

# Piper PA-28 Cherokee 140



## Specifications

¼ scale ARF

wing span 100"

length 73" (plus spinner)

wing area 1823 sq inch

flying weight 17-19 lbs

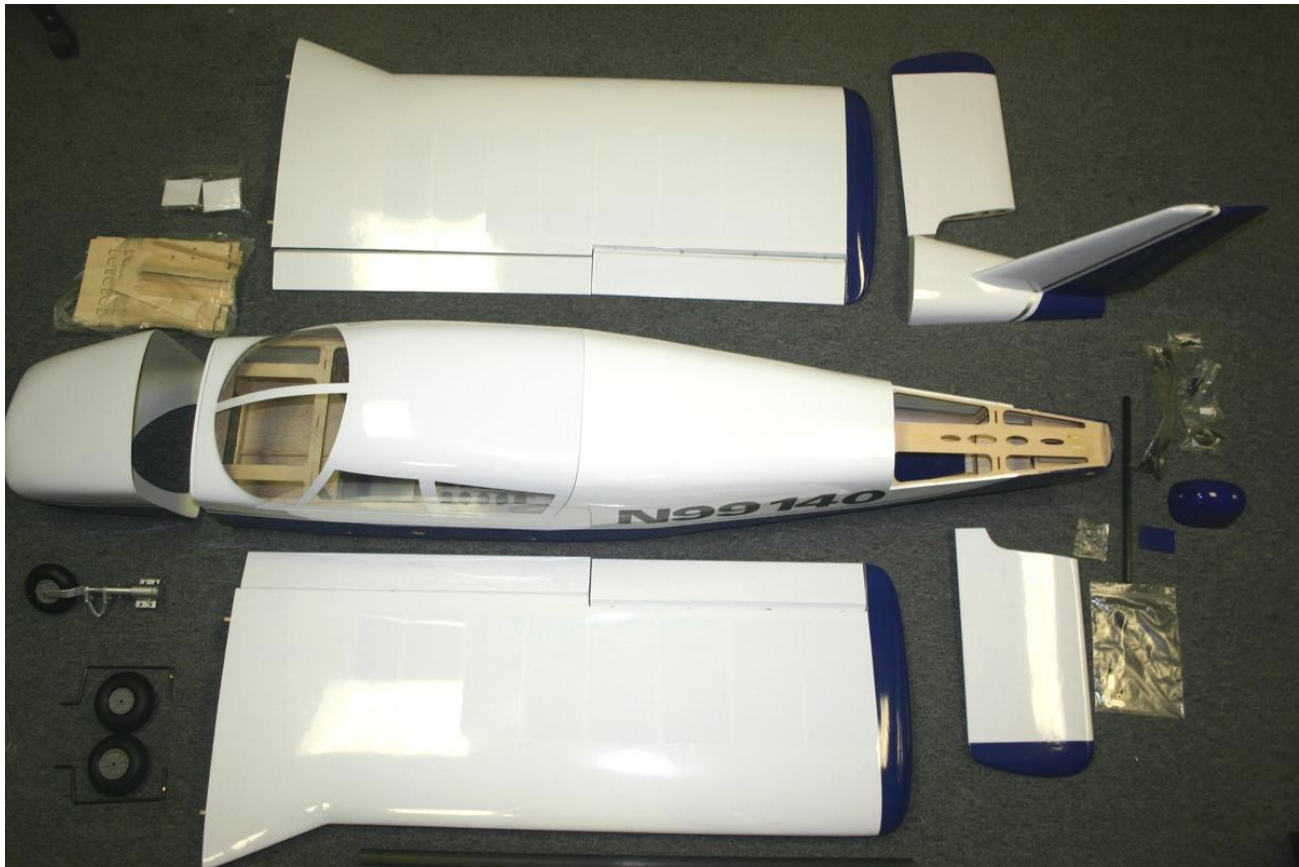
cowl 10-3/4" x 11-7/8" x 9-5/8"

recommended engines 40cc-50cc gas

features – carbon wing tubes, painted fiberglass cowl, machined aluminum Oleo strut

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## Parts Needed To Complete Kit

- 1 - Rudder Servo (minimum 100 oz. torque) and mounting hardware (such as Hitec HS645MG)
- 1 - Large Rudder Servo Arm
- 1 - Elevator Servo (minimum 100 oz. torque) and mounting hardware (such as Hitec HS645MG)
- 2 - Aileron Servos (minimum 70 oz. torque) and mounting hardware (such as Hitec HS645MG)
- 2 - Flap Servos (minimum 50 oz. torque) and mounting hardware
- 1 - Nose Wheel Servo (minimum 50oz torque) and mounting hardware
- 1 - Throttle Servo (minimum 40 oz. torque) and mounting hardware
- 1 - 24 inch Servo Extension (Elevator)
- 2 - 24 inch Servo Extensions (Ailerons)
- 2 - 6 inch Servo Extensions (Throttle and Nose Wheel)
- 3 - “Y” Servo Extensions (Flaps, Ailerons, Rudder/ Nose Wheel)
- 1 – 3 inches 1/8 inch Heat Shrink Tubing
- 1 – 3 inches 5/8 inch Heat Shrink Tubing
- 1 - Engine 40 cc to 50 cc gas (recommended DLE 55)
- 1 – Ignition Battery (as per your engine manufacturer’s instructions)
- 1 – Propeller 20-22 inch (we used 22 x 10)
- 1 - Radio Transmitter (minimum 5 channels)
- 1 - Receiver
- 1 - Receiver Battery
- 1 - Switch Harness
- 1 - 3 ½ inch Aluminum Spinner

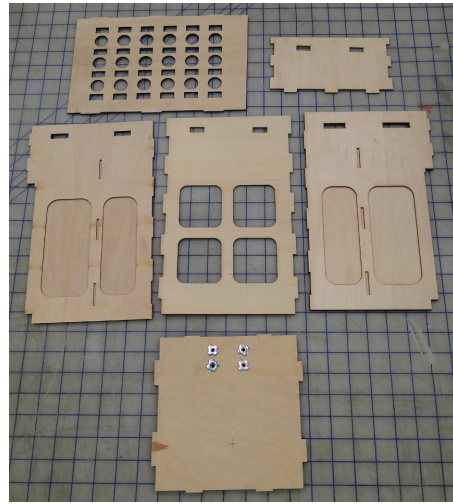
**Notes:** *Loctite everything that doesn't need to be removed or adjusted often.*

**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.**

## Engine Box

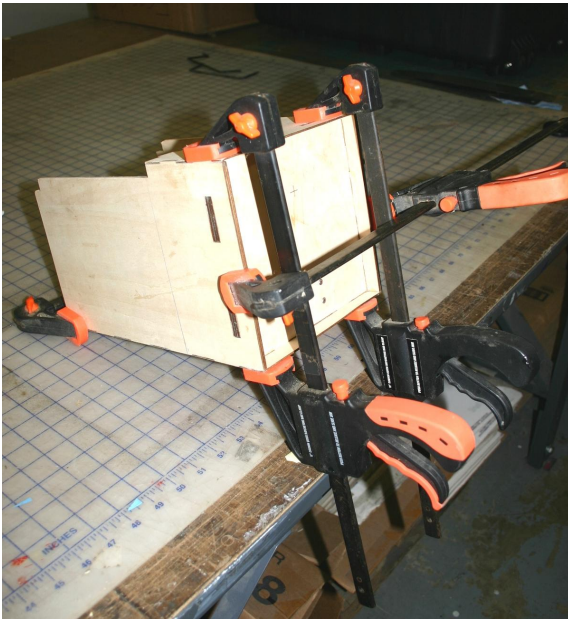
Collect these parts:

- 6 plywood sides of Engine Box
- 2 sizes of Wooden Triangular Stock



The 6 pieces of the Engine Box are all notched differently to assure correct assembly. Trial fit all the pieces. Sand if necessary. When satisfied, glue all pieces using 30 minute Epoxy Glue. Hold pieces together for a tight fit using clamps.

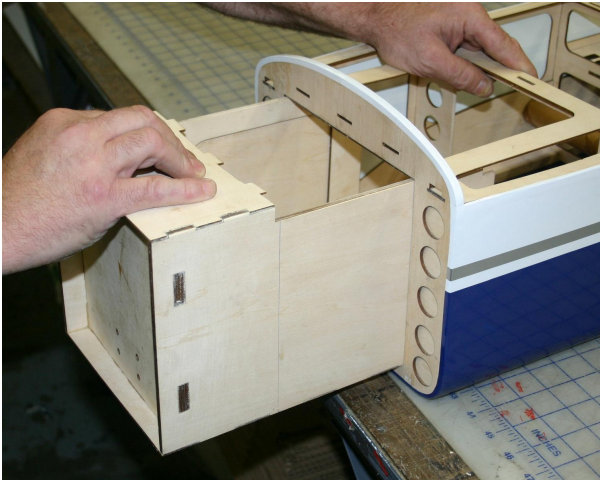
*Note: 30 minute Epoxy Glue is often better than 5 minute Epoxy Glue because it has more working time and is not as brittle.*



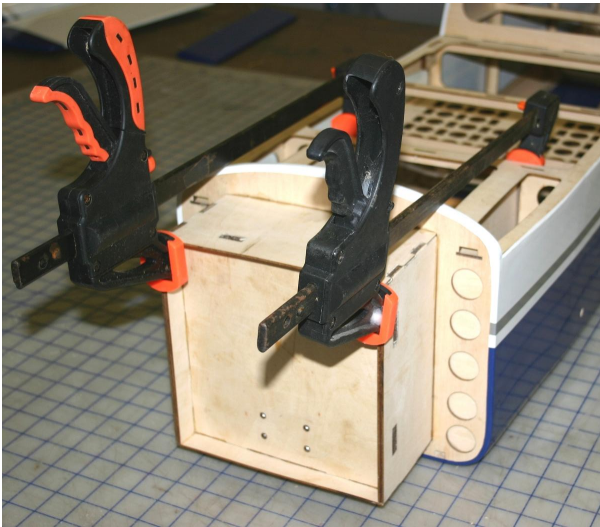
Remove clamps when glue is set and sand a slight bevel on sides and corners to help with clearance when sliding into place.



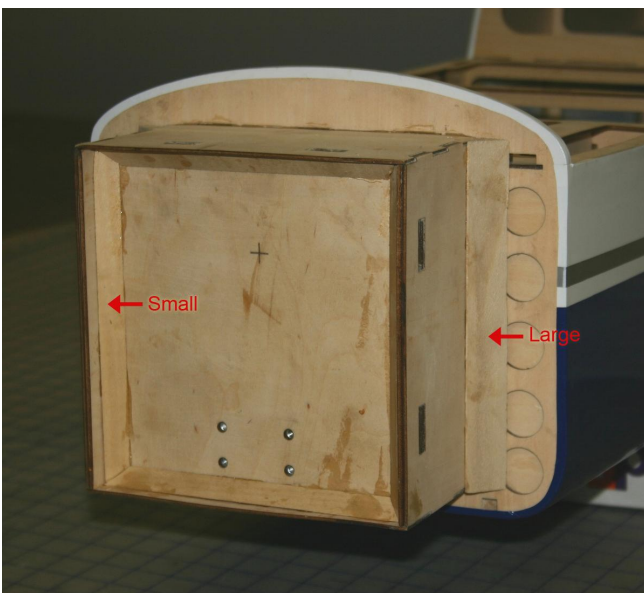
Slide box in place / into front of fuse again making sure you have a good fit.



When satisfied, glue box into place with 30 minute Epoxy Glue. Again clamp where able until glue dries.



Brace all four sides inside the engine box front with the smaller supplied Tri Stock. Glue the larger Tri Stock to the outside sides of engine block.



To help protect all wood surfaces on the outside of the firewall and engine block we recommend giving these areas a coat of 30 minute Epoxy.



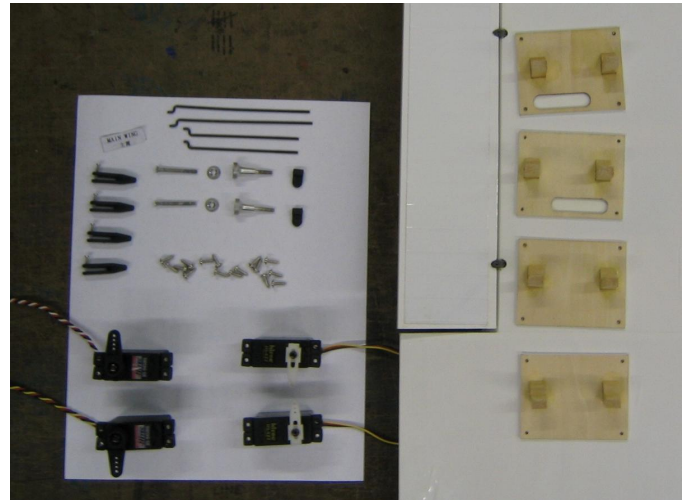
***Hint: Mix enough Epoxy Glue to do the job and use a small stiff brush. Use your Heat Gun to warm the glue as you brush it on. The heat will help thin the glue giving a much smoother glass like finish when dry. It also helps the Epoxy Glue soak into the wood easier for greater protection.***

***Note: The Epoxy will set up faster when heated.***

## Ailerons & Flaps

Collect these parts:

- 2 – Main Wings
- 2 - Ailerons
- 2 - Flaps
- 4 – Servo Hatch Covers
- 16 – Hatch Covers Screws
- 4 - Threaded Push Rods
- 2 - Trumpet Bases
- 2 - Trumpet Washers
- 2 - Trumpet Screws
- 2 - Control Horns
- 2 - Clevises
- 2 - Aileron Servos (minimum 70 oz. torque) and mounting hardware (such as Hitec HS645MG)
- 2 - Flap Servos (minimum 50 oz. torque) and mounting hardware
- 2 - 18 inch Aileron Servo Extensions



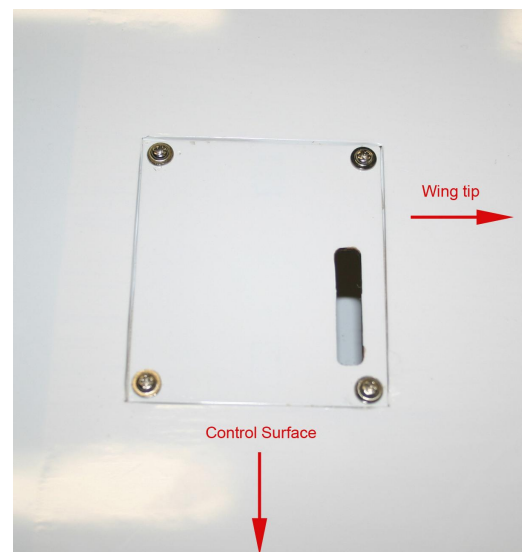
The Ailerons and Flaps have been pre-drilled and the Hinge Pins installed but not glued. Assure they fit and are rotated so the Hinge Pin bends properly before using Epoxy glue.

**Tip: To help keep glue out of the Hinge Pin joint, apply a small drop of light oil.**



Find the openings in the bottom of both Wings for the Aileron and Flap Servos and cut out the covering corner to corner with an X-Acto Knife. Use a Heat Sealing Iron to stick the covering to the edges, cutting off the excess covering.

Use an X-Acto Knife to cut the covering for the Push Rods slots in the 2 Aileron Hatch Covers. The Flap Hatch Covers have no slots. Position the Aileron Hatch Covers so the Servo arm is on the wing tip side and Control Surface side.

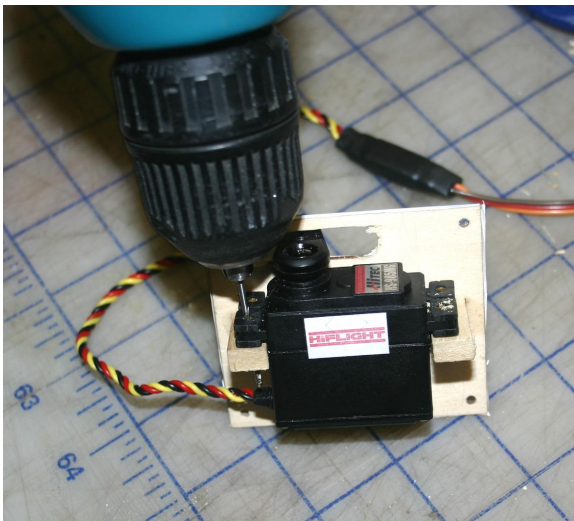
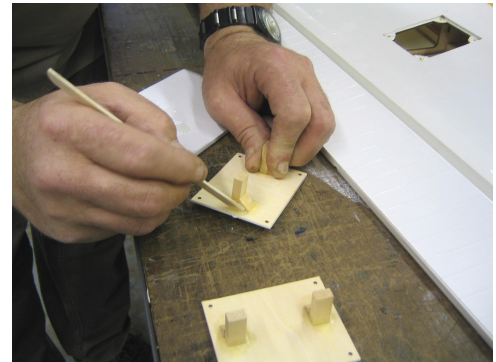




With the hatch cover in place poke a hole in the covering for each screw hole and drill 1/16" holes in the Wing for the Hatch Cover Screws.

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

**Tip:** Also installing a small wood screw through the top of the Servo Hatch Cover into the Servo Mounting Post will provide superior strength (optional).



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 weight 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:** Heat shrink a 1-1/4 inch piece of 5/8 inch wide shrink tubing over each Servo Extension connection to prevent them coming apart





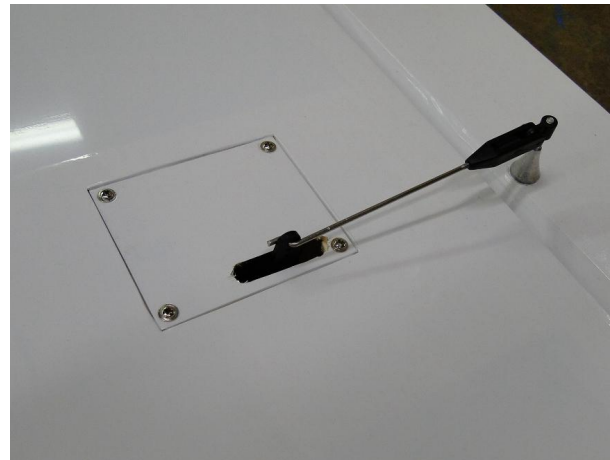
To install the supplied Control Horns position the Trumpet Base at the beveled edge of the Aileron and align with the Aileron Push Rod and mark the location. Drill a 3/32 inch diameter hole on these marks.

**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. Thread the Aileron Push Rod into the Clevis and make a “Z” bend in the other end to install through your Aileron Servo Arm.

**Tip: Double check the length before making the “Z” bend with the control surface at the neutral position.**



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/Hatch Assemblies to the wing using 4 Small Wood Screws using the same procedure as the Aileron Servo Hatch Covers.

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).

**Note: If the wing tube is excessively tight when you test fit the Main Wings use some 600 Grit Sandpaper.**



## Vertical Stab & Rudder

Collect these parts:

- Fuselage
- Rudder Tail Block



Locate the plastic tubes already installed in the tail block for the rudder pull cables (covered over with covering).

### **To find the tubes covered over...**

From rear of the block measures 5-3/4"

From the fin (at the mark) measure 3/4"

The end of the tube should be at the intersecting marks / measurements.

Check the Tail block with fin for fit. Attach using Epoxy Glue. Use masking tape to hold in place until glue sets.

*Note: If you use 5 minute Epoxy Glue here set in place and align quickly.*



Using same method as with Ailerons, use Epoxy to glue the Rudder Hinges in place.

*Tip: remember to use a drop of light oil on the hinge pin before glueing.*

## Horizontal Stabilizer

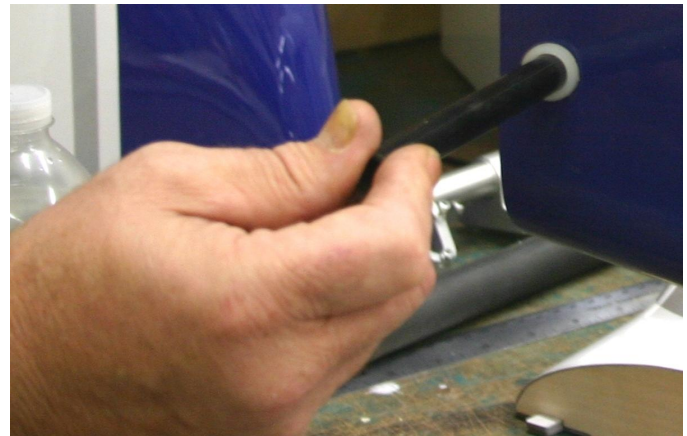
Collect these parts:

- Fuselage
- 2 Nylon Bushings
- Carbon Fiber Stabilizer Tube
- 2 halves Stabilizer
- Control Horn Bolt
- 2-56 Elevator Push Rod
- Elevator Push Rod Clevis



You will find the Carbon Fiber Stabilizer Tube packaged inside the Carbon Fiber Main Wing Tube.

Drill through the Stabilizer Tube for the Control Horn Bolt so that it lines up with your Elevator Servo Push Rod. We recommend you first Epoxy a piece of Wooden Dowel inside the Stabilizer Tube for reinforcement, lining up with the hole you will be drilling. It will stop the Control Horn from crushing the Carbon Fiber Tube. The dowel may already be glued in place.



Locate the 2 Nylon Bushings and install one on each side of the Fuselage in the pre-cut holes at the rear of the fuselage. Slide the Carbon Fiber through the bushings. Measure the rod on each side so you have it in the middle.



*Note: You may have to sand the holes in the Fuselage so the Nylon Bushings sit looser and don't bind the Stabilizer Tube.*

Slide each half of the Stabilizer into place.



Make sure the Stabilizer rotates smoothly. Sand the portions of the tube that insert into each Stabilizer half to allow the Epoxy Glue to bond well.



***Important: Before glueing the Stab install the Control Horn Bolt with the Bolt pointing DOWN.***

Trial fit the Stab and once satisfied glue both ends of the Carbon Fiber tube and where the Stab halves meet together with 30 minute Epoxy Glue. Make sure the Control Horn Bolt remains in position with the Stab in the neutral (horizontal) position. It is not necessary to glue in the Nylon Bushings.

When dry use a strip of white vinyl tape to cover the joint between the two halves.

Find the opening in the bottom rear of the Fuselage for access to the Horizontal Stabilizer Servo. With a sharp X-Acto Knife cut out the covering and use a Heat Sealing Iron to stick the covering to the edges, cutting off the excess covering. Use a small screw to secure the Hatch Cover.



## Horizontal Stab Controls

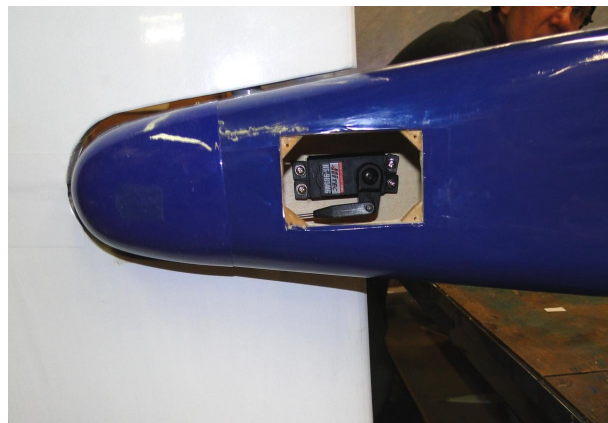


Install the Elevator Servo in the cut-out location in the bottom of the Fuselage at the rear through the bottom Hatch. With the Servo in the neutral position, have the Servo Arm extend to the left side of the airplane to line up with the Stab Control Horn.

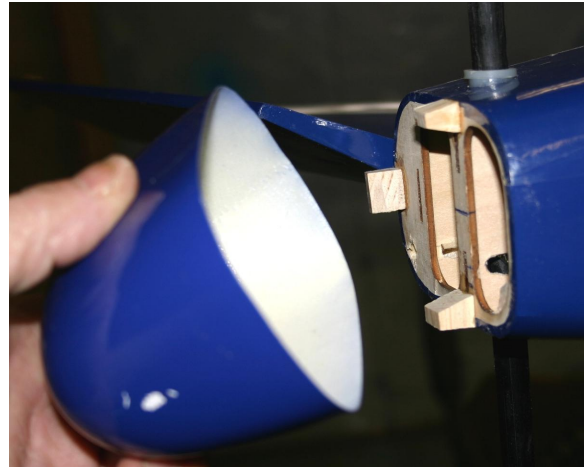
Thread a Clevis onto a short piece of 2-56 rod, threaded at one end. Carefully measure the distance between the outer Servo Arm hole and the hole in the Stab Control Horn and make a "Z" bend at this mark and trim off the excess rod.



Test fit the new Push Rod to make sure it moves the Stab properly. Make sure it lines up with one of the slots in the plywood surface (that holds the Servo) to allow full movement of the Control Horn.

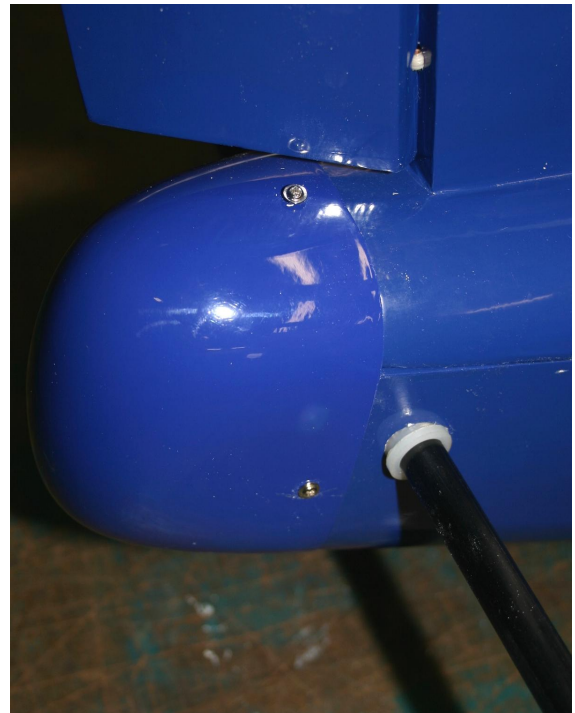


Glue the 3 Wood Blocks as shown with Epoxy Glue.

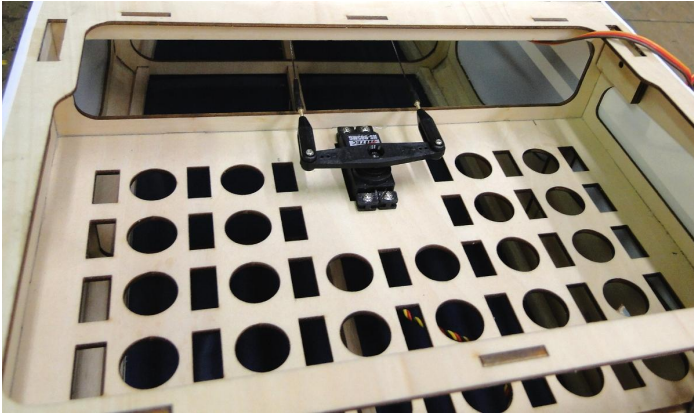


Cut 3 pieces of stiff Card Stock 1 inch x 4 inches and tape them on the Fuselage so that the ends overlap the center of each Wooden Block. Mark these locations on the Card Stock. Gently slide the End Cone into place under the tabs and tape in place.

Drill pilot holes through the center marks with 1/16 inch drill bit. Remove the Card Stock and use Wood Screws to attach the End Cone through the holes you drilled.



## Rudder Controls



Install Rudder Servo in the cutout on the Servo tray. We recommend a minimum 3 inch wide Servo Arm.

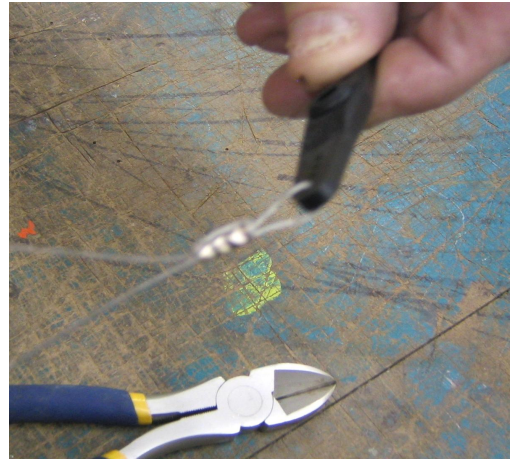
The Rudder has 2 Trumpet Bases that screw together through the Rudder.



Position the Trumpet Base at the edge of the Rudder beveled edge and 1 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 Pull-Pull Cable into 2 equal lengths and thread the Cable through the hoes 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.***

Install a clevis onto the Trumpet base on each side of the Rudder the same way.





## Canopy

Collect these parts:

- Canopy
- Fuselage
- 4-40 Socket Head Bolts (2)



Test fit to see that everything is aligned and seated properly. You may have to sand the front tabs slightly.

The canopy hold down tabs to the rear of the canopy have been pre-drilled with blind nuts installed.

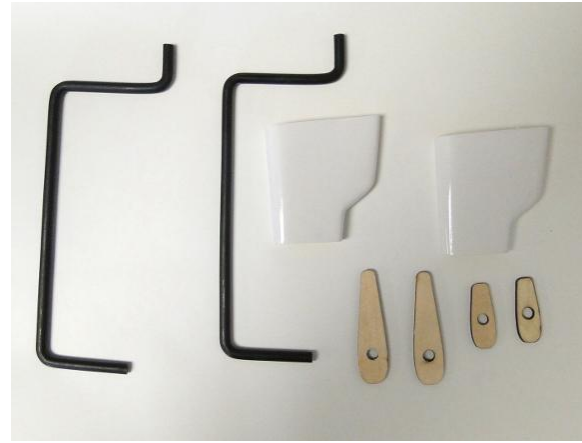
With the canopy in place, poke a hole in the covering at the location of each blind nut. Use supplied 4-40 socket head bolts to secure canopy in place.



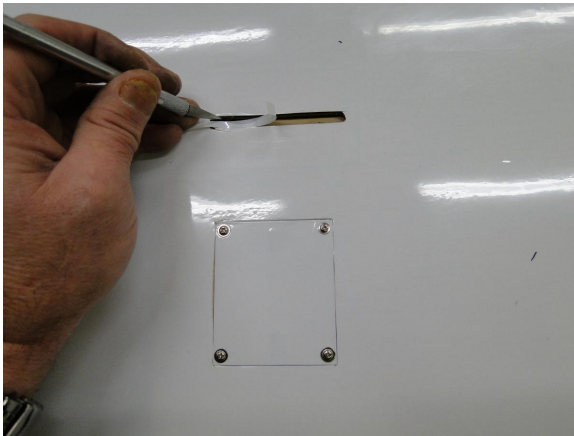
## Main Gear & Wheels

Collect these parts:

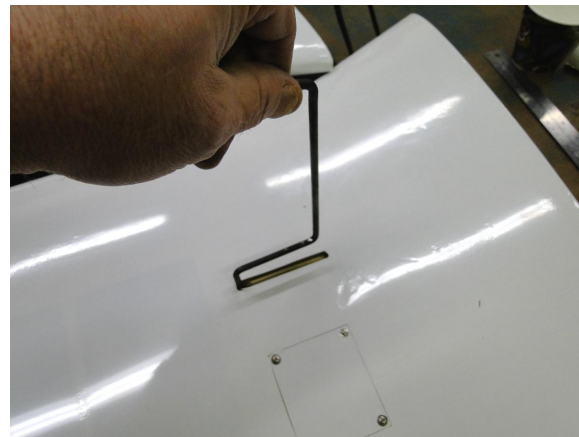
- 2 - Pre-bent Landing Gear Wire Struts
- 2 - Fiberglass Landing Gear Fairings
- 4 - Plywood Fairing Inserts
- 4 - Metal Mounting Straps
- 8 - Small Wood Screws
- 2 - Main Wing Halves
- 2 - Main Wheels
- 4 - Wheel Collars



You can upgrade the appearance of the wire landing gear with Robarts #674 Forked Robo Struts.



Use an Xacto Knife to cut out the covering over the slot in each Wing for the Landing Gear Struts.

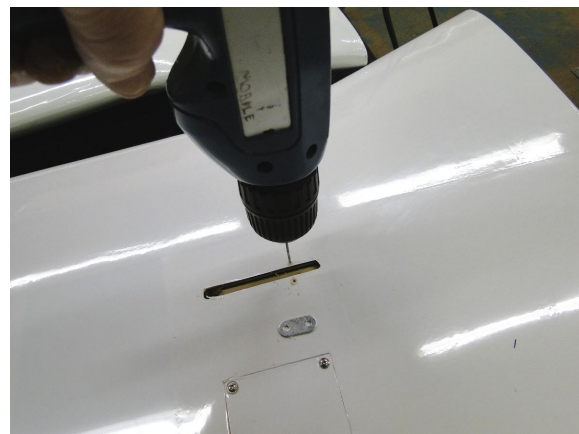


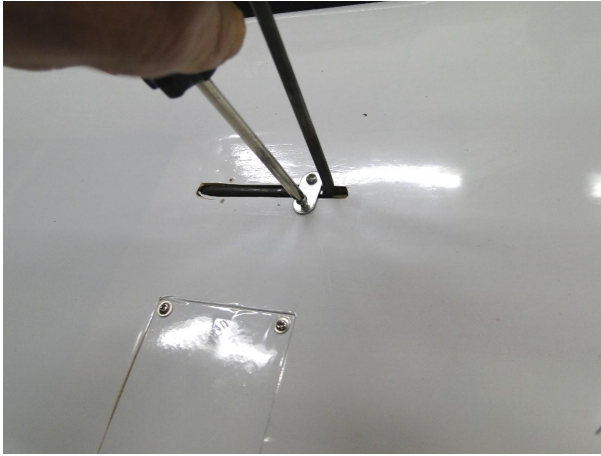
Trial fit each Landing Gear to assure a tight fit.



Set in the Landing Gear Struts and position 2 of the Metal Straps and mark the location for the screw holes.

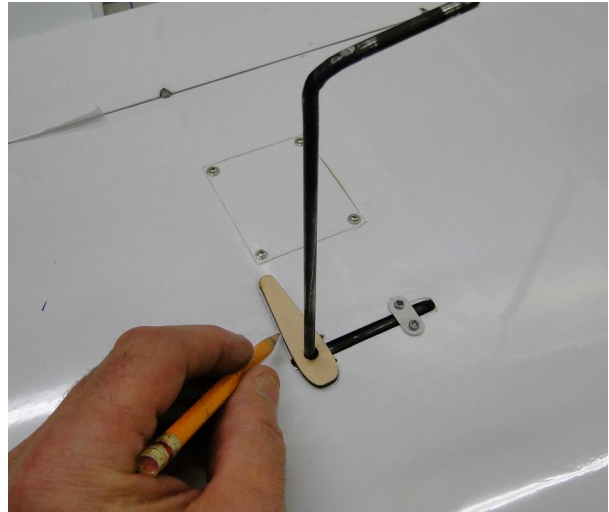
Drill pilot holes with a 1/16 inch drill bit.





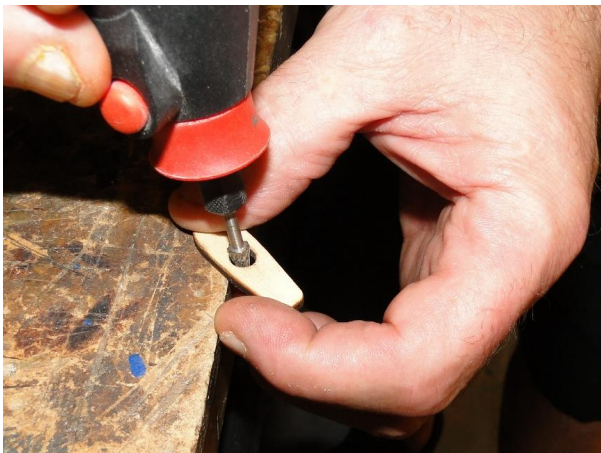
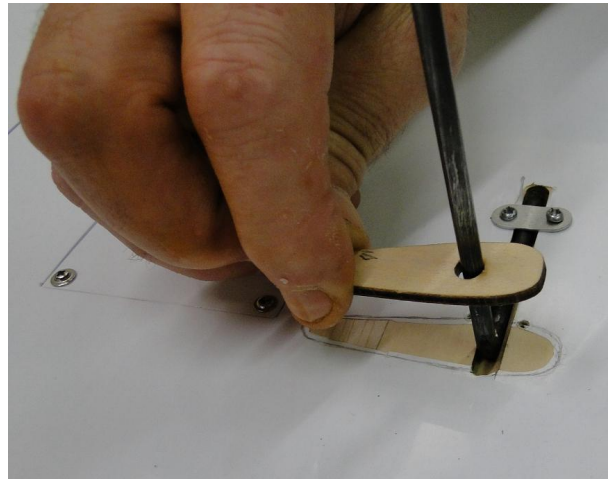
Use the supplied Wood Screws to screw the straps in place on both Wing halves.

Slide the larger Fairing Insert over the wire Landing Gear with the narrow end towards the trailing edge of the Wing and trace around it.



Using a sharp X-Acto Knife cut out the covering approximately 1/16 inch inside the traced line.

Glue the larger Fairing insert into place with CA Glue.

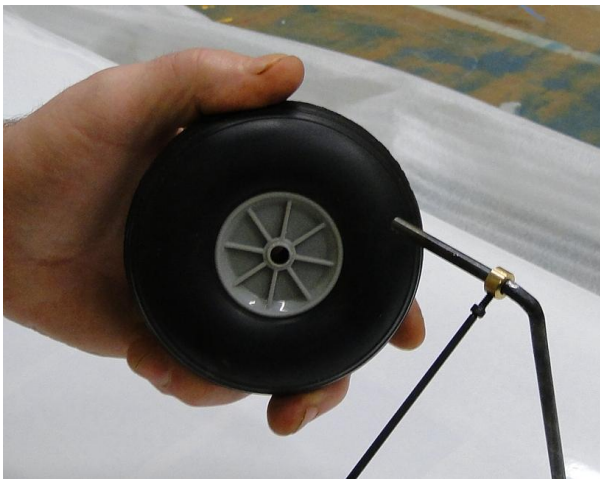


Use a Dremil Tool to elongate the hole in the smaller Fairing Insert so the Fairings won't get ripped off on a rough landing.

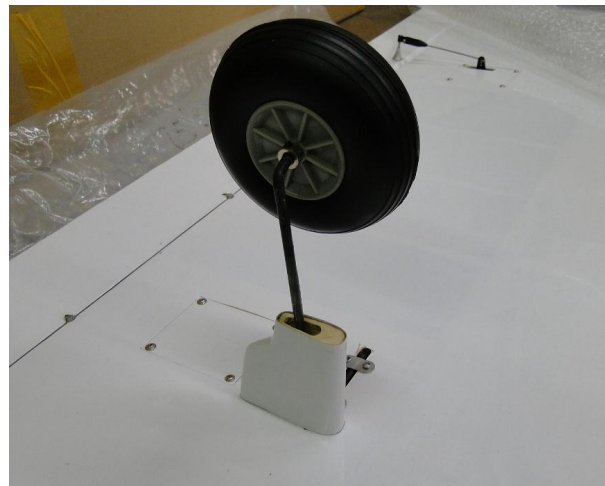


Slide the Fairing into place and glue to the bottom larger Insert and the top smaller Insert.

Drill out the Wheel Axle Hole with 1/4 inch drill bit to fit the Landing Gear Wire.



Slide a Wheel Collar onto each Landing Gear Strut. Slide the Wheel on and then another Collar. With the Wheel centered in the middle of the Strut tighten the Wheel Collars just tight enough so the Wheel turns freely.



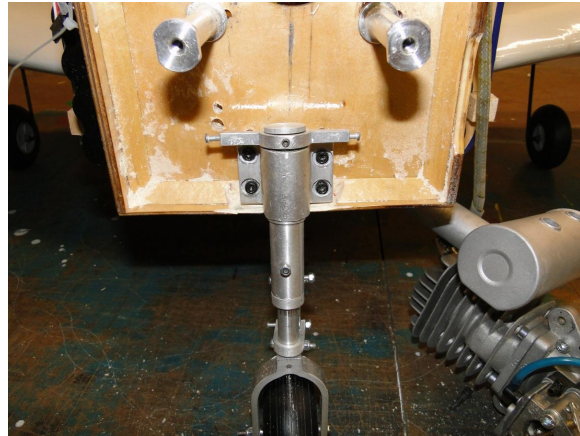
## Nose Gear Strut

Collect these parts:

- Nose Gear Strut
- Strut Hardware Package (Bolts & Blind Nuts)
- Nose Gear Servo Mount
- Fuselage

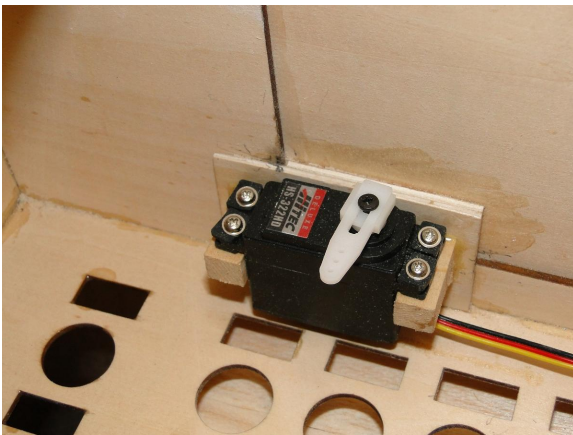
The Nose Gear Strut comes pre-assembled and the mounting holes have been pre-drilled on the Engine Box.

Fasten the blind nuts to the inside of the Engine Box and bolt the strut to the front of the Engine Box.



You will have to lower the Nose Gear to accommodate larger props (22 inches & larger).

Determine which side of the Fuselage will have the Throttle Servo lined up with the Engine Carburetor and locate the Nose Gear Servo Mount on the opposite wall at the floor of the Fuselage.



Mark and drill a  $\frac{1}{4}$ " hole in the front of the Engine Box to accommodate steering linkage. Just as before, measure a piece of Control Rod with threaded end. Make a "Z" bend on the other end, trim off and attach a Clevis. Use this assembly to connect the Throttle Servo to the Engine Throttle.

## Fuel Tank

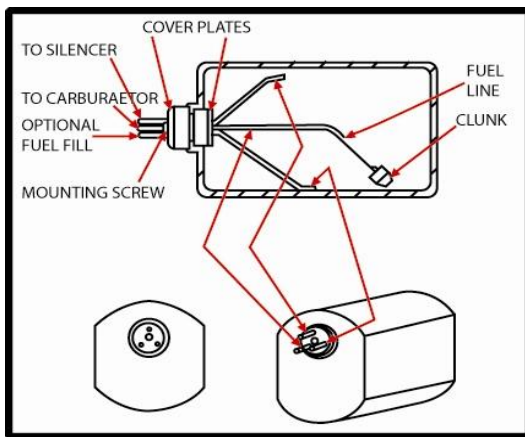
Collect these parts:

- Fuel Tank & Hardware
- Fuselage

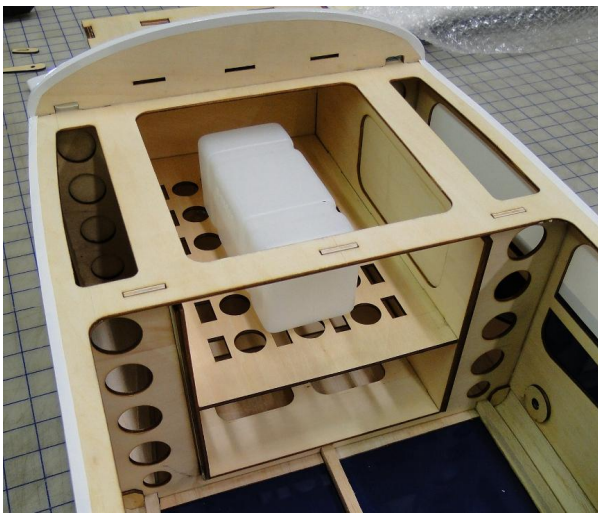
Using the supplied hardware, assemble the Fuel Tank. Carefully, bend the metal tubing to avoid kinking. You might need to use a larger size Fuel Tubing for your engine.



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



You want to locate the Fuel Tank nearest the CofG so there is no noticeable change in balance when the tank gets empty. One of the easiest solutions is a plywood platform and Velcro straps to hold the Tank down



**Tip:** Stick Velcro to the Fuel Tank and on the Tank Platform for a stronger attachment.

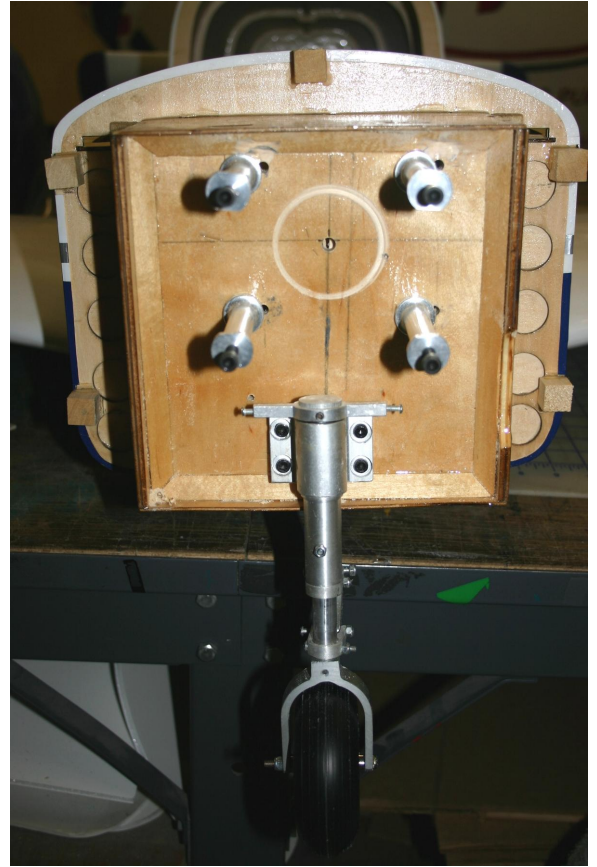
## Engine, Muffler, Ignition

The horizontal and vertical lines on the front of the engine box mark the engine center line of thrust. The vertical center line is already offset by approx. 3/8" to the right of actual center to allow for the thrust of the engine.

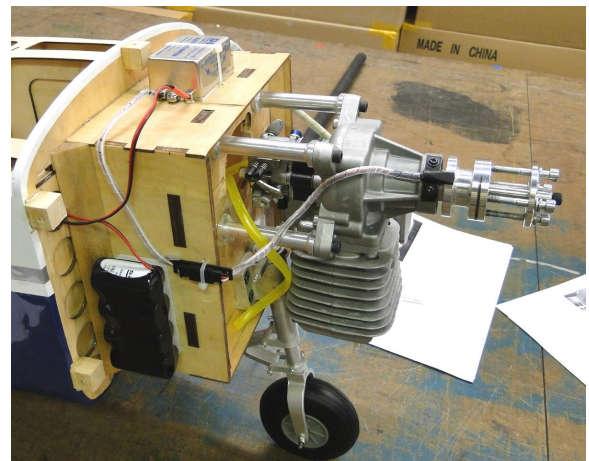
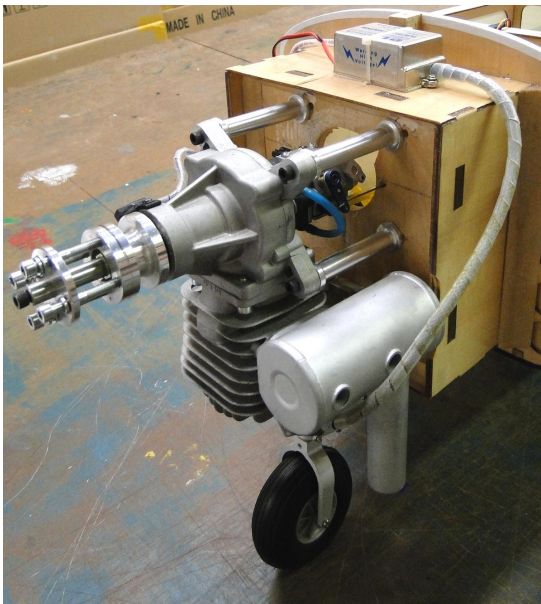
Use your engine manufacturer's recommendations for mounting your engine using these lines as a reference. With engine box installed the distance from front of the Cowl to the Firewall is 6-3/4" to 7-5/8".

We used a DL50 with the standard 68mm standoffs.

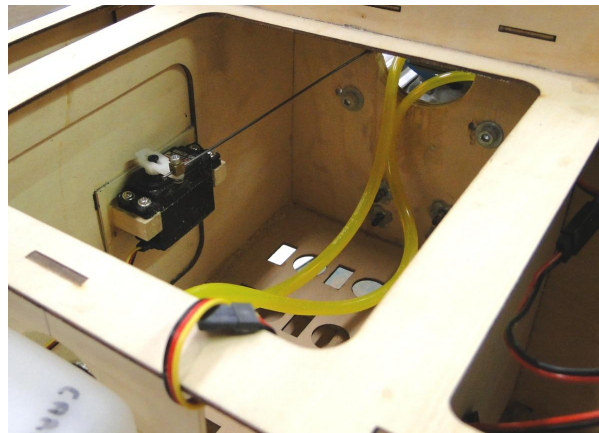
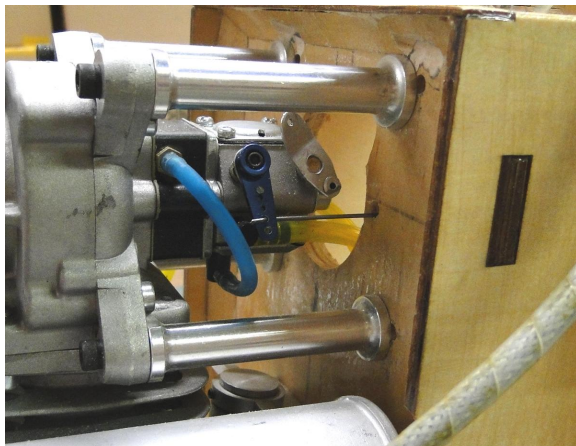
You may need to cut a whole in the firewall to allow your rear mounted carburetor to breathe.



If using a gas engine with Electronic Ignition locate and mount it where it is convenient and free of interfering with the cowl mounting. Same with the Ignition Battery Pack, which you may want to leave until you balance the model at the end of the assembly. Install the muffler.



Attach the Throttle Servo Mount to line up with Carburetor and drill a 3/16 inch hole in the Firewall for the Throttle Push Rod. Make a "Z" bend at the one end and use an EZ Connector on the other end of the Push Rod.



If using a gas engine you will also need to install a shut off switch for the electronic ignition.



## Cowl

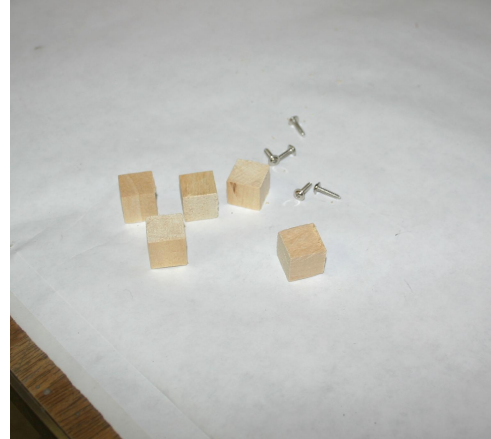
Collect these parts:

- 5 - Wood Blocks
- 5 - Small Wood Screws



Make the necessary cut-outs in the cowl for the engine you have chosen. Slide the Cowl on the Fuselage so the Prop Shaft exits the center of the Cowl opening and mark the edge of the Cowl on the Fuselage. We suggest using Masking Tape.

Glue 5 Wooden Blocks around the perimeter of the Engine Firewall, out to the edge of the Fuselage. Roughen the firewall so the Epoxy Glue bonds better.



Cut 5 pieces of stiff Card Stock 1 inch x 4 inches and tape them on the Fuselage so that the ends overlap the center of each Wooden Block and mark that location on the Card Stock.



Gently slide the Cowl into place under the tabs (with the engine installed and cut-outs done) up to the Masking Tape marks on the Fuselage. Tape the cowl in place. Drill pilot holes through the center marks with 1/16 inch drill bit. Remove the Card Stock and use Wood Screws to attach the Cowl through the holes you drilled.



## Radio Set Up

You will need to locate your receiver and batteries on the plywood deck.

We used foam wrap and plastic electrical straps to secure our receiver and battery.

You will need Y Servo Extensions to connect the Aileron Servos and Flap Servos together if you are connecting to the same receiver channel.

***Tip: You will need to balance your model before choosing the location of your batteries.***

***NOTE: The C of G is on the main Wing Spar which is 1/2" ahead of the wing tube.***

## Control Throws

These are very good starting points to setup the control surface deflections for sport flying:

Elevator +/- 8 to 12 degrees

Aileron +/- 12 to 15 degrees

Rudder +/- 15 to 20 degrees

These settings can be altered slightly to suit the individual pilot's preferences.



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