CARF-Models P-51 Mustang

Building Instructions

Version 1.1

Building Instructions for CARF-Models P-51 Mustang

Thank you very much for purchasing our CARF Models P-51 Mustang all composite aircraft, made in total area vacuum sandwich (TAVS) technology. Skilled craftsmen and experienced modelers have finalized the shapes and contours as well as the details of the plane before the production mold was made. This high-tech marvel of production tooling is a precise, handcrafted set of molds, which will allow us to supply precision composite parts for many years to come. Before you get started building and setting-up your aircraft, please make sure you have read the instruction manual several times, and understood it. If you have any questions, please don't hesitate to contact us. Below are the contact details:

Email: info@carf-models.com

Website: http://www.carf-models.com

Liability Exclusion and Damages

You have acquired a kit, which can be assembled into a fully working R/C model when fitted out with suitable accessories, as described in the instruction manual with the kit. However, as manufacturers, we at CARF-Models are not in a position to influence the way you build and operate your model, and we have no control over the methods you use to install, operate and maintain the radio control system components. For this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect application and operation of our products, or which are connected with such operation in any way. Unless otherwise prescribed by binding law, the obligation of the CARF-Models company to pay compensation is excluded, regardless of the legal argument employed. This applies to personal injury, death, damage to buildings, loss of turnover and business, interruption of business or other direct and indirect consequent damages. In all circumstances our total liability is limited to the amount which you actually paid for this model.

BY OPERATING THIS MODEL YOU ASSUME FULL RESPONSIBILITY FOR YOUR ACTIONS.

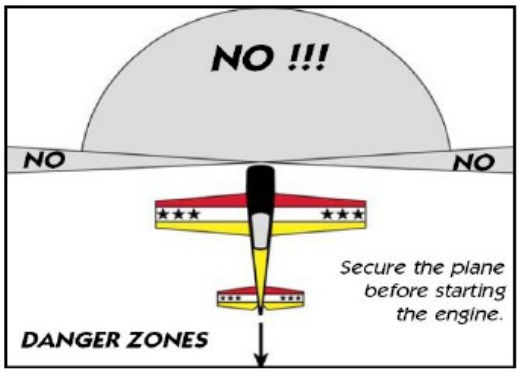
It is important to understand that CARF-Models Co., Ltd, is unable to monitor whether you follow the instructions contained in this instruction manual regarding the construction, operation and maintenance of the aircraft, nor whether you install and use the radio control system correctly. For this reason we at CARF-Models are unable to guarantee or provide a contractual agreement with any individual or company that the model you have made will function correctly and safely. You, as operator of the model, must rely upon your own expertise and judgment in acquiring and operating this model.

Attention!

This aircraft is a high-end product and can create an enormous risk for both pilot and spectators, if not handled with care, and used according to the instructions. Make sure that you operate your Mustang according to the AMA rules, or those laws and regulations governing model flying in the country of use.

The engine, servos and control surfaces have to be attached properly. Please use only the recommended servos, propellers, and accessories. Make sure that the 'Centre of Gravity' is located in the recommended place. Use the nose heavy end of the CG range for your first flights. A tail heavy plane, in a first flight, can be an enormous danger for you and all spectators. Fix any heavy items, like batteries, very securely into the plane. Make sure that the plane is secured properly when you start up the engine. Have a helper hold your plane from the tail end or from behind the wing tips before you start the engine. Make sure that all spectators are behind, or far in front, of the aircraft when running up the engine.

Make sure that you range check your R/C system thoroughly before the 1st flight. It is absolutely necessary to range check your complete R/C installation first WITHOUT the engine running. Leave the transmitter antenna retracted, and check the distance you can walk before 'fail-safe' occurs. Then start up the engine, run it at about half throttle and repeat this range check with the engine running. Make sure that there is no range reduction before 'fail-safe' occurs. Only then make the 1st flight. If the range with engine running is less then with the engine off, please contact the radio supplier/engine manufacturer and DON'T FLY at that time. If you use a Spread Spectrum radio please refer to the instruction that came with your radio for proper range testing.



Check for vibrations through the whole throttle range. The engine should run smoothly with no unusual vibration. If you think that there are any excessive vibrations at any engine rpm's, DON'T FLY at this time and check your engine, spinner and propeller for proper balancing. The lightweight sandwich composite parts don't like too much vibration and they can suffer damage. The low mass of all the parts results in a low physical inertia, so that any excess vibrations can affect the servos and linkages.

Make sure that your wing and stab spar tubes are not damaged. Check that the anti-rotation pins in the stabilizers are not loose. Check that the M3 bolts retaining the horizontal stabilizers onto the aluminum tube are tight, and that the rudder hinge wire cannot come out.

Take Care

Composite sandwich parts are extremely strong, but fragile at the same time. Always keep in mind that these contest airplanes are designed for minimum weight and maximum strength in flight. Please take care of it, especially during transport, to make sure that none of the critical parts and linkages are damaged. Always handle your airplane with great care, especially on the ground and during transport, so you will have many hours of pleasure with it.

About these Instructions

The Mustang is not really a true 'ARF', like our other planes. It is not a beginner's model, or a trainer. It is a 'Scale' plane, aimed at the professional scale flyer, as well as the people that want to enter this exciting class of flying, and the instructions assume the builder has some experience with scale aircraft and full composite models.

The Mustang can be fitted many different engines, therefore the choice of wood parts/firewalls and motor mounts to fit all these makes it impossible for us to include these items for all options. However, we have included a main firewall which you can use if you wish. We also know that most modelers in this class have their own favorite hardware, and the Mustang was designed to allow you to use your own choices here. Nevertheless, we have included the main hardware for the flying surfaces and landing gear, and all these items are well proven and properly tested.

Gluing Preparation

It is most important to prepare all surfaces properly before gluing, to ensure a good bond, with the minimum amount of glue. The inner surface of the laminated sandwich parts must be scuffed with 240 grit sandpaper, then cleaned with denaturized alcohol or equivalent before gluing parts together. Milled carbon or fiberglass sandwich parts also need to be lightly sanded and cleaned before gluing in place. We recommend at least 30 minute epoxy for all structural joints, mixed with a little micro-balloons to give a light weight fillet to all joints.

Tools

1. Sharp knife (X-Acto or similar)
2. Allen key set (metric) 2.5mm, 3mm, 4mm & 5mm.
3. Sharp scissors
4. Pliers (various types)
5. Wrenches (metric)
6. Slotted and Phillips screwdrivers (various sizes)
7. M3 tapping tool (metric)
8. Drills of various sizes
9. Small spirit level, or incidence meter.
10. Dremel tool (or Proxxon, or similar) with cutting discs, sanding tools and mills.
11. Sandpaper (various grits), or Permagrit sanding tools (high quality).
12. Carpet, bubble wrap or soft cloth to cover your work bench (most important!)
13. Car wax polish (clear)
14. Paper masking tape
15. Denaturized alcohol, or similar (for cleaning joints before gluing)

Adhesives and Solvents

Not all glues are suited to working with composite parts. Here is a selection of what we normally use, and what we can truly recommend. Please don't use inferior quality glues - you will end up with an inferior quality plane that is not so strong or safe. High performance models require good gluing techniques. We highly recommend you use either a slow (minimum 30 minute cure) epoxy resin and milled fiber mixture, or a slow filled thyrotrophic epoxy for gluing highly stressed joints (eg: Hysol 9462, Aeropoxy). The self-mixing nozzles make it easy to apply exactly the required amount, in exactly the right place, and it will not run or flow onto places where you don't want it! It takes about 1 - 2 hours to start to harden so it also gives plenty of time for accurate assembly. Finally it gives a superb bond on all fiberglass and wood surfaces. Of course there are many similar glues available, and you can use your favorite type.

1. CA glue 'Thin' and 'Thick' types. We recommend ZAP, as this is very high quality.
2. ZAP-O or Plasti-ZAP, odorless, or ZAP canopy glue 560 (for clear canopy)
3. 30 minute epoxy (stressed joints must be glued with at least 30 min & NOT 5 min epoxy).
4. Loctite Hysol 9462, Aeropoxy or equivalent (optional, but highly recommended)
5. Epoxy laminating resin (12 - 24 hr cure) with hardener.
6. Milled glass fiber, for adding to slow epoxy for stronger joints.
7. Micro-balloons, for adding to slow epoxy for lightweight filling.
8. Thread-locking compound (Loctite 243, ZAP Z-42, or equivalent)

We take great care during production at the factory to ensure all joints are properly glued, but of course it is wise to check yourself and re-glue any that have been missed. When sanding areas on the inside of the composite sandwich parts to prepare the surface for gluing, do NOT sand through the layer of lightweight glass cloth on the inside foam sandwich. It is only necessary to rough up the surface, with 80/120 grit, and wipe off any dust with acetone or de-natured alcohol (or similar) before gluing to make a perfect joint. Of course, you should always prepare both parts to be joined before gluing for the highest quality joints. Don't use Acetone for cleaning external, painted, surfaces as you will damage the paint.

Tip: For cleaning small (uncured) glue spots or marks off the painted surfaces you can use old-fashioned liquid cigarette lighter fuel, like 'Ronsonol' or equivalent. This will not damage the paint, as Acetone and many other solvents will.This is what we use at the factory.

At CARF Models we try our best to offer you a high quality kit, with outstanding value-for money, and as complete as possible. However, if you feel some additional or different hardware should be included, please feel free to let us know.

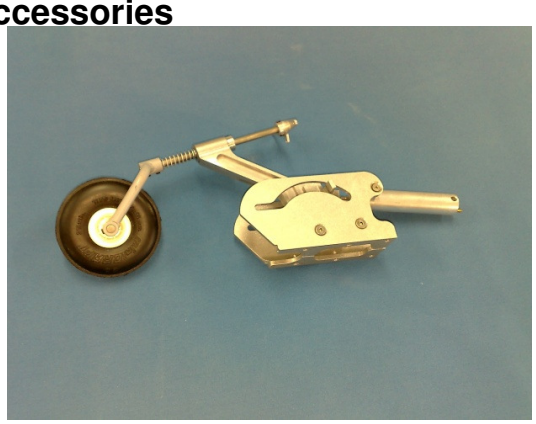
Email us: info@carf-models.com
We know that even good things can be made better !

Kit Contents

Below are pictures of the contents of the kit after you open the box. Carefully remove and inspect each piece of the kit.

Available Accessories

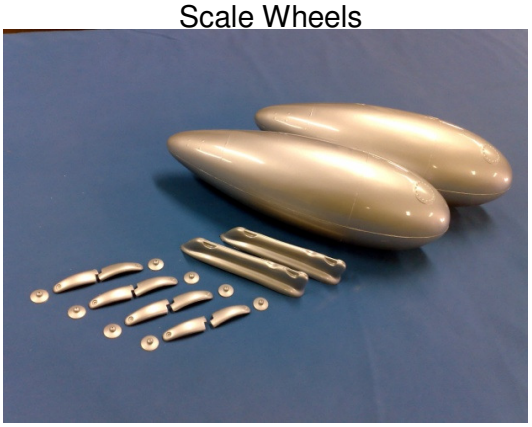
P-51 Retract Set



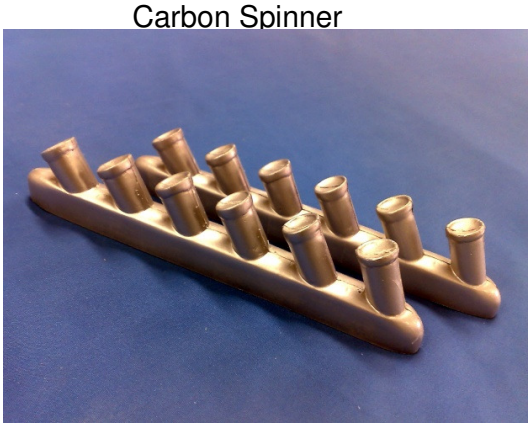
P-51 Tail Wheel Assembly

Scale Wheels

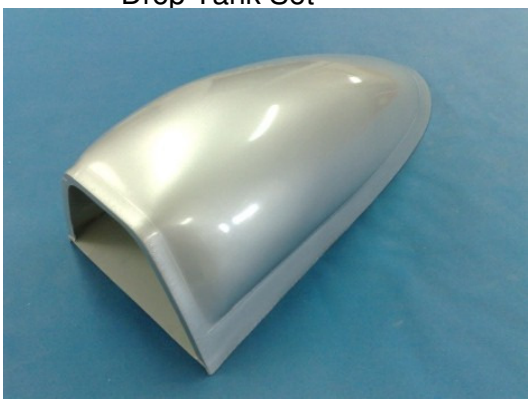
Carbon Spinner



Drop Tank Set



Scale Dummy Exhaust



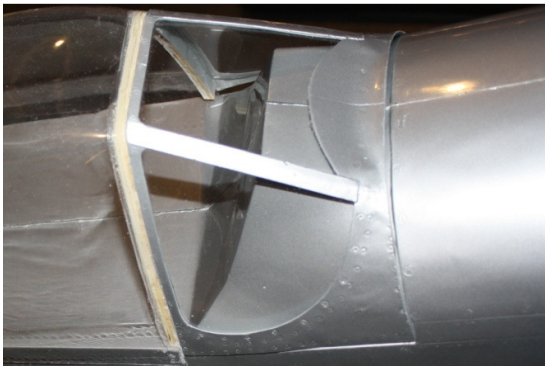
Fiberglass Canopy Frame

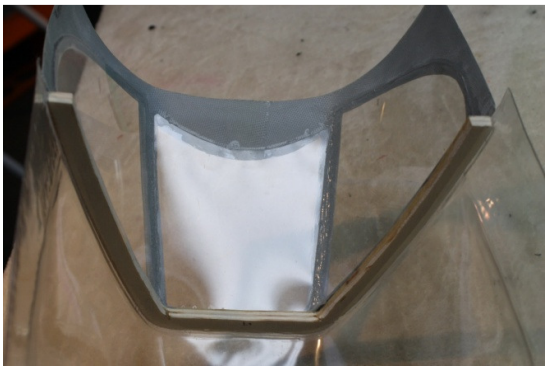
Scale Dummy Propeller

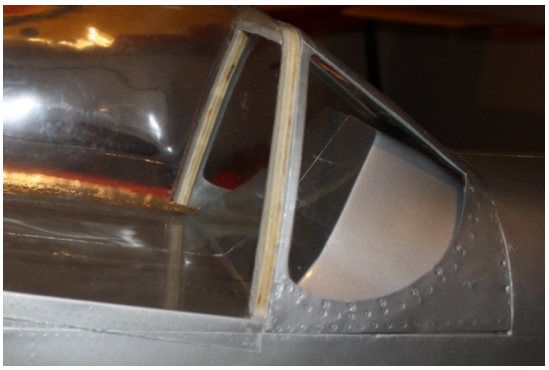
Canopy Assembly and Installation

The canopy should only be installed after all the work on the inside is complete to avoid damaging it. **Do not** cut out the window openings until instructed to do so. The frame will become very delicate and can easily be broken. Start with the forward section of the canopy frame which is molded fiberglass. Test fit into the recessed part of the fuse. Sand the edges if necessary for a good fit. It will be necessary to build a former around the rear of the section of the forward frame in order to attach the rear, clear canopy. We used two pieces of 1/8"(3mm) plywood laminated together to do this. Using the forward canopy frame as a guide lay the back side of the frame on the plywood and trace around the inside. Cutout the former and temporarily clamp to the canopy frame. Test fit the forward frame to the fuse and adjust the former if necessary. When satisfied with the fit, use epoxy and glue the former to the canopy frame.

We now need to cutout and fit the clear canopy. Once the glue has set on the forward canopy frame tape it into position on the fuse. Using the cut line on the clear canopy as a guide, carefully remove the excess material. It is best to cut it oversized to start with and trim to fit. When satisfied with the fit, carefully sand the inside section of the clear canopy that will contact the frame and glue in place with Plastic Zap. *continued*

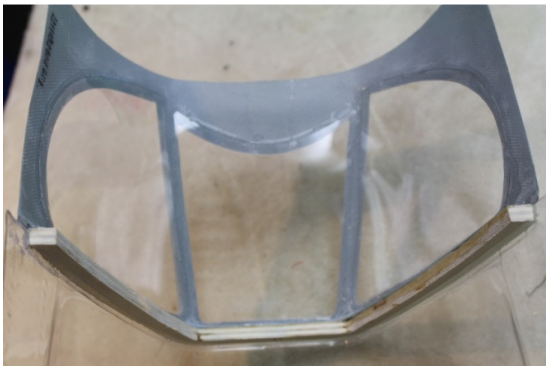






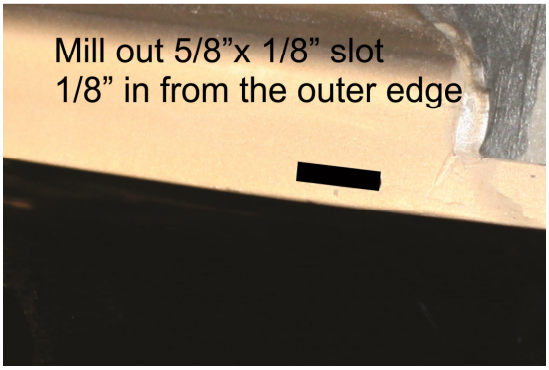
Canopy assembly and installation cont.

The inside edge of the canopy should also be sanded where it will contact the fuse. We can now install the windows in the forward canopy frame. Before cutting out the window openings, sand the inside where the clear windows will make contact using the photo as a guide. After sanding, the windows holes can be cut out. The clear windows need to be cut an 1/8”(3mm) oversized to allow for a gluing surface. Carefully sand the edge of the window that will contact the frame and glue in place with Plastic Zap. We will use white glue to attach the canopy when all other work is done.



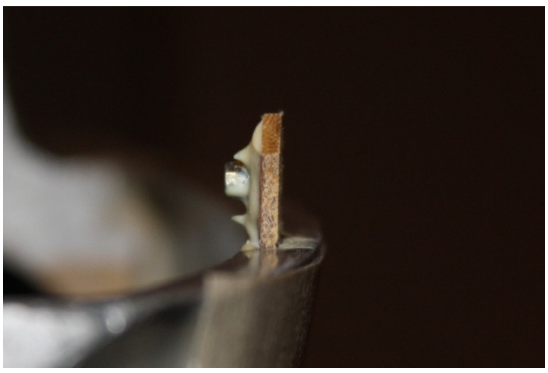
Cowl Installation

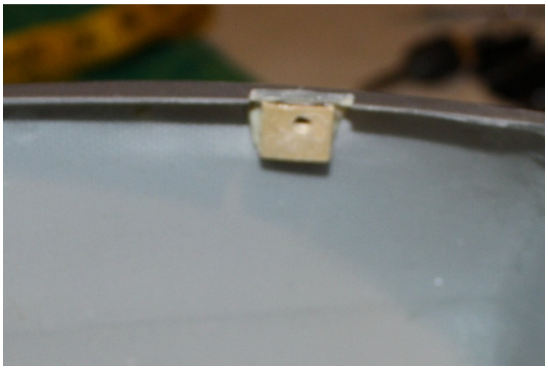
The cowling comes ready to install and only requires a little work to complete. We need to install 6 tabs total. Four will have blind nuts glued to them and will be installed into the fuse, and two will be glued into the cowl to help maintain alignment. The tabs can be made up from 1/8”(3mm) aircraft plywood or phenolic material. The tabs should be 5/8”(16mm) by 1 1/4”(32mm). We first cut out the slots for the tabs. Apply masking tape to the fuse just below the cowl as shown in the photo. Temporary tape the cowl into position and mark the location for the four screws. We used the most forward and rearward scale screws as the location for our screws. With the location marked on the tape remove the cowl and mark for the cutout that will hold the tabs. *Continued*

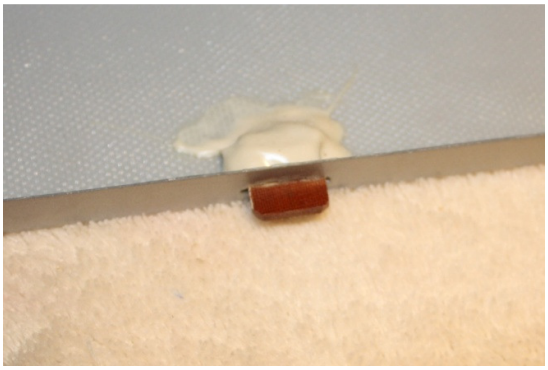


Cowl installation cont.

The 5/8”(16mm) X 1/8”(3mm) slot will be centered on the marks made and set in from the outer edge of the fuse 1/8”(3mm). With the slots marked, cut out the holes for the tabs. The tab will be installed in the slots just made and should protrude from the fuse about 1/2”(13mm). Be sure the tab is perpendicular to the fuse flange as shown in the photo. Sand the inside area of the fuse and glue the tab in place with fiber reinforced epoxy. After the glue has cured, reinstall the cowl and tape into position. Use a 4mm screws to mount the cowl. Drill a hole through the center of the scale screws and through the tabs. A small shim may be necessary on the inside of the cowl in order to make it flush with the fuse. After the hole is drilled install a blind nut in the inside of the tabs. The two alignment tabs will be installed in the cowl, not the fuse and do not need screws.





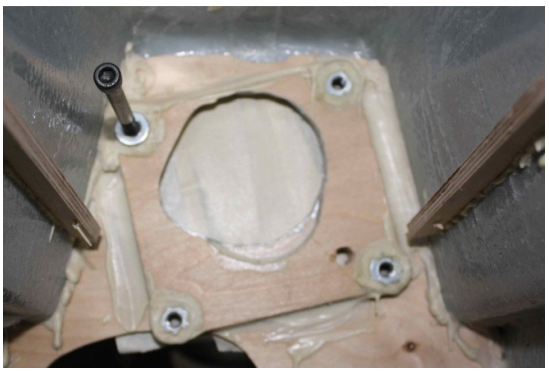


Firewall Installation

Before you can install the engine, you need to install the plywood firewall. Locate the 1/8”(3mm) plywood firewall with the precut hole for the pipe assembly and test fit it in place behind the fiberglass firewall. Sand if necessary for a good fit. NOTE, the plywood needs to fit tightly against the back side of the fiberglass firewall to ensure no flexing when bolting on the motor. When satisfied with the fit glue the firewall into position with fiber reinforced epoxy.

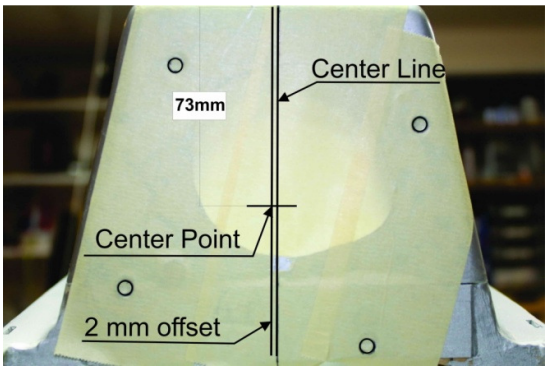
Firewall Installation cont.

Be sure to sand all glue surfaces well with 80 grit sand paper before gluing to insure a good bond. NOTE, the hole for the pipe is on the left side of the fuse, see photo.

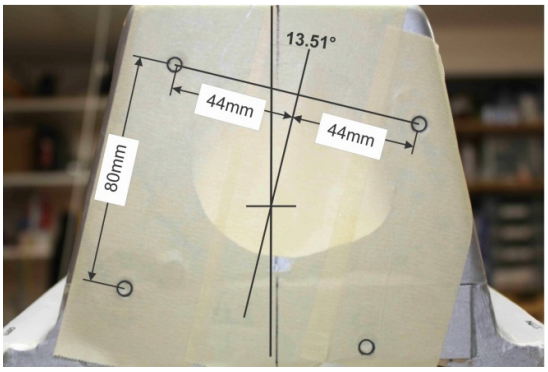


Engine installation

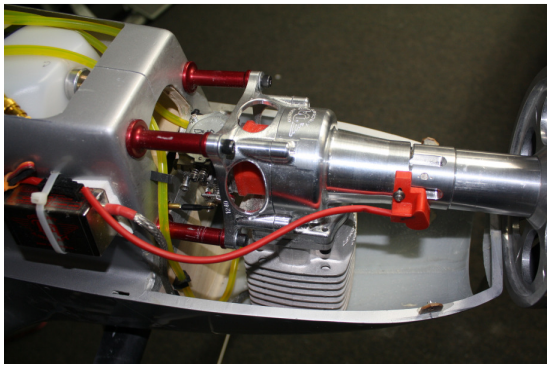
There are many engine and exhaust combination that will work in the mustang. We will be using a DA 85 engine with a wrap around header and a MTW 110 canister. In our setup we use a prop standoff to set back and allow us to keep the entire engine inside the cowl. Please check with your engine manufacture before using this method. An alternate is to use longer standoffs and have the cylinder protrude out through the bottom of the cowl. You will need 4-2”(51mm)standoffs and a 2-1/8”(54mm) prop standoff. The engine will need to be mounted at a 13.5 degree angle in order to center the canister in the fuse. Start by masking the entire firewall. Trace the vertical center line from the firewall on to the masking tape. The engine needs to be offset 5/64”(2mm). Measure from the center line and mark the line on the tape. We now need to find the horizontal center line. Have a helper hold a straight edge on the top of the fuse as shown or you can tape it into position. Lay a ruler in the front side of the firewall. Where the two intersect will be the point from which to measure from. On the 2mm line, measure down and make a mark at 2 7/8”(73mm.)



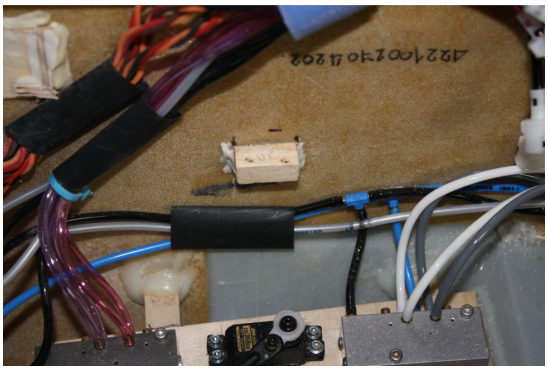
Engine installation cont.



This will be the center point for the engine. Using a protractor, draw the new center line at 13.5 degrees from the 2mm center line. This will be the new centerline to measure from for the engine bolts holes. On the 13.5 degree line, measure up from the center point 1 37/64”(40mm). Use a square and the dimensions shown in the photo to locate and mark for the bolt holes. The engine will be held in with 6mm bolts and blind nuts. After the mounting holes are drilled, you need to make up and glue in a 1/4”(6mm) plywood reinforcement to go behind the motor. Install 6mm blind nuts in the 1/4”(6mm) plywood after it is glued in place. If you are using a n alternate engine use the same method to find the center line and transfer your measurements to the fire wall. Test fit the engine and pipe combination before mounting and adjust the angle if necessary.

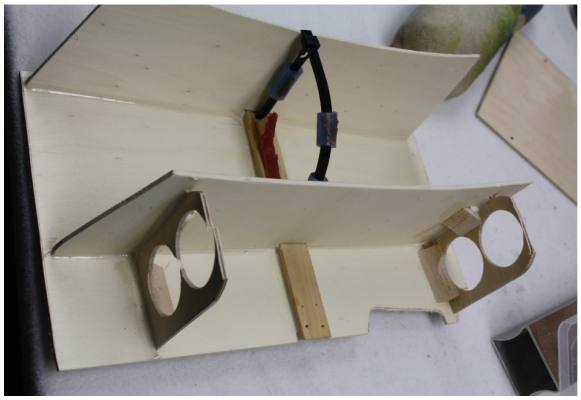


Exhaust System



The exhaust system will be mounted to a 1/4"(6mm) X 1” (25mm) piece of hardwood using wire ties with silicone tubing to protect the ties. The mount will then be attached to the fuse using two 3/8”(10mm)X3/8” (10mm)X 1” (25m m)hardwood blocks. Before gluing the blocks to the fuse, be sure to have adequate clearance between the pipe and the wing. Use the photo above as a guide but ignore the plywood at this time. After the pipe is mounted we need to make up a plywood heat shield to protect the equipment from heat generated from the exhaust system. The easiest way accomplish this is to use heavy paper to make a template.

We will use 1/8”(3mm) lite plywood to make up the shield. The shield will be attached to the bottom side of the pipe mount and to the fuel tank mount. Next we will use lite plywood again to make up a tunnel for the pipe as shown.

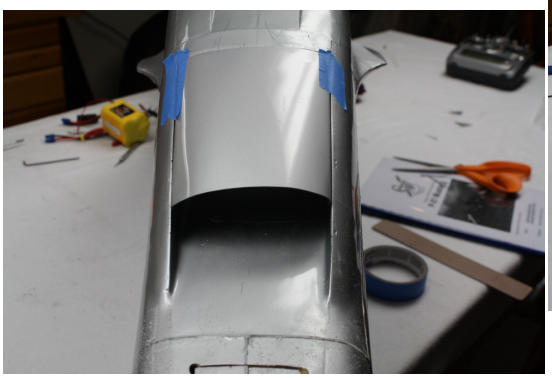


Fuselage Cutouts

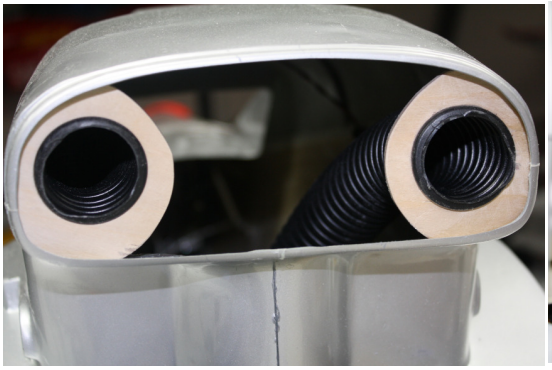
We need to cut out a few openings in the fuse to allow cooling air in and out of the fuse. The air intake in the nose just under the spinner. The radiator intake under the wing and the radiator exit. After the holes are cut, we can install the front scoop extension and the radiator exit cover with epoxy or white glue.

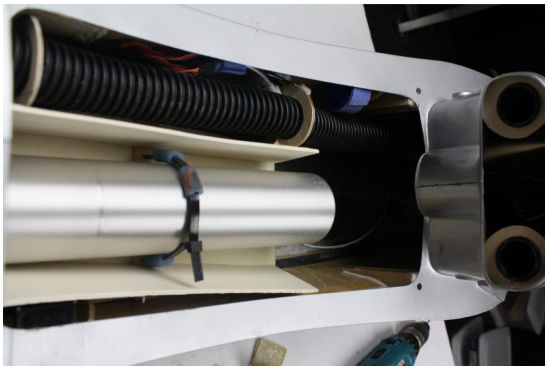
Cooling System

The design of the Mustang does not allow enough airflow into the fuse from the cutouts we made. It is necessary to provide additional cooling from the radiator intake. This will be accomplished by using 1 ½” (38mm) flexible ducting directing air to the front of the fuse. Use the photos on the next page as a guide to accomplish this. We found our ducting at a local hardware store.



. *Continued*

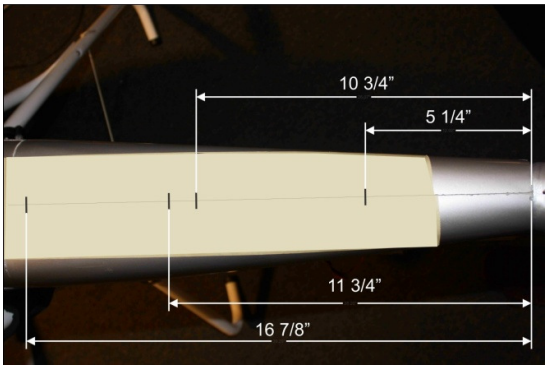


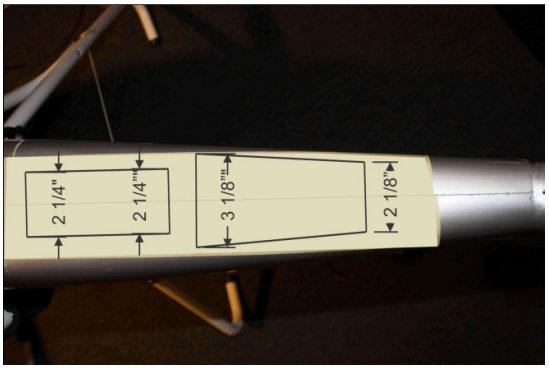


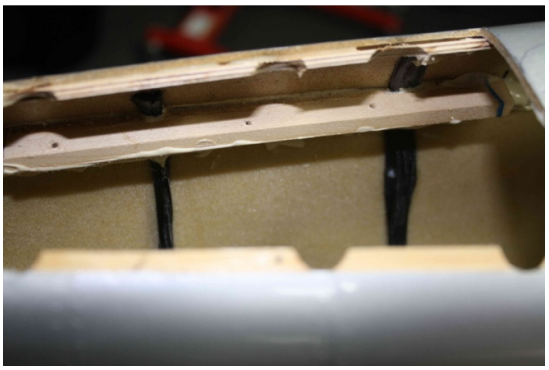
Tail Wheel Assembly

We first need to locate and cutout the opening in the rear of the fuse. Apply masking tape the bottom side of the fuse. Transfer the center line to the tape. Measure from the rear of the fuse and make marks at 5 1/4"(133mm), 10 3/4"(273mm), 11 3/4"(299mm) and 16 7/8(429mm)". Draw a line from each point just made on the tape, square from the fuse centerline. Use the photo shown for the line dimensions and then connect the lines at the end. The rear hole is for access to the tail wheel mount assembly. The forward hole will be cut at the center line also and will be the gear doors. Using a sharp x-acto knife and a straight edge cut out the access holes. For the best results, use light pressure and make many passes with the knife. It may be necessary to use an x-acto saw blade to cut through the center where the fuse halves are joined.

Next we can install the tail wheel mounting plate. *Continued*

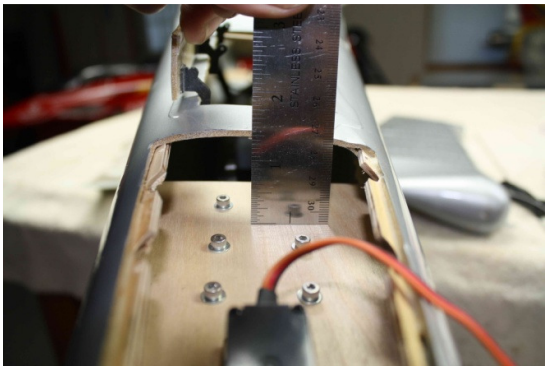


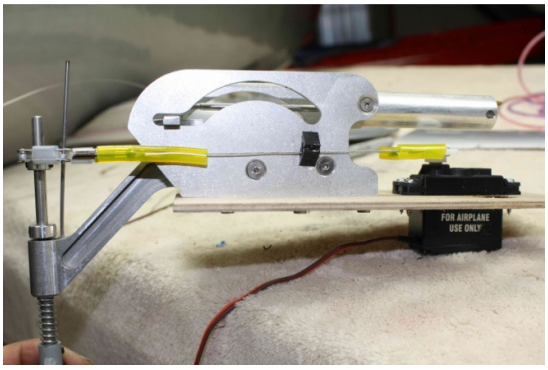


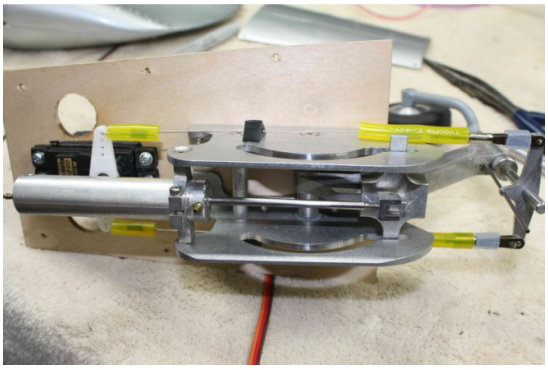


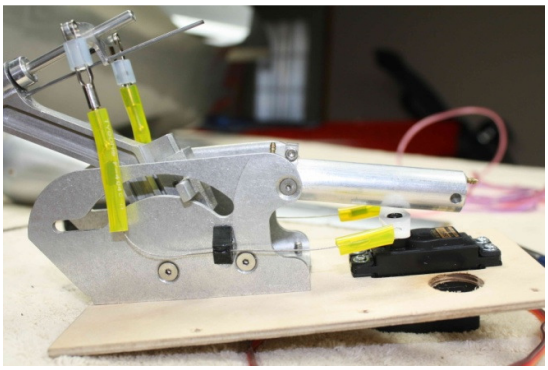
Tail Wheel Assembly. Cont.

The mounting plate will be attached to two side supports that will be made up from 1/4"(6mm) aircraft plywood or bass wood and should be 1/2"(13mm) wide. The supports need to be glued in place with fiber reinforced epoxy. The rear of the plate needs to be 5 1/4" (133mm) from the rear of the fuse and should set down in the fuse 1 7/16”(37mm) measured at the center of the fuse. With the side supports glued in place drill holes to attach the plate with 8, 4-40 socket head sheet metal screws. **Do not** change any of the following steps as it is a very tight clearance and the tail wheel may not work properly. Remove the plate and mount the tail wheel assembly as shown the photo with #6 screws. Install the servo arm on the servo before installing the servo. The holes in the servo arm should be the same width as the holes in the control arm. Install the servo with the servo arm closest to the tail wheel assembly. Make sure the control arm on the tail wheel is in line with the servo arm when viewed from the side. After locating the control arm, be sure to put a flat spot under the set screw to insure the arm will not move. Make up two pull cables as shown. It’s a good idea to install fuel tubing to prevent any binding of the cables. We also added two clamp mounts to the side of the tail wheel to hold the cable when the gear is retracted. To attach the rear cover, line the side of the hole with light ply and install cover with small screws.



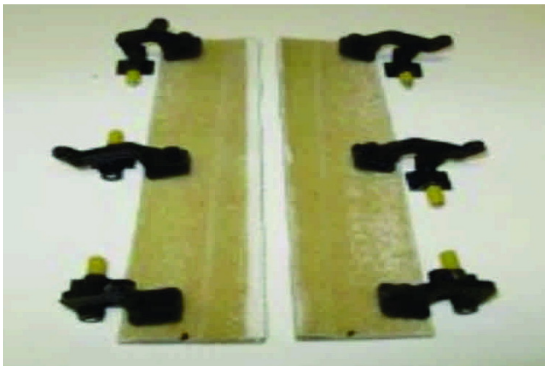


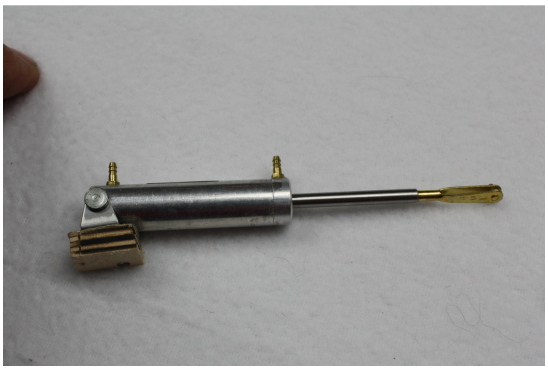




Gear doors installation

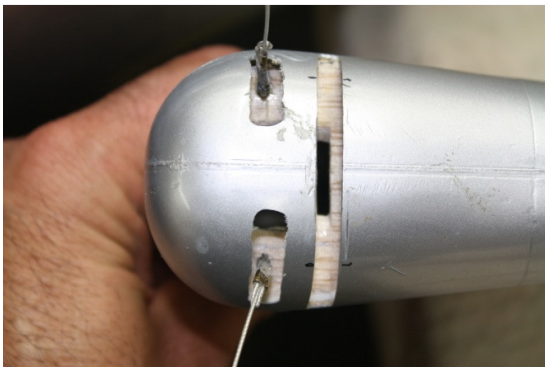
The tail wheel gear doors will be installed with the offset hinges provided with the kit. We used a slightly different hinge but the procedure is the same. Use the photo as a guide to locate the hinges and glue into position. It may be a good idea to also install a small screw into the hinge for added support. **Note**, the kit includes a piece of music wire that can be used to open and close the doors. We will use two Robart 165 air cylinders to operate the doors. These cylinders are **not** included in the kit. Use the photo as a guide to install the cylinders. Use 1/4"(6mm) aircraft plywood to makeup a block to mount the cylinder bracket. Use small screw to attach the cylinder brackets to the plywood mounts. Test the location of the mounts by holding the assembly in the fuse and make sure the door will open and close. When satisfied, mark the location and glue the mounts into position.

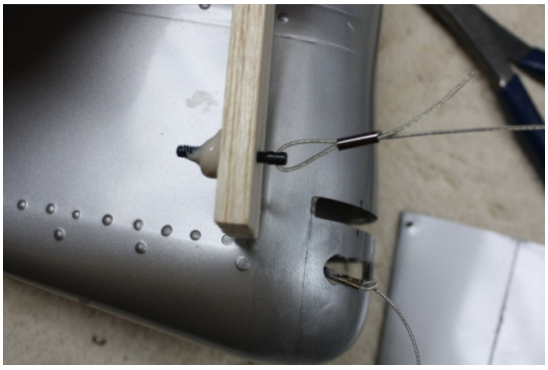


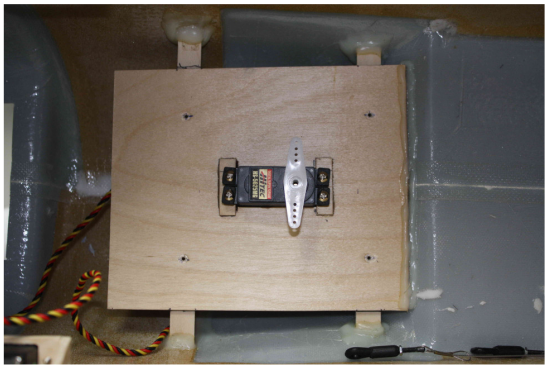


Rudder Installation

The rudder is installed at the factory and only requires installing the control cables. Locate and cut out the two holes for the rudder cables as shown. The hole should be 1/2"(13mm) below the cutout for the lower rudder hinge. The holes need to be wide enough to allow clearance for rudder movement. Make up two pull-pull cables as shown. Measure in from the outside of the rudder a 1/4"(6mm) and drill the holes for the cable retainer. The holes should be just large enough for the threaded retainer to pass through. Push the retainer into the hole until only 1/8”(*3mm) is showing above the balsa. The retainer is held in place with fiber reinforced epoxy built up on the back side of the retainer. This can be done with a long thin stick, working through the holes in the rudder. To better explain this, we made up a cut away that represents the balsa inside the rudder. After the glue is dry, the rudder can be installed using the 1/16”(1.5mm) wire supplied with the kit. Hold the wire in place with a small dab of epoxy on the bottom of the rudder. The rudder cables will pass through two 1/8”(3mm) plastic tubes, 12”(305mm) long, and will be glued in place just over the tail wheel plate supports. This will help guide the cables away from the tail wheel assembly. We need to make up a tray to install the rudder servo. Use a piece of 1/8”(3mm) aircraft plywood and mount it just ahead or the cockpit floor as shown. We can also use this plate to mount the retract valve.



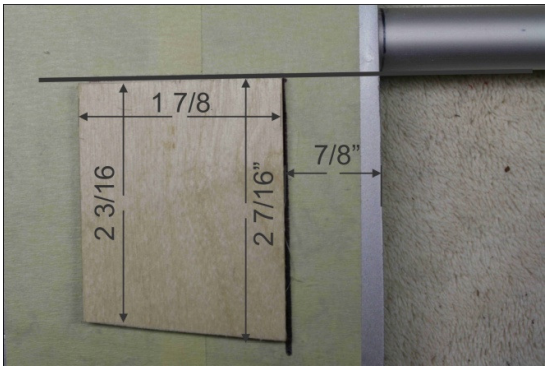


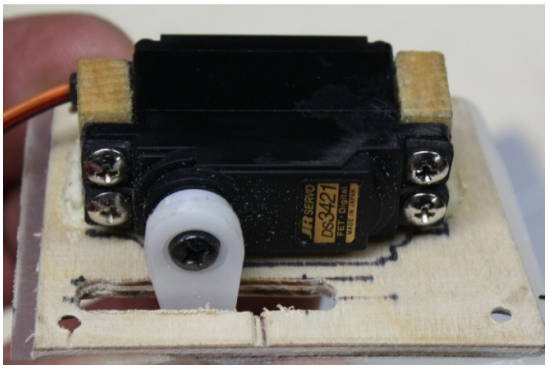


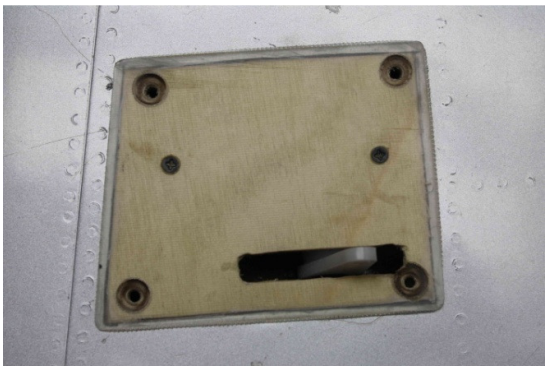
Horizontal Stabs

The elevator is pre-hinged at the factory and only the servo and control horns installation is required. Due to the limited space in the stab, we chose a JR DS3421 servo for the elevators. Start by fabricating a servo plate using 1/8”(3mm) Aircraft plywood. Use the dimensions in the photo as a guide. Apply tape to the bottom side of the stab just in front of the spar tube. Draw a line on the tape parallel to the front edge of the spar tube as shown. Using a square, make another line 7/8”(22mm) in from the inside edge of the stab. Lay the servo plate you just made on the stab as shown. Using the plate as a guide, cut out the servo pocket with an x-acto knife. This will ensure a tight fit. Remove and discard the cutout. Line the inside of the hole with 1/8”(3mm) aircraft plywood as shown and drill holes for the servo plate. Mark for the servo arm slot as shown in the photo. The center of the slot should be 3/8”(9mm) in from the edge and should be 1 1/4"(32mm) long and 3/16”(5mm) wide. Lay the servo into position with the servo arm centered in the slot. Using 1/4"(6mm) hardwood, make up two mounts for the servo and glue into position. It would be wise to screw the mounts to the plate for a stronger bond. We chose to cover out plate with poly ply for a clean finish and will paint to match.

Continued





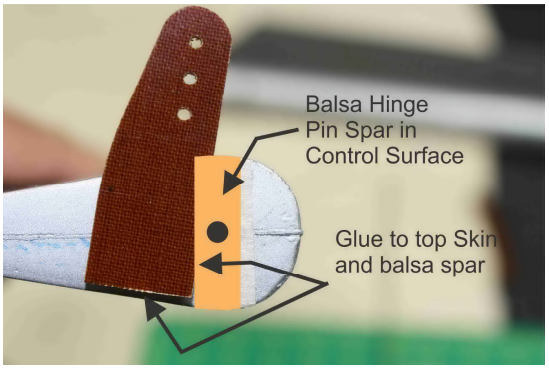


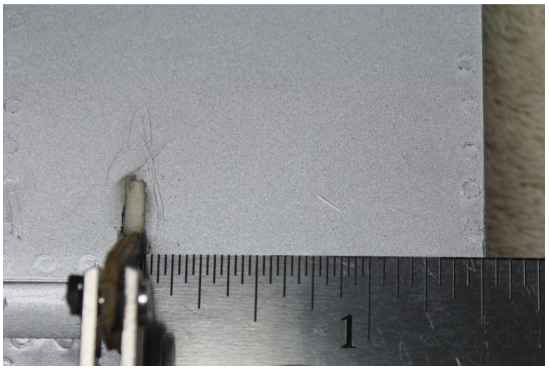
Horizontal Stabs cont.

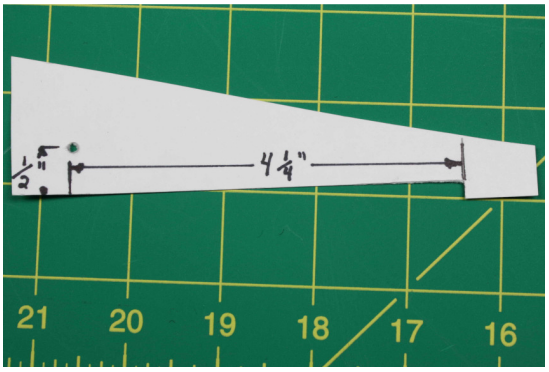
Unlike most CARF models, the Mustang control surfaces do not have hard points in them for the control horn. The reason for this is to allow the scale modeler more flexibility when building. We will explain how to install the horn once, the procedure is the same for all the surfaces. Mill the hole right behind the hinge pin spar, 1 1/2"(38mm) in from the inboard edge of the elevator. The horn will be glued to the top and bottom surface and to the pin spar.

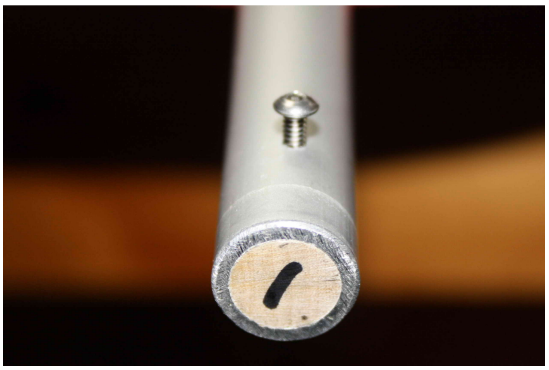
Some trimming of the control horn will be necessary for proper fit and alignment. Use the photo as a guide and make up a jig to set the control horn into position. This will ensure both sides are the same. Be sure the jig sits tight on the elevator at the control horn not at the rear of the elevator. Glue the horn in with fiber reinforced epoxy

The stabs are held in place by 3mm screws that will screw into the spar tube. Use a straight edge to transfer a line to the stab at the center of the spar tube. Measure in from the root of the stab 4 1/4"(108mm). This hole will need to be tapped out for a 3mm screw so use the appropriate drill bit. We decided to add a piece of hardwood to the inside of the stab in order to have a little more to tap into.



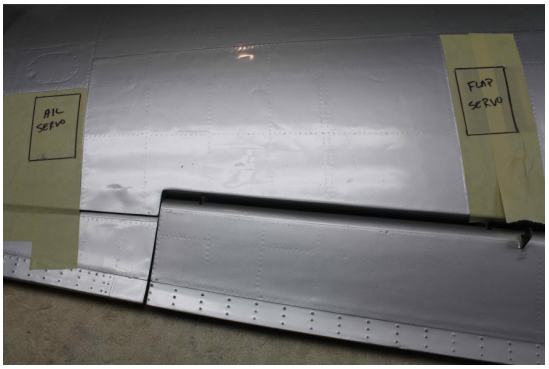


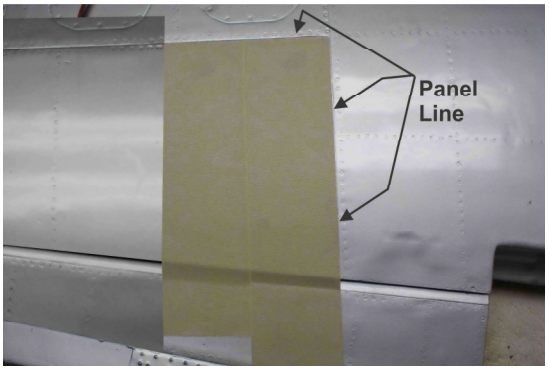


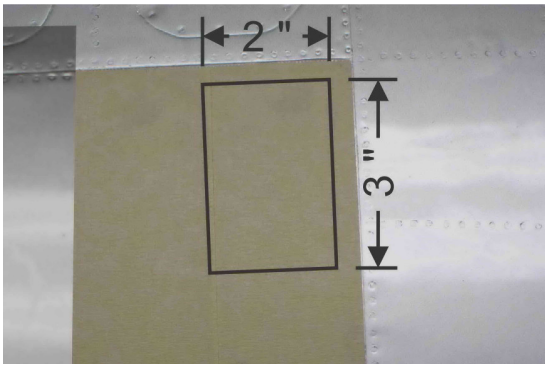


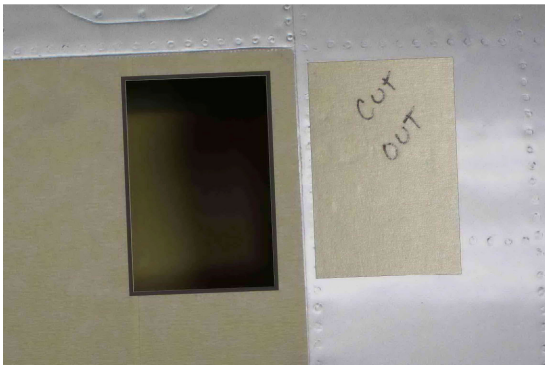
Wings, Servo installation

There are many ways the servos can be installed and many different locations. From hiding the flap servo inside the landing gear compartment, to something as basic as what was done with the elevator servos. This will serve as a guide and give you one idea of how to accomplish this. The kit comes with four servo mounts intended to be mounted on the top wing skin. We will show you this method and the location of the servo mounts. Let's start with the ailerons. If you haven't done so already, install the ailerons on the wing. Apply masking tape to the bottom as shown in the photo. Mark for the cut out of the aileron servo as shown. This should be set in from the panel line 1/4"(6mm). The cut out should be 2"(51mm) by 3"(76mm). Use an x-acto knife and a stright edge to cut out the servo cover. Making many light cuts will result in a perfect fitting cover and will almost be invisable when finished. Mark the location of the cut out the back side, this way it can be installed in it's original location. We now need to assmbly the servo mounts. Locate all the parts and assmbly as shown in the photo. Be sure to sand all the parts well where they will be glued. After the glue has dryed, we can mount the sevros. Screw the two servo parts that you just made together with 3mm SHS and install the servos. *Continued*





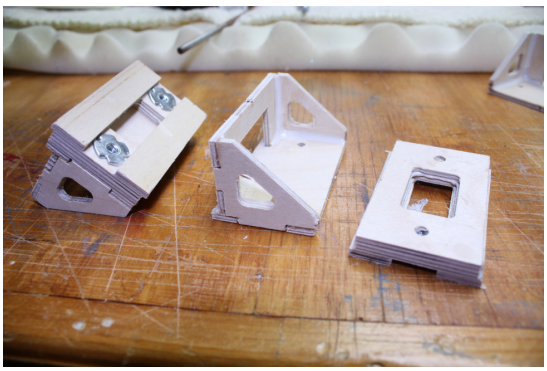


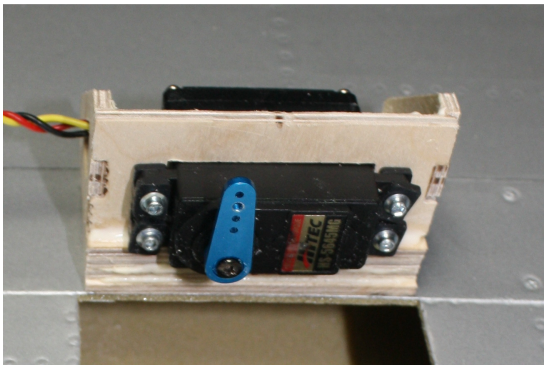


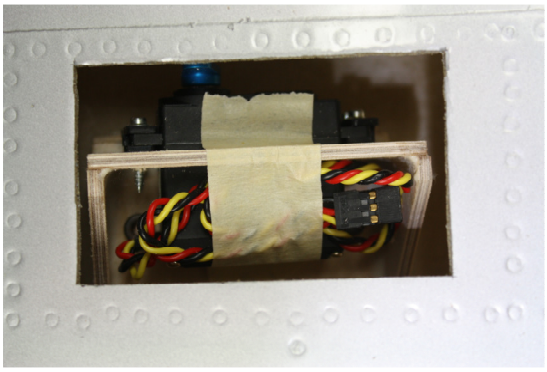
Servo installation cont.

We can now locate the position for the servo mount. Set the assembled servo into the hole. Use the photo as a guide to install the servo. Note that the mount is centered fore and aft, the servo arm lines up with the edge of the pocket, the servo arm faces the root of the wing and the servo output shaft is to the rear. Mark the location of the servo, sand the top side of the wing and glue the mount into position. We can now locate the position of the control horn. Continue the line from the edge of the servo pocket all the way to the aileron. The slot for the control horn will be as shown, right behind the hinge spar on the aileron. Use the same method to glue in the horn as with the elevators. It is only necessary to have about 1/2"(13mm) of the control horn protruding from the wing. This will allow plenty of throw and allow a small servo arm to be used. Trim the control horn as necessary to achieve this. You can use the line in the wing as a guide to cut out the push rod exit. Start in the middle and adjust as necessary.

The flap will be done in the same manner in the location shown on the next page. Use the panel line as a guide to locate and mark for the servo cut out. *Continued*

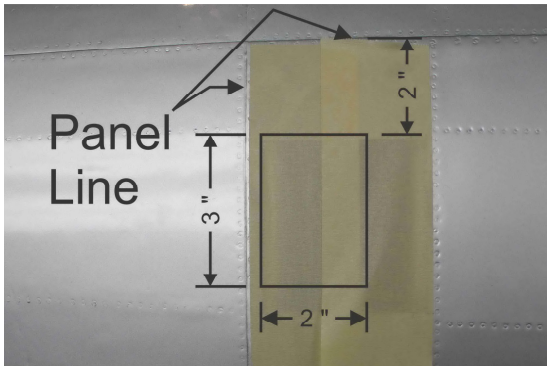


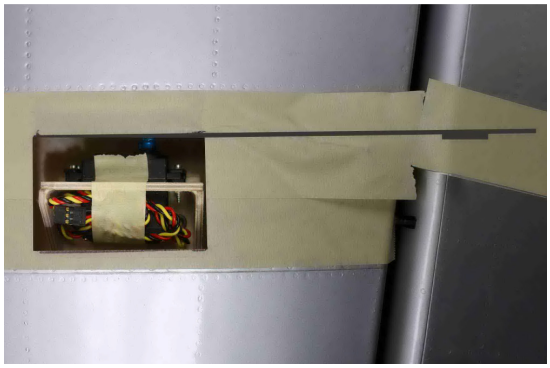


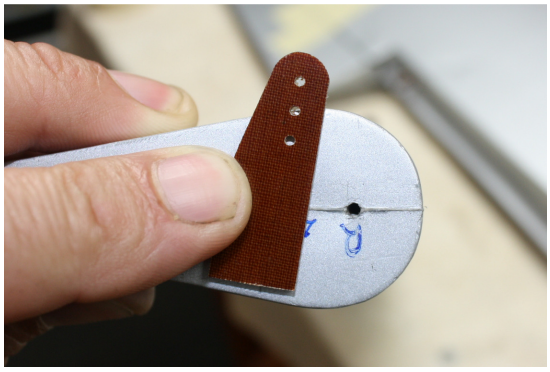


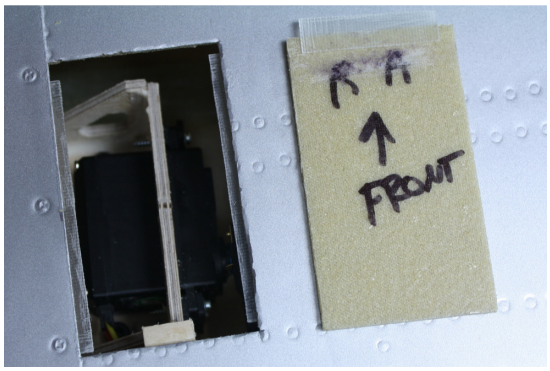
Servo installation cont.

Note the servo will be positioned in the pocket the same way as the aileron, servo output shaft inboard, and rearward. The servo arm lined up with outer edge of pocket. Continue the line from the servo pocket to locate and mark the slot for the control horn. Note the flap control horn will only protrude from the flap surface about 3/8(10mm). This will give you more than enough throw and allow use of a short servo arm. The exit for the push rod will be almost all the way back on the wing near the control horn. To finish the servo pockets, use 3/8”(10mm) strips of poly ply or similar. Apply a strip on each side of the pocket and a strip on the front edge of the cover as shown in the photo. Then glue a small tab at the rear of the pocket. This will allow you to attach the cover with only one small screw. Make up the necessary linkage from the parts provided to complete the installation. Run the appropriate wiring to the root of the wing



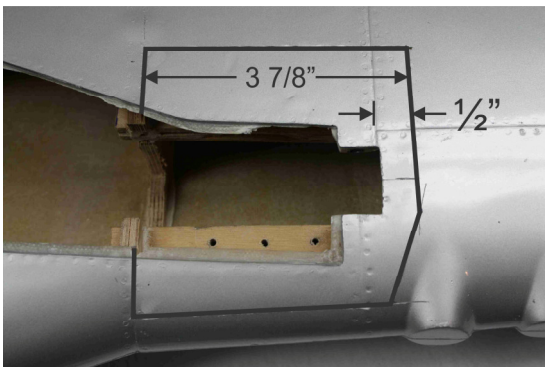


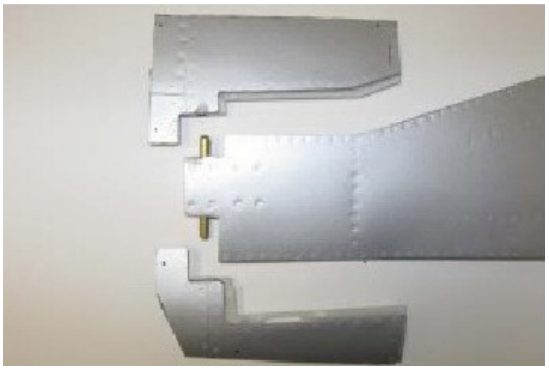




Landing Gear Installation

The gear doors and strut covers are pre mounted at the factory and only require a little work to complete. Start by marking and cutting out the access hole for the retract mechanism. Use the photo as a guide to locate and cutout the cover. The cover should be 3 7/8”(98mm) X 4(101mm)”. Use the panel line shown as a guide to measure from as shown. The cover needs to be split in the center in order to install the strut cover rod. See photo. Cut a piece of 5/32”brass rod, 1 1/2” (40mm) long to mount the strut cover as shown. Next we need to locate and install the 1/8”(3mm) plywood mounts needed to attach the cutout to the wing. Use the photo as a guide and glue 5 mounts to the wing. Use small screws to attach the cover.





Next we can install the landing gear. Assemble the landing gear as shown in the photo. Use 1/4" wheel collars to Center the wheel below the strut. The gear will be mounted with 7 #6X3/4” SHSM screws. The outboard end of the mechanism should be 3/8”(10mm) from the wing former as shown. Check to make sure the wheel clears the wheel opening in the wing before mounting. With the wheel retracted into the opening it will be closer to the front edge than the rear. See the photo on the next page. . *Continued*

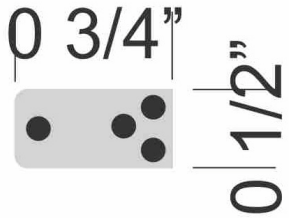
Landing Gear installation cont.

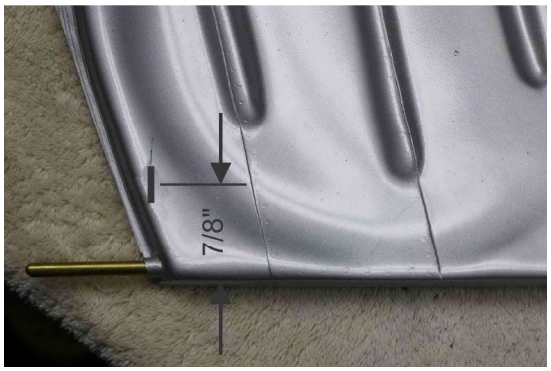
Some shimming under the mechanism may be necessary for proper clearance of the wheel when retracted.

LG Door and Strut Cover

Note on strut cover linkage. The kit comes with hardware to install two push rods on each strut cover to open and close the door. Be advised that due to the complex geometry of the Mustangs landing gear that it can be very difficult to set up. We chose to only use one rod to work the door as a simple and effective alternative. Start by making up 6 brackets that we need to mount to the doors. The mounts can be made from 1/16”(2mm)thick by 1/2”(13mm) brass or aluminum 3/4”(19mm) long. Drill small glue holes in the bottom and a hole to attach the linkage as shown. Use the measurement in the photos as a guide to locate the mounts. Be sure to sand all contact points to ensure a good bond. The mount on the door will be 7/8”(22mm) from the inside edge of the cover as shown and should be perpendicular to the inside edge. The mounts for the strut cover will be 5” (127mm) from the inboard edge of the cover. We can now install the air cylinder that will open the gear door. You can glue the cylinder mount right to the wing or make up a small block to mount it to. Position the cylinder as shown in the photo on the next page. . .

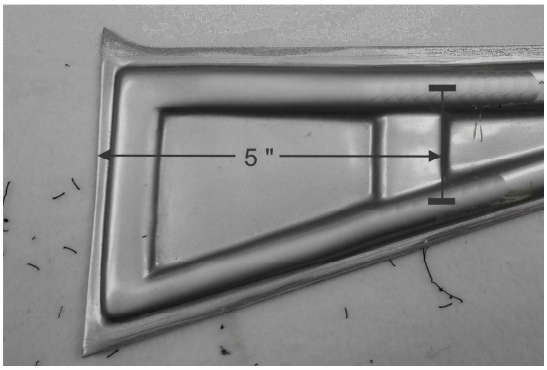
Continued





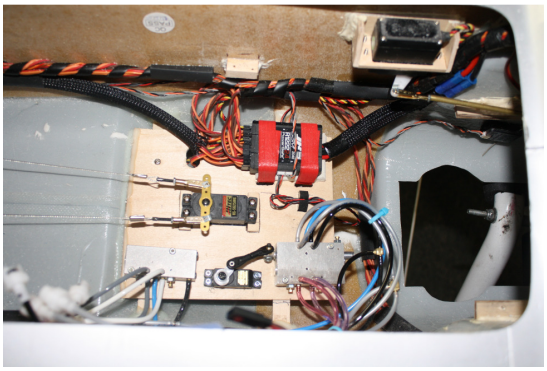
LG Door and Strut Cover cont.

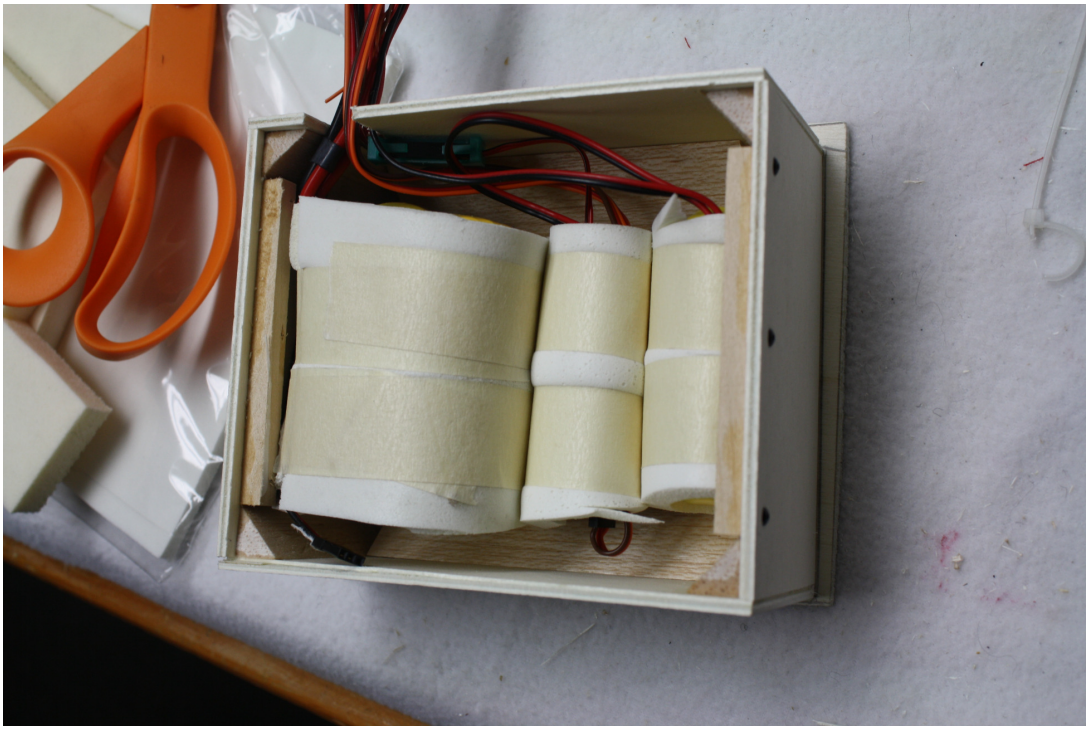
Attach the gear door in the same manner as the strut cover, with 5/32” brass rod. The front piece will be 3 15/16” (100mm) and the rear is 2 1/16” (53mm). Makeup the linkage to pull the strut cover closed. The linkage needs to be approximately 1 7/8”(48mm) long. Mount the linkage to the cover and to the mount installed on the strut and adjust.

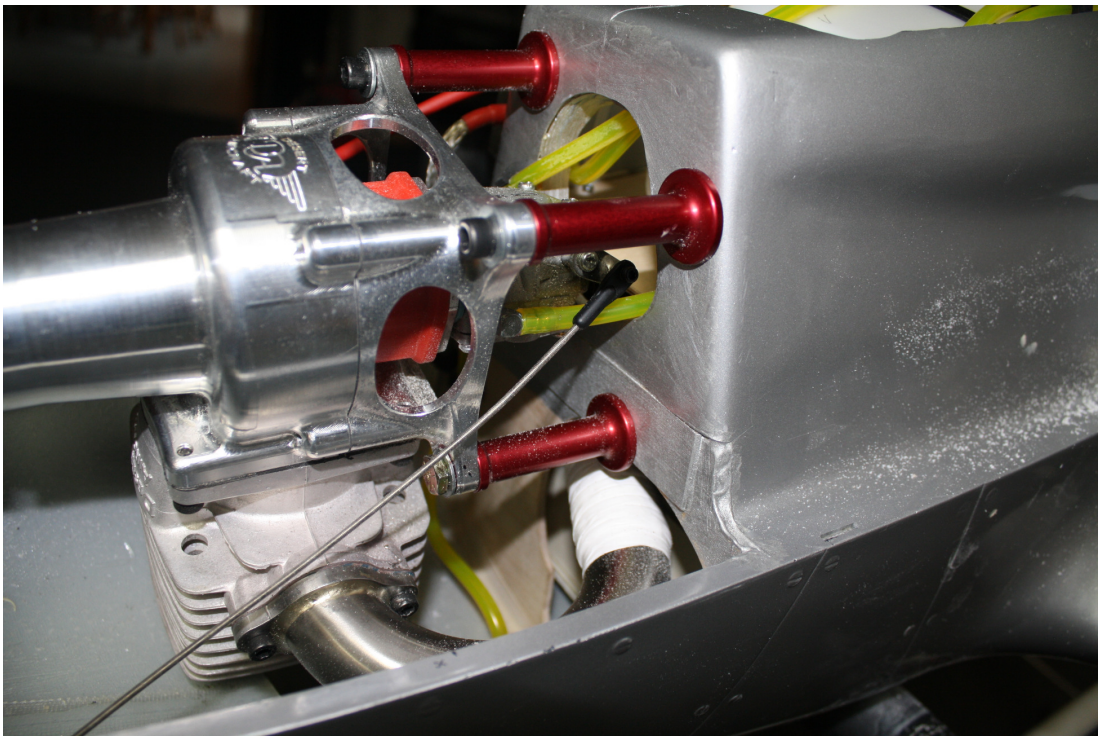


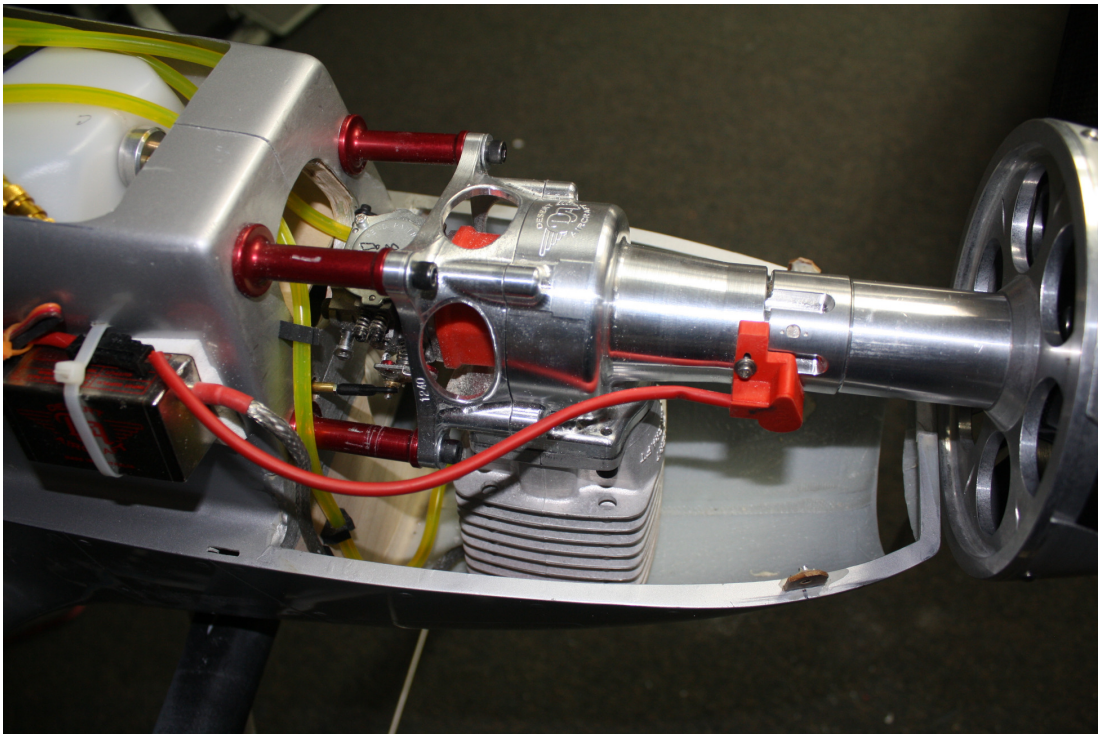
Equipment Installation

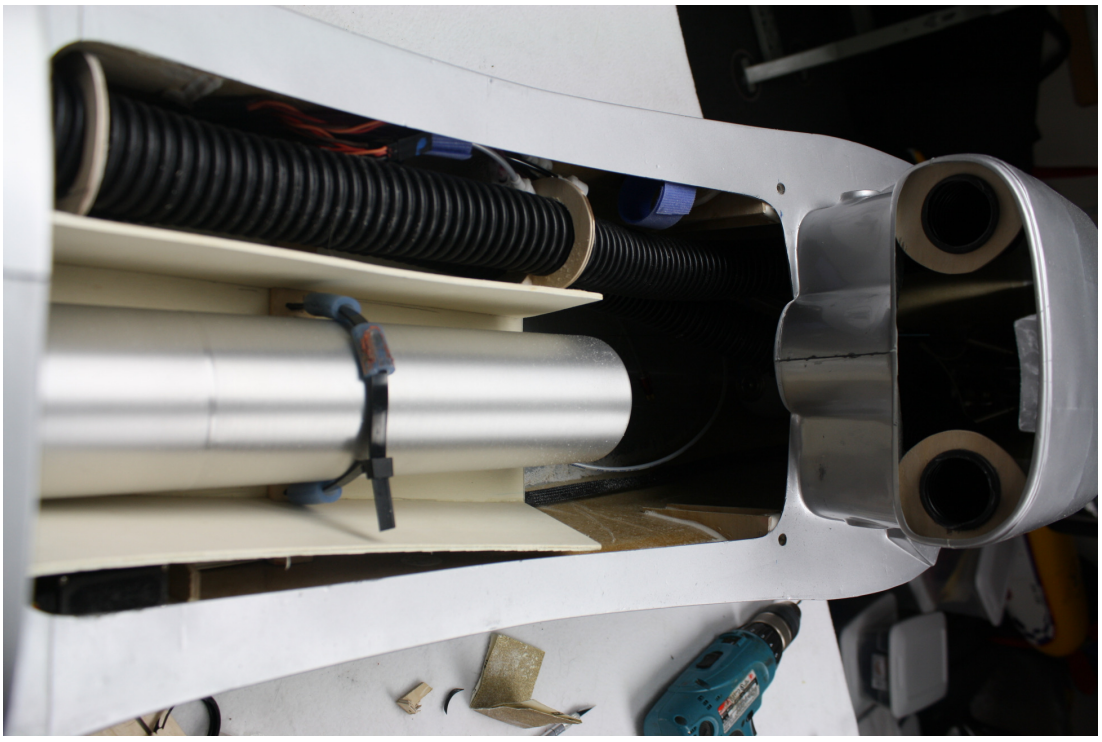
We have included a few photos of our gear installation to help guide you through the equipment setup. Your installation may differ and this is to serve a guide only. We used an Ultra Precision UP 2 and UP 4 valve to control the gear and doors on our Mustang. We used a piece of 1/8”(3mm) plywood to make up a tray for the fuel tank and attached it to rails glued to the side of the fuse. The tank should sit right behind the motor as shown in the photo. We made up an equipment box to install the batteries in the nose. The box is necessary to shield the batteries for the exhaust heat. Glue the box to the bottom side of the fuse as shown in the photo. We glued the bottom of the box to the fuse before attaching the sides.

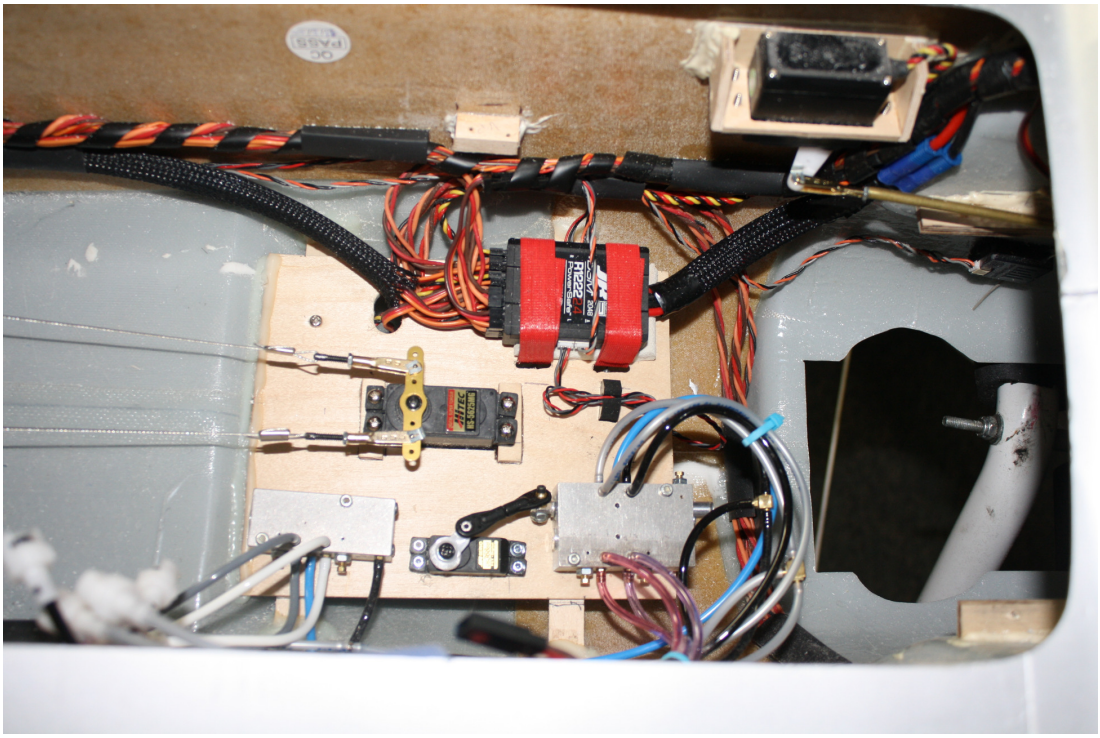












Center of Gravity

The CG for the Mustang is at the front edge of the wing tube. Use a straight edge to transfer a mark to the bottom of the wing. We found that with the batteries in the nose it took no extra weight balance our Mustang. This should give you a good starting point for a safe first flight.

Control Throws

This will give you a starting point for the control throws. Set these measurements as high rate, set a low rate at about 70 percent. Add about 30% expo to high rate and 20% to the low. After the first flights you can adjust to your preference.

Ailerons 1/2" Up and Down

Elevator 3/4"Up 1/2"Down

Rudder 2” Right and Left

Flaps 15 degrees for take off

45 degrees for landing

Preflight Check and First Flight

This Scale-Aircraft is a high-end product and can create an enormous risk for both pilot and Spectators if not handled with care and used according to the instructions. Make sure that you operate your Mustang according to the AMA rules, or those laws and regulations governing the model flying in the country of use. The engine, servos and control surfaces have to be attached properly. Please use only the recommended engines, servos, propellers, and accessories supplied in the kit. **Make sure that the 'Centre of Gravity'** is located in the recommended place. Use the nose heavy end of the CG range for your first flights, before you start experimenting with moving the CG back. If you find that you need to relocate your batteries or even add weight in the aircraft to move the CG to the recommended position, please do so and don't try to save weight or hassle. A tail heavy plane, in a first flight, can be an enormous danger for you and all spectators. Fix any weights, and heavy items like batteries very securely to the plane.

Make sure that the plane is secured properly when you start the engine. Have at least 2 helpers hold your plane from the tail end or from behind the wing tips, before you start the engine. Make sure that all spectators are behind, or far in front, of the aircraft when running up the engine. Make sure that you range check your R/C system thoroughly before the first flight. It is absolutely necessary to range check your complete R/C installation first WITHOUT the engine running. Leave the transmitter antenna retracted and check the distance you can walk before 'fail-safe' occurs. Then start up the engine, run it at about half throttle and repeat this range check with the engine running. Make sure that there is no range reduction before 'fail-safe' occurs. Only then make the 1st flight. If you feel that the range with engine running is less then with the engine off, please contact the radio supplier and the engine manufacturer and DON'T FLY at this time. If you fly with 2.4 GHz technology, please follow the radio manufacturer's instructions for range checking. Always check range before a flying session!

After starting your engine the first time, check for vibrations through the whole throttle range. The engine should run smoothly with no unusual vibration. If you think that there are any excessive vibrations at any engine rpm's, DON'T FLY at this time and check your engine, spinner and propeller for proper balancing. Please follow the engine manufacturer's run-in recommendations and make sure that the engine is running properly before you attempt the first flight. The light-weight sandwich composite parts don't like too much vibration and they can suffer damage. The low mass of all the parts results in a low physical inertia, so that any excess vibrations can affect the servos and linkages. Check that the M3 bolts retaining the horizontal stabilizers on to the aluminum tube are installed and tight, and that the hinge wires for the rudder cannot come out. Make sure that your main and stab tubes are not damaged.