



T-1 Mini Build Guide

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T-ONE MODELS



PACIFIC RC JETS



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While many of these procedures are applicable to the T-1 and T-3 jets as well, this guide is specific to the T-1 Mini.

This guide does not cover radio setup and programming or turbine operation and fuel systems setup. You will need to refer to the documentation provided with those systems for information on proper setup and operation.

The following components were used in this build:

- T-1 Mini airframe as sold by Pacific RC Jets.
- T-1 Mini servo wire harness as sold by Pacific RC Jets.
- T-1 Mini Savox servo package as sold by Pacific RC Jets.
- JP electric landing gear setup with separate gear and brake controllers (included with airframe).
- KingTech K85-G2 Turbine

Tips for Success:

- Don't rush! Allow plenty of time for your build. Take your time, enjoy it, and do it right.
- Don't be afraid to ask questions! In addition to this document there are several build threads on RC Universe where you can get input and assistance with your build:
 - [T-1 Build Thread](#)
 - [T-1 Mini Build Thread](#)
- Complete the latter part of your build on a CG stand...when you're down to the components that can relocate in order to adjust CG.
- After your build is complete, have another turbine operator/pilot review your build. A fresh set of eyes is a good sanity check.

Specifications:

- **Length:** 1.7m (67")
- **Wing Span:** 1.5m (59")
- **Weight:** 6.8KG (15lbs) Dry weight with turbine, servos, retracts, pipe, tank and full UAT.
- **Center of Gravity:** 190mm - 210mm from leading edge of wing root.
- **Recommended Aileron Throw:** 20mm
- **Recommended Elevator Throw:** 25mm
- **Recommended Rudder Throw:** 25mm
- **Recommended Flap Throw:** Half flaps = 45mm, Full flaps = 70mm



Hopefully you came home to this recently.



It is very well packed. **Carefully** remove all the parts from the bubble wrap that they are encased in. Don't go slashing it with a knife or razor as you can damage the parts or their finish.



You should have these parts:

L-wing	Landing gear
R-wing	Gear Controller
L-stab	Brake Controller
R-stab	Engine Access Hatch
Tail Section	Fuel Tank
Exhaust Pipe	Smoke Tank
Fuselage	Fuel Parts Bag
Canopy	Assembly Parts Bag
Wing Tube	





This is the contents of the Assembly Parts Bag. It's recommended that you acquire an inexpensive organizer box to make your life easier.

Note: Some of the parts in this photo are mine and did not come with the airframe.

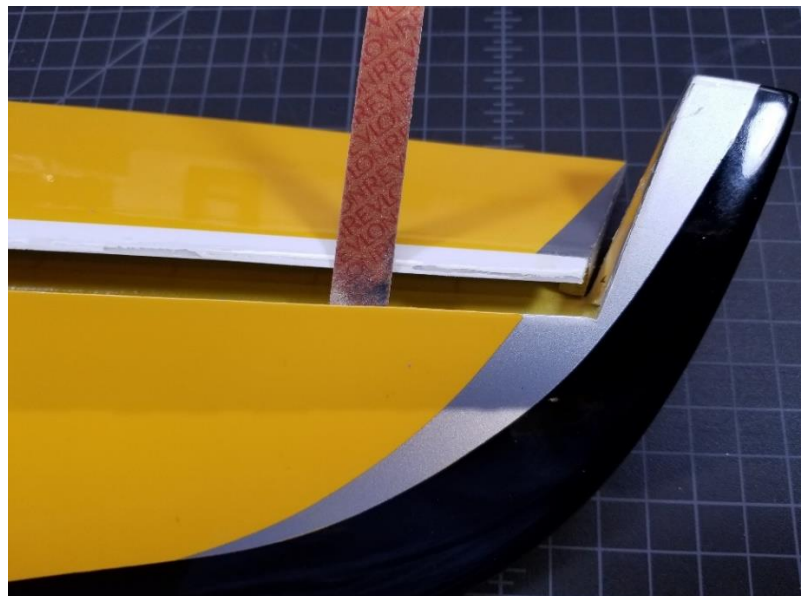


Inspect all control surfaces for smooth movement throughout their range of travel.

Sometimes the painting process results in a rough edge that might cause binding as shown here.



This is easily resolved by using a common emery board to gently smooth the underside/inside the flight surface and the top/outside on the control surface. Go slow and don't be too aggressive with the file to avoid removing too much material.





Nose Gear Steering:

This is the nose gear assembly and included hardware.



Mount the nose steering servo in the configuration shown.

Note: Always use blue thread-locker on all metal-to-metal connections.



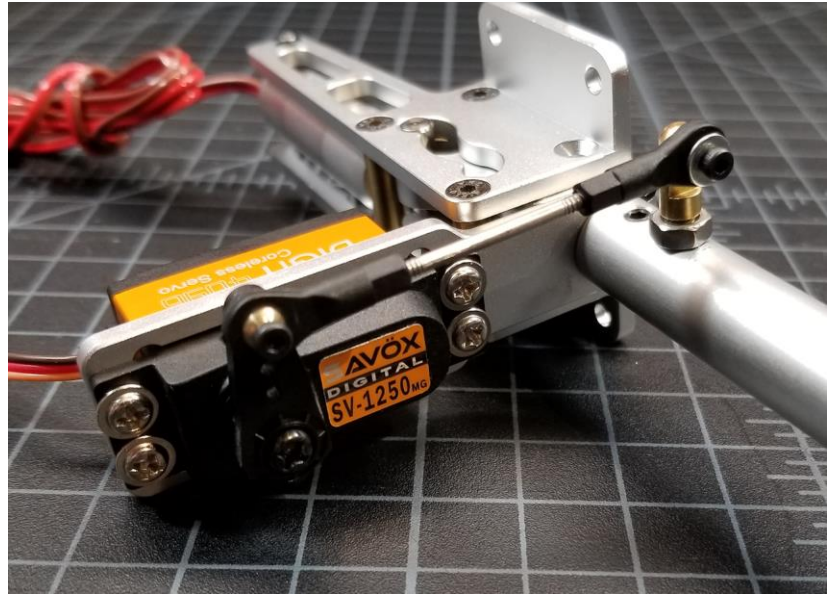
Install the nose gear steering horn and its locking nut as shown. Tighten the brass arm to the orientation pictured then tighten the locking nut against the gear shaft to hold in place.

Note: Always use blue thread-locker on all metal-to-metal connections.





Install the steering pushrod as shown. Ensure that you have the servo arm and steering arm at 90° to the servo and shaft respectively.



The completed steering assembly.



Nose Gear Installation:

Test fit the nose gear in the nose gear bay. Verify that there is clearance between all moving parts in the area such as the gear door servo, arm, pushrod, and gear door hinges. I did need to remove a small amount of material from one of the door hinges to avoid binding during gear operation.

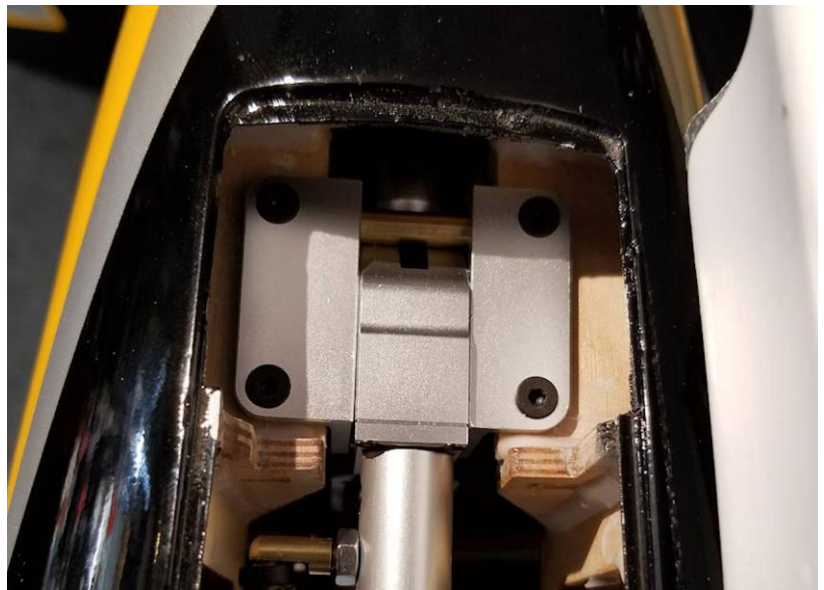




Once everything is aligned and fitting nicely, mark the holes for gear mounting and drill as shown.



The completed nose gear installation.



The completed nose gear installation.





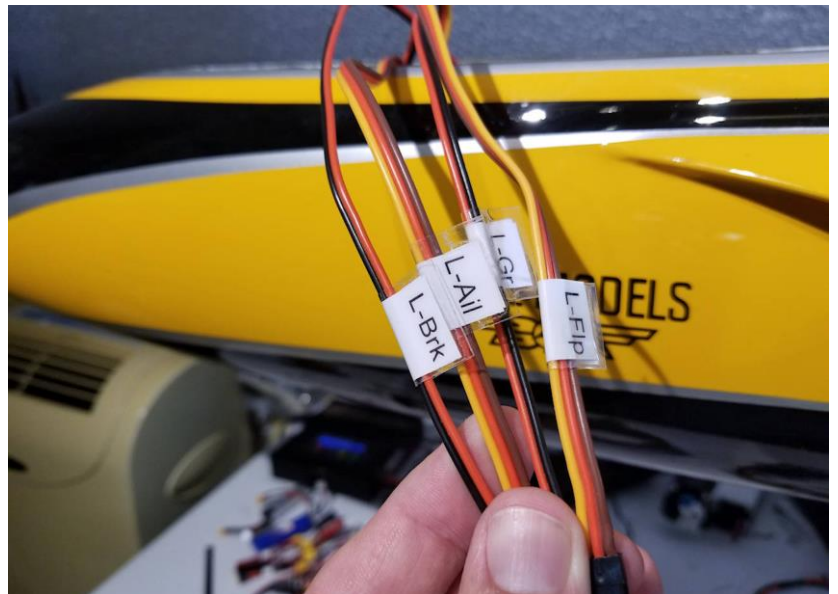
Wing Servo Set:

The [“One Klik” servo wire harness kit](#) available from Pacific RC Jets was used on this build.

The [T-1 Mini servo package](#) available from Pacific RC Jets was also used. Eight Savox SV1250MG servos are included in this set.



Label both ends of your servo leads!!! Trust me!

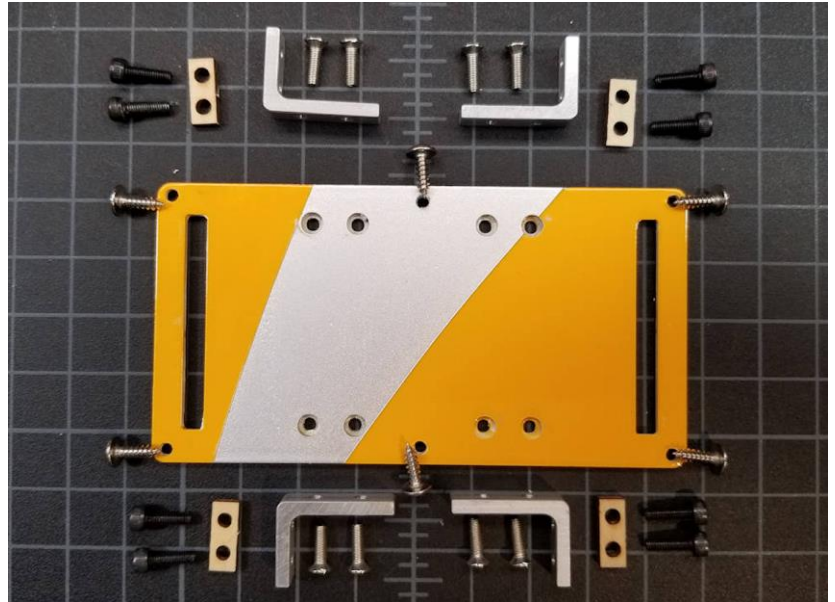


Remove the wing servo panel shown here. It is secured by six self-tapping screws.



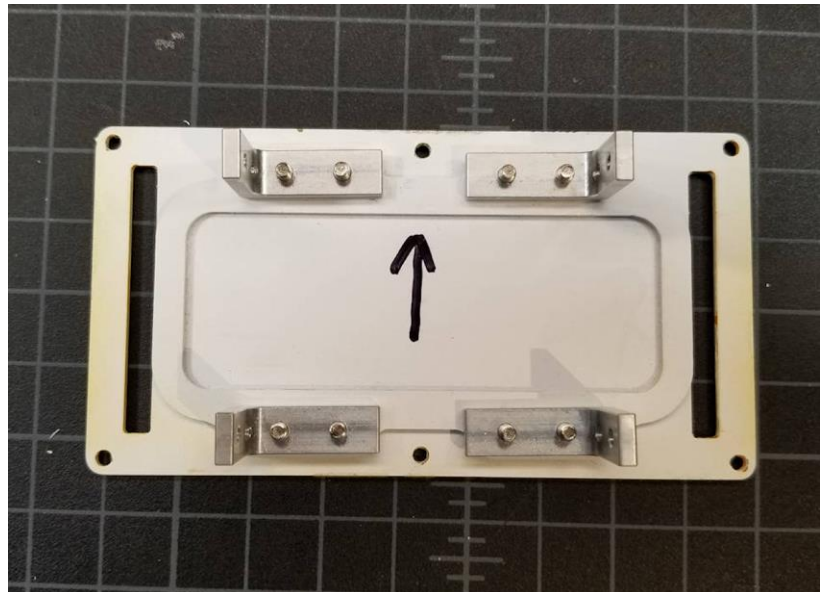


The wing servo hardware layout.



Begin by attaching the aluminum servo brackets to the wing panel. Mark the panel with an arrow indicating the aircraft forward direction. This helps you keep the mounting orientation straight.

Note: Always use blue thread-locker on all metal-to-metal connections.



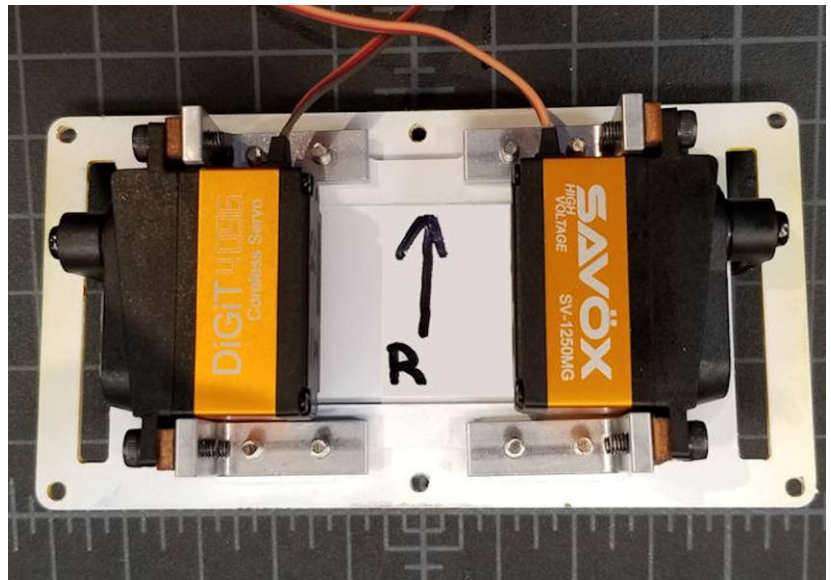
There are plenty of spacers included in the kit to achieve the proper spacing of the servo arm within the slot in the wing panel. You want to mount the servo so that the arm protrudes directly in the middle of the slot.

The servos should be mounted with the arms closest to the front of the aircraft.





The completed wing servo set.
(Inside View)

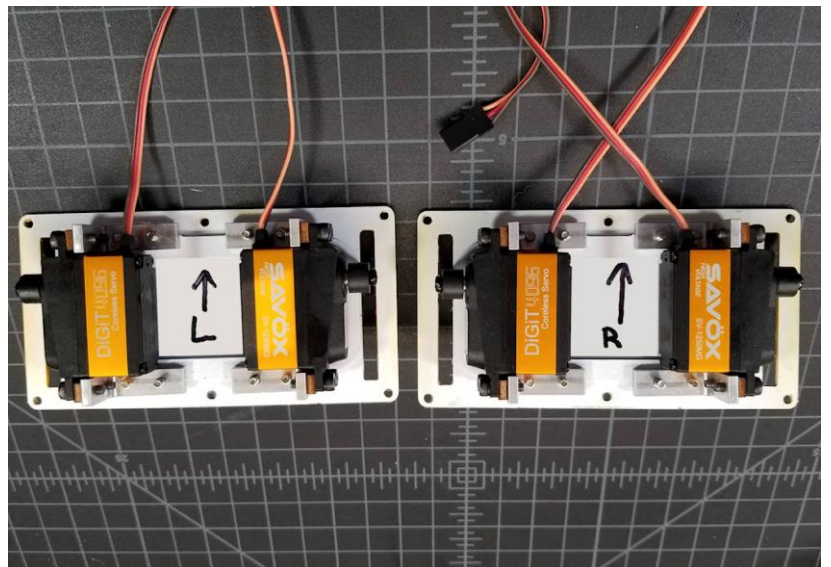


The completed wing servo set.
(Outside View)



Repeat the prior wing servo assembly steps for the other wing's servo assembly.

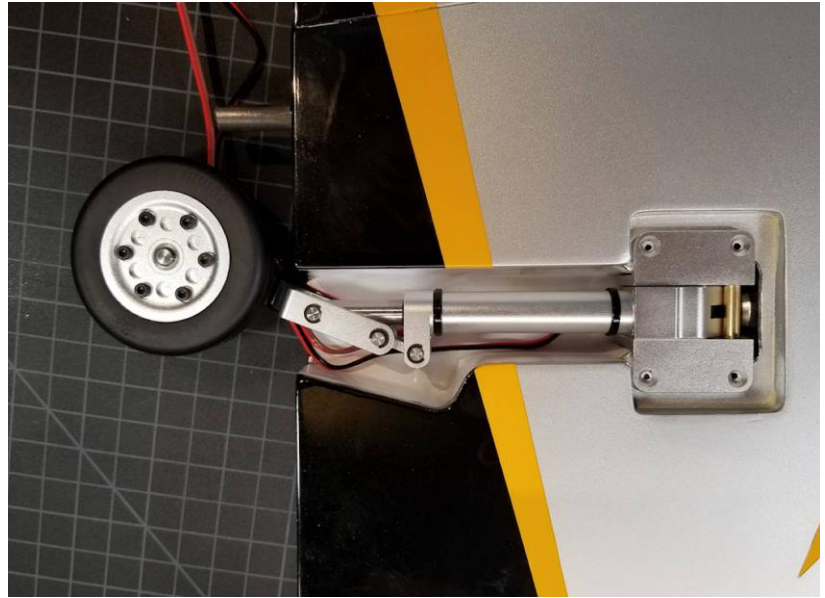
Once completed, set both of the servo sets aside.





Main Gear Installation:

As with the nose gear, test fit the main gear in both wings and mark the mounting holes for drilling.

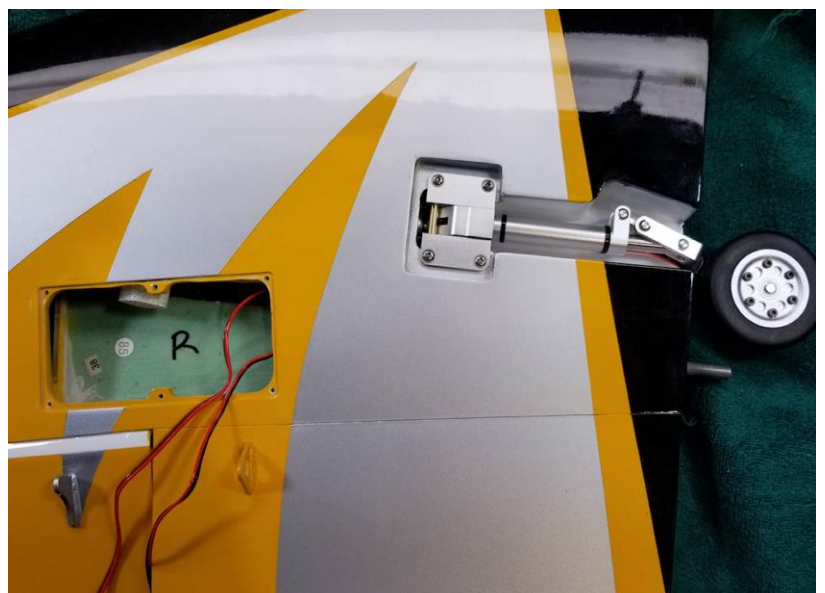


Drill the mounting holes as shown.

Note: The screws for the landing gear that were included in my kit were too large to fit the through the holes on the gear's mounting bracket. I chose to use some of my own slightly smaller screws rather than drill out the landing gear to accommodate the included screws.



Mount the main gear and feed the gear and brake wires to the wing servo access area as shown.

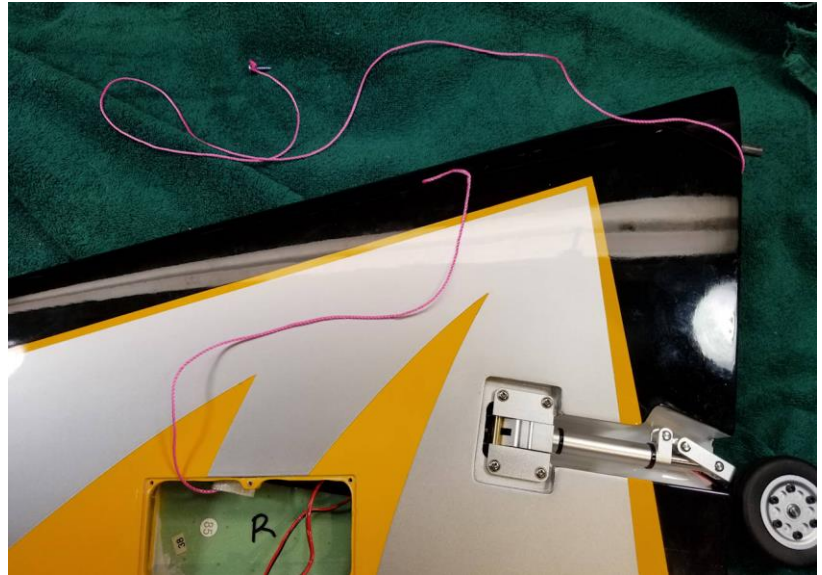




Wing Wiring:

You like a good challenge...right?

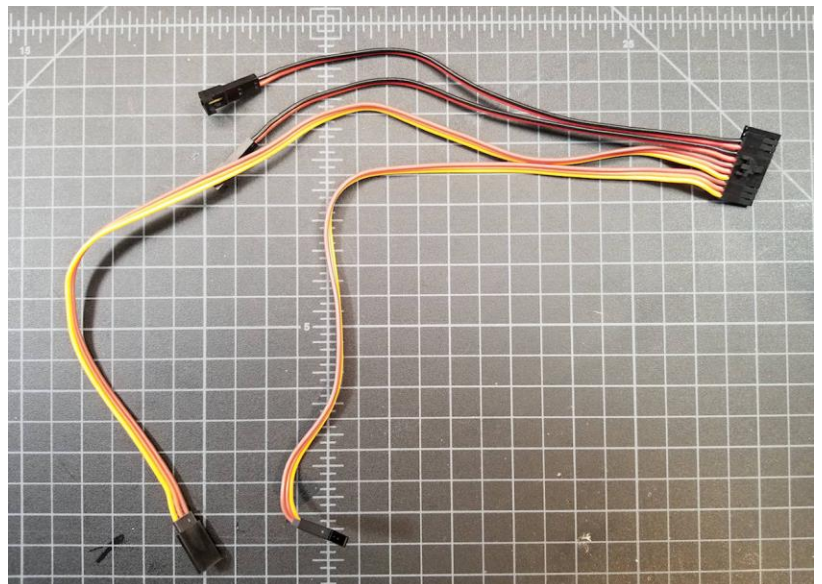
Get a good length of string. Nylon is recommended because of its strength. You want enough string so that you can pull back and forth between the wing root and the servo area. It's a good idea to tie a screw on one end to make it easier to drop the string through the wing.



From the servo area, drop the screw through the fiberglass tube toward the leading edge of the wing. Tilt the wing up to drop the screw with the string down to the root of the wing.

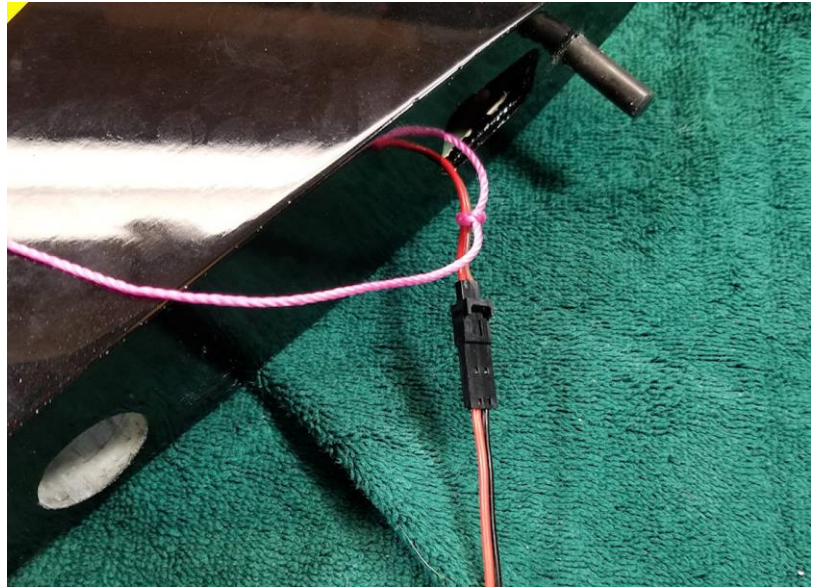


This is the wing section of the wiring harness. Due to the different lengths of servo, gear, and brake wires and their corresponding connections on the harness, you'll be pulling back and forth a few times.



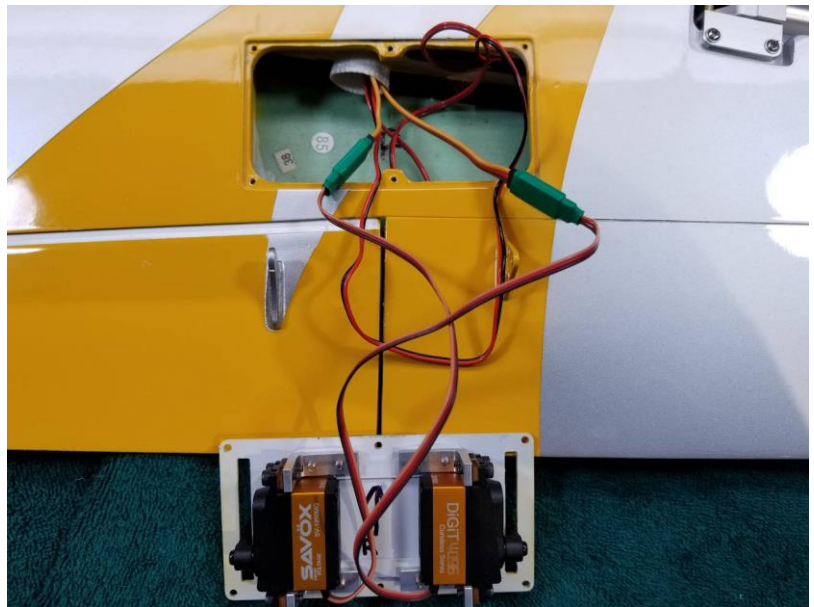


When fishing wires back and forth, make sure you leave enough string to be able to pull it back.



Find the appropriate wing servo assembly you set aside earlier and make the appropriate connections. Make sure you secure these connections using your preferred method such as a servo plug bracket or heat shrink tubing.

Take care when installing the servo assembly into the wing. Be sure no wires are touching any moving parts of the servo linkages.



When you're done, you should have the harness coming out of the wing as shown here. You should have enough slack to have the wing pulled away from the body to retract the gear during disassembly.





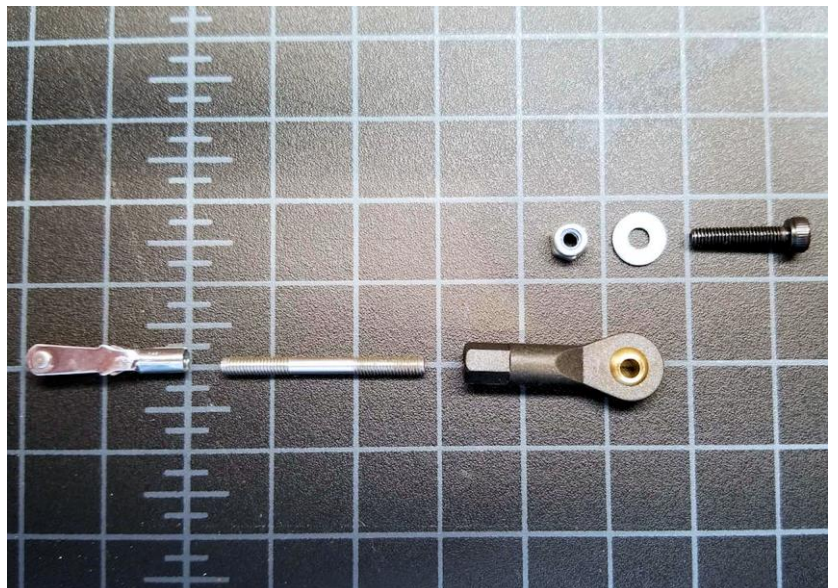
Secure the brake wire to the landing gear strut using your preferred method. Thin black zip ties were used here.



Now it's time to finish the wing servo linkages.



This is the layout of wing servo linkage hardware.



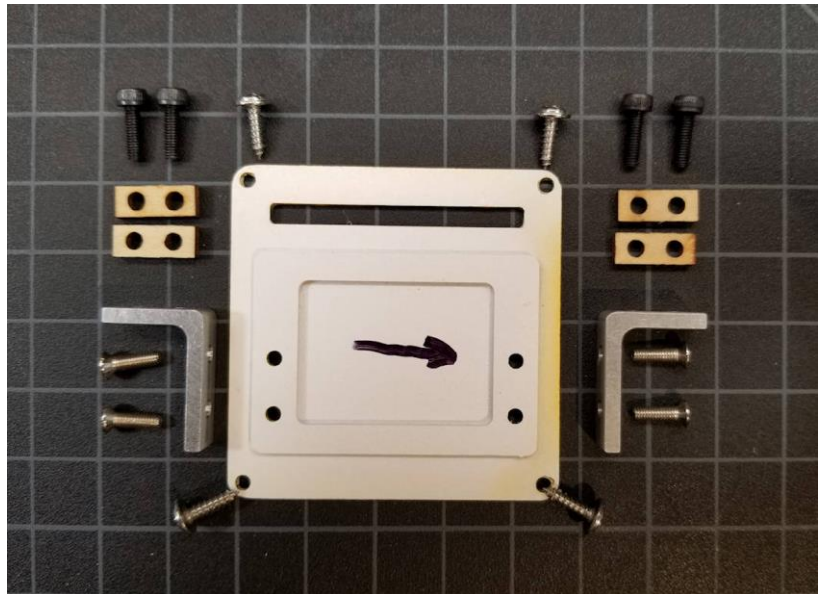


Install the assembled linkages as shown. Remember to use something to secure the clevis. Fuel tubing was used in this assembly.



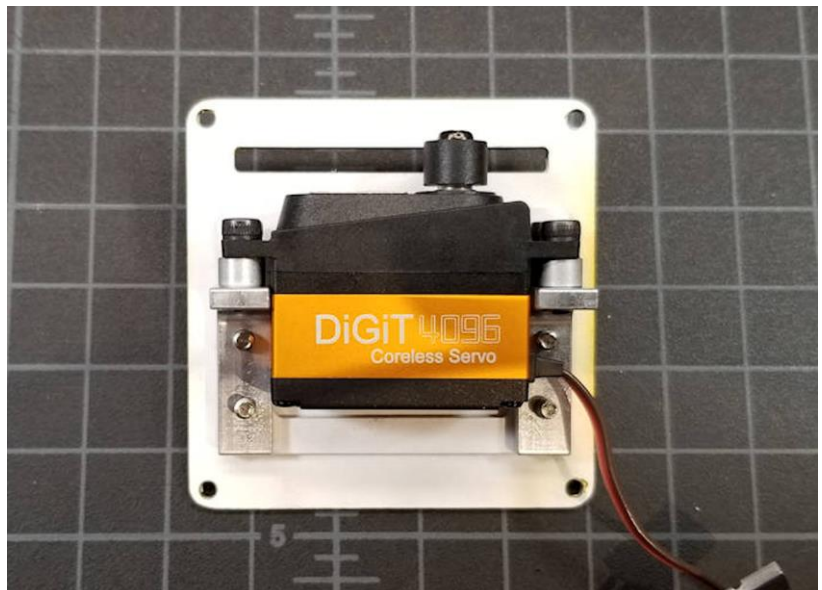
Rudder Servo Installation:

This is the rudder servo mount layout.



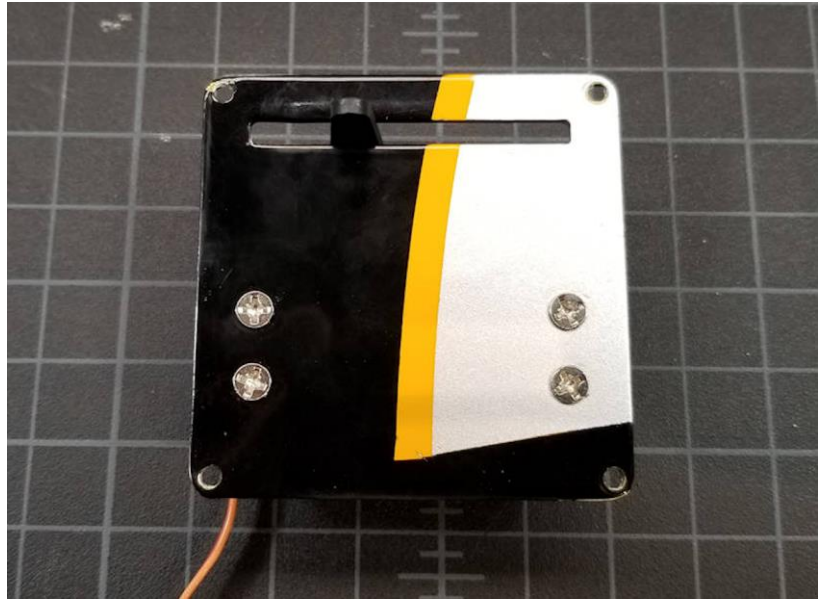
Assemble the rudder servo mounting as shown. I needed to use two of the wood spacers that came with the kit. I happen to have some aluminum spacers that fit perfectly. Ensure the servo arm protrudes in the center of the slot and there is no rubbing or binding with the arm.

Note: Always use blue thread-locker on all metal-to-metal connections.



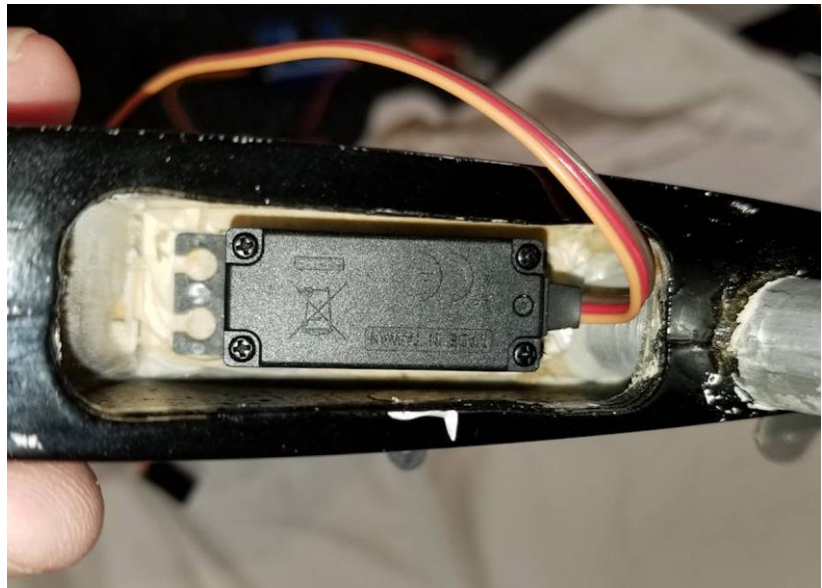


The finished rudder servo assembly.

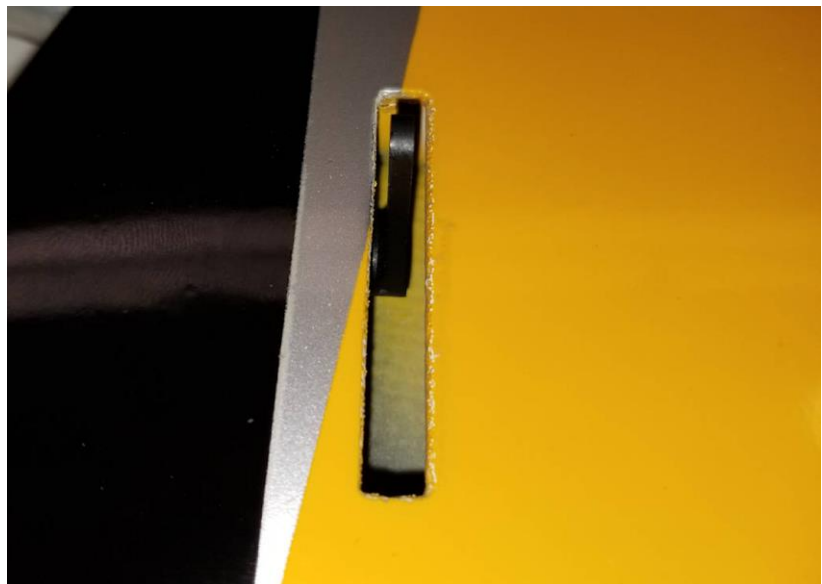


Elevator Servo Installation:

Check the fit of the elevator servo and its arm.



Using the Savox SV1250MG servos in this build, the servo did not sit deep-enough in its mount for the arm to be in the middle of the slot as shown.





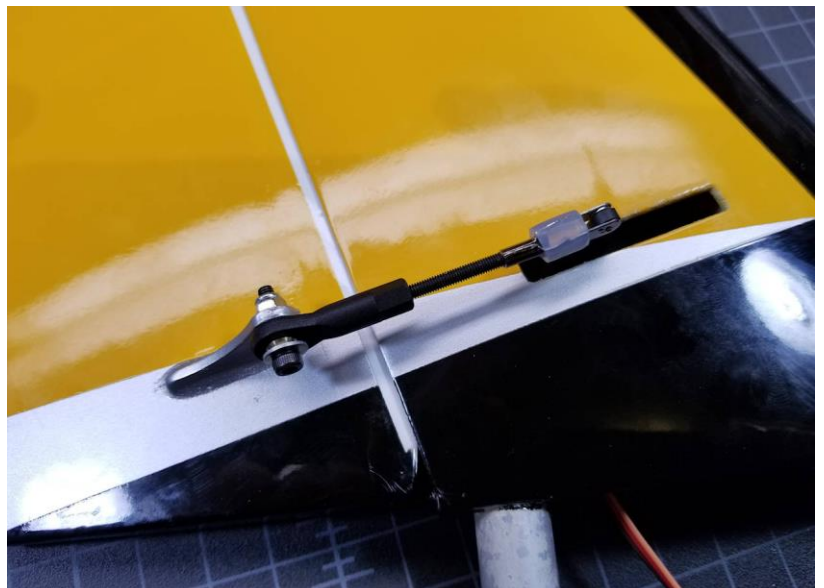
The servo mounting surface was routed using a Dremel with a routing bit. The plywood in this area was more than thick enough to allow this adjustment without impacting strength.



The completed elevator servo mounting.



Linkages for the elevators are the same as the ailerons. (Page 14)

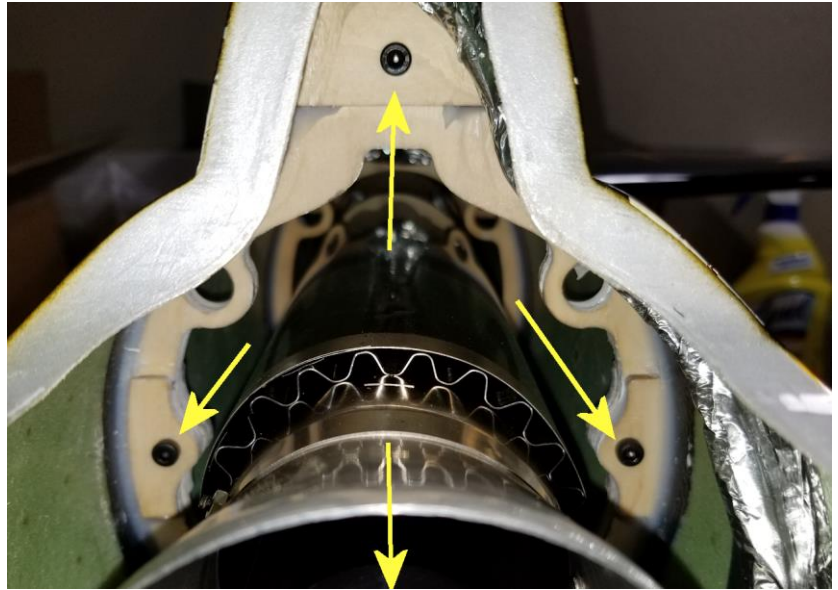




Install the tail section.

Set the exhaust pipe aside as you cannot reach the bolts with it installed. Attach the tail section to the main fuselage using four of the M4 bolts included in the kit. The bolts are installed at the 12, 3, 6, and 9 o'clock positions as shown here.

Note: Always use blue thread-locker on all metal-to-metal connections.



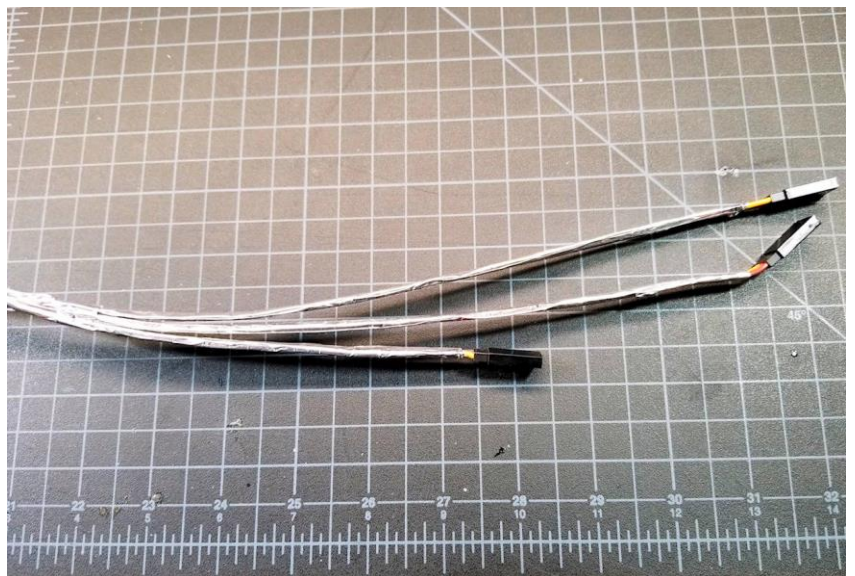
Ensure proper alignment of the tail section with the main fuse before the final tightening of the bolts.



Rear Servo Harness:

The elevator and rudder servo wires must be protected from heat as they run down the fuselage passed the turbine and exhaust pipe.

While aluminum duct tape was used here, there are a number of other solutions that you can use. Use whatever suites your requirements best.





Route the wires as needed through the fuselage. Do your best to stay away from any potential heat sources if possible.



The completed rudder and elevator wires.



Internal Wing Wiring Harness Installation:

You can begin either from the wing or the cockpit area. Feed the wiring harness through so there is enough slack at both ends to connect to the radio system and to connect to the wing harness. You will need enough slack on the wing side to allow you to pull the wing out in order to retract the gear for wing installation and removal.





The completed wing wiring harness. This is plenty of slack to allow the wing to be pulled off while still allowing for gear operation.



Rudder Servo Installation:

Make the rudder servo connection and install the servo assembly in the tail. Ensure that you use a servo clip or some heat shrink to secure the servo plug to the extension.

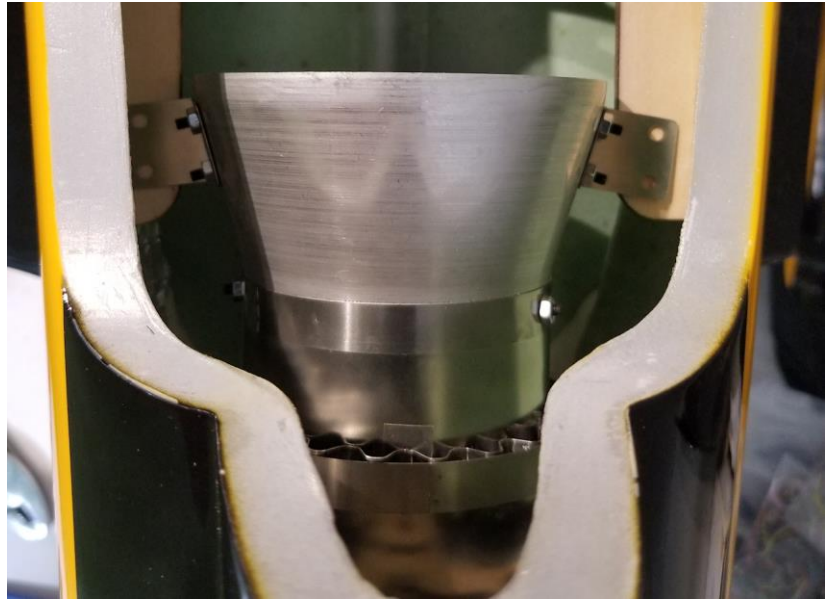


Install the rudder linkage as shown. The control surface horn aligns with the servo arm so a two-clevis setup was used. Use your preferred method to secure the clevis' such as fuel tubing as shown.

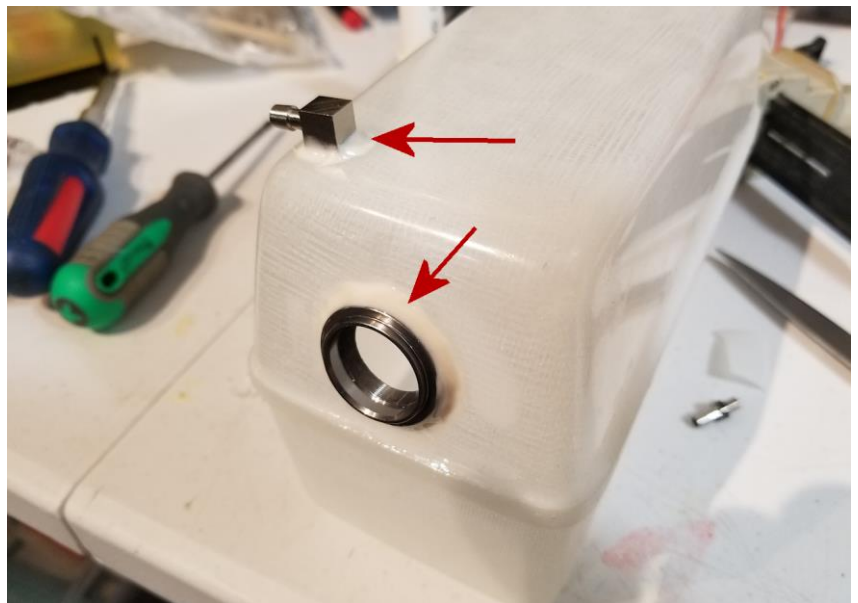


**Exhaust Pipe Installation:**

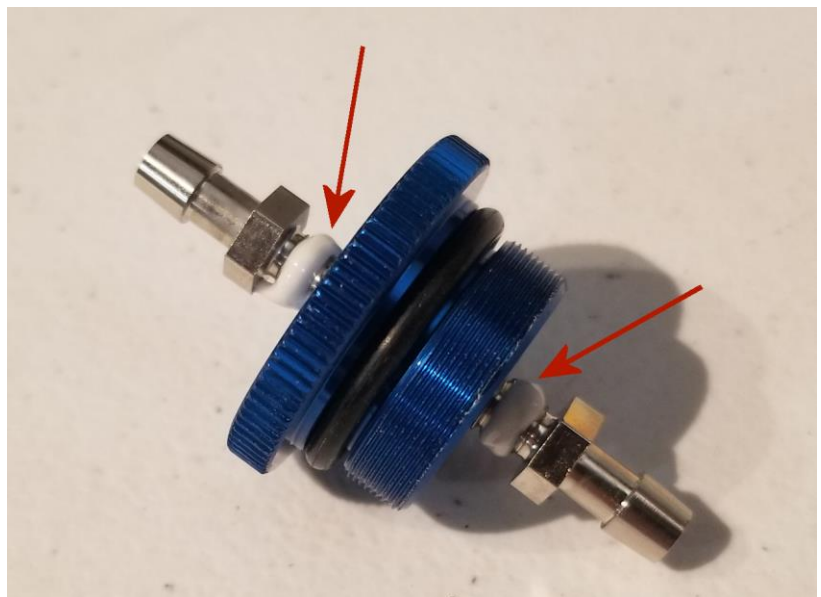
Feed the tail pipe in through the cockpit. While it is a snug fit, you shouldn't have to use any force to get the tube in place. Rest the pipe as shown, but do not fasten it down yet. We'll come back to this later.

**Fuel Tank Installation:**

Install the vent fitting and tank mouth fitting using 3M Hysol or another suitable marine epoxy. The vent location can vary based on your requirements. Here you can see the completed install after the epoxy has set.

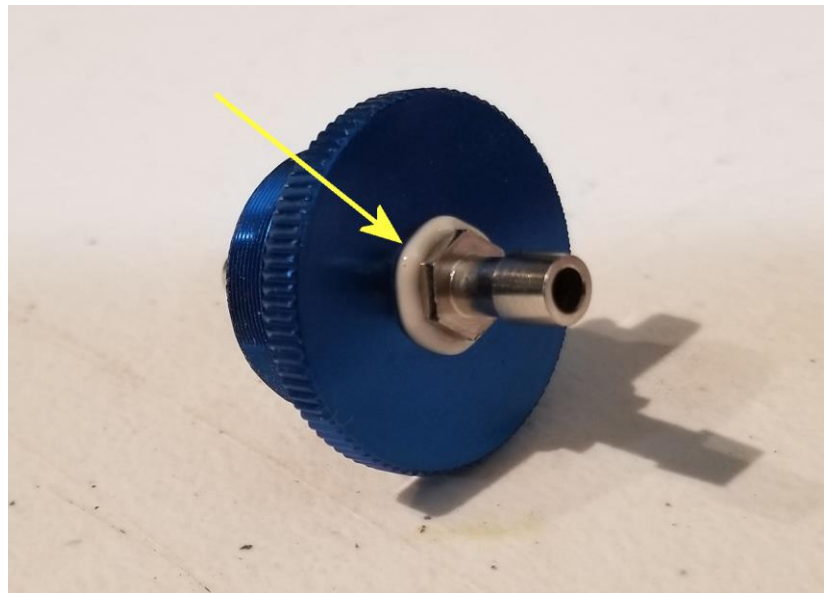


Install the fittings you need onto the fuel tank cap. Depending on your needs, you may want to use different fittings. You can use Teflon plumbers tape or a small amount of Hysol epoxy on the fitting threads to seal and secure them.





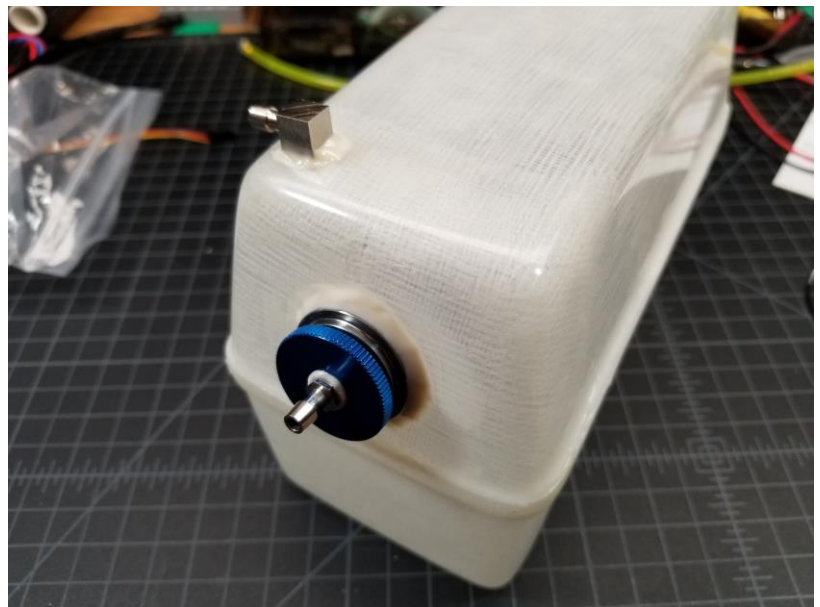
The completed fuel cap after the epoxy has set.



Assemble a tank clunk line using your preferred materials and methods.



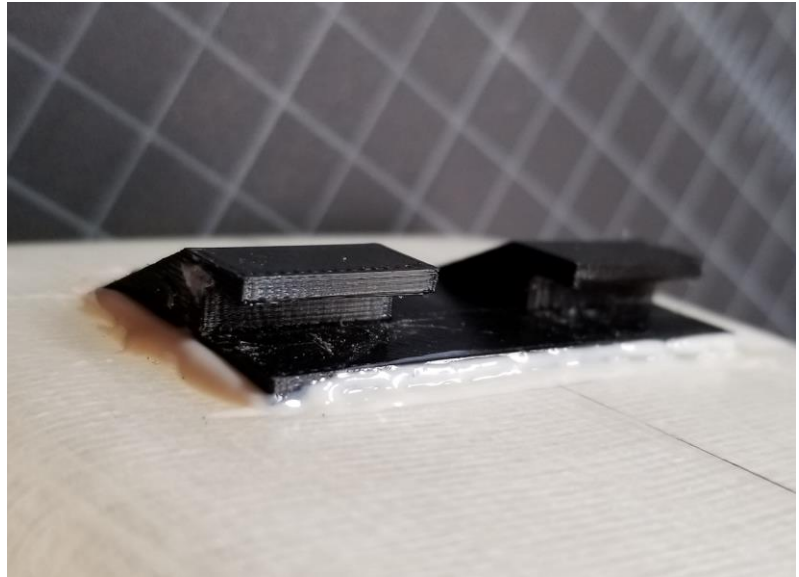
The completed fuel tank with cap and clunk line installed.





You may use whatever means you like to mount the tank in the place you need it.

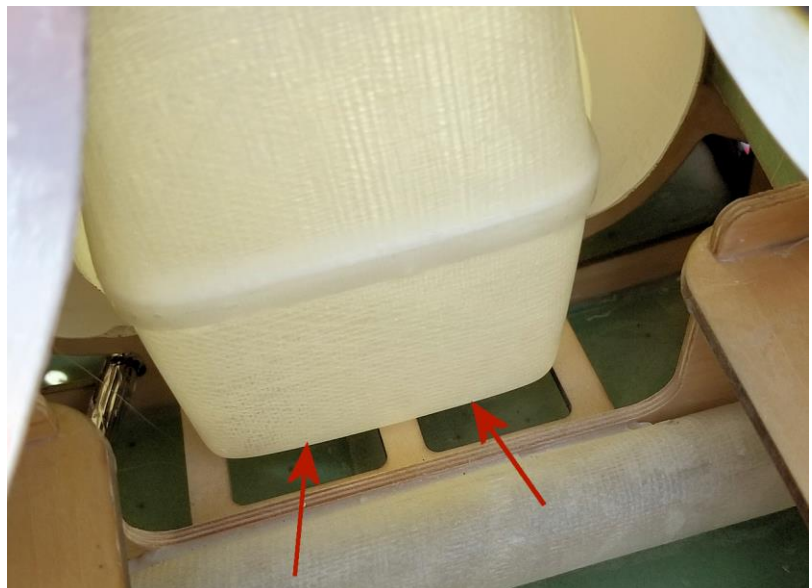
In this example I designed and printed brackets that allow for easy installation and removal using only two screws. This bracket goes on the bottom rear of the tank and slides under the plywood on the tank deck to secure the rear of the tank. These brackets were epoxied in place with Hysol.



This is the bracket for the bottom front of the tank. Two M3 self-tapping screws are used to hold the tank in place. In addition to securing the front of the tank, this bracket holds the tank forward so the bottom rear bracket stays firmly seated under the plywood deck. These parts are available for downloading and printing here: <https://www.thingiverse.com/thing:3124330>

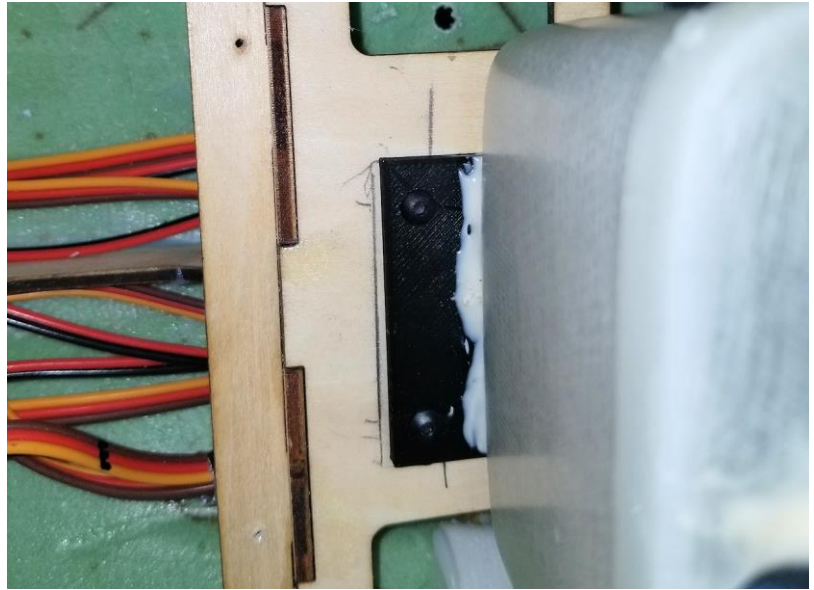


The bottom rear bracket fits down inside these two holes in the plywood deck. The tank then slides forward to engage the clips under the plywood.





Tank install completed. This is the front bracket on the tank. Two M3 self-tapping screws were used to secure it to the deck.



Turbine Installation:

The exhaust pipe should sit flush with the rear of the aircraft as shown here.

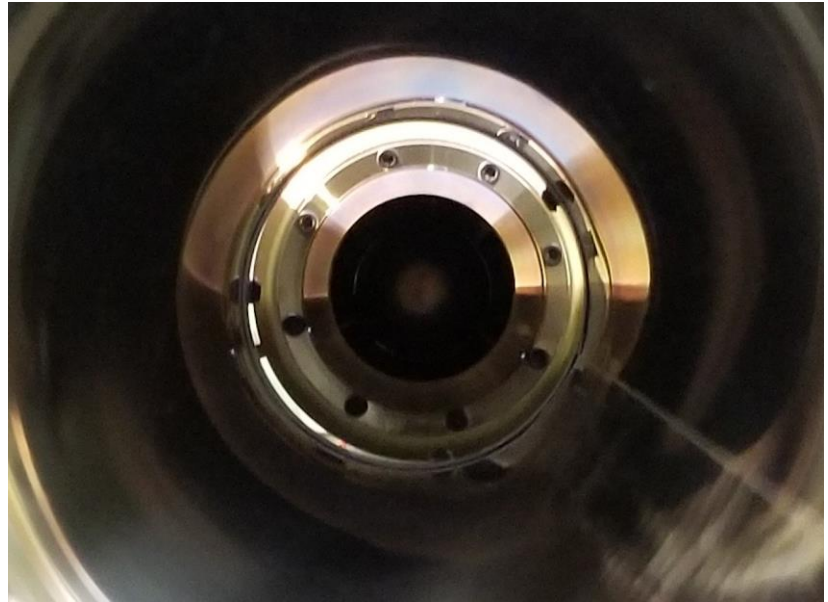


Place the turbine on the plywood mounts as shown. Your arrangement may differ slightly depending on the turbine you're using. The turbine exhaust should sit within the exhaust pipe bell and be within 25mm of the beginning of the exhaust pipe as illustrated here.





Check both horizontal and vertical alignment of the turbine and exhaust pipe. When looking in from the rear of the exhaust pipe, you should see that the turbine is centered.

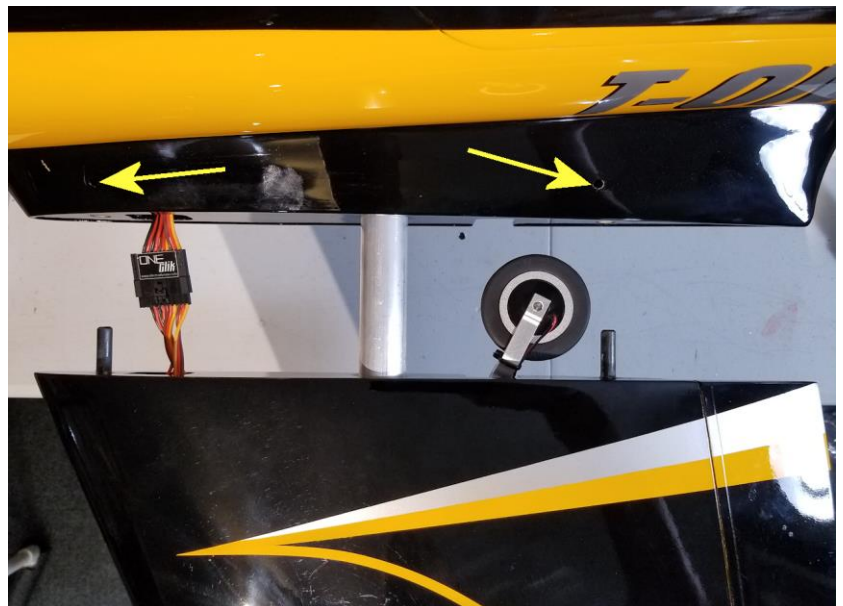


Once you are confident with the placement and alignment of the turbine and pipe. Mark the holes for mounting and predrill. Use self-tapping or wood screws to complete the installation.



Wing Installation:

Insert the aluminum wing tube. Slide the wing onto the tube close enough to connect the servo wiring harness as shown. Once the wiring is connected, the main gear will need to be lowered so the wing can slide on all the way. There are two small holes in the wing root that lead to clamp bolts that will secure the wing in place.





When the wing has been slid all the way to the root, check for any binding of the flaps against the fuselage and adjust as needed. Tighten the wing clamp bolts with a 3mm driver as shown.

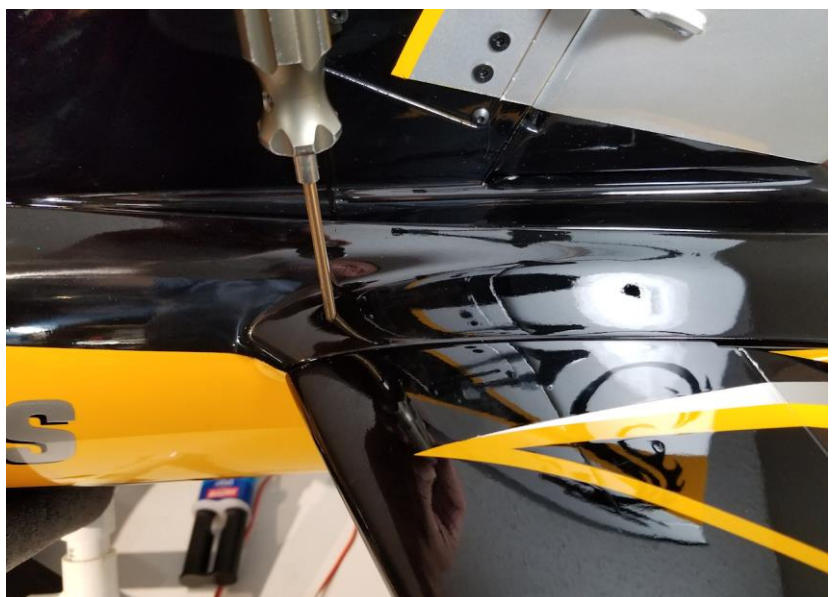


Horizontal Stab Installation:

Very similar to the installation of the wing. Connect the elevator servo to the harness and secure the connection. Insert the horizontal stab into position and tighten the internal clamps using a 3mm driver.



Ensure there is no binding of the moving control surface against the airframe.





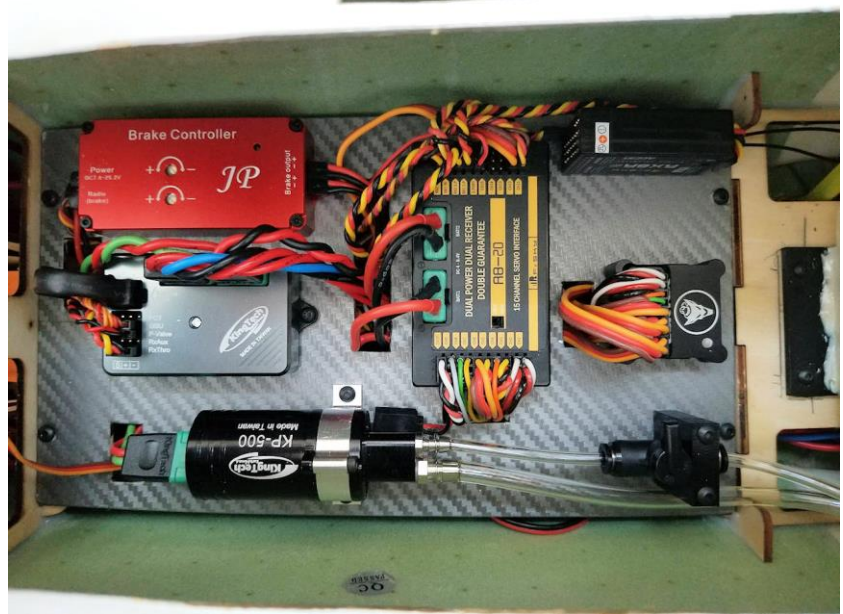
Electrical Systems

Installation:

Now that you've installed everything that can't be moved from its location, it's time to layout and install everything that CAN move to aid with keeping the CG in place. The recommended CG is 190-210mm from the leading edge of the wing root. [Use of a CG stand](#) can greatly improve your accuracy and ease for the rest of the build.



This section of the build will vary drastically from aircraft to aircraft depending on the equipment being used. Use whatever layout suites your needs best. In the layout shown here, the main gear controller is under the deck and the radio and turbine batteries are to the left on the deck above the nose gear. The fuel ball valve holder is my own design and can be downloaded and printed from [Thingiverse](#).



Fuel System Installation:

As with the electrical systems, your install will likely be quite different from the one shown here. Tygon was used for vent, fill, and clunk lines and Polyurethane for everything else. I did not plan on using a smoke system for this build, so that is not covered by this guide. The 6mm fuel line clips are also my design can be downloaded and printed from [Thingiverse](#).

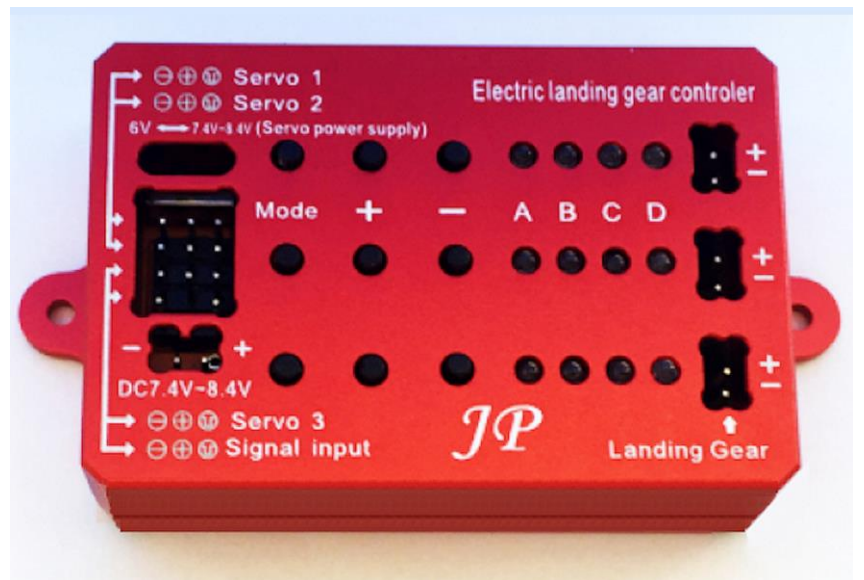




Landing Gear Configuration:

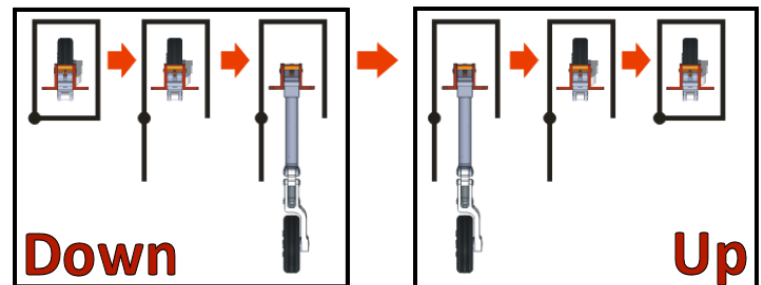
Ports/Buttons:

- Servo power supply switch:
Select the input voltage range for the gear controller.
- Servo 1 -> Gear door 1 (Nose)
- Servo 2 -> Gear door 2 (Main)
- Servo 3 -> Gear door 3 (Main)
- Signal Input -> gear lead from radio.
- JST power port -> use the included JST pigtail to connect to your power source.
- Mode and + and – buttons -> used for device programming.
- Landing gear ports -> where the two-wire leads to the landing gear are connected.

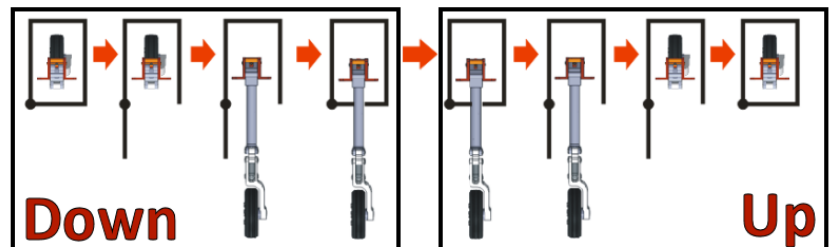


Each landing gear unit can operate in one of two modes as show here. For this build, we are only worried about configuring Mode 1 for the nose gear door sequencing. We will use the “Servo 1” port for our nose gear door servo.

Mode 1



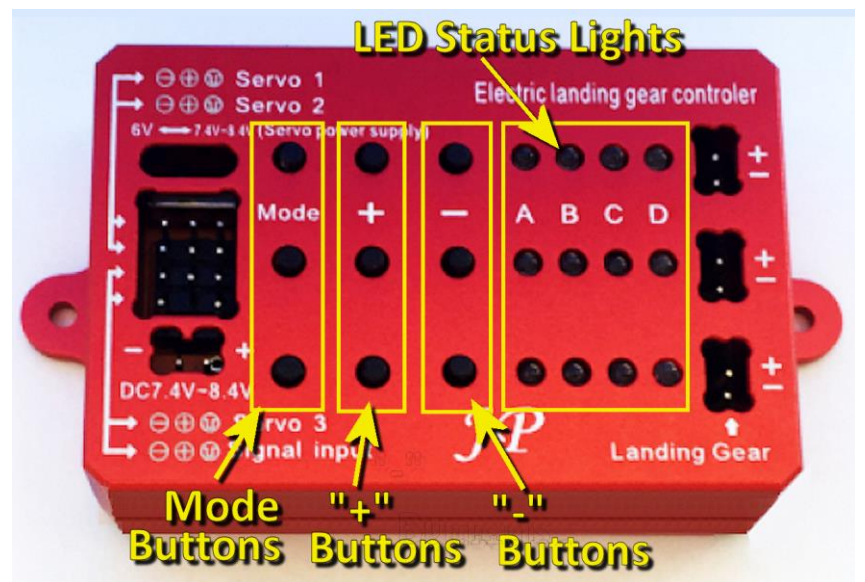
Mode 2





Each of the three gear units is independently programmable.

- Long press the mode button to enter programming mode.
- Short press the mode button to cycle through the programming options below.
- When the A or B light is blinking, you can press the + or – button to change the servo direction. This setting is used if the door is open when it should be closed or vice versa.
- When the A and B lights are alternating, pressing the + or – will increase or decrease the servo throw on one end of its movement. This setting is so that you can adjust the door to open or close all of the way without excessive binding at the extents of motion.
- When the C and D lights are alternating, pressing the + or – will increase or decrease the servo throw on one end of its movement. This setting is so that you can adjust the door to open or close all of the way without excessive binding at the extents of motion.
- The C light blinking alone indicates Mode 1 operation for that gear unit.
- The D light blinking alone indicates Mode 2 operation for that gear unit.
- When you have completed making your programming adjustments, long press the mode button to save your changes and exit programming mode.





Brake Configuration:

Connect the two-wire brake leads from the main gear to the “Brake output” port on the side of the brake controller. Connect the radio lead from the brake controller to the appropriate channel that you have configured for brake operation. Lastly, connect the power lead to your power source (7.4V-25.2V). Turn the strength screw adjustments to their weakest setting (completely clockwise). You will need to execute some taxi and brake tests at your flying location to tune the brake strength and radio settings that will work best for you. Ensure that you have your brakes and landing gear tuned and working properly prior to any real flight operations.





Congratulations! You have completed the assembly and configuration of your T-1 Mini turbine sport jet!

Make sure you have another set of eyes give your aircraft a good looking-over. Quite often, a problem can be spotted by a fresh, experienced pair of eyes. It's better to find and fix rather than fly and fail.



FLY SAFE AND HAVE FUN!!!



Document:

Version 1.0 – September 2018 – Initial composition and release.