Gary's Corsair
Introduction

Chelsea rounding up some hogs

With its distinctive bent wing, the Vought F4U Corsair is one of the most recognizable fighter aircraft of all time. Over 12,000 were built in many different configurations during the forties and early fifties. The models shown are radio controlled, 1/12 semi-scale versions of the early F4U. The wingspan is 40" and the weight approx. 3 lbs. They have successfully flown with engine displacements ranging from .25 to .46 cubic inches (the smaller being ideal).

Made primarily of Coroplast and foam, balsa builders will find this model a unique challenge. Everything you need to know with regards to working with Coroplast can be found on the SPAD (Simple Plastic Airplane Designs) web-sight. I have personally gained a tremendous amount of model making knowledge by frequenting the forums there. http://www.spadtothebone.com/

Gary's Corsair is also a good introduction to advanced control systems and working with foam. Materials to build the basic airframe are inexpensive and some parts are even free!! Plans for electric powered and control line versions are coming soon.

This F4U is 4U
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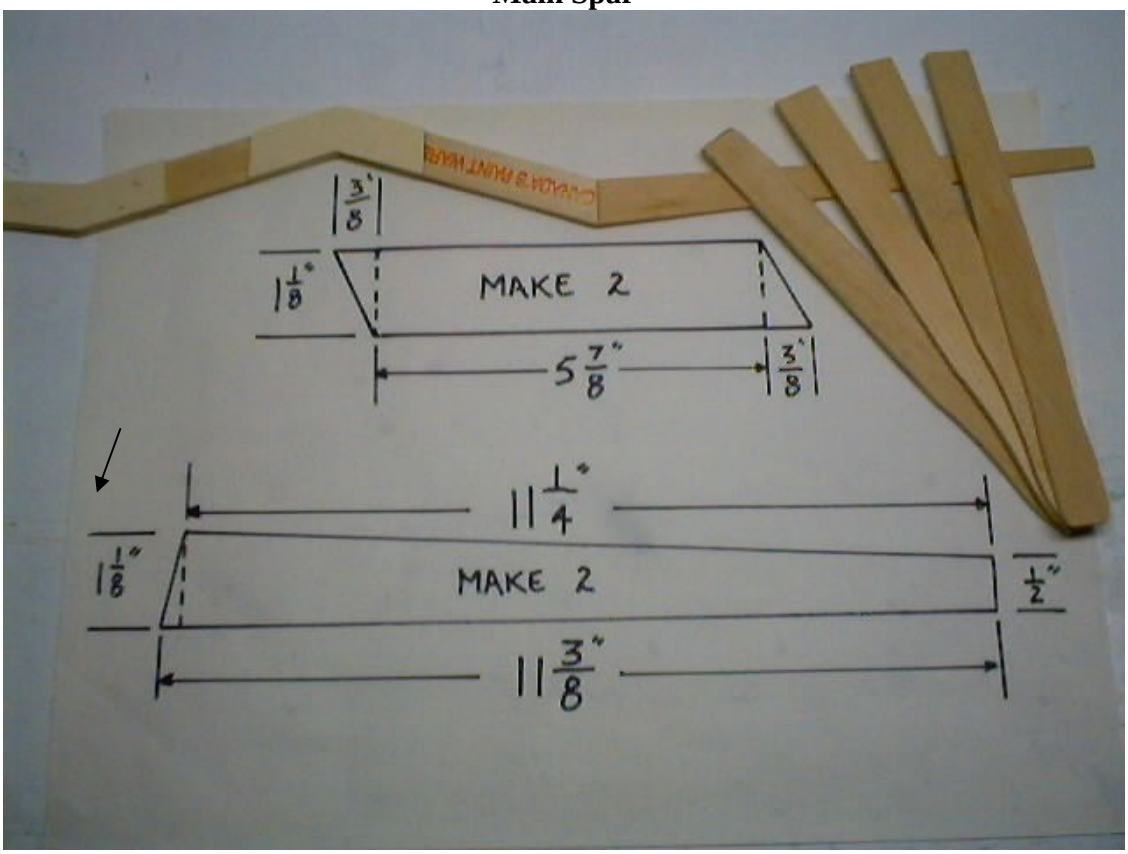
Gary's Corsair

Wing

Cut the four spar sections as per the dimensions shown. They are made from paint stir sticks, which are approx. 1 1/8" high and 3/16" wide. Pine or spruce also makes good spar material. There is no need to go thicker than 3/16" as the joints are reinforced on both sides with 1/8" plywood. Note: test stir sticks for brittleness by giving them a good twist before using.

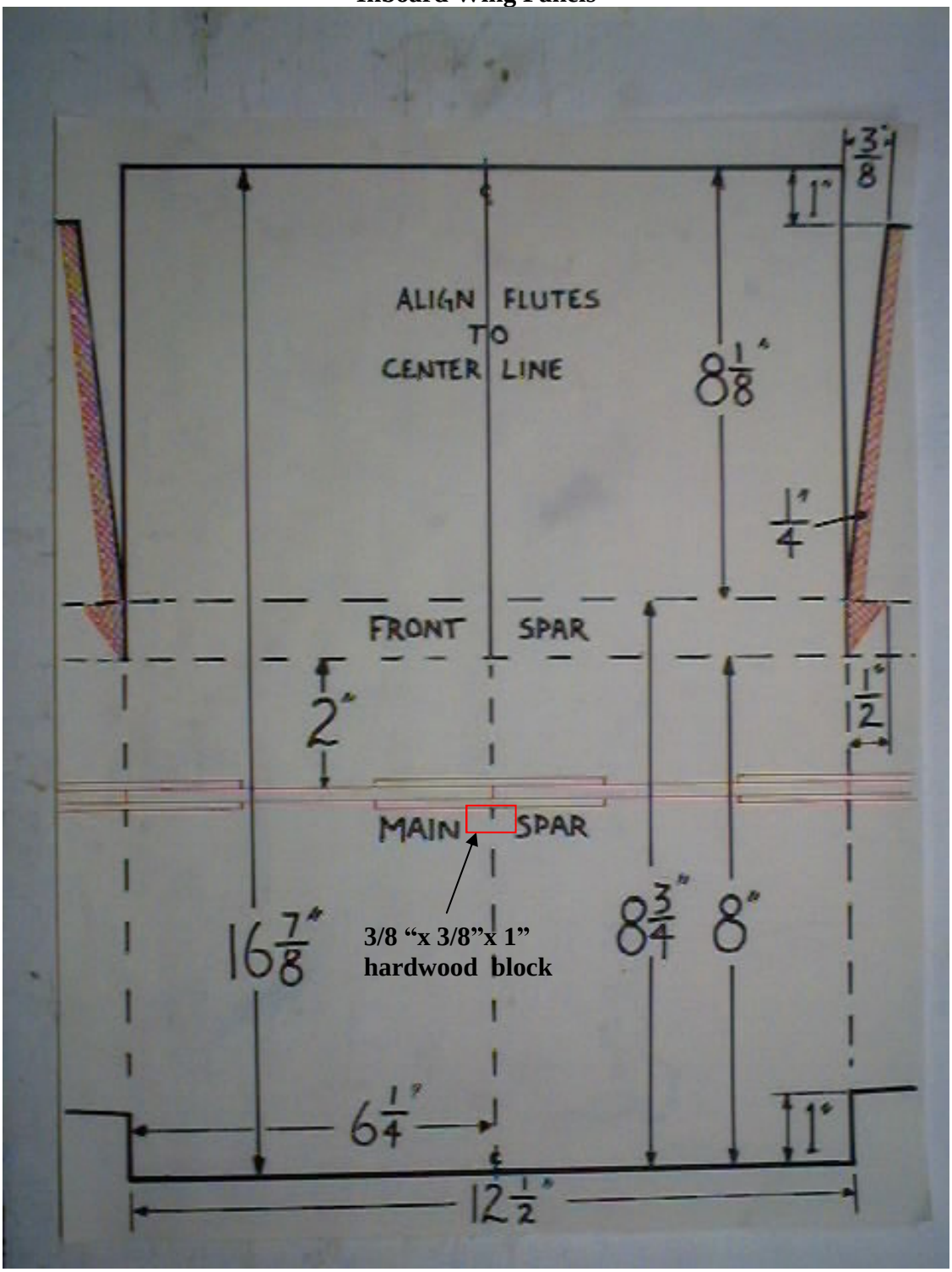
Main Spar



Assemble the main spar on a flat surface and join the sections with epoxy. After epoxy sets, sand joints smooth. Make 6 doublers out of 1/8" aircraft grade plywood, 4" wide, for the spar joints. Do not use the three layer plywood typically sold as light ply. The light grade was used in the early models and the spar center joint failed during hard landings and full power snap rolls. Clamp the doublers on with carpenter's glue and once set, sand the edges even with the main spar. Epoxy a 3/8"x3/8"x1" hardwood block on the rear of the spar for the landing gear attachment screw. Balance the finished main spar on your finger. The heavier side should go in the left wing to help offset the imbalance caused by the engine muffler.

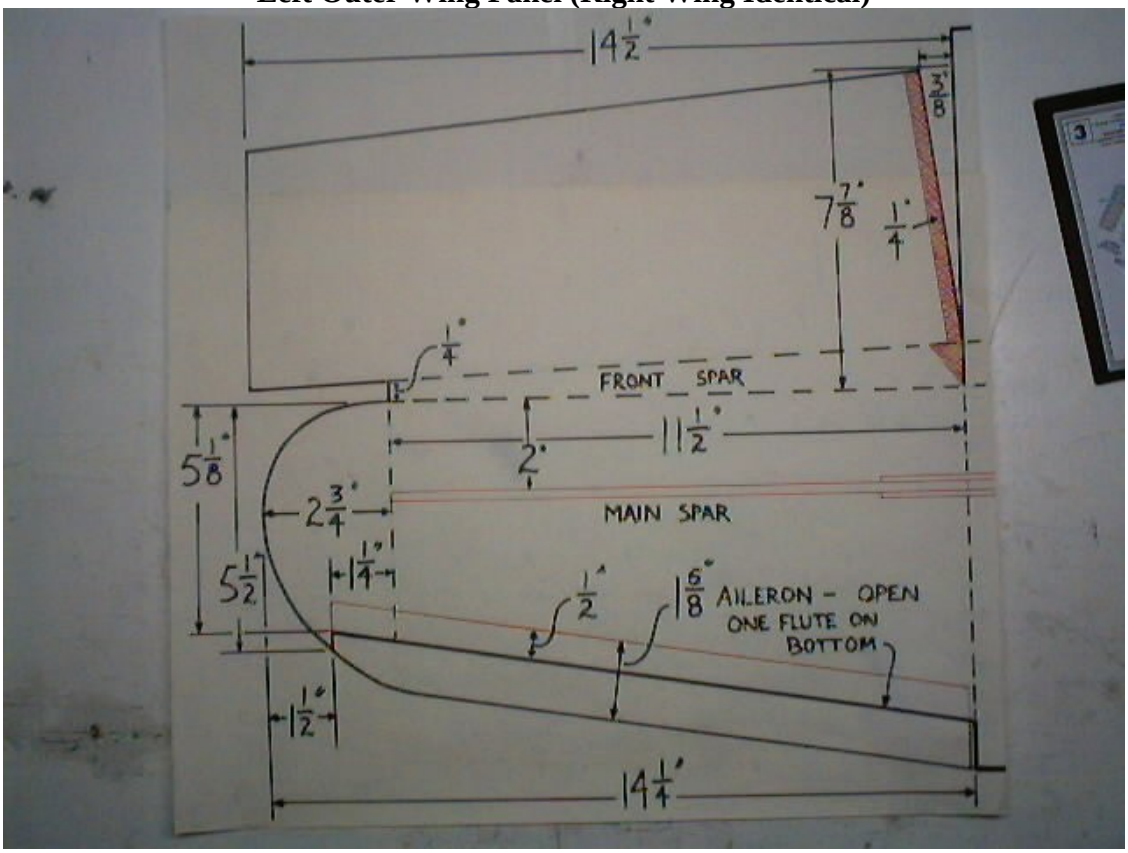
Cut a piece of 2 mil coroplast 42" by 19". The flutes run the shorter distance. If you're planning to order 2 mil from a local supplier and want the scale colour, be sure to specify NAVY BLUE. One 4' X 8' sheet will yield 5 wings and 5 belly pans. You better order 2 sheets because your flying friends will want some as well. Basically, the wing is all one piece with three folds on the bottom at the main spar joints. The folds at the front edge form the front spar and add strength to the wing. The leading edge is made of foam and is attached to the front spar with double-sided tape. Ailerons are made of 4 mil coroplast and are sandwiched between the top and bottom wing skins.

Inboard Wing Panels



The vertical, dotted fold lines must run along the nearest flute. This will result in smooth bends in the bottom wing skin. Dotted lines are fold lines, solid lines are cut lines, cross-hatched areas have the flutes removed on the inside to give a smooth overlap. Lay out the wing as per dimensions on both plans. You may want to make a cardboard template if building more than one wing (harden the edges of the cardboard with thin ca and make pin holes at key locations). Tip: To see your lines easily on Navy blue coroplast, use a silver or gold permanent marker. Be sure to mark the spar location. Score dotted fold lines with a Phillips screwdriver bit or window screen roller (center wing score is on opposite side).

Left Outer Wing Panel (Right Wing Identical)

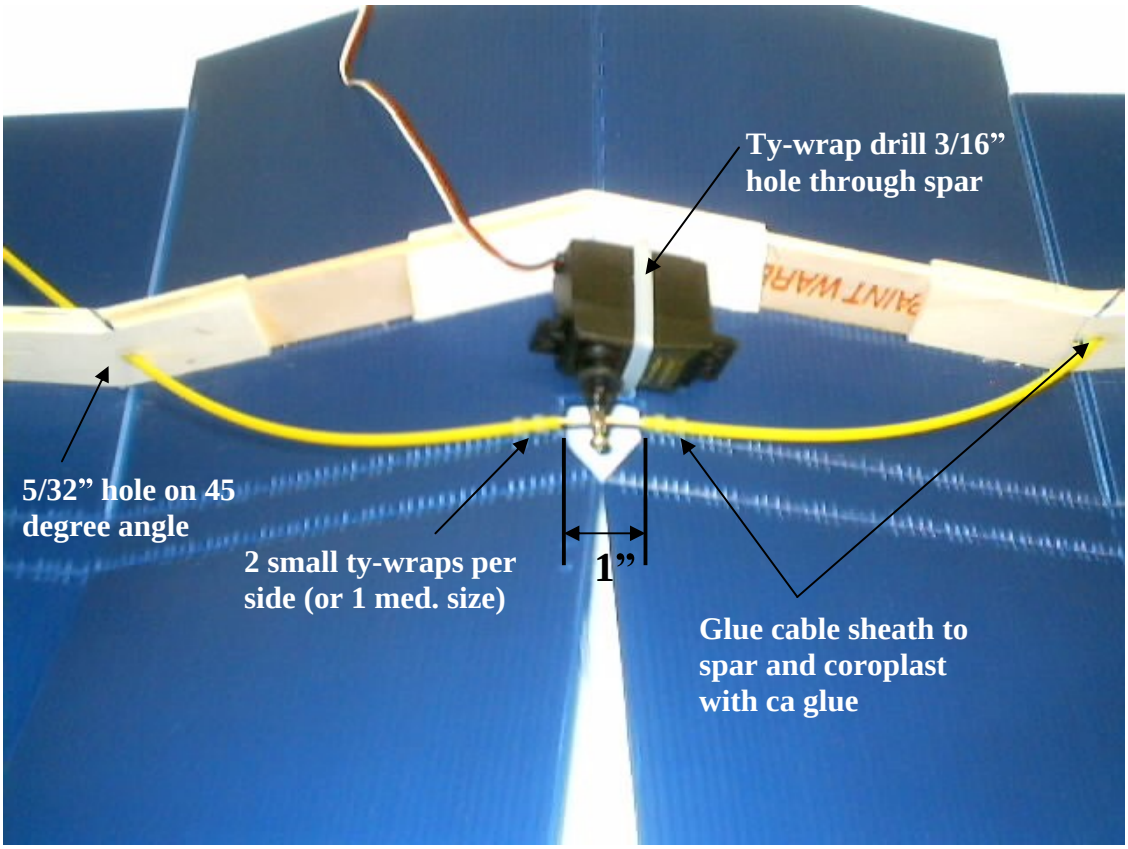


Note: The top skin (top of photo) is oversize and is trimmed to match the bottom skin just before final wing closure.

Check Fit of Main Spar

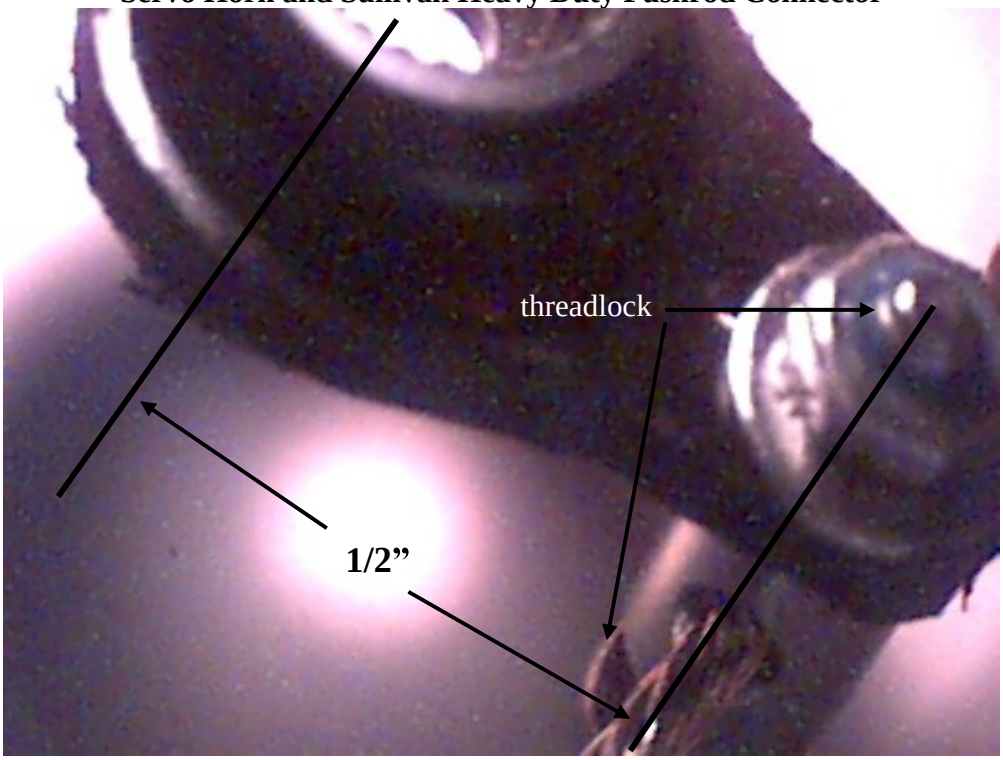
Ensure that the folds in the bottom wing skin match the angles in the main spar. Prepare the coroplast for cyanoacrylate (ca) glue; sand area to be bonded with 100 grit sandpaper, scrub with a rag dampened with mineral spirits, wipe area with a dry cloth, lightly flash with a butane or propane torch. This ensures a strong bond in all wing joints glued with medium ca. Drill a 5/32" hole on a 45 degree angle through the center of the outer doublers. The aileron flex cable will pass through these holes. Glue the main spar to the wing bottom skin in 4 separate steps; right inboard, left inboard, right outboard, left outboard. Lay a generous bead of medium ca on the section of spar to be glued. Quickly lay the spar in position and apply some weight for at least half an hour. Separating the parts to re-align the joint weakens the bond so try to line everything up before joining the parts.

Aileron Servo and Flex Cable Installation



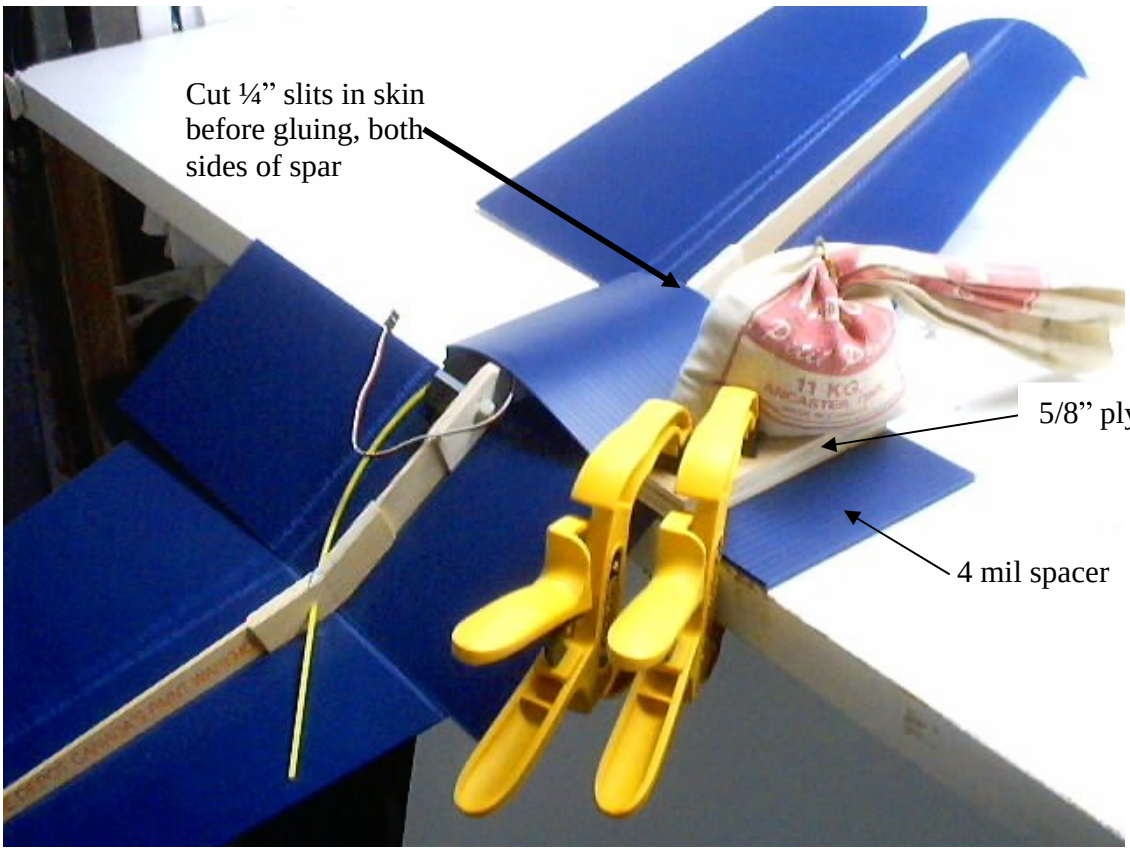
Mount full size aileron servo to front of main spar as shown. Align the servo output shaft with the center of the main spar. Mark hole locations for the ty-wrap and drill 3/16" hole in spar. Apply double sided tape to the servo bottom and side. Secure servo with a medium ty-wrap. Remove a ¾" wide section of coroplast from under the servo shaft to allow clearance for the servo arm. Install the servo arm assembly. Insert a 24" length of braided flex cable through the main spar and the hole in the pushrod connector. Cut the yellow outer sheath into 12" lengths and install as per photo. Locate the cable on the servo side of the fold so it's not in the way when folding up the front spar. Secure the cable to the bottom skin with 4 small ty-wraps. Glue the cable sheath to the spar, ty-wraps and lower skin coroplast with ca. Do a pull test to ensure the outer sheath of the flex cable is securely attached at these locations. Check the main spar to lower skin glue joint by holding the wing up to the light. Use thick ca to fill any gaps.
Note: The servo is mounted on the left side of the spar to help offset the weight of the engine muffler. When the right center section is folded over it may contact the servo mount. Trim as required.

Servo Horn and Sullivan Heavy Duty Pushrod Connector



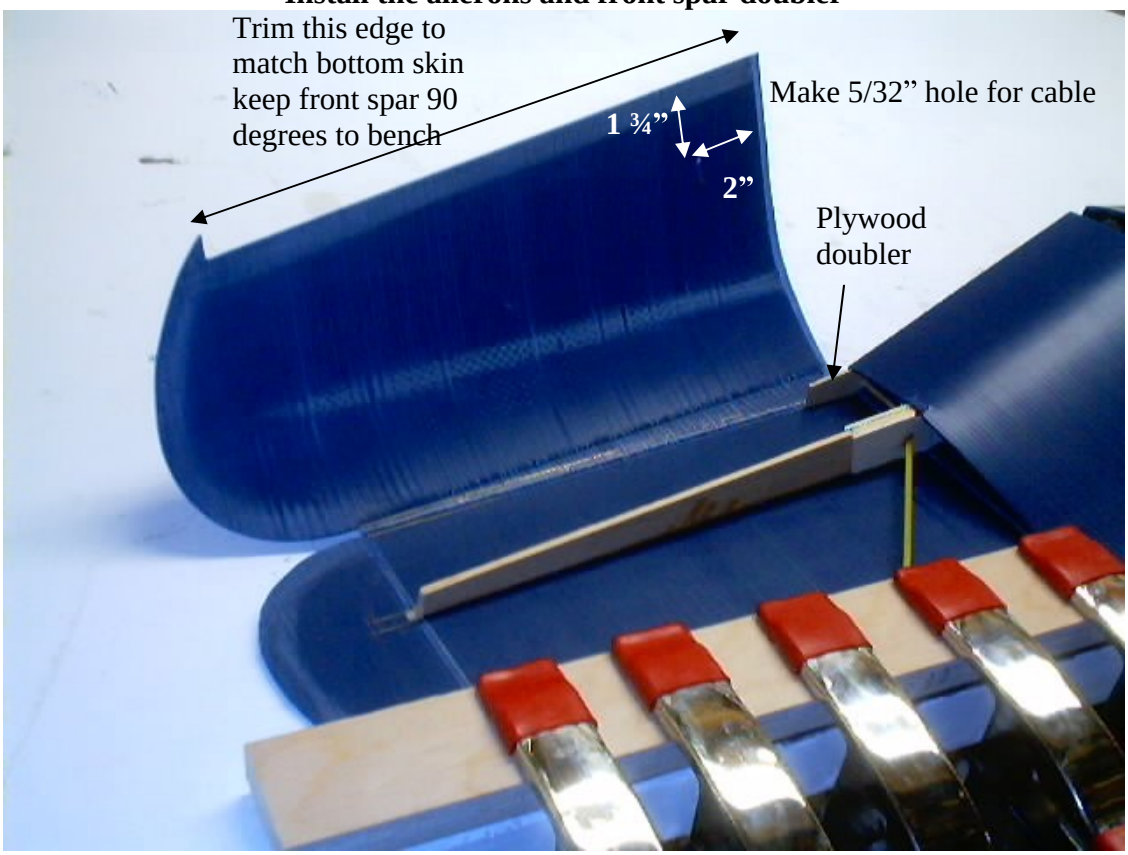
Install a Sullivan Heavy Duty Pushrod Connector in a servo horn as shown. There must be no slop between the two. Tighten the nut and washer so there is only light friction when rotating the link. Use a threadlocking compound (Loctight) on the nut.

Close Center Section



Before gluing with medium ca, sand, clean and flash the main spar contact area on the Coroplast and a ½" strip along the inside trailing edge of both skins. Slit the skin where it rides up on the outer spar (see photo above). Use a 4 mil spacer to prevent crushing the trailing edge. Run a bead of medium ca along top of spar. For the trailing edge, (coroplast to coroplast), apply the ca glue in small dots ½ " apart. Use weights and clamp joint for 2 to 3 hours. Ensure top skin is bonded to the spar.

Install the ailerons and front spar doubler



Make the ailerons from 4 mil coroplast as per the plan. Remove a flute on the bottom side to form the hinge. Crease the rear edge of the hinge only. Fold it all the way back and lightly sand the hinge line with 400 grit sandpaper to remove some of the stiffness. Prepare both sides of the aileron for ca glue. Tape a 2 mil spacer strip under the aileron to prevent crush. Glue (dots of ca ½" apart) and clamp to workbench. Make two 1/8" plywood doublers (2 ½" wide) and ca or epoxy to the inside of the front spar

Check the fit of the outboard top skins. The easiest way to keep the front spar 90 degrees is to push the wing against a piece of wood attached to the workbench. The inboard edge with the shaved flutes should be flush with the center section skin. Pay particular attention to the front spar where the skins overlap. Trim as required. The outboard top wing skins must have a curved shape to eliminate any pre-load prior to gluing. This is accomplished by heating the center of the skin with a heat gun while forcing it to bend. Stiffen the trailing edge with two strips of wood and some paper clamps. Pass the heat gun back and forth until the coroplast starts to soften. A checkered pattern will appear when the critical temperature is reached. Stop heating and hold the bend until the coroplast starts to cool (approx. 30 sec.). The bend will be permanent and there should be no distortion on the outside of the skin. Drill an angled hole in the top skin for the aileron cable (see wing plan). The hole must be angled so the cable runs smoothly to the control horn.

Note: If you do not pre-shape the top skins the wing will end up with a twist along the trailing edge.

Shape the Outboard Top Skins

Do a dry run before gluing down the outboard skins. Pass the aileron cable through the hole in the skin. The front spar should be approx. 90 degrees to your work surface with the skin contacting the top of the main spar. Clamp a board across the top of the trailing edge and place weights along the spar. Check the front spar and make sure there is an even gap all along the bottom. If the outer end is sitting higher that's called wash in and it's bad. Re-position the top skin until the gap is even. Mark the trailing edge to match the front of the open aileron hinge flute (try not to cut off the little stub at the wingtip). Trim along this line and recheck the fit and gap along the front spar. The gluing part can be a nightmare if you aren't prepared to work fast. Have everything within easy reach.

1. Apply medium ca to the front spar doubler
2. Lay a bead of medium ca on top of the spar
3. Fold the skin back to where you can insert the aileron cable in the hole
4. Apply dots of medium ca on the ½" gluing strip on the aileron
5. Line up the skin trailing edge with the front of the open aileron hinge flute
6. Place soft weights on top of the main spar
7. Clamp a board to the top of the trailing edge along the ½" glue strip
8. Make sure the top skin is contacting the main spar
9. Leave clamped overnight

Trim the wingtip to match the bottom skin and glue with ca. Run a bead of thin ca along the seam where the top skins meet. Remove the aileron flex cable and apply ca to the plastic cable sheaths where they exit the top skin. Trim the ends leaving 1/8" protruding. Make the wing saddle template from stiff cardboard and make sure it's a perfect match to the wing chord. Add a 5/8" strip to the bottom of the template to ensure proper alignment when cutting the fuselage wing saddle (see fuselage section).

Aileron control system

This homemade control horn is adjustable and works well on the Corsair ailerons. It is an alternative to nylon control horns from a hobby shop. It's basically a 3/16" aluminum pop rivet with a pvc washer . The rivet stem is threaded with a 6NC32 die and the link is cut from a medium size zip tie. A 3/8" square pvc washer is installed on the opposite side of the coroplast. The rivet stem is pulled until the coroplast just starts to crush. Run thin ca into the stem and under the head and washer. Trim stem to 3/4" and screw on the link.

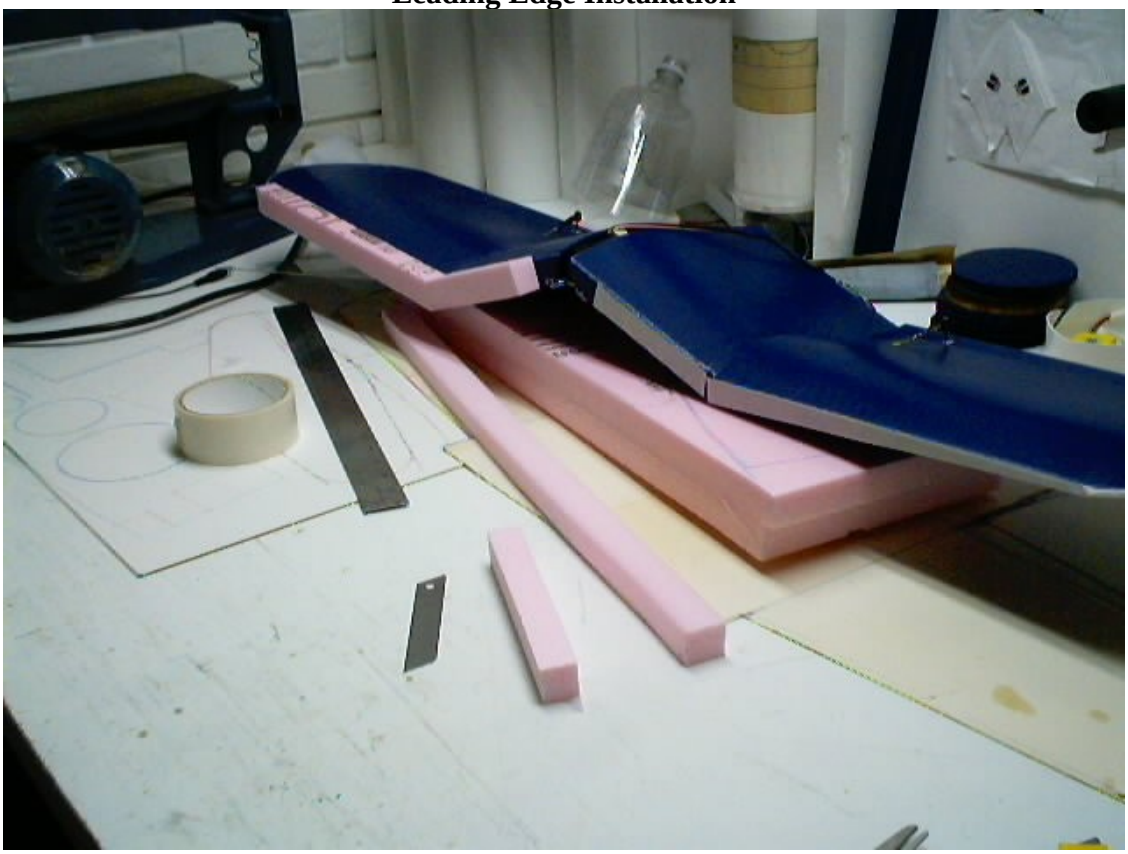
Rig Aileron Control System

Remove the flex cable from the wing and solder a clevis to one end. A small butane torch is ideal for this job. Most small soldering irons **will not** heat the cable and clevis sufficiently to ensure a good joint. Re-insert the cable in the wing and connect the clevis to the aileron horn. Cut 1/16" off the end of the clevis. Cut 5/16" off the hollow end of the coupling and cut 1/8" off the threaded end of the coupling. This will ensure sufficient aileron travel. Screw the clevis onto the coupling. Tape the ailerons in the neutral position (see below). Measure how deep the cable will penetrate the coupling and then mark where the cable is to be cut. A small Dremel cut-off wheel works best. The clevis coupling must be soldered with the cable installed. Detach the opposite clevis and pull the end to be soldered out as far as possible. Shield the coroplast around and under the coupling joint with layers of tin foil to prevent heat damage. Solder the clevis connector to the cable. It is acceptable to solder both clevises directly to the cable if you don't have a connector.

Note: the aileron clevises are adjustable on one side only. Neutral trim is adjusted at the servo connector.

Lay a straight edge across the bottom of the outboard wing and adjust the clevis and servo connector so that the ailerons are parallel to the straight edge. They must not droop in the neutral position**. Note**: Don't use the inboard wing trailing edges as a reference for the aileron neutral. Tighten servo connector screw and secure with loctite (thread lock).

Leading Edge Installation

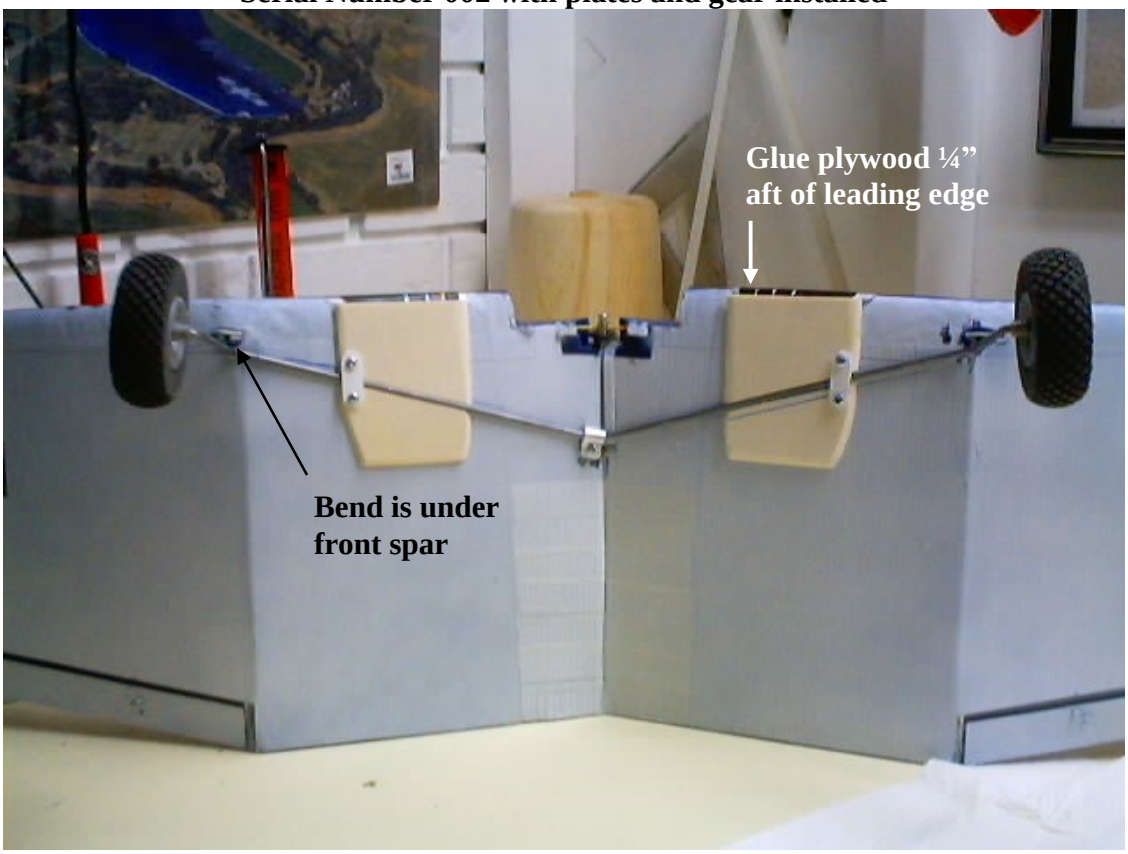


Cut 4 lengths of foam 7/8" X 7/8" X 12". Cover the front spar with double sided tape and trim even with edges. Attach the foam sections with no gap between the joints.
Using a new knife blade, taper the outboard foam sections to 1/8" at the wingtip. Sand the foam into a rounded shape with a sanding bar. Check the fit and alignment of the wing to the fuselage. Trim the foam so it contacts the fuselage sides. Patch any damage to foam with lightweight spackle (Poly instafil).
Install the landing gear.
Notch the leading edge back to the landing gear plates to form the air intakes.
Vacuum the wing and cover the leading edges with vinyl (see template drawing in Fuselage Section).
Re-enforce the wing center section top and bottom with strips of fiberglass packing tape.
Install wing and check fit of belly pan.

Note: It may be necessary to flatten the top of the main spar slightly to clear the bottom of the fuel tank.
Ensure the aileron servo arm does not contact the fuselage through the full range of travel.

Gary's Corsair
Landing Gear

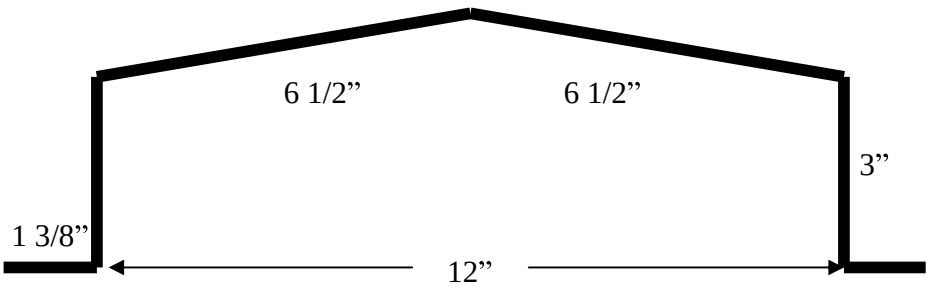
Serial Number 002 with plates and gear installed



The main landing gear is made from a 22" length of 1/8" piano wire and is mounted externally to the bottom of the wing. Stresses are distributed over a wide area making this configuration ideal for flying off grass. To prevent damage to the Coroplast, the wire should be removed from the wing when bending into shape. If piano wire is unavailable, the wire handle from a 5-gallon pail can be substituted.

Note: If you are installing landing gear on your Corsair, you must also have an operable rudder for directional control during take-off.

Bend the 1/8" piano wire to the dimensions show below. Adjust the center bend to match wing. You may want to trial fit a dummy gear made from coat hanger first.



Mount a P-clip on the landing gear beside the center bend. You can make one from a 3/8" wide strip of thin aluminum or plastic. Cushion the piano wire inside the clip with a piece of fuel tubing. Drill a 1/16" hole through the clip, through the bottom of the wing and into the hardwood block. Attach the clip with a #4 screw. Check the alignment of the gear. The 90 degree bends at the gear legs should sit under the front spar (see photo above). The center bend should sit under the main spar. Locating the bends as described will prevent the wire from penetrating the Coroplast when you "drop it on the carrier deck".

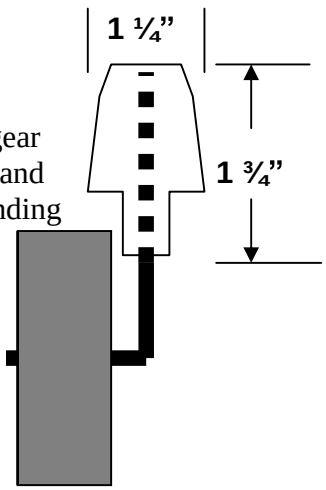
Cut the two intakes from 1/8" light ply 3" X 2 ½". Tape them to the center of the inboard wing panel, ¼" back from the leading edge as shown. Mark a line along the front of the landing gear wire. Remove the intakes and **cut them in half** along the line. Bevel the outside edges and round the corners (you may want to taper the plywood for a more scale like appearance). Glue the 4 intake sections in place with medium ca. Make some straps from pvc and secure the landing gear at the outboard edge of the plates with #4 screws. Notch the foam leading edges along the plywood plates to simulate the air intakes. Fill gaps with lightweight spackle. Cover intakes and exposed foam with vinyl.

There is no need to install a steerable tailwheel. The big rudder provides plenty of steering authority, even in thick grass. Any additional weight on the aft end of this model must be avoided. Make a simple, half round skid from Coroplast and glue to the bottom of the fuselage behind the rudder hinge line.

For grass fields, use the lightest 2 ½" to 3" wheels available. The model in the picture has DU-BRO super light foam wheels.

For a more scale looking landing gear, cut out gear doors from sign vinyl and stick to both sides of the piano wire. The original models had pvc forward gear doors mounted to the landing gear legs. They looked great but really slowed the airplane down. The vinyl is flexible and bends back creating less drag.

Forward main landing gear door. Cut 4 from vinyl and stick to both sides of landing gear leg

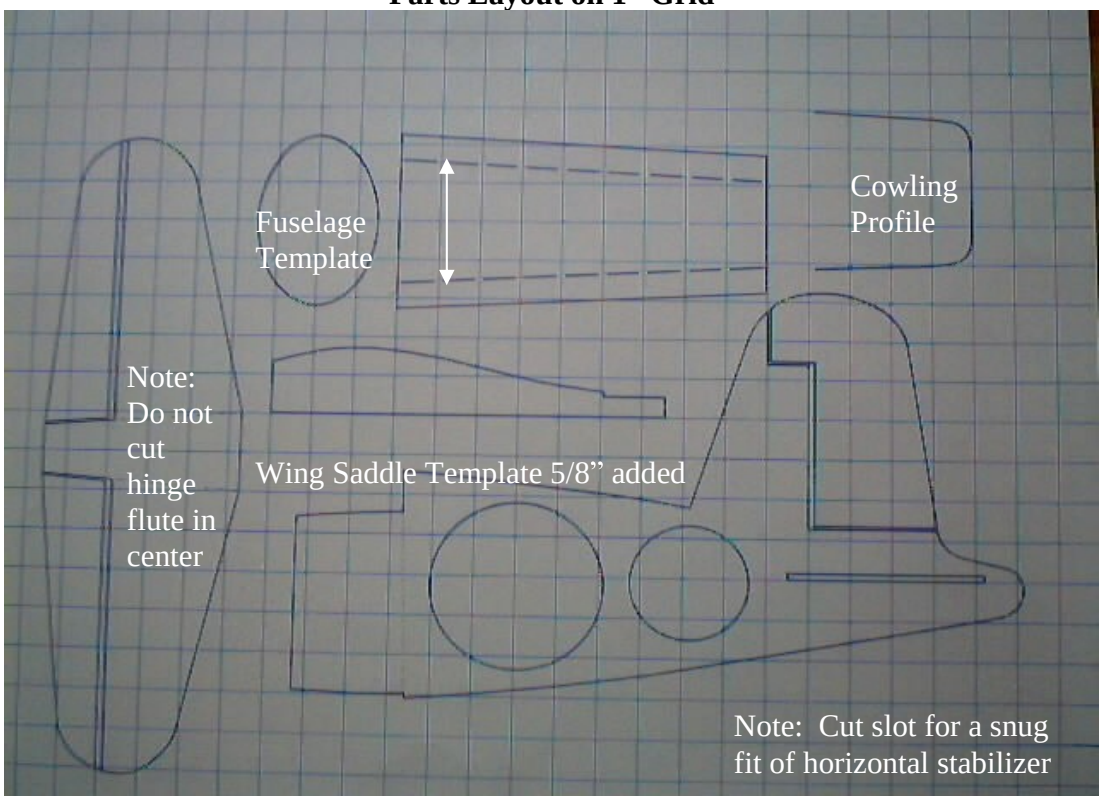


Gary's Corsair (DRAFT COPY)

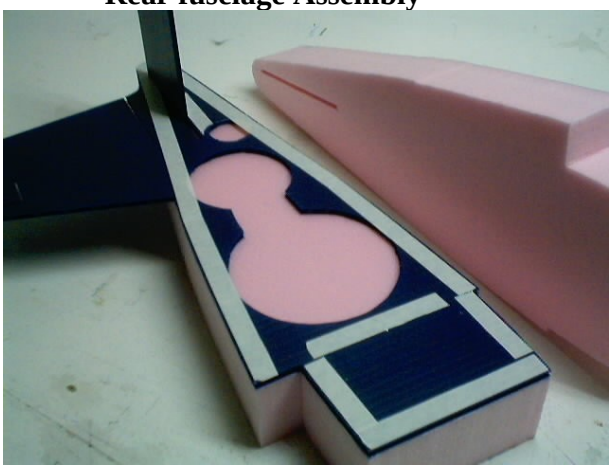
Fuselage

Cut out the 4 mil rear fuselage section and horizontal stabilizer. The parts are laid out below on a 1" grid. Line up the rudder and elevator hinges with the flute direction. Carefully open the hinge flute on the left side and cut the 1/16" slots at the top and bottom of the rudder. Make sure the slot for the horizontal stabilizer is a snug fit. Use the Coroplast fuselage to trace out two foam sections. Use 2" blue or pink expanded polystyrene foam. A scroll saw with a fine blade is ideal for cutting the foam. Vacuum all dust and attach strips of double sided tape as shown. Use a piece of 4 mil Coroplast in the stabilizer slots to ensure accurate assembly of the foam / Coroplast / foam sandwich.

Parts Layout on 1" Grid

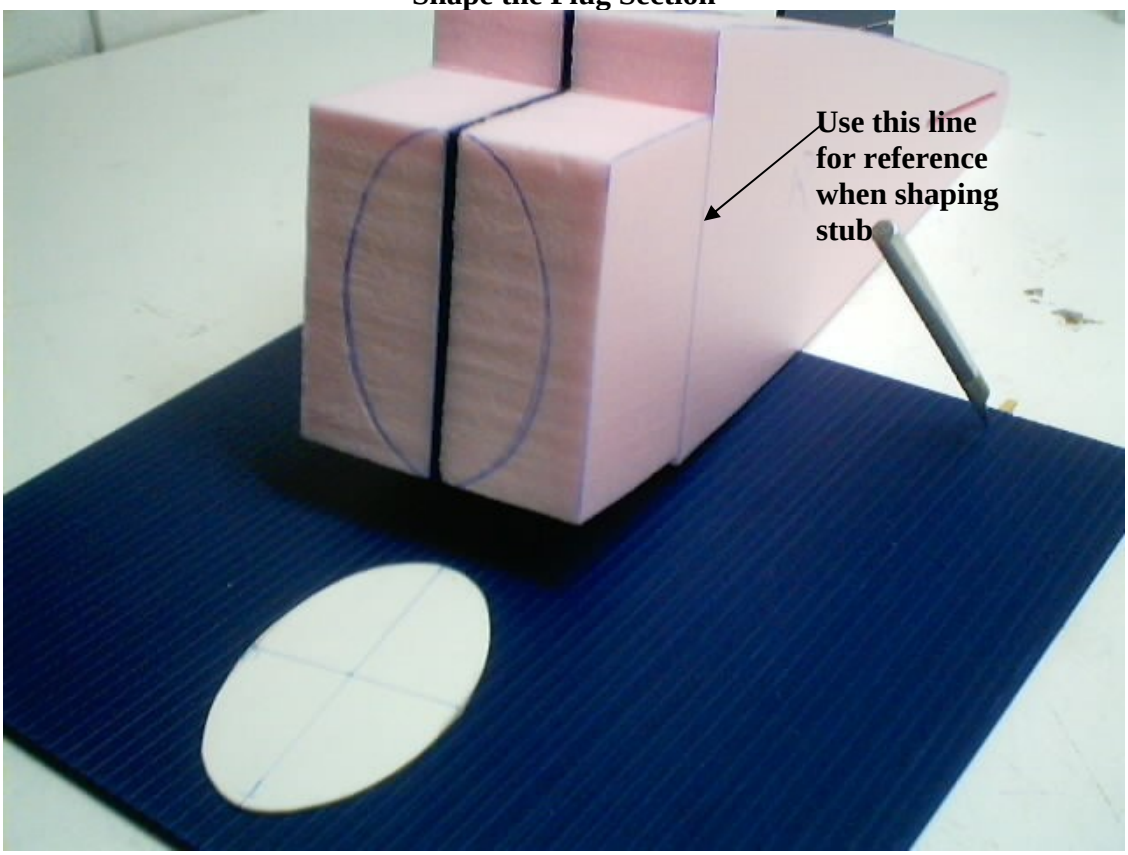


Rear fuselage Assembly



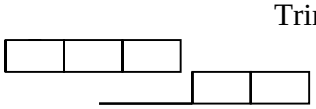
Remove the section of Coroplast between the lightening holes to allow clearance for the Kevlar pull pull cables.

Shape the Plug Section



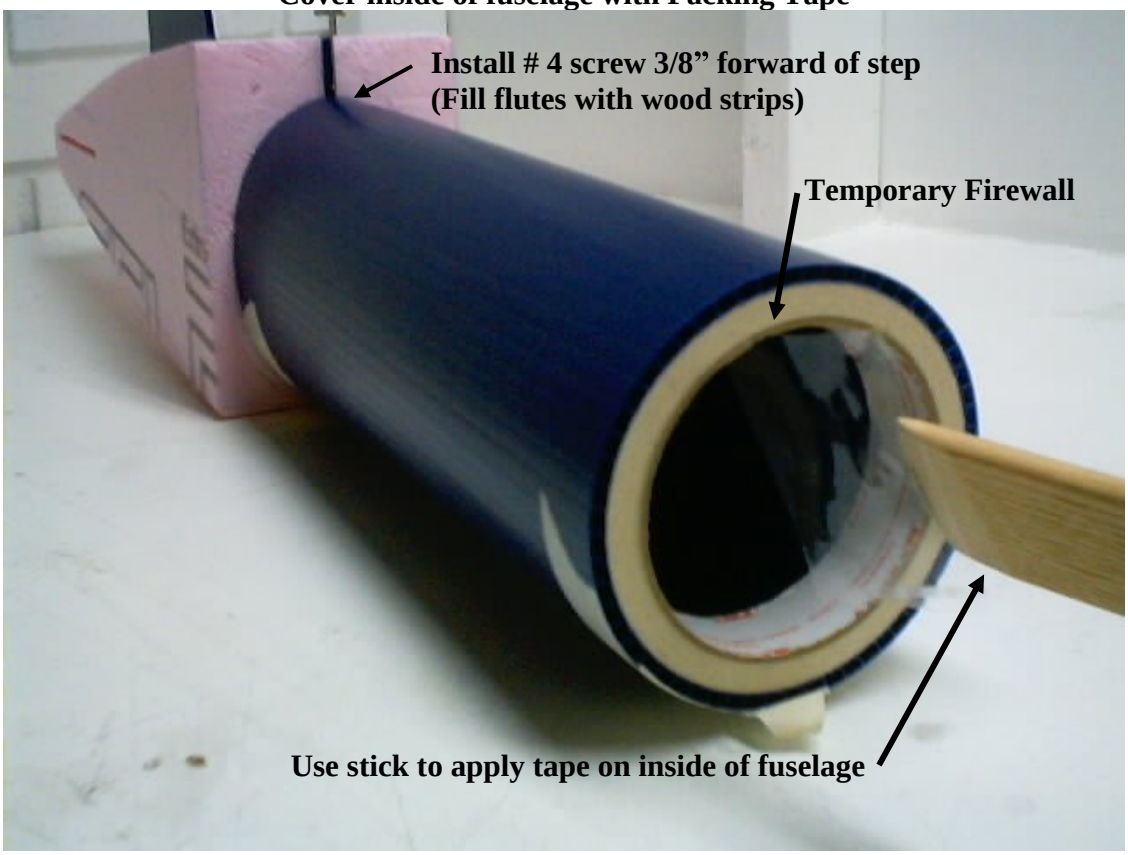
Make a template from the parts layout to mark out and carve the cockpit section into an oval shape. This plug fits inside the Coroplast forward fuselage. A 100 grit sanding block works well.

Cut a piece of 4 mil Coroplast 12 1/4“ X13” (flutes running the shorter dimension). Slit all the flutes down the middle on one side. A simple cutting guide can be made from a short strip of hardwood or pvc plastic 3/16” wide. Stick a #11 exacto knife blade into the center of the plastic, sharp edge up. Hold the knife on a 45 degree angle and push it through the flutes….a perfect cut every time. Make a temporary firewall from a roll of masking tape. Strip a 1” wide roll down to 3 ¾” diameter and wrap the Coroplast around it. Shave the flutes on one edge as necessary to achieve a tight wrap and smooth overlap on the bottom (see diagram below). Secure the firewall with tape. Wrap the other end around the foam stub section. Check the alignment with a straight edge, you may have to glue some foam shims to the foam stub. For a rigid fuselage, there should be little or no gap on the inside. Continue sanding the stub until a close tolerance fit is achieved. Separate the two fuselage sections and thoroughly vacuum all the foam dust from parts and bench. Re-assemble the two fuselage sections with the seam on the bottom and secure with strips of tape. Working through the hole in the firewall, cover the inside of the Coroplast with 2” pieces of packing tape. This will lock the slit flutes and make the forward fuselage rigid. Glue the bottom seam overlap with ca. Using a pin, mark the location of the # 4 locking screw. The flutes must be re-enforced with wood strips to hold the screw.

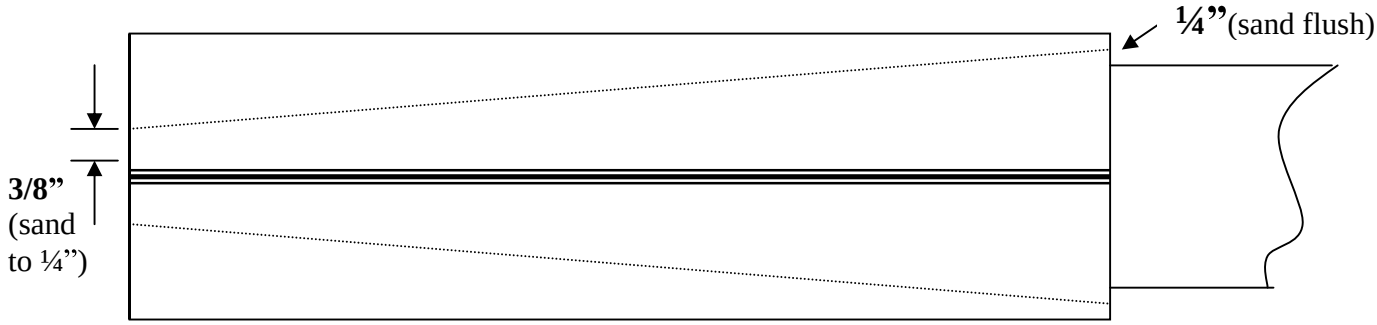


Trim and sand Coroplast to create a smooth overlap
Flash mating surfaces prior to gluing with ca

Cover inside of fuselage with Packing Tape

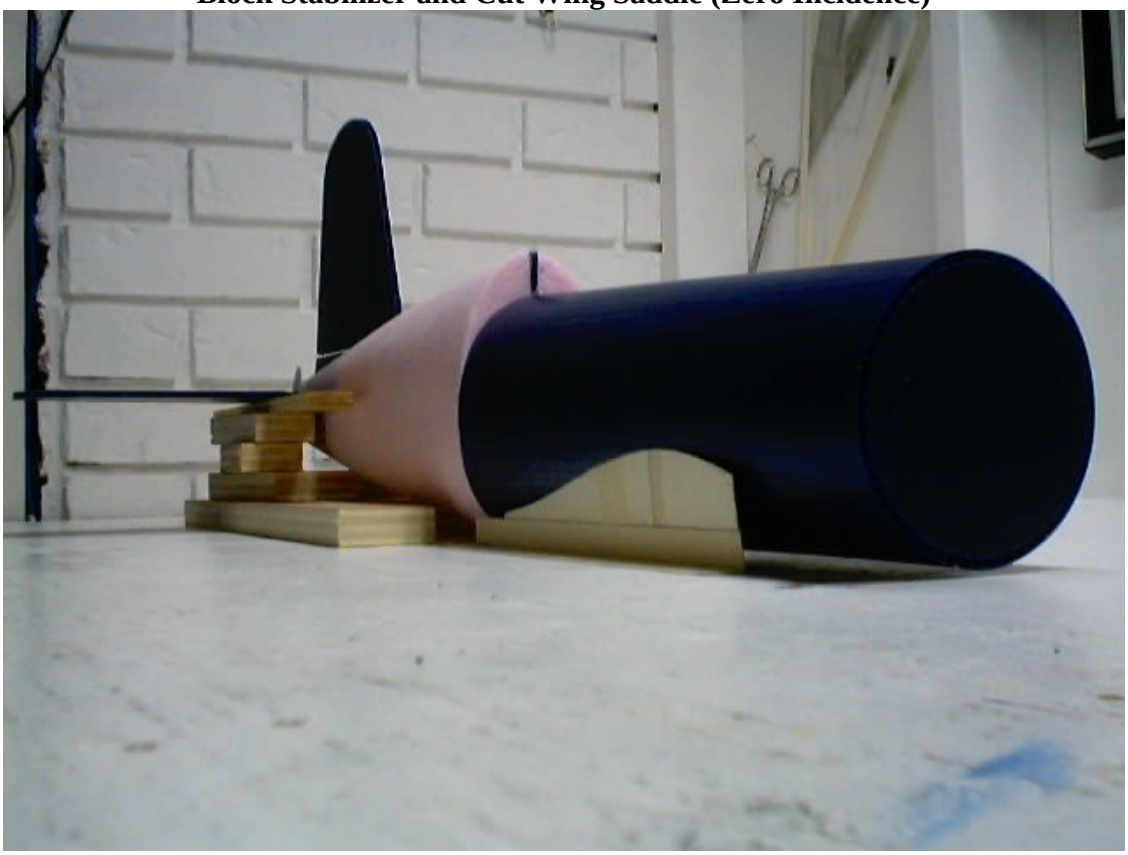


Separate the fuselage sections and remove the temporary firewall. Vacuum the foam dust and cover the rest of the open flutes with packing tape. Re-assemble the fuselage and install the #4 screw. Mark the aft fuselage foam as shown below and trim with a long knife or saw. Sand the foam with a 10" block until it's flush with the Coroplast forward fuselage. There should be ¼" of foam left on each side of the tail after sanding. Try to achieve an egg shape with the fuselage considerably narrower on top. Dents and mistakes can be filled in with lightweight spackle compound (I use Poly Instafil). Install the horizontal stabilizer and check for alignment and a snug fit.



Fuselage Top View

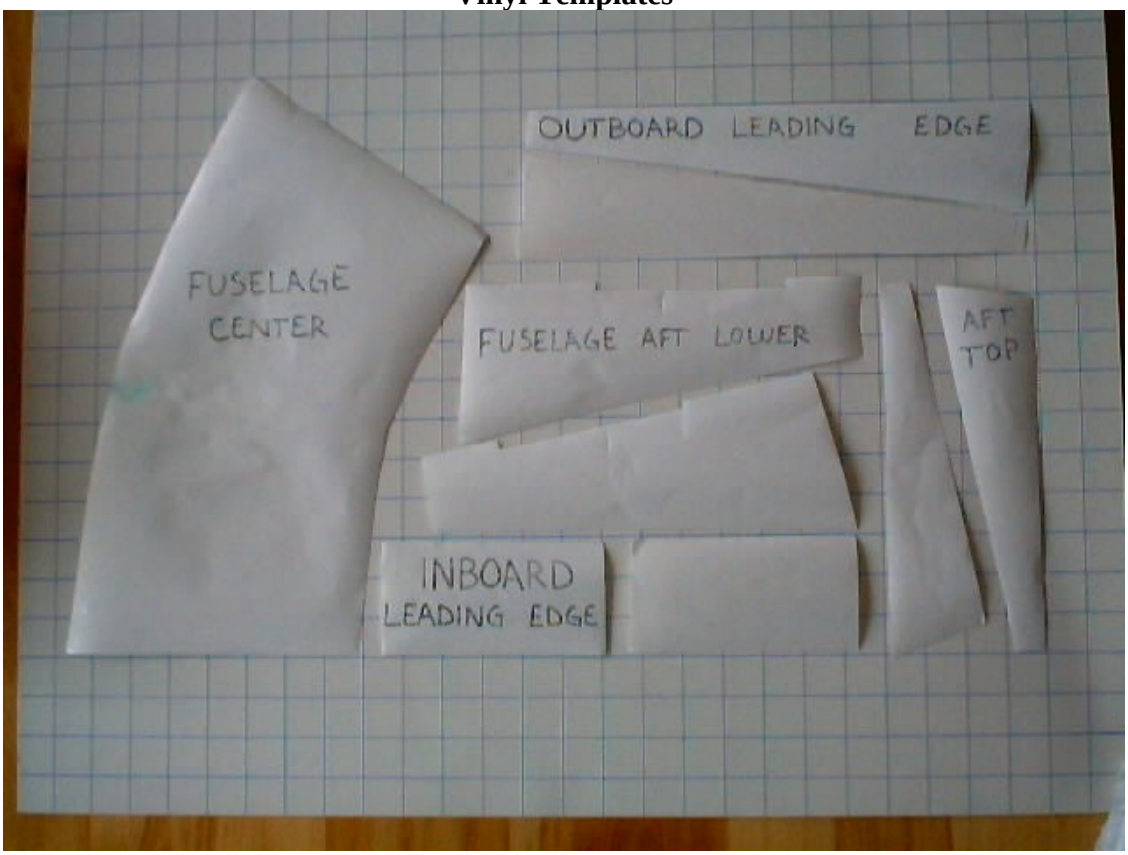
Block Stabilizer and Cut Wing Saddle (Zero Incidence)



Block up the horizontal stabilizer equally on both sides until it is perfectly parallel to the work surface. This will setup the tail and wing at zero incidence. Use a flashlight to help you see any gaps under the stabilizer. Place the wing root template beside the fuselage with the trailing edge 1 ½" forward of the joint. Mark the wing outline and repeat on the other side. Connect the leading and trailing edge lines across the bottom of the fuselage. Carefully cut the Coroplast with a #11 exacto blade. Short, stabbing cuts will ensure a neat job. Trim the bottom of the foam stub a little at a time until the wing sits flush against the saddle. This is a good time to correct any slop or miss-alignment. Shim the stub with scraps of foam until you achieve a straight, rigid fuselage. Fill all joint gaps with lightweight spackle, inside and outside the fuselage. It is also acceptable to glue the two sections together with polyurethane glue or epoxy however the rear fuselage will usually survive a major crash and can be used again if the joint is not permanent.

Drill a 3/16" hole for the rear wing dowel midway between the fuselage joint and the trailing edge. For added strength, insert 1/8" fiberglass rods or dowels 12" long, into the flute immediately above the wing, both sides. This will keep the saddle area of the fuselage rigid. Replace any damaged or missing packing tape on the inside of the Coroplast. Re-enforce the Coroplast forward of the joint with tape. Wrap all the way around with a 1" strip of fiberglass re-enforced strapping tape. It will be hidden under the vinyl covering.
Install the elevator and rudder control systems at this time (see Radio Installation section)
Make the firewall and glue in position (see Firewall section).
Install the cowling and firewall screws (see Cowling section)
Cover the fuselage foam with vinyl (see template lay out).
Make and install canopy (see Canopy section)

Vinyl Templates



A piece of sign vinyl approx. 15” X 24” is required to cover all the foam sections. The closest match to the navy blue Coroplast is the Mactac 9800 Pro (Scandinavian blue). The gloss can be removed with 400 grit sandpaper before applying to match the semi-gloss of the Coroplast. Use the 1” squares in the photo to size the templates. Vacuum brush all dust from the model before applying vinyl. The best bond is achieved if the Coroplast is wiped with isopropyl alcohol to remove any oil and dust.

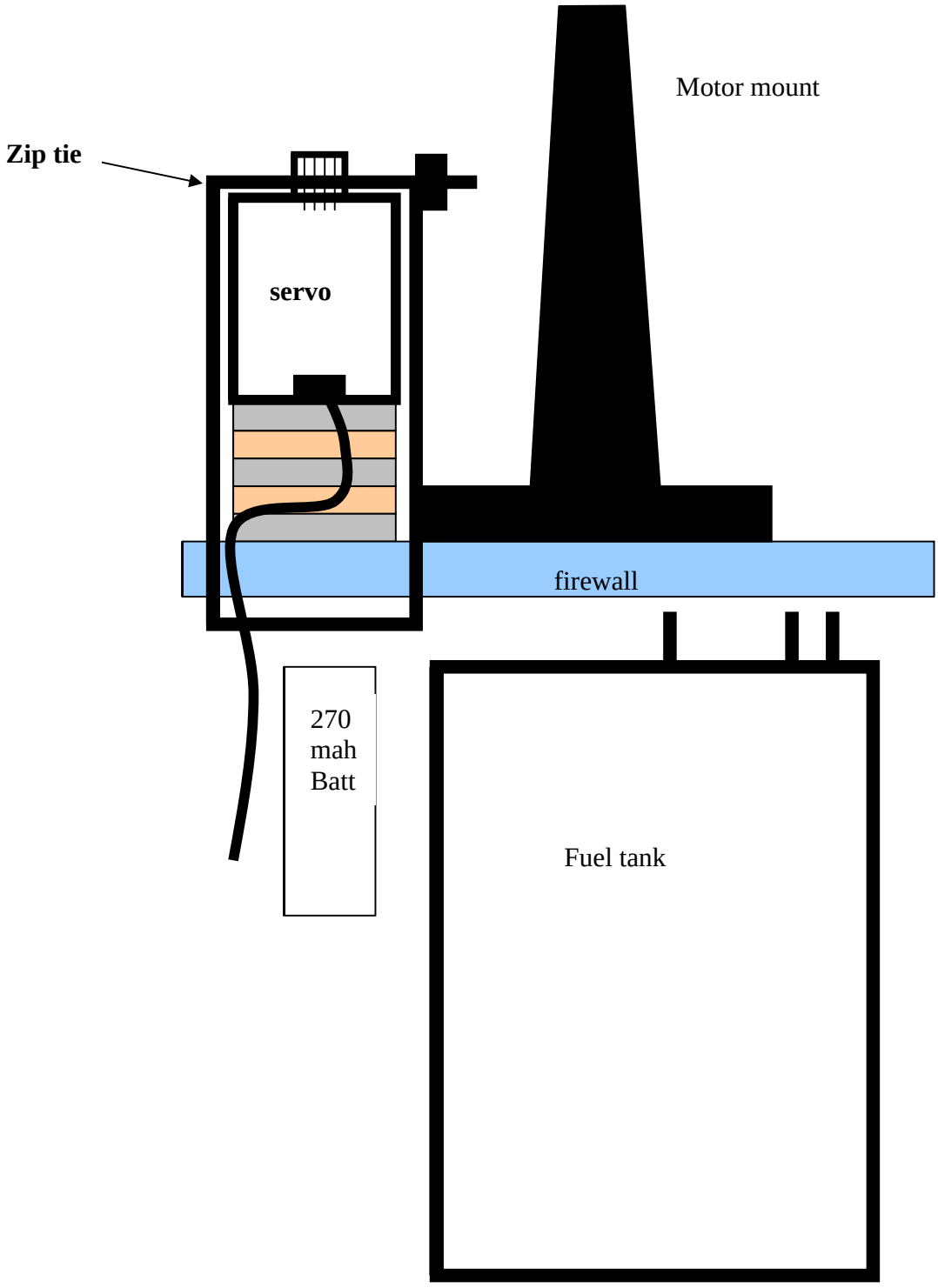
Gary's Corsair (Draft Copy)

Firewall

6 mil Coroplast Firewall with Inverted Mount

The 3 ¾" diameter firewall is made from 1/4" plywood or 6 mil. Coroplast. The Coroplast firewall is lighter and allows the forward dowel to pass through the center. Hardwood strips must be inserted in the flutes to hold the engine mount screws and also to hold the firewall attachment screws. If you only have 1/8" lite ply available, glue two pieces together. Carefully sand the edge to achieve a snug fit. Note: there should be no packing tape under the firewall, as this area will be glued later. Lightly sand the inside of the fuselage where it mates with the firewall and then flash this strip. Slip 8 pieces of wood, 3/4" long into the fuselage flutes equally spaced around the firewall and lock them in place with thin ca. Do not install the firewall at this time. Center the motor mount on the firewall and attach #6 wood screws or blind nuts and bolts. The engine can also be mounted inverted if desired. I prefer the standard orientation because the muffler is out of harms way and the belly area stays clean. Grind off the tips of the screws if they protrude through the firewall to protect the fuel tank. Screw the motor to the mount. Insert the firewall / mount / engine assembly into the fuselage. Approx. 2 degrees of down thrust and 2 degrees of right thrust is recommended. To help you gauge the angle of the motor in relation to the rest of the airplane make a simple tool made from a Bic pen. For OS engines, thread the inside of the pen with a ¼"NF28 tap and screw onto the prop shaft. To check down thrust, lay the straightedge parallel to the horizontal stabilizer. To check right thrust, lay the straightedge parallel to the vertical stabilizer and top fuselage flutes. Once the motor is lined up to your satisfaction, glue the firewall in place with thin ca. The screw holes into the firewall edge are drilled with the cowling in position. Mark the location of the 3/16" forward wing hold dowel (slightly higher than the top of the wing). It should contact the aft face of the wooden firewall.

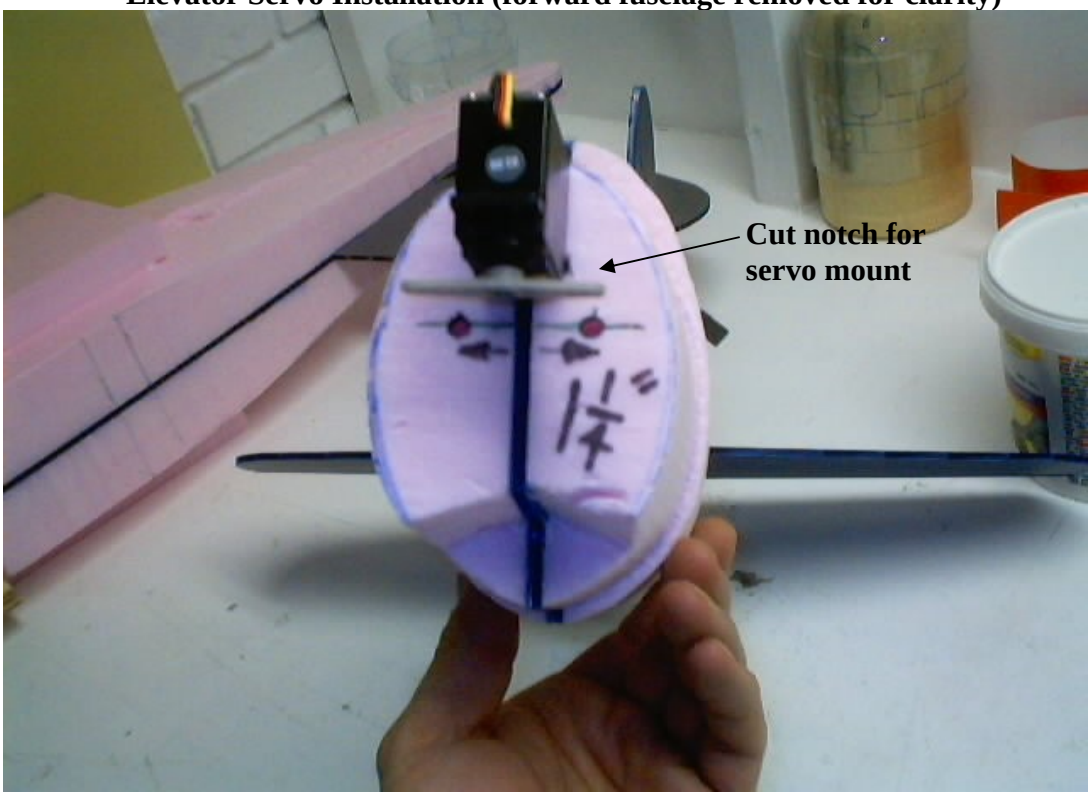
Mount a full size servo under the motor mount. The servo is mounted in this location in order to get the cg as far forward as possible. Do not use a high quality servo for the throttle control. Make a shock-absorbing base for the servo with alternating layers of 1/8" lite ply (2) and foam mounting tape (3). Locate the servo as close as possible to the bottom of the motor mount and secure with a zip tie. Run the servo lead through a hole in the firewall. Stay close to the edge to avoid running into the fuel tank or battery. Make a pushrod to connect the servo arm to the throttle lever. Ensure there is no metal-to-metal contact with the engine through the entire range of travel. You may have to re-orient the lever on the carburetor to make this work. Install fuel tank (min. 6 oz recommended). Seal all the firewall penetrations with a dab of silicone including all the open fuselage flutes around the firewall.



Gary's Corsair (Draft Copy)
Radio Installation

This model utilizes full size radio equipment. The center of gravity of the completed airplane must be considered when locating the radio components. The Corsair has a short nose and may end up tail heavy if the servos and battery are located somewhere other than shown. Lighter, micro sized gear will reduce the weight of the finished airplane by several ounces. In my opinion, the marginal increase in performance does not justify the added cost of micro gear. Rudder control is optional and can be added to the finished model at a later date if so desired. You must have a functional rudder if installing landing gear.

Elevator Servo Installation (forward fuselage removed for clarity)

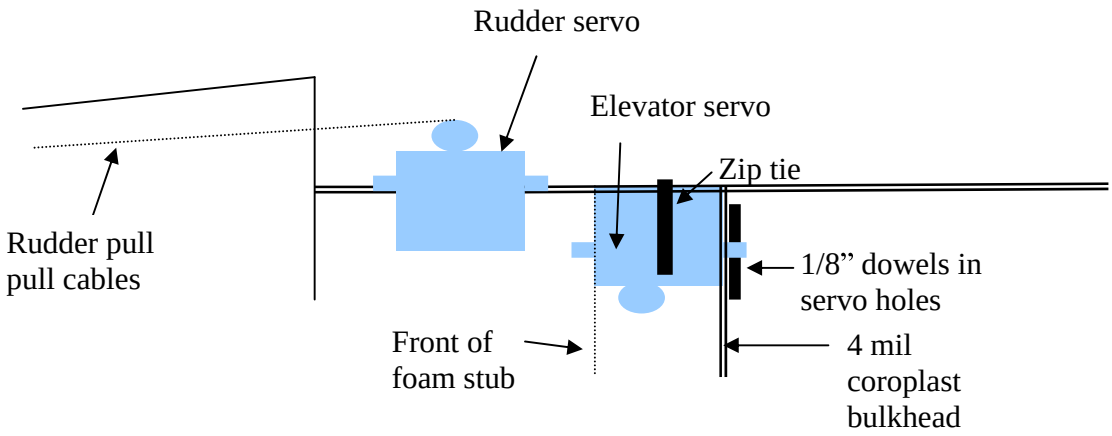


The elevators can be controlled by a pull pull cable system or by a single push rod. Reference will be made to both systems during the build description.
With the fuselage assembled, and the elevator servo held in the position shown, mark where the elevator servo mount contacts the foam. Notch the foam and coroplast so that the servo sits squarely against the foam and coroplast. Poke holes through the top of the fuselage on each side of the servo for a zip tie (do not install the zip tie at this time). Install a large 1 ½" servo arm and mark where the kevlar pull pull cables will penetrate the foam. If you are planning to install a single push rod to the elevator, use the servo arm of your choice and mark the left side only. Remove the servo and separate the front and rear fuselage halves. Mount the elevator horns top and bottom both sides for pull pull or join the elevator halves with a U-shaped wire if using a pushrod. Using a felt tip pen, mark the cable or pushrod runs on the sides of the fuselage. Lay a straight edge along the top of the fuselage from the elevator horn to the servo arm location and mark where the cables or pushrod will exit the foam.

Foam Boring Tool

It is difficult to bore an accurate hole in foam without the aid of a jig. If you are installing the pull pull cables this tool will guarantee straight cable runs that exit the foam in the right spot (see Tools Section for details). If you going with a single pushrod you can probably manage by working a sharpened piece of piano wire from both ends. Install the outer tube of the push rod and trim flush with the foam. 4 pull pull cables are used in this model for redundancy. Should one elevator become disabled during a combat mid air collision, the other will still function normally. This theory hasn't been proven yet! Another option is to connect the elevators halves with a wire and run two pull pull cables in the standard manner. Personally, I like the 4 cable set-up because elevator flex is minimized during hard maneuvers. Cables are installed after covering the foam in vinyl. Prepare the fuselage for final assembly.

Insert ½" long strips of wood into the flutes directly above the elevator servo. Push them in until they are between the zip tie holes made previously. This will prevent coroplast crush when tightening the zip tie. Replace any damaged or missing packing tape on the inside of the coroplast**.** Re-assemble the fuselage sections and install the lock screw and rear dowel. Install the elevator servo with foam double sided tape and a zip tie. Make a bulkhead out of 4 mil coroplast and secure the bulkhead to the front of the servo with 1" pieces of dowel (see diagram below). The bulkhead adds rigidity to the fuselage so don't omit this part. The rudder servo is installed under the canopy. Cut out the coroplast for a snug fit. Use a dremel tool to open up a hole so the servo mounts contact the top of the fuselage. The pull pull cables will run very close to the outside of the foam fuselage. Make shallow slits in the foam so the cable runs are straight. Go to the Fuselage Section for final assembly instructions.



Rudder installed with pull pull cables

Gary's Corsair (Draft Copy)

Cowling

The cowl shown was made be shrinking a 2 liter soda bottle over a wooden plug. The scale profile of the Corsair cowl is shown in the Fuselage section. If you don't have access to a wood lathe, a simple, semi-scale cowling can be made using a 4" diameter (1.5 liter) wine bottle as the mold. Grind off any lumps around the base of the wine bottle. Another source for a plug is 4" plastic drain pipe approximately 6" long. Cut a ½" thick piece of wood the same diameter as your tube. Put a ¼" bolt through the center so you can spin it in a drill. Round the edge on one side. Glue the wooden cap onto your tube with ca (leave the bolt in). Sand the joint smooth.

Place the top half of a clear pop bottle over the plug (rinse it out first) with the cap removed. Set your heat gun on low and start applying heat to the bottom of the bottle. Rotate the plug slowly and work your way up. Heat the top until the plastic has shrunk around the curved edge. Note: starting at the bottom locks the pop bottle onto the plug and makes for a better result. Now to try and get that sucker off ! Compressed air from a bicycle pump will separate cowl from plug. Cut out the valve on an old tire tube and trim the rubber to fit snug inside the bottle cap (see photo). Make a hole in the cap, install the valve, put the cap on, attach a bicycle pump, plug your ears, close your eyes and **boom**, you're now the proud owner or an F4U cowl.

Cut the cowl openings to suit your engine. Cooling airflow exits the cowl through flaps just forward of the firewall**.** Flaps are ¾" long and 5/8" wide spaced 1/8" apart.

TIP: This plastic is remarkably strong and it's easy to slip and cut more than intended. To avoid spoiling a cowl, use scissors when possible and finish your cuts with a Dremel sanding drum. Drill tiny holes in the corners of the cowl flaps and drag the exacto knife away from the corners. Also, support the cowl on the inside when cutting openings with an exacto knife. Apply vinyl checks or strips on inside. Scuff, then paint the inside to match coro.

Center the cowl around the prop shaft and leave 3/8” clearance between the front of the cowl and the trailing edge of the propeller. Drill through the re-enforced fuselage flutes into the firewall. Install #4 screws and check for sufficient clearance around muffler and cylinder.

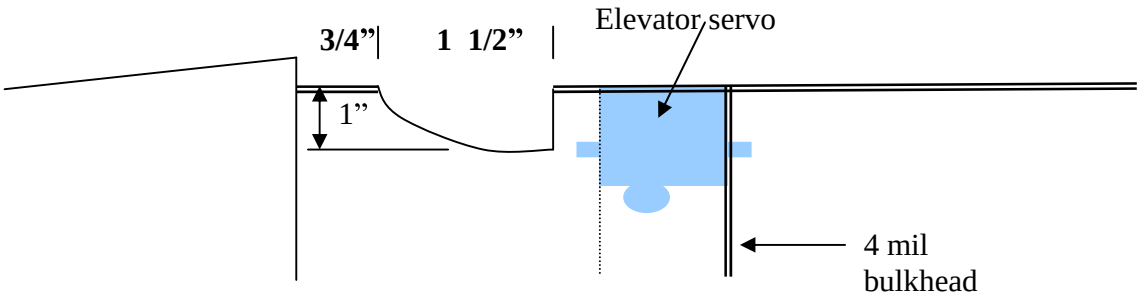
Materials required for Pop Bottle Cowls

Gary's Corsair

Canopy

The canopy is cut from a 950 ml. plastic spray bottle. Your grocery store will carry several versions of the same size spray bottle containing: Windex, Tilex, etc. The profile is not perfectly scale but still looks good once the frames are added on the inside (use strips of vinyl). In order to fit perfectly, the edges need to be re-shaped slightly. Roll up a few magazines into a 3" diameter tube and secure with tape. Hold the canopy against the tube and apply a small amount of heat to the front edge. Try to create a smooth bend and then try it for size on the fuselage. It takes very little heat to make this plastic soft so use the low heat setting on your heat gun and only apply heat to the edge.

Secure the canopy to the fuselage with two t-pins. Locate one pin on each side where the frames intersect. Go through the center of a flute. Remove the canopy. Push a ¾" long piece of wood into the punctured flutes from the front. Center the strips of wood where the canopy screws are located. Drill holes and install canopy with two servo screws. Mark the outline of the canopy on the fuselage and remove. If you are not installing a rudder servo, you can notch the fuselage to create a cockpit and install an instrument panel. Cover exposed foam with black vinyl.



Gary's Corsair

Flying

S/n 005 does a low and slow pass for the camera

Gary's Corsair is a solid flyer with no bad habits. Top speed, especially with no landing gear, will have you grinning from ear to ear. It will slow to comfortable landing speeds and stalls predictably. Tight, smooth loops will come with a little practice. If your Corsair snaps with hard elevator inputs, you'll probably find one or more of the following needs to be corrected; tail out of alignment, one wing is heavier than the other, too much elevator throw, center of gravity too far aft. I like to keep a lot of throw on the elevator for inverted maneuvers and those slow, carrier landings. Be sure to build up adequate speed during the take off roll. The high lift wing, combined with the nose high attitude on the landing gear can cause the Corsair to lift off prematurely and stall. It is strongly recommended that you fly this model in a tight circuit and make gentle turns during the first few flights. The bent wing makes it very easy to lose orientation in a banked turn, especially in overcast conditions. Take a long look at the photo above. Is the airplane turning left or right? The visibility of a dark blue airplane is dramatically improved with yellow stripes and markings on the top surfaces. Be sure to put these on until you are comfortable flying this airplane. Prior to attempting a solo hand launch, make certain your Corsair has been test flown and tracks straight at full power. A 46oz. model with an OS25FX has proven to be very competitive in 2610 combat and always draws plenty of attention. Gary's Corsair is a great looking, inexpensive warbird project suitable for any model builder. It's also quite small, fast, and more than a novice pilot can handle. But don't let that stop you, build it now and fly it later! Comments and suggestions are welcome.

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