extensions and also the 2 Flap Servos to your Receiver. Disconnect all the Servo Arms before you turn on your Radio Transmitter for the first time and reconnect so that each Servo is centered and working in the proper direction.

Control Surface Throws

These are recommended Control Surface Throws to start with. After you have become familiar with the airplane you can adjust for your personal style of flying.

Rudder	+/- 1-1/2 inch low rate and 2-1/2 inch high rate
Elevators	+/- 3/4 inch low rate and 1-1/4 inch high rate
Ailerons	+/- 3/4 inch low rate and 1-1/4 inch high rate
Flaps	- 3/4 inch low rate and 1-1/4 inch high rate

Decals

Assemble the entire model and make any changes to suit your flying style. Decals of the model number N97AW is included for you to apply to both sides of the Fuselage in front of the Stabilizer.



Covering



Sometimes in storage or shipping the Covering can sag or wrinkle. Use a small amount of heat from a Heat Gun and a Mitt to go over the entire airplane and smooth any wrinkles in the Covering. Be careful not to use too much heat.



20 Ryan Place, Brantford, Ontario, N3S 7S1, Canada
tel: 519-756-1110 fax: 519-756-1663